DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 218

[190731–0008]

RIN 0648–BI42

Takes of Marine Mammals Incidental to Specified Activities: Taking Marine Mammals Incidental to U.S. Navy Surveillance Towed Array Sensor System Low Frequency Active Sonar Training and Testing in the Central and Western North Pacific Ocean and Eastern Indian Ocean

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

ACTION: Final rule; notification of issuance of Letter of Authorization.

SUMMARY: NMFS, upon request from the U.S. Navy (Navy) issues these regulations pursuant to the Marine Mammal Protection Act (MMPA) to govern the taking of marine mammals incidental to the use of Surveillance Towed Array Sensor System Low Frequency Active (SURTASS LFA) sonar systems onboard U.S. Navy surveillance ships for training and testing activities conducted under the authority of the Secretary of the Navy in the western and central North Pacific Ocean and eastern Indian Ocean (SURTASS LFA sonar activities) beginning August 2019. These regulations, which allow for the issuance of a Letter of Authorization (LOA) for the incidental take of marine mammals during the described activities and timeframes, prescribe the permissible methods of taking and other means of effecting the least practicable adverse impact on marine mammal species or stocks and their habitat, and establish requirements pertaining to the monitoring and reporting of such taking.

DATES: Effective on August 12, 2019, through August 11, 2026.

ADDRESSES: A copy of the Navy's application and supporting documents, as well as a list of the references cited in this document, may be obtained online at: *www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-military-readiness-activities.* In case of problems accessing these documents, please call the contact listed below (see **FOR FURTHER INFORMATION CONTACT**).

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

SUPPLEMENTARY INFORMATION:

Purpose for Regulatory Action

These regulations, issued under the authority of the MMPA (16 U.S.C. 1361 *et seq.*), establish a framework for authorizing the take of marine mammals incidental to the Navy's use of SURTASS LFA sonar systems onboard U.S. Navy surveillance ships for training and testing activities (categorized as military readiness activities) conducted under the authority of the Secretary of the Navy in the western and central North Pacific Ocean and eastern Indian Ocean.

NMFS received an application from the Navy requesting regulations and an associated letter of authorization (LOA) to take individuals of multiple species and stocks of marine mammals (''Navy's rulemaking/LOA application'' or ''Navy's application'') by Level B harassment incidental to SURTASS LFA sonar activities. Please see ''Background'' below for definitions of harassment. This final rule establishes 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 Navy's specified activities.

Legal Authority for the Final Action

Section 101(a)(5)(A) of the MMPA (16 U.S.C. 1371(a)(5)(A)) generally 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 and other means of effecting the least practicable adverse impact (LPAI) on the affected species or stocks and their habitat, 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 final rule and any associated LOAs. As described in the *Background* section, the MMPA has been amended in a number of ways when the specified activity is a military readiness activity, including most recently in 2018 to extend the maximum authorization period under section 101(a)(5)(A) from five to seven years for Department of Defense military readiness activities. As directed by this legal authority, this final rule contains mitigation, monitoring, and reporting requirements.

Background

The MMPA prohibits the ''take'' of marine mammals, with certain exceptions. Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq.*) direct 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 and either regulations are issued or, if the taking is limited to harassment, an incidental harassment authorization may be issued following notice and opportunity for public comment.

Authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s) and will not have an unmitigable adverse impact on the availability of the species or stock(s) for taking for subsistence uses (where relevant). Further, NMFS must prescribe the permissible methods of taking and other means of effecting the least practicable adverse impact on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stocks for taking for certain subsistence uses (referred to in shorthand as ''mitigation''), and requirements pertaining to the monitoring and reporting of such takings.

The 2004 NDAA (Pub. L. 108–136) removed the ''small numbers'' and ''specified geographical region'' limitations indicated above and amended the definition of ''harassment'' as it applies to a ''military readiness activity'' to read as follows (Section 3(18)(B) of the MMPA): (i) Any act that injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild (Level A Harassment); or (ii) Any act that disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns, including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering, to a point where such behavioral patterns are abandoned or significantly altered (Level B Harassment). In addition, the FY 2004 NDAA amended the MMPA as it relates to military readiness activities and the incidental take authorization (ITA) process such that ''least practicable adverse impact'' shall include consideration of personnel safety, practicality of implementation,

and impact on the effectiveness of the military readiness activity. As mentioned above, the NDAA for FY 2019 amended the MMPA to extend the period of permitted incidental takings of marine mammals covered by section 101(a)(5)(A) in the course of specified military readiness activities from five to seven years.

The authorization of incidental taking under section 101(a)(5)(A) requires promulgation of activity-specific regulations following notice and opportunity for public comment. Under NMFS' implementing regulations for section 101(a)(5)(A), a Letter of Authorization (LOA) also is required to conduct activities pursuant to any activity-specific regulations (50 CFR 216.106).

Summary of Request

On June 4, 2018, NMFS received a request from the Navy for authorization to take, by Level B harassment, 46 species of marine mammals incidental to the use of SURTASS LFA sonar onboard U.S. Navy surveillance ships for training and testing activities (categorized as military readiness activities) conducted under the authority of the Secretary of the Navy in the western and central North Pacific Ocean and eastern Indian Ocean beginning in August 2019 and extending to August 2026. On July 13, 2018, NMFS published a notice of receipt (NOR) of the Navy's application in the **Federal Register** (83 FR 32615), and requested comments and information related to the Navy's request. The review and comment period for the NOR ended on August 13, 2018. The Navy submitted a revised application on November 13, 2018, that included a minor change to the mitigation measures provided in the June 2018 application. On March 1, 2019, NMFS published a notice of proposed rulemaking in the **Federal Register** (84 FR 7186), and requested comments and information related to the Navy's request. The review and comment period for the proposed rule ended on April 1, 2019. One comment received during the NOR comment period was addressed in the Proposed Rule, and comments received during the proposed rulemaking comment period are addressed in this final rule. See further details addressing comments received in the *Comments and Responses* section.

The Navy states, and NMFS concurs, that these SURTASS LFA sonar activities, classified as military readiness activities, may incidentally take marine mammals by exposing them to SURTASS LFA sonar at levels that constitute Level B harassment as defined above. The Navy requests authorization to take, by Level B Harassment, individuals from 139 stocks of 46 species of marine mammals (10 species of mysticete (baleen) whales, 31 species of odontocete (toothed) whales, and 5 species of pinnipeds (seals and sea lions)). This rule also covers the authorization of take of animals from additional associated stocks of marine mammals not listed here, should one or more of the stocks identified in this rule be formally separated into multiple stocks, provided NMFS is able to confirm the necessary findings for the newly identified stocks. As discussed later in this document, incidental takes due to SURTASS LFA sonar will be limited to Level B harassment. No takes by Level A harassment are authorized, as Level A harassment is considered unlikely and will be avoided through the implementation of the Navy's mitigation measures, as discussed below.

In previous SURTASS LFA sonar rulemakings, NMFS authorized some Level A harassment takes in an abundance of caution even though Level A harassment takes were not anticipated. However, to the knowledge of the Navy and NMFS, no Level A harassment takes have resulted over the 17-year history of SURTASS LFA sonar activities. Additionally, the exposure criteria and thresholds for assessing Level A harassment have been modified since prior rules based on the best available science. Under these new metrics, the zone for potential injury is substantially reduced. Therefore, due to the small injury zones and the fact that mitigation measures would ensure that marine mammals would not be exposed to received levels associated with injury, the Navy has not requested authorization for Level A harassment takes, and NMFS is not authorizing any takes by Level A harassment.

NMFS published the first incidental take rule for SURTASS LFA sonar, effective from August 2002 through August 2007, on July 16, 2002 (67 FR 46712); the second rule, effective from August 2007 through August 2012, on August 21, 2007 (72 FR 46846); and the third rule, effective from August 2012 through August 2017, on August 20, 2012 (77 FR 50290).

In 2016, the Navy submitted an application for a fourth incidental take regulation under the MMPA (DoN, 2016) for the taking of marine mammals by harassment incidental to the deployment of up to four SURTASS LFA sonar systems from August 15, 2017, through August 14, 2022. NMFS published a proposed rule on April 27, 2017 (82 FR 19460). On August 10, 2017, the Deputy Secretary of Defense, after conferring with the Secretary of Commerce, determined that it was necessary for the national defense to exempt all military readiness activities that use SURTASS LFA sonar from compliance with the requirements of the MMPA for a period of up to two years beginning August 13, 2017, through August 12, 2019, or until such time when NMFS issues regulations and an LOA under MMPA section 101(a)(5)(A) for military readiness activities associated with the use of SURTASS LFA sonar, whichever is earlier. During the period of the National Defense Exemption (NDE) (available at *http://www.surtass-lfa-eis.com/wp-content/uploads/2018/01/SURTASS_LFA_NDE_10Aug17.pdf*), all military readiness activities that involve the use of SURTASS LFA sonar were required to comply with all mitigation, monitoring, and reporting measures set forth in the NDE for SURTASS LFA sonar, which were based on the measures included in NMFS' prior (2012) final rule (77 FR 50290; August 20, 2012) and 2017 proposed rule (82 FR 19460; April 27, 2017). As a result of the NDE, NMFS did not finalize its April 2017 proposed rule.

The NDE expires August 12, 2019. For this rulemaking, the Navy will continue to use SURTASS LFA sonar systems onboard United States Naval Ship (USNS) surveillance ships for training and testing activities conducted under the authority of the Secretary of the Navy within the western and central North Pacific Ocean and eastern Indian Ocean. The operating features of the LFA sonar will remain, and have remained the same since the 2001 SURTASS LFA FOEIS/EIS. The typical duty cycle of LFA sonar, based on historical SURTASS LFA sonar use, is 7.5 to 10 percent (DoN, 2007). The maximum duty cycle remains the same at 20 percent.

For this rulemaking, the Navy scoped the geographic extent of the area where the specified activity will occur (Study Area) to better reflect the areas where the Navy anticipates conducting SURTASS LFA sonar training and testing activities. Whereas the previous authorizations included certain routine military operations among the scope of actions analyzed, the Navy also has narrowed the scope of activities in the current request for authorization to training and testing activities only, due to various statutory and practical considerations, as described in Chapter 1 of the 2019 SURTASS LFA FSEIS/SOEIS, and discussed further below.

The Navy will transmit a total of up to 496 LFA sonar transmission hours

per year for its specified activity, as described below (see *Description of the Specified Activities* section), pooled across all SURTASS LFA sonar-equipped vessels in the first four years of the authorization, with an increase in usage to a total of up to 592 LFA transmission hours in years five through seven.

Changes From the Proposed to the Final Rule

Since the proposed rule, based on public comment and additional analysis, NMFS and the Navy have agreed to additional mitigation and monitoring measures that are expected to reduce the likelihood and/or severity of adverse impacts on marine mammal species/stocks and their habitat and are practicable for implementation.

- In the proposed rule we presented 25 marine areas for further consideration as marine mammal Offshore Biologically Important Areas (OBIAs) for SURTASS LFA sonar. After considering public comments and conducting additional analyses, 33 marine areas were assessed as potential OBIAs. Of these 33 marine areas, 17 were determined to qualify as OBIAs. All 17 of the areas were found to be practicable and were designated as 14 OBIAs (some OBIAs encompass several marine areas). All four of the OBIAs previously designated in the SURTASS LFA sonar Study Area have been expanded spatially.
- The Navy will use no more than 25 percent of the authorized amount (transmission hours) of SURTASS LFA sonar for training and testing within 10 nautical miles (nmi) (18.5 kilometers (km)) of any single OBIA during any year (no more than 124 hours in years 1–4 and 148 hours in years 5–7) unless the following conditions are met: Should national security present a requirement to conduct more than 25 percent of authorized hours of SURTASS LFA sonar within 10 nmi (18.5 km) of any single OBIA during any year, naval units will obtain permission from the appropriate designated Command authority prior to commencement of the activity. The Navy will provide NMFS with notification as soon as is practicable and include the information (*e.g.,* sonar hours) in its annual activity reports submitted to NMFS.
- The Navy has agreed to evaluate the feasibility and appropriate methods to collect new data to supplement the data available on behavioral responses of marine mammals to SURTASS LFA sonar using newer methods and technologies. These types of scientific inquiries fit within the scope the Navy's Living Marine Resources (LMR) program. The LMR program weighs the various Navy research needs against each other through a needs and solicitation process. The Navy has submitted a needs statement to the LMR advisory committee to research future data collection that would supplement understanding of how SURTASS LFA sonar may affect marine resources, including mysticetes and beaked whales.

Description of the Specified Activities

Overview

The Navy's primary mission is to organize, train, and equip combat-ready naval forces capable of accomplishing American strategic objectives, deterring maritime aggression, and assuring freedom of navigation in ocean areas. This mission is mandated by Federal law in Section 8062 of Title 10 of the United States Code, which directs the Secretary of the Navy to ensure the readiness of the U.S. naval forces.

The Secretary of the Navy and the Chief of Navy Operations (CNO) have established that anti-submarine warfare (ASW) is a critical capability for achieving the Navy's mission, and it requires unfettered access to both the high seas and littoral environments to be prepared for all potential threats by maintaining ASW core competency. The Navy is challenged by the increased difficulty in locating undersea threats solely by using passive acoustic technologies due to the advancement and use of quieting technologies in diesel-electric and nuclear submarines. At the same time, as the distance at which submarine threats can be detected decreases due to quieting technologies, improvements in torpedo and missile design have extended the effective range of these weapons.

One of the ways the Navy has addressed the changing requirements for ASW readiness was to develop SURTASS LFA sonar, which is able to reliably detect quieter and harder-to-find submarines at long range before these vessels can get within their effective weapons range to launch against their targets. SURTASS LFA sonar systems have a passive component (SURTASS), which is a towed line array of hydrophones used to detect sound emitted or reflected from submerged targets, and an active component (LFA), which is comprised of a set of acoustic transmitting elements. The active component detects objects by creating a sound pulse, or ''ping'' that is transmitted through the water and reflects off the target, returning in the form of an echo similar to echolocation used by some marine mammals to locate prey and navigate. SURTASS LFA sonar systems are long-range sensors that operate in the low-frequency (LF) band (*i.e.,* 100–500 Hertz (Hz)). Because LF sound travels in seawater for greater distances than higher frequency sound, the SURTASS LFA sonar system meets the need for improved detection and tracking of new-generation submarines at a longer range and maximizes the opportunity for U.S. armed forces to safely react to, and defend against, potential submarine threats while remaining a safe distance beyond a submarine's effective weapons range. Thus, the active acoustic component in the SURTASS LFA sonar is an important augmentation to the Navy's passive and tactical systems, as its long-range detection capabilities can effectively counter the threat to the Navy and national security interests posed by quiet, diesel submarines.

The Navy's specified activities for MMPA incidental take coverage is to continue employment of SURTASS LFA sonar systems onboard USNS surveillance ships for training and testing activities conducted under the authority of the Secretary of the Navy in the western and central Pacific Ocean and eastern Indian Ocean, which is classified as a military readiness activity, beginning August 13, 2019. The use of the SURTASS LFA sonar system will result in acoustic stimuli from the generation of sound or pressure waves in the water at or above levels that NMFS has determined would result in take of marine mammals under the MMPA. This is the principal means of marine mammal taking associated with these military readiness activities. In addition to the use of active acoustic sources, the Navy's activities include the movement of vessels. This final rule also analyzes the potential effects of this aspect of the activities. NMFS does not anticipate takes of marine mammals to result from ship strikes from any SURTASS LFA vessels because each vessel moves at a relatively slow speed (10 to 12 knots (kt) while transiting), especially when towing the SURTASS and LFA sonar systems (moving at 3 to 4 kt), and for a relatively short period of time. Combined with the use of mitigation measures as noted below, it is likely that surveillance vessels will be able to avoid any marine mammals.

The Navy will restrict SURTASS LFA sonar training and testing activities to the central and western North Pacific Ocean and eastern Indian Ocean. The Navy will not conduct training or testing utilizing SURTASS LFA sonar within the foreign territorial seas of other nations and will maintain

SURTASS LFA sonar received levels below 180 decibels (dB) re: 1 μPa (root-mean-square (rms)) within 12 nmi (22 km) of any emerged land features or within 1 km of the seaward boundaries of designated Offshore Biologically Important Areas (OBIAs) during their effective periods (see *Mitigation* section below for OBIA details). In addition to these geographic mitigation measures, the Navy will implement procedural mitigation measures, including monitoring for the presence of marine mammals (including visual as well as active and passive acoustic monitoring) and implementing shutdown procedures for marine mammals within a mitigation zone around the LFA sonar source (see *Mitigation* and *Monitoring* sections below for further details).

Dates and Duration

The specified activities may occur at any time during the seven-year period of validity of the regulations (August 13, 2019, through August 12, 2026). The Navy currently conducts SURTASS LFA sonar activities from four vessels. The Navy is planning to add new vessels to its ocean surveillance fleet. As new vessels are developed, the onboard LFA and High Frequency Marine Mammal Monitoring sonar (HF/M3 sonar) systems (discussed below) may need to be updated, modified, or even re-designed. Current indications are that future LFA sonar systems will have the same operational characteristics and that updates and modifications are focused toward miniaturizing the system components to reduce the weight and handling of the systems. If system parameters are modified as a result of these updates the Navy will determine if supplementary analysis would be required to cover the deployment of these new systems. As the new vessels and sonar system components are developed and constructed, at-sea testing would eventually be necessary. The Navy anticipates that new vessels, or new/updated sonar system components, would be ready for at-sea testing beginning in the fifth year of the time period covered by this final rule.

Thus, the Navy's activity analysis included consideration of the sonar hours associated with future testing of new or updated LFA sonar system components and new ocean surveillance vessels. This consideration resulted in two scenarios of annual sonar transmit hours: Years 1 to 4 will entail up to 496 hours total per year across all SURTASS LFA sonar vessels, while years 5 to 7 will include an increase in LFA sonar transmit hours up to 592 hours across all vessels.

The SURTASS LFA sonar transmission hours represent a distribution across six activities that include (with an approximate allocation of hours indicated):

- Contractor crew proficiency training (80 hours per year);
- Military crew (MILCREW) proficiency training (96 hours per year);
- Participation in or support of naval exercises (96 hours per year);
- Vessel and equipment maintenance (64 hours per year);
- Acoustic research testing (160 hours per year); and
- New SURTASS LFA sonar system testing (96 hours per year; will occur in years 5 to 7).

Each of these activities utilizes the SURTASS LFA sonar system within the operating profile described above; therefore, the number of hours designated for each activity represents an estimate for planning purposes.

As noted above, this rulemaking would result in the fourth such regulation for the Navy's SURTASS LFA sonar activities. The Navy is currently conducting the specified activities under an NDE that will expire on August 12, 2019. Therefore, the Navy requested MMPA rulemaking and an LOA for SURTASS LFA sonar training and testing activities effective beginning August 13, 2019, to take marine mammals incidental to the SURTASS LFA sonar activities for a seven year period.

SURTASS LFA Sonar Training and Testing Areas

The geographic area of the SURTASS LFA sonar activities covered by these regulations includes the western and central North Pacific Ocean and eastern Indian Ocean outside of the territorial seas of foreign nations (generally 12 nmi (22 km) from most foreign nations). Figure 1 depicts the areas of SURTASS LFA sonar activities. In areas within 12 nmi from any emergent land (coastal exclusion areas) and in areas identified as OBIAs, SURTASS LFA sonar training and testing would be conducted such that received levels of LFA sonar are below 180 dB re: 1 μPa rms sound pressure level (SPL). This restriction will be observed year-round for coastal standoff zones and during known periods of biological importance for OBIAs.

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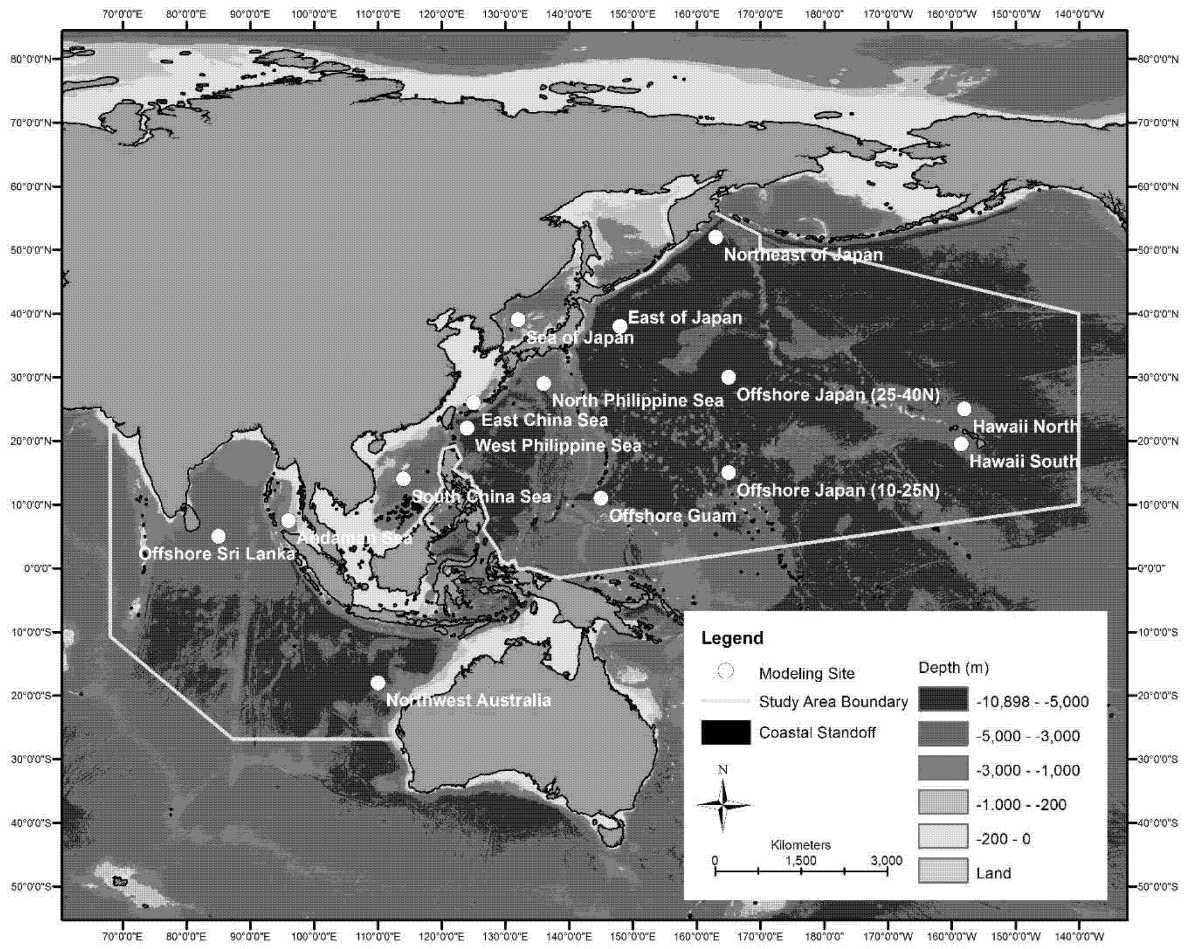

Figure 1. Potential Areas for SURTASS LFA sonar activities including modeling areas.

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For this rulemaking, the Navy scoped the geographic extent of its specified activities to better reflect the areas where the Navy anticipates conducting SURTASS LFA sonar training and testing activities now through 2026. Fifteen representative model areas (shown in Figure 1 and listed in Table 1), with nominal modeling sites in each region, provide geographic context for the SURTASS LFA sonar activities.

TABLE 1—REPRESENTATIVE SURTASS LFA SONAR MODELING AREAS THAT THE NAVY MODELED FOR THE 2019 SURTASS LFA FSEIS/SOEIS AND THE NAVY'S MMPA RULEMAKING/LOA APPLICATION

Modeled site	Location (latitude/longitude of center of modeling area)	Notes
East of Japan	38° N, 148° E.	
North Philippine Sea	29° N, 136° E.	
West Philippine Sea	22° N, 124° E.	
Offshore Guam	11° N, 145° E	Navy Mariana Islands Testing and Training Area.
Sea of Japan	39° N, 132° E.	
East China Sea	26° N, 125° E.	
South China Sea	14° N, 114° E.	
Offshore Japan 25° to 40° N	30° N, 165° E.	
Offshore Japan 10° to 25° N	15° N, 165° E.	
Hawaii North	25° N, 158° W	Navy Hawaii-Southern California Training and Testing Area.
Hawaii South	19.5° N, 158.5° W	Navy Hawaii-Southern California Training and Testing Area.
Offshore Sri Lanka	5° N, 85° E.	
Andaman Sea	7.5° N, 96° E.	
Northwest of Australia	18° S, 110° E.	
Northeast of Japan	52° N, 163° E.	

Detailed Description of the Specified Activities

SURTASS LFA Sonar—SONAR is an acronym for Sound Navigation and Ranging, and its definition includes any system (biological or mechanical) that uses underwater sound, or acoustics, for detection, monitoring, and/or communications. Active sonar is the transmission of sound energy for the purpose of sensing the environment by interpreting features of received signals. Active sonar detects objects by creating a sound pulse, or ''ping'' that is transmitted through the water and reflects off the target, returning in the form of an echo. Passive sonar detects the transmission of sound waves created by an object.

As mentioned previously, the SURTASS LFA sonar system is a long-range, all-weather LF sonar (operating between 100 and 500 Hertz (Hz)) system that has both active and passive components. LFA, the active system component (which allows for the detection of an object that is not generating noise), is comprised of source elements (called projectors) suspended vertically on a cable beneath the surveillance vessel. The projectors produce an active sound pulse by converting electrical energy to mechanical energy by setting up vibrations or pressure disturbances within the water to produce a ping. The Navy uses LFA as an augmentation to the passive SURTASS operations when passive system performance is inadequate. SURTASS, the passive part of the system, uses hydrophones (*i.e.,* underwater microphones) to detect sound emitted or reflected from submerged targets, such as submarines. The SURTASS hydrophones are mounted on a horizontal line array that is towed behind the surveillance vessel. The Navy processes and evaluates the returning signals or echoes, which are usually below background or ambient sound level, to identify and classify potential underwater targets.

LFA Active Component—The active component of the SURTASS LFA sonar system consists of up to 18 projectors suspended beneath the surveillance vessel in a vertical line array. The SURTASS LFA sonar projectors transmit in the low-frequency band (between 100 and 500 Hz). The source level of an individual projector in the SURTASS LFA sonar array is approximately 215 dB re: 1 µPa at 1 m or less. Sound pressure is the sound force per unit area and is usually measured in micropascals (µPa), where one Pascal (Pa) is the pressure resulting from a force of one newton exerted over an area of one square meter (m^2). The commonly used reference pressure level in underwater acoustics is 1 µPa at 1 m, and the units for source level are decibels (dB) re: 1 µPa at 1 m). Because of the physics involved in acoustic beamforming (*i.e.,* a method of mapping noise sources by differentiating sound levels based upon the direction from which they originate) and sound transmission loss processes, the SURTASS LFA sonar array cannot have a sound pressure level (SPL) higher than the SPL of an individual projector.

The SURTASS LFA sonar acoustic transmission is an omnidirectional beam (a full 360 degrees (°)) in the horizontal plane. The LFA sonar system also has a narrow vertical beam that the vessel's crew can steer above or below the horizontal plane. The typical SURTASS LFA sonar signal is not a constant tone, but rather is a transmission of various signal types that vary in frequency and duration (including continuous wave (CW) and frequency-modulated (FM) signals). A complete sequence of sound transmissions, also referred to by the Navy as a ''ping'' or a wavetrain, can be as short as six seconds (sec) or last as long as 100 sec, with an average length of 60 sec. Within each ping, the duration of any continuous frequency sound transmission is no longer than 10 seconds and the time between pings is typically from six to 15 minutes (min). Based on the Navy's historical operating parameters, the average duty cycle (*i.e.,* the ratio of sound ''on'' time to total time) for LFA sonar is normally 7.5 to 10 percent and will not exceed a maximum duty cycle of 20 percent.

Compact LFA Active Component—In addition to the LFA sonar system currently deployed on the USNS IMPECCABLE, the Navy developed a compact LFA (CLFA) sonar system, which is now deployed on its three smaller surveillance vessels (*i.e.,* the USNS ABLE, EFFECTIVE, and VICTORIOUS). The operational characteristics of the active component for the CLFA sonar system are comparable to the LFA sonar system and the potential impacts from the CLFA sonar system will be similar to the effects from the LFA sonar system. The CLFA sonar system consists of smaller projectors that weigh 142,000 lbs (64,410 kilograms (kg)), which is 182,000 lbs (82,554 kg) less than the weight of the LFA projectors on the USNS IMPECCABLE. The CLFA sonar system also consists of up to 18 projectors suspended beneath the surveillance vessel in a vertical line array, and the CLFA sonar system projectors transmit in the low-frequency band (also between 100 and 500 Hz) with the same duty cycle as described for LFA sonar. Similar to the active component of the LFA sonar system, the source level of an individual projector in the CLFA sonar array is approximately 215 dB re: 1 µPa or less.

For the analysis in this rulemaking, NMFS will use the term LFA to refer to both the LFA sonar system and/or the CLFA sonar system, unless otherwise specified.

SURTASS Passive Component—The passive component of the SURTASS LFA sonar system consists of a SURTASS Twin-line (TL–29A) horizontal line array mounted with hydrophones. The Y-shaped array is 1,000 ft (305 m) in length and has an operational depth of 500 to 1,500 ft (152.4 to 457.2 m).

High-Frequency Marine Mammal Monitoring Active Sonar (HF/M3)—Although technically not part of the SURTASS LFA sonar system, the Navy will also use a high-frequency sonar system, called the HF/M3 sonar, to detect and locate marine mammals within the SURTASS LFA sonar mitigation zone, as described in the *Mitigation* and *Monitoring* sections. This enhanced commercial fish-finding sonar, mounted at the top of the SURTASS LFA sonar vertical line array, has a source level of 220 dB re: 1 µPa at 1 m with a frequency range of 30 to 40 kilohertz (kHz). The duty cycle is variable, but is normally below three to four percent and the maximum pulse duration is 40 milliseconds (ms). The HF/M3 sonar has four transducers with 8 degrees horizontal and 10 degrees vertical beamwidths, which sweep a full 360 degrees in the horizontal plane every 45 to 60 sec with a maximum range of approximately 1.2 mi (2 km).

Vessel Specifications—The Navy currently deploys SURTASS LFA sonar on four twin-hulled ocean surveillance vessels that are 235 to 282 feet (ft) (72 to 86 m) in length, with twin-shafted diesel electric engines capable of providing 3,200 to 5,000 horsepower. Each vessel has an observation area on the bridge that is more than 30 ft above sea level from where lookouts will monitor for marine mammals whenever SURTASS LFA sonar is transmitting. As stated previously, the Navy may develop and field additional SURTASS LFA equipped vessels, either to replace or complement the Navy's current SURTASS LFA capable fleet, and these vessels may be in use beginning in the fifth year of the time period covered by this rulemaking.

The operational speed of each vessel during sonar activities will be approximately 3.4 miles per hour (mph)

(5.6 km per hour (km/hr); 3 kt) and each vessel's cruising speed outside of sonar activities would be a maximum of approximately 11.5 to 14.9 mph (18.5 to 24.1 km/hr; 10 to 13 kt). During sonar activities, the SURTASS LFA sonar vessels will generally travel in straight lines or in oval-shaped (*i.e.,* racetrack) patterns depending on the training or testing scenario.

Comments and Responses

We published a notice of proposed rule in the **Federal Register** on March 1, 2019 (84 FR 7186), with a 30-day comment period. During the 30-day comment period, we received eight total comment letters. Of this total, one submission was from another Federal agency, one letter was from organizations or individuals acting in an official capacity (*e.g.,* non-governmental organizations (NGOs)), and six submissions were from private citizens. NMFS has reviewed all public comments received on the proposed rule and issuance of the LOA. All relevant comments and our responses are described below organized by major category. We provide no response to specific comments that addressed species or statutes not relevant to our proposed rule under section 101(a)(5)(A) of the MMPA (*e.g.,* comments related to sea turtles).

General Comments

The majority of the comments from six private citizens expressed general opposition toward the Navy's proposed training and testing activities, cited concern for marine mammals and the oceans, and requested that NMFS not issue the LOAs, but without providing information relevant to NMFS' decisions. NMFS appreciates the concerns expressed for marine life and resources. We reiterate that no mortality of marine mammals is anticipated, nor is any injury (Level A harassment) of marine mammals anticipated; therefore, neither injuries nor mortality of marine mammals is authorized for the SURTASS LFA sonar activities. Moreover, the MMPA directs the Secretary of Commerce (whose authority has been delegated to NMFS) to allow, upon request, the incidental taking for a specified activity, provided that we are able to make the required findings under section 101(a)(5)(A) and set forth regulations containing the required prescriptions for mitigation, monitoring, and reporting after notice and comment. Therefore, these comments were not considered further. The remaining comments are addressed below.

Impact Analysis

Density Estimates

Comment 1: The Marine Mammal Commission (hereafter ''Commission'') expressed concerns regarding the density estimates used in Navy's Global Marine Species Density Database (Global NMSDD). The Commission and The Commission and Natural Resources Defense Council (NRDC), The Humane Society of the United States, and Humane Society Legislative Fund (hereafter ''NRDC *et al.*'') recommended that NMFS require the Navy to make available to the public the resulting products of the current version of the Global NMSDD, similar to the information provided in Department of the Navy (2017c), as soon as possible. The Commission noted that they have requested for several years that this information be made available to the public and are puzzled why neither the Navy nor NMFS has provided it. The Commission asserted that without public access to such data, the process is not transparent and there is no basis to assert that either NMFS' or the Navy's analyses are based on best available data.

Response: Currently, the NMSDD is not publically available since proprietary geospatial modeling data are included in the database, for which the Navy has established proprietary data sharing agreements. However, products of the Navy's database have been made available to the public, such as the *U.S. Navy Marine Species Density Database Phase III for the Hawaii-Southern California Training and Testing Study Area* (DoN, 2017c). The citations for the sighting surveys or other data upon which the densities were derived in the NMSDD have been provided when appropriate, and information similar to that presented in the *U.S. Navy Marine Species Density Database Phase III for the Hawaii-Southern California Training and Testing Study Area* (DoN, 2017c) is provided in the 2019 SURTASS LFA FSEIS/SOEIS (Chapter 3 and Appendix D) for the 15 Representative Modeling Areas in the SURTASS LFA sonar Study Area. Chapter 3, Section 3.4.3.3.3 describes the process and methods used to derive marine mammal occurrence and population estimates (abundance and density) in the model areas. Appendix D includes detailed information on the available data and abundance and density estimates by model area and species/stock and these references are also included in the marine mammal species, stocks (DPSs), abundance, and density estimates by season summary table (Chapter 3, Table 3–8). When the NMSDD is referenced in the Offshore Sri Lanka, Andaman Sea, Northwestern Australia, and Northeast of Japan (humpback whales only) modeling areas the specific data source (*e.g.,* Kaschner *et al.,* 2006 or SMRU Ltd., 2012) is also referenced. NMFS coordinated closely with the Navy in the development of its incidental take application, and agrees that the methods the Navy has put forth described herein to estimate densities are appropriate and based on the best available science.

Comment 2: The Commission and NRDC et al. recommended that NMFS specify whether and how uncertainty was incorporated in abundance and density estimates in the preamble to the final rule and, if it was not, that NMFS require the Navy to incorporate measures of uncertainty inherent in the underlying data (*e.g.,* CV, standard deviations, standard errors) in those estimates and re-estimate the numbers of takes accordingly in the final rule. The Commission noted that for all of the Navy's Phase III activities since 2016, including for Hawaii-Southern California Training and Testing (HSTT), the Navy has incorporated uncertainty in the densities and the group size estimates that ultimately seed its animat modeling. It is unclear why the same approach was not taken for SURTASS LFA sonar, particularly since the action areas for HSTT and SURTASS LFA sonar overlap.

Response: Information on uncertainty (*e.g.,* CV, standard deviations, standard errors, etc.) in species/stock population estimates for each modeling area is included when available in the 2019 SURTASS LFA FSEIS/SOEIS (Chapter 3 and Appendix D). The population estimates provided in the 2019 SURTASS LFA FSEIS/SOEIS (Chapter 3 and Appendix D) were used to model estimated takes using the Acoustic Integration Model (AIM) (described in the *Estimated Take of Marine Mammals* section). The AIM is a Monte Carlo based statistical model in which multiple iterations of realistic predictions of acoustic source use as well as animal distribution and movement patterns (''animats'') are conducted to provide statistical predictions of estimated impacts from exposure to acoustic source transmissions. AIM does not include uncertainty in population estimates to predict estimated takes, however uncertainty in the horizontal and vertical movement patterns of marine mammals is incorporated through the Monte Carlo components of the AIM. At each 30-sec timestep, the diving pattern, swim speed, and heading of each animat are re-sampled, resulting in movement of each animat through the acoustic

field. In the AIM, the modeled marine mammal animats were set to populate the simulation area with densities of 0.086, 0.17, or 0.34 animats/nmi^2 (0.025, 0.05, or 0.1 animats/km^2). These densities are often higher than those estimated in the marine environment (as many species/stocks are rare in modelled areas). This ''over population'' of the modeling environment ensures that the result of the simulation is not unduly influenced by the chance placement of a few simulated marine mammals. To obtain final harassment estimates, the modeled results are normalized by the ratio of the modeled animat density to the real-world marine mammal density estimate. This allows for greater statistical power without overestimating risk. Additional details on the methods used to calculate take estimates are included in the *Estimated Take of Marine Mammals* section. NMFS considers these estimates conservative as take estimates are based on the maximum potential impact to a species or stock across all model areas in which a SURTASS LFA sonar activity may occur. Therefore, if an activity occurs in a different model area than the area where the maximum potential impact was predicted, the actual potential impact may be less than estimated. Here, the densities and modeling used reflect the best available science and, further, monitoring of SURTASS activities from the past 17 years of activities do not suggest that these models have underestimated marine mammal exposure.

Comment 3: NRDC et al. recommended that NMFS consider alternative and potentially more powerful modeling approaches that are emerging to extrapolate cetacean densities beyond surveyed regions (Corkeron et al., 2011; Lambert et al., 2014; Mannocci et al., 2015) which are likely to be superior to the Kaschner et al. (2006) model (and more consistent with the prior recommendations of NMFS biologists) that the Navy has relied on in the past. They recommended that the Navy should consult with NMFS experts on the utility of these models for estimating densities within the LFA Study Area. They also recommended that NMFS examine the data collected during the International Whaling Commission's Pacific Ocean Whale and Ecosystem Research Programme (IWC–POWER) 2010, 2013, 2014, 2015, and 2016 surveys with the view to developing improved marine mammal density models for regions of the western and central Pacific.

Response: NMFS is aware of the active area of research in developing density models for data poor areas that extrapolate cetacean densities beyond surveyed regions. For example, the Navy and NMFS were reviewers of, and used, the results of Mannocci *et al.* (2017) in the U.S. Navy's Atlantic Fleet Training and Testing (AFTT) Study Area NEPA analysis and MMPA rulemaking. NMFS and the Navy will continue to discuss and examine the utility of these emerging models for estimating densities of marine mammals in the SURTASS LFA sonar Study Area. It is possible that the sighting results from the IWC–POWER cruises could be used to extrapolate density and abundance estimates throughout the North Pacific in the future, using the methods developed by Mannocci et al. (2015) that were applied to extrapolate density estimates in the North Atlantic (Mannocci et al., 2017). Cruise reports through 2017 are available online, with cruises continuing for another few years. When additional results are available, NMFS and the Navy will consider use of these methods to extrapolate density and abundance estimates that could inform mitigation through Adaptive Management process, or to inform analyses for future actions. Lambert et al. (2014) used the simulated distribution of micronekton from the Spatial Ecosystem And Population Dynamics Model (SEAPODYM) to predict the habitat of three cetacean guilds in tropical waters. While their results provide some interesting insights into the use of predicted prey maps in cetacean distribution models, they are best used to prioritize future research areas. Corkeron et al. (2011) developed statistical methods for using spatially autocorrelated sighting results to identify the Dhofar coast of Oman as an important region for the Arabian Sea DPS of humpback whales. However, the Dhofar coast of Oman is outside of the SURTASS LFA sonar Study Area and Corkeren et al. state ''Although it is theoretically possible for us to project model predictions into other areas, we consider this inadvisable, as our basic design was not to make inference about the distribution of humpback whales along the entire Oman coast.'' Therefore, though its statistical models could be applied to sightings data within the SURTASS LFA Study Area, these humpback whale results are not applicable. When considering how to predict marine mammal densities across large spatial scales using many varied datasets, there are often multiple appropriate and effective ways that data can be modeled and extrapolated, and NMFS does not prescribe any particular model in these cases, as long as our review indicates that the proposed method is supportable. Here, the densities and modeling used reflect the best available science and, further, monitoring of SURTASS activities from the past 17 years of activities do not suggest that these models have underestimated marine mammal exposure.

Comment 4: The Commission recommended that, in the preamble to the final rule, NMFS specify how density estimates were derived and what statistic (*e.g.,* mean, median, maximum) was used when multiple sources are referenced in Tables 2–16 of the **Federal Register** notice and Table 3–2 of the revised LOA application.

Response: We have included the density estimate and associated reference or references for each species/stock in each of the 15 Representative Modeling Areas in the SURTASS LFA sonar Study Area in Tables 2 through 16 of this rule. Additional details on the densities used for each species/stock in each modeling area are provided in the 2019 SURTASS LFA FSEIS/SOEIS (Chapter 3, Table 3–8 and Appendix D). In Chapter 3, Table 3–8 2019 SURTASS LFA FSEIS/SOEIS, multiple references are provided to reflect references used to support the population density estimate and seasonality of occurrence. In Tables 2–16 of this rule we have included only the reference to the density estimate. Appendix D of the 2019 SURTASS LFA FSEIS/SOEIS includes detailed descriptions and references for each species/stock in each of the model areas that include how each density estimate was derived. In response to this comment the Navy has also reviewed and revised the descriptions in Appendix D of the 2019 SURTASS LFA FSEIS/SOEIS to increase clarity.

Comment 5: With respect to estimated densities of cetaceans in Offshore Guam, the Commission recommended that NMFS use the densities stipulated in Department of the Navy (2018b) for blue whales, Bryde's whales, fin whales, ginkgo-toothed beaked whales, and Deraniyagala's beaked whales rather than the densities in Table 5 of the **Federal Register** notice and re-estimate the numbers of takes accordingly in the final rule.

Response: As recommended, we have revised the densities for blue whales, Bryde's whales, fin whales, ginkgo-toothed beaked whales, and Deraniyagala's beaked whales to those presented in the *U.S. Navy marine species density database Phase III for the Mariana Islands Training and Testing Study Area* (DoN, 2018b) and have revised our estimated takes of

these species/stocks in the Offshore Guam modeling area accordingly.

Comment 6: NRDC et al. recommended that NMFS require the Navy to conduct baseline research in unsurveyed areas that it repeatedly employs in LFA sonar operations, prioritizing areas on the basis of exposure frequency, environmental vulnerability, and research feasibility.

Response: Per the Council on Environmental Quality (CEQ) regulation 40 CFR 1502.22, the Navy has indicated plainly in the 2019 SURTASS LFA FSEIS/SOEIS where data or information are lacking to support Navy analyses and how the Navy has resolved the issue of scarcity of data/information (*i.e.,* surrogate data/information). The Navy is not required to conduct costly baseline research, such as that suggested, to obtain incomplete or unavailable data and information for areas in which the Navy operates LFA sonar (CEQ Regulation 1502.22). Further, the ESA and MMPA only require that a Federal agency consider the best available data, and do not require the agency generate the data itself. However, as noted in this rule, the Navy does fund ongoing research and conservation related to marine mammals. The Navy sponsors a significant portion of the U.S. research on the effects of human-generated sound on marine mammals (between approximately 25 to 30 million dollars per year on marine mammal research from the Navy's three main programs: Office of Naval Research, Living Marine Resources Program, and the Fleet/SYSCOM monitoring programs), which is crucial to the overall knowledge base on the potential for effects from underwater anthropogenic noise on marine mammals (82 FR 19460, 19516; April 27, 2017). See Office of Naval Research (*https://www.onr.navy.mil/*) and Navy Living Marine Resources program (*https://navysustainability.dodlive.mil/environment/lmr/*) for examples of Navy support research. The Navy also sponsors research to determine marine mammal abundances and densities for all Navy ranges and other operational areas (see Marine Species Monitoring Program: *https://www.navymarinespeciesmonitoring.us/*). As described in the *Description of Marine Mammals in the Area of the Specified Activities* section of the rule and Chapter 3 and Appendix D of the SURTASS LFA FSEIS/SOEIS, the Navy used a combination of density estimates from a region with similar oceanographic characteristics to that model area, estimates derived from the Navy's Marine Species Density Database (DoN, 2018), and pooled density estimates for species of the same genus if sufficient data were not available to compute a density for individual species or the species are difficult to distinguish at sea (*e.g., Mesoplodon* spp. and *Kogia* spp.) to inform their analyses in unsurveyed areas, which NMFS concurred represented the best available science.

Permanent Threshold Shift (PTS)/Temporary Threshold Shift (TTS) Thresholds and Take Estimates

Comment 7: The Commission recommended that NMFS (1) specify the numbers of model-estimated Level A harassment (PTS) takes of marine mammals in the absence of implementing mitigation measures and any and all assumptions (including within the animat modeling scenarios) that were made to reduce those takes to zero in the preamble to the final rule and (2) authorize the model-estimated Level A harassment (PTS) takes rather than reducing them to zero in the final rule. The Commission stated that specifics regarding the situations in which those takes were estimated to occur (*i.e.,* distances to the source and timeframe over which the exposure occurred) should be delineated in the preamble to the final rule as well.

Response: The Navy quantitatively assessed the potential for PTS and TTS resulting from exposure to SURTASS LFA sonar transmissions using NMFS' 2018 Acoustic Technical Guidance for estimating impacts of PTS and TTS using AIM. In AIM the potential for PTS is considered within the context of the mitigation and monitoring efforts that would occur whenever SURTASS LFA sonar is transmitting. Mitigation monitoring is designed to detect marine mammals before they are exposed to a received level of 180 dB re: 1 µPa SPL. The probability of detection of a marine mammal by the HF/M3 system alone within the LFA sonar mitigation zone approaches 100 percent over the course of multiple pings (see the 2001 SURTASS LFA FOEIS/EIS, Subchapters 2.3.2.2 and 4.2.7.1 for the HF/M3 sonar testing results as well as section 5.4.3 of the 2019 SURTASS LFA FSEIS/SOEIS for a summary of the effectiveness of the HF/M3 system). As described in the *Estimated Take of Marine Mammals* section, with the implementation of the three-part monitoring programs (visual, passive acoustic, and HF/M3 monitoring, as discussed below), NMFS and the Navy do not expect that marine mammals would be injured by SURTASS LFA sonar because a marine mammal is likely to be detected and active transmissions suspended or delayed to avoid injurious exposure. Therefore, in incorporating mitigation, AIM assumes no animats will be exposed to SURTASS LFA sonar in the LFA sonar mitigation zone. AIM records the exposure history for each individual animat and the potential impact is determined on an individual animal basis. The sound energy received by each individual animat over the 24-hr modeled period was calculated as sound exposure level (SEL) and the potential for that animal to experience PTS and then TTS was considered using the NMFS (2018) acoustic guidance thresholds. When mitigation is applied in the modeling-analysis environment, estimations of PTS impacts were 0 for all marine mammal species in all model areas.

Therefore, the Navy did not request and NMFS is not authorizing Level A harassment take. As presented in the *Estimated Take of Marine Mammals* section, based on simple spherical spreading (*i.e.,* transmission loss based on $20 \times \log10$ [range {m}]), all hearing groups except LF cetaceans would need to remain within 22 ft (7 m) for the entire duration (60 sec) of an LFA sonar ping to potentially experience PTS. LF cetaceans would need to remain at the greatest distance from the transmitting LFA sonar, 135 ft (41 m) before experiencing the onset of PTS. This distance is well within the LFA sonar mitigation zone and a distance where visual, passive, and acoustic monitoring can reliably detect small and large marine mammals 100 percent of the time and transmission can shut down before any injury can occur. NMFS has determined that the suite of mitigation monitoring efforts is highly effective at detecting marine mammals and avoiding Level A take and notes that there have been no reported or known incidents of Level A harassment of any marine mammal in 17 years of SURTASS LFA sonar activities. Therefore, NMFS has determined that authorizing Level A harassment take is not warranted.

Comment 8: The Commission recommended that NMFS explain why TTS takes are greater than behavior takes for some species of mysticetes, or stocks of mysticetes within the same species, in the preamble to the final rule.

Response: The estimated Level B harassment takes presented in Chapter 4 of the 2019 SURTASS LFA FSEIS/SOEIS are correct. Table 18 in this final rule presents total Level B Harassment takes (including both behavioral disruption and TTS). In the vast majority of mysticete species/stocks, estimated takes by behavioral disruption

are greater than estimated incidents of TTS; however, in a few cases the predicted numbers of TTS are higher than the estimated takes by behavioral disruption. This is due to the way these two impacts are assessed. The TTS acoustic threshold level is based on cumulative SEL metric and a take occurs when a marine mammal exposed to sounds above the threshold level (a step function where 0 is no take and 1 is a take for each individual). Behavioral response is calculated for each individual on a continuum from 0 to 1 based on the marine mammals single ping equivalent (SPE) value. Therefore, many more marine mammals may be (and typically are) exposed at sound (SPE) levels with a very low risk for a behavior response (less than 1). When these risk values are summed to calculate the estimated take due to behavioral response, the result may be an estimate that is lower than the estimate for TTS. In their response to comments in the SURTASS LFA FSEIS/SOEIS, the Navy provides the following example to illustrate: If the blue whale has a hypothetical population estimate of 10 individuals, one animal may experience TTS, five may have some percent risk of a behavioral response, and four may not be impacted. Estimating take, one animal is predicted to experience TTS. The five animals in the population have potential behavioral response (risk values) of 0.5, 0.2, 0.05, 0.04, and 0.01. When summed, this is 0.8 for the entire population. Therefore, the risk of TTS (1 animal) is greater than the risk of behavioral response (0.8 animal), but the number of animals experiencing TTS (one) is less than the number that have the potential to experience a behavioral response (five).

Behavioral Harassment Thresholds and Take Estimates

Comment 9: With respect to SPE as the metric to estimate behavioral response, the Commission recommended that NMFS use either (1) a metric (*i.e.,* SPL or sound exposure level (SEL)) and associated thresholds that are based on physics rather than SPE or (2) the behavioral response metrics and thresholds that the Navy currently uses for all other LF sonar sources based on Department of the Navy (2017b) to estimate behavior takes for the final rule. NRDC et al. also stated that given the lack of any tenable justification for maintaining an SPE approach, NMFS, and the Navy, should use the more widely accepted, more conservative SEL in determining the effect of multiple exposures on marine mammals.

Response: The behavioral risk function is based on field measurements of behavioral responses of mysticetes during the SURTASS LFA Sonar Low Frequency Sound Scientific Research Program (LFS SRP). SPE was developed by researchers in the LFS SRP to account for received energy from all LFA sonar transmissions that a modeled animal (''animat'') receives during a 24-hr period of a SURTASS LFA sonar mission. SPE was also designed to approximate the manner in which the effect of repeated exposures accumulate, as known from studies on humans (Kryter, 1985; Richardson *et al.,* 1995; Ward, 1968). SPE accounts for the increased potential effect of repeated exposures on animals by adding 5 x log10 (number of pings) to each 1-dB received level (RL) increment (Kryter, 1985; Richardson et al., 1995; Ward, 1968). If an individual's exposure within a 24-hour period is dominated by a single loud pulse, the SPE will not be greater than the SPL (rms) of that single loud pulse. However, if there are two or more pulses of the same amplitude, the calculated SPE will be greater than the SPL (rms) of a single pulse because the SPE metric accounts for accumulation, and SPL does not. Therefore, the calculated SPE is never lower than the SPL rms of the loudest pulse.

The SEL metric is used to determine physiological effects (PTS and TTS) and the Navy's rulemaking and LOA application, as well as this final rule, use the SEL metric to estimate these impacts as described in the NMFS' 2018 Acoustic Technical Guidance. Research indicates that behavioral responses are context specific and due to both received level and a suite of other factors including behavioral context. All other applicants use SPL thresholds for assessing Level B harassment by behavioral disruption, and the Navy uses SPL based risk functions for all of its other training and testing activities, which utilize sound sources of shorter pulse lengths. Since SPE allows for a consideration of the duration of a signal and is always more conservative than SPL rms values, it is equal to or more conservative than an SPL based risk function and NMFS concurs with its use with SURTASS LFA sonar.

Although the LFS SRP study is from the late 1990s, the source used was the most similar in source characteristics and operating parameters to the SURTASS LFA sonar source, and most closely matches the nature and context of the Navy's current activity. Specifically, the multiple LF sources that may be used in the Navy's major training exercises (such as AFTT and HSTT) include sources that are operated differently, are operated at different frequencies, and are only one component of any training activity — and for these reasons, the Navy and NMFS found it appropriate to apply the thresholds and modeling utilized for the other active Navy sources. However, for SURTASS, the results of the LFS SRP remain the best available data for the purpose of predicting potential impacts from exposure to SURTASS LFA sonar as they evaluated the behavioral responses of LF hearing specialists conducting biologically important behaviors to exposures of SURTASS LFA sonar. NMFS and the Navy have evaluated the science conducted with other sound sources (*e.g.,* mid-frequency sonar, the European ''low-frequency active sonar'' that operates at 1–2 and 6–7 kHz) and no newer data change the prediction of expected behavioral responses.

Comment 10: The Commission recommended that NMFS and the Navy prioritize conducting a behavioral response study (BRS) using updated BRS methods involving SURTASS LFA sonar and mysticetes, other odontocetes including sperm whales, and/or phocids under the monitoring requirements for the final rule and ensure that the behavior thresholds are able to be updated accordingly before the next rulemaking.

Response: The Navy has agreed to evaluate the feasibility and appropriate methods to collect new data to supplement the data available on behavioral responses of marine mammals to SURTASS LFA sonar using newer methods and technologies. These types of scientific inquiries fit within the scope the Navy's Living Marine Resources (LMR) program. The LMR program weighs the various Navy research needs against each other through a needs and solicitation process. The Navy has submitted a needs statement to the LMR advisory committee to research future data collection that would supplement understanding of how SURTASS LFA sonar may affect marine resources, including mysticetes and beaked whales.

Comment 11: NRDC et al. noted that the proposed rule analysis relies entirely on the LFA Scientific Research Program (SRP) in establishing behavioral risk parameters for the SURTASS LFA system. They noted that study took place twenty years ago and is inconsistent with more recent science on the behavioral response of marine mammals to low-frequency underwater noise. They stated that reliance on the SRP to the exclusion of all other scientific literature on the impacts of

low-frequency sound would be arbitrary and capricious. NRDC et al. noted that marine mammal science, including the technology used to study behavioral response to underwater noise, has advanced significantly over the two decades since the SRP concluded. They stated that the tags used in the SRP were Time-Depth Recorders, which, in rendering only depth profile, are primitive by comparison with contemporary marine mammal tags, which include accelerometers, magnetometers, and hydrophones. The newer tags provide far greater capacity to track alterations in animal orientation, velocity, and noise production, and therefore to detect disruptions in marine mammal feeding and other behaviors. Additionally, they noted that the SRP's sample sizes were small, focal species were limited, and the LFA system was generally operated at less than full power. They noted that new technologies and methods indicate limitations of the Navy's research. They cited studies that observed reductions in buzz rates in sperm whales and harbor porpoises that could not have been observed without newly available technology (Miller et al., 2009; Pirotta et al., 2014).

Response: As noted in the response to Comment 9, the data collected during the SURTASS LFA sonar LFS SRP studies remain the best available data for predicting behavioral responses to SURTASS LFA sonar. However, NMFS and Navy also considered other relevant studies on the potential effects of LF sound transmissions on marine mammals. None of these other studies contradict the conclusions of the LFS SRP (see the *Potential Effects of the Specified Activity on Marine Mammals and their Habitat* section in the proposed rule and Chapter 4 of the 2019 SURTASS LFA FSEIS/SOEIS for descriptions of studies). While we acknowledge the age of the SURTASS sonar LFS SRP data, the age of these data does not invalidate them, their contributions to science, nor the conclusions based upon those data. It is true that the technology and techniques available to gather marine animal data have become increasingly diverse and sophisticated over time and that LFS SRP sample sizes were small. The commenter points out the sorts of data that may be gathered utilizing new technologies and cites to the ''limitations'' of the SRP. NMFS acknowledges that newer methods may allow for additional data collection, however, in the meanwhile, NMFS and the Navy have considered all of the data, LFS SRP and otherwise, that are applicable to the SURTASS LFA sonar assessment and are aware of no basis to invalidate the overall results of the SRP. As noted in the response to Comment 10, the Navy will evaluate the feasibility and appropriate methods to collect new data to supplement the data available on behavioral responses of marine mammals to SURTASS LFA sonar.

Comment 12: NRDC et al. noted that the Navy claims that the SRP remains more relevant than the host of more recent investigations because it is the only study of a tonal source operating at frequencies below 500 Hz. The commenters noted that researchers in the Stellwagen Bank National Marine Sanctuary documented suppression in humpback whale vocalization during operations of an Ocean Acoustic Waveguard Remote Sensing (OAWRS) system, a powerful low-frequency fish sensor operating at similar frequencies, at distances of 200 km from the source (Risch et al. 2012). The Heard Island Feasibility Test, which likewise involved a tonal sound source operating below 500 Hz, reported complete cessations in vocalizations of long-finned pilot whales and sperm whales over a 4900 km^2 area following exposure (Bowles et al. 1994). They stated that these papers join a spate of other studies documenting large-scale changes in baleen whale vocalizations and those of other species in response to predominantly low-frequency anthropogenic noise (Nowacek et al., 2015) and that the best available science indicates that the Navy's behavioral response function for LFA, promulgated by NMFS in the Proposed Rule, is non-conservative.

Response: We disagree that the LFA sonar behavioral response function is non-conservative. Discussion of additional studies on the behavioral responses of marine mammals to a variety of sound sources are provided in the *Potential Effects of the Specified Activity on Marine Mammals and their Habitat* section in the proposed rule and Chapter 4 of the 2019 SURTASS LFA FSEIS/SOEIS. As discussed in the proposed rule, the potential for behavioral response to an anthropogenic source is highly variable and context-specific. Also, as discussed in the proposed rule, the recorded OAWRS produced a series of frequency-modulated pulses and signal received levels. Risch *et al.* (2012) documented reduction in humpback whale vocalization concurrent with transmissions of the low-frequency OAWRS system at distances of 200 km (108 nmi) from the source. The OAWRS source appears to have affected more whales than Phase III of the LFS SRP, even though exposure was at a lower RL (88 to 110 dB re: 1 µPa), which the authors noted was a novel sound source that provided a compelling contextual probability for the observed effects. Gong *et al.* (2014) assessed the effects of the OAWRS transmissions on calling rates on Georges Bank and determined constant vocalization rates of humpback whales, with a reduction occurring before the OAWRS system began transmitting. Risch *et al.* (2014) pointed out that the results of Risch *et al.* (2012) and Gong *et al.* (2014) are not contradictory, but rather highlight the principal point of their original paper that behavioral responses depend on many contextual factors, including range to source, RL above background noise level, novelty of signal, and differences in behavioral state. Further, the authors did not state or imply that the observed behaviors had long-term effects on individual animals or populations. The responses of whales to the OAWRS system are consistent with the LFA behavioral response function, as it estimates that behavioral changes can occur at received levels lower than 180 dB. Results from the Heard Island Feasibility Test (Bowles et al., 1994) show that during the pre-experiment baseline period, sperm whales were detected 24 percent of the time and short-finned pilot whales were detected eight percent of the time. During night-time recordings during the baseline period, sperm whales were detected eight percent of the time and pilot whales were detected zero percent of the time. Neither species was detected during the low-frequency transmissions, but both species were detected 36 h after transmissions ended. It is not known whether sperm and pilot whales were masked during the transmissions or whether they ceased vocalizing. Since sperm whales frequently become silent in the presence of anthropogenic noise (Watkins and Schevill, 1975; Watkins *et al.,* 1985), it is possible they exhibited a behavioral response.

NMFS concurs with the use of the Navy's behavioral response function and that it conservatively estimates Level B harassment takes. There is no indication that this method underestimates take. While the entire ensonified area cannot be monitored (using visual or passive and active acoustic monitoring), marine mammal observations during SURTASS LFA sonar activity and those predicted using annual activity level and location indicate the Navy has never exceeded authorized take for SURTASS LFA sonar activities (with the first LOA for SURTASS LFA sonar activities

beginning in August 2002). The potential for behavioral response to an anthropogenic source is highly dependent on context, including characteristics of the sound signals and their pattern of transmission, the environmental factors affecting sound movement, and the behavioral state of the animal during exposure. Further, not every response of a marine mammal rises to the level of a take, and some of the responses cited by the commenter would not necessarily do so (*e.g.,* minor modifications in vocalizations of a duration shorter than exposure to the signal). As previously noted, the SURTASS LFS SRP exposed LF specialist cetaceans engaged in biologically important behaviors to real-world SURTASS LFA sonar transmissions; the SRP results remain the best available science for assessing potential impacts associated with exposure to SURTASS LFA sonar. The SURTASS LFS SRP experiments exposed baleen whales to RLs ranging from 120 to about 155 dB re: 1 μPa rms SPL and detected only minor, short-term behavioral responses. Short-term behavioral responses do not necessarily constitute significant changes in biologically important behaviors. The behavioral response function is also conservative for non-LF specialists, as it was developed for species believed to be most sensitive to SURTASS LFA sonar. Therefore, although the results of the risk function modeling are interpreted such that they would constitute ''significant disruptions to biologically important behaviors,'' (*i.e.,* causing disruption of natural behavioral patterns, including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering, to a point where such patterns are abandoned or significantly altered) not all predicted exposures would in fact rise to such a level, and the resulting risk function modeling is conservative for all marine mammals.

Mitigation and Monitoring

Least Practicable Adverse Impact Determination

Comment 13: The Commission noted that NMFS' interpretation of the least practicable impact standard in various proposed rules has been an evolving one, and it is unclear that any of those discussions, targeted to specific instances, should be considered to constitute a formal interpretation. Rather, it is a shifting target that requires the Commission and other stakeholders to comment repeatedly on the various permutations. The Commission stated that such generally applicable policies and interpretations should be developed through a separate rulemaking (*e.g.,* in amendments to 50 CFR 216.103 or 216.105) or policy statement rather than in individual incidental take authorizations and recommended that NMFS pursue such a rulemaking or publish a proposed policy for public review and comment. The Commission expressed concerns that some stakeholders may not be aware of or choose not to comment on the proposed interpretation in this context, because the particular authorization may not otherwise be of interest to them (*e.g.,* because the activity is in a geographical location or concerns a type of activity not of particular interest).

Response: We appreciate the Commission's recommendation and may consider the recommended approaches in the future. We note, however, that providing relevant explanations in a proposed incidental take rule is an effective and efficient way to provide information to the reader and solicit focused input from the public, and ultimately affords the same opportunities for public comment as a stand-alone rulemaking would. NMFS has provided similar explanations of the least practicable adverse impact standard in other recent section 101(a)(5)(A) rules, including: the final rules for U.S. Navy Training and Testing Activities in the Atlantic Fleet Study Area (83 FR 57076; November 14, 2018) and the Hawaii-Southern California Study Area (83 FR 66846; December 21, 2018), as well as the proposed rule for Geophysical Surveys Related to Oil and Gas Activities in the Gulf of Mexico (83 FR 29212; June 22, 2018).

Comment 14: The Commission stated that in its previous letters it recommended that NMFS adopt a two-step approach when applying the least practicable adverse impact standard. First, it should identify the criteria it will use to determine whether adverse impacts on marine mammal species/stocks or their habitat are anticipated. If potential adverse impacts are identified, the second step should be to determine whether measures designed to reduce those impacts are available and practicable. The Commission expressed concern that, because NMFS' criteria for applying the least practicable adverse impact standard commingle elements related to whether impacts are adverse and whether potential mitigation measures are likely to be effective, NMFS' analysis is not as clear as it should be. The Commission therefore recommended that NMFS rework its evaluation criteria for applying the least practicable adverse impact standard to separate the factors used to determine whether a potential impact on marine mammals or their habitat is adverse and whether possible mitigation measures would be effective.

Response: The Commission recommends NMFS consider applicable factors in its least practicable adverse impact analysis in a specific manner. However, it did not provide any suggested criteria for determining its recommended first step.

NMFS has clearly articulated the agency's interpretation of the LPAI standard and our evaluation framework in the *Mitigation* section of this notice. Specifically, NMFS identified the adverse impacts that it is considering in the LPAI analysis and comprehensively evaluated an extensive suite of measures that might be available to reduce those impacts (some of which are adopted and some that are not) both in the context of their expected ability to reduce impacts to marine mammal species or stocks and their habitat, as well as their practicability (see *Mitigation* and *Negligible Impact Analysis and Determination* sections). In the *Mitigation* section, NMFS has explained in detail our interpretation of the least practicable adverse impact standard, the rationale for our interpretation, and our approach for implementing our interpretation. The ability of a measure to reduce effects on marine mammals is entirely related to its ''effectiveness'' as a measure, whereas the effectiveness of a measure is not connected to its practicability. NMFS' interpretation of the LPAI standard is a reasonable interpretation that gives effect to the language in the statute and the underlying legislative intent. Congress intended the agencies administering section 101(a)(5)(A) to consider practicability when determining appropriate mitigation, but we do not believe the analysis must be conducted in such a rigid sequential fashion. There is a tension inherent in the phrase ''least practicable adverse impact'' in that ''least [. . .] adverse impact'' pulls in favor of one direction (*i.e.,* expanding mitigation) while ''practicable'' pulls in favor of the other direction (*i.e.,* limiting mitigation), and weighing the relative costs and benefits is, in our view, a more meaningful way to address and resolve this tension. Contrary to the Commission's suggestion, there is no formulaic way to do this. As we explained in the discussion of the LPAI standard above using a simple hypothetical example to illustrate the point, means of minimizing adverse impacts at the species or stock level is not a black and white proposition. Further, the standard is accomplished

through mitigation imposed for individuals—yet the standard does not require that we minimize individual takes or impacts to the maximum extent practicable.

NMFS' approach laid out in this rulemaking acknowledges that, even when the negligible impact standard is met, NMFS must still consider mitigation under the LPAI standard. NMFS' approach recognizes that impacts to species or stocks of marine mammals accrue through individuals and, as such, allows for reducing impacts on individuals, but with a focus on measures designed to avoid or minimize impacts on marine mammals that are likely to increase the probability or severity of population level effects. The greater the likelihood that a measure will contribute to reducing the probability or severity of adverse impacts to a species or stock, the greater the weight that measure is given when considered in combination with practicability to determine the appropriateness of a mitigation measure. While the analysis we describe can be conducted for each measure, we read the ''means of effecting the LPAI'' standard as ultimately applying to the totality of all required measures taken together. Accordingly, NMFS can take into account other measures that will be implemented when considering the benefit of additional measures. NMFS has weighed the relevant considerations as explained in its fuller discussion of LPAI.

While the Ninth Circuit's opinion in *Pritzker* (83 F.3d 1125 (9th Cir. 2016)) did not directly address this question, the Court appeared to view NMFS' conceptual approach of weighing various considerations as an acceptable one. In response to our 2012 rule, where we described our approach as including ''a careful balancing of the likely degree to which the measure is expected to minimize adverse impacts to marine mammals with the likely effect of that measure on personnel safety, practicality of implementation, and impact on the effectiveness of military readiness activity,'' the Court said ''this formulation makes sense so far as it is stated,'' *Pritzker,* 828 F.3d at 1135 (emphasis added), though faulted NMFS for not meaningfully discussing how the measures it imposed would meet that standard. The legislative history on the 2004 MMPA amendments for military readiness activities provides further support, in that it shows Congress intended additional weighing for military readiness impacts and placed equal import on the military's need to conduct training activities. 2004 U.S.C.C.A.N. at 1447 (stating that the changes with the MMPA ''properly balance the equities associated with military readiness and maritime species protection'').

Comment 15: The Commission stated that section 101(a)(5)(A)(i)(II)(aa) of the MMPA specifies that incidental take regulations are to set forth permissible methods of taking pursuant to such activity, and other means of effecting the least practicable adverse impact on such species or stock and its habitat, paying particular attention to rookeries, mating grounds, and other areas of similar significance. The Commission stated that in this case, NMFS has only identified in the most general sense the means it will use to effect the least practicable adverse impact—it will identify and impose heightened protections in as yet unidentified OBIAs—and has provided no information to assess when and where NMFS believes it would be practicable for the Navy to abide by those exclusions. Only at the final rule stage would NMFS generate a list of the areas that meet the OBIA criteria, provide its rationale for determining which areas satisfy those criteria, and discuss whether requiring the Navy to employ mitigation measures in and near those areas would be practicable. The Commission stated that this approach is inconsistent with how NMFS has handled every previous rulemaking involving the Navy's activities, and more importantly, is inconsistent with the requirements of the Administrative Procedure Act (APA), which requires that NMFS give the public a meaningful opportunity to comment on what the agency is proposing. In this instance, the public is not being given a meaningful opportunity to comment on which OBIAs are appropriate to include in the final rule. Rather, commenters are left to speculate on which OBIAs NMFS might select and to comment in a vacuum as to whether those would be practicable for the Navy to meet its operational goals if some or all of the OBIAs that meet the criteria are included in the final rule. The Commission recommended that, in this and other proposed rules, NMFS inform the public what measures it is proposing to include in the final rule to satisfy the requirements of section 101(a)(5)(A)(i)(II)(aa) of the MMPA rather than leaving the public to speculate on all of the possibilities and the practicability of implementing them.

Response: NMFS disagrees with both the Commission's description of the lack of information that NMFS provided the public in the proposed rule and the assertion that it was inconsistent with the requirements of the APA. NMFS described a clear proposed process and detailed set of factors that would be used to identify OBIAs, both prior to the finalization of the rule, as well as adaptively throughout the course of the rule. Further, NMFS provided the public with a carefully evaluated and honed list (reduced from hundreds considered, down to 25 presented) of potential OBIAs that preliminarily met the biological criteria (in addition to the four that were already established for the geographic areas included in the Study Area) to provide input on. NMFS systematically described these OBIA candidates in the context of the OBIA process and factors and indicated all of the references from which the supporting information was obtained. The public was given adequate information upon which to base input on this mitigation, as required by the APA. The fact that the practicability of these areas for the Navy was not discussed in the proposed rule did not prevent the public from providing meaningful input on the information and potential OBIAs presented.

Comment 16: The Commission noted that the analysis provided in the **Federal Register** notice seems to conflate the species and habitat portions of the least practicable adverse impact standard. NMFS discussed the distinction between impacts on individual marine mammals versus impacts on species and stocks in some detail. However, that distinction is irrelevant when considering adverse impacts to important marine mammal habitat such as rookeries, mating grounds, and areas of similar significance. All of these types of areas are important at the species or stock level. Further, the Commission stated that it believes all of the areas that meet the OBIA designation criteria constitute important habitat for purposes of implementing section 101(a)(5)(A)(i)(II)(aa) of the MMPA and that mitigation measures to avoid or reduce adverse impacts to all of those areas should be included in the final rule unless such measures are not practicable. The Commission therefore recommended that, in the final rule, NMFS again require that the Navy ensure that none of the areas designated as OBIAs (or the 1 km buffer zones around them) are subjected to SURTASS LFA sonar received levels of 180 dB re 1 μPa or greater. Further, because the proposed rule did not include any information that indicates it would be impracticable for the Navy to adhere to such a limitation for any of the OBIAs under consideration, the Commission recommended that this mitigation

measure apply to all areas the Commission recommended be designated as OBIAs herein. If NMFS or the Navy believes it would be impracticable to implement the identified measures in any of those areas, then NMFS should make that case in a subsequent **Federal Register** notice and provide the public with an opportunity to comment on any proposed exceptions before adopting them.

Response: NMFS disagrees with the Commission's assertion that NMFS conflates the species and habitat portions of the LPAI standard. NMFS recognizes the LPAI standard includes a requirement to prescribe measures that will effect the least practicable adverse impact on both the affected species or stocks and their habitat. In our description of implementation of the standard, we state that reduction of habitat impacts is relevant, particularly as it relates to rookeries, mating grounds, and areas of similar significance, and can include measures to reduce impacts of an activity on known prey utilized in the area or reducing impacts on physical habitat. Our discussion of least practicable adverse impact points out that because habitat value is informed by marine mammal presence and use, in some cases there may be overlap in measures for the species or stock and for use of habitat. Here we have identified time-area restrictions based on a combination of factors that include higher densities and observations of specific important behaviors of the animals themselves, but these also clearly reflect preferred habitat. In addition to being delineated based on physical features that drive habitat function (*e.g.,* bathymetric features, among others), the high densities and concentration of certain important behaviors (*e.g.,* feeding) in these particular areas clearly indicates the presence of preferred habitat. Just because the OBIAs address both marine mammals and their habitat does not mean that NMFS has conflated the two pieces of the standard. The MMPA does not specify that effects to habitat must be mitigated in separate measures, and NMFS has clearly identified measures that provide for mitigation of impacts to both marine mammal ''species or stocks and their habitat,'' as required by the statute.

Further, this rulemaking evaluated the effects of SURTASS LFA sonar activities on marine mammal habitat, specifically including prey, and concluded that marine mammal prey will not be exposed to sustained duration and intensity of sound levels that would result in significant adverse effects to marine mammal food resources. Accordingly, no additional mitigation for habitat beyond the geographic based measures identified to minimize impacts on the affected species or stocks while using/occurring in certain preferred habitat (such as OBIAs), or the coastal standoff range was warranted.

To the Commission's last point, in consideration of input from the public and our final evaluation, NMFS identified 17 areas (in the form of 14 OBIAs) as satisfying the necessary biological and geographic qualifications for OBIA designation and the Navy found that the implementation of all of these areas as OBIAs would be practicable. Accordingly, all 14 OBIAs are included in the final regulations.

Comment 17: NRDC et al. expressed concern that NMFS, in its discussion of the LPAI standard, has set forth an interpretation that remains inconsistent with the plain language of the MMPA and with the Court's ruling in *Pritzker* (83 F.3d 1125 (9th Cir. 2016)). NRDC et al. stated that the agency reserves its consideration of mitigation measures to those that ultimately ''are likely to increase the probability or severity of population-level effects'' (84 FR 7228), and that it appears to base this understanding on an imputation of population-level harm into the ''least practicable adverse impact'' standard, and particularly into the standard's reference to ''such species or stock.'' NRDC et al. stated that the Court in *NRDC* v. *Pritzker* specifically rejected this assumption when the agency attempted to import it into the statute via its existing regulations concerning ''negligible impact.'' NRDC agreed with NMFS that the reduction of impacts to affected species or stocks ''accrues through the application of mitigation measures that limit impacts to individual animals'' and, consistent with this, ''focuses on measures that are designed to avoid or minimize impacts on individual marine mammals'' that, in turn, ''are likely to increase the risk of population-level effects'' (citing to 84 FR 7228). They cite as an example that the agency recognizes measures ''limiting interruption of known feeding, breeding, mother/young, or resting behaviors'' as having ''greater value'' for mitigation. However, NRDC stated that NMFS' formulation remains problematic in practice. NRDC stated that in detaching itself from the MMPA's ''take provision,'' it creates ''vagueness that leaves the provision open to inconsistent, arbitrary application'' and that the proposed rule appears to wander beyond the interpretation that NMFS sets down when it rejects the White Paper (*Identifying Areas of Biological Importance to Cetaceans in Data-Poor Regions*) guidelines to establish OBIAs in data-poor regions. NRDC et al. state that the proposed rule: ''does so on the grounds [. . .] that establishing OBIAs would not further reduce fitness consequences (*i.e.,* 'the potential for impacts on reproduction or survival') in individual marine mammals and thus would not reduce the probability of population-level harm. Id. at 7247. Yet this is an ostensibly higher bar than is articulated by the agency in its section interpreting the least practicable adverse impact standard, requiring actual reduction of fitness impacts rather than reduced disruption of behavioral responses associated with fitness. Compare *id.* at 7229 (listing factors having 'greater value' for mitigation to include 'limiting interruption of known feeding, breeding, mother/young, or resting behaviors'). Putting aside the inconsistency with the statute, discussed above, our practical concern is that NMFS' interpretation will be used as a convenient legal defense—just as it was in *Pritzker*—to prop up an insufficient analysis. NMFS should ensure that it applies the ''least practicable adverse impact'' standard in a manner that reduces the impacts (*e.g.,* Level A and Level B harassment take) that Congress intended to prohibit in adopting the MMPA.''

Response: NMFS' interpretation and implementation of the LPAI standard is not inconsistent with the statute or the *Pritzker* decision, as described in the *Mitigation* section of this rule (and not re-included here). We interpret the LPAI standard as having a species or stock-level focus but believe the reduction of impacts to those species or stocks accrues through the application of mitigation measures that limit impacts to individual animals. Accordingly, NMFS' analysis focuses on measures that are designed to avoid or minimize impacts on individual marine mammals that are likely to increase the probability or severity of population-level effects. NMFS acknowledges that it is not a mathematical formula; in evaluating a measure, consideration of its value and its practicability will necessarily involve exercise of the agency's professional judgment taking into account the specified activity and other contextual factors. NMFS' rule fully discusses its evaluation applying the standard it sets forth. Moreover, there is no inconsistency in the standard and the application in view of the full discussion in this rule. The language quoted in the comment cannot be isolated from the context of the full

discussion in the rule and then cited as proof of inconsistency. Specifically, to support its assertion, NRDC points to our rationale for not adopting the recommendations in the White Paper (discussed in detail in the *Mitigation* section). The comment mischaracterizes our conclusions by suggesting our reasoning is based solely on the fact that the recommendations in the White Paper will not further reduce fitness consequences of individuals and thus would not reduce population level harm. This ignores the fuller discussion, in which our assessment shows that the proposed mitigation would add little, if any, value for lowering the probability or severity of impacts to individual marine mammal fitness, but also that it is highly impracticable for the Navy. Thus, the White Paper recommendations were not adopted based on a straightforward application of the LPAI standard.

Procedural Mitigation Effectiveness and Recommendations

Comment 18: The Commission recommended that, in the final rule, NMFS require the Navy to (1) use a 30-minute clearance time when a marine mammal has not been observed to have left the mitigation zone, consistent with other Navy activities and (2) conduct post-activity monitoring including visual, passive acoustic, and active acoustic monitoring for 30 rather than 15 minutes.

Response: A 30-minute post monitoring timeframe is more widely used in other authorizations mainly due to the fact that marine mammal detections are largely reliant on visual surveys and this time accounts for marine mammals with longer-duration dives. In addition to visual and passive acoustic monitoring, the HF/M3 (active acoustic monitoring system) is used with SURTASS LFA sonar activities. Detection through active acoustics is typically not used with authorizations for other activities. However, given the near 100 percent effectiveness of the HF/M3 system with multiple pings (see response to Comment 7), in combination with the two other mitigation monitoring efforts (visual and passive acoustic monitoring), NMFS feels confident that any marine mammals present in the mitigation zone would be detected within the 15-minute timeframe.

Comment 19: The Commission noted that it does not appear that the Navy has conducted a study to investigate the effectiveness of the suite of mitigation measures currently being employed or proposed for SURTASS LFA sonar activities and that such a study would be prudent. The Commission noted that determination of effectiveness has been based solely on what has been ''observed'' via the three monitoring methods and some theoretical assumptions. True ''effectiveness'' studies evaluate not only the animals that are detected, but also those that are missed. The Navy is conducting a lookout effectiveness study to assess the effectiveness of visual monitoring. A similar study, including the assessment of both passive and active acoustic monitoring, would provide a more appropriate means than the Navy's current approach for concluding that the measures are 100 percent effective.

Response: The effectiveness of the HF/M3 sonar system to monitor and detect marine mammals has been assessed. Details on this assessment and the effectiveness of the HF/M3 system are provided in a technical report by Ellison and Stein (2001), the 2001 SURTASS LFA FOEIS/EIS (see subchapters 2.3.2.2 and 4.2.7.1 for the HF/M3 sonar testing results), as well as Chapter 4, Section 5.4.3 of the 2019 SURTASS LFA FSEIS/SOEIS. The study qualitatively and quantitatively assessed the HF/M3 system's ability to detect marine mammals of various sizes with 170 hours of at-sea testing, including trials off the coast of San Diego with trained bottlenose dolphins, as well as several developmental tests with artificial targets (which allowed for examination of whether these methods potentially miss animals). The results indicate a near 100 percent probability of detecting marine mammals before they enter the LFA mitigation zone. As noted by the commenter, the Navy continues to assess the effectiveness of its mitigation measures. The results of any new studies will be assessed through the Adaptive Management process. NMFS acknowledges the limitations associated with visual and passive acoustic monitoring, but together with the near 100 percent effectiveness of active acoustic monitoring with the HF/M3 sonar system, NMFS has determined that these mitigation monitoring measures are highly effective.

Comment 20: NRDC et al. noted that the proposed mitigation distance resulting in sound pressure levels within OBIAs and coastal exclusion zones not to exceed 180 dB re 1 μPa (rms) bears no relation to the Navy's behavioral response function, even though the agencies have repeatedly identified behavioral disruption as the primary marine mammal impact of concern from LFA sonar, or to any qualitative assessment of stress response or masking effects. NRDC et al. noted that it roughly reflects the Navy's threshold for the onset of auditory injury per NMFS guidance. NRDC et al. stated that the 180 dB threshold fails to meaningfully protect marine mammals from the behavioral impacts that the agencies have repeatedly characterized as the impacts of primary concern. They noted that according to prior Navy analysis, the 175–180 dB (rms) annulus has an average ''take'' risk of 91.5 percent, the 170–175 dB (rms) annulus a take risk of 80.5 percent, the 165–170 dB (rms) annulus a risk of 61.5 percent, the 160–165 dB annulus a risk of 38.5 percent (rms), the 155–160 dB annulus a risk of 18 percent, and the 150–155 dB annulus a risk on the order of 8–9 percent (see 2007 SEIS at 4–74). They stated that given the greater area subsumed within the lower-decibel annuluses, the number of takes occurring within even the 150 dB annulus can be high, despite the lower relative risk. NRDC et al. stated that the geographic sound field operational constraints designed to eliminate LFA exposures out to at least 150 dB (rms) are likely to be practicable for most, if not all, OBIAs, as the Navy already avoids dive sites out to 145 dB (rms) (DSEIS at 5–5), nominally requiring a greater mitigation distance than a 150 dB (rms) standoff would entail. They stated that the Navy's broad claim of impracticability for any mitigation threshold lower than 180 dB exemplifies the non-rigorous rationalizing that the court in *Conservation Council* found unconvincing and unsupportable under the MMPA (See 97 F.Supp.3d at 1229–31). NRDC et al. stated that NMFS' ''practicability criterion'' requires a site-specific discussion, with the Navy, of any OBIA that the Navy initially determines to be impracticable, to see if a modification of the OBIA can address the issue. They recommended that the Navy and NMFS presumptively adopt a 150 dB (rms) mitigation distance from each OBIA, except where geographically specific, clearly stated operational needs make such a distance impracticable, in which case it should adopt the largest practicable distance, to be determined on a case-by-case basis according to the procedure set forth in the ''practicability criterion.''

Response: After the development of NMFS' 2018 Acoustic Technical Guidance, NMFS and the Navy reevaluated the use of 180 dB re: 1 μPa rms as the basis for the LFA mitigation zone and concluded that 180 dB would be retained as the mitigation basis (see the *Mitigation* section of this final rule and Chapter 5, Section 5.2 of the 2019

SURTASS LFA FSEIS/SOEIS for details on this reevaluation). However, in consideration of updated PTS and TTS thresholds, the 180 dB threshold for the OBIA and the coastal exclusion zone boundaries is expected to preclude not only PTS at the outer perimeter of these areas, but also likely some instances of TTS and more severe forms of Level B harassment by behavioral disruption. Moreover, the 180 dB threshold applies at a distance 1 km from OBIA boundaries, further reducing exposure levels at the OBIA perimeters to approximately 174 dB. In addition, the likelihood and severity of behavioral harassment is further reduced within these important areas as maximum received levels in these areas are even lower the farther an animal is from the perimeter and the farther the vessel is from the edge. In other words, while an individual in the coastal exclusion zone might be exposed to levels as high as 180 dB (174 dB if in an OBIA, given the 1 km buffer) briefly if animal is at the edge and a SURTASS LFA vessel has approached at the closest allowable distance from the edge—the majority of individuals within the area will always be exposed to levels increasingly lower than that (the farther they are from the edge), plus the vast majority of the time SURTASS LFA vessels will not be right at the edge. Therefore, while this mitigation measure based on 180 dB will not totally avoid all takes within OBIAs, it will meaningfully reduce both the number and severity of takes within these important areas significantly by ensuring that the majority of individual marine mammals within these areas are exposed to lower levels with lower probabilities of being taken, and less severe responses if the take occurs.

Regarding the comments about practicability, NMFS and the Navy have thoroughly evaluated the practicability of all of the mitigation measures, including the OBIAs and their associated 180-dB zones, and in consideration of public comments have added an additional measure to further minimize behavioral harassment within OBIAs. Specifically, no more than 25 percent of the authorized amount of SURTASS LFA sonar will be used for training and testing within 10 nmi (18.5 km) of any single OBIA during any year unless it is required for national security, permission is obtained from the appropriate designated Command authority prior to commencement of the activity, NMFS is notified as soon as is practicable, and these sonar hours are reported in annual activity reports. This measure ensures that exposures (and thereby probability and severity of Level B harassment) to LFA sonar of individuals within OBIAs will be even further limited, both in received level and time. Specifically, the already protective circumstances described for OBIAs above will be in place up until an OBIA has been exposed to LFA sonar for 124–148 hours per year; beyond that number of hours, the maximum received level an individual may be exposed to (when both the animal is at the edge and the vessel at its closest approach) would be substantially reduced and, as described above, any marine mammals further within the OBIA would be exposed to even lower levels, and even lower when the vessel is not right at the edge.

Further, it is inappropriate to compare the 145-dB zone around dive sites to the 180-dB zone around OBIAs, as they have different purposes and are subject to different requirements. Whereas the goal of the 145-dB zone around dive sites is generally to avoid any impacts to human divers and is in no way associated with the requirements of the MMPA, take of marine mammals is expected and authorized to occur, but as required by the MMPA, NMFS and the Navy have ensured that the extensive suite of measures required will effect the least practicable adverse impact.

Comment 21: NRDC et al. stated that the criteria NMFS adopted [NMFS' Acoustic Technical Guidance], following the Navy, to estimate temporary and permanent threshold shift in marine mammals are erroneous and non-conservative. They stated that Wright (2015) identified several statistical and numerical faults in the Navy's approach, such as pseudo-replication and inconsistent treatment of data that tend to bias the proposed criteria towards an underestimation of effects. NRDC et al. stated that similar and additional issues were raised by a dozen scientists during the public comment period on the draft Acoustic Technical Guidance held by NMFS and noted that at the root of the problem is the agencies' broad extrapolation from a small number of individual animals, mostly bottlenose dolphins, without taking account of what Racca et al. (2015) have succinctly characterized as a ''non-linear accumulation of uncertainty.''

Response: NMFS disagrees with this characterization of the Acoustic Technical Guidance and the associated recommendation. The Acoustic Technical Guidance is a compilation, interpretation, and synthesis of the scientific literature that provides the best scientific information regarding the effects of anthropogenic sound on marine mammals' hearing. The Technical Guidance was classified as a Highly Influential Scientific Assessment and, as such, underwent three independent peer reviews, at three different stages in its development, including a follow-up to one of the peer reviews, prior to its dissemination by NMFS. In addition, there were three separate public comment periods, during which time we received and responded to similar comments on the guidance (81 FR 51694; August 4, 2016), which we cross-reference here, and more recent public and interagency review under Executive Order 13795. This review process was scientifically rigorous and ensured that the Guidance represents the best scientific data available. Furthermore, the recent peer-reviewed updated marine mammal noise exposure criteria by Southall *et al.* (2019) provide identical PTS and TTS thresholds to those provided in NMFS' Acoustic Technical Guidance.

NMFS disagrees with any suggestion that the use of the Acoustic Technical Guidance provides erroneous results. The use of the 180-dB rms threshold to identify where PTS would occur is plainly outdated, as the best available science indicates that rms SPL is not an appropriate metric by which to gauge potential auditory injury (whereas the scientific debate regarding thresholds for Level B harassment by behavioral disruption is not about the proper metric but rather the proper level or levels and how these may vary in different contexts).

Regarding the suggestion that the thresholds are non-conservative, multiple studies from humans, terrestrial mammals, and marine mammals have demonstrated less TTS from intermittent exposures compared to continuous exposures with the same total energy because hearing is known to experience some recovery in between noise exposures, which means that the effects of intermittent noise sources such as tactical sonars are likely overestimated. Marine mammal TTS data have also shown that, for two exposures with equal energy, the longer duration exposure tends to produce a larger amount of TTS. Most marine mammal TTS data have been obtained using exposure durations of tens of seconds up to an hour, much longer than the durations of many tactical sources (much less the continuous time that a marine mammal in the field would be exposed consecutively to those levels), further suggesting that the use of these TTS data are likely to overestimate the effects of sonars with shorter duration signals.

Regarding the suggestion of pseudo-replication and erroneous models, since

marine mammal hearing and noise-induced hearing loss data are limited, both in the number of species and in the number of individuals available, attempts to minimize pseudo-replication would further reduce these already limited data sets. Specifically, with marine mammal behavioral temporary threshold shift studies, behaviorally derived data are only available for two mid-frequency cetacean species (bottlenose dolphin, beluga) and two phocids (in-water) pinniped species (harbor seal and northern elephant seal), with otariid (in-water) pinnipeds and high-frequency cetaceans only having behaviorally-derived data from one species. Arguments from Wright (2015) regarding pseudo-replication within the TTS data are therefore largely irrelevant in a practical sense because there are so few data points. Multiple data points were not included for the same individual at a single frequency. If multiple data points existed at one frequency, the lowest TTS onset was always used. There is only a single frequency where TTS onset data exist for two individuals of the same species: 3 kHz for dolphins. Their TTS (unweighted) onset values were 193 and 194 dB re 1 μPa^2s. Thus, NMFS believes that the current approach makes the best use of the given data. Appropriate means of reducing pseudo-replication may be considered in the future, if more data become available. Many other comments from Wright (2015) and the comments from Racca et al. (2015b) appear to be erroneously based on the idea that the shapes of the auditory weighting functions and TTS/PTS exposure thresholds are directly related to the audiograms; *i.e.,* that changes to the composite audiograms would directly influence the TTS/PTS exposure functions (*e.g.,* Wright (2015) describes weighting functions as ''effectively the mirror image of an audiogram'' (p. 2) and states, ''The underlying goal was to estimate how much a sound level needs to be above hearing threshold to induce TTS.'' (p. 3)). Both statements are incorrect and suggest a fundamental misunderstanding of the criteria/threshold derivation. This would require a constant (frequency-independent) relationship between hearing threshold and TTS onset that is not reflected in the actual marine mammal TTS data. Attempts to create a ''cautionary'' outcome by artificially lowering the composite audiogram thresholds would not necessarily result in lower TTS/PTS exposure levels, since the exposure functions are to a large extent based on applying mathematical functions to fit the existing TTS data.

Comment 22: NRDC et al. stated the proposed rule gives little consideration to expanding the LFA coastal exclusion zone, assuming, based on its analysis in prior environmental reviews, that its standoff distance should remain 12 nmi from shore. The commenters stated that this reliance on prior analyses is not supportable.

Response: As described in the *Mitigation* section, the Navy's 2007 SURTASS LFA FSEIS/SOEIS evaluated increasing the coastal standoff distance up to 46 km (25 nmi). Based on a six-step analysis process, its analysis showed that increasing the coastal standoff range would decrease exposure to higher received levels for concentrations of marine animals closest to shore, but would do so at the expense of increasing exposure levels for shelf break and pelagic species. This result is due to the reduced overlap of the exposure area with land leading to an increase in exposure area as the sound source moves farther offshore. There have been no changes to the best available scientific information or other indications that the coastal standoff distance should be increased since this analysis; therefore, there is no change in this mitigation measure from previous rulemakings. Nonetheless, it is also erroneous to say that the new rule gives no consideration to further extending the coastal exclusion, given the extensive analysis of the White Paper (see *Mitigation* section and response to Comment 23 immediately below), which included a recommendation for a larger coastal exclusion. As noted in the 2012 final rule (77 FR 50290; August 20, 2012), over 80 percent of the existing and potential marine protected areas reviewed were within 12 nmi from a coastline, indicating the effectiveness of the coastal standoff as one of the primary mitigation measures for reducing potential impacts to marine mammals. OBIAs expand upon this protection by avoiding or minimizing impacts in areas beyond the coastal standoff distance where marine mammals are known to engage in specific behaviors that may lead to more severe impacts if interrupted; known to congregate in higher densities; and/or known to have a limited range and small abundance that creates more vulnerability for the stock as a whole. These criteria are important when determining whether mitigation would be likely to reduce the probability of effects to individuals that would translate to minimization of impacts at the population level under the LPAI standard.

Comment 23: NRDC et al. noted that they have called on the Navy and NMFS to adopt a more expansive, more biologically meaningful coastal exclusion, particularly one that protects the continental shelf and slope with a standoff from the shelf break. They noted that NMFS' own subject-matter experts, in the White Paper, recommend that, absent specific data to the contrary, ''all continental shelf waters and waters 100 km of the continental slope should be designated as biologically important habitat for marine mammals.'' They recommended that NMFS, in consultation with the Navy, should consider alternative coastal exclusion areas.

Response: NMFS carefully considered the White Paper's recommendations and we present an evaluation of the White Paper's recommendation to restrict LFA sonar transmissions from all continental shelf waters and waters 100 km seaward of continental slope in the *White Paper Specific Recommendations* subsection of the *Mitigation* section. As discussed in this section, given the other mitigation measures we are requiring, takes of marine mammals would be limited to Level B harassment in the less severe range of behavioral reactions and some TTS, as described above. Consequently, the only additional anticipated value to restricting SURTASS LFA sonar activities in continental shelf waters and waters 100 km seaward of continental slope would be some potential, though not certain or significant, reduction in the number of less severe behavioral reactions in those areas. In general, not all behavioral responses rise to the level of a take and not all harassment takes result in fitness consequences to individuals that have the potential to translate to population consequences to the species or stock. Given the anticipated impacts of SURTASS LFA sonar, there is little to no likelihood that the impacts of the anticipated takes would accrue in a manner that would impact a species or stock even in the absence of any additional mitigation. Considered with the uncertain potential of this proposed recommendation to provide meaningful incremental reduction of risk or severity of impacts to individual marine mammals, NMFS concludes that this recommendation would not reasonably be expected to provide a reduction in the probability or degree of effects on any marine mammal species or stocks. Moreover, NMFS discusses why the measure would not be practicable for the Navy to implement. NMFS acknowledges that while these measures could potentially reduce the numbers of

takes of some individual marine mammals within a limited number of species, or could add some small degree of protection to preferred habitat or feeding behaviors in certain circumstances, this limited and uncertain benefit did not justify adopting the White Paper's recommendations considering the existing mitigation measures already implemented by the Navy and the high degree of impracticality for Navy implementation.

Offshore Biologically Important Areas (OBIAs)

OBIA Criteria/Evaluation Process

Comment 24: The Commission noted that a lack of data or insufficient data regarding marine mammal presence and abundance is not an adequate basis for failing to adopt precautionary measures, especially when such data are not available for most of the world's oceans. The Commission noted it made this point in its 2011 letter on a previous DSEIS and the U.S. Court of Appeals for the Ninth Circuit remanded the SURTASS LFA sonar case on that basis. The Commission stated that the Ninth Circuit indicated that NMFS and the Navy should have considered whether a precautionary approach would give more protection to marine mammals, and then whether that protection would impede military training to a degree that makes such mitigation impracticable. The Commission stated that it appears that NMFS is failing to take a sufficiently precautionary approach, particularly with respect to the Pacific Remote Island MNM.

Response: We acknowledge that the Ninth Circuit opinion stated that NMFS ''should have considered whether 'the precautionary approach' would give more protection to marine mammals, and then whether that protection would impede military training to a degree making that mitigation not practicable.'' *Pritzker,* 828 F.3d at 1138. The Court went on to fault NMFS for not considering the White Paper's recommendations. Taken in the context of the Court's full discussion, however, we read the Ninth Circuit's use of the term ''the precautionary approach'' as specifically referring to the recommendations in the White Paper for designating OBIAs in ''data-poor'' regions of the ocean (described therein as a precautionary approach for designating OBIAs), rather than a broader mandate to adopt a ''precautionary approach'' in carrying out the requirements of the statute.

In response to the Ninth Circuit's opinion and in the context of the LPAI standard, for this rulemaking NMFS directly considered the White Paper recommendations (see discussion of the White Paper recommendation in the *Mitigation* section). We considered the factors as instructed by the Court, although we ultimately did not adopt the White Paper's recommendations.

NMFS' interpretation of the Ninth Circuit's opinion is based on the fact that neither the MMPA nor NMFS' implementing regulations include references to, or requirements for, the precautionary approach, nor is there a clear, agreed-upon description of what the precautionary approach is or would entail in the context of the MMPA or any specific activity. Nevertheless, the MMPA by nature is inherently protective, including the requirement to mitigate to the lowest level practicable (''least'' practicable adverse impacts, or ''LPAI,'' on species or stocks and their habitat).[1] This requires that NMFS assess measures in light of the LPAI standard. To fulfill that requirement, NMFS considers all measures that we are reasonably aware of (*e.g.,* from recommendations or review of data) that have the potential to reduce impacts on marine mammal species or stocks, their habitat, or subsistence uses of those stocks, regardless of whether those measures are characterized as ''precautionary'' or address ''data-poor'' areas. Through the LPAI standard, NMFS considers ''precautionary'' recommendations such as those contained in the White Paper. As discussed below, the OBIA process specifically allows for consideration of areas that could be characterized as relatively ''data-poor'' and we also considered measures that provide for mitigation in data-poor areas under the LPAI standard (independent of the OBIA process, *i.e.,* the White Paper). In short, we believe the requirements of section 101(a)(5)(A), including the LPAI standard, have been satisfied.

The Ninth Circuit's *Pritzker* decision faulted NMFS for not considering the White Paper mitigation recommendations for ''data-poor areas'' against the OBIA standards NMFS had set for the 2012 rule. We do not read the opinion as holding that the MMPA compelled a change in the criteria and process for evaluating OBIAs. Again, NMFS addressed the Court's decision by separately and independently evaluating the White Paper's recommendations for benefits to the affected species or stocks and practicability, without regard to the OBIA criteria. Using the best available information, NMFS considered the recommendations in the White Paper under our interpretation of the LPAI standard and determined the measures (as well as smaller buffer distances) were not warranted, as described in those sections of this rule.

In reaching the conclusion that NMFS' record for the 2012 rule did not establish the agency had satisfied the LPAI standard, the Court determined that NMFS failed to consider an important aspect of the problem, ''namely the underprotection that accompanies making conclusive data an indispensable component of OBIA designation,'' and that this ''systematic underprotection of marine mammals''

[1] We are aware of statements we made in the preamble for our 2001 incidental take regulations for the Navy's ship shock tests (66 FR 22450, 22453 (May 4, 2001)), in which we evaluated the impact of underwater detonations that propagate shock waves through a ship's hull under deliberate and controlled conditions to simulate near misses from underwater explosions similar to those encountered in combat. In that case, NMFS was authorizing up to four mortalities and six non-serious injuries of various species. During that rulemaking we received a public comment stating that in the absence of adequate data, NMFS and the Navy should apply the precautionary principle, ''the fundamental elements of the principle being: the existence of some indication of threat of harm; the harm is serious or irreversible; scientific uncertainty as to the nature or severity of the outcome; and an obligation on decision-makers.'' Our response said:

The MMPA prohibits the taking of marine mammals unless exempted or permitted. Taking means to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal. Therefore, NMFS believes that the precautionary principle is already at the core of the MMPA. However, because the MMPA authorizes the taking of marine mammals under section 101(a)(5), provided certain conditions and requirements are met, NMFS must prudently apply the Precautionary Principle through careful analysis of impacts and implementation of measures that will reduce impacts to marine mammals to the lowest level practicable. As described in this document, NMFS believes that it and the Navy have applied the Precautionary Principle to the greatest extent possible for this action through an extensive aerial monitoring and mitigation program that will protect marine mammals to the greatest extent practicable. The mitigation and monitoring program are discussed later in this document. In addition, NMFS and the Navy have applied the precautionary principle by having the decision-making process in the public forum through NEPA and notice and comment rulemaking.

Taken as a whole, we do not view that response as inconsistent with our current position. We agree here that the MMPA is inherently protective. As for the mitigation imposed for the ship shock trials, we said we conducted a careful analysis of impacts and implementation of measures that will reduce impacts to marine mammals to the lowest level practicable. This consisted of an extensive aerial monitoring program, delaying detonations, and requirements for good visibility and daylight. Those specific measures would be appropriate under the LPAI approach we set forth in this rule assuming similar circumstances. The risks to individual marine mammals from the ship shock tests were potentially irreversible in terms of acute impacts to fitness in light of the nature of the specified activity, and the mitigation and monitoring measures were deemed appropriate to achieve the LPAI standard.

cannot be consistent with the requirement that mitigation measures result in the ''least practicable adverse impact'' on marine mammals.'' *Pritzker,* 828 F.3d 1125 at 1140. While we have corrected the identified deficiency by evaluating the White Paper measures independent of the OBIA criteria, we disagree with the suggestion that the prescribed mitigation is systematically underprotective.

We emphasize that NMFS' (and the Navy's) informational standards for OBIAs and other mitigation measures, while data-driven, do not require scientific certainty or conclusive data. This is illustrated by the fact that the OBIA criteria and factors allow for consideration of a variety of information sources, including historic whaling data, stranding data, sightings information, and regional expertise, to name a few examples of the data considered. As more detailed in Appendix C of the 2019 SURTASS LFA FSEIS/SOEIS, supporting documents that are considered include peer-reviewed articles; scientific committee reports; cruise reports or transects; personal communications or unpublished reports; dissertations or theses; books, government reports, or NGO reports; and notes, abstracts, and conference proceedings. In fact, NMFS has designated OBIAs for areas based on these types of information sources (whaling data, stranding data, unpublished reports, etc.). For example, the evidence supporting the designation of the Southern Bali OBIA (designated in this rule) is largely from an unpublished report of line-transect surveys and the National Marine Mammal Stranding Network of Indonesia.

Thus, we disagree that we are failing to take a sufficiently precautionary approach. The Pacific Remote Islands Marine National Monument (Wake/Johnson/Palmyra atolls and Kingman Reef Units, which are located in the SURTASS LFA Study Area) was on the OBIA Watchlist and was considered as a candidate OBIA. NMFS and the Navy reviewed all available data and no specific important biological behaviors of marine mammals have been characterized in these waters. As such, this marine area did not meet the biological criteria required for designation of an OBIA and was not further considered currently as an OBIA.

Comment 25: The Commission stated its concern that although NMFS has identified potential OBIAs it might include in the final rule, it has neither specified which ones it actually is proposing to include nor provided any assessment of whether it believes including specific areas that meet the designation criteria would be practicable. Rather, NMFS has only requested public comment on whether any of the potential areas satisfy the OBIA criteria, after which time the Navy and NMFS would, apparently without any additional public input, evaluate the practicability of those measures to avoid or reduce impacts in those areas. The Commission stated that NMFS' approach effectively undermines the ability of the Commission and others to provide informed comments on that portion of the proposed rule.

Response: In the **Federal Register** notice of the proposed rule, we described the process NMFS and the Navy used to identify and evaluate potential OBIAs and presented 25 areas considered for potential designation as new OBIAs for this rulemaking. We presented the draft analysis for these potential OBIAs using the identified OBIA criteria and factors in a document entitled *Potential Marine Mammal OBIAs for SURTASS LFA Sonar; Marine Areas Under Consideration.* Through the proposed rule, the public had the opportunity to comment on the OBIA analysis and designation process (including practicability) and potential OBIAs (including recommending additional OBIAs). As noted in response to Comment 15, we disagree that the ability to provide informed comments was undermined, given the public was provided a discrete, manageable list of potential OBIAs supported by our preliminary analysis, and that NMFS was accepting and addressing input regarding biological qualifications and practicability. Further, as always, NMFS will also consider entirely new recommendations for OBIAs through the adaptive management process, and will do so utilizing the process and types of information described in the proposed rule.

Comment 26: NRDC et al. recommended that NMFS reconsider the guidelines for capturing biologically important marine mammal habitat in data-poor areas that its subject-matter experts provided during the last LFA authorization cycle (in the White Paper) and that were addressed by the Ninth Circuit. NRDC et al. stated that information on cetacean distribution and habitat use demonstrate that the White Paper guidelines (as described in their additional comments on OBIAs) hold true in almost every case, with important marine mammal habitat areas occurring along continental shelf and shelf edge waters (*e.g.,* the multi-species migratory route off western Australia), around seamounts and island systems (*e.g.,* the humpback whale feeding area supported by the bathymetric and oceanographic complexity of the Commander Islands), and in other areas of high productivity (*e.g.,* the multi-species feeding area supported by the North Pacific Transition Zone). NRDC et al. recommend that NMFS reconsider the White Paper guidelines.

Response: See response to Comment 23. NMFS carefully considered the White Paper's recommendations and we present an evaluation of the White Paper's recommendations in the *White Paper Specific Recommendations* subsection of the *Mitigation* section.

Comment 27: NRDC et al. recommended that NMFS consider alternative habitat models and (particularly in the Northwest Pacific) additional line-transect data for identifying areas of biological importance. NRDC et al. stated that it is prudent for NMFS to consider alternative modeling approaches capable of accounting for non-standardized collection of survey data and opportunistic sightings such as those presented in Corkeron et al. (2011), Lambert et al. (2014), and Mannocci et al. (2015). NRDC et al. noted that the IWC–POWER large-area transect surveys conducted by Japan over the last decade provide a basis for empirically grounded modeling and identification of high-density habitat for most of the Navy's Northwest Pacific operations area. NRDC et al. note that NMFS now has the data needed to conduct a data-based analysis in this region at least, satisfying its own criteria for OBIA identification. NRDC et al. recommended that NMFS should consult the same subject-matter experts it drew upon during the last authorization cycle, who are the agency's experts in marine mammal habitat modeling in the North Pacific.

Response: NMFS and the Navy are aware of the active area of research in developing habitat-based models that extrapolate cetacean densities beyond surveyed regions. For example, the Navy and NMFS were reviewers of and used the results of Mannocci et al. (2017) for the U.S. Navy's Atlantic Fleet Training and Testing area NEPA analyses and MMPA rulemaking. As previously noted in the response to Comment 3, it is possible that the sighting results from the IWC–POWER cruises could be used to extrapolate density and abundance estimates throughout the North Pacific in the future, using the methods developed by Mannocci et al. (2015) that were applied to extrapolate density estimates in the North Atlantic (Mannocci et al., 2017). Cruise reports through 2017 are

available online, with cruises continuing for another few years. When additional results are available, NMFS and the Navy will consider use of these methods to extrapolate density and abundance estimates that could inform identification of biologically important areas through the Adaptive Management process. Lambert et al. (2014) used the simulated distribution of micronekton from the Spatial Ecosystem And Population Dynamics Model (SEAPODYM) to predict the habitat of three cetacean guilds in tropical waters. While their results provide some interesting insights into the use of predicted prey maps in cetacean distribution models, they are best used to prioritize future research areas. Corkeron et al. (2011) developed statistical methods for using spatially autocorrelated sighting results to identify the Dhofar coast of Oman as an important region for the Arabian Sea DPS of humpback whales. However, the Dhofar coast of Oman is outside of the SURTASS LFA sonar Study Area and Corkeren et al. (2011) state ''Although it is theoretically possible for us to project model predictions into other areas, we consider this inadvisable, as our basic design was not to make inference about the distribution of humpback whales along the entire Oman coast.'' Therefore, though its statistical models could be applied to sightings data within the SURTASS LFA Study Area, the humpback whale results are not applicable. NMFS and the Navy will continue to consider, discuss and examine the utility of these models for identifying important areas for marine mammals in the SURTASS LFA sonar Study Area.

Comment 28: NRDC et al. recommended that NMFS and the Navy communicate directly with researchers in the Indian Ocean and Asia to identify potential areas of biological importance, including areas with high cetacean abundance. NRDC et al. included a list of contacts in their comment letter (Appendix).

Response: NMFS and the Navy acknowledge the importance of regional input to identify and gather data for areas of biological importance to marine mammals for which information may not be available in published literature. To obtain the best available data for each potential OBIA, NMFS and the Navy conducted a deep and comprehensive literature review. As described in the response to Comment 24 the Navy and NMFS considered a variety of information sources when evaluating the potential of an area as an OBIA (detailed in Appendix C of the 2019 SURTASS LFA FSEIS/SOEIS), including information gathered from regional experts. NMFS and the Navy contacted regional experts when available information was not sufficient to determine whether an area met the OBIA criteria and factors. In these cases NMFS and the Navy contacted regional researchers known to be conducting research or surveys in the area. The Navy and NMFS contacted marine mammal researchers in the Marianas and Guam region to request copies of their marine mammal sighting data to gain an understanding about the areas already identified via survey effort where marine mammals may be aggregating and conducting biologically important behaviors. We also provided the opportunity for regional researchers to comment on the potential OBIAs and the OBIA analysis, and to suggest additional OBIAs for consideration through the public comment process on the proposed rule and the 2018 SURTASS LFA DSEIS/SOEIS. In addition to using information gathered from regional experts and presented in reports with regional authors (for example, through the IMMA and EBSA designation process), as noted in response to Comment 24 and detailed in Appendix C of the 2019 SURTASS LFA FSEIS/SOEIS, we also used a variety of supporting documents including peer-reviewed articles; scientific committee reports; cruise reports or transects; personal communications or unpublished reports; dissertations or theses; books, government reports, or NGO reports; and notes, abstracts, and conference proceedings. At any rate, NMFS and the Navy have considered the best available science in the development of this SURTASS LFA sonar final rule. Given limited agency resources, the limited likely value added beyond our already extensive research, and the fact that there is no requirement that the agency communicate directly with all experts in a particular topic, we have not contacted all of the individuals recommended by NRDC.

In a related effort, NMFS and the Navy have obligated funding to convene a Working Group/Expert Elicitation effort (beginning in 2020) to update existing Biologically Important Areas and identify new areas outside of the U.S. Exclusive Economic Zone (EEZ). As applicable, the results of this effort would be considered through the adaptive management provision of the rule.

Comment 29: NRDC et al. expressed concern that NMFS' selection criteria for OBIAs maintain an evidentiary requirement that exceeds the information available for most of the LFA operations area. See, *e.g.,* 84 FR at 7234 (noting that ''best source'' of data demonstrating high marine mammal densities ''is publicly-available, direct measurements from survey data''). NRDC et al. stated that while NMFS' criteria do allow for use of ''other available data or information,'' they do so only if ''those data and information, either alone or in combination with limited direct data, are sufficient to establish that at least one of the biological criteria are present,'' and that it remains unclear from this description what evidentiary standard will apply to the consideration of OBIAs where direct data are not available.

Response: NMFS does not require ''conclusive data'' [2] for imposing conservation and management measures for SURTASS LFA sonar, including—though not only—in the case of OBIAs (see response to Comment 24). As another example of the incorporation of data poor areas in mitigation measures, the coastal standoff zone uniformly applies not only in areas with supporting data about marine mammals (80 percent of the areas initially identified for OBIA consideration in 2012 were within the 12 nmi (22 km) coastal standoff) but also in areas that could be fairly characterized as data poor. In addition, shutdown protocols will be in effect wherever SURTASS LFA sonar activities occur, including in areas where data are limited.

Comment 30: NRDC et al. stated that as it did during the most recent authorization cycle, NMFS proposes to exclude from OBIA consideration all marine mammals that do not exhibit low-frequency specialization, excepting sperm whales and elephant seals, and that this position remains non-precautionary and inappropriate. They state that the Navy did not include odontocetes in the LFA SRP which it continues to take as the exclusive data source for estimating impacts from the LFA system, notwithstanding that study's age and limitations. NRDC et al. noted that recent meta analyses of the ocean noise literature indicates that, taken as a whole, the odontocetes are behaviorally reactive to predominantly low-frequency sources of noise, in ways that are consistent with a higher potential for effects on vital rates, at exposure levels that would put them well outside the LFA shutdown zone (Gomez et al., 2016; Bowles et al., 1994).

NRDC *et al.* goes on to state that literature has also demonstrated that some species, such as harbor porpoises and beaked whales, are particularly

[2] *NRDC* v. *Pritzker,* 828 F.3d 1125, 1140 (9th Cir. 2016).

sensitive to a diversity of anthropogenic sounds, including sounds of predominantly low frequency; and physiological research on finless porpoise indicates that a heightened sensitivity to lower-frequency sound may be conserved across porpoise species (Liu, 1985; Li et al., 2008). They indicated that several studies have reported harbor porpoise behavioral responses to pile driving sounds (Tougaard et al., 2009; Bailey et al., 2010; Brandt et al., 2011; Dahne et al., 2013; Parsons, 2017) and beaked whale behavioral responses to commercial shipping sounds and European LFAS systems (between 1 and 2 kHz) (Aguilar de Soto et al., 2006; Pirotta et al., 2012; Miller et al., 2015; Sivle et al., 2015) and that some of these responses occurred at distances beyond 20 km (*e.g.,* beyond the 1 km safety zone in proposed mitigation). NRDC et al. stated that according to a recent paper on the vulnerability of range-limited populations to acoustic impacts, failure to consider the effects of both noise exposure and displacement of Cuvier's beaked whales from their habitat in this region ''could lead to more severe biological consequences than 'Level B Harassment''' (Forney et al., 2017). NRDC et al. state it is ''improper to exclude these acoustically sensitive species from OBIA mitigation,'' and that the Navy and NMFS must take a precautionary approach to harbor porpoises and beaked whales, both in analyzing impacts and in considering habitat-based mitigation measures.

Response: One of the factors that the Navy and NMFS consider in the designation of OBIAs, established in the 2012 FSEIS/SOEIS (DoN, 2012) and carried forward in the current OBIA assessment process, is that the OBIA protective measures pertain to those species most likely to be affected by exposure to LFA sonar transmissions, namely LF sensitive species such as baleen whales. Thus, the primary focus of the OBIA mitigation measure is on LF hearing specialist species. However, as noted in the proposed rule, OBIAs have been designated for non-LF hearing specialists, such as elephant seals and sperm whales, since the available hearing data for these species indicate an increased sensitivity to LF sound (compared to most odontocetes and pinnipeds). Therefore, contrary to the comment's assertion, NMFS did not propose to exclude from OBIA consideration all marine mammals that do not exhibit low-frequency specialization. The very fact that we acknowledged that OBIAs could be appropriate for sperm whales and elephant seals negates that assertion, and nothing in the proposed rule suggested that NMFS would not consider other species with increased sensitivity to LF sound, if data indicate that it is appropriate. As described in this rule, the hearing sensitivity of other taxa (MF and HF cetaceans) is such that their sensitivity to the LFA signal is reduced by 40 to 50 dB, meaning that source has to be much louder for the animal to hear it, and therefore to potentially be behaviorally harassed by it. The Navy will implement a near-100 percent-effective mitigation measure for minimizing impacts when marine mammals are in close proximity to the LFA sonar source (passive and active acoustic and visual detection and shutdown), and it also restricts transmissions within the coastal standoff range, which encompasses the majority of biologically important habitats.

NMFS and the Navy are aware of the publications discussed by NRDC et al. NMFS and the Navy have considered all available data on potential impacts to marine mammal species and stocks in their analyses, not just the SURTASS LFA sonar SRP. Very few studies (many are described by the commenters) have examined odontocete behavioral responses to LF sounds. Those that have been conducted largely focus on sounds that include both the frequencies produced by LFA sonar (100–500 Hz) and also higher frequencies (greater than 500 Hz), or LFA sonar sounds at higher frequencies than proposed by the Navy (*e.g.,* European LFA sonar between 1 and 2 kHz). For example, the sounds produced by pile driving, seismic surveys, and vessel movement are broadband, low-frequency sounds (*i.e.,* containing frequencies greater than 500 Hz), and pile driving and seismic survey sounds are more impulsive in nature than LFA sonar. Further, some of the responses documented in the studies cited are lower level behavioral responses that would not necessarily rise to the level of MMPA harassment. It is true that the quantitative estimates of takes for all marine mammals are derived from the LFA risk continuum, which is based on the behavioral responses of LF hearing specialists (baleen whales) collected with an actual SURTASS LFA sonar source. As such, these data are realistic contextually and remain the best available for quantifying the response of LF-sensitive marine mammals to the SURTASS LFA sonar source (see also response to Comment 9). Because the LFA risk continuum was developed based on the responses of marine mammal species with the most sensitive LF hearing, the LFA risk continuum is conservative in that it is anticipated to overestimate the responses of other species that are less sensitive to LF sounds.

Comment 31: NRDC et al. stated that NMFS' 2012 rule required the Navy to advance research on the impacts of LFA sonar on beaked whales and harbor porpoises, first, by convening an independent Scientific Advisory Group to make research and monitoring recommendations and, second, by either promulgating a plan of action to implement the Advisory Group's recommendations or submitting a written response to NMFS explaining why they are infeasible. NRDC et al. requested a copy of any Scientific Advisory Group and Executive Oversight Group reports and recommendations and asked that they be made available to the public.

Response: The Navy completed an assessment of the validity, need, and recommendations for field research and/or laboratory research on the potential effects of SURTASS LFA sonar on beaked whales and harbor porpoises in a final report submitted to NMFS in July 2017, prior to the expiration of the 2012 MMPA rule. One research project was funded to study the spatial overlap of SURTASS LFA sonar activities with harbor porpoise habitat to bound the potential for impacts. Given the larger overlap of SURTASS activities with beaked whale populations (as compared to harbor porpoises, which have very little overlap with SURTASS activities) and the relative lack of data regarding beaked whale responses to LFA sonar, the Navy has agreed to initiate a formal feasibility study through the Living Marine Resources program to assess the value, practicality, and cost of designing and conducting a controlled exposure experiment to measure the effects of LFA sonar on beaked whales (as well as other marine mammals—see response to Comment 10).

The 2013 Scientific Advisory Group report on beaked whales and harbor porpoises can be found at: *http://www.surtass-lfa-eis.com/downloads/.* While there is no Executive Oversight Group report, the Executive Oversight Group recommendations are summarized in the 2017 report *Beaked Whale and Harbor Porpoise Monitoring and Reporting Requirements* which can also be found at: *http://www.surtass-lfa-eis.com/downloads/.*

Comment 32: NRDC et al. recommended that in line with NMFS' intent in previous authorizations, that frequency specialization be considered as one factor among several in determining the relative importance of a

potential OBIA. NRDC et al. noted that the agency can then focus their practicability analysis for odontocete species on the most biologically important habitat. NRDC et al. noted that NMFS should give careful analysis to areas of high marine mammal biodiversity, which are also likely to be areas of high marine biodiversity—appropriate given the increasing evidence of impacts of low-frequency sound on non-marine mammal biota, some of which is described in the Proposed Rule, and that NMFS should carefully analyze the practicability of protecting areas, such as those off the main Hawaiian Islands and around certain Hawaiian seamounts (which are important to beaked whales, among other species), that are known to contain small, resident odontocete populations.

Response: As described in response to Comment 30, frequency specialization is one factor NMFS and the Navy considered when evaluating potential OBIAs. The intent of OBIAs is to protect those marine mammal species, such as baleen whales, most likely to hear and be affected by LFA sonar transmissions and to provide these marine mammals additional protections during periods when they are conducting biologically significant activities. However, OBIAs have been evaluated and designated to provide additional mitigation protection for non-LF hearing specialists, such as elephant seals and sperm whales, since the available hearing data for these species indicate an increased sensitivity to LF sound (compared to most odontocetes and pinnipeds). Regarding the comment about areas of high marine mammal diversity, NMFS has evaluated all of the areas recommended by commenters in the context of the LPAI standard, including several areas of high marine mammal diversity (*e.g.,* Southeast Kamchatka OBIA) and our analysis and findings are presented in this rule and the SURTASS LFA FSEIS/SOEIS. Specifically, NMFS designated the Main Hawaiian Islands OBIA which, although designated for the purposes of further protecting humpback whales, will also reduce the exposure of several small resident populations of odontocetes to SURTASS LFA sonar. NMFS and the Navy will continue to evaluate any new science as part of the Adaptive Management process.

Comment 33: NRDC et al. noted that several marine mammal species occurring within the proposed SURTASS LFA study area are considered ''data deficient'' by the International Union for Conservation of Nature (IUCN), due to the eastern Indian Ocean and, to a lesser extent, the Northwestern Pacific regions being understudied. They stated that Parsons (2016) recently suggested that such species should be assumed ''threatened,'' as it is likely certain data-deficient species are, in fact, ''vulnerable'' or ''endangered,'' given their low sightings rates and restricted ranges. NRDC et al. recommended NMFS and the Navy work with researchers embedded within these regions to help build our state of knowledge on these species and identify potential OBIAs. They stated that three species of data-deficient cetaceans are worth particular note: Omura's whale (*Balaenoptera omurai*) and Deraniyagala's beaked whale (*Mespolodon hotula*) and *Berardius* beaked whale, which have been recently described in the northern Pacific Ocean.

Response: NMFS and the Navy are aware of the active area of genetics research used to identify new species. Omura's whales and Deraniyagala's beaked whales are considered in the rule and SURTASS LFA FSEIS/SOEIS impact analyses using the best available data for those taxa. The new Berardius beaked whale splits the black form of Baird's beaked whale into a new species distinct from the gray form of the Baird's beaked whale, which will retain the scientific name *Berardius bairdii* (Morin et al., 2017). Therefore, although this split into two species is not part of the LFA impact analysis, the data on Baird's beaked whale encompasses both forms, as has traditionally been reported.

While no hearing data on these new species are available, hearing in the Omura's whale is presumed, like other baleen whales, to be within the range of 7 Hz to 22 kHz and they have been recorded producing sounds from 15 to 50 Hz (Cerchio et al., 2015; Southall et al., 2007). Very little is known about the Deraniyagala's beaked whale and nothing specifically is known about their hearing sensitivity. They are, however, similar to other beaked whales presumed to hear in the mid-frequency range from 150 Hz to 160 kHz (NMFS, 2018). While their hearing range overlaps partially with the frequency bandwidth of SURTASS LFA sonar, it is presumed that their bandwidth of best hearing, like other beaked whales, is well above the frequency range of SURTASS LFA sonar. The intent of OBIAs is to protect those marine mammal species, such as baleen whales, most likely to hear and be affected by LFA sonar transmissions and to provide them additional protections during periods when they are conducting biologically significant activities. Thus, the primary focus of the OBIA mitigation measure is on LF hearing specialist species. Based on current information, beaked whales are not known to have increased sensitivity to LF sounds; therefore, we do not believe added protection afforded by an OBIA (*i.e.,* beyond that provided by the LFA sonar mitigation zone, described in the *Mitigation* section) is warranted. As with other marine mammals, Navy will re-evaluate if additional data become available that demonstrate that these animals are more sensitive to LF sounds.

The proposal described in the Parsons (2016) opinion paper has not been adopted by the IUCN. As stated in the *IUCN Red List categories and criteria* (IUCN, 2012) definition: ''A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status.'' They go to say a data deficient species may be well studied, but appropriate data on abundance and/or distribution are lacking, and that ''listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate.'' To be precautionary they suggest, ''it is important to make positive use of whatever data are available.'' As described in response to Comment 24, NMFS has compiled and assessed the best available science, as required, to support the findings made here and does not plan to reach out to additional regional experts.

OBIA Areas

Comment 34: NRDC et al. noted in their comment regarding the designation of OBIAs that as ESA Critical Habitat, Important Marine Mammal Areas (IMMAs), and Ecologically or Biologically Significant Areas (EBSAs), have all previously been identified through a rigorous scientific process, including opportunity for public comment and peer review; as such, these areas should be immediately carried forward by the Navy for geographic mitigation purposes.

Response: As noted in the *Mitigation* section of this final rule, the 2019 SURTASS LFA FSEIS/SOEIS, and previous documentation for SURTASS LFA sonar, criteria for the designation of OBIAs are specific to the purpose of designating OBIAs for SURTASS LFA sonar, which is geographic mitigation. The purpose and criteria for designation of ESA critical habitat, EBSAs, and IMMAs may inform our consideration of areas as potential OBIAs but are not per se coincident with the criteria or purpose of OBIAs for SURTASS LFA

sonar. As such, all marine areas considered as potential OBIAs must be evaluated per the criteria developed for SURTASS LFA sonar, including the Navy's practicability assessment, regardless of the rigorous scientific processes other agencies or organizations may have undertaken for their marine area designations.

Comment 35: NRDC et al. noted that 30 IMMAs were recently identified in the Northeast Indian Ocean and South East Asian Seas Region (IUCN Marine Mammal Protected Areas Task Force 2019) and should be incorporated into NMFS' analysis for its Final Rule. They also noted that 55 candidate IMMAs were recently been identified in the Western Indian Ocean and Arabian Seas by regional experts and submitted for additional independent peer review (IMMA sub-regions ''ii'' and ''vii'' fall within the LFA Study Area). They recommended that these new IMMAs be immediately taken into consideration by NMFS and the Navy as potential OBIAs upon their release.

Response: As recommended, NMFS and the Navy assessed the 30 IMMAs designated in the Northeast Indian Ocean and South East Asian Seas Regions. Details of this analysis and which IMMAs met the OBIA designation criteria are included in Appendix C of the 2019 SURTASS LFA FSEIS/SOEIS. As part of the Adaptive Management process for SURTASS LFA sonar, NMFS and the Navy will periodically assess any newly designated IMMAs for their suitability as OBIAs for SURTASS LFA sonar.

Comment 36: NRDC et al. recommended the following for blue whales:

A. Chagos Archipelago—NMFS should ensure that the waters encompassed by the no-take marine protected area are included in a year-round OBIA to protect important habitat for blue whales as well as other cetacean species including sperm whales.

Response: The BIOT-Chagos Islands Marine Protected Area (MPA) was an area on the OBIA Watchlist because when last assessed by NMFS and the Navy, sufficient data were not available to determine if marine mammals were present and conducting biologically important behaviors in the area. The BIOT-Chagos Islands MPA was re-evaluated to determine if more data have become available; however, there continues to be limited data describing the presence of marine mammals in the MPA, and even less data on whether marine mammals are conducting biologically important behaviors. Accordingly, the BIOT-Chagos Islands MPA will remain on the OBIA Watchlist and NMFS and the Navy will evaluate the area as a potential OBIA through the Adaptive Management Process if new information becomes available.

B. Waters around Sri Lanka—NMFS should advance the following areas for year-round blue-whale mitigation areas: (i) ''Southern Coastal/Offshore Waters between Galle and Yala National Park,'' an area largely overlapping with OBIA Offshore Sri Lanka but which affords year-round protection to the submarine canyons that support high numbers of blue whales, and other marine megafauna, throughout the year; (ii) ''Trincomalee Canyon and Associated Ecosystems'' and (iii) ''Coastal and Offshore Area of the Gulf of Mannar (OBIA Watchlist),'' which also encompasses the currently not considered ''Sri Lankan Side of Gulf of Mannar'' EBSA. NRDC et al. also recommended that any waters not yet included within the boundaries of the new ''South West to Eastern Sri Lanka IMMA'' also be advanced for year-round protection.

Response: The Navy and NMFS assessed areas (i) and (ii) mentioned in this comment as potential OBIAs for the blue (pygmy) whale. NMFS and the Navy's final assessment of these areas' potential as OBIAs is described in Chapter 5 and Appendix C of the 2019 SURTASS LFA FSEIS/SOEIS. We have also noted in our assessment that although most available data for these two areas are for blue whales, data on sperm whales have been reported and, where applicable, we note the seasonal period during which sperm whale as well as blue whale important biological activity occurs.

Although both the Gulf of Mannar EBSA and IMMA ((iii) of this comment) were defined principally for the dugong and coastal dolphins, which occur in nearshore or inshore coastal waters too shallow for use of SURTASS LFA sonar, because baleen and sperm whale records from MPAs located within the Gulf of Mannar EBSA and IMMA are available, the NMFS and the Navy further evaluated the Gulf of Mannar region as a potential OBIA. The available information and data do not support the area's biological importance to blue whales, as only rare blue whale records, from strandings, are available for the Gulf of Mannar. Although not designated as an OBIA for SURTASS LFA sonar, the Gulf of Mannar has been added to the OBIA Watchlist so that data and information about the area will continue to be monitored.

However, most available information and data support the waters off southern and eastern Sri Lanka as important migrational and foraging areas for both pygmy blue and sperm whales, and both these regions include physiographic features and annual monsoonal transport that support higher productivity. NMFS and the Navy have designated the waters off the entire southern and eastern shore of Sri Lanka to the Trincomalee Canyon region as an OBIA for both blue (pygmy) and sperm whales.

C. Southwest India and Western Sri Lanka—NMFS should establish an OBIA southwest of India and west of Sri Lanka that reflects the boundaries of the new ''Gulf of Mannar and Palk Bay IMMA'' that includes the buffer recommended for protection purposes.

Response: The available data and information are not sufficient for the area southwest and west of Sri Lanka to warrant designation as an OBIA, as the blue whale data for this area are very sparse and do not support designation of this area as biologically important to blue whales. Anderson *et al.* (2012) used ocean color data to develop a hypothesis of blue (likely pygmy) whale migration in the northern Indian Ocean. Based on their hypothesis, Anderson *et al.* (2012) predicted that blue whales may occur in this area as they migrate from the Arabian Sea to eastern Sri Lanka/Bay of Bengal, but the authors also note that ''with only a single offshore sighting from April (Table 1 and Fig. 4), this is one area where additional survey work and/or satellite tracking will be required to test our predictions.''

We conclude that the existing data are insufficient to support designating the proposed area as an OBIA for migration or foraging of North Indian Ocean blue whales. The proposed area southwest of Sri Lanka in the Indian Ocean (3° to 12° N, 74° to 80° E) has been added to the OBIA Watchlist, and NMFS and the Navy will evaluate the area as a potential OBIA through the Adaptive Management Process if new information becomes available.

D. West of the Maldives (November and April)—NMFS should establish an OBIA west of the Maldives that reflects the boundaries described in Anderson et al (2012): 1°–6° N, 70.5°–72.5° E.

Response: Blue whales occur in the area around the Maldives. However, the purpose of OBIAs is to protect areas with some demonstrated biological importance to a marine mammal species. According to Anderson *et al.* (2012), the highest concentrations of blue whales in this area occurred in April, November, and December, with strandings having been recorded from December through February. These data describe the average seasonal occurrence of blue whales in these

waters, but are not indicative of high densities nor that biologically important activity is occurring in these waters. Occurrence in a marine area is not sufficient to establish an area's importance to a species. The Navy and NMFS examined all available data and research on blue whale occurrence in the waters adjacent to the Maldives to determine if biologically important activity of blue whales occurred in these waters. As described in the final assessment of the Maldives area as a potential OBIA in Chapter 5 and Appendix C of the 2019 SURTASS LFA FSEIS/SOEIS, there were no data to support that blue whales conducted biologically important activities in this area. The area was not designated as an OBIA but has been added to the OBIA Watchlist, and NMFS and the Navy will evaluate the area as a potential OBIA through the Adaptive Management Process if new information becomes available.

E. Indonesia—Western Australia migration route—

1. Citing satellite data from Double *et al.* (2014), the commenter recommended that NMFS/Navy should establish an OBIA encompassing the continental shelf along western Australia between March through June and September through December. Importantly, the North West Cape/Ningaloo Reef region, out to the continental shelf edge, needs to be protected from at least April through June. The Navy should also take measures to avoid the continental shelf edge off northwestern Australia between May through July and September through November, to protect whales traveling along the migration route.

Response: The Navy and NMFS have reviewed the Double *et al.* (2014) paper cited herein. We agree that the information cited on the migrational area for blue whales was compelling enough to warrant the Navy and NMFS researching the area to obtain additional information and data on the Western Australia shelf and slope, since the information pertains to a LF specialist marine mammal and relates to one of the key biological behaviors that define the criteria for OBIAs. The Navy and NMFS assessed the entire Western Australia shelf and slope, including Browse Basin and the nearby Savu Sea area, as a potential OBIA for blue (pygmy) and humpback whales. An OBIA was designated for each species in this region. The OBIA for the humpback whale greatly expands the geographic extent of OBIA 27, Camden Sound/Kimberly Region in place during the NDE.

2. An OBIA should be established to protect Browse Basin (~14° S between 121° E and 124° E) year-round, in light of its persistent upwelling and high levels of cetacean diversity, including foraging pygmy blue whales.

Response: The Navy and NMFS designated an OBIA for migrating blue (pygmy) whales and vastly expanded the areal extent of the OBIA in place during the NDE for humpback whales in the waters off Western Australia (Camden Sound/Kimberly Region, OBIA 27 during the NDE). The OBIA for the blue whale encompasses Browse Basin and the Savu Sea.

3. For similar reasons, an OBIA should also be established bounding the upwelling system along the southern coasts of Java and the Sumbawa Islands, Indonesia. A similar approach to that employed by Anderson *et al.* (2012) could be used to map the boundaries of this region. The waters of the newly designated ''Savu Sea and Surrounding Areas IMMA'' and the associated buffer recommended for protection should also be included.

Response: Branch *et al.* (2007) suggest the environmental factors ''driving biological enrichment and enhanced blue whale foraging'' and the regional location of such factors, which have been cited in this comment. The upwelling information in Branch *et al.* (2007) is based on Hendiarti *et al.* (2004). Hendiarti *et al.* (2004) note that the majority of the upwelling in the southern Indonesian region occurs seasonally off southeastern Java. It is also difficult to discern from the data presented in Hendiarti *et al.* (2004) how much of the coastal upwelling would occur within the coastal standoff range of SURTASS LFA sonar, as much of the higher productivity appears to take place nearshore.

However, more importantly, while an upwelling area has potential, at least seasonally, as an important foraging area for cetaceans, a species' seasonal occurrence as denoted by higher relative abundance in that area would indicate increased foraging during the period of increased productivity. However, NMFS and the Navy conducted a thorough review of the best available data and no data are available to support the association of blue whales foraging in this area in Indonesia. Therefore, this area does not meet the criteria for establishing an OBIA. The area has been added to the OBIA Watchlist, and NMFS and the Navy will evaluate the area as a potential OBIA through the Adaptive Management Process if new information becomes available.

Comment 37: NRDC et al. recommended that for humpback whales:

A. Northern Arabian Sea—The Arabian Sea DPS is a small, highly isolated, resident population that requires an OBIA encompassing all waters north of 21°50′ N from the western coast of India westward to the boundary of the proposed SURTASS LFA study area.

Response: The endangered Arabian Sea DPS of humpback whales is geographically, genetically, and demographically isolated from all other populations of humpback whales. Research surveys over the past 30 years have confirmed the continuous presence of humpback whales in the shallow, nearshore waters of the Arabian Sea off Oman, which is not in the SURTASS LFA sonar Study Area. Only a limited and incidental number of humpback whale sightings (13 recorded humpbacks by the Marine Mammal Conservation Network of India, with records beginning in 1943), passive acoustic detections, strandings, and one tagging record have been reported from the eastern Arabian Sea off Pakistan and western India, with only the waters off western India being located within the SURTASS LFA sonar Study Area. Given the small population size and the well-documented concentration of this DPS in the western Arabian Sea, the Navy concluded, and NMFs agreed, that the likelihood of humpback whales from the Arabian Sea DPS being located in the waters of the northwestern most part of the Study Area was vanishingly small.

However, as part of the OBIA process and upon the recommendation of public comments on the 2018 SURTASS LFA Draft SEIS/SOEIS and MMPA proposed rule, NMFS and the Navy assessed all available data and information on humpback whales in the waters off western India and the nearby Lakshadweep Archipelago. See Area 32 of Appendix C of the 2019 SURTASS LFA FSEIS/SOEIS for review of the scientific literature available for this region, which includes assessment of three recommended OBIAs encompassing the west and south coast of India: One in the Northern Arabian Sea (north of 21°50′ N from the western coast of India westward to the boundary of the SURTASS LFA study area); one along the coast of west coast of India from Konkan and Malabar out to 60 km (32.4 nmi) from shore; and one along the south coast of India from Muttom to Kanyakumari out to include Wadge Bank. Although several records indicate that rare occurrences of humpback whales from the Arabian Sea DPS have been reported from the waters off central and southern Western India, these records are far too sparse to suggest a regular occurrence of part of

the Arabian Sea population of humpbacks off western India. For this reason, the Navy made the decision not to include the Arabian Sea DPS of humpback whales in the 2019 SURTASS LFA FSEIS/SOEIS nor in associated documentation, including the ESA Biological Evaluation for SURTASS LFA sonar. However, due the potential for important migrational activity of humpbacks in these waters, the waters of western and southern India were added to the OBIA Watchlist and NMFS and the Navy will evaluate the area as a potential OBIA through the Adaptive Management Process if new information becomes available.

B. Maldives Archipelago—Given the importance of this area for multiple species, including Arabian Sea and Southern Ocean humpback whales, and Bryde's whales, NMFS should establish an OBIA encompassing the waters within 30 nmi of the archipelago baseline.

Response: Humpback whales and Bryde's whales occur in the area around the Maldives. Again, however, occurrence in a marine area is not sufficient to establish its importance to a species. The Navy and NMFS examined all available data and research on whale occurrence in the waters adjacent to the Maldives to determine if whales conduct biologically important activities in these waters. As described in the final assessment of the Maldives area as a potential OBIA in Chapter 5 and Appendix C of the 2019 SURTASS LFA FSEIS/SOEIS, there were no data to support that whales conduct biologically important activities in this area. The area was not designated as an OBIA; however, it has been added to the OBIA Watchlist and NMFS and the Navy will evaluate the area as a potential OBIA through the Adaptive Management Process if new information becomes available.

C. Konkan and Malabar Coast—NMFS should establish an OBIA to protect this important habitat area for Arabian Sea humpback whales, blue whales, and Bryde's whales (See Figure 2 for proposed approximate boundaries).

Response: See response to Comment 37A above. NMFS and the Navy assessed all available data and information on humpback, blue, and Bryde's whales for the West and South Coasts of India area (see Area 32 in Appendix C of the 2019 SURTASS LFA FSEIS/SOEIS for review of the scientific literature available for this region, which includes assessment of three recommended OBIAs encompassing the west and south coast of India: One in the Northern Arabian Sea (north of north of 21°50′ N from the western coast of India westward to the boundary of the SURTASS LFA study area); one along the coast of west coast of India from Konkan and Malabar out to 60 km (32.4 nmi) from shore; and one along the south coast of India from Muttom to Kanyakumari out to include Wadge Bank). There was no evidence that biologically important activities are conducted in this area. The area was not designated as an OBIA, however it has been added to the OBIA Watchlist and NMFS and the Navy will evaluate the area as a potential OBIA through the Adaptive Management Process if new information becomes available.

D. Muttom-Kanyakumari and Wadge Bank, southern India—NMFS should establish an OBIA to protect this important foraging habitat area for Arabian Sea humpback whales and potentially other baleen whale species (See Figure 3 for proposed approximate boundaries).

Response: See response to Comment 37A above.

E. Northwestern Pacific Breeding Areas—NMFS should afford protection to: (i) The Okinawa/Philippines humpback whale DPS by establishing an OBIA encompassing waters less than 200 m deep—typical of humpback whale wintering habitat—surrounding the islands of Okinawa from January to April and the islands of Ogasawara from December to June. The commenters note that Ogasawara is included on NMFS' list of potential OBIAs (84 FR at Table 21, 7) and strongly recommend that this area be carried forward for inclusion and expanded to the 200 m depth contour; and (ii) The newly designated ''Babuyan Marine Corridor IMMA'' and buffer recommended for protection, primarily identified as the only breeding area for humpback whales in the Philippines.

Response: The area around the islands of Ogasawara was designated as an OBIA for humpback whales from December to May (this area was also designated for sperm whales from June to September). Although humpback whales are observed in relatively shallow waters of the Ogasawara and Kazin Islands, humpbacks move between the islands. Male humpback whales are also observed in deeper more offshore waters than are female humpbacks with calves. Last, the specific location where breeding and calving occur in this area is unknown. Given that lack of knowledge and to accommodate the deeper water movements of male humpbacks, the OBIA boundary around the Ogasawara and Kazin Islands was offset from the coastal standoff zone by less than 4 nmi (7.4 km). A straight-line corridor to accommodate migrating humpbacks that are traveling between the Ogasawara and Kazin Islands was also included.

The area surrounding the islands of Okinawa was designated as part of the Ryukyu-Philippines OBIA. As recommended all areas of the Babuyan Marine Corridor IMMA outside of the coastal standoff zone were designated as part of the Ryukyu-Philippines OBIA. The Ryukyu-Philippines OBIA is designated seasonally from January to April (Okinawa) and late February to April (Philippines). Based on the best available information, the boundary for the Ryukyu-Philippines OBIA was derived by creating a buffer that was offset from the coastal standoff range by less than 2 nmi (3.7 km) around the majority of the Ryukyu Islands and Babuyan Islands, with straight lines creating transit corridors between the Ryukyu Islands, the eastern Taiwan coast, and the Babuyan Islands off the northern Philippines. The boundary off eastern Taiwan was created as a straight line less than 3 nmi (5.6 km) from the Taiwanese coastal standoff range. Although the Ryukyu Islands extend all the way to Kyushu Island of the main Japanese islands, since no records indicate humpback whales are sighted in these waters of the northern Ryukyu Islands, the OBIA boundary extends only as far north as Amami Island.

F. Northwestern Pacific Feeding Areas—NMFS should establish: (i) An OBIA extending from the east Kamchatka coastline offshore to the continental shelf break (encompassing the ''Watchlist'' OBIA ''Southeast Kamchatka Coastal waters''), from June through September; and (ii) an OBIA reflecting the boundaries of the ''Commander Islands Shelf and Slope EBSA,'' which has not yet been considered.

Response: The Commander Islands Shelf and Slope EBSA was not included for consideration as an OBIA, because the area lies outside the SURTASS LFA sonar Study Area, and as such, is not eligible for consideration as an OBIA.

NMFS and the Navy considered the Southeast Kamchatka Coastal Waters (although it was not on the OBIA Watchlist) and designated an OBIA off southeastern Kamchatka. Further details on the seasonal restrictions and areal extent may be found in Appendix C of the 2019 SURTASS LFA FSEIS/SOEIS.

Comment 38: NRDC et al. recommended that for Bryde's whales NMFS designate a year-round OBIA reflecting the boundaries of both the ''Coastal Northern Bay of Bengal IMMA'' and the ''Swatch-of-No-Ground IMMA,'' and their associated buffers

designed to inform place-based conservation measures.

Response: The Coastal Northern Bay of Bengal IMMA was assessed but not carried forward as a potential OBIA because it is relevant to marine mammal species known to only frequent inshore waters (Irrawaddy, Indo-Pacific finless, and Indo-Pacific humpback dolphins). These species are not anticipated to be impacted by SURTASS LFA sonar training and testing activities. NMFS and the Navy have designated the Swatch-of-No-Ground (SoNG) OBIA. The SoNG IMMA encompasses the waters of the Head of the SoNG canyon (MMPATF, 2019), which were not fully encompassed in the existing OBIA 20. The SoNG IMMA boundary fully captures the foraging habitat where Bryde's whales have been identified (Smith et al., 2008; WCS Bangladesh, 2014). The SoNG OBIA for this final rule combines OBIA 20, Northern Bay of Bengal and Head of SoNG OBIA (in place during the NDE) and the SoNG IMMA.

Comment 39: NRDC et al. recommended that for gray whales, NMFS establish an OBIA off eastern Japan extending from the coast out to the continental shelf edge from March through May.

Response: In consideration of the Convection Zone East of Honshu EBSA for baleen whales, the Navy and NMFS evaluated a migrational corridor just off the coastal standoff range along eastern Honshu island for the western gray whale DPS. NMFS with Navy input designated an OBIA in this area off eastern Honshu for gray whale migration. Additional details on the areal extent and seasonal restrictions are provided in Appendix C of the 2019 SURTASS LFA FSEIS/SOEIS.

Comment 40: NRDC et al. recommended that for sei whales, NMFS establish an OBIA that extends from the Polar Front boundary southwards towards the Kuroshio Extension Front (*i.e.,* approximately 45° N to 35° N, 152° E to 170° E) to protect foraging sei whales (*i.e.,* the ''Polar/Kuroshio Extension Front'' area that NMFS identified in the proposed rule as a potential OBIA). They stated that protecting this highly productive foraging area would have broad benefit for a number of marine mammal species, including sperm whales, other odontocetes, and elephant seals.

Response: The Navy and NMFS evaluated the Polar/Kuroshio Extension Fronts region as recommended by the commenter. Additionally, the Navy and NMFS assessed the North Pacific Transition Zone EBSA (which encompasses these fronts) for its importance to the northern elephant seal. Although it is true that the North Pacific Transition Zone (NPTZ), Polar Front, and Kuroshio Extension Front are defined as oceanographic frontal zones that are large spatially persistent features, the physical, chemical, and even biological features by which each frontal zone is defined, including the species associated with them, are unique and not consistent across frontal zones. It would, therefore, be scientifically inappropriate to combine the frontal areas into one large combined area as suggested and disregard the defining features of the respective frontal zones and the data associated with each. The Navy and NMFS are aware of the suggested correlation of oceanographic frontal features with sei whale foraging and reviewed the available information on foraging areas for the North Pacific sei whale population. However, data and information are currently insufficient to correlate specific oceanographic frontal features or their boundaries in the northwestern Pacific with biologically important behavior of sei whales. Although neither the Polar/Kuroshio Extension Fronts nor NPTZ have been designated as OBIAs, both marine areas have been added to the OBIA Watchlist. The Navy and NMFS will continue to compile and evaluate data and information on both areas and will reassess them in the future through the Adaptive Management process.

Comment 41: NRDC et al. recommended that for sperm whales:

A. Waters off Sri Lanka—Similar to blue whales, NMFS should advance the following three areas currently being considered by NMFS as year-round mitigation areas for both blue and sperm whales (and, in some cases, Bryde's whales): (i) ''Southern Coastal/Offshore Waters between Galle and Yala National Park'', (ii) ''Trincomalee Canyon and Associated Ecosystems'', and (iii) ''Coastal and Offshore Area of the Gulf of Mannar'' (OBIA Watchlist), which also encompasses the currently not considered ''Sri Lankan Side of Gulf of Mannar'' EBSA.

Response: See response to Comment 36.

B. Lakshadweep Archipelago—NMFS should consider designating an OBIA to encompass the entirety of the Lakshadweep Archipelago and the waters therein.

Response: In assessing this area as a potential OBIA, NMFS and the Navy conducted a thorough review of the available information on marine mammal occurrence in the Lakshadweep Archipelago. Very little information is available on marine mammal occurrence in the Lakshadweep Archipelago, with very few survey sightings of cetaceans or stranding data. Because of this lack of data there is no indication that this area supports important biological activities for marine mammals and, therefore, it does not meet the biological criteria for designation as an OBIA or otherwise warrant inclusion as a mitigation area pursuant to the LPAI standard. However the Lakshadweep Archipelago has been added to the OBIA Watchlist and NMFS and the Navy will evaluate the area as a potential OBIA through the Adaptive Management Process if new information becomes available.

C. Northwestern Pacific—To protect foraging areas for sperm whales, NMFS should utilize the boundaries of three historic whaling grounds (*i.e.,* Japan Ground, Coast of Japan Ground, and Japan-Bonin Island Ground) to delineate OBIAs for sperm whales in the Northwestern Pacific Ocean (following the areas described in Ivashchenko et al. (2014); Fig. 9). They noted that the Japan Ground area is generally consistent with that of the ''Polar/Kurioshio Extension Fronts'' area that NMFS is currently considering.

Response: NMFS and the Navy did not consider the major areas of sperm whale concentration outlined in Ivashchenko *et al.* (2014) when assessing the North Pacific Transition Zone EBSA as we did not consider these areas either singly or in combination to be coincident with the boundary of the North Pacific Transition Zone EBSA. While the whaling data compiled by Ivaschenko *et al.* (2014) provide valuable information on the historical extent of the North Pacific sperm whale distribution, those locations cannot be used without other supporting data to create OBIAs reflective of areas where sperm whales conduct important biological activities. These areas of historical concentrations provide no insights into what important biological activities are occurring in the areas. Many cetacean species became extirpated and never repopulated heavily exploited commercial whaling grounds, so basing current occurrences for a species solely on whaling ground data is not appropriate; those data provide a historical perspective on occurrence and distribution but cannot be used as a current template of a species' occurrence. Accordingly, these areas were not considered as potential OBIAs.

Comment 42: NRDC et al. recommended a year-round OBIA in the waters of the Avacha Gulf to protect important foraging habitat and transitory corridor for killer whales.

NRDC et al. noted that the small population size and cumulative impacts upon mammal-eating killer whales in this area should be carefully considered by NMFS and that neglecting to include the best available science on the population structure, ecotypes, and abundance estimates of killer whales in this region is a major oversight of the proposed rule.

Response: NMFS and Navy are aware of the importance of southeastern Kamchatka and Avacha Gulf to resident killer whales and have assessed the wealth of survey data and information on this population of odontocetes and the importance of the area, particularly Avacha Gulf, to this population. However, the majority of Avacha Gulf, including the core area where most sightings of resident killer whales have been recorded, lies within the coastal standoff zone for SURTASS LFA sonar. To be eligible as an OBIA, a marine area must meet geographic criteria, one of which is that the area must lie outside the coastal standoff range for LFA sonar (*i.e.,* be more than 12 nmi (22 km) from shore). Furthermore, OBIA designation is designed to provide protection to those marine mammal species most likely to be impacted by LFA sonar, which are the LF-sensitive species. There is no evidence that killer whales have increased sensitivity to LF sounds. Therefore, we do not believe an OBIA will add meaningful protection beyond that provided by the LFA sonar mitigation zone (described in the *Mitigation* section). These factors render this marine area ineligible for consideration as an OBIA for SURTASS LFA sonar. However, an OBIA in southeastern Kamchatka waters outside the coastal standoff range has been designated for gray and right whales that migrate and forage seasonally in these waters. Thus, albeit not designated specifically for resident killer whales in this area, the OBIA will reduce the exposure of some resident killer whales to LFA sonar.

Comment 43: NRDC et al. stated a more comprehensive evaluation of important habitat for harbor porpoises and beaked whales is needed, however they recommended that NMFS establish OBIAs in waters outside the coastal exclusion zone that are contained within the Biologically Important Areas for Blainville's and Cuvier's beaked whales, as well as for other small, resident odontocete populations, around the Main Hawaiian Islands, as defined in Baird et al. (2015).

Response: One of the factors considered for designation of OBIAs, established in the 2012 rulemaking and SURTASS LFA FSEIS/SOEIS and carried forward in the current OBIA assessment process, is sensitivity to LF sounds. The intent of OBIAs is to protect those marine mammal species most likely to hear and be affected by LFA sonar transmissions and to provide them with additional protections during periods when they are conducting biologically significant activities. Based on current information, neither Blainville's nor Cuvier's beaked whales are known to have increased sensitivity to LF sounds, therefore we do not believe added protection afforded by an OBIA (*i.e.,* beyond that by the LFA sonar mitigation zone described in the *Mitigation* section) is warranted. However, a large portion of the BIAs are included in the Main Hawaiian Islands OBIA designated for other species.

Comment 44: NRDC et al. recommended that NMFS include critical habitat that NMFS recently designated, under the Endangered Species Act, for the Main Hawaiian Islands insular false killer whale.

Response: NMFS and the Navy assessed the ESA-designated critical habitat for the Main Hawaiian Insular DPS of false killer whales as a potential OBIA. However, there is no evidence that false killer whales have increased sensitivity to LF sounds. Therefore, we do not believe an OBIA will afford more protection than what is provided by the LFA sonar mitigation zone (described in the *Mitigation* section). False killer whales hear underwater sounds in the range of 1 to 115 kHz, with best hearing at 17 kHz (Au, 1993; Johnson, 1967). Nevertheless, a large portion of the ESA critical habitat for the Main Hawaiian Insular DPS of false killer whales is included in the newly designated Main Hawaiian Islands OBIA (November to April), and per the CZMA consultation with the State of Hawaii for SURTASS LFA sonar, the Navy agreed not to ensonify Hawaii state waters (out to 3 nmi) at levels above 145 dB re: 1 µPa rms.

Comment 45: NRDC et al. recommended that NMFS establish a year-round OBIA at Cross Seamount, which represents important foraging habitat for a potentially rare or evolutionarily distinct species of beaked whale. They noted that such a designation would have secondary benefits for a variety of other odontocete species foraging at Cross Seamount seasonally between November and May.

Response: The Cross Seamount is within the SURTASS LFA sonar Study Area and is known for prey aggregations that support beaked whale foraging, as inferred by the detection of beaked whale echolocation signals at night. However, there is no supporting information or data to suggest that the waters surrounding this seamount support higher than average densities of beaked whales and no small-resident populations have been confirmed, which would qualify as a biological criterion for delineation of an OBIA in the region. Additionally, based on current information, beaked whales are not known to have increased sensitivity to LF sounds, therefore we do not believe added protection afforded by an OBIA (*i.e.,* beyond that provided by the LFA buffer zone, described in the Mitigation section) is warranted to protect beaked whales foraging in the waters of Cross Seamount. However through the adaptive management process, NMFS and the Navy will evaluate new information as it becomes available.

Comment 46: The Commission noted that 14 of the 25 potential OBIAs (as described in Table 21 of the proposed rule) meet the various low frequency-sensitivity and biological importance criteria and occur within the SURTASS LFA sonar mission areas and, at least partially, outside the coastal stand-off range where SURTASS LFA sonar activities already are restricted. The Commission suggests these areas should be designated as OBIAs. Additionally, the Commission noted that Raja Ampat and Northern Bird's Head serve as important habitat for migrating and/or foraging Bryde's and sperm whales and the Main Hawaiian Archipelago serves as important habitat for breeding and calving humpback whales. In addition, Peter the Great Bay serves as important breeding habitat for spotted seals. All of those species are sensitive to LF sound, and portions of those potential OBIAs meet the geographic criteria as well. The Commission also notes that the Pacific Remote Islands Marine National Monument (MNM), including areas around Wake and Johnston Atolls and a small part of the northern end of Kingman Reef/Palmyra Atoll, meet the geographic criteria. Although marine mammal data are limited, sperm whales have been observed in the MNM and the Navy noted that the MNM could serve as potential critical habitat for some threatened and endangered species (*e.g.,* humpback whales). Baleen and sperm whales are considered sensitive to low-frequency sound. For these reasons, the Commission recommended that NMFS include these areas as OBIAs in the final rule.

Response: Fourteen OBIAs were designated. Of the 14 OBIAs presented in Table 21 of the proposed rule, all but the West of Maldives was designated as an OBIA. The West of Maldives area was not designated because there were

no data to support that whales conducted biologically important activities in this area. The West of Maldives area has been added to the OBIA Watchlist (see response to Comment 36). As recommended, an OBIA has also been designated for the Main Hawaiian Islands.

Raja Ampat and Northern Bird's Head was considered as a candidate OBIA. However, none of the areas surveyed in any of the best available data occur within the SURTASS LFA sonar Study Area. Since no data exist to support important biological activities by marine mammals being carried out in the part of this marine area that lies within the SURTASS LFA Study Area, this area did not meet the biological criteria for OBIA designation and was not considered further as an OBIA. The area has been added to the OBIA Watchlist, and NMFS and the Navy will evaluate the area as a potential OBIA through the Adaptive Management Process if new information becomes available.

Peter the Great Bay was considered as a candidate OBIA. Only a small portion of Peter the Great Bay lies outside the coastal standoff zone and thus meets the geographic criteria. While Peter the Great Bay is an important seasonal reproductive area for the spotted seal, pupping activities are conducted in the northern reaches of the bay, well within the coastal standoff zone, and no pupping or reproductive activity is known to occur in the portion of the bay outside the coastal standoff zone. Further, based on currently available information and data, the spotted seal is not known to have increased sensitivity to LF sound; the best hearing sensitivity in-water of the spotted seal is between 2 and 72 kHz (Reichmuth et al., 2013; Sills et al., 2014). Reichmuth et al. (2016) found no TTS in trained spotted seals exposed to LF impulsive sounds that represented single seismic air gun transmissions (which are different from LFA sonar signals). As such, an OBIA is not warranted. For these reasons, the IMMA for Peter the Great Bay was not further considered as an OBIA for SURTASS LFA sonar.

The Pacific Remote Islands Marine National Monument (Wake/Johnson/Palmyra atolls and Kingman Reef Units which are located in the SURTASS LFA Study Area) was on the OBIA Watchlist and was considered as a candidate OBIA. NMFS and the Navy reviewed all available data and no specific important biological behaviors of marine mammals have been characterized in these waters. As such, this marine area did not meet the biological criteria required for designation of an OBIA and was not further considered currently as an OBIA.

Practicability Analysis

Comment 47: NRDC et al. noted that the Navy's application distinguishes among types of LFA activities, ranging from ''military crew (MILCREW) proficiency training'' to ''vessel and equipment maintenance.'' NRDC et al. stated that these categories suggest that geographic mitigation could potentially be implemented for a subset of activities in the case that blanket geographic mitigation is deemed impracticable—a development that could, if rigorously applied, substantially improve mitigation and help NMFS and the Navy meet their MMPA responsibilities. In its practicability analysis for OBIAs, NRDC et al. recommended that NMFS analyze the practicability of mitigating each individual category of activity and implement mitigation measures to the greatest extent practicable for each category. NRDC et al. stated that such an approach will serve to reduce potential impact to marine mammals in an OBIA even if not all Navy activities can practicably be mitigated.

Response: The Navy and NMFS' OBIA assessment resulted in 14 candidate OBIAs. These 14 candidate OBIAs underwent Navy Fleet practicability review and the Navy Fleet determined that the designation of the 14 OBIAs in the SURTASS LFA sonar Study Area for the relevant effective periods would not impede the effectiveness of SURTASS LFA active sonar testing and training activities, would be practical to implement as a geographic mitigation measure, and would not impact personnel safety. As a result, all 14 candidate OBIAs were deemed practicable and 14 new, marine mammal OBIAs for SURTASS LFA sonar have been designated (see the *Mitigation* section and Table 21) and apply to all SURTASS LFA sonar training and testing activities. Therefore, analysis of practicability for different types of activities is not necessary.

Additionally, all of the activities utilize the SURTASS LFA sonar system within the same operating profile, such that any single hour of SURTASS LFA sonar transmissions is the same as all others. The differentiation of activities was merely for planning purposes, to aid in determining the overall number of transmission hours per year for SURTASS LFA sonar training and testing. It is not practicable to develop geographic mitigation measures for each activity.

Comment 48: NRDC et al. recommended that NMFS, in consultation with the Navy, establish geographic alternatives for OBIAs that raise practicability concerns for certain categories of LFA activity. Given the importance of site-selection in minimizing environmental impacts, it is conventional for agencies to analyze the environmental effects of alternative sites that meet the activity's purpose and need. They stated that doing so is essential where, as here, protected habitat is of ''paramount importance''.

Response: As previously noted in the response to Comment 47, all 14 candidate OBIAs were deemed practicable and 14 new marine mammal OBIAs for SURTASS LFA sonar have been designated (see the *Mitigation* section and Table 21), therefore geographic alternatives for OBIAs are not necessary.

Comment 49: NRDC et al. recommended where reasonable alternative sites are not available, NMFS, in consultation with the Navy, consider other mitigation measures, including procedural requirements (*e.g.,* requiring Fleet-level approval for use), substantive standards (*e.g.,* allowing use only when certain criteria are met), and activity limits (*e.g.,* limiting the number of activities per annum or avoiding biologically important periods such as the blue whale foraging season), that would protect vital habitat while allowing continued use for training purposes. They stated that the Navy, in the ''practicability criterion'' it sets forth in the DSEIS, commits to identifying for NMFS the concerns that lead to its determination that a particular OBIA is not practicable, and discussing ''whether modifications could be made to the proposed OBIA to alleviate the Navy's practicability concerns.'' (DSEIS at 5–8). NRDC et al. recommended that both agencies work to ensure that the resulting analysis is rigorous and searching, rather than a parroting of Navy conclusions (citing *Conservation Council for Hawaii* v. *NMFS,* 97 F.Supp.3d 1210, 1230 (D. Haw. 2015)).

Response: As previously noted in the response to Comment 48, all 14 candidate OBIAs were deemed practicable and 14 new marine mammal OBIAs for SURTASS LFA sonar have been designated (see the *Mitigation* section and Table 21), so there is no need to identify geographic alternative sites for OBIAs. As described in the *Mitigation* section, these OBIAs, in combination with the existing procedural mitigation effect the least practicable adverse impact.

Comment 50: NRDC et al. recommended to the extent that additional operational mitigation is impracticable, NMFS consider compensatory mitigation to achieve the

''least practicable adverse impact'' required under the MMPA. NRDC et al. stated that compensatory mitigation is a concept that is routinely employed in implementation of the Endangered Species Act, Clean Water Act, and other environmental laws. The MMPA itself is broad in its characterization of mitigation, requiring the agency to prescribe not only ''permissible methods of taking pursuant to [a specified activity],'' but also ''other means of effecting the least practicable adverse impact'' on affected marine mammal species and populations and on their habitat. 16 U.S.C. 1371(a)(5)(A)(II)(aa) (emphasis added). NRDC et al. stated that the Ninth Circuit opinion in *Pritzker* makes clear, this requirement should be construed by the agency as a ''stringent standard.'' 828 F.3d at 1129, 1133, 1135. NRDC et al. recommended that NMFS consider compensatory mitigation for the adverse impacts of the permitted activity on marine mammals and their habitat that cannot be prevented or mitigated by modifying SURTASS LFA operations.

Response: As previously noted in the response to Comment 47, all 14 candidate OBIAs were deemed practicable and 14 new, marine mammal OBIAs for SURTASS LFA sonar have been designated (see the *Mitigation* section and Table 21), therefore other mitigation measures for these areas are not necessary. NMFS has prescribed a robust comprehensive suite of measures that are expected to reduce the amount of Level A and Level B harassment takes, as well as the severity of any incurred impacts on the species or stock and their habitat. Compensatory mitigation is not required to be imposed upon Federal agencies under the MMPA. Importantly, the commenter did not recommend any specific measure(s), rendering it impossible to conduct any meaningful evaluation of its recommendation. Finally, many of the methods of compensatory mitigation that have proven successful in terrestrial settings (purchasing or preserving land with important habitat, improving habitat through plantings, etc.) are not applicable in a marine setting with such far-ranging species. Thus, any presumed conservation value from such an idea would be purely speculative at this time.

National Environmental Policy Act (NEPA)

Comment 51: NRDC et al. stated that NMFS cannot rely on the Navy's EIS to fulfill its obligations under NEPA because it is unlawful. They stated that the Navy's DEIS serves only the Navy's interests, considering only the purpose and need of military readiness, thus limiting the range of alternatives and mitigation. They noted that the Navy's purpose and need is unrelated to NMFS' statutory obligations under the MMPA. Those obligations in this instance involve prescribing regulations for the incidental take of marine mammals that effect the least practicable adverse 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 subsistence uses (16 U.S.C. 1371(a)(5)(A)(i)). While military readiness effectiveness must be considered, id. § 1371(a)(5)(ii), the ultimate purpose of the MMPA is to protect marine mammals, and NMFS is charged with that duty. Thus, they stated that NMFS has a distinct purpose and need for its proposed regulations that may dictate consideration of a broader set of alternatives.

Response: The proposed action at issue is the Navy's proposal to conduct SURTASS LFA sonar testing and training activities in the SURTASS LFA Study Area. NOAA's NMFS is a cooperating agency for that proposed action, as it has jurisdiction by law and special expertise over marine resources impacted by the proposed action, including marine mammals and federally-listed threatened and endangered species. Consistent with the regulations published by the Council on Environmental Quality (CEQ), it is common and sound NEPA practice for NOAA to adopt a lead agency's NEPA analysis when, after independent review, NOAA determines the document to be sufficient in accordance with 40 CFR 1506.3. Specifically here, NOAA must be satisfied that the Navy's EIS adequately addresses the impacts of issuing the MMPA incidental take authorization and that NOAA's comments and concerns have been adequately addressed. There is no requirement in CEQ regulations that NMFS, as a cooperating agency, issue a separate purpose and need statement in order to ensure adequacy and sufficiency for adoption. Nevertheless, the Navy, in coordination with NMFS, has clarified the statement of purpose and need in the 2019 SURTASS LFA FSEIS/SOEIS to more explicitly acknowledge NMFS' action of issuing an MMPA incidental take authorization. NMFS also clarified how its regulatory role under the MMPA related to Navy's activities. NMFS' early participation in the NEPA process and role in shaping and informing analyses using its special expertise ensured that the analysis in the 2019 SURTASS LFA FSEIS/SOEIS is sufficient for purposes of NMFS' own NEPA obligations related to its issuance of incidental take authorization under the MMPA.

Regarding the alternatives, NMFS' early involvement in the development of the 2019 SURTASS LFA FSEIS/SOEIS and role in evaluating the effects of incidental take under the MMPA ensured that the 2018 SURTASS LFA DSEIS/SOEIS would include adequate analysis of a reasonable range of alternatives. The 2019 SURTASS LFA FSEIS/SOEIS includes a No Action Alternative specifically to address what could happen if NMFS did not issue an MMPA authorization. The other two Alternatives address two action options that the Navy could potentially pursue while also meeting their mandated Title 10 training and testing responsibilities. More importantly, these alternatives fully analyze a comprehensive variety of mitigation measures. This mitigation analysis supported NMFS' evaluation of our options in potentially issuing an MMPA authorization, which primarily revolves around the appropriate mitigation to prescribe. This approach to evaluating a reasonable range of alternatives is consistent with NMFS policy and practice for issuing MMPA incidental take authorizations. NOAA has independently reviewed and evaluated the SEIS, including the purpose and need statement and range of alternatives, and determined that the 2019 SURTASS LFA FSEIS/SOEIS fully satisfies NMFS' NEPA obligations related to its decision to issue the MMPA final rule and associated LOA, and we have adopted it.

Description of Marine Mammals in the Area of the Specified Activities

Forty-six species of marine mammals, including 10 baleen whale (mysticete); 31 toothed whale (odontocete); and 5 seal/sea lion (pinniped) species that represent 139 stocks (as currently classified) have confirmed or possible occurrence within potential SURTASS LFA sonar activity areas in the central and western North Pacific Ocean and eastern Indian Ocean. Multiple stocks of some species are affected, and independent assessments are conducted to make the necessary findings and determinations for each of these.

There are 11 marine mammal species under NMFS' jurisdiction listed as endangered or threatened under the Endangered Species Act (ESA; 16 U.S.C. 1531 *et seq.*) with confirmed or possible occurrence in the study area for SURTASS LFA sonar training and testing activities. Marine mammal species under NMFS' jurisdiction in the

study area listed as endangered are: North Pacific right whale (*Eubalaena japonica*); gray whale (*Eschrichtius robustus*); blue whale (*Balaenoptera musculus*); fin whale (*Balaenoptera physalus*); Western North Pacific distinct population segment (DPS) of humpback whale (*Megaptera novaeangliae*); sei whale (*Balaenoptera borealis*); sperm whale (*Physeter macrocephalus*); Main Hawaiian Islands Insular DPS of false killer whale (*Pseudorca crassidens*); Western DPS of the Steller sea lion (*Eumetopias jubatus*); and Hawaiian monk seal (*Neomonachus schauinslandi*). The southern DPS of the spotted seal (*Phoca largha*) is listed as threatened under the ESA and is within the study area for SURTASS LFA sonar activities. The aforementioned threatened and endangered marine mammal species also are depleted under the MMPA.

Chinese river dolphins (*Lipotes vexillifer*) do not have stocks designated within the SURTASS LFA sonar study area (see Potential SURTASS LFA Study Area section). The distribution of the Chinese river dolphin is limited to the main channel of a river section between the cities of Jingzhou and Jiangyin. Based on the extremely rare occurrence of these species in the Navy's Study Area and due to the coastal standoff range (*i.e.,* distance of 22 km (13 mi; 12 nmi) from land), take of Chinese river dolphins is not considered a reasonable likelihood; therefore, this species is not addressed further in this document. Similarly, the Taiwanese humpback dolphin, a subspecies of the Indo-Pacific humpback dolphin, is found only in a small, narrow stretch of estuarine waters off the western coast of Taiwan. Take of this species is also not considered a reasonable likelihood and this species is not addressed further in this document. Finally, the small population (<100 individuals) of Arabian Sea DPS of humpback whales includes those whales breeding and foraging in tropical waters year-round along the coast of Oman (Bettridge *et al.,* 2015). Historical records, sparse sightings and acoustic recordings, and one satellite tagged whale, along the coasts of Pakistan and India indicate that the Arabian Sea DPS range may also include these areas. Based on the small population size and the extremely rare occurrence of humpback whales along the coasts of Pakistan and India, take of the Arabian Sea DPS of humpback whales is not considered a reasonable likelihood; therefore, this species is not addressed further in this document.

None of the marine mammal species which the U.S. Fish and Wildlife Service (USFWS) is responsible for managing occur in geographic areas that would overlap with the SURTASS LFA sonar Study Area. Therefore, the Navy has determined that SURTASS LFA sonar activities would have no effect on the endangered or threatened species or the critical habitat of the ESA-listed species under the jurisdiction of the USFWS. These species are not considered further in this notice.

To accurately assess the potential effects of SURTASS LFA sonar activities, the Navy modeled 15 representative sites in the SURTASS LFA sonar activity area. Tables 2 through 16 (below) summarize the abundance, status under the ESA, and density estimates of the marine mammal species and stocks that have confirmed or possible occurrence within the 15 SURTASS LFA sonar modeling areas in the central and western North Pacific Ocean and eastern Indian Ocean. Information on how the density and abundance stock estimates were derived for the selected mission sites is described in Appendix D of the 2019 SURTASS FSEIS/SOEIS and references for the abundances and densities described are provided in Tables 2 through 16.

TABLE 2—ABUNDANCE AND DENSITY ESTIMATES FOR THE MARINE MAMMAL SPECIES, SPECIES GROUPS, AND STOCKS ASSOCIATED WITH MODEL AREA 1, EAST OF JAPAN

Species	Stock name [1]	Abundance	Abundance source reference	Density (animals/Km^2)				Density source reference [2]	ESA status [3]
				Winter	Spring	Summer	Fall		
Blue whale	WNP	9,250	Tillman, 1977	0.00001	0.00001	.....	0.00001	Tillman, 1997; Ferguson and Barlow 2001; 2003; LGL, 2008.	EN
Bryde's whale	WNP	20,501	IWC, 2009	0.0006	0.0006	0.0006	0.0006	Ohsumi, 1977	NL
Common minke whale	WNP OE	25,049	Buckland *et al.,* 1992	0.0022	0.0022	0.0022	0.0022	Buckland *et al.,* 1992	NL
Fin whale	WNP	9,250	Tillman, 1977; Mizroch *et al.,* 2009.	.....	.....	0.0002	0.0002	Tillman, 1977	EN
Humpback whale	WNP stock and DPS.	1,328	Bettridge *et al.,* 2015	.....	.....	0.00036	0.00036	Calambokidis *et al.,* 2008; LGL, 2008.	EN
North Pacific right whale	WNP	922	Best *et al.,* 2001	0.00001	0.00001	.....	.....	Unavail	EN
Sei whale	NP	7,000	Mizroch *et al.,* 2015	0.00029	0.00029	0.00029	0.00029	Fulling *et al.,* 2011	EN
Baird's beaked whale	WNP	5,688	Miyashita 1986 and 1990; Kasuya and Perrin, 2017.	.....	.....	0.0029	0.0029	Kasuya, 1986	NL
Common dolphin	WNP	3,286,163	Ferguson and Barlow, 2001; 2003.	0.0761	0.0761	0.0761	0.0761	Ferguson and Barlow, 2001; 2003.	NL
Common bottlenose dolphin	WNP Northern Offshore.	100,281	Miyashita, 1993; Kasuya and Perrin, 2017.	0.0171	0.0171	0.0171	0.0171	Miyashita, 1993	NL
Cuvier's beaked whale	WNP	90,725	Ferguson and Barlow, 2001; 2003.	0.0031	0.0031	0.0031	0.0031	Ferguson and Barlow, 2001; 2003.	NL
Dall's porpoise (*truei*)	WNP *truei*	178,157	Miyashita, 2007; Kasuya and Perrin, 2017.	0.0390	0.0520	.....	0.0520	Ferguson and Barlow, 2001; 2003.	NL
False killer whale	WNP	16,668	Miyashita, 1993	0.0036	0.0036	0.0036	0.0036	Miyashita, 1993	NL
Ginkgo-toothed beaked whale	NP	22,799	Ferguson and Barlow, 2001; 2003.	0.0005	0.0005	0.0005	0.0005	Ferguson and Barlow, 2001; 2003.	NL
Harbor porpoise	WNP	31,046	Hobbs and Waite, 2010; Allen and Angliss, 2014.	0.0190	0.0190	0.0190	0.0190	Hobbs and Waite, 2010	NL
Hubbs beaked whale	NP	22,799	Ferguson and Barlow, 2001; 2003.	0.0005	0.0005	0.0005	0.0005	Ferguson and Barlow, 2001; 2003.	NL
Killer whale	WNP	12,256	Ferguson and Barlow, 2001; 2003.	0.0001	0.0001	0.0001	0.0001	LGL, 2011	NL
Kogia spp. [4]	WNP	350,553	Ferguson and Barlow, 2001; 2003.	0.0031	0.0031	0.0031	0.0031	Ferguson and Barlow, 2001; 2003.	NL
Pacific white-sided dolphin	NP	931,000	Buckland *et al.,* 1993	0.0082	0.0082	0.0082	0.0082	Ferguson and Barlow, 2001; 2003.	NL
Pantropical spotted dolphin	WNP	130,002	Kanaji *et al.,* 2018	.....	.....	0.0259	0.0259	Miyashita, 1993	NL
Pygmy killer whale	WNP	30,214	Ferguson and Barlow, 2001; 2003.	0.0021	0.0021	0.0021	0.0021	Ferguson and Barlow, 2001; 2003.	NL
Risso's dolphin	WNP	143,374	Kanaji *et al.,* 2018	0.0097	0.0097	0.0097	0.0097	Miyashita, 1993	NL
Rough-toothed dolphin	WNP	5,002	Kanaji *et al.,* 2018	0.00224	0.00224	0.00224	0.00224	Forney *et al.,* 2015	NL
Short-finned pilot whale	WNP Northern	20,884	Miyashita, 1993	0.0128	0.0128	0.0128	0.0128	Miyashita, 1993	NL

TABLE 2—ABUNDANCE AND DENSITY ESTIMATES FOR THE MARINE MAMMAL SPECIES, SPECIES GROUPS, AND STOCKS ASSOCIATED WITH MODEL AREA 1, EAST OF JAPAN—Continued

Species	Stock name [1]	Abundance	Abundance source reference	Density (animals/Km [2])				Density source reference [2]	ESA status [3]
				Winter	Spring	Summer	Fall		
Sperm whale	NP	102,112	Kato and Miyashita, 1998	0.00123	0.00123	0.00123	0.00123	Fulling *et al.,* 2011	EN
Spinner dolphin	WNP	1,015,059	Ferguson and Barlow, 2001; 2003.			0.00083	0.00083	Barlow, 2006	NL
Stejneger's beaked whale	WNP	8,000	Kasuya, 1986	0.0005	0.0005	0.0005	0.0005	Ferguson and Barlow, 2001; 2003.	NL
Striped dolphin	WNP Northern Offshore.	497,725	Miyashita, 1993; Kasuya and Perrin, 2017.	0.0111	0.0111	0.0111	0.0111	Miyashita, 1993	NL
Northern fur seal	WP	503,609	Kuzin 2015; Gelatt *et al.,* 2015.	0.368	0.158			Horimoto *et al.,* 2016	NL

[1] NP = north Pacific; OE = Offshore Japan; WP = western Pacific; WNP = western north Pacific.
[2] Unavail = No density estimates are available for this rare species/stock, therefore, the minimum density estimate of 0.00001 animals/km^2 was used in the take analysis to reflect the low probability of occurrence.
[3] ESA Status: EN = Endangered; T = Threatened; NL = Not Listed.
[4] Pygmy and dwarf sperm whales are difficult to distinguish at sea, and abundance estimates are pooled for *Kogia* spp as reported in Ferguson and Barlow, 2001 and 2003.

TABLE 3—ABUNDANCE AND DENSITY ESTIMATES FOR THE MARINE MAMMAL SPECIES, SPECIES GROUPS, AND STOCKS ASSOCIATED WITH MODEL AREA 2, NORTH PHILIPPINE SEA

Species	Stock name [1]	Abundance	Abundance source reference	Density (animals/Km [2])				Density source reference [2]	ESA status [3]
				Winter	Spring	Summer	Fall		
Blue whale	WNP	9,250	Tillman, 1977	0.00001	0.00001		0.00001	Tillman, 1997; Ferguson and Barlow 2001; 2003; LGL, 2008.	EN
Bryde's whale	WNP	20,501	IWC, 2009	0.0006	0.0006	0.0006	0.0006	Ohsumi, 1977	NL
Common minke whale	WNP OE	25,049	Buckland *et al.,* 1992	0.0044	0.0044	0.0044	0.0044	Buckland *et al.,* 1992	NL
Fin whale	WNP	9,250	Tillman, 1977; Mizroch *et al.,* 2009.	0.0002	0.0002			Tillman, 1977	EN
Humpback whale	WNP and DPS	1,328	Bettridge *et al.,* 2015	0.00089	0.00089		0.00089	Acebes *et al.,* 2007; LGL, 2008.	EN
North Pacific right whale	WNP	922	Best *et al.,* 2001	0.00001	0.00001			Unavail	EN
Omura's whale	WNP	1,800	Oshsumi, 1980	0.00004	0.00004	0.00004	0.00004	LGL, 2008; DoN, 2018	NL
Blainville's beaked whale	WNP	8,032	Ferguson and Barlow, 2001; 2003.	0.0005	0.0005	0.0005	0.0005	Ferguson and Barlow, 2001; 2003.	NL
Common dolphin	WNP	3,286,163	Ferguson and Barlow, 2001; 2003.	0.0562	0.0562	0.0562	0.0562	Ferguson and Barlow, 2001; 2003.	NL
Common bottlenose dolphin	Japanese Coastal	3,516	Kanaji *et al.,* 2018	0.0146	0.0146	0.0146	0.0146	Miyashita, 1993	NL
Cuvier's beaked whale	WNP	90,725	Ferguson and Barlow, 2001; 2003.	0.0054	0.0054	0.0054	0.0054	Ferguson and Barlow, 2001; 2003.	NL
False killer whale	WNP	16,668	Miyashita, 1993	0.0029	0.0029	0.0029	0.0029	Miyashita, 1993	NL
Fraser's dolphin	WNP	220,789	Ferguson and Barlow, 2001; 2003.	0.0069	0.0069	0.0069	0.0069	Bradford *et al.,* 2013	NL
Ginkgo-toothed beaked whale	NP	22,799	Ferguson and Barlow, 2001; 2003.	0.0005	0.0005	0.0005	0.0005	Ferguson and Barlow, 2001; 2003.	NL
Killer whale	WNP	12,256	Ferguson and Barlow, 2001; 2003.	0.00009	0.00009	0.00009	0.00009	LGL, 2011	NL
Kogia spp.[4]	WNP	350,553	Ferguson and Barlow, 2001; 2003.	0.0031	0.0031	0.0031	0.0031	Ferguson and Barlow, 2001; 2003.	NL
Longman's beaked whale	WNP	7,619	Bradford *et al.,* 2017	0.00025	0.00025	0.00025	0.00025	LGL, 2011	NL
Melon-headed whale	WNP	56,213	Kanaji *et al.,* 2018	0.00428	0.00428	0.00428	0.00428	Fulling *et al.,* 2011	NL
Pacific white-sided dolphin	NP	931,000	Buckland *et al.,* 1993	0.0119	0.0119			Ferguson and Barlow, 2001; 2003.	NL
Pantropical spotted dolphin	WNP	130,002	Kanaji *et al.,* 2018	0.0137	0.0137	0.0137	0.0137	Miyashita, 1993	NL
Pygmy killer whale	WNP	30,214	Ferguson and Barlow, 2001; 2003.	0.0021	0.0021	0.0021	0.0021	Ferguson and Barlow, 2001; 2003.	NL
Risso's dolphin	WNP	143,374	Kanaji *et al.,* 2018	0.0106	0.0106	0.0106	0.0106	Miyashita, 1993	NL
Rough-toothed dolphin	WNP	5,002	Kanaji *et al.,* 2018	0.00224	0.00224	0.00224	0.00224	Forney *et al.,* 2015	NL
Short-finned pilot whale	WNP Southern	31,396	Kanaji *et al.,* 2018	0.0153	0.0153	0.0153	0.0153	Miyashita, 1993	NL
Sperm whale	NP	102,112	Kato and Miyashita, 1998	0.00123	0.00123	0.00123	0.00123	Fulling *et al.,* 2011	EN
Spinner dolphin	WNP	1,015,059	Ferguson and Barlow, 2001; 2003.	0.00083	0.00083	0.00083	0.00083	Barlow, 2006	NL
Striped dolphin	Japanese Coastal	19,631	Miyashita, 1993; Kasuya and Perrin, 2017.	0.0329	0.0329	0.0329	0.0329	Miyashita, 1993	NL

[1] NP = north Pacific; OE = Offshore Japan; WNP = western north Pacific.
[2] Unavail = No density estimates are available for this rare species/stock, therefore, the minimum density estimate of 0.00001 animals/km^2 was used in the take analysis to reflect the low probability of occurrence.
[3] ESA Status: EN = Endangered; T = Threatened; NL = Not Listed.
[4] Pygmy and dwarf sperm whales are difficult to distinguish at sea, and abundance estimates are pooled for *Kogia* spp as reported in Ferguson and Barlow, 2001 and 2003.

TABLE 4— ABUNDANCE AND DENSITY ESTIMATES FOR THE MARINE MAMMAL SPECIES, SPECIES GROUPS, AND STOCKS ASSOCIATED WITH MODEL AREA 3, WEST PHILIPPINE SEA

Species	Stock name [1]	Abundance	Abundance source reference	Density (animals/Km [2])				Density source reference [2]	ESA status [3]
				Winter	Spring	Summer	Fall		
Blue whale	WNP	9,250	Tillman, 1997	0.00001	0.00001		0.00001	Tillman, 1997; Ferguson and Barlow 2001; 2003; LGL, 2008.	EN
Bryde's whale	WNP	20,501	IWC, 2009	0.0006	0.0006	0.0006	0.0006	Ohsumi, 1977	NL
Common minke whale	WNP OE	25,049	Buckland *et al.,* 1992	0.0033	0.0033	0.0033	0.0033	Buckland *et al.,* 1992	NL
Fin whale	WNP	9,250	Tillman, 1977; Mizroch *et al.,* 2009.	0.0002	0.0002			Tillman, 1977	EN
Humpback whale	WNP and DPS	1,328	Bettridge *et al.,* 2015	0.00089	0.00089		0.00089	Acebes *et al.,* 2007; LGL, 2008.	EN

TABLE 4— ABUNDANCE AND DENSITY ESTIMATES FOR THE MARINE MAMMAL SPECIES, SPECIES GROUPS, AND STOCKS ASSOCIATED WITH MODEL AREA 3, WEST PHILIPPINE SEA—Continued

Species	Stock name [1]	Abundance	Abundance source reference	Density (animals/Km^2)				Density source reference [2]	ESA status [3]
				Winter	Spring	Summer	Fall		
Omura's whale	WNP	1,800	Oshsumi, 1980	0.00004	0.00004	0.00004	0.00004	LGL, 2008; DoN, 2018	NL
Blainville's beaked whale	WNP	8,032	Ferguson and Barlow, 2001; 2003.	0.0005	0.0005	0.0005	0.0005	Ferguson and Barlow, 2001; 2003.	NL
Common dolphin	WNP	3,286,163	Ferguson and Barlow, 2001; 2003.	0.1158	0.1158	0.1158	0.1158	Carretta *et al.,* 2011	NL
Common bottlenose dolphin	WNP Southern Offshore.	40,769	Kanaji *et al.,* 2018	0.0146	0.0146	0.0146	0.0146	Miyashita, 1993	NL
Cuvier's beaked whale	WNP	90,725	Ferguson and Barlow, 2001; 2003.	0.0003	0.0003	0.0003	0.0003	Ferguson and Barlow, 2001; 2003.	NL
Deraniyagala's beaked whale	NP	22,799	Ferguson and Barlow, 2001; 2003.	0.0005	0.0005	0.0005	0.0005	Ferguson and Barlow, 2001; 2003.	NL
False killer whale	WNP	16,668	Miyashita, 1993	0.0029	0.0029	0.0029	0.0029	Miyashita, 1993	NL
Fraser's dolphin	WNP	220,789	Ferguson and Barlow, 2001; 2003.	0.0069	0.0069	0.0069	0.0069	Bradford *et al.,* 2013	NL
Ginkgo-toothed beaked whale	NP	22,799	Ferguson and Barlow, 2001; 2003.	0.0005	0.0005	0.0005	0.0005	Ferguson and Barlow, 2001; 2003.	NL
Killer whale	WNP	12,256	Ferguson and Barlow, 2001; 2003.	0.00009	0.00009	0.00009	0.00009	LGL, 2011	NL
Kogia spp.[4]	WNP	350,553	Ferguson and Barlow, 2001; 2003.	0.0017	0.0017	0.0017	0.0017	Ferguson and Barlow, 2001; 2003.	NL
Longman's beaked whale	WNP	7,619	Bradford *et al.,* 2017	0.00025	0.00025	0.00025	0.00025	LGL, 2011	NL
Melon-headed whale	WNP	56,213	Kanaji *et al.,* 2018	0.00428	0.00428	0.00428	0.00428	Fulling *et al.,* 2011	NL
Pantropical spotted dolphin	WNP	130,002	Kanaji *et al.,* 2018	0.0137	0.0137	0.0137	0.0137	Miyashita, 1993	NL
Pygmy killer whale	WNP	30,214	Ferguson and Barlow, 2001; 2003.	0.0021	0.0021	0.0021	0.0021	Ferguson and Barlow, 2001; 2003.	NL
Risso's dolphin	WNP	143,374	Kanaji *et al.,* 2018	0.0106	0.0106	0.0106	0.0106	Miyashita, 1993	NL
Rough-toothed dolphin	WNP	5,002	Kanaji *et al.,* 2018	0.00224	0.00224	0.00224	0.00224	Forney *et al.,* 2015	NL
Short-finned pilot whale	WNP Southern	31,396	Kanaji *et al.,* 2018	0.0076	0.0076	0.0076	0.0076	Miyashita, 1993	NL
Sperm whale	NP	102,112	Kato and Miyashita, 1998	0.00123	0.00123	0.00123	0.00123	Fulling *et al.,* 2011	EN
Spinner dolphin	WNP	1,015,059	Ferguson and Barlow, 2001; 2003.	0.00083	0.00083	0.00083	0.00083	Barlow, 2006	NL
Striped dolphin	WNP Southern Offshore.	52,682	Miyashita, 1993; Kasuya and Perrin, 2017.	0.0164	0.0164	0.0164	0.0164	Miyashita, 1993	NL

[1] NP = north Pacific; OE = Offshore Japan; WNP = western north Pacific.
[2] Unavail = No density estimates are available for this rare species/stock, therefore, the minimum density estimate of 0.00001 animals/km^2 was used in the take analysis to reflect the low probability of occurrence.
[3] ESA Status: EN = Endangered; T = Threatened; NL = Not Listed.
[4] Pygmy and dwarf sperm whales are difficult to distinguish at sea, and abundance estimates are pooled for *Kogia* spp as reported in Ferguson and Barlow, 2001 and 2003.

TABLE 5—ABUNDANCE AND DENSITY ESTIMATES FOR THE MARINE MAMMAL SPECIES, SPECIES GROUPS, AND STOCKS ASSOCIATED WITH MODEL AREA 4, OFFSHORE GUAM

Species	Stock name [1]	Abundance	Abundance source reference	Density (animals/Km^2)				Density source reference [2]	ESA status [3]
				Winter	Spring	Summer	Fall		
Blue whale	WNP	9,250	Tillman, 1977	0.00005	0.00005	.....	0.00005	Bradford *et al.,* 2017	EN
Bryde's whale	WNP	20,501	IWC, 2009	0.0004	0.0004	0.0004	0.0004	Fulling *et al.,* 2011	NL
Common minke whale	WNP ''OE''	25,049	Buckland *et al.,* 1992	0.0003	0.0003	0.0003	0.0003	Ferguson and Barlow, 2001; 2003.	NL
Fin whale	WNP	9,250	Tillman, 1977; Mizroch *et al.,* 2009.	0.00006	0.00006	.....	0.00006	Bradford *et al.,* 2017	EN
Humpback whale	WNP and DPS	1,328	Bettridge *et al.,* 2015	0.00089	0.00089	.....	0.00089	Acebes *et al.,* 2007; LGL, 2008.	EN
Omura's whale	WNP	1,800	Oshsumi, 1980	0.00004	0.00004	0.00004	0.00004	LGL, 2008; DoN, 2018	NL
Sei whale	NP	7,000	Mizroch *et al.,* 2015	0.00029	0.00029	.....	0.00029	Fulling *et al.,* 2011	EN
Blainville's beaked whale	WNP	8,032	Ferguson and Barlow, 2001; 2003.	0.00086	0.00086	0.00086	0.00086	Bradford *et al.,* 2017	NL
Common bottlenose dolphin	WNP Southern Offshore.	40,769	Kanaji *et al.,* 2018	0.00899	0.00899	0.00899	0.00899	Bradford *et al.,* 2017	NL
Cuvier's beaked whale	WNP	90,725	Ferguson and Barlow, 2001; 2003.	0.0003	0.0003	0.0003	0.0003	Bradford *et al.,* 2017	NL
Deraniyagala's beaked whale	NP	22,799	Ferguson and Barlow, 2001; 2003.	0.00189	0.00189	0.00189	0.00189	Bradford *et al.,* 2017	NL
Dwarf sperm whale	WNP	350,553	Ferguson and Barlow, 2001; 2003.	0.00714	0.00714	0.00714	0.00714	Barlow, 2006	NL
False killer whale	WNP	16,668	Miyashita, 1993	0.00111	0.00111	0.00111	0.00111	Fulling *et al.,* 2011	NL
Fraser's dolphin	CNP	16,992	Bradford *et al.,* 2013	0.02104	0.02104	0.02104	0.02104	Bradford *et al.,* 2017	NL
Ginkgo-toothed beaked whale	NP	22,799	Ferguson and Barlow, 2001; 2003.	0.00189	0.00189	0.00189	0.00189	Bradford *et al.,* 2017	NL
Killer whale	WNP	12,256	Ferguson and Barlow, 2001; 2003.	0.00006	0.00006	0.00006	0.00006	Bradford *et al.,* 2017	NL
Longman's beaked whale	WNP	7,619	Bradford *et al.,* 2017	0.00311	0.00311	0.00311	0.00311	Bradford *et al.,* 2017	NL
Melon-headed whale	WNP	56,213	Kanaji *et al.,* 2018	0.00428	0.00428	0.00428	0.00428	Fulling *et al.,* 2011	NL
Pantropical spotted dolphin	WNP	130,002	Kanaji *et al.,* 2018	0.0226	0.0226	0.0226	0.0226	Fulling *et al.,* 2011	NL
Pygmy killer whale	WNP	30,214	Ferguson and Barlow, 2001; 2003.	0.00014	0.00014	0.00014	0.00014	Fulling *et al.,* 2011	NL
Pygmy sperm whale	WNP	350,553	Ferguson and Barlow, 2001; 2003.	0.00291	0.00291	0.00291	0.00291	Barlow, 2006	NL
Risso's dolphin	WNP	143,374	Kanaji *et al.,* 2018	0.00474	0.00474	0.00474	0.00474	Bradford *et al.,* 2017	NL
Rough-toothed dolphin	WNP	5,002	Kanaji *et al.,* 2018	0.00185	0.00185	0.00185	0.00185	LGL, 2011	NL
Short-finned pilot whale	WNP Southern	31,396	Kanaji *et al.,* 2018	0.00797	0.00797	0.00797	0.00797	Bradford *et al.,* 2017	NL
Sperm whale	NP	102,112	Kato and Miyashita, 1998	0.00123	0.00123	0.00123	0.00123	Fulling *et al.,* 2011	EN
Spinner dolphin	WNP	1,015,059	Ferguson and Barlow, 2001; 2003.	0.00083	0.00083	0.00083	0.00083	Barlow, 2006	NL

TABLE 5—ABUNDANCE AND DENSITY ESTIMATES FOR THE MARINE MAMMAL SPECIES, SPECIES GROUPS, AND STOCKS ASSOCIATED WITH MODEL AREA 4, OFFSHORE GUAM—Continued

Species	Stock name [1]	Abundance	Abundance source reference	Density (animals/Km²)				Density source reference [2]	ESA status [3]
				Winter	Spring	Summer	Fall		
Striped dolphin	WNP Southern Offshore.	52,682	Mayashita, 1993; Kasuya and Perrin, 2017.	0.00616	0.00616	0.00616	0.00616	Fulling *et al.,* 2011	NL

[1] CNP = central north Pacific; NP = north Pacific; OE = Offshore Japan; WNP = western north Pacific.
[2] Unavail = No density estimates are available for this rare species/stock, therefore, the minimum density estimate of 0.00001 animals/km² was used in the take analysis to reflect the low probability of occurrence.
[3] ESA Status: EN = Endangered; T = Threatened; NL = Not Listed.

TABLE 6—ABUNDANCE AND DENSITY ESTIMATES FOR THE MARINE MAMMAL SPECIES, SPECIES GROUPS, AND STOCKS ASSOCIATED WITH MODEL AREA 5, SEA OF JAPAN

Species	Stock name [1]	Abundance	Abundance source reference	Density (animals/Km²)				Density source reference [2]	ESA status [3]
				Winter	Spring	Summer	Fall		
Bryde's whale	WNP	20,501	IWC, 2009	0.0001	0.0001	0.0001	0.0001	Ferguson and Barlow, 2001; 2003.	NL
Common minke whale	WNP JW Stock	2,611	Miyashita and Okamura, 2011	0.00016	0.00016	0.00016	0.00016	Ferguson and Barlow, 2001; 2003.	NL
Fin whale	WNP	9,250	Tillman, 1977; Mizroch *et al.,* 2009.	0.0009	0.0009		0.0009	Ferguson and Barlow, 2001; 2003.	EN
North Pacific right whale	WNP	922	Best *et al.,* 2001	0.00001	0.00001			Unavail	EN
Omura's whale	WNP	1,800	Oshsumi, 1980	0.00004	0.00004	0.00004	0.00004	LGL, 2008; DoN, 2018	NL
Western North Pacific gray whale.	WNP Western DPS.	290	Caretta *et al.,* 2019	0.00001	0.00001	0.00001	0.00001	Unavail	EN [4]
Baird's beaked whale	WNP	5,688	Miyashita 1986 and 1990; Kasuya and Perrin, 2017.	0.0003	0.0003		0.0003	Kasuya, 1986	NL
Common dolphin	WNP	279,182	Carretta *et al.,* 2011	0.1158	0.1158	0.1158	0.1158	Carretta *et al.,* 2011	NL
Common bottlenose dolphin	IA	105,138	Miyashita, 1986; Kishiro and Kasuya 1993.	0.00077	0.00077	0.00077	0.00077	LGL, 2011	NL
Cuvier's beaked whale	WNP	90,725	Ferguson and Barlow, 2001; 2003.	0.0031	0.0031	0.0031	0.0031	Ferguson and Barlow, 2001; 2003.	NL
Dall's porpoise	SOJ *dalli*	173,638	IWC, 2008	0.0520	0.0520		0.0520	Ferguson and Barlow, 2001; 2003.	NL
False killer whale	IA	9,777	Miyashita, 1986; Kishiro and Kasuya 1993.	0.0027	0.0027	0.0027	0.0027	Ferguson and Barlow, 2001; 2003.	NL
Harbor porpoise	WNP	31,046	Hobbs and Waite, 2010; Angliss and Allen, 2014.	0.0190	0.0190		0.0190	Hobbs and Waite, 2010	NL
Killer whale	WNP	12,256	Ferguson and Barlow, 2001; 2003.	0.00009	0.00009	0.00009	0.00009	LGL, 2011	NL
Kogia spp. [5]	WNP	350,553	Ferguson and Barlow, 2001; 2003.	0.0017	0.0017	0.0017	0.0017	Ferguson and Barlow, 2001; 2003.	NL
Pacific white-sided dolphin	NP	931,000	Buckland *et al.,* 1993	0.0030	0.0030			Ferguson and Barlow, 2001; 2003.	NL
Risso's dolphin	IA	143,374	Kanaji *et al.,* 2018	0.0073	0.0073	0.0073	0.0073	Miyashita, 1993	NL
Rough-toothed dolphin	WNP	5,002	Kanaji *et al.,* 2018	0.00224	0.00224	0.00224	0.00224	Forney *et al.,* 2015	NL
Sperm whale	NP	102,112	Kato and Miyashita, 1998	0.00123	0.00123	0.00123	0.00123	Fulling *et al.,* 2011	EN
Spinner dolphin	WNP	1,015,059	Ferguson and Barlow, 2001; 2003.			0.00083	0.00083	Barlow, 2006	NL
Stejneger's beaked whale	WNP	8,000	Kasuya, 1986	0.0005	0.0005	0.0005	0.0005	Ferguson and Barlow, 2001; 2003.	NL
Northern fur seal	WP	503,609	Kuzin 2015; Gelatt *et al.,* 2015.	0.368	0.158			Horimoto *et al.,* 2016	NL
Spotted seal	Southern and DPS	6,284	Trukhin 2019, Han *et al.,* 2010; Han *et al.,* 2005, Yan *et al.,* 2018, Shibuya and Kobayashi 2016.	0.00001	0.00001	0.00001	0.00001	Unavail	T

[1] IA = Inshore Archipelago; JW = Sea of Japan (minke); NP = north Pacific; SOJ = Sea of Japan; WNP = western north Pacific.
[2] Unavail = No density estimates are available for this rare species/stock, therefore, the minimum density estimate of 0.00001 animals/km² was used in the take analysis to reflect the low probability of occurrence.
[3] ESA Status: EN = Endangered; T = Threatened; NL = Not Listed.
[4] Only the western Pacific population of gray whale is endangered under the ESA.
[5] Pygmy and dwarf sperm whales are difficult to distinguish at sea, and abundance estimates are pooled for *Kogia* spp as reported in Ferguson and Barlow, 2001 and 2003.

TABLE 7—ABUNDANCE AND DENSITY ESTIMATES FOR THE MARINE MAMMAL SPECIES, SPECIES GROUPS, AND STOCKS ASSOCIATED WITH MODEL AREA 6, EAST CHINA SEA

Species	Stock name [1]	Abundance	Abundance source reference	Density (animals/km²)				Density source reference [2]	ESA status [3]
				Winter	Spring	Summer	Fall		
Bryde's whale	ECS	137	IWC, 1996	0.0003	0.0003	0.0003	0.0003	Bradford *et al.,* 2013	NL
Common minke whale	YS	4,492	Miyashita and Okamura, 2011; Hakamada and Hatanaka, 2010.	0.0018	0.0018	0.0018	0.0018	Buckland *et al.,* 1992	NL
Fin whale	ECS	500	Tillman, 1977; Mizroch *et al.,* 2009.	0.0002	0.0002	0.0002	0.0002	Tillman, 1977	EN
North Pacific right whale	WNP	922	Best *et al.,* 2001	0.00001	0.00001			Unavail	EN
Omura's whale	WNP	1,800	Oshsumi, 1980	0.00004	0.00004	0.00004	0.00004	LGL, 2008	NL
Western North Pacific gray whale.	WNP and Western DPS.	290	Carretta *et al.,* 2019	0.00001	0.00001		0.00001	Unavail	EN [4]
Blainville's beaked whale	WNP	8,032	Ferguson and Barlow, 2001; 2003.	0.0005	0.0005	0.0005	0.0005	Ferguson and Barlow, 2001; 2003.	NL
Common dolphin	WNP	279,182	Carretta *et al.,* 2011	0.1158	0.1158	0.1158	0.1158	Carretta *et al.,* 2011	NL
Common bottlenose dolphin	IA	105,138	Miyashita, 1986; Kishiro and Kasuya 1993.	0.00077	0.00077	0.00077	0.00077	LGL, 2011	NL

TABLE 7—ABUNDANCE AND DENSITY ESTIMATES FOR THE MARINE MAMMAL SPECIES, SPECIES GROUPS, AND STOCKS ASSOCIATED WITH MODEL AREA 6, EAST CHINA SEA—Continued

Species	Stock name [1]	Abundance	Abundance source reference	Density (animals/km²)				Density source reference [2]	ESA status [3]
				Winter	Spring	Summer	Fall		
Cuvier's beaked whale	WNP	90,725	Ferguson and Barlow, 2001; 2003.	0.0003	0.0003	0.0003	0.0003	Ferguson and Barlow, 2001; 2003.	NL
False killer whale	IA	9,777	Miyashita, 1986; Kishiro and Kasuya 1993.	0.00111	0.00111	0.00111	0.00111	Fulling *et al.,* 2011	NL
Fraser's dolphin	WNP	220,789	Ferguson and Barlow, 2001; 2003.	0.00694	0.00694	0.00694	0.00694	Bradford *et al.,* 2013	NL
Ginkgo-toothed beaked whale	NP	22,799	Ferguson and Barlow, 2001; 2003.	0.0005	0.0005	0.0005	0.0005	Ferguson and Barlow, 2001; 2003.	NL
Killer whale	WNP	12,256	Ferguson and Barlow, 2001; 2003.	0.00009	0.00009	0.00009	0.00009	LGL, 2011	NL
Kogia spp.[5]	WNP	350,553	Ferguson and Barlow, 2001; 2003.	0.0017	0.0017	0.0017	0.0017	Ferguson and Barlow, 2001; 2003.	NL
Longman's beaked whale	WNP	7,619	Bradford *et al.,* 2017	0.00025	0.00025	0.00025	0.00025	LGL, 2011	NL
Melon-headed whale	WNP	56,213	Kanaji *et al.,* 2018	0.00428	0.00428	0.00428	0.00428	Fulling *et al.,* 2011	NL
Pacific white-sided dolphin	NP	931,000	Buckland *et al.,* 1993	0.0028	0.0028			Ferguson and Barlow, 2001; 2003.	NL
Pantropical spotted dolphin	WNP	130,002	Kanaji *et al.,* 2018	0.01374	0.01374	0.01374	0.01374	Miyashita, 1993	NL
Pygmy killer whale	WNP	30,214	Ferguson and Barlow, 2001; 2003.	0.00014	0.00014	0.00014	0.00014	Fulling *et al.,* 2011	NL
Risso's dolphin	IA	143,374	Kanaji *et al.,* 2018	0.0106	0.0106	0.0106	0.0106	Miyashita, 1993	NL
Rough-toothed dolphin	WNP	5,002	Kanaji *et al.,* 2018	0.00224	0.00224	0.00224	0.00224	Forney *et al.,* 2015	NL
Sperm whale	NP	102,112	Kato and Miyashita, 1998	0.00123	0.00123	0.00123	0.00123	Fulling *et al.,* 2011	EN
Spinner dolphin	WNP	1,015,059	Ferguson and Barlow, 2001; 2003.	0.00083	0.00083	0.00083	0.00083	Barlow, 2006	NL
Spotted seal	Southern and DPS	1,500	Han *et al.,* 2005 in Yan *et al.,* 2018; Han *et al.,* 2010.	0.00001	0.00001	0.00001	0.00001	Unavail	T

[1] ECS = East China Sea; IA = Inshore Archipelago; NP = north Pacific; WNP = western north Pacific; YS = Yellow Sea.
[2] Unavail = No density estimates are available for this rare species/stock, therefore, the minimum density estimate of 0.00001 animals/km² was used in the take analysis to reflect the low probability of occurrence.
[3] ESA Status: EN = Endangered; T = Threatened; NL = Not Listed.
[4] Only the western Pacific population of gray whale is endangered under the ESA.
[5] Pygmy and dwarf sperm whales are difficult to distinguish at sea, and abundance estimates are pooled for *Kogia* spp as reported in Ferguson and Barlow, 2001 and 2003.

TABLE 8—ABUNDANCE AND DENSITY ESTIMATES FOR THE MARINE MAMMAL SPECIES, SPECIES GROUPS, AND STOCKS ASSOCIATED WITH MODEL AREA 7, SOUTH CHINA SEA

Species	Stock name [1]	Abundance	Abundance source reference	Density (animals/km²)				Density source reference [2]	ESA status [3]
				Winter	Spring	Summer	Fall		
Bryde's whale	WNP	20,501	IWC, 2009	0.0006	0.0006	0.0006	0.0006	Ohsumi, 1977	NL
Common minke whale	YS	4,492	Miyashita and Okamura, 2011; Kakamada ad Hatanaka 2010.	0.0018	0.0018	0.0018	0.0018	Buckland *et al.,* 1992	NL
Fin whale	WNP	9,250	Tillman, 1977	0.0002	0.0002		0.0002	Tillman, 1977	EN
Humpback whale	WNP and DPS	1,328	Bettridge *et al.,* 2015	0.00036	0.00036		0.00036	Calambokidis *et al.,* 2008; LGL, 2008.	EN
North Pacific right whale	WNP	922	Best *et al.,* 2001	0.00001	0.00001			Unavail	EN
Omura's whale	WNP	1,800	Oshsumi, 1980	0.00004	0.00004	0.00004	0.00004	LGL, 2008; DoN, 2018	NL
Western North Pacific gray whale.	WNP and Western DPS.	290	Carretta *et al.,* 2019	0.00001	0.00001		0.00001	Unavail	EN [4]
Blainville's beaked whale	WNP	8,032	Ferguson and Barlow, 2001; 2003.	0.0005	0.0005	0.0005	0.0005	Ferguson and Barlow, 2001; 2003.	NL
Common dolphin	WNP	279,182	Carretta *et al.,* 2011	0.1158	0.1158	0.1158	0.1158	Carretta *et al.,* 2011	NL
Common bottlenose dolphin	IA	105,138	Miyashita, 1986; Kishiro and Kasuya 1993.	0.00077	0.00077	0.00077	0.00077	LGL, 2011	NL
Cuvier's beaked whale	WNP	90,725	Ferguson and Barlow, 2001; 2003.	0.0003	0.0003	0.0003	0.0003	Ferguson and Barlow, 2001; 2003.	NL
Deraniyagala's beaked whale	NP	22,799	Ferguson and Barlow, 2001; 2003.	0.0005	0.0005	0.0005	0.0005	Ferguson and Barlow, 2001; 2003.	NL
False killer whale	IA	9,777	Miyashita, 1986; Kishiro and Kasuya 1993.	0.00111	0.00111	0.00111	0.00111	Fulling *et al.,* 2011	NL
Fraser's dolphin	WNP	220,789	Ferguson and Barlow, 2001; 2003.	0.00694	0.00694	0.00694	0.00694	Bradford *et al.,* 2013	NL
Ginkgo-toothed beaked whale	NP	22,799	Ferguson and Barlow, 2001; 2003.	0.0005	0.0005	0.0005	0.0005	Ferguson and Barlow, 2001; 2003.	NL
Killer whale	WNP	12,256	Ferguson and Barlow, 2001; 2003.	0.00009	0.00009	0.00009	0.00009	LGL, 2011	NL
Kogia spp.[5]	WNP	350,553	Ferguson and Barlow, 2001; 2003.	0.0017	0.0017	0.0017	0.0017	Ferguson and Barlow, 2001; 2003.	NL
Longman's beaked whale	WNP	7,619	Bradford *et al.,* 2017	0.00025	0.00025	0.00025	0.00025	LGL, 2011	NL
Melon-headed whale	WNP	56,213	Kanaji *et al.,* 2018	0.00428	0.00428	0.00428	0.00428	Fulling *et al.,* 2011	NL
Pantropical spotted dolphin	WNP	130,002	Kanaji *et al.,* 2018	0.01374	0.01374	0.01374	0.01374	Miyashita, 1993	NL
Pygmy killer whale	WNP	30,214	Ferguson and Barlow, 2001; 2003.	0.00014	0.00014	0.00014	0.00014	Fulling *et al.,* 2011	NL
Risso's dolphin	IA	143,374	Kanaji *et al.,* 2018	0.0106	0.0106	0.0106	0.0106	Miyashita, 1993	NL
Rough-toothed dolphin	WNP	5,002	Kanaji *et al.,* 2018	0.00224	0.00224	0.00224	0.00224	Forney *et al.,* 2015	NL
Short-finned pilot whale	WNP Southern	31,396	Kanaji *et al.,* 2018	0.00159	0.00159	0.00159	0.00159	Fulling *et al.,* 2011	NL
Sperm whale	NP	102,112	Kato and Miyashita, 1998	0.00123	0.00123	0.00123	0.00123	Fulling *et al.,* 2011	EN
Spinner dolphin	WNP	1,015,059	Ferguson and Barlow, 2001; 2003.	0.00083	0.00083	0.00083	0.00083	Barlow, 2006	NL
Striped dolphin	WNP Southern Offshore.	52,682	Miyashita, 1993; Kasuya and Perrin, 2017.	0.00584	0.00584	0.00584	0.00584	LGL, 2011	NL

[1] IA = Inshore Archipelago; NP = north Pacific; WNP = western north Pacific; YS = Yellow Sea.
[2] Unavail = No density estimates are available for this rare species/stock, therefore, the minimum density estimate of 0.00001 animals/km² was used in the take analysis to reflect the low probability of occurrence.
[3] ESA Status: EN = Endangered; T = Threatened; NL = Not Listed.

[4] Only the western Pacific population of gray whale is endangered under the ESA.
[5] Pygmy and dwarf sperm whales are difficult to distinguish at sea, and abundance estimates are pooled for *Kogia* spp as reported in Ferguson and Barlow, 2001 and 2003.

TABLE 9—ABUNDANCE AND DENSITY ESTIMATES FOR THE MARINE MAMMAL SPECIES, SPECIES GROUPS, AND STOCKS ASSOCIATED WITH MODEL AREA 8, OFFSHORE JAPAN 25° TO 40° N

Species	Stock name [1]	Abundance	Abundance source reference	Density (animals/km²)				Density source reference [2]	ESA status [3]
				Winter	Spring	Summer	Fall		
Blue whale	WNP	9,250	Tillman, 1977	0.00001	0.00001	.....	0.00001	Tillman, 1997; Ferguson and Barlow 2001; 2003; LGL, 2008.	EN
Bryde's whale	WNP	20,501	IWC, 2009	0.0003	0.0003	0.0003	0.0003	LGL, 2011	NL
Common minke whale	WNP "OE"	25,049	Buckland *et al.,* 1992	0.0003	0.0003	0.0003	0.0003	Buckland *et al.,* 1992	NL
Fin whale	WNP	9,250	Tillman, 1977; Mizroch *et al.,* 2009.	.....	.....	0.0001	0.0001	Tillman, 1977	EN
Humpback whale	WNP and DPS	1,328	Bettridge *et al.,* 2015	.....	.....	0.00036	0.00036	Calambokidis *et al.,* 2008; LGL, 2008.	EN
Sei whale	NP	7,000	Mizroch *et al.,* 2015	.....	0.00029	0.00029	0.00029	Fulling *et al.,* 2011	EN
Baird's beaked whale	WNP	5,688	Miyashita, 1986; Kasuya and Perrin, 2017.	0.0001	0.0001	0.0001	0.0001	Kasuya, 1986	NL
Blainville's beaked whale	WNP	8,032	Ferguson and Barlow, 2001; 2003.	0.0007	0.0007	0.0007	0.0007	LGL, 2011	NL
Common dolphin	WNP	3,286,163	Ferguson and Barlow, 2001; 2003.	0.0863	0.0863	0.0863	0.0863	Ferguson and Barlow, 2001; 2003.	NL
Common bottlenose dolphin	WNP Northern Offshore.	100,281	Miyashita, 1993; Kasuya and Perrin, 2017.	0.00077	0.00077	0.00077	0.00077	LGL, 2011	NL
Cuvier's beaked whale	WNP	90,725	Ferguson and Barlow, 2001; 2003.	0.00374	0.00374	0.00374	0.00374	LGL, 2011	NL
Dall's porpoise	WNP *dalli*	162,000	Miyashita, 1991; Kasuya and Perrin, 2017.	0.0390	0.0520	.....	0.0520	Ferguson and Barlow, 2001; 2003.	NL
Dwarf sperm whale	WNP	350,553	Ferguson and Barlow, 2001; 2003.	0.0043	0.0043	0.0043	0.0043	LGL, 2011	NL
False killer whale	WNP	16,668	Miyashita, 1993	0.0036	0.0036	0.0036	0.0036	Miyashita, 1993	NL
Hubb's beaked whale	NP	22,799	Ferguson and Barlow, 2001; 2003.	0.0005	0.0005	0.0005	0.0005	Ferguson and Barlow, 2001; 2003.	NL
Killer whale	WNP	12,256	Ferguson and Barlow, 2001; 2003.	0.00009	0.00009	0.00009	0.00009	LGL, 2011	NL
Longman's beaked whale	WNP	7,619	Bradford *et al.,* 2017	0.00025	0.00025	0.00025	0.00025	LGL, 2011	NL
Melon-headed whale	WNP	56,213	Kanaji *et al.,* 2018	0.0027	0.0027	0.0027	0.0027	LGL, 2011	NL
Mesoplodon spp.[4]	WNP	22,799	Ferguson and Barlow, 2001; 2003.	0.0005	0.0005	0.0005	0.0005	Ferguson and Barlow, 2001; 2003.	NL
Northern right whale dolphin	NP	68,000	Buckland *et al.,* 1993	0.00001	0.00001	.....	0.00001	Unavail	NL
Pacific white-sided dolphin	NP	931,000	Buckland *et al.,* 1993	0.0048	0.0048	0.0048	0.0048	Ferguson and Barlow, 2001; 2003.	NL
Pantropical spotted dolphin	WNP	130,002	Kanaji *et al.,* 2018	0.0113	0.0113	0.0113	0.0113	LGL, 2011	NL
Pygmy killer whale	WNP	30,214	Ferguson and Barlow, 2001; 2003.	0.0001	0.0001	0.0001	0.0001	LGL, 2011	NL
Pygmy sperm whale	WNP	350,553	Ferguson and Barlow, 2001; 2003.	0.0018	0.0018	0.0018	0.0018	LGL, 2011	NL
Risso's dolphin	WNP	143,374	Kanaji *et al.,* 2018	0.0005	0.0005	0.0005	0.0005	LGL, 2011	NL
Rough-toothed dolphin	WNP	5,002	Kanaji *et al.,* 2018	0.0019	0.0019	0.0019	0.0019	LGL, 2011	NL
Short-finned pilot whale	WNP Northern	20,884	Miyashita, 1993	0.0021	0.0021	0.0021	0.0021	LGL, 2011	NL
Sperm whale	NP	102,112	Kato and Miyashita, 1998	0.0022	0.0022	0.0022	0.0022	LGL, 2011	EN
Spinner dolphin	WNP	1,015,059	Ferguson and Barlow, 2001; 2003.	0.0019	0.0019	0.0019	0.0019	LGL, 2011	NL
Stejneger's beaked whale	WNP	8,000	Kasuya, 1986	0.0005	0.0005	0.0005	0.0005	Ferguson and Barlow, 2001; 2003.	NL
Striped dolphin	WNP Northern Offshore.	497,725	Miyashita, 1993; Kasuya and Perrin, 2017.	0.0058	0.0058	0.0058	0.0058	LGL, 2011	NL
Hawaiian monk seal	Hawaii	1,427	NMFS, 2018	0.00001	0.00001	0.00001	0.00001	Unavail	EN
Northern fur seal	WP	503,609	Kuzin 2015; Gelatt *et al.,* 2015.	0.0123	.....	.....	.....	Buckland *et al.,* 1993	NL

[1] NP = north Pacific; OE = Offshore Japan; WNP = western north Pacific; WP = Western Pacific.
[2] Unavail = No density estimates are available for this rare species/stock, therefore, the minimum density estimate of 0.00001 animals/km² was used in the take analysis to reflect the low probability of occurrence.
[3] ESA Status: EN = Endangered; T = Threatened; NL = Not Listed.
[4] No methods are available to distinguish between the species of *Mesoplodon* beaked whales in the WNP stocks (Blainville's beaked whale (*M. densirostris*), Perrin's beaked whale (*M. perrini*), Lesser beaked whale (*M. peruvianus*), Stejneger's beaked whale (*M. stejnegeri*), Gingko-toothed beaked whale (*M. gingkodens*), and Hubbs' beaked whale (*M. carlhubbsi*)) when observed during at-sea surveys (Carretta *et al.,* 2018). As reported in Ferguson and Barlow, 2001 and 2003, data on these species were pooled. These six species are managed as one unit.

TABLE 10—ABUNDANCE AND DENSITY ESTIMATES FOR THE MARINE MAMMAL SPECIES, SPECIES GROUPS, AND STOCKS ASSOCIATED WITH MODEL AREA 9, OFFSHORE JAPAN 10° TO 25° N

Species	Stock name [1]	Abundance	Abundance source reference	Density (animals/Km²)				Density source reference [2]	ESA status [3]
				Winter	Spring	Summer	Fall		
Blue whale	WNP	9,250	Tillman, 1977; Caretta *et al.,* 2019.	0.00001	0.00001	.....	0.00001	Tillman, 1997; Ferguson and Barlow 2001; 2003; LGL, 2008.	EN
Bryde's whale	WNP	20,501	IWC, 2009	0.0003	0.0003	0.0003	0.0003	LGL, 2011	NL
Fin whale	WNP	9,250	Tillman, 1977	0.00001	0.00001	.....	.....	Unavail	EN
Humpback whale	WNP and DPS	1,328	Bettridge *et al.,* 2015	0.00036	0.00036	.....	0.00036	Calambokidis *et al.,* 2008; LGL, 2008.	EN
Omura's whale	WNP	1,800	Oshsumi, 1980	0.00004	0.00004	0.00004	0.00004	LGL, 2008; DoN, 2018	NL
Sei whale	NP	7,000	Mizroch *et al.,* 2015	0.00029	.....	.....	0.00029	Fulling *et al.,* 2011	EN
Blainville's beaked whale	WNP	8,032	Ferguson and Barlow, 2001; 2003.	0.0007	0.0007	0.0007	0.0007	LGL, 2011	NL
Common bottlenose dolphin	WNP Southern Offshore.	40,769	Kanaji *et al.,* 2018	0.00077	0.00077	0.00077	0.00077	LGL, 2011	NL
Cuvier's beaked whale	WNP	90,725	Ferguson and Barlow, 2001; 2003.	0.00374	0.00374	0.00374	0.00374	LGL, 2011	NL

TABLE 10—ABUNDANCE AND DENSITY ESTIMATES FOR THE MARINE MAMMAL SPECIES, SPECIES GROUPS, AND STOCKS ASSOCIATED WITH MODEL AREA 9, OFFSHORE JAPAN 10° TO 25° N—Continued

Species	Stock name [1]	Abundance	Abundance source reference	Density (animals/Km²)				Density source reference [2]	ESA status [3]
				Winter	Spring	Summer	Fall		
Deraniyagala's beaked whale	NP	22,799	Ferguson and Barlow, 2001; 2003.	0.00093	0.00093	0.00093	0.00093	Ferguson and Barlow, 2001; 2003.	NL
Dwarf sperm whale	WNP	350,553	Ferguson and Barlow, 2001; 2003.	0.0043	0.0043	0.0043	0.0043	LGL, 2011	NL
False killer whale	WNP	16,668	Miyashita, 1993	0.00057	0.00057	0.00057	0.00057	LGL, 2011	NL
Fraser's dolphin	CNP	16,992	Bradford *et al.,* 2013	0.00251	0.00251	0.00251	0.00251	LGL, 2011	NL
Ginkgo-toothed beaked whale	NP	22,799	Ferguson and Barlow, 2001; 2003.	0.00093	0.00093	0.00093	0.00093	Ferguson and Barlow, 2001; 2003.	NL
Killer whale	WNP	12,256	Ferguson and Barlow, 2001; 2003.	0.00009	0.00009	0.00009	0.00009	LGL, 2011	NL
Longman's beaked whale	WNP	7,619	Bradford *et al.,* 2017	0.00025	0.00025	0.00025	0.00025	LGL, 2011	NL
Melon-headed whale	WNP	56,213	Kanaji *et al.,* 2018	0.00267	0.00267	0.00267	0.00267	LGL, 2011	NL
Pantropical spotted dolphin	WNP	130,002	Kanaji *et al.,* 2018	0.01132	0.01132	0.01132	0.01132	LGL, 2011	NL
Pygmy killer whale	WNP	30,214	Ferguson and Barlow, 2001; 2003.	0.00006	0.00006	0.00006	0.00006	LGL, 2011	NL
Pygmy sperm whale	WNP	350,553	Ferguson and Barlow, 2001; 2003.	0.00176	0.00176	0.00176	0.00176	LGL, 2011	NL
Risso's dolphin	WNP	143,374	Kanaji *et al.,* 2018	0.00046	0.00046	0.00046	0.00046	LGL, 2011	NL
Rough-toothed dolphin	WNP	5,002	Kanaji *et al.,* 2018	0.00185	0.00185	0.00185	0.00185	LGL, 2011	NL
Short-finned pilot whale	WNP Southern	31,396	Kanaji *et al.,* 2018	0.00211	0.00211	0.00211	0.00211	LGL, 2011	NL
Sperm whale	NP	102,112	Kato and Miyashita, 1998	0.00222	0.00222	0.00222	0.00222	LGL, 2011	EN
Spinner dolphin	WNP	1,015,059	Ferguson and Barlow, 2001; 2003.	0.00187	0.00187	0.00187	0.00187	LGL, 2011	NL
Striped dolphin	WNP Southern Offshore.	52,682	Miyashita, 1993; Kasuya and Perrin, 2017.	0.00584	0.00584	0.00584	0.00584	LGL, 2011	NL

[1] NP = north Pacific; CNP = central north Pacific; WNP = western north Pacific.
[2] Unavail = No density estimates are available for this rare species/stock, therefore, the minimum density estimate of 0.00001 animals/km² was used in the take analysis to reflect the low probability of occurrence.
[3] ESA Status: EN = Endangered; T = Threatened; NL = Not Listed.

TABLE 11—ABUNDANCE AND DENSITY ESTIMATES FOR THE MARINE MAMMAL SPECIES, SPECIES GROUPS, AND STOCKS ASSOCIATED WITH MODEL AREA 10, NORTHERN HAWAII

Species	Stock name [1]	Abundance	Abundance source reference	Density (animals/Km²)				Density source reference [2]	ESA status [3]
				Winter	Spring	Summer	Fall		
Blue whale	CNP	133	Bradford *et al.,* 2017	0.00005	0.00005	.....	0.00005	Bradford *et al.,* 2017	EN
Bryde's whale	Hawaii	1,751	Bradford *et al.,* 2017	0.000085	0.000085	0.000085	0.000085	Forney *et al.,* 2015	NL
Common minke whale	Hawaii	25,049	Buckland *et al.,* 1992	0.00423	0.00423	.....	0.00423	Martin *et al.,* 2015	NL
Fin whale	Hawaii	154	Bradford *et al.,* 2017	0.00006	0.00006	.....	0.00006	Bradford *et al.,* 2017	EN
Humpback whale	CNP and Hawaii DPS.	10,103	Calambokidis *et al.,* 2008; Muto *et al.,* 2019.	0.00529	0.00529	.....	0.00529	Mobley *et al.,* 2001; Calambokidis *et al.,* 2008.	NL
Sei whale	Hawaii	391	Bradford *et al.,* 2017	0.00016	0.00016	.....	0.00016	Bradford *et al.,* 2017	EN
Blainville's beaked whale	Hawaii	2,105	Bradford *et al.,* 2017	0.00086	0.00086	0.00086	0.00086	Bradford *et al.,* 2017	NL
Common bottlenose dolphin	Hawaii pelagic	21,815	Bradford *et al.,* 2017	0.00118	0.00118	0.00118	0.00118	Forney *et al.,* 2015	NL
	Kauai/Niihau	184	Baird *et al.,* 2009; Caretta *et al.,* 2014.	0.065	0.065	0.065	0.065	Baird *et al.,* 2009	NL
	4 Islands	191	Baird *et al.,* 2009; Caretta *et al.,* 2014.	0.017	0.017	0.017	0.017	Baird *et al.,* 2009	NL
	Oahu	743	Baird *et al.,* 2009; Caretta *et al.,* 2014.	0.187	0.187	0.187	0.187	Baird *et al.,* 2009	NL
	Hawaii Island	128	Baird *et al.,* 2009; Caretta *et al.,* 2014.	0.028	0.028	0.028	0.028	Baird *et al.,* 2009	NL
Cuvier's beaked whale	Hawaii	723	Bradford *et al.,* 2017	0.0003	0.0003	0.0003	0.0003	Bradford *et al.,* 2017	NL
Dwarf sperm whale	Hawaii	17,519	Barlow, 2006	0.00714	0.00714	0.00714	0.00714	Barlow, 2006	NL
False killer whale	Hawaii-Pelagic	1,540	Bradford *et al.,* 2014; 2015; Caretta *et al.,* 2019.	0.0006	0.0006	0.0006	0.0006	Forney *et al.,* 2015; Bradford *et al.,* 2015.	NL
	Main Hawaiian Islands Insular and DPS.	167	Bradford *et al.,* 2018; Caretta *et al.,* 2019.	0.0008	0.0008	0.0008	0.0008	Bradford *et al.,* 2015	EN
	Northwest Hawaiian Islands.	617	Bradford *et al.,* 2014; 2015; Caretta *et al.,* 2019.	0.0006	0.0006	0.0006	0.0006	Forney *et al.,* 2015; Bradford *et al.,* 2015.	NL
Fraser's dolphin	Hawaii	51,491	Bradford *et al.,* 2017	0.02104	0.02104	0.02104	0.02104	Bradford *et al.,* 2017	NL
Killer whale	Hawaii	146	Bradford *et al.,* 2017	0.00006	0.00006	0.00006	0.00006	Bradford *et al.,* 2017	NL
Longman's beaked whale	Hawaii	7,619	Bradford *et al.,* 2017	0.00311	0.00311	0.00311	0.00311	Bradford *et al.,* 2017	NL
Melon-headed whale	Hawaiian Islands	8,666	Bradford *et al.,* 2017	0.002	0.0020	0.0020	0.0020	Aschettino, 2010	NL
	Kohala Resident	447	Aschettino, 2010	0.1000	0.1000	0.1000	0.1000	Aschettino, 2010	NL
Pantropical spotted dolphin	Hawaii Pelagic	55,795	Bradford *et al.,* 2017	0.00369	0.00369	0.00369	0.00369	Forney *et al.,* 2015	NL
	Hawaii Island	220	Courbis *et al.,* 2014	0.061	0.061	0.061	0.061	Oleson *et al.,* 2013	NL
	Oahu	220	Courbis *et al.,* 2014	0.072	0.072	0.072	0.072	Oleson *et al.,* 2013	NL
	4 Islands	220	Courbis *et al.,* 2014	0.061	0.061	0.061	0.061	Oleson *et al.,* 2013	NL
Pygmy killer whale	Hawaii	10,640	Bradford *et al.,* 2017	0.00435	0.00435	0.00435	0.00435	Bradford *et al.,* 2017	NL
Pygmy sperm	Hawaii	7,138	Barlow, 2006	0.0029	0.0029	0.0029	0.0029	Barlow, 2006	NL
Risso's dolphin	Hawaii	11,613	Bradford *et al.,* 2017	0.00474	0.00474	0.00474	0.00474	Bradford *et al.,* 2017	NL
Rough-toothed dolphin	Hawaii	72,528	Bradford *et al.,* 2017	0.00224	0.00224	0.00224	0.00224	Forney *et al.,* 2015	NL
Short-finned pilot whale	Hawaii	19,503	Bradford *et al.,* 2017	0.00459	0.00459	0.00459	0.00459	Forney *et al.,* 2015	NL
Sperm whale	Hawaii	4,559	Bradford *et al.,* 2017	0.00158	0.00158	0.00158	0.00158	Forney *et al.,* 2015	EN
Spinner dolphin	Hawaii Pelagic	3,351	Barlow, 2006	0.00159	0.00159	0.00159	0.00159	Forney *et al.,* 2015	NL
	Kauai/Niihau	601	Carretta *et al.,* 2014	0.097	0.097	0.097	0.097	Hill *et al.,* 2011	NL
	Hawaii Island	665	Carretta *et al.,* 2019	0.066	0.066	0.066	0.066	Tyne *et al.,* 2014	NL
	Oahu/4 Islands	355	Carretta *et al.,* 2014	0.023	0.023	0.023	0.023	Hill *et al.,* 2011	NL
	Kure/Midway Atoll	260	Carretta *et al.,* 2014	0.0070	0.0070	0.0070	0.0070	Barlow, 2006	NL
	Pearl and Hermes Reef.	300	Karczmarski *et al.,* 2005	0.0070	0.0070	0.0070	0.0070	Barlow, 2006	NL
Striped dolphin	Hawaii	61,201	Bradford *et al.,* 2017	0.00385	0.00385	0.00385	0.00385	Forney *et al.,* 2015	NL

TABLE 11—ABUNDANCE AND DENSITY ESTIMATES FOR THE MARINE MAMMAL SPECIES, SPECIES GROUPS, AND STOCKS ASSOCIATED WITH MODEL AREA 10, NORTHERN HAWAII—Continued

Species	Stock name [1]	Abundance	Abundance source reference	Density (animals/Km²)				Density source reference [2]	ESA status [3]
				Winter	Spring	Summer	Fall		
Hawaiian monk seal	Hawaii	1,427	NMFS, 2018	0.00004	0.00004	0.00004	0.00004	NMFS, 2018; DoN, 2018	EN

[1] CNP = central north Pacific.
[2] Unavail = No density estimates are available for this rare species/stock, therefore, the minimum density estimate of 0.00001 animals/km² was used in the take analysis to reflect the low probability of occurrence.
[3] ESA Status: EN = Endangered; T = Threatened; NL = Not Listed.

TABLE 12—ABUNDANCE AND DENSITY ESTIMATES FOR THE MARINE MAMMAL SPECIES, SPECIES GROUPS, AND STOCKS ASSOCIATED WITH MODEL AREA 11, SOUTHERN HAWAII

Species	Stock name [1]	Abundance	Abundance source reference	Density (animals/Km²)				Density source reference [2]	ESA status [3]
				Winter	Spring	Summer	Fall		
Blue whale	CNP	133	Bradford *et al.,* 2017	0.00005	0.00005	.....	0.00005	Bradford *et al.,* 2017	EN
Bryde's whale	Hawaii	798	Bradford *et al.,* 2013	0.00012	0.00012	0.00012	0.00012	Forney *et al.,* 2015	NL
Common minke whale	Hawaii	25,049	Buckland *et al.,* 1992	0.00423	0.00423	.....	0.00423	Martin *et al.,* 2015	NL
Fin whale	Hawaii	154	Bradford *et al.,* 2017	0.00006	0.00006	.....	0.00006	Bradford *et al.,* 2017	EN
Humpback whale	CNP/Hawaii DPS	10,103	Calambokidis *et al.,* 2008	0.00631	0.00631	.....	0.00631	Mobley *et al.,* 2001; Calambokidis *et al.,* 2008.	NL
Sei whale	Hawaii	391	Bradford *et al.,* 2017	0.00016	0.00016	.....	0.00016	Bradford *et al.,* 2017	EN
Blainville's beaked whale	Hawaii	2,105	Bradford *et al.,* 2017	0.00086	0.00086	0.00086	0.00086	Bradford *et al.,* 2017	NL
Common bottlenose dolphin	Hawaii Pelagic	21,815	Bradford *et al.,* 2017	0.00126	0.00126	0.00126	0.00126	Forney *et al.,* 2015	NL
	Oahu	743	Baird *et al.,* 2009; Carretta *et al.,* 2014.	0.187	0.187	0.187	0.187	Baird *et al.,* 2009	NL
	4 Islands	191	Baird *et al.,* 2009; Carretta *et al.,* 2014.	0.017	0.017	0.017	0.017	Baird *et al.,* 2009	NL
	Hawaii Island	128	Baird *et al.,* 2009; Carretta *et al.,* 2014.	0.028	0.028	0.028	0.028	Baird *et al.,* 2009	NL
	Kauai/Niihau	184	Baird *et al.,* 2009; Carretta *et al.,* 2014.	0.065	0.065	0.065	0.065	Baird *et al.,* 2009	NL
Cuvier's beaked whale	Hawaii	723	Bradford *et al.,* 2017	0.0003	0.0003	0.0003	0.0003	Bradford *et al.,* 2017	NL
Deraniyagala's beaked whale	NP	22,799	Ferguson and Barlow, 2001; 2003.	0.00093	0.00093	0.00093	0.00093	Ferguson and Barlow, 2001; 2003.	NL
Dwarf sperm whale	Hawaii	17,519	Barlow, 2006	0.00714	0.00714	0.00714	0.00714	Barlow, 2006	NL
False killer whale	Hawaii-Pelagic	1,540	Bradford *et al.,* 2014; 2015	0.00086	0.00086	0.00086	0.00086	Forney *et al.,* 2015; Bradford *et al.,* 2015.	NL
	Main Hawaiian Island Insular and DPS.	167	Bradford *et al.,* 2018; Carretta *et al.,* 2019.	0.0008	0.0008	0.0008	0.0008	Bradford *et al.,* 2015	EN
Fraser's dolphin	Hawaii	51,491	Bradford *et al.,* 2017	0.02104	0.02104	0.02104	0.02104	Bradford *et al.,* 2017	NL
Killer whale	Hawaii	146	Bradford *et al.,* 2017	0.00006	0.00006	0.00006	0.00006	Bradford *et al.,* 2017	NL
Longman's beaked whale	Hawaii	7,619	Bradford *et al.,* 2017	0.00311	0.00311	0.00311	0.00311	Bradford *et al.,* 2017	NL
Melon-headed whale	Hawaiian Islands	8,666	Bradford *et al.,* 2017	0.0020	0.0020	0.0020	0.0020	Aschettino, 2010	NL
	Kohala Resident	447	Aschettino, 2010	0.1000	0.1000	0.1000	0.1000	Aschettino, 2010	NL
Pantropical spotted dolphin	Hawaii Pelagic	55,795	Bradford *et al.,* 2017	0.00541	0.00541	0.00541	0.00541	Forney *et al.,* 2015	NL
	Hawaii Island	220	Courbis *et al.,* 2014	0.061	0.061	0.061	0.061	Oleson *et al.,* 2013	NL
	Oahu	220	Courbis *et al.,* 2014	0.072	0.072	0.072	0.072	Oleson *et al.,* 2013	NL
	4 Islands	220	Courbis *et al.,* 2014	0.061	0.061	0.061	0.061	Oleson *et al.,* 2013	NL
Pygmy killer whale	Hawaii	10,640	Bradford *et al.,* 2017	0.00435	0.00435	0.00435	0.00435	Bradford *et al.,* 2017	NL
Pygmy sperm whale	Hawaii	7,138	Barlow, 2006	0.0029	0.0029	0.0029	0.0029	Barlow, 2006	NL
Risso's dolphin	Hawaii	11,613	Bradford *et al.,* 2017	0.00474	0.00474	0.00474	0.00474	Bradford *et al.,* 2017	NL
Rough toothed dolphin	Hawaii	75,528	Bradford *et al.,* 2017	0.00257	0.00257	0.00257	0.00257	Forney *et al.,* 2015	NL
Short-finned pilot whale	Hawaii	19,503	Bradford *et al.,* 2017	0.00549	0.00549	0.00549	0.00549	Forney *et al.,* 2015	NL
Sperm whale	Hawaii	4,559	Bradford *et al.,* 2017	0.00131	0.00131	0.00131	0.00131	Forney *et al.,* 2015	EN
Spinner dolphin	Hawaii Pelagic	3,351	Barlow, 2006	0.00348	0.00348	0.00348	0.00348	Forney *et al.,* 2015	NL
	Oahu/4-Islands	601	Carretta *et al.,* 2014	0.023	0.023	0.023	0.023	Hill *et al.,* 2011	NL
	Hawaii Island	665	Carretta *et al.,* 2019	0.066	0.066	0.066	0.066	Tyne *et al.,* 2014	NL
	Kauai/Niihau	355	Carretta *et al.,* 2014	0.097	0.097	0.097	0.097	Hill *et al.,* 2011	NL
Striped dolphin	Hawaii	61,201	Bradford *et al.,* 2017	0.00475	0.00475	0.00475	0.00475	Forney *et al.,* 2015	NL
Hawaiian monk seal	Hawaii	1,427	NMFS, 2018	0.00004	0.00004	0.00004	0.00004	NMFS, 2018, DoN, 2018	EN

[1] CNP = central north Pacific; NP = north Pacific.
[2] Unavail = No density estimates are available for this rare species/stock, therefore, the minimum density estimate of 0.00001 animals/km² was used in the take analysis to reflect the low probability of occurrence.
[3] ESA Status: EN = Endangered; T = Threatened; NL = Not Listed.

TABLE 13—ABUNDANCE AND DENSITY ESTIMATES FOR THE MARINE MAMMAL SPECIES, SPECIES GROUPS, AND STOCKS ASSOCIATED WITH MODEL AREA 12, OFFSHORE SRI LANKA

Species	Stock name [1]	Abundance	Abundance source reference	Density (animals/Km²)				Density source reference [2]	ESA status [3]
				Winter	Spring	Summer	Fall		
Blue whale	NIND	3,691	IWC, 2016	0.00004	0.00004	0.00004	0.00004	Kaschner *et al.,* 2006; DoN, 2018.	EN
Bryde's whale	NIND	9,176	Wade and Gerrodette, 1993	0.00041	0.00041	0.00041	0.00041	Kaschner *et al.,* 2006; DoN, 2018.	NL
Common minke whale	IND	257,000	IWC, 2016	0.00001	0.00001	0.00001	0.00001	SMRU Ltd., 2012; DoN, 2018	NL
Fin whale	IND	1,846	IWC, 2016	0.00001	0.00001	0.00001	0.00001	DoN, 2018	EN
Omura's whale	NIND	9,176	Wade and Gerrodette, 1993	0.00041	0.00041	0.00041	0.00041	Kaschner *et al.,* 2006; DoN, 2018.	NL
Sei whale	NIND	9,176	Wade and Gerrodette, 1993	0.00041	0.00041	0.00041	0.00041	SMRU Ltd., 2012; DoN, 2018	EN
Blainville's beaked whale	IND	16,867	Wade and Gerrodette, 1993	0.00105	0.00105	0.00105	0.00105	SMRU Ltd., 2012; DoN, 2018	NL
Common dolphin	IND	1,819,982	Wade and Gerrodette, 1993	0.00513	0.00516	0.00541	0.00538	SMRU Ltd., 2012; DoN, 2018	NL
Common bottlenose dolphin	NIND	785,585	Wade and Gerrodette, 1993	0.04839	0.04829	0.04725	0.04740	SMRU Ltd., 2012; DoN, 2018	NL

TABLE 13—ABUNDANCE AND DENSITY ESTIMATES FOR THE MARINE MAMMAL SPECIES, SPECIES GROUPS, AND STOCKS ASSOCIATED WITH MODEL AREA 12, OFFSHORE SRI LANKA—Continued

Species	Stock name [1]	Abundance	Abundance source reference	Density (animals/km²)				Density source reference [2]	ESA status [3]
				Winter	Spring	Summer	Fall		
Cuvier's beaked whale	NIND	27,272	Wade and Gerrodette, 1993	0.00506	0.00508	0.00505	0.00505	SMRU Ltd., 2012; DoN, 2018	NL
Deraniyagala's beaked whale	IND	16,867	Wade and Gerrodette, 1993	0.00513	0.00516	0.00541	0.00538	SMRU Ltd., 2012; DoN, 2018	NL
Dwarf sperm whale	IND	10,541	Wade and Gerrodette, 1993	0.00005	0.00005	0.00005	0.00005	Kaschner *et al.,* 2006; DoN, 2018.	NL
False killer whale	IND	144,188	Wade and Gerrodette, 1993	0.00024	0.00024	0.00024	0.00024	Kaschner *et al.,* 2006; DoN, 2018.	NL
Fraser's dolphin	IND	151,554	Wade and Gerrodette, 1993	0.00207	0.00207	0.00207	0.00207	Kaschner *et al.,* 2006; DoN, 2018.	NL
Indo-Pacific bottlenose dolphin	IND	7,850	Wade and Gerrodette, 1993	0.00048	0.00048	0.00047	0.00047	SMRU Ltd., 2012; DoN, 2018	NL
Killer whale	IND	12,593	Wade and Gerrodette, 1993	0.00697	0.00155	0.00693	0.00694	SMRU Ltd., 2012; DoN, 2018	NL
Longman's beaked whale	IND	16,867	Wade and Gerrodette, 1993	0.00513	0.00516	0.00541	0.00538	SMRU Ltd., 2012; DoN, 2018	NL
Melon-headed whale	IND	64,600	Wade and Gerrodette, 1993	0.00921	0.00920	0.00937	0.00936	SMRU Ltd., 2012; DoN, 2018	NL
Pantropical spotted dolphin	IND	736,575	Wade and Gerrodette, 1993	0.00904	0.00904	0.00904	0.00904	Kaschner *et al.,* 2006; DoN, 2018.	NL
Pygmy killer whale	IND	22,029	Wade and Gerrodette, 1993	0.00138	0.00137	0.00152	0.00153	SMRU Ltd., 2012; DoN, 2018	NL
Pygmy sperm whale	IND	10,541	Wade and Gerrodette, 1993	0.00001	0.00001	0.00001	0.00001	Kaschner *et al.,* 2006; DoN, 2018.	NL
Risso's dolphin	IND	452,125	Wade and Gerrodette, 1993	0.08641	0.08651	0.08435	0.08466	SMRU Ltd., 2012; DoN, 2018	NL
Rough-toothed dolphin	IND	156,690	Wade and Gerrodette, 1993	0.00071	0.00071	0.00071	0.00071	Kaschner *et al.,* 2006; DoN, 2018.	NL
Short-finned pilot whale	IND	268,751	Wade and Gerrodette, 1993	0.03219	0.03228	0.03273	0.03279	SMRU Ltd., 2012; DoN, 2018	NL
Sperm whale	NIND	24,446	Wade and Gerrodette, 1993	0.00129	0.00118	0.00126	0.00121	SMRU Ltd., 2012; DoN, 2018	EN
Spinner dolphin	IND	634,108	Wade and Gerrodette, 1993	0.00678	0.00678	0.00678	0.00678	Kaschner *et al.,* 2006; DoN, 2018.	NL
Striped dolphin	IND	674,578	Wade and Gerrodette, 1993	0.14601	0.14629	0.14780	0.14788	SMRU Ltd., 2012; DoN, 2018	NL

[1] IND = Indian Ocean; NIND = northern Indian Ocean.
[2] Unavail = No density estimates are available for this rare species/stock, therefore, the minimum density estimate of 0.00001 animals/km² was used in the take analysis to reflect the low probability of occurrence.
[3] ESA Status: EN = Endangered; T = Threatened; NL = Not Listed.

TABLE 14—ABUNDANCE AND DENSITY ESTIMATES FOR THE MARINE MAMMAL SPECIES, SPECIES GROUPS, AND STOCKS ASSOCIATED WITH MODEL AREA 13, ANDAMAN SEA

Species	Stock name [1]	Abundance	Abundance source reference	Density (animals/km²)				Density source reference [2]	ESA status [3]
				Winter	Spring	Summer	Fall		
Blue whale	NIND	3,691	IWC, 2016	0.00003	0.00003	0.00003	0.00003	Kaschner *et al.,* 2006; DoN, 2018.	EN
Bryde's whale	NIND	9,176	Wade and Gerrodette, 1993	0.00038	0.000036	0.00037	0.00037	Kaschner *et al.,* 2006; DoN, 2018.	NL
Common minke whale	IND	257,000	IWC, 2016	.....	0.00001	0.00968	0.00001	SMRU Ltd., 2012; DoN, 2018	NL
Fin whale	IND	1,846	IWC, 2016	0.00001	0.00001	.....	0.00001	SMRU Ltd., 2012; DoN, 2018	EN
Omura's whale	NIND	9,176	IWC, 2016	0.00038	0.00036	0.00037	0.00037	Kaschner *et al.,* 2006; DoN, 2018.	NL
Blainville's beaked whale	IND	16,867	Wade and Gerrodette, 1993	0.00094	0.00089	0.00094	0.00099	SMRU Ltd., 2012; DoN, 2018	NL
Common bottlenose dolphin	NIND	785,585	Wade and Gerrodette, 1993	0.07578	0.07781	0.07261	0.07212	SMRU Ltd., 2012; DoN, 2018	NL
Cuvier's beaked whale	NIND	27,272	Wade and Gerrodette, 1993	0.00466	0.00482	0.00480	0.00473	SMRU Ltd., 2012; DoN, 2018	NL
Deraniyagala's beaked whale	IND	16,867	Wade and Gerrodette, 1993	0.00094	0.00092	0.00097	0.00099	SMRU Ltd., 2012; DoN, 2018	NL
Dwarf sperm whale	IND	10,541	Wade and Gerrodette, 1993	0.00005	0.00006	0.00006	0.00005	Kaschner *et al.,* 2006; DoN, 2018.	NL
False killer whale	IND	144,188	Wade and Gerrodette, 1993	0.00023	0.00023	0.00024	0.00023	Kaschner *et al.,* 2006; DoN, 2018.	NL
Fraser's dolphin	IND	151,554	Wade and Gerrodette, 1993	0.00176	0.00179	0.00180	0.00180	Kaschner *et al.,* 2006; DoN, 2018.	NL
Ginkgo-toothed beaked whale	IND	16,867	Wade and Gerrodette, 1993	0.00094	0.00092	0.00097	0.00099	SMRU Ltd., 2012; DoN, 2018	NL
Indo-Pacific bottlenose dolphin	IND	7,850	Wade and Gerrodette, 1993	0.00076	0.00078	0.00073	0.00072	SMRU Ltd., 2012; DoN, 2018	NL
Killer whale	IND	12,593	Wade and Gerrodette, 1993	0.00744	0.00178	0.00730	0.00734	SMRU Ltd., 2012; DoN, 2018	NL
Longman's beaked whale	IND	16,867	Wade and Gerrodette, 1993	0.00444	0.00429	0.00459	0.00440	SMRU Ltd., 2012; DoN, 2018	NL
Melon-headed whale	IND	64,600	Wade and Gerrodette, 1993	0.00884	0.00884	0.00878	0.00846	SMRU Ltd., 2012; DoN, 2018	NL
Pantropical spotted dolphin	IND	736,575	Wade and Gerrodette, 1993	0.00868	0.00841	0.00829	0.00873	Kaschner *et al.,* 2006; DoN, 2018.	NL
Pygmy killer whale	IND	22,029	Wade and Gerrodette, 1993	0.00121	0.00113	0.00125	0.00131	SMRU Ltd., 2012; DoN, 2018	NL
Pygmy sperm whale	IND	10,541	Wade and Gerrodette, 1993	0.00001	0.00001	0.00001	0.00001	Kaschner *et al.,* 2006; DoN, 2018.	NL
Risso's dolphin	IND	452,125	Wade and Gerrodette, 1993	0.09197	0.09215	0.09173	0.09366	SMRU Ltd., 2012; DoN, 2018	NL
Rough-toothed dolphin	IND	156,690	Wade and Gerrodette, 1993	0.00077	0.00078	0.00077	0.00074	Kaschner *et al.,* 2006; DoN, 2018.	NL
Short-finned pilot whale	IND	268,751	Wade and Gerrodette, 1993	0.03354	0.03364	0.03543	0.03504	SMRU Ltd., 2012; DoN, 2018	NL
Sperm whale	NIND	24,446	Wade and Gerrodette, 1993	0.00109	0.00099	0.00107	0.00105	SMRU Ltd., 2012; DoN, 2018	EN
Spinner dolphin	IND	634,108	Wade and Gerrodette, 1993	0.00736	0.00711	0.00701	0.00726	Kaschner *et al.,* 2006; DoN, 2018.	NL
Striped dolphin	IND	674,578	Wade and Gerrodette, 1993	0.14413	0.14174	0.14123	0.14402	SMRU Ltd., 2012; DoN, 2018	NL

[1] IND = Indian Ocean; NIND = northern Indian Ocean.
[2] Unavail = No density estimates are available for this rare species/stock, therefore, the minimum density estimate of 0.00001 animals/km² was used in the take analysis to reflect the low probability of occurrence.
[3] ESA Status: EN = Endangered; T = Threatened; NL = Not Listed.

TABLE 15—ABUNDANCE AND DENSITY ESTIMATES FOR THE MARINE MAMMAL SPECIES, SPECIES GROUPS, AND STOCKS ASSOCIATED WITH MODEL AREA 14, NORTHWESTERN AUSTRALIA

Species	Stock name [1]	Abundance	Abundance source reference	Density (animals/km²)				Density source reference [2]	ESA status [3]
				Winter	Spring	Summer	Fall		
Antarctic minke whale	ANT	90,000	Bannister *et al.,* 1996	.....	0.00001	0.00001	0.00001	Unavail	NL
Blue whale/Pygmy blue whale	SIND	1,657	Jenner *et al.,* 2008; McCauley and Jenner, 2010.	.....	0.00003	0.00003	0.00003	Kaschner *et al.,* 2006; DoN, 2018.	EN
Bryde's whale	SIND	13,854	IWC, 1981	0.00032	0.00032	0.00032	0.00032	Kaschner *et al.,* 2006; DoN, 2018.	NL
Common minke whale	IND	257,500	IWC, 2016	.....	0.01227	0.01929	0.01947	SMRU Ltd., 2012; DoN, 2018	NL
Fin whale	SIND	38,185	Branch and Butterworth, 2001; Mori and Butterworth, 2006.	0.00001	0.00099	0.00128	0.00121	SMRU Ltd., 2012; DoN, 2018	EN
Humpback whale	Western Australia stock and DPS.	13,640	Bannister and Hedley, 2001	.....	0.00007	0.00007	0.00007	Kaschner *et al.,* 2006; DoN, 2018.	NL
Omura's whale	SIND	13,854	IWC, 1981	0.00032	0.00032	0.00032	0.00032	Kaschner *et al.,* 2006; DoN, 2018.	NL
Sei whale	SIND	13,854	IWC, 1981	0.00001	0.00001	0.00001	0.00001	Unavail	EN
Blainville's beaked whale	IND	16,867	Wade and Gerrodette, 1993	0.00083	0.00083	0.00082	0.00083	SMRU Ltd., 2012; DoN, 2018	NL
Common bottlenose dolphin	WAU	3,000	Preen *et al.,* 1997	0.03630	0.03652	0.03459	0.03725	SMRU Ltd., 2012; DoN, 2018	NL
Cuvier's beaked whale	SH	76,500	Dalebout *et al.,* 2005	0.00399	0.00406	0.00402	0.00405	SMRU Ltd., 2012; DoN, 2018	NL
Dwarf sperm whale	IND	10,541	Wade and Gerrodette, 1993	0.00004	0.00004	0.00004	0.00004	Kaschner *et al.,* 2006; DoN, 2018.	NL
False killer whale	IND	144,188	Wade and Gerrodette, 1993	0.00020	0.00020	0.00019	0.00020	Kaschner *et al.,* 2006; DoN, 2018.	NL
Fraser's dolphin	IND	151,554	Wade and Gerrodette, 1993	0.00145	0.00148	0.00149	0.00147	Kaschner *et al.,* 2006; DoN, 2018.	NL
Killer whale	IND	12,593	Wade and Gerrodette, 1993	0.00585	0.00435	0.00588	0.00580	SMRU Ltd., 2012; DoN, 2018	NL
Longman's beaked whale	IND	16,867	Wade and Gerrodette, 1993	0.00393	0.00393	0.00403	0.00412	SMRU Ltd., 2012; DoN, 2018	NL
Melon-headed whale	IND	64,600	Wade and Gerrodette, 1993	0.00717	0.00717	0.00635	0.00637	SMRU Ltd., 2012; DoN, 2018	NL
Pantropical spotted dolphin	IND	736,575	Wade and Gerrodette, 1993	0.00727	0.00727	0.00715	0.00746	Kaschner *et al.,* 2006; DoN, 2018.	NL
Pygmy killer whale	IND	22,029	Wade and Gerrodette, 1993	0.00100	0.00104	0.00101	0.00097	SMRU Ltd., 2012; DoN, 2018	NL
Risso's dolphin	IND	452,125	Wade and Gerrodette, 1993	0.07152	0.07214	0.06944	0.07173	SMRU Ltd., 2012; DoN, 2018	NL
Rough-toothed dolphin	IND	156,690	Wade and Gerrodette, 1993	0.00059	0.00060	0.00059	0.00059	Kaschner *et al.,* 2006; DoN, 2018.	NL
Short-finned pilot whale	IND	268,751	Wade and Gerrodette, 1993	0.02698	0.02759	0.02689	0.02716	SMRU Ltd., 2012; DoN, 2018	NL
Southern bottlenose whale	IND	599,300	Wade and Gerrodette, 1993	0.00083	0.00083	0.00082	0.00083	SMRU Ltd., 2012; DoN, 2018	NL
Spade-toothed beaked whale	IND	16,867	Wade and Gerrodette, 1993	0.00083	0.00083	0.00082	0.00083	SMRU Ltd., 2012; DoN, 2018	NL
Sperm whale	SIND	24,446	Wade and Gerrodette, 1993	0.00096	0.00087	0.00097	0.00092	SMRU Ltd., 2012; DoN, 2018	EN
Spinner dolphin	IND	634,108	Wade and Gerrodette, 1993	0.00561	0.00549	0.00568	0.00563	Kaschner *et al.,* 2006; DoN, 2018.	NL
Striped dolphin	IND	674,578	Wade and Gerrodette, 1993	0.12018	0.12041	0.11680	0.11727	SMRU Ltd., 2012; DoN, 2018	NL

[1] ANT = Antarctic; SIND = southern Indian Ocean; IND = Indian Ocean; SH = Southern Hemisphere; WAU = Western Australia.
[2] Unavail = No density estimates are available for this rare species/stock, therefore, the minimum density estimate of 0.00001 animals/km² was used in the take analysis to reflect the low probability of occurrence.
[3] ESA Status: EN = Endangered; T = Threatened; NL = Not Listed.

TABLE 16—ABUNDANCE AND DENSITY ESTIMATES FOR THE MARINE MAMMAL SPECIES, SPECIES GROUPS, AND STOCKS ASSOCIATED WITH MODEL AREA 15, NORTHEAST OF JAPAN

Species	Stock name [1]	Abundance	Abundance source reference	Density (animals/km²)				Density source reference [2]	ESA status [3]
				Winter	Spring	Summer	Fall		
Blue whale	WNP	9,250	Tillman, 1977	0.00001	0.00001	.....	0.00001	Tillman, 1997; Ferguson and Barlow 2001; 2003; LGL, 2008.	EN
Common minke whale	WNP ''OE''	25,049	Buckland *et al.,* 1992	0.0022	0.0022	0.0022	0.0022	Buckland *et al.,* 1992	NL
Fin whale	WNP	9,250	Tillman, 1977	.....	0.0002	0.0002	0.0002	Tillman, 1977	EN
Humpback whale	WNP and DPS	1,328	Bettridge *et al.,* 2015	.....	0.000498	0.000498	0.000498	Kaschner *et al.,* 2006 in DoN, 2018.	EN
North Pacific right whale	WNP	922	Best *et al.,* 2001	.....	.....	0.00001	0.00001	Unavail	EN
Sei whale	NP	7,000	Mizroch *et al.,* 2015	.....	0.00029	0.00029	.....	Fulling *et al.,* 2011	EN
Western North Pacific gray whale.	Western and DPS	290	Caretta *et al.,* 2019	.....	.....	0.00001	0.00001	Unavail	EN
Baird's beaked whale	WNP	5,688	Miyashita 1986 and 1990, Kasuya and Perrin, 2017.	.....	0.0015	0.0029	0.0029	Kasuya, 1986	NL
Common dolphin	WNP	3,286,163	Ferguson and Barlow, 2001; 2003.	0.0863	0.0863	0.0863	0.0863	Ferguson and Barlow, 2001; 2003.	NL
Cuvier's beaked whale	WNP	90,725	Ferguson and Barlow, 2001; 2003.	0.0054	0.0054	0.0054	0.0054	Ferguson and Barlow, 2001; 2003.	NL
Dall's porpoise	WNP *dalli*	162,000	Miyashita, 1991; Kasuya and Perrin, 2017.	0.0390	0.0520	0.0650	0.0520	Ferguson and Barlow, 2001; 2003.	NL
Killer whale	WNP	12,256	Ferguson and Barlow, 2001; 2003.	0.0036	0.0036	0.0036	0.0036	Springer *et al.,* 2003	NL
Pacific white-sided dolphin	NP	931,000	Buckland *et al.,* 1993	0.0048	0.0048	0.0048	0.0048	Ferguson and Barlow, 2001; 2003.	NL
Sperm whale	NP	102,112	Kato and Miyashita, 1998	0.0017	0.0022	0.0022	0.0022	LGL, 2011	EN
Stejneger's beaked whale	WNP	8,000	Kasuya, 1986	0.0005	0.0005	0.0005	0.0005	Ferguson and Barlow, 2001; 2003.	NL
Northern fur seal	Western Pacific	503,609	Kuzin 2015; Gelatt *et al.,* 2015.	0.00689	0.01378	0.01378	0.01378	Buckland *et al.,* 1993	NL
Ribbon seal	NP	365,000	Lowry, 2016	0.0904	0.0904	0.0452	0.0452	Moreland *et al.,* 2012	NL
Spotted seal	Alaska/Bering Sea DPS.	461,625	Conn *et al.,* 2014; Muto *et al.,* 2019.	.....	0.2770	0.1385	.....	Moreland *et al.,* 2012	NL
Steller sea lion	West-Asian and Western DPS.	77,767	Muto *et al.,* 2019	0.00001	0.00001	0.00001	0.00001	Unavail	EN

[1] IND = Indian Ocean; NP = northern Pacific; WNP = western north Pacific; OE = Offshore Japan.
[2] Unavail = No density estimates are available for this rare species/stock, therefore, the minimum density estimate of 0.00001 animals/km² was used in the take analysis to reflect the low probability of occurrence.

[3] ESA Status: EN = Endangered; T = Threatened; NL = Not Listed.

Stock abundance and density estimates are derived from the best available source documentation and species or stock-specific information on the marine mammals that could occur in that area. The Navy developed the abundance and density estimates by first using estimates from line-transect surveys that occurred in or near each of the 15 model sites (*e.g.,* Bradford *et al.,* 2017) and NMFS' SARs. When density estimates were not available from a survey in the model area, the Navy extrapolated density estimates from a region with similar oceanographic characteristics to that model area. For example, the eastern tropical Pacific has been extensively surveyed and provides a comprehensive understanding of marine mammals in temperate oceanic waters (Ferguson and Barlow, 2001, 2003). Density estimates for some model areas were also derived from the Navy's Marine Species Density Database (DoN, 2018). In addition, density estimates are usually not available for rare marine mammal species or for those that have been newly defined (*e.g.,* the Deraniyagala's beaked whale). For these species, the lowest density estimate of 0.0001 animals/square kilometer (0.0001 animals/km^2) was used in the take analysis to reflect the low probability of occurrence in a specific SURTASS LFA sonar model area. Further, the Navy pooled density estimates for species of the same genus if sufficient data were not available to compute a density for individual species or the species are difficult to distinguish at sea, which is often the case for beaked whales (*e.g., Mesoplodon* spp.), as well as the pygmy and dwarf sperm whales (*Kogia* spp.). Density estimates are available for species groups rather than the individual species for *Kogia* spp. in model areas 1, 2, 3, 5, 6, and 7 and for *Mesoplodon* spp. in model area 8, and the best available data (Ferguson and Barlow, 2001 and 2003) are reported as pooled data.

The Navy provides detailed descriptions of the distribution, abundance, diving behavior, life history, and hearing vocalization information for each affected marine mammal species with confirmed or possible occurrence within SURTASS LFA sonar study areas in section 4 (pages 4–1 through 4–44) of the application (available online at *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-military-readiness-activities*) and Chapter 3 of the 2019 SURTASS LFA FSEIS/SOEIS.

Although not repeated in this document, NMFS has reviewed these data, determined them to be the best available scientific information for this rulemaking, and considers this information part of the administrative record for this action. Additional information is available in NMFS' Marine Mammal Stock Assessment Reports, which may be viewed at *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments.* There are no active Unusual Mortality Events in the SURTASS LFA sonar Study Area.

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

NMFS provided a brief primer on the subjects of underwater sound, the metrics used in the analysis of the effects of underwater sound on marine mammals, and marine mammal hearing sensitivities and vocalizations in the *Brief Background on Sound, Marine Mammal Hearing, and Vocalization* section of the proposed rule (84 FR 7186; March 1, 2019). Additionally, NMFS provided a summary and discussion of the potential effects of the specified activities (*e.g.,* use of acoustic sources) on marine mammals and their habitat in the proposed rule (84 FR 7186; March 1, 2019). In the *Potential Effects of Specified Activities on Marine Mammals and Their Habitat* section of the proposed rule, NMFS provided a description of the potential effects of SURTASS LFA sonar training and testing activities on marine mammals, including a discussion of serious injury or mortality, physical trauma, sensory impairment (permanent and temporary threshold shift and acoustic masking), physiological responses (particular stress responses), behavioral disturbance, or habitat effects, as well as the results from previous SURTASS LFA sonar activities monitoring. Therefore, we do not reprint this information here but refer the reader to that document, however, we provide an overview of relevant new scientific studies below. None of the newer information highlighted here affects our analysis in a manner that changes our determinations under the MMPA from the proposed rule.

New Pertinent Science Since Publication of the Proposed Rule

Southall *et al.* (2019a) evaluated Southall *et al.* (2007) and used updated scientific information to propose revised noise exposure criteria to predict onset of auditory effects in marine mammals (*i.e.,* PTS and TTS onset). Southall *et al.* (2019a) note that the quantitative processes described and the resulting exposure criteria (*i.e.,* thresholds and auditory weighting functions) are largely identical to those in Finneran (2016) and NMFS (2016 and 2018). However, they differ in that the Southall *et al.* (2019a) exposure criteria are more broadly applicable as they include all marine mammal species (rather than those only under NMFS jurisdiction) for all noise exposures (both in air and underwater for amphibious species), and while the hearing group compositions are identical, Southall *et al.* (2019a) renamed the hearing groups.

Recent studies on the behavioral responses of cetaceans to mid-frequency sonar examine and continue to demonstrate the importance of not only sound source parameters, but exposure context (*e.g.,* behavioral state, presence of other animals and social relationships, prey abundance, distance to source, presence of vessels, environmental parameters, etc.) in determining or predicting a behavioral response. Wensveen *et al.* (2019) examined the role of sound source (simulated sonar pulses) distance and received level in northern bottlenose whales in an environment without frequent sonar activity using multi-scaled controlled exposure experiments. They observed behavioral avoidance of the sound source over a wide range of distances (0.8–28 km) and estimated avoidance thresholds ranging from received SPLs of 117–126 dB re: 1 μPa. The behavioral response characteristics and avoidance thresholds were comparable to those previously observed in beaked whale studies; however, Wensveen *et al.* (2019) did not observe an effect of distance on behavioral response and found that onset and intensity of behavioral response were better predicted by received SPL. When conducting controlled exposure experiments on blue whales, Southall *et al.* (2019b) observed that after exposure to simulated and operational mid-frequency active sonar, more than 50 percent of blue whales in deep-diving states responded to the sonar, while no behavioral response was observed in shallow-feeding blue whales. The behavioral responses they observed were generally brief, of low to moderate severity, and highly dependent on exposure context (behavioral state, source-to-whale horizontal range, and

prey availability). Blue whale response did not follow a simple exposure-response model based on received sound exposure level. In a review of the potential impacts of sonar on beaked whales, Bernaldo de Quirós *et al.* (2019) suggested that the effect of mid-frequency active sonar on beaked whales varies among individuals or populations, and that predisposing conditions such as previous exposure to sonar and individual health risk factors may contribute to individual outcomes (such as decompression sickness).

Estimated Take of Marine Mammals

This section indicates the numbers of takes that NMFS is authorizing in its LOA, which are based on the maximum number of instances in which marine mammals could be reasonably expected to be taken, as described in detail below. NMFS coordinated closely with the Navy in the development of its incidental take application, and agrees that the methods the Navy has put forth described herein to estimate take (including the model, thresholds, and density estimates), and the resulting numbers estimated for authorization, are appropriate and based on the best available science.

Level B harassment is the only means of take expected to result from these activities. For military readiness activities, the MMPA defines ''harassment'' as: (i) Any act that injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild (Level A Harassment); or (ii) any act that disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavior patterns, including but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering, to a point where such behavioral patterns are abandoned or significantly altered (Level B Harassment). As described in the *Potential Effects of the Specified Activity on Marine Mammals and their Habitat* section of the proposed rule (84 FR 7186, March 1, 2019), based on the specified activities operational parameters and mitigation, only Level B Harassment is expected to occur and therefore authorized. Based on the nature of the activities and the anticipated effectiveness of the mitigation measures, take by Level A Harassment, serious injury, or mortality is neither anticipated nor authorized.

Generally speaking, for acoustic impacts we estimate the amount and type of harassment by considering: (1) Acoustic thresholds above which NMFS believes the best available science indicates marine mammals will be taken by behavioral disruption or incur some degree of temporary or permanent hearing impairment; (2) the area or volume of water that will be ensonified above these levels in a day or event; (3) the density or occurrence of marine mammals within these ensonified areas; and (4) the number of days of activities or events. Below, we describe these components in more detail, as well as the model the Navy used to incorporate these components to predict impacts, and present the take estimates.

Density Estimates

To derive density estimates, direct estimates from line-transect surveys that occurred in or near each of the 15 modeled areas (described in the *Description of Marine Mammals in the Area of the Specified Activities* section above) were utilized first (*e.g.,* Bradford *et al.,* 2017). When density estimates were not available from a survey in the Study Area, density estimates from a region with similar oceanographic characteristics were extrapolated to the operational area. Densities for some model areas were also derived from the Navy's Marine Species Density Database (DoN, 2018a). Last, density estimates are usually not available for rare marine mammal species or for those that have been newly defined (*e.g.,* Deraniyagala's beaked whale). For such species, a low density estimate of 0.0001 animals per square kilometer (animals/km^2) was used in the risk analysis to reflect the low probability of occurrence in a specific model area. Further, density estimates are sometimes pooled for species of the same genus if sufficient data are not available to compute a density for individual species or the species are difficult to distinguish at sea. This is often the case for beaked whales (*Mesoplodon* spp) as well as the pygmy and dwarf sperm whales (*Kogia* spp), which is why densities were pooled for these species in certain model areas. Density estimates are available for these species groups rather than the individual species in model areas 1, 2, 3, 5, 6, and 7 for *Kogia* spp, and in model area 8 for *Mesoplodon* spp. Density information is provided in Tables 2 through 16 above, and is also available in the Navy's application (Table 3–2, Pages 3–6 through 3–25) and Chapter 3 and Appendix D of the 2019 SURTASS LFA FSEIS/SOEIS.

SURTASS LFA Sonar Behavioral Response Function

To model potential behavioral impacts to marine animals from exposure to SURTASS LFA sonar sound, the Navy has developed a methodology to estimate the total exposure of modeled animals exposed to multiple pings over an extended period of time. NMFS concurs that this model is appropriate and utilizes the best available science, and adopted the model for use in the analysis to support these regulations. The Navy's acoustic model analyzes the following components: (1) The LFA sonar source modeled as a point source, with an effective source level (SL) of approximately 235 dB re: 1 µPa at 1 m (SPL) (note: This was incorrectly stated as 240 dB in the proposed rule); (2) a 60 second duration signal; and (3) a beam pattern that is correct for the number and spacing of the individual projectors (source elements). This source model, when combined with the three-dimensional transmission loss (TL) field generated by the Parabolic Equation (PE) acoustic propagation model, defines the received level (RL) (in SPL) sound field surrounding the source for a 60-second LFA sonar signal (*i.e.,* the SPE metric accounts for received level and exposure from multiple pings). To estimate the total exposure of animals exposed to multiple pings, the Navy models the RLs for each modeled location and any computer-simulated marine mammals (animats) within the location, records the exposure history of each animat, and generates a SPE value. Thus, the Navy can model the SURTASS LFA sound field, providing a four-dimensional (position and time) representation of a sound pressure field within the marine environment and estimates of an animal's exposure to sound over a period of 24 hours (hrs).

The Navy uses a behavioral response function to estimate the number of behavioral responses that would qualify as behavioral Level B harassment under the MMPA. NMFS determined that this threshold is appropriate for SURTASS LFA sonar and utilizes the best available science and adopted this function for use in the analysis for these regulations. The behavioral response function is described fully in Chapter 4 and Appendix B of the 2019 SURTASS LFA FSEIS/SOEIS.

A wide range of behavioral reactions may qualify as Level B harassment under the MMPA, including but not limited to avoidance of the sound source, temporary changes in vocalizations or dive patterns, temporary avoidance of an area, or temporary disruption of feeding, migrating, or reproductive behaviors. The estimates calculated using the behavioral response function do not differentiate between the different types of potential behavioral reactions, nor do the estimates provide information regarding the potential fitness or other

biological consequences of the reactions on the affected individuals.

The definition of Level B harassment for military readiness activities contemplates the disruption of behavioral patterns to the point where they are abandoned or significantly altered. It is difficult to predict with certainty, given existing data, when exposures that are generally expected are likely to result in significantly altered or abandoned behavioral patterns. Therefore, the Navy's take estimates capture a wider range of impacts, including less significant responses. Moreover, NMFS does not assume that each instance of Level B harassment modeled by the Navy will have, or is likely to have, an adverse impact on an individual's fitness. Rather, NMFS considers the available scientific evidence to determine the likely nature of the modeled behavioral responses and the potential fitness consequences for affected individuals in its negligible impact evaluation. Accordingly, we consider application of this Level B harassment threshold as identifying the maximum number of instances in which marine mammals could be reasonably expected to experience a disruption in behavior patterns to a point where they are abandoned or significantly altered (*i.e.,* Level B harassment). Because this is the most appropriate method for estimating Level B harassment given the best available science and uncertainty on the topic, it is these numbers of Level B harassment by behavioral disturbance that are analyzed in the *Negligible Impact Analysis and Determination* section and authorized.

Estimates of Potential Marine Mammal Exposure

The Navy's acoustic impact analysis for marine mammals, which NMFS has adopted for the purposes of these regulations, represents an evolution that builds upon the analysis and methodology documented in previous SURTASS LFA sonar NEPA efforts (DoN, 2001; 2007; 2012; and 2017), and includes updates of the most current acoustic thresholds and methodology to assess auditory impacts (NMFS, 2018). A detailed discussion of the acoustic impact analysis is provided in Appendix B of the 2019 SURTASS LFA FSEIS/SOEIS, but is summarized here.

Using the Acoustic Integration Model (AIM), the Navy modeled 15 representative model areas in the central and western North Pacific and eastern Indian Oceans, representing the acoustic regimes and marine mammal species that may be encountered during SURTASS LFA sonar training and testing activities. Modeling was conducted for one 24-hour period in each of the four seasons in each model area. To predict acoustic exposure, the LFA sonar ship was simulated traveling in a triangular pattern at a speed of 4 kt (7.4 kilometers per hour (kph), for eight hours in each leg of the triangle. The duration of the LFA sonar transmission was modeled as 24 hrs, with a signal duration of 60 seconds and a duty cycle of 10 percent (*i.e.,* the source transmitted for 60 seconds every 10 minutes (min) for 24 hrs, which equates to 2.4 active transmission hours and is representative of average actual transmission times based on the past 17 years of SURTASS LFA sonar activities).

The acoustic field around the LFA sonar source was predicted by the Navy standard parabolic equation propagation model using the defined LFA sonar operating parameters. Each marine mammal species potentially occurring in a model area in each season was simulated by creating animats (simulated animals) programmed with behavioral values describing their dive and movement patterns. AIM then integrates the acoustic field created from the underwater transmission of LFA sonar with the three-dimensional (3D) movement of marine mammals to estimate their potential for sonar exposure at each 30-second timestep within the 24-hr modeling period. Thus, the output of AIM is the time history of exposure for each animat.

The Navy assesses the potential impacts on marine mammals by predicting the sound field that a given marine mammal species/stock could be exposed to over time in a potential model area. This is a multi-part process involving: (1) The ability to measure or estimate an animal's location in space and time; (2) the ability to measure or estimate the three-dimensional sound field at these times and locations; (3) the integration of these two data sets into the acoustic impact model to estimate the total acoustic exposure for each animal in the modeled population; and (4) the conversion of the resultant cumulative exposures for a modeled population into an estimate of the risk of a potential injury (*i.e.,* Level A harassment (permanent threshold shift (PTS)), temporary threshold shift (TTS), or disruption of natural behavioral patterns (*i.e.,* a take estimate for Level B harassment).

To estimate the potential impacts for each marine mammal stock on an annual basis, several calculation steps are required. First, the potential impact for one LFA sonar transmission hour is calculated. Second, the number of LFA sonar transmission hours that may occur in each model area for each activity is determined. The third step is to determine the number of model areas in which each stock may occur for each activity, and the fourth step is to select the maximum per-hour impact for each stock that may occur in the model areas for that activity. The final step is to multiply the results of steps two, three, and four to calculate the potential annual impacts per activity, which are then summed across the stocks for a total potential impact for all individual activities. The number of individual marine mammals that may be taken over the seven-year period of the proposed SURTASS LFA sonar training and testing activities was estimated by multiplying the maximum number of instances of exposure for each species/stock calculated annually for each of the two transmission scenarios (496 transmission hours in years 1–4 and 592 transmission hours in years 5–7), and then adding these to calculate a total estimate. For example, for the WNP blue whale, four years of 496 transmission hours (for years 1–4) resulted in 90 Level B harassment takes/year and three years of 592 transmission hours (for years 5–7) resulted in 123 Level B harassment takes/year. Multiplying 90 takes/year by 4 years equals 360 Level B harassment takes for the 496 transmission hour scenario, and multiplying 123 takes/year by 3 years equals 369 Level B harassment takes for the 592 transmission hour scenario. The final step is adding the totals for the two transmission scenarios to arrive at a total (360 + 369 = 729 Level B harassment takes over the 7-year period for WNP blue whales). For additional detail on modeling and take estimation, please refer to Chapter 6.6 (*Quantitative Impact Analysis for Marine Mammals*) of the Navy's application and Appendix B of the 2019 SURTASS LFA FSEIS/SOEIS.

With the implementation of the three-part monitoring programs (visual, passive acoustic, and HF/M3 monitoring, as discussed below), NMFS and the Navy do not expect that marine mammals would be injured by SURTASS LFA sonar because a marine mammal is likely to be detected and active transmissions suspended or delayed to avoid injurious exposure. The probability of detection of a marine mammal of any size by the HF/M3 system within the LFA sonar mitigation zone approaches 100 percent over the course of multiple pings (see the 2001 SURTASS LFA FOEIS/EIS, Subchapters 2.3.2.2 and 4.2.7.1 for the HF/M3 sonar testing results as well as section 5.4.3 of the 2019 SURTASS LFA FSEIS/SOEIS

for a summary of the effectiveness of the HF/M3 system). Quantitatively, modeling output shows zero takes by Level A harassment for all marine mammal stocks in all representative mission areas with mitigation applied. All hearing groups of marine mammals except LF cetaceans would need to be within 22 ft (7 m) of the LFA sonar source for an entire LFA transmission (60 seconds), and a LF cetacean would need to be within 135 ft (41 m) for an entire LFA transmission to potentially experience PTS. This is unlikely to occur, especially given the mitigation measures in place and the Navy's proven effectiveness at detecting marine mammals well outside of this range so that shut down measures would be implemented well before marine mammals would be within these ranges. Again, NMFS notes that over the course of the previous three rulemakings from 2002 to 2017, and during the Navy's training and testing activities during the NDE from 2017 to the present, there have been no reported or known incidents of Level A harassment of any marine mammal. This is because it would be highly unlikely that a marine mammal would remain close enough to the vessel to experience Level A harassment (see discussion in Threshold Shift subsection of the *Potential Effects of the Specified Activity on Marine Mammals and their Habitat* section of the proposed rulemaking 84 FR 7186, 7205–7206; March 1, 2019), in combination with the Navy's highly effective detection of marine mammals and shutting down SURTASS LFA sonar prior to the animals entering the Level A harassment zone. Therefore, NMFS does not anticipate and does not authorize any Level A harassment takes for any marine mammal species or stocks over the course of the seven-year regulations.

The distances to the TTS thresholds are less than 50 ft (15 m) for mid-frequency (MF) and high-frequency (HF) cetaceans and otariids; 216 ft (66 m) for phocids; and 1,354 ft (413 m) for low-frequency (LF) cetaceans if an animal were to remain at those distances for an entire LFA sonar signal (60 sec). While it is likely that mitigation measures would also avoid TTS, some small subset of the animals may also experience TTS if exposed for longer periods of time at greater distances; however, any of the TTS impacts would be expected to be captured within the estimate of Level B harassment takes by behavioral disruption and separate enumeration is not necessary or appropriate. Any TTS incurred would likely be of a low level and of short duration because we do not expect animals to be exposed for long durations close to the source.

Of note, the estimated number of Level B harassment takes does not necessarily equate to the number of individual animals the Navy expects to harass (which is lower), but rather to the instances of take (*i.e.,* exposures above the Level B harassment threshold) that are anticipated to occur over the seven-year period. Some individuals may experience multiple instances of take (meaning over multiple days) over the course of the year, while some members of a species or stock may not experience take at all, which means that the number of individuals taken is likely somewhat smaller than the total estimated takes. Generally speaking, the higher the number of takes as compared to the population abundance, the more repeated takes of individuals are likely, and the higher the actual percentage of individuals in the population that are likely taken at least once in a year. However, because of the nature of the SURTASS LFA activities (small number of continuously moving vessels spread over a very large area), there are likely fewer repeated takes of the same individuals than would be expected from other more localized or stationary activities.

More detailed information for each of the steps to quantify take estimates, as well as an illustrative example, are provided in section 6.6 of the Navy's application (Quantitative Impact Analysis for Marine Mammals). A more thorough description of the impact analysis is also provided in the 2019 SURTASS LFA FEIS/SOEIS, specifically section 4.5.2.1.3, Marine Mammals (Quantitative Impact Analysis for Marine Mammals subsection) and Appendix B (Marine Mammal Impact Analysis). NMFS has reviewed this information and has accepted the Navy modeling procedure and results. The total maximum potential impact on an annual basis for years 1–4 and years 5–7 as well as the total overall takes for the seven-year period covered by this rulemaking are presented in Table 17 below. These are considered conservative estimates because they are based on the maximum potential impact to a species or stock across all model areas in which an activity may occur. Therefore, if an activity occurs in a different model area than the area where the maximum potential impact was predicted, the actual potential impact may be less than estimated. However, since the Navy cannot forecast where a specific activity may be conducted this far in advance, this maximum estimate provides the Navy with the flexibility to conduct its training and testing activities across all modeled areas identified for each activity.

TABLE 17—MAXIMUM TOTAL ANNUAL MMPA LEVEL B HARASSMENT PROPOSED FOR AUTHORIZATION FOR YEARS 1–4 AND 5–7, AND TOTAL FOR THE SEVEN-YEAR PERIOD OF THE FINAL RULE BY SURTASS LFA SONAR

Species	Stock [1]	Maximum annual Level B harassment, years 1–4		Maximum annual Level B harassment, years 5–7		Total overall Level B harassment for 7-year period
		Instances	Percen species or stock	Instances	Percent species or stock	
Antarctic minke whale	ANT	0	0.00	0	0.00	0
Blue whale	CNP	3	2.39	4	2.85	24
	NIND	0	0.00	1	0.00	3
	WNP	90	0.90	123	1.14	729
	SIND	1	0 .07	1	0.07	7
Bryde's whale	ECS	14	10.28	19	14.13	113
	Hawaii	5	0.62	6	0.74	38
	WNP	378	1.94	437	2.26	2,823
	NIND	8	0.07	10	0.10	62
	SIND	7	0.05	9	0.07	55
Common minke whale	Hawaii	572	2.30	682	2.74	4,334
	IND	1,271	0.43	1,748	0.59	10,328
	WNP JW	3	0.12	5	0.17	27

TABLE 17—MAXIMUM TOTAL ANNUAL MMPA LEVEL B HARASSMENT PROPOSED FOR AUTHORIZATION FOR YEARS 1–4 AND 5–7, AND TOTAL FOR THE SEVEN-YEAR PERIOD OF THE FINAL RULE BY SURTASS LFA SONAR—Continued

Species	Stock [1]	Maximum annual Level B harassment, years 1–4		Maximum annual Level B harassment, years 5–7		Total overall Level B harassment for 7-year period
		Instances	Percen species or stock	Instances	Percent species or stock	
	WNP OE	2,127	8.59	2,404	9.71	15,720
	YS	189	4.20	250	5.57	1,506
Fin whale	ECS	9	1.80	12	2.47	72
	Hawaii	3	2.30	4	2.74	24
	IND	0	0.00	0	0.00	0
	SIND	22	0.05	30	0.07	178
	WNP	2,558	27.55	3,455	37.23	20,597
Humpback whale	CNP stock and Hawaii DPS	487	4.85	611	6.10	3,781
	WAU stock and DPS	1	0.00	1	0.00	7
	WNP stock and DPS	3,103	233.84	4,266	321.49	25,210
North Pacific right whale	WNP	89	9.57	122	13.15	722
Omura's whale	NIND	8	0.07	10	0.10	62
	SIND	5	0.04	7	0.05	41
	WNP	14	0.81	16	0.95	104
Sei whale	Hawaii	19	4.78	22	5.70	142
	SIND	0	0.00	0	0.00	0
	NP	3,172	45.37	4,361	62.37	25,771
	NIND	4	0.04	5	0.05	31
Western North Pacific gray whale.	WNP stock and Western DPS.	0	0.00	1	0.20	3
Baird's beaked whale	WNP	2,747	48.26	3,777	66.36	22,319
Blainville's beaked whale	Hawaii	35	1.83	47	2.40	281
	WNP	269	3.30	311	3.82	2,009
	IND	47	0.27	65	0.37	383
Common bottlenose dolphin	4-Islands	5	2.48	6	2.96	38
	Hawaii Island	0	0.00	0	0.00	0
	Hawaii Pelagic	95	0.41	114	0.49	722
	IA	104	0.11	140	0.15	836
	IND	1,128	0.14	1,551	0.20	9,165
	Japanese Coastal	1,686	47.94	1,789	50.86	12,111
	Kauai/Niihau	13	7.16	16	8.55	100
	Oahu	38	5.17	46	6.17	290
	WNP Northern Offshore	581	0.57	799	0.78	4,721
	WNP Southern Offshore	2,726	6.63	3,063	7.45	20,093
	WAU	635	21.16	873	29.09	5,159
Common dolphin	IND	52	0.00	72	0.00	424
	WNP	203,871	12.24	275,079	16.08	1,640,721
Cuvier's beaked whale	Hawaii	22	3.03	26	3.62	166
	IND	231	0.85	317	1.17	1,875
	SH	77	0.11	106	0.15	626
	WNP	6,946	7.78	8,980	10.04	54,724
Dall's porpoise	SOJ dalli type	614	0.36	845	0.49	4,991
	WNP dalli ecotype	22,056	13.62	30,327	18.72	179,205
	WNP truei ecotype	487	0.28	670	0.39	3,958
Deraniyagala's beaked whale.	IND	158	0.92	217	1.27	1,283
	NP	342	1.41	412	1.69	2,620
Dwarf sperm whale	Hawaii	655	3.72	782	4.44	4,966
	IND	3	0.05	4	0.07	24
	WNP	486	0.14	635	0.18	3,849
False killer whale	Hawaii Pelagic	58	3.72	69	4.44	439
	IA	252	2.59	341	3.51	2,031
	IND	12	0.01	16	0.00	96
	Main Hawaiian Islands Insular stock and DPS.	1	0.41	1	0.49	7
	Northwestern Hawaiian Islands.	0	0.00	0	0.00	0
	WNP	1,350	8.15	1,596	9.63	10,188
Fraser's dolphin	CNP	546	3.24	686	4.06	4,242
	Hawaii	1,944	3.79	2,320	4.52	14,736
	IND	93	0.05	128	0.07	756
	WNP	2,287	1.16	2,559	1.29	16,825
Ginkgo-toothed beaked whale.	IND	12	0.07	16	0.10	96
	NP	476	2.00	568	2.38	3,608
Harbor porpoise	WNP	366	1.17	503	1.61	2,973

TABLE 17—MAXIMUM TOTAL ANNUAL MMPA LEVEL B HARASSMENT PROPOSED FOR AUTHORIZATION FOR YEARS 1–4 AND 5–7, AND TOTAL FOR THE SEVEN-YEAR PERIOD OF THE FINAL RULE BY SURTASS LFA SONAR—Continued

Species	Stock [1]	Maximum annual Level B harassment, years 1–4		Maximum annual Level B harassment, years 5–7		Total overall Level B harassment for 7-year period
		Instances	Percen species or stock	Instances	Percent species or stock	
Hubbs' beaked whale	NP	26	0.11	36	0.15	212
Indo-Pacific bottlenose dolphin.	IND	11	0.14	16	0.20	92
Killer whale	Hawaii	6	4.41	8	5.26	48
	IND	397	3.15	546	4.33	3,226
	WNP	10,470	85.37	14,387	117.31	85,041
Kogia spp.[2]	WNP	1,317	0.31	1,494	0.35	9,750
Longman's beaked whale	Hawaii	739	5.01	882	11.59	5,602
	IND	325	1.92	447	2.64	2,641
	WNP	471	6.14	574	7.50	3,606
Melon-headed whale	Hawaiian Islands	181	2.07	216	2.47	1,372
	IND	402	0.64	552	0.88	3,264
	Kohala Resident	9	0.41	11	0.49	69
	WNP	1,605	2.87	1,823	3.27	11,889
Mesoplodon spp.[2]	WNP	10	0.05	14	0.07	82
Northern right whale dolphin	NP	0	0.00	0	0.00	0
Pacific white-sided dolphin	NP	9,530	1.05	12,890	1.41	76,790
Pantropical spotted dolphin	4-Islands	32	14.40	38	17.18	242
	Hawaii Island	23	10.26	27	12.25	173
	Hawaiian Pelagic	297	0.55	355	0.66	2,253
	IND	311	0.05	428	0.07	2,528
	Oahu	23	10.54	28	12.58	176
	WNP	5,105	3.95	5,883	4.53	38,069
Pygmy killer whale	Hawaii	393	3.72	469	4.44	2,979
	IND	60	0.27	82	0.37	486
	WNP	901	2.87	1,035	3.30	6,709
Pygmy sperm whale	Hawaii	266	3.72	318	4.44	2,018
	IND	0	0.00	0	0.00	0
	WNP	203	0.07	265	0.09	1,607
Risso's dolphin	Hawaii	414	3.58	494	4.28	3,138
	IA	1,045	0.70	1,374	0.92	8,302
	WNP	4,347	3.07	4,914	3.47	32,130
	IND	4,621	1.01	6,354	1.39	37,546
Rough-toothed dolphin	Hawaii	213	0.28	254	0.33	1,614
	IND	41	0.00	57	0.00	335
	WNP	1,439	28.74	1,732	34.56	10,952
Short-finned pilot whale	Hawaii	396	2.00	473	2.38	3,003
	IND	1,526	0.59	2,098	0.81	12,398
	WNP Northern Ecotype	525	2.52	721	3.47	4,263
	WNP Southern Ecotype	5,683	18.03	6,303	19.99	41,641
Southern bottlenose whale	IND	22	0.00	31	0.00	181
Spade-toothed beaked whale.	IND	16	0.09	22	0.12	130
Sperm whale	Hawaii	106	2.34	126	2.80	802
	NIND	33	0.14	46	0.20	270
	NP	1,429	1.28	1,855	1.68	11,281
	SIND	16	0.07	22	0.10	130
Spinner dolphin	Hawaii Island	1	0.19	1	0.22	7
	Hawaii Pelagic	192	5.72	229	6.82	1,455
	IND	240	0.05	330	0.07	1,950
	Kauai/Niihau	83	13.85	99	16.53	629
	Kure/Midway Atoll	0	0.00	0	0.00	0
	Oahu/4-Islands	20	2.88	24	6.66	152
	Pearl and Hermes Reef	0	0.00	0	0.00	0
	WNP	574	0.00	721	0.00	4,459
Stejneger's beaked whale	WNP	201	2.49	276	3.42	1,632
Striped dolphin	Hawaii	269	0.41	321	0.49	2,039
	IND	5,059	0.75	6,957	1.03	41,107
	Japanese Coastal	3,366	17.18	3,571	18.23	24,177
	WNP Northern Offshore	267	0.07	367	0.10	2,169
	WNP Southern Offshore	3,282	6.28	3,729	7.13	24,315
Hawaiian monk seal	Hawaii	10	0.69	13	0.91	79
Northern fur seal	Western Pacific	8,475	1.71	11,653	2.35	68,859
Ribbon seal	NP	15,705	4.30	21,595	5.92	127,605
Spotted seal	Alaska stock/Bering Sea DPS.	80,722	17.53	110,993	24.10	655,867

TABLE 17—MAXIMUM TOTAL ANNUAL MMPA LEVEL B HARASSMENT PROPOSED FOR AUTHORIZATION FOR YEARS 1–4 AND 5–7, AND TOTAL FOR THE SEVEN-YEAR PERIOD OF THE FINAL RULE BY SURTASS LFA SONAR—Continued

Species	Stock [1]	Maximum annual Level B harassment, years 1–4		Maximum annual Level B harassment, years 5–7		Total overall Level B harassment for 7-year period
		Instances	Percen species or stock	Instances	Percent species or stock	
Steller sea lion	Southern stock and DPS ...	0	0.00	1	0.04	3
	Western/Asian stock, Western DPS.	2	0.00	3	0.00	17

[1] ANT = Antarctic; CNP = Central North Pacific; NP = North Pacific; NIND = Northern Indian; SIND = Southern Indian; IND = Indian; WNP = Western North Pacific; ECS = East China Sea; WP = Western Pacific; SOJ = Sea of Japan; IA = Inshore Archipelago; WAU = Western Australia; YS = Yellow Sea; OE = Offshore Japan; OW = Nearshore Japan; JW = Sea of Japan/Minke; JE = Pacific coast of Japan; SH = Southern Hemisphere; DPS = distinct population segment.

[2] *Kogia* spp: Pygmy and dwarf sperm whales are difficult to distinguish at sea, and abundance estimates are pooled for Kogia spp in Modeled Areas 1, 2, 3, 5, 6, and 7 (reported as pooled in Ferguson and Barlow, 2001 and 2003, and pooled). *Mesoplodon* spp: No methods are available to distinguish between the species of Mesoplodon beaked whales in the WNP stocks (Blainville's beaked whale (*M. densirostris*), Perrin's beaked whale (*M. perrini*), Lesser beaked whale (*M. peruvianus*), Stejneger's beaked whale (*M. stejnegeri*), Gingko-toothed beaked whale (*M. gingkodens*), and Hubbs' beaked whale (*M. carlhubbsi)*) when observed during at-sea surveys (Carretta et al., 2018). As reported in Ferguson and Barlow, 2001 and 2003, data on these species were pooled. These six species are managed as one unit.

Mitigation

Under section 101(a)(5)(A) of the MMPA, NMFS must set forth the ''permissible methods of taking pursuant to such activity, and other means of effecting the least practicable adverse 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 subsistence uses'' (hereinafter referred to as ''LPAI'' or ''least practicable adverse impact''). NMFS does not have a regulatory definition for least practicable adverse impact. The NDAA for FY 2004 amended the MMPA as it relates to military readiness activities and the incidental take authorization process such that a determination of least practicable adverse impact shall include consideration of personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity.

Least Practicable Adverse Impact Standard

In *Conservation Council for Hawaii* v. *National Marine Fisheries Service,* 97 F. Supp.3d 1210, 1229 (D. Haw. 2015), the Court stated that NMFS ''[appear[s] to think [it] satisfies] the statutory 'least practicable adverse impact' requirement with a 'negligible impact' finding.'' More recently, expressing similar concerns in a challenge to the 2012 SURTASS LFA sonar incidental take rule (77 FR 50290; August 12, 2012), the Ninth Circuit Court of Appeals in *Natural Resources Defense Council (NRDC)* v. *Pritzker,* 828 F.3d 1125, 1134 (9th Cir. 2016), stated, ''[c]ompliance with the 'negligible impact' requirement does not mean there [is] compliance with the 'least practicable adverse impact' standard.'' As the Ninth Circuit noted in its opinion, however, the Court was interpreting the statute without the benefit of NMFS' formal interpretation. We state here explicitly that NMFS is in full agreement that the ''negligible impact'' and ''least practicable adverse impact'' requirements are distinct, even though both statutory standards refer to species and stocks. With that in mind, we provide further explanation of our interpretation of least practicable adverse impact, and explain what distinguishes it from the negligible impact standard. This discussion is consistent with, and expands upon, previous rules we have issued, such as the Navy Gulf of Alaska rule (82 FR 19530; April 27, 2017); the Navy Atlantic Fleet Testing and Training rule (83 FR 57076; November 14, 2018); and the Navy Hawaii-Southern California Training and Testing rule (83 FR 66846; December 27, 2018).

Before NMFS can issue incidental take regulations under section 101(a)(5)(A) of the MMPA, it must make a finding that the total taking will have a ''negligible impact'' on the affected ''species or stocks'' of marine mammals. NMFS' and USFWS' implementing regulations for section 101(a)(5) both define ''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 and 50 CFR 18.27(c)). Recruitment (*i.e.,* reproduction) and survival rates are used to determine population growth rates [3] and, therefore are considered in evaluating population level impacts.

As we stated in the preamble to the final rule for the incidental take implementing regulations, not every population-level impact violates the negligible impact requirement. The negligible impact standard does not require a finding that the anticipated take will have ''no effect'' on population numbers or growth rates: ''The statutory standard does not require that the same recovery rate be maintained, rather that no significant effect on annual rates of recruitment or survival occurs. [T]he key factor is the significance of the level of impact on rates of recruitment or survival.'' (54 FR 40338, 40341–42; September 29, 1989).

While some level of impact on population numbers or growth rates of a species or stock may occur and still satisfy the negligible impact requirement—even without consideration of mitigation—the least practicable adverse impact provision separately requires NMFS to prescribe means of ''effecting the least practicable adverse impact on such species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance,'' 50 CFR 216.102(b), which are typically identified as mitigation measures.[4]

The negligible impact and LPAI standards in the MMPA both call for evaluation at the level of the ''species or stock.'' The MMPA does not define the term ''species.'' However, Merriam-Webster Dictionary defines ''species'' to include ''related organisms or

[3] A growth rate can be positive, negative, or flat.

[4] For purposes of this discussion, we omit reference to the language in the standard for least practicable adverse impact that says we also must mitigate for subsistence impacts because they are not at issue in this regulation.

populations potentially capable of interbreeding.'' See *www.merriam-webster.com/dictionary/species* (emphasis added). The MMPA defines ''stock'' as a group of marine mammals of the same species or smaller taxa in a common spatial arrangement that interbreed when mature (16 U.S.C. 1362(11)). The definition of ''population'' is a group of interbreeding organisms that represents the level of organization at which speciation begins. *www.merriam-webster.com/dictionary/population.* The definition of ''population'' is strikingly similar to the MMPA's definition of ''stock,'' with both involving groups of individuals that belong to the same species and located in a manner that allows for interbreeding. In fact, the term ''stock'' in the MMPA is interchangeable with the statutory term ''population stock'' (16 U.S.C. 1362(11)). Both the negligible impact standard and the least practicable adverse impact standard call for evaluation at the level of the species or stock, and the terms ''species'' and ''stock'' both relate to populations; therefore, it is appropriate to view both the negligible impact standard and the least practicable adverse impact standard as having a population-level focus.

This interpretation is consistent with Congress's statutory findings for enacting the MMPA, nearly all of which are most applicable at the species or stock (*i.e.,* population) level. *See* 16 U.S.C. 1361 (finding that it is species and population stocks that are or may be in danger of extinction or depletion; that it is species and population stocks that should not diminish beyond being significant functioning elements of their ecosystems; and that it is species and population stocks that should not be permitted to diminish below their optimum sustainable population level). Annual rates of recruitment (*i.e.,* reproduction) and survival are the key biological metrics used in the evaluation of population-level impacts, and accordingly these same metrics are also used in the evaluation of population level impacts for the least practicable adverse impact standard.

Recognizing this common focus of the least practicable adverse impact and negligible impact provisions on the ''species or stock'' does not mean we conflate the two standards. Despite some common statutory language, we recognize the two provisions are different and have different functions. First, a negligible impact finding is required before NMFS can issue an incidental take authorization. Although it is acceptable to use the mitigation measures to reach a negligible impact finding (*see* 50 CFR 216.104(c)), no amount of mitigation can enable NMFS to issue an incidental take authorization for an activity that still would not meet the negligible impact standard. Moreover, even where NMFS can reach a negligible impact finding—which we emphasize does allow for the possibility of some ''negligible'' population-level impact—the agency must still prescribe measures that will affect the least practicable amount of adverse impact upon the affected species or stock.

Section 101(a)(5)(A)(i)(II) requires NMFS to issue, in conjunction with its authorization, binding—and enforceable—restrictions (in the form of regulations) setting forth how the activity must be conducted, thus ensuring the activity has the ''least practicable adverse impact'' on the affected species or stocks and their habitat. In situations where mitigation is specifically needed to reach a negligible impact determination, section 101(a)(5)(A)(i)(II) also provides a mechanism for ensuring compliance with the ''negligible impact'' requirement. Finally, we reiterate that the LPAI standard also requires consideration of measures for marine mammal habitat, with particular attention to rookeries, mating grounds, and other areas of similar significance, and for subsistence impacts, whereas the negligible impact standard is concerned solely with conclusions about the impact of an activity on annual rates of recruitment and survival.[5]

In *NRDC* v. *Pritzker,* the Court stated, ''[t]he statute is properly read to mean that even if population levels are not threatened *significantly,* still the agency must adopt mitigation measures aimed at protecting *marine mammals* to the greatest extent practicable in light of military readiness needs.'' *Id.* at 1134 (emphases added). This statement is consistent with our understanding stated above that even when the effects of an action satisfy the negligible impact standard (*i.e.,* in the Court's words, ''population levels are not threatened significantly''), still the agency must prescribe mitigation under the least practicable adverse impact standard. However, as the statute indicates, the focus of both standards is ultimately the impact on the affected ''species or stock,'' and not solely focused on or directed at the impact on individual marine mammals.

[5] Outside of the military readiness context, mitigation may also be appropriate to ensure compliance with the ''small numbers'' language in MMPA sections 101(a)(5)(A) and (D).

We have carefully reviewed and considered the Ninth Circuit's opinion in *NRDC* v. *Pritzker* in its entirety. While the Court's reference to ''marine mammals'' rather than ''marine mammal species or stocks'' in the italicized language above might be construed as a holding that the least practicable adverse impact standard applies at the individual ''marine mammal'' level, *i.e.,* that NMFS must require mitigation to minimize impacts to each individual marine mammal unless impracticable, we believe such an interpretation reflects an incomplete appreciation of the Court's holding. In our view, the opinion as a whole turned on the Court's determination that NMFS had not given separate and independent meaning to the least practicable adverse impact standard apart from the negligible impact standard, and further, that the Court's use of the term ''marine mammals'' was not addressing the question of whether the standard applies to individual animals as opposed to the species or stock as a whole. We recognize that while consideration of mitigation can play a role in a negligible impact determination, consideration of mitigation measures extends beyond that analysis. In evaluating what mitigation measures are appropriate, NMFS considers the potential impacts of the specified activities, the availability of measures to minimize those potential impacts, and the practicability of implementing those measures, as we describe below.

Implementation of Least Practicable Adverse Impact Standard

Given the *NRDC* v. *Pritzker* decision, we discuss here how we determine whether a measure or set of measures meets the ''least practicable adverse impact'' standard. Our separate analysis of whether the take anticipated to result from Navy's activities meets the ''negligible impact'' standard appears in the *Negligible Impact Analysis and Determination* section below.

Our evaluation of potential mitigation measures includes consideration of two primary factors:

(1) The manner in which, and the degree to which, implementation of the potential measure(s) is expected to reduce adverse impacts to marine mammal species or stocks, their habitat, and their availability for subsistence uses (where relevant). This analysis considers such things as the nature of the potential adverse impact (such as likelihood, scope, and range), the likelihood that the measure will be effective if implemented, and the

likelihood of successful implementation; and

(2) The practicability of the measures for applicant implementation. Practicability of implementation may consider such things as cost, impact on activities, and, in the case of a military readiness activity, specifically considers personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity. 16 U.S.C. 1371(a)(5)(A)(iii).

While the language of the least practicable adverse impact standard calls for minimizing impacts to affected species or stocks and their habitats, we recognize that the reduction of impacts to those species or stocks accrues through the application of mitigation measures that limit impacts to individual animals. Accordingly, NMFS' analysis focuses on mitigation measures that are designed to avoid or minimize impacts on individual marine mammals that have the potential to increase the probability or severity of population-level effects.

While direct evidence of impacts to species or stocks from a specified activity is rarely available, and additional study is still needed to understand how specific disturbance events affect the fitness of individuals of certain species, there have been improvements in understanding the process by which disturbance effects are translated to the population. With recent scientific advancements (both marine mammal energetic research and the development of energetic frameworks), the relative likelihood or degree of impacts on species or stocks may often be inferred given a detailed understanding of the activity, the environment, and the affected species or stocks. This same information is used in the development of mitigation measures and helps us understand how mitigation measures contribute to lessening effects (or the risk thereof) to species or stocks. We also acknowledge that there is always the potential that new information, or a new recommendation that we had not previously considered, becomes available and necessitates reevaluation of mitigation measures (which may be addressed through adaptive management) to see if further reductions of population impacts are possible and practicable.

In the evaluation of specific measures, the details of the specified activity will necessarily inform each of the two primary factors discussed above (expected reduction of impacts and practicability), and are carefully considered to determine the types of mitigation that are appropriate under the least practicable adverse impact standard. Analysis of how a potential mitigation measure may reduce adverse impacts on a marine mammal stock or species, consideration of personnel safety, practicality of implementation, and consideration of the impact on effectiveness of military readiness activities are not issues that can be meaningfully evaluated through a yes/no lens. The manner in which, and the degree to which, implementation of a measure is expected to reduce impacts, as well as its practicability in terms of these considerations, can vary widely. For example, a time/area restriction could be of very high value for reducing the potential for, or severity of, population-level impacts (*e.g.,* avoiding disturbance of feeding females in an area of established biological importance), or it could be of lower value (*e.g.,* decreased disturbance in an area of high productivity but of less firmly established biological importance). Regarding practicability, a measure might involve restrictions in an area or time that impede the Navy's ability to certify a strike group (higher impact on mission effectiveness), or it could mean delaying a small in-port training event by 30 minutes to avoid exposure of a marine mammal to injurious levels of sound (lower impact). A responsible evaluation of ''least practicable adverse impact'' will consider the factors along these realistic scales. Accordingly, the greater the likelihood that a measure will contribute to reducing the probability or severity of adverse impacts to the species or stock or their habitat, the greater the weight that measure is given when considered in combination with practicability to determine the appropriateness of the mitigation measure, and vice versa. In the evaluation of specific measures, the details of the specified activity will necessarily inform each of the two primary factors discussed above (expected reduction of impacts and practicability), and will be carefully considered to determine the types of mitigation that are appropriate under the least practicable adverse impact standard. We discuss consideration of these factors in greater detail below.

1. *Reduction of adverse impacts to marine mammal species or stocks and their habitat.*[6]

The emphasis given to a measure's ability to reduce the impacts on a species or stock considers the degree, likelihood, and context of the anticipated reduction of impacts to individuals (and how many individuals) as well as the status of the species or stock.

The ultimate impact on any individual from a disturbance event (which informs the likelihood of adverse species- or stock-level effects) is dependent on the circumstances and associated contextual factors, such as duration of exposure to stressors. Though any proposed mitigation needs to be evaluated in the context of the specific activity and the species or stocks affected, measures with the following types of effects have greater value in reducing the likelihood or severity of adverse species- or stock-level impacts: Avoiding or minimizing injury or mortality; limiting interruption of known feeding, breeding, mother/young, or resting behaviors; minimizing the abandonment of important habitat (temporally and spatially); minimizing the number of individuals subjected to these types of disruptions; and limiting degradation of habitat. Mitigating these types of effects is intended to reduce the likelihood that the activity will result in energetic or other types of impacts that are more likely to result in reduced reproductive success or survivorship. It is also important to consider the degree of impacts that are expected in the absence of mitigation in order to assess the added value of any potential measures. Finally, because the least practicable adverse impact standard gives NMFS discretion to weigh a variety of factors when determining appropriate mitigation measures and because the focus of the standard is on reducing impacts at the species or stock level, the least practicable adverse impact standard does not compel mitigation for every kind of take, or every individual taken, if that mitigation is unlikely to contribute meaningfully to the reduction of adverse impacts on the species or stock and its habitat, even when practicable for implementation by the applicant.

The status of the species or stock is also relevant in evaluating the appropriateness of potential mitigation measures in the context of least practicable adverse impact. The following are examples of factors that may (either alone, or in combination) result in greater emphasis on the importance of a mitigation measure in

[6] We recognize the least practicable adverse impact standard requires consideration of measures that will address minimizing impacts on the availability of the species or stocks for subsistence uses where relevant. Because subsistence uses are not implicated for this action, we do not discuss them. However, a similar framework would apply for evaluating those measures, taking into account the MMPA's directive that we make a finding of no unmitigable adverse impact on the availability of the species or stocks for taking for subsistence, and the relevant implementing regulations.

reducing impacts on a species or stock: The stock is known to be decreasing or status is unknown, but believed to be declining; the known annual mortality (from any source) is approaching or exceeding the potential biological removal (PBR) level (as defined in 16 U.S.C. 1362(20)); the affected species or stock is a small, resident population; or the stock is involved in a UME or has other known vulnerabilities, such as recovering from an oil spill.

Habitat mitigation, particularly as it relates to rookeries, mating grounds, and areas of similar significance, is also relevant to achieving the standard and can include measures such as reducing impacts of the activity on known prey utilized in the activity area or reducing impacts on physical habitat. As with species- or stock-related mitigation, the emphasis given to a measure's ability to reduce impacts on a species or stock's habitat considers the degree, likelihood, and context of the anticipated reduction of impacts to habitat. Because habitat value is informed by marine mammal presence and use, in some cases there may be overlap in measures for the species or stock and for use of habitat.

We consider available information indicating the likelihood of any measure to accomplish its objective. If evidence shows that a measure has not typically been effective nor successful, then either that measure should be modified or the potential value of the measure to reduce effects should be lowered.

2. *Practicability.* Factors considered may include cost, impact on activities, and, in the case of a military readiness activity, personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity (16 U.S.C. 1371(a)(5)(A)(iii)).

Mitigation Measures

As with other rulemakings for SURTASS LFA sonar, our consideration of mitigation under the LPAI standard was conducted at scales that take into account the entire rulemaking period and geographic scope of potential areas of SURTASS LFA sonar activities and the types of impacts that could occur under the rule. NMFS reviewed the proposed activities and the proposed mitigation measures as described in the Navy's application, and the measures added by NMFS, to determine if they would satisfy the standard of LPAI on marine mammal species or stock(s) and their habitat. Since the proposed rule 14 OBIAs have been designated and additional mitigation has been added that limits the number of hours of SURTASS LFA sonar transmission occurring around any single OBIA (see below). As described below, and in the 2019 SURTASS LFA FSEIS/SOEIS, NMFS has determined that the following mitigation measures would satisfy the LPAI standard:

(1) *2,000-yd LFA sonar mitigation zone*—LFA sonar training and testing transmissions will be suspended if the Navy detects marine mammals within a distance of 2,000 yds (1.8 km; 1.1 mi; 1.0 nmi) of the LFA sonar source, which encompasses both the approximately 1-km radial distance of the 180 dB re: 1 µPa rms received level mitigation zone and an additional buffer, by any of the following detection methods:

(a) Visual monitoring;

(b) Passive acoustic monitoring; and

(c) Active acoustic monitoring.

(2) *Geographic restrictions*—LFA sonar training and testing will be conducted such that:

(a) The received level of SURTASS LFA sonar transmissions during training and testing events will not exceed 180 dB re: 1 µPa rms within 1 km seaward of any OBIA boundary, during the indicated periods of biological importance;

(b) no more than 25 percent of the authorized amount (transmission hours) of SURTASS LFA sonar for training and testing will be used within 10 nmi (18.5 km) of any single OBIA during any year (no more than 124 hours in years 1–4 and 148 hours in years 5–7) unless the following conditions are met: Should national security present a requirement to conduct more than 25 percent of authorized hours of SURTASS LFA sonar within 10 nmi (18.5 km) of any single OBIA during any year, naval units will obtain permission from the appropriate designated Command authority prior to commencement of the activity. The Navy will provide NMFS with notification as soon as is practicable and include the information (*e.g.,* sonar hours) in its annual activity reports submitted to NMFS.

(c) the received level of SURTASS LFA sonar transmissions will not exceed 180 dB re: 1 µPa rms within the Coastal Standoff Zone (22 km (12 nmi) from any land);

(d) no activities with the SURTASS LFA sonar system will occur within territorial seas of foreign nations, which are areas up to 12 nmi from shore, depending on the distance that individual nations claim; and

(e) no activities with the SURTASS LFA sonar system will occur within the waters of Penguin Bank, Hawaii (defined as water depth of 600 ft (183 m)), and ensonification of Hawaii state waters (out to 3 nmi) will not exceed 145 dB re: 1 µPa rms. This measure, which is a result of an agreement between the Navy and the State of Hawaii through its CZMA Program, was correctly described in the 2018 Draft SURTASS LFA SEIS/SOEIS and 2019 SURTASS LFA FSEIS/SOEIS. The proposed rule incorrectly suggested that Navy would not operate the SURTASS LFA sonar system within Hawaii state waters. The description of this measure is corrected in this final rule.

Below, we discuss the mitigation measures as agreed upon by the Navy and NMFS. For additional details regarding the Navy's mitigation measures, please also see Chapter 5 in the 2019 SURTASS LFA FSEIS/SOEIS.

2,000-yard Mitigation Zone (Re-Evaluation of the 180 dB re: 1 µPa rms Zone)

The Navy requested, and NMFS includes in this rule, a single, fixed 2,000-yard (yd) (0.99 nmi/1,829 m/1.83 km) mitigation zone rather than a combined mitigation and buffer zone (based on real-time propagation modeling) of nominally 1.08 nmi (2 km), which has been required in past rules. This modification will standardize and simplify Navy mitigation and monitoring implementation and includes consideration of updated information on marine mammal injury thresholds. The 180 dB re: 1 µPa rms threshold for the onset of potential injury has been used in the impact assessment for SURTASS LFA sonar since 2001, and the isopleth associated with that threshold has also previously informed the development of mitigation. However, NMFS' *2018 Revision to: Technical Guidance for Assessing the Effect of Anthropogenic Sound on Marine Mammal Hearing* (NMFS, 2018, hereafter referred to as ''NMFS' 2018 Acoustic Technical Guidance'') reflects the current state of scientific knowledge regarding the potential impacts of sound on marine mammal hearing. It specifies auditory weighted (SEL_{cum}) values for the onset of PTS (onset of injury) based on marine mammal hearing groups. The NMFS 2018 Acoustic Technical Guidance categorizes marine mammals into five generalized hearing groups with defined hearing ranges and presents the auditory weighting functions developed for each of these hearing groups, reflecting the best available data on hearing, impacts of sound on hearing, and data on equal latency.

When estimating the onset of injury for non-impulsive sound sources (PTS), NMFS' 2018 Acoustic Technical Guidance defines weighted thresholds as cumulative sound exposure levels (SEL_{cum}). The new thresholds and their associated metric incorporate a duration component, which means that they are

not directly comparable to the previous 180 dB re: 1 µPa rms SPL threshold. To determine what the SEL_{cum} for each hearing group would be when exposed to a 60-second (the nominal time of an LFA sonar transmission, or one ping), 300 Hz (the center frequency in the possible sonar transmission range of 100–500 Hz, single element source level of 215 dB re: 1 µPa at 1 m) SURTASS LFA sonar transmission, the appropriate auditory weighting function must be applied to account for each hearing group's sensitivity. Again, although direct comparisons are difficult, when a 300 Hz, 60-second exposure is considered, applying the auditory weighting functions results in the thresholds increasing by approximately 1.5; 46; 56; 15; and 20 dB for the LF, MF, HF, phocid pinnipeds (underwater) (PW), and otariid pinnipeds (underwater) (OW) hearing groups, respectively, above the baseline threshold level (Table 18). Based on simple spherical spreading (*i.e.,* transmission loss based on $20 \times \log10$ [range {m}]), all hearing groups except LF cetaceans would need to remain within 22 ft (7 m) for the duration of an entire LFA sonar ping (60 seconds) to potentially experience PTS. LF cetaceans would need to remain at the greatest distance from the transmitting LFA sonar before experiencing the onset of injury, 135 ft (41 m) for this example. Consequently, if mitigation is tied to preventing the same type of impact (PTS), the distance at which SURTASS LFA sonar transmissions should be mitigated for marine mammals would be the distance associated with LF cetaceans, as the mitigation range would be the greatest for this hearing group. Any mitigation measure developed for LF cetaceans based on PTS onset would be highly conservative for any other marine mammals potentially exposed to SURTASS LFA sonar transmissions.

TABLE 18—TTS AND PTS ONSET THRESHOLDS FOR NON-IMPULSIVE SOUNDS

Hearing group	Cumulative sound exposure level threshold for TTS [1] (dB)	Cumulative sound exposure level threshold for PTS [1] (dB)	Cumulative sound exposure level threshold for PTS [1] with weighting function applied at 300 Hz (dB)
Low-frequency cetaceans	179	199	200.5
Mid-frequency cetaceans	178	198	244
High-frequency cetaceans	153	173	229
Phocid pinnipeds (PW) (Underwater)	181	201	216
Otariid pinnipeds (OW) (Underwater)	199	219	239

[1] Referenced to 1 μPa^2s; weighted according to appropriate auditory weighting function.

To calculate the SPL of these SEL_{cum} thresholds it is necessary to account for the weighting function, as previously explained, and the duration of exposure (10 x log (duration in sections)). Applying the duration of a single ping of SURTASS LFA sonar (60 sec) results in 17.8 dB (*i.e.,* (10 log (60)), which is subtracted from the weighted SEL_{cum} value of 200.5 dB for LF cetaceans (199 dB PTS onset threshold plus 1.5 dB associated with LF cetacean weighting function at 300 Hz), for an SPL of 182.7 dB re: 1 µPa rms. The distance to the 182.7 dB re: 1 µPa rms isopleth would be slightly smaller than that associated with the previously used 180 dB re: 1 µPa rms isopleth. To convert the SEL_{cum} threshold to SPL for two pings of SURTASS LFA sonar, one would need to account for this increased duration of exposure (10 x log (120 seconds)), which results in 20.8 dB being subtracted from the weighted SEL_{cum} value of 200.5 dB for LF cetaceans, for an SPL of 179.7 dB re: 1 µPa rms. The resulting SPL for exposure of an LF cetacean to two pings of SURTASS LFA sonar (179.7 dB re: 1 µPa rms) is very close to the 180 dB re: 1 µPa rms received level, on which previous mitigation measures were based. This exposure scenario is unlikely, as a marine mammal would have to remain close, <200 ft (61 m), to the transmitting LFA sonar array for an extended period, approximately 20 minutes, to experience two full pings (one ping every 10 min). Although this is an unlikely scenario, the Navy will retain and NMFS will require a mitigation zone that is basically equivalent to the previous zone based on 180 re: 1 µPa rms received level as the current mitigation zone for SURTASS LFA sonar training and testing activities in this rule, as described below.

In previous rules, prior to commencing and during SURTASS LFA sonar training and testing transmissions, the Navy determined (in real time) the propagation of LFA sonar signals in the ocean and the distance from the SURTASS LFA sonar source to the 180 dB re: 1 µPa rms isopleth (See *Description of Real-Time SURTASS LFA Sonar Sound Field Modeling* section of the application). The 180 dB re: 1 µPa rms isopleth defined the extent of the LFA sonar mitigation zone for marine mammals around the surveillance vessel. If a marine mammal entered the LFA sonar mitigation zone (or the 1-km buffer previously required by NMFS, as described below), the Navy implemented a suspension of SURTASS LFA sonar transmissions. This measure was included in prior rules to reduce or alleviate the likelihood that marine mammals would be exposed to levels of sound that may result in injury (PTS). However, due to the updated criteria in NMFS' 2018 Acoustic Technical Guidance, this 180 dB mitigation zone would not only preclude PTS, but almost all TTS and more severe behavioral reactions as well. While not an expansion of the mitigation, the best available science indicates the mitigation zone is more effective at reducing PTS and TTS than previously considered in prior authorizations for SURTASS LFA sonar.

The Navy modeling of the sound field in near-real time conditions provided the information necessary to calculate the mitigation zone for which delay or suspension of LFA sonar transmissions would occur. Acoustic model updates were nominally made every 12 hrs, or as meteorological or oceanographic conditions changed. If a marine mammal entered the calculated threshold distance (plus its associated buffer distance), the sonar operator notified the senior military member in charge, who would order the delay or suspension of transmissions. If it were

predicted that the SPL threshold distances would change within the next 12-hr period, the senior military member in charge would also be notified in order to take the necessary action to ensure that the sound field criteria would not be exceeded.

As an added protective measure, NMFS previously required the Navy to include a ''buffer zone'' that extended an additional 1 km (0.62 mi; 0.54 nm) beyond the Navy's proposed 180 dB re: 1 µPa rms isopleth LFA sonar mitigation zone. This buffer typically coincides with the full detection range of the HF/M3 active sonar for mitigation monitoring (approximately 2 to 2.5 km; 1.2 to 1.5 mi; 1.1 to 1.3 nmi). Thus, implementation of this additional 1 km buffer zone increases the shutdown zone around the LFA sonar array and vessel and, given the highly effective monitoring capabilities (described below), ensures that no marine mammals will be exposed to an SPL greater than approximately 174 dB re: 1 µPa rms. In past applications, the Navy has noted that this additional mitigation is practicable and the Navy has implemented this measure in previous authorizations. In addition, as noted above for the 180 dB mitigation zone, based on new scientific information and updated criteria in NMFS' 2018 Acoustic Technical Guidance, this buffer mitigation is likely even more effective at avoiding the likelihood of PTS and reducing the degree of TTS than previously known when analyzed and employed in previous authorizations. The proposed 2,000 yd (1.83 km) single fixed mitigation zone would cover virtually all of the previous combined mitigation/buffer zone of nominally 1.08 nmi (2 km), since the difference between 2,000 yd and 2 km is only about 187 yd (or 0.09 nmi (167 m)). Likewise, the difference in the sound field of the combined mitigation/buffer zone of 2,000 yd (1.83 km) versus 1.08 nmi (2,187 yd; 2 km) would also be negligible. At 2,000 yd (1.83 km), modeling shows that the received level would be 174.75 dB while at 1.08 nmi (2 km), the received level would be 173.98 dB, which is a difference of only 0.77 dB. This very small difference in received level would not be perceptible to a marine mammal.

In summary, Navy proposed, and NMFS will require, a single, fixed, combined mitigation/buffer zone for SURTASS LFA sonar training and testing activities to standardize and simplify implementation of this monitoring requirement using standard Navy metrics (yards not meters). This measure will be effective mitigation in all acoustic environments, even in the rare event of a strong acoustic duct in which the volume of water ensonified to 180 dB re: 1 µPa rms could exist at a horizontal distance somewhat greater than 0.54 nmi (1 km) (DoN, 2001). With the mitigation zone of 2,000 yd (1.83 km), there is no potential for animals to be exposed to received levels greater than 180 dB re: 1 µPa rms, or levels above the new injury (PTS) thresholds identified in NMFS' 2018 Acoustic Technical Guidance, and, therefore, marine mammals are protected from both acoustic injury and more severe occurrences of Level B harassment.

Visual Mitigation Monitoring

Visual monitoring will consist of daytime observations for marine mammals from the bridge of SURTASS LFA sonar vessels by lookouts (personnel trained in detecting and identifying marine mammals). Navy shipboard lookouts are highly qualified and experienced observers of the marine environment. Their operational duties require that they report all objects sighted on the water surface to the senior military member in charge (*e.g.,* trash, a periscope, marine mammals, sea turtles) and all disturbances (*e.g.,* surface disturbance, discoloration) that may be indicative of a threat to the vessel and its crew. The objective of visual mitigation monitoring is to maintain location, distance, and movement information about marine mammals observed to ensure that none approach close enough to enter the 2,000-yd LFA mitigation/buffer zone.

Daylight is defined as 30 min before sunrise until 30 min after sunset. Visual monitoring will begin 30 min before sunrise or 30 min before the Navy deploys the SURTASS LFA sonar array. Lookouts will continue to monitor the area until 30 min after sunset or continue to monitor for at least 15 min after completion of the SURTASS LFA sonar training and testing transmission.

The lookouts will maintain a topside watch and marine mammal observation log during daytime activities that employ SURTASS LFA sonar in the active mode. These trained monitoring personnel maintain a topside watch and scan the water's surface around the vessel systematically with standard binoculars (7x) and with the naked eye. If the lookout sights a possible marine mammal, the lookout will use big-eye binoculars (25x) to confirm the sighting and potentially identify the marine mammal species. Lookouts will enter numbers and identification of marine mammals sighted into the log, as well as any unusual behavior. A designated ship's officer will monitor the conduct of the visual watches and periodically review the log entries.

If a lookout observes a marine mammal outside of the 2,000-yd LFA sonar mitigation zone, the lookout will notify the senior military member in charge of the watch. The senior military member in charge shall then notify the HF/M3 active sonar operator to determine the range and projected track of the marine mammal. If the HF/M3 sonar operator or the lookout determines that the marine mammal will pass within the 2,000-yd LFA sonar mitigation zone, the senior military member in charge shall order the delay or suspension of SURTASS LFA sonar training and testing transmissions when the animal enters the 2,000-yd LFA sonar mitigation zone to prevent Level A harassment as well as reduce the potential for TTS and more severe behavioral responses.

If a lookout observes a marine mammal anywhere within the 2,000-yd LFA mitigation/buffer zone (required by NMFS), the senior military member in charge will be notified so that the LFA sonar training and testing transmissions will be immediately shut down or suspended. The lookout will enter his/her observations about sighted marine mammals into the log: date/time; vessel name; geographic coordinates/position; type and number of marine mammals observed; assessment basis (*i.e.,* observed injury or behavioral response); bearing from vessel; whether activities were delayed, suspended, or terminated; and relevant narrative information.

Marine mammal biologists who are qualified in conducting at-sea marine mammal visual monitoring from surface vessels will train and qualify designated ship personnel to conduct at-sea visual monitoring. This training may be accomplished either in-person or via video training.

Passive Acoustic Mitigation Monitoring

For the second of the three-part mitigation monitoring measures, the Navy will conduct passive acoustic monitoring using the SURTASS towed horizontal line array to detect vocalizing marine mammals as an indicator of their presence. This system serves to augment the visual and active sonar detection systems, and is deployed and operated at all times in which the LFA sonar system could be utilized. If a passive acoustic technician detects a vocalizing marine mammal that may be potentially affected by LFA sonar prior to or during transmissions, the technician will notify the senior military member in charge who will immediately alert the HF/M3 active sonar operators and the lookouts. The senior military member in charge

shall order the delay or suspension of LFA sonar transmissions when the animal enters the 2,000-yd LFA mitigation/buffer zone as detected by either the HF/M3 sonar operator or the lookouts. The passive acoustic technician will record all contacts of marine mammals in a log.

Active Acoustic Mitigation Monitoring

Active acoustic monitoring uses the high-frequency marine mammal monitoring (HF/M3) sonar to detect, locate, and track marine mammals that could pass close enough to the SURTASS LFA sonar array to enter the 2,000-yd LFA sonar mitigation zone. HF/M3 acoustic monitoring may be used at all times of the day or night and begins 30 min before the first LFA sonar transmission of a given training or testing activity is scheduled to commence and continues until the Navy terminates LFA sonar transmissions.

If the HF/M3 sonar operator detects a marine mammal contact outside the 2,000-yd LFA sonar mitigation zone, the HF/M3 sonar operator will determine the range and projected track of the marine mammal. If the operator determines that the marine mammal will pass within the 2,000-yd LFA sonar mitigation zone, he/she will notify the senior military member in charge. The senior military member in charge will then immediately order the delay or suspension of LFA sonar training and testing transmissions when the animal is predicted to enter the 2,000-yd LFA sonar mitigation zone.

If the HF/M3 sonar operator detects a marine mammal within the 2,000-yd LFA mitigation zone, he/she will notify the senior military member in charge who will immediately order the delay or suspension of training and testing transmissions. The HF/M3 sonar operator will record all contacts of marine mammals into the log.

Prior to full-power operations of the HF/M3 active sonar during SURTASS LFA sonar training and testing activities, the Navy will ramp up the HF/M3 sonar power level over a period of 5 min from the source level of 180 dB re 1 μPa at 1 m in 10-dB increments until the HF/M3 system attains full power (if required) to ensure that there are no inadvertent exposures of marine mammals to received levels greater than 180 dB re 1 μPa rms from the HF/M3 sonar. The Navy will not increase the HF/M3 sonar source level if any of the three monitoring methods detects a marine mammal during ramp-up. Ramp-up of the HF/M3 active sonar may continue once marine mammals are no longer detected within the 2,000-yd LFA mitigation zone by any of the three monitoring methods.

In situations where the HF/M3 sonar system has been powered down for more than 2 min during a training and testing event, the Navy will ramp up the HF/M3 sonar power level over a period of 5 min from the source level of 180 dB re: 1 μPa at 1 m in 10-dB increments until the system attains full power.

NMFS' Additional 1-km Buffer Zone Around OBIAs

Similar to the previously-required 1-km buffer around the LFA Sonar Mitigation Zone, NMFS is requiring the Navy to include a ''buffer zone'' that extends an additional 1 km (0.62 mi; 0.54 nm) beyond the seaward boundary of any OBIA (discussed in ''Geographic Restrictions'' section immediately below). The Navy has noted that this additional mitigation is practicable and has implemented this measure in previous authorizations. In addition, as noted above for the 180-dB mitigation zone, based on new scientific information and updated criteria in NMFS' 2018 Acoustic Technical Guidance, this 1-km buffer mitigation is more effective at avoiding PTS and reducing TTS than previously known when analyzed and employed in previous authorizations.

Geographic Restrictions

As noted above, the Navy will implement geographic restrictions for SURTASS LFA sonar training and testing activities that entail restricting SURTASS LFA sonar activities within these designated areas such that:

(a) The received level of SURTASS LFA sonar transmissions during training and testing events will not exceed 180 dB re: 1 μPa rms within 1 km seaward of any OBIA boundary, during the indicated periods of biological importance.

(b) No more than 25 percent of the authorized amount (transmission hours) of SURTASS LFA sonar for training and testing will be used within 10 nmi (18.5 km) of any single OBIA during any year (no more than 124 hours in years 1–4 and 148 hours in years 5–7) unless the following conditions are met: Should national security present a requirement to conduct more than 25 percent of authorized hours of SURTASS LFA sonar within 10 nmi (18.5 km) of any single OBIA during any year, naval units will obtain permission from the appropriate designated Command authority prior to commencement of the activity. The Navy will provide NMFS with notification as soon as is practicable and include the information (*e.g.,* sonar hours) in its annual activity reports submitted to NMFS.

(c) The received level of SURTASS LFA sonar transmissions will not exceed 180 dB re: 1 μPa rms within the Coastal Standoff Zone (22 km (12 nmi) from any land).

(d) No activities with the SURTASS LFA sonar system will occur within territorial seas of foreign nations, which are areas up to 12 nmi from shore, depending on the distance that individual nations claim.

(e) No activities with the SURTASS LFA sonar system will occur within the waters of Penguin Bank, Hawaii (defined as water depth of 600 ft (183 m)), and ensonification of Hawaii state waters (out to 3 nmi) will not exceed 145 dB re: 1 μPa rms.

As with previous rulemakings for SURTASS LFA sonar, this rulemaking contains a consideration of geographic restrictions, including OBIAs. However, whereas the Navy previously considered SURTASS LFA sonar activities worldwide, it has narrowed the geographic scope of its current application to reflect only those areas of the world's oceans where the Navy anticipates conducting covered SURTASS LFA sonar activities (*i.e.,* training and testing in the SURTASS LFA Study Area in the central and western North Pacific and eastern Indian Oceans). Therefore, consideration of geographical restrictions is also limited to the SURTASS LFA Study Area in the central and western North Pacific and eastern Indian Oceans.

Offshore Biologically Important Areas—Background

Given the unique operational characteristics of SURTASS LFA sonar, Navy and NMFS developed the concept of geographical restrictions for SURTASS LFA sonar in the SURTASS LFA Sonar FOEIS/EIS (DoN, 2001) to include: Delineating a 12 nmi coastal standoff zone where received levels from SURTASS LFA sonar will not exceed 180 dB re: 1 μPa rms, and designating OBIAs, where warranted, for areas beyond this coastal standoff zone, wherein received levels will not exceed 180 dB re: 1 μPa rms. The coastal standoff zone and OBIAs are intended to reduce the likelihood and/or degree of impacts on affected marine mammal species or stocks. As noted in the 2012 final rule (77 FR 50290; August 20, 2012), over 80 percent of the existing and potential marine protected areas reviewed were within 12 nmi from a coastline, indicating the effectiveness of the coastal standoff as one of the primary mitigation measures for

reducing potential impacts to marine mammals. OBIAs expand upon this protection by avoiding or minimizing impacts in areas beyond the coastal standoff zone where marine mammals are known to engage in specific behaviors that may lead to more severe impacts if interrupted; known to congregate in higher densities; and/or known to have a limited range and small abundance that creates more vulnerability for the stock as a whole. These criteria are important when determining whether mitigation would be likely to reduce the probability or severity of effects to individuals that would translate to minimization of impacts at the population level under the LPAI standard. Limiting LFA sonar activities in these important areas is expected to limit the likelihood and/or degree of species or stock effects by minimizing the chances that the activity will result in detrimental energetic effects to individuals (such as those that could occur in known feeding areas) or direct interference in breeding or mother/young interactions (such as those that could occur in reproductive or nursing areas) that could result in reductions in reproductive success or survivorship.

Three OBIAs were identified in the 2001 SURTASS LFA FOEIS/EIS: 200 m isobaths of the east coast of North America; Costa Rica Dome; and Antarctic Convergence Zone. In 2007, the Navy published a supplemental FEIS/FOEIS that designated six new OBIAs in addition to the three OBIAs that were designated in the 2001 SURTASS LFA FOEIS/FEIS. The criteria for identifying OBIAs in the 2001 and 2007 rules were originally defined in the 2001 SURTASS LFA Sonar FOEIS/EIS (Subchapter 2.3.2.1) as areas of the world's oceans outside of the geographic stand-off distance (greater than 22 km (12 nmi)) from a coastline (including islands) where marine animals of concern (those animals listed under the ESA and/or marine mammals) carry out biologically important activities, including migration, foraging, breeding, and calving.

For the 2012 rule, the Deputy Assistant Secretary of the Navy for Environment (DASN(E)) determined that the purpose of NEPA and Executive Order 12114 would be furthered by the preparation of an additional supplemental analysis related to the employment of SURTASS LFA sonar. Accordingly, the DASN(E) directed that an SEIS/SOEIS (among other things) provide further analysis of potential additional OBIAs in regions of the world where the Navy intended to use the SURTASS LFA sonar systems.

In parallel, for the 2012 rule, NMFS, with Navy input, developed a new process and screening criteria for determining an area's eligibility to be considered as an OBIA nominee for marine mammals. Those screening criteria were: (1) Areas with: (a) High densities of marine mammals; or (b) Known/defined critical habitat, breeding/calving grounds, foraging grounds, migration routes; or (c) Small, distinct populations of marine mammals with limited distributions; and (2) Areas that are outside of the coastal standoff distance and within potential operational areas for SURTASS LFA (*i.e.,* greater than 22 km (13.6 mi; 12 nmi) from any shoreline and not in polar regions).

For the 2012 SURTASS LFA FSEIS/SOEIS and 2012 rule, NMFS also developed and implemented a robust, systematic screening process for reviewing existing and potential marine protected areas against the OBIA criteria, based on the World Database on Protected Areas (WDPA, 2009), Hoyt (2005), and prior SURTASS LFA sonar OBIAs. This process produced a preliminary list of 403 OBIA nominees. As noted above, and stated in the 2012 Final Rule (77 FR 50290; August 20, 2012), the vast majority of the areas reviewed as potential OBIAs were within 12 nmi from a coastline and therefore already afforded protection due to the coastal standoff zone, indicating the effectiveness of the coastal standoff zone as one of the primary mitigation measures for reducing potential impacts. The remaining areas were broadly evaluated under the OBIA criteria and, after review, 73 potential OBIAs were considered by the Navy and NMFS.

After the list of potential OBIAs was developed based on information at a broad scale, each of these areas was evaluated at a finer scale to determine whether they qualified for designation as an OBIA. Further analysis of the biological evidence and robustness of the data for each of these recommendations included ranking them in categories using a numbering system ranging from 0 to 4. Any of the nominees that received a ranking of 2 or higher were eligible for continued consideration as an OBIA nominee. A rank score of 2 for designation criteria or for OBIA boundary considerations indicated that the designation was inferred from habitat suitability models (non-peer reviewed), expert opinion, regional expertise, or ''gray literature'' (inferred from analyses conducted for purposes other than quantifying OBIA criteria or boundary; see DoN (2012), Section 4.5.2.1). Thus, even areas with somewhat limited data were eligible for further consideration as an OBIA.

The systematic process described here was developed in order to support an orderly and manageable expert review and to ensure some definable information quality in the identification of OBIAs. As a result of this process, 45 areas ranked a 2 or higher.

Although not part of the initial screening criteria for the 2012 rulemaking, consideration of marine mammal hearing frequency sensitivity led NMFS to screen out areas that qualified solely on the basis of their importance for mid- or high-frequency hearing specialists in past rulemakings. This was due to the fact that the LFA sound source is below the range of best hearing sensitivity for MF and HF odontocete hearing specialists. Using the example of harbor porpoises, this means that a sound with a frequency less than 1 kHz would need to be significantly louder (more than 50 dB louder) than a sound in their area of best sensitivity (around 100 kHz) in order for them to hear it. Additionally, during the 1997 to 1998 SURTASS LFA Sonar Low Frequency Sound Scientific Research Program (LFS SRP), numerous odontocete and pinniped species (*i.e.,* MF and HF hearing specialists) were sighted in the vicinity of the sound exposure tests and showed no immediately obvious responses or changes in sighting rates as a function of source conditions, which likely produced received levels similar to those that produced minor short-term behavioral responses in the baleen whales (*i.e.,* LF hearing specialists). NMFS reasoned that MF and HF odontocete hearing specialists have such reduced sensitivity to the LFA sonar source that limiting ensonification in OBIAs for those animals would not afford protection beyond that which is already achieved by implementing a shutdown when any marine mammal enters the LFA mitigation zone. Therefore, consideration of marine mammal frequency sensitivity led NMFS to screen out areas that qualified solely on the basis of their importance for MF or HF specialists.

In addition to the considerations above, NMFS reviewed Hoyt (2011), which was an update and revision of Hoyt's 2005 earlier work, along with areas recommended in public comments received on the 2012 SURTASS LFA DSEIS/SOEIS. As a result of this further analysis, NMFS developed a list of OBIAs, which were then further considered in the context of practicability.

In response to public comments on the 2012 proposed rule, NMFS also

reevaluated its preliminary decision not to include areas that met the criteria for sperm whales and pinnipeds (because they were not considered LF specialists), and ultimately determined such areas would be appropriate for OBIA designation where information established by the criteria were met, and in fact noted that one OBIA (Patagonia Shelf) had already been identified for elephant seals. While no OBIAs had been identified for sperm whales, NMFS committed to considering sperm whales in future analyses should supporting information become available.

As part of the 2017 SURTASS LFA DSEIS/SOEIS, and as part of the 2017 rulemaking process, NMFS and Navy continued their evaluation of OBIAs. As a result of that work, NMFS and the Navy revised boundaries and designated seven more OBIAs, for a total of 29 OBIAs that were identified and made part of the NDE, under which the Navy is currently conducting SURTASS LFA sonar activities. Two of these OBIAs include protection for sperm whales (OBIA #28, Perth Canyon; and OBIA #29, Southwest Australia Canyons).

Since 2012, the Navy and NMFS have maintained an ''OBIA Watchlist'' of potential marine areas in the Study Area for which information or data have not been sufficient to designate as OBIAs, and reviewed new literature to determine if additional areas should be added to the list of potential areas. As part of the Adaptive Management process (see *Adaptive Management* section), the OBIA Watchlist is periodically evaluated as additional information becomes available to determine if the new information provides adequate support under one of the OBIA biological criteria. NMFS refers the reader to the 2019 SURTASS LFA FSEIS/SOEIS, Chapter 5 and Appendix C, for more detail on the analysis of potential OBIAs. As part of the ongoing Adaptive Management process and in preparation for the 2019 SURTASS LFA FSEIS/SOEIS, NMFS and Navy reviewed the OBIA Watchlist and other new information to determine the potential for additional OBIAs or expansion of existing OBIAs within the SURTASS LFA Study Area.

Offshore Biologically Important Areas—Current Rulemaking

For the 2019 SURTASS LFA FSEIS/SOEIS and this final rule, the following biological criteria, geographic criteria, and LF hearing sensitivity factors were considered in the identification of OBIAs:

Biological Criteria—As with other biological criteria, critical habitat is considered as one of the possible factors in the OBIA process, but designation as critical habitat does not necessarily comport with designation as an OBIA due to differences in the intent of these designations. Critical habitat is defined and used in the ESA and includes specific geographic areas that contain features essential to the conservation of an endangered or threatened species, including areas that are not currently occupied by the relevant species. However, as stated above, the intent of OBIA designation is to expand upon the coastal standoff zone, and provide protection from potential SURTASS LFA sonar impacts by avoiding or minimizing impacts in areas beyond the coastal standoff zone where marine mammals are known to engage in specific behaviors that may lead to more severe impacts if interrupted; known to congregate in higher densities; and/or known to have a limited range and small abundance that creates more vulnerability for the stock as a whole. Therefore, at least one of the following biological criteria must be met for a marine area to be considered as a marine mammal OBIA for SURTASS LFA sonar. When direct data relevant to one of the following are limited, other available data and information may be used if those data and information, either alone or in combination with limited direct data, are sufficient to establish that at least one of the biological criteria are present:

- *Known Breeding/Calving or Foraging Ground, or Mitigation Route*—an area representing a location of known biologically important activities, including defined breeding or calving areas, foraging grounds, or migration routes. Potential designation under this criterion is indicative that these areas are concentrated areas for at least one biologically important activity. ''Concentrated'' means that more of the animals are engaged in the particular behavior at the location (and perhaps time) than are typically engaged in that behavior elsewhere.
- *Small, Distinct Populations of Marine Mammals with Limited Distributions*—geographic areas in which small, distinct populations of marine mammals occur and whose distributional ranges are limited.
- *High Densities*—an area of high density for one or more species of marine mammal. High density areas are those marine waters where the density, within a definable area (and potentially time), measurably and meaningfully exceeds the average density of the species or stock within the region. The exact basis for the identification of high density areas may differ across species/stocks and regions/scales, depending on the available information and should be evaluated on a stock-by-stock basis, although combining species or stocks may be appropriate in some situations. The best source for this type of determination are publically-available, direct measurements from survey data.

Geographic Criteria—For a marine area to be eligible for consideration as an OBIA for marine mammals, the area must be located where training and testing activities of SURTASS LFA sonar would occur (*i.e.* in the Study Area) and cannot be located within 12 nm (22 km) of any emergent land including islands or island systems (*i.e.,* must be outside of the coastal standoff zone, which already receives the same protection as OBIAs).

LF Hearing Sensitivity—The frequencies produced by SURTASS LFA sonar transmissions are well below the frequency range of best hearing sensitivity for most odontocetes and pinnipeds based on the measured hearing thresholds (Au and Hastings, 2008; Houser *et al.,* 2008; Kastelein *et al.,* 2009; Mulsow and Reichmuth, 2010; NMFS, 2018; Nedwell *et al.,* 2004; Richardson *et al.,* 1995; Southall *et al.,* 2007; Southall *et al.,* 2019). The intent of OBIAs is to protect those marine mammal species, such as baleen whales, most likely to hear and be affected by LFA sonar transmissions and to provide them with additional protections during periods when they are conducting biologically significant activities. Thus, the primary focus of the OBIA mitigation measure is on LF hearing specialist species. However, OBIAs have been designated for non-LF hearing specialists, such as elephant seals and sperm whales, since the available hearing data for these species indicate an increased sensitivity to LF sound (compared to most odontocetes and pinnipeds).

The biological criteria considered in the identification of OBIAs have changed since the 2001 SURTASS LFA FOEIS/EIS (and as continued in the 2007 SURTASS LFA SEIS) in two respects. First, under the 2001 SURTASS LFA FOEIS/EIS, 2007 SURTASS LFA SEIS, and the 2007 final rule, an area could be designated as an OBIA only if it met a conjunctive test of being an area where marine mammals congregate (1) in high densities, and (2) for a biologically important purpose. The current scheme is more protective because any one of the biological criteria alone could be a sufficient basis for designation as an OBIA if it also meets the geographic criterion of falling outside of 12 nmi (22 km) from any coastline. Second, the current biological criteria now include ''small, distinct

populations with limited distribution,'' which also could, standing alone, be a basis for designation.

The 2017 NDE for SURTASS LFA sonar lists the 29 marine mammal OBIAs and their effective periods as geographic mitigation with which the Navy must comply for SURTASS LFA sonar activities. These OBIAs resulted from analyses conducted as part of the 2017 SURTASS LFA SEIS/SOEIS and application for rulemaking, and retained existing OBIAs; revised/expanded existing OBIAs; and added new OBIAs to those defined as part of the 2012 SURTASS LFA sonar rule (also see the 2019 SURTASS LFA FSEIS/SOEIS, Chapter 5, Section 5.3.6.2 and Appendix C for more detail on OBIAs). Of these 29 OBIAs, four are located within the current SURTASS LFA sonar Study Area (OBIA 16, Penguin Bank, Hawaiian Islands Humpback Whale NMS; OBIA 20, Northern Bay of Bengal and Head of Swatch-of-No-Ground; OBIA 26, Offshore Sri Lanka; and OBIA 27, Camden Sound/Kimberly Region), as indicated in Table 19, below.

TABLE 19—MARINE MAMMAL OBIAS OBSERVED FOR SURTASS LFA SONAR DURING THE NDE

OBIA No.	Name of OBIA	Location/water body	Relevant low-frequency marine mammal species	Effectiveness seasonal period
16	Penguin Bank, Hawaiian Islands Humpback Whale NMS.	North-Central Pacific Ocean	Humpback whale	November through April, annually.
20	Northern Bay of Bengal and Head of Swatch-of-No-Ground (SoNG).	Bay of Bengal/Northern Indian Ocean.	Bryde's whale	Year-round.
26	Offshore Sri Lanka	North-Central Indian Ocean	Blue whale	December through April, annually.
27	Camden Sound/Kimberly Region.	Southeast Indian Ocean; northwestern Australia.	Humpback whale	June through September, annually.

Since the 2017 SURTASS LFA SEIS/SOEIS and NDE for SURTASS LFA sonar, analysis and assessment of marine areas as potential OBIAs has continued. The Navy and NMFS have conducted a comprehensive assessment of the available scientific literature, data, and information on potential marine areas in the SURTASS LFA Study Area to determine their potential as OBIAs. Because this rulemaking and the 2019 SURTASS LFA FSEIS/SOEIS have a narrowed geographic scope for SURTASS LFA sonar training and testing activities, review of OBIAs was similarly scoped to reflect only the current Study Area. Navy and NMFS' comprehensive assessment of marine areas as potential OBIAs included review of the OBIA Watchlist for areas located within the Study Area as well as a thorough review of the Important Marine Mammal Areas (IMMAs), Ecologically or Biologically Significant Marine Areas (EBSAs), IUCN Green List of Protected and Conserved Areas, as well as marine areas recommended in public comments on the 2019 SURTASS LFA DSEIS/SOEIS (see Chapter 7 of the 2019 SURTASS LFA FSEIS/SOEIS) and on our MMPA proposed rule (84 FR 7186; March 1, 2019). For this final rule, we have applied the OBIA biological criteria, geographic criteria, and hearing sensitivity factor, as well as the practicability criterion to the potential OBIAs. A summary of the number and types of marine areas assessed as potential OBIAs for SURTASS LFA sonar and their location relative to the Study Area and coastal standoff range (12 nmi) and relevancy for marine mammals is provided in Table 20. While we provide a summary of the OBIA analysis here, we direct the reader to Chapter 5 and Appendix C of the 2019 SURTASS LFA FSEIS/SOEIS for the complete analysis of all considered OBIA areas.

TABLE 20—NUMBER AND TYPES OF MARINE AREAS ASSESSED AS POTENTIAL OFFSHORE BIOLOGICALLY IMPORTANT AREAS (OBIAS) FOR SURTASS LFA SONAR, AND THEIR LOCATION RELATIVE TO THE STUDY AREA AND COASTAL STANDOFF RANGE (12 nmi) AND RELEVANCY TO MARINE MAMMALS

Marine area region	Total number marine areas	Number of marine areas located within study area [1] for SURTASS LFA sonar	Number of marine areas in LFA study area relevant to marine mammals	Number of marine mammal areas located in study area and outside [2] the coastal standoff range	Number of marine areas further assessed
OBIA Watchlist Areas					
Western North Pacific Ocean	3	3	3	3	3
Central Indian Ocean	1	1	1	1	0
Total OBIA Watchlist	4	4	4	4	3

TABLE 20—NUMBER AND TYPES OF MARINE AREAS ASSESSED AS POTENTIAL OFFSHORE BIOLOGICALLY IMPORTANT AREAS (OBIAS) FOR SURTASS LFA SONAR, AND THEIR LOCATION RELATIVE TO THE STUDY AREA AND COASTAL STANDOFF RANGE (12 nmi) AND RELEVANCY TO MARINE MAMMALS—Continued

Marine area region	Total number marine areas	Number of marine areas located within study area[1] for SURTASS LFA sonar	Number of marine areas in LFA study area relevant to marine mammals	Number of marine mammal areas located in study area and outside[2] the coastal standoff range	Number of marine areas further assessed
U.S. ESA Critical Habitat					
Central North Pacific Ocean	2	2	2	2	2
UNEP Ecologically or Biologically Significant Areas (EBSAs)					
Northeast Indian Ocean	10	10	5	3	3
South and Western Indian Ocean	39	5	1	0	0
East Asian Seas	34	31	9	6	[3]7
North Pacific Ocean	20	6	4	4	4
Western South Pacific Ocean	26	2	0	0	0
Total EBSAs	129	54	19	13	14
IUCN WCPA–SSC Important Marine Mammal Areas (IMMAs)					
Pacific Islands	15	3	3	2	2
Southeast Asian Seas and Northeast Indian Ocean	30	20	20	9	8
Total IMMAs	45	23	23	11	10
IUCN Green List of Protected and Conserved Areas					
Asian Pacific	11	0	0	0	0
Recommended in Public Comments on Draft SEIS/SOEIS and MMPA Proposed Rule[4]					
Western North Pacific Ocean	41	40	40	21	21
Eastern Indian Ocean	52	52	52	27	27
Total Comment Recommendations	93	92	92	48	48

[1] At least part of marine area located within study area for SURTASS LFA sonar.
[2] At least part of the marine area is located outside the LFA coastal standoff range.
[3] Even though the Ogasawara Islands EBSA is located within the coastal standoff range, due to its importance to the endangered humpback whale DPS, this area was further considered.
[4] The number of marine areas received in Public Comments includes the newly designated IMMAs (SE Asian Seas and NE Indian Ocean) as well as duplicate marine areas, since some of the same marine areas were noted in comments received both for the 2018 SURTASS LFA DSEIS/SOEIS and MMPA Proposed Rule. Additionally, some of the recommended marine areas were EBSAs for marine mammals. The duplicate marine areas have been removed from the total number of marine areas further assessed, but that total number includes marine areas that are designated as IMMAs and EBSA.

Review of OBIA Watchlist Areas—The OBIA Watchlist areas located within the Study Area that were re-evaluated include the British Indian Ocean Territory-Chagos Islands Marine Protected Area (MPA), the Pacific Remote Islands (PRI) Marine National Monument (MNM), Marianas Trench MNM, and the Papahānaumokuākea MNM. Only one unit of the Marianas Trench MNM and only two units and a very small strip of the northern part of a third unit (Kingman Reef/Palmyra Atoll) of the PRI MNM were within the boundary of the Study Area (for a detailed map see Appendix C of the 2019 SURTASS LFA FSEIS/SOEIS). Thus, only those areas of the MNMs within the Study Area were further assessed.

The British Indian Ocean Territory-Chagos Islands Marine MPA is a large MPA, and includes areas outside of the LFA coastal standoff range. All available literature and information were researched and reviewed; however, as was the case when this area was originally evaluated, very little information is available on the presence of marine mammals in the MPA (Dunne *et al.,* 2014) or whether marine mammals conduct biologically important activities in the MPA. Due to the lack of supporting information and data available to demonstrate that the waters of this MPA are important biologically to any marine mammal species, the Navy and NMFS did not further consider the British Indian Ocean Territory-Chagos MPA as a possible OBIA but will retain the area on the OBIA Watchlist.

Scientific information and data indicate that marine mammals occur in the waters of all the MNMs on the OBIA Watchlist. Scientific data and information on important biological activities conducted by marine mammal species were most available for the Papahānaumokuākea MNM, where the majority of the very small population of the ESA-listed endangered Hawaiian monk seal resides, reproduces, and forages, and where critical habitat for

this species has been designated out to the 656-ft (200-m) isobath. Although little information and data are readily available on marine mammals in the waters of the Marianas Trench MNM Islands Unit or in the waters of Wake, Johnson, Palmyra atolls or Kingman Reef units of the PRI MNM, the Navy and NMFS conducted a thorough review of the available data for these areas. Due to the lack of supporting information and data available to demonstrate that the waters of the PRI MNM in the Study Area are important biologically to any marine mammal species, the Navy and NMFS did not further consider the PRI MNM as a possible OBIA but will retain the area on the OBIA Watchlist. Sufficient information and data were available to support designation of OBIAs in the waters of the Papahānaumokuākea MNM and the Marianas Trench MNM (for a detailed analysis of these areas see Appendix C of the 2019 SURTASS LFA FSEIS/SOEIS).

Review of Important Marine Mammal Areas (IMMAs) as OBIAs—IMMAs are defined by the Marine Mammal Protected Areas Task Force (MMPATF), which is comprised of partners from the International Union for Conservation of Nature (IUCN) World Commission on Protected Areas (WCPA); IUCN Species Survival Commission (SSC); International Committee on Marine Mammal Protected Areas (ICMMPA); Tethys Research Institute; Whale and Dolphin Conservation (WDC); Global Ocean Biodiversity Initiative (GOBI), and Water Evolution organizations. These areas are defined as discrete portions of habitat that are important to one or more marine mammal species; represent priority sites for marine mammal conservation worldwide without management implications; and merit protection and monitoring. IMMA selection criteria are designed to capture aspects of the biology, ecology, and population structure of marine mammals, and a candidate IMMA need only satisfy one of the following criteria and/or sub-criteria to successfully qualify for IMMA status: Criterion A—Species or Population Vulnerability; Criterion B—Distribution and Abundance; Criterion C—Key Life Activities; or Criterion D—Special Attributes. To date, IMMAs have been identified in the western and central Pacific Ocean, Mediterranean Sea, and the North East Indian Ocean and South East Asian Seas (MMPATF, 2018; 2019). IMMAs are divided into three categories: IMMAs, candidate IMMAs, and areas of interest. Only areas designated as IMMAs were considered as possible OBIAs, as these areas have met the IMMA selection criteria and have complete supporting data and information.

All areas designated as IMMAs located in the Study Area were assessed as potential OBIAs. Twenty-three IMMAs are located in the study area for SURTASS LFA sonar (see detailed maps and summary assessment tables in Appendix C of the 2019 SURTASS LFA FSEIS/SOEIS). Of the 15 Pacific Islands IMMAs, three are located within the SURTASS LFA sonar Study Area in the North Pacific Ocean: The Northwest Hawaiian Islands, Main Hawaiian Archipelago, and Southern Shelf Waters/Slope Edge of Palau. However, only the Northwest Hawaiian Islands and Main Hawaiian Archipelago IMMAs have some part of their area located outside the coastal standoff zone for SURTASS LFA sonar; the geographic extent of the Palau IMMA is entirely located within the coastal standoff range for SURTASS LFA sonar and therefore does not meet the geographic criteria for consideration as an OBIA. Sufficient information and data were available to support designation of OBIAs in the waters of the Northwestern Hawaiian Islands and the Main Hawaiian Archipelago IMMAs (for a detailed analysis of these areas see Appendix C of the 2019 SURTASS LFA FSEIS/SOEIS).

Thirty IMMAs were designated in the North East Indian Ocean and South East Asian Seas (MMPATF, 2019) (see detailed maps and summary assessment tables in Appendix C of the 2019 SURTASS LFA FSEIS/SOEIS). Of these 30 IMMAs, 20 are located at least partially within the SURTASS LFA Study Area, with nine of these located at least partially outside of the coastal standoff zone. Additionally, one was only relevant to inshore species. Eight of the North East Indian Ocean and South East Asian IMMAs were carried forward for additional assessment as potential OBIAs.

Review of Ecologically or Biologically Significant Marine Areas (EBSAs) as OBIAs—EBSAs are an effort of the Convention on Biological Diversity (Convention), which was initiated by the United Nations Environment Programme (UNEP). The Convention is an international legal instrument for the conservation and sustainable use of biological diversity. EBSAs are defined as special marine areas that serve important purposes that ultimately support the healthy functioning of oceans and thus should have increased protection and sustainable management. Currently there are 278 EBSAs defined worldwide, 129 of which are within the central or western North Pacific or eastern Indian Oceans. Fifty-four of these EBSAs are located in the SURTASS LFA sonar Study Area (see detailed maps and summary assessment tables in Appendix C of the 2019 SURTASS LFA FSEIS/SOEIS). Nineteen of these 54 EBSAs were pertinent to marine mammals under NMFS' jurisdiction, and only 14 of these areas are located at least partially outside the coastal standoff zone. One of these areas was pertinent only to coastal/inshore species of marine mammals and was not carried forward. In addition, the Ogasawara Islands EBSA was also carried forward for additional review, even though the EBSA is located entirely within the coastal standoff zone for SURTASS LFA sonar. In recognition of the importance of the Ogasawara area as a migrational waypoint and breeding/calving area for the endangered WNP DPS and stock of humpback whales, the waters beyond the coastal standoff zone of the Ogasawara Islands were assessed to determine if an areal extent could be defined in which the important migrational or reproductive behavior of humpback whales occurs and if data were sufficient to support the determination. Therefore, 14 EBSAs were carried forward for additional assessment as potential OBIAs.

Review of IUCN Green List of Protected and Conserved Areas as OBIAs—The IUCN Green List of Protected and Conserved Areas has been generated as part of an IUCN program that aims to encourage, achieve, and promote effective, equitable, and successful protected areas with a principal goal of increasing the number of protected and conserved areas that are effectively and equitably managed and deliver conservation outcomes. The basis of the IUCN Green List Programme is the Green List Standard, which is a set of components, criteria, and indicators for successful protected area conservation and international benchmarks for quality to provide improved performance and achievement of conservation objectives (IUCN, 2018). Eleven of the 25 Green List areas are located within the SURTASS LFA sonar Study Area, but all are terrestrial parks or reserves, and none of the IUCN Green List Protected or Conserved Areas encompass any marine waters. For this reason, no IUCN Green List areas were further considered as potential OBIAs.

Review of Areas Recommended Through Public Comment as OBIAs—In addition to evaluation of OBIA Watchlist areas, EBSAs, IMMAs, IUCN Green List of Protected and Conserved Areas (discussed above), and Critical Habitat areas (discussed below), NMFS

and the Navy evaluated areas that were suggested as OBIAs in public comments received on the 2018 SURTASS LFA DSEIS/SOEIS and the proposed rule (84 FR 7186; March 1, 2019). Ninety-three marine areas were recommended for consideration as OBIAs during the public comment periods. These areas included 30 IMMAs for the Southeast Asian Seas and Northeast Indian Ocean designated in February 2019. Many of the comments on the 2018 SURTASS LFA DSEIS/SOEIS and the proposed rule recommended the same marine areas, so after duplicate areas were removed, 69 marine areas remained were assessed. Only one of the recommended marine areas was not located within the SURTASS LFA sonar Study Area (Commander Islands). The remaining 68 marine areas, including the 30 newly designated IMMAs, were assessed in the context of the criteria for OBIAs. Of these 68 recommended marine areas, 48 were carried forward for assessment as potential OBIAs (Table 20).

During the assessment, marine areas were combined if they were designated for the same geographic area (*e.g.,* the Gulf of Mannar where an EBSA and IMMA have been designated) or if different species of marine mammals were designated in the same marine area (*e.g.,* humpback and sperm whales in the Ogasawara region). This combination of areas resulted in 33 marine areas being considered as potential OBIAs (see Table 5–2 and Appendix C in the 2019 SURTASS LFA FSEIS/SOEIS). Of these 33, the Navy's and NMFS' assessment resulted in 14 candidate OBIAs representing 17 of the marine areas. Some OBIAs, such as the blue and humpback whale OBIAs for Western Australia, encompassed several marine areas, which is why the number of candidate OBIAs is smaller than the number of marine areas represented. The 14 candidate OBIAs (representing 17 areas) underwent Navy practicability review. The Navy determined that these OBIAs in the SURTASS LFA sonar Study Area and the relevant seasonal effectiveness periods would be practicable to implement. As a result, 14 new marine mammal OBIAs for SURTASS LFA sonar have been designated (Table 21) (see detailed maps and supporting information for each designated OBIA in Appendix C of the 2019 SURTASS LFA FSEIS/SOEIS). All four of the OBIAs previously designated in the SURTASS LFA Study Area (see Table 19) have been expanded spatially. Former OBIA 16, Penguin Bank, is now part of the much larger Main Hawaiian Islands OBIA, while OBIA 20, Northern Bay of Bengal/Swatch-of-No-Ground (SoNG) is now encompassed in the SoNG OBIA, and the Offshore Sri Lanka, OBIA #26, is now part of the more encompassing Sri Lanka OBIA. Last, OBIA #27, Kimberly-Camden Sound was greatly expanded to become the Western Australia (Humpback Whale) OBIA. A list of the areas added to the Watchlist can be found at *https://www.fisheries.noaa.gov/action/incidental-take-authorization-us-navy-operations-surveillance-towed-array-sensor-system-0.*

TABLE 21—DESIGNATED MARINE MAMMAL OFFSHORE BIOLOGICALLY IMPORTANT AREAS (OBIAS) IN THE SURTASS LFA STUDY AREA

OBIA No.	OBIA name	Ocean area	Low-frequency marine mammal species	Effective seasonal period
1	Main Hawaiian Islands [1]	Central North Pacific	Humpback whale	November to April.
2	Northwestern Hawaiian Islands.	Central North Pacific	Humpback whale	December to April.
3	Mariana Islands	Western North Pacific	Humpback whale	February to April.
4	Ryukyu-Philippines	Western North Pacific	Humpback whale	January to April.
5	Ogasawara Islands (Sperm Whale).	Western North Pacific	Sperm whale	June to September.
6	Ogasawara-Kazin Islands (Humpback Whale).	Western North Pacific	Humpback whale	December to May.
7	Honshu	Western North Pacific	Gray whale	January to May.
8	Southeast Kamchatka	Western North Pacific	Humpback, fin, Western North Pacific gray, and North Pacific right whales.	June to September.
9	Gulf of Thailand	Eastern Indian Ocean	Bryde's whale	April to November.
10	Western Australia (Blue Whale).	Eastern Indian Ocean	Blue (pygmy) whale	May to November.
11	Western Australia (Humpback Whale) [2].	Eastern Indian Ocean	Humpback whale	May to December.
12	Southern Bali	Eastern Indian Ocean	Bryde's, sei, humpback, Omura's, and sperm whales.	October to November.
13	Swatch-of-No-Ground (SoNG) [3].	Northern Bay of Bengal	Bryde's whale	Year-round.
14	Sri Lanka [4]	Eastern Indian Ocean	Blue (pygmy) and sperm whales	October to April.

[1] Expansion of existing OBIA #16, Penguin Bank.
[2] Expansion of existing OBIA #27, Kimberly-Camden Sound.
[3] Expansion of existing OBIA #20, Northern Bay of Bengal/SoNG.
[4] Expansion of existing OBIA #26, Offshore Sri Lanka

Other Geographic Mitigation Considerations

Above, we describe a comprehensive process and set of criteria for identifying OBIAs, which, when used in conjunction with the limits on SURTASS LFA sonar transmission levels in and around them described above, we expect to decrease the likelihood and/or scale of impacts on marine mammal species or stocks. However, the inclusion of this focused and systematic process and criteria for designating OBIAs does not mean that other mitigation, including specific time/area restrictions, could not be considered in the context of the LPAI standard. Below we address some other factors that NMFS and the Navy considered in the development of the final rule.

ESA-Designated Critical Habitat

Under section 7 of the ESA, all Federal agencies must ensure that any actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of a listed species or destroy or adversely modify its designated critical habitat. ESA-designated critical habitat is not designated in foreign countries or any other areas outside of U.S. jurisdiction. Critical habitat within the U.S. EEZ implicated by SURTASS LFA sonar activities has been designated for two of the relevant ESA-listed marine mammal species, Hawaiian monk seals and the Main Hawaiian Island (MHI) Insular DPS of false killer whales. Effects to ESA-designated critical habitat are explicitly addressed through the section 7 consultation process under the ESA. Notably, the ESA biological opinion for the Navy's SURTASS LFA sonar activities and this MMPA rule concludes that they are not likely to adversely affect the relevant designated critical habitat for those species.

Some of the characteristics of ESA-designated critical habitat are also germane to the identification of OBIAs or other mitigation under this rulemaking. However, critical habitat also considers physical as well as biological features and may also consider areas that are currently unoccupied by the species. Therefore, not all critical habitat necessarily qualifies as an OBIA or is appropriate as a basis for other time/area restrictions for SURTASS LFA sonar when considering mitigation under the MMPA. As it pertains to the potential inclusion of these areas as OBIAs, we note that neither of these two ESA-listed species is a LF hearing specialist or sensitive to SURTASS LFA sonar in a manner that would otherwise justify additional species-specific mitigation on their behalf, given the existing protections of the Navy's three-part detection and shutdown protocols and coastal standoff zone.

Nearly all of the ESA-designated critical habitat for the Hawaiian monk seal lies within the coastal standoff distance for SURTASS LFA sonar. A small area of the monk seal's critical habitat at Penguin Bank extends beyond the 22-km (12-nmi) coastal standoff distance, which is part of the Main Hawaiian Islands OBIA (designated in this final rule). Per the CZMA consultation with the State of Hawaii for SURTASS LFA sonar, the Navy agreed not to operate SURTASS LFA sonar in the waters of Penguin Bank to the 600-ft (183-m) isobath. In addition, the Navy also agreed not to ensonify Hawaii state waters at levels above 145 dB re: 1 µPa rms. Main Hawaiian Islands and Northwestern Hawaiian Islands OBIAs (designated in this final rule), effective from November to April and December to April, respectively, encompass the critical habitat for Hawaiian monk seal. During this time, the received levels in waters within 1 km of these OBIAs will not exceed 180 dB re: 1 µPa (rms).

The ESA-designated critical habitat for the MHI insular false killer whale (MHI IFKW) DPS includes waters from the 148- to 10,499-ft (45-to 3,200-m) depth contours around the MHI from Niihau east to Hawaii. MHI IFKWs are island-associated whales that rely entirely on the productive submerged habitat of the main Hawaiian Islands to support all of their life-history stages, and their range is restricted to the shelf and slope habitat around the MHI, unlike pelagic false killer whales found more in open oceans. Because of the habitat characteristics that are important components to the ecology of these whales, NMFS identified a single feature, island-associated marine habitat, with four characteristics that support this feature as essential to their conservation. The four characteristics include: (1) Adequate space for movement and use within shelf and slope habitat; (2) prey species of sufficient quantity, quality, and availability to support individual growth, reproduction, and development, as well as overall population growth; (3) waters free of pollutants of a type and amount harmful to MHI IFKWs; and (4) sound levels that will not significantly impair the whales' use or occupancy.

Some Navy and other Federal agency areas, such as the Pacific Missile Range Facility offshore ranges, are excluded from the critical habitat designation (NOAA, 2018). In most areas of the waters surrounding the MHI, the coastal standoff range for SURTASS LFA (12 nmi (22 km)) is located closer to shore than the seaward boundary of the critical habitat for the MHI Insular DPS of the false killer whale (*i.e.,* some of the critical habitat is beyond the coastal standoff range). The Main Hawaiian Islands OBIA (designated in this final rule) encompasses some of the critical habitat, but a portion of the critical habitat lies beyond the OBIA. However, as discussed above, part of the CZMA stipulations for SURTASS LFA sonar use in Hawaiian waters required the Navy to agree not to use SURTASS LFA sonar in the waters over Penguin Bank to a water depth of 600 ft (183 m) and to limit ensonification within Hawaii state waters (out to 3 nmi) to 145 dB re: 1 µPa rms.

Regarding prey availability (large pelagic fish and squid) of sufficient quantity, quality, and availability to support individual growth, reproduction, and development, as well as overall population growth of false killer whales, no mortality of marine invertebrates is reasonably expected to occur from exposure to LFA sonar training and testing activities nor are population level effects likely. Thus, marine invertebrates such as squid would not reasonably be adversely affected by SURTASS LFA sonar training and testing activities such that their availability (or other prey availability) would be diminished (also refer to Chapter 3, section 3.4.2.1 of the 2019 SURTASS LFA FSEIS/SOEIS for a discussion of why marine invertebrates are not reasonably likely to be adversely impacted by SURTASS LFA sonar training and testing activities). Marine fishes, however, may be affected by exposure to LFA sonar transmissions, but only if they are located within close proximity (<0.54 nmi (<1 km)) to the transmitting sonar source. The Navy's analysis indicates a minimal to negligible potential for an individual fish to experience non-auditory or auditory effects or a stress response from exposure to SURTASS LFA sonar transmissions. A low potential exists for minor, temporary behavioral responses or masking effects to an individual fish when LFA sonar is transmitting, but no potential is estimated for fitness level consequences to fish stocks. Since it is highly unlikely that a significant percentage of any prey stock would be in sufficient proximity during LFA sonar transmissions to experience such effects, there is minimal potential for LFA sonar to affect prey fish stocks. Thus, no adverse effects are reasonably expected on the quantity, quality, and availability of prey fishes as the result of exposure to SURTASS LFA sonar training and testing activities. Accordingly, SURTASS LFA sonar training and testing activities would not significantly impact the biological characteristics of prey availability of the MHI IFKW DPS's designated critical habitat.

Regarding the underwater sound produced by SURTASS LFA sonar, it would not be expected to ''significantly impair false killer whale's use or occupancy'' due both to the small scale of the activity (small number of vessels operating across two ocean basins, meaning that any individual marine mammal would be expected to be exposed for only a short amount of time) and the frequency of the SURTASS signal, which is not in the range of

higher sensitivity for this species and would not be expected to interfere with their communication. Further, required shutdowns are expected to minimize false killer whale exposure to high sound levels and the Navy's implementation of a coastal standoff zone means that SURTASS LFA training and testing is not occurring across much of the critical habitat. No aspect of SURTASS LFA sonar training and testing activities would reasonably be expected to impact the spatial use of false killer whales. As a result, the use of SURTASS LFA sonar for training and testing activities in Hawaiian waters would not reasonably be expected to have any impact on the physical characteristics of the false killer whale critical habitat since neither the spatial availability nor sound levels in the continental shelf and slope habitat would be significantly impacted. As noted, NMFS is not recommending additional geographic mitigation in this area.

Both the Navy and NMFS Protected Resources Permits and Conservation Division consulted with NMFS Protected Resources Interagency Cooperation Division on effects on critical habitat pursuant to section 7 of the ESA.

Coastal Standoff Zone

The Navy will restrict training and testing activities utilizing SURTASS LFA sonar within 22 km (14 mi; 12 nmi) of any coastline, including islands, such that the SURTASS LFA sonar-generated sound field will not exceed a received level of 180 dB re: 1 μPa rms at that seaward distance. This measure is intended to minimize both the severity and scale of effects to marine mammals and, by extension, marine mammal species and stocks, by avoiding areas where many biologically important behaviors and higher densities of many species that may be found in coastal areas occur. In the past, some commenters have recommended the Navy implement a larger coastal standoff zone than what we proposed. We reiterate that as noted in 2012 final rule (77 FR 50290; August 20, 2012), approximately 80 percent of known and potential marine protected areas are within the 22 km (12 nmi) coastal standoff zone, an indication of this measure's effectiveness, and it is practicable. Additionally, this restriction limits exposures of marine mammals to high-level sounds in the vicinity of geographical features that have been associated with some stranding events (*i.e.,* enclosed bays, narrow channels, etc.) attributed to activities other than SURTASS LFA sonar.

The Navy's 2007 SURTASS LFA SEIS/SOEIS evaluated increasing the coastal standoff distance up to 46 km (25 nmi) and, based on a six-step analysis process, determined that increasing the coastal standoff range would decrease exposure to higher received levels for concentrations of marine animals closest to shore, but would do so at the expense of increasing exposure levels for shelf break and pelagic species. There have been no changes to the best available information or other indications that the coastal standoff distance should be increased, so there is no change in this mitigation measure from previous rulemakings. In addition, any areas beyond the 12 nmi coastal standoff can still be considered for mitigation, such as through the OBIA process.

White Paper on ''Identifying Areas of Biological Importance to Cetaceans in Data-Poor Regions''

As described earlier, for the 2012 rulemaking, NMFS convened a panel of subject matter experts (SMEs) to help identify marine mammal OBIAs relevant to the Navy's use of SURTASS LFA sonar. Separately, we consulted a NMFS scientist, who was also on that same SME panel, to help address a recommendation in a public comment that NMFS consider a global habitat model (Kaschner *et al.,* 2006) in the development of OBIAs. In addition to providing the requested input (which essentially concluded that using the Kaschner model was not advisable, for several reasons), the NMFS scientist, in conjunction with other NMFS scientists, went further and provided some guidance for alternate methods for considering ''data poor areas'' and drafted a paper entitled ''Identifying Areas of Biological Importance to Cetaceans in Data-Poor Regions'' (referred to in this notice as the ''White Paper''). NMFS' consideration of the White Paper was discussed in the 9th Circuit's ruling on our 2012 final rule, and as a consequence we provide here some additional details and background regarding our consideration of the White Paper recommendations for this rulemaking.

Kaschner *et al.* (2006) Recommendation

As requested, the White Paper authors reviewed the Kaschner *et al.* (2006) paper in the context of potential mitigation for SURTASS LFA sonar. The Kaschner *et al.* (2006) paper used models based on a synthesis of ''existing and often general qualitative observations about the spatial and temporal relationships between basic environmental conditions and a given species' presence'' to ''develop a generic quantitative approach to predict the average annual geographic ranges'' of marine mammal species on a global scale. Several environmental correlates including depth, sea surface temperature, distance to land, and mean annual distance to ice edge were used in the Kaschner effort. After evaluating four case studies from the Kaschner *et al.* (2006) study for predicting gray whale, northern right whale dolphin, North Atlantic right whale, and narwhal distribution, the authors of the White Paper concluded that ''(t)he predictions from the four case studies . . . included errors of omission (exclusion of areas of known habitat) and commission (inclusion of areas that are not known to be habitat) that could have important implications if the model predictions alone were used for decision making in a conservation or management context.''

Specifically, the White Paper illustrated that the Kaschner *et al.* effort omitted a considerable portion of known gray whale habitat; overestimated the range of suitable habitat for northern right whale dolphins off the U.S. West Coast (noting that species-specific models based on dedicated shipboard surveys more correctly identified suitable habitat); predicted habitat for North Atlantic right whales in large areas where they have never been recorded; and predicted suitable habitat for narwhal that did not correspond with their known distribution. Noting that these significant inaccuracies in the model could result in either under-protection or over-restrictiveness, the authors of the White Paper did not recommend basing the identification of biologically important areas on this modeling. NMFS concurred with this recommendation and elected not to use the Kaschner paper, or other similar predictive envelope models as a basis for identifying additional protective areas in the 2012 SURTASS LFA sonar incidental take rule.

Clarification of Concepts Raised in White Paper

In *NRDC* v. *Pritzker,* referring to the White Paper and its specific recommendations that NMFS did not adopt for identification of OBIAs, the 9th Circuit stated that NMFS, in its 2012 rule, ''did not give adequate protection to areas of the world's oceans flagged by its own experts as biologically important, based on the present lack of data sufficient to meet the Fisheries Service's (OBIA) designation criteria, even though NMFS' own experts

acknowledged that (f)or much of the world's oceans, data on cetacean distribution or density do not exist.'' *NRDC* v. *Pritzker,* 828 F.3d at 1142. Although the White Paper authors utilized the term ''biological importance'' in the title of the paper, they clearly stated that ''it must be decided whether the list of OBIAs should be comprehensive (based on a 'precautionary approach') or pure (based on the 'minimalist approach'),'' and explicitly declined to provide an answer. Specifically, they indicated ''it must be decided whether to be precautionary and possibly nominate areas that are of marginal importance in an attempt to minimize the chances of overlooking biologically important areas'' or ''minimize the chances of nominating sites that are of marginal biological importance and, therefore, risk overlooking biologically important areas.'' Then, the authors suggested three general recommendations for decision making based upon a precautionary approach if that is the method selected by the decision maker, as discussed further below.

However, the recommendations of the White Paper present a dichotomous ''precautionary versus non-precautionary'' choice, an interpretation that fails to consider the context of the requirements of the MMPA, the nature of the anticipated effects of the action at issue, and the other mitigation measures. More appropriately, NMFS has fully and independently considered each of the White Paper's three recommendations in the context of the MMPA's LPAI standard, as described below. In that analysis, we first note the small scale of the anticipated effects of the Navy's request for authorization (496–592 hours/year of SURTASS LFA sonar spread across two ocean basins) and the low magnitude and severity of impacts expected to any individual marine mammals (relatively short-term exposures given the spatial scale of the vessels' movement), even in the absence of mitigation, given the nature of the activities. Then we note the robust shutdown measures that utilize the highly effective visual, passive acoustic, and active acoustic detection methods that are in place for all areas and times to avoid marine mammal injury as well as minimize TTS and more severe behavioral responses, belying claims that we treat data-poor areas as though they are equivalent to zero-density areas or areas of no biological importance. Next, we discuss the coastal standoff zone, which minimizes take of many species with coastal habitat preferences. We then examine the activity restrictions in OBIAs, which further limit potentially more significant impacts in areas that are known to be biologically important to the species that are more susceptible to the SURTASS LFA sonar signal. Finally, we discuss the limited and uncertain additional protective value that the White Paper recommendations would be expected to provide for marine mammal individuals, much less species or stocks. After considering all of this information, in addition to the information provided by the Navy indicating that further restricting SURTASS LFA sonar training and testing in the areas recommended in the White Paper would be impracticable, NMFS determined that the use of the White Paper recommendations was not appropriate.

White Paper Specific Recommendations

While the White Paper authors essentially disqualified the specific extrapolative predictive results of the Kaschner model based on validating them against known data, they nevertheless recommended broader protections based on fewer environmental variables, to be used if NMFS determined that a ''precautionary approach'' was appropriate. Although the current White Paper recommendations are grounded in some sound broad ecological principles, basing mitigation on the ''precautionary approach'' considered by the White Paper authors suffers from some of the same types of weaknesses as using the Kaschner model or other ''environmental envelope'' approaches. In the 2012 SURTASS LFA sonar rule, NMFS evaluated the White Paper solely through the lens of the OBIA process, and determined that the recommendations presented were not appropriate for identification of OBIAs, which may have limited fuller consideration of the recommendation. For this rulemaking, NMFS independently examined the White Paper's specific recommendations in the context of the LPAI standard to determine whether following those recommendations is warranted to minimize the impacts from SURTASS LFA sonar training and testing activities on the affected marine mammal species or stocks. This consideration was done outside of the OBIA designation process, and is consistent with the consideration of the LPAI criteria described above when determining appropriateness of mitigation measures. The White Paper recommended the following general guidelines based on ecological principles to identify areas of biological importance for cetaceans:

(1) Designation of all continental shelf waters and waters 100 km seaward of the continental slope as biologically important habitat for marine mammals;

(2) Establishment of OBIAs within 100 km of all islands and seamounts that rise within 500 m of the surface; and

(3) Nomination of high productivity regions that are not included in the continental shelf, continental slope, seamount, and island ecosystems above as biologically important areas.

These recommendations were evaluated (see below) in the context of the proposed SURTASS LFA sonar training and testing activities and the mitigation measures proposed to be implemented to minimize impacts on the affected marine mammal species or stocks from these activities.

To reiterate, NMFS has required several mitigation measures for SURTASS LFA training and testing sonar activities that: (1) Minimize or alleviate the likelihood of injury (PTS), TTS, and more severe behavioral responses (the 2,000-yd LFA mitigation/buffer zone); (2) additionally minimize or avoid behavioral impacts in known important areas (which includes important habitat) that would have a higher potential to have negative energetic effects or deleterious effects on reproduction that could reduce the likelihood of survival or reproductive success (OBIAs); and (3) generally lessen the total number of takes of many species with coastal or shelf habitat preferences (coastal standoff). The nature and context of how LFA sonar is used in training and testing activities (small number of vessels operating in open ocean areas and typically using active sonar only sporadically) is such that impacts to any individual are expected to be limited primarily because of the short duration of exposure to any individual mammal. In addition, as explained above, an animal would need to be fairly close to the source for the entire length of a transmission (60 sec) to experience injury, and exposures occur in open water areas where animals can more readily avoid the source and find alternate habitat relatively easily. In addition, highly effective mitigation measures would be implemented that further ensure impacts are limited to lower-level responses with limited potential to significantly alter natural behavior patterns in ways that would affect the fitness of individuals and by extension the affected species or stocks.

SURTASS LFA sonar operates from 100 to 500 Hz. These frequencies are far below the best hearing sensitivity for MF and HF species. HF species have

their best hearing between around 60 and 125 kHz, which means that a sound at 500 Hz (and below) has to be at least 50 dB louder for HF species to hear it as well as a sound in their best hearing range. MF cetaceans have their best hearing between around 40 and 80 kHz, which means that at 500 Hz and below, the sound has to be 40 dB louder, or more, for this group to hear the sound as well as a sound in their best hearing range. In other words, these species have to be much closer to a sound at the frequency of SURTASS LFA sonar to hear it, which means that generally they have to be much closer to the SURTASS sonar source for it to cause PTS, TTS, or a behavioral response. Additionally, during the 1997 to 1998 SURTASS LFA Sonar LFS SRP, numerous odontocete species (*i.e.,* MF and HF hearing specialists) and pinniped species were sighted in the vicinity of the sound exposure tests and showed no immediately obvious responses or changes in sighting rates as a function of source conditions, which likely produced received levels similar to those that produced minor short-term behavioral responses in the baleen whales (*i.e.,* LF hearing specialists).

As described in the 2012 rule, NMFS believes that MF and HF odontocete hearing specialists have such reduced sensitivity to the LFA sonar source that limiting ensonification in OBIAs for those animals would not afford meaningful protection beyond that which is already incurred by implementing a shutdown when any marine mammal enters the 2,000-yd LFA sonar mitigation zone. For the same reason, our discussion of the White Paper recommendations is limited to low frequency sensitive species. We note the White Paper's recommendations for mitigation in data-poor areas similarly were solely for cetaceans.

As noted previously, in evaluating mitigation for species or stocks and their habitat, we consider the expected benefits of the mitigation measures for the species or stocks and their habitats against the practicability of implementation. This consideration includes assessing the manner in which, and the degree to which, the implementation of the measure(s) is expected to reduce impacts to marine mammal species or stocks (including through consideration of expected reduced impacts on individuals), their habitat, and their availability for subsistence uses (where relevant). This analysis will consider such things as the nature of the proposed activity's adverse impact (likelihood, scope, range); the likelihood that the measure will be effective if implemented; the likelihood of successful implementation. Practicability of implementing the measure is also assessed and may involve consideration of such things as cost, impact on operations, and, in the case of a military readiness activity, personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity (16 U.S.C. 1371(a)(5)(A)(ii)).

Taking into account the above considerations, NMFS' evaluation of the White Paper's recommendations is described below:

Continental shelf waters and waters 100 km seaward of continental slope

Consideration of potential for reduction of adverse impacts to marine mammal species and stocks and their habitat—The Navy already implements a coastal standoff zone of 22 km (14 mi; 12 nmi), which includes large parts of the continental shelf around the world, includes parts of the slope in some areas, and reduces potential takes of many marine mammal species and stocks with coastal habitat preferences. In addition, under this rulemaking, the Navy is not able to deploy and utilize SURTASS LFA sonar for training and testing within any foreign nations territorial seas, which encompasses an area up to 12 nmi (depending on the distance each nation claims). The White Paper provided little basis for the 100 km buffer seaward of the continental slope and we have found no specific literature to support such a broad buffer in all areas. Therefore, in the context of this evaluation, NMFS first considered if there was evidence of the importance of the continental slope itself, without any consideration for a buffer.

In support of understanding the additional value of expanding this standoff to 100 km beyond the continental slope margin, NMFS assessed known marine mammal density information for low frequency hearing specialists from the U.S. East (Roberts *et al.,* 2016) and West coasts and compared these densities to bathymetry, specifically looking at areas of high density compared to the continental shelf and slopes on both coasts (NOAA, 2009). This assessment and comparison focused on the U.S. East and West coasts as an example because relatively more data is available for these waters. The comparison showed that mapped areas of highest densities are not always related to the slope or shelf. For example, while fin whales in the eastern U.S. waters show relatively higher densities on the continental shelf and slope, relatively higher densities of fin whales in western U.S. waters are much farther out to sea from the continental shelf or slope (well beyond 100 km of the slope), and the same was found for sperm whales. Some mysticetes do show higher densities on the continental shelf, and some have higher densities along the continental slope, which may also vary among seasons (*e.g.,* fin whales on the east coast). Generally, density information from the Atlantic showed some enhanced densities along the slope, but only for certain species in certain seasons, and did not indicate universally high densities along the slope. There are many factors that influence the spatial and temporal distribution and abundance of cetaceans, including environmental variables such as physiochemical, climatological, and geomorphological variables operating on times scales ranging from less than a day to millennia; biotic variables, such as prey distribution, competition among other species, reproduction, and predation; and anthropogenic factors, such as historical hunting, pollution, ship activity, etc. (Davis *et al.,* 1998). Humpback whales (especially around Cape Hatteras) seem to show some higher densities around the slope, but also seaward of the slope, especially in winter. However, the slope is closer to the shore around Cape Hatteras than most places along the eastern seaboard, and while humpbacks may show higher densities along the slope in this area, the same cannot be said of humpbacks further south (*i.e.,* in Florida) where the slope is much further offshore. Right whales show higher densities closer to shore along the Atlantic coast, while sperm whales are farther out past the slope on the Atlantic coast, as they are deep divers. Density data from the Pacific coast show higher densities of blue whales on the shelf and slope, while fin whales and sperm whales are observed in waters beyond the continental slope. Gray whales show higher densities closer to shore along the Pacific coast, while humpbacks seem to be along the slope and beyond in some places. Using the continental United States densities of these lower frequency sensitive species as examples showed that densities are sometimes higher within 100 km of the slope, but are often higher elsewhere (off the slope) and many of these high density areas are highly seasonal.

As stated above, NMFS looked at these areas because relatively more data are available and, since comparisons in these areas do not consistently show strong correlation of high densities with the continental slope, it is reasonable to infer the same inconsistent relationship

for other slope/shelf areas where there are even fewer data. As discussed below, there is no scientific basis for NMFS to conclude that geographical restrictions for these data-poor areas would reduce adverse impacts to marine mammal species or stocks or their habitat. Therefore, restricting SURTASS LFA sonar training and testing activities within 100 km of the entire continental shelf and slope is of questionable value as a mitigation measure to avoid areas of higher densities of marine mammal species or stocks, and further, would restrict these activities in large areas of the open ocean that we know do not harbor high densities of marine mammals (especially when the 100-km buffer is considered).

We said in the OBIA context that although we are identifying ''known'' biologically important areas, other biologically important areas have yet to be identified, due to limited data. However, it is important to realize that much more research is conducted close to shore, in the United States and internationally, and typically areas within 100 km of the slope are less likely to be data-poor compared to other areas. In areas where there is extensive data on marine mammal density and use (*e.g.,* in the continental US EEZ), it may be inappropriate to use broader principles that could be helpful in identifying protected areas in data-poor areas. NOAA, Navy, other agencies, and many independent researchers have been conducting marine mammal research throughout the U.S. EEZ (200 mi from shore) for decades. The prevalence of research makes it less likely that important areas closer to shore have been overlooked.

NMFS acknowledges that large ocean areas such as the continental shelf and slope and seamounts may include habitat features that could provide important habitat for marine mammals at certain times—as the White Paper states, the higher primary productivity in these areas could generally be associated with higher densities of marine mammals. However, exposures to any individual animal are expected to be short term and intermittent, since a small number of ships would conduct SURTASS LFA sonar training and testing activities for up to 496 hours (years 1–4) and 592 hours (years 5–7) total for all ships combined annually. In addition, shutdown measures would avoid injury (PTS), most TTS, and severe behavioral responses, and coastal standoff zones and OBIAs would avoid disturbances more likely to lead to fitness impacts by further restricting activities in these areas of known biological importance for marine mammals. Therefore, the other mitigation measures (which are currently in effect) would already limit most take of marine mammals to less severe Level B harassment (*e.g.,* short periods of changes to swim speed or calling patterns; alterations of dive profiles, etc.). As a result, there is little to no indication that there is a risk to marine mammal species or stocks that would be avoided or lessened if waters 100 km seaward of the continental slope were subject to restrictions.

Of note, in many areas the waters of the continental shelf/slope will be afforded significant protection due to the coastal standoff mitigation measure. In addition, review of designated OBIAs reveals that the majority include continental shelf/slope areas and similar coastal waters. The Navy will also transmit no more than 25 percent of the authorized amount (transmission hours) of SURTASS LFA sonar for training and testing activities within 10 nmi (18.5 km) of any single OBIA during any year (no more than 124 hours in years 1–4 and 148 hours in years 5–7). Therefore, to the extent that some portion of the shelf/slope waters are important habitats, many are afforded protection due to the geographical restrictions already in place (coastal standoff and OBIAs), and NMFS has determined that the best available information justifies these measures under our evaluation framework set forth above.

Given the proposed mitigation measures, many of which are already in place under the NDE and have been in effect for many years under prior rules, takes of marine mammals would be limited to Level B harassment in the less severe range of behavioral reactions and some TTS, as described above. Consequently, the only additional anticipated value to restricting activities in continental shelf waters and waters 100 km seaward of continental slope would be some, though not a significant, reduction in the number of these less severe behavioral reactions in those areas. As discussed above, in general, not all behavioral responses rise to the level of a take and not all harassment takes result in fitness consequences to individuals that have the potential to translate to population consequences to the species or stock. For example, the energetic costs of short-term intermittent exposures to SURTASS LFA sonar (such as are expected here) would be unlikely to affect the reproductive success or survivorship of individuals. This means there is little to no likelihood that the impacts of the anticipated takes would accrue in a manner that would impact a species or stock even in the absence of any additional mitigation. Therefore, considered with the uncertain potential of this proposed recommendation to provide meaningful incremental reduction of risk or severity of impacts to individual marine mammals, NMFS concludes that this recommendation would not reasonably be expected to provide a reduction in the probability or degree of effects on any marine mammal species or stocks.

In addition to the mitigation measures in place for SURTASS LFA sonar that would already provide protection for continental shelf/slope waters, it is important to note that there are currently a total of four SURTASS LFA sonar ships that would be training and testing with up to a maximum of 496 transmission hours total, pooled across all vessels, per year in years one through four. While the Navy plans to add additional vessels beginning in year 5, the total transmission hours would be capped at 592 hours total, regardless of the number of vessels. It is not known, nor does the Navy indicate in its plans, whether activities of these existing or proposed new vessels would be focused in any specific area. It is likely, based on past monitoring reports, that the activities of the multiple vessels are spatially separated and not concentrated in a single area, and that they would not necessarily overlap marine mammal high-density areas for an extended period of time. However, as noted, the Navy will transmit no more than 25 percent of the authorized amount (transmission hours) of SURTASS LFA sonar for training and testing activities within 10 nmi (18.5 km) of any single OBIA during any year, which means no more than 124 hours in years 1–4 and 148 hours in years 5–7.

Consideration of practicability for restrictions in continental shelf waters and waters 100 km seaward of continental slope—NMFS and the Navy evaluated the practicability of implementation of the White Paper's recommended continental shelf, slope, and 100-km seaward restriction. The Navy has indicated, and NMFS concurs, that additional continental shelf, slope, and 100 km seaward restrictions beyond the territorial waters of foreign nations and the existing coastal standoff and OBIAs would unacceptably impact the Navy's national security mission, as large areas of the ocean would be restricted where LFA sonar transmissions are required for training and testing proficiency in order for the ships' crews to understand how the system operates in these varied bathymetry conditions under future operational scenarios.

The submarine forces of several key adversaries are rapidly growing in size, capability, and geographic reach. Due to advancements in quieting technologies in diesel-electric and nuclear submarines, undersea threats are becoming increasingly difficult to locate using traditional passive acoustic technologies. Submarines from many nations are now much more capable and able to stay submerged for a longer period of time than earlier vessels. For both conventional diesel-electric and nuclear submarines, quieting technology has increased stealth and thus operational effectiveness. These technologies include air-independent propulsion (AIP), hull coatings that minimize echoes, sound isolation mounts for machinery, and improved propeller design. What once were unique U.S. design capabilities are now being employed in new submarine projects and as upgrades to older submarines throughout potential adversaries' navies. As this technology has improved, the predominant sources of ship noise (for example propeller noise or other machinery noise) have been reduced. Passive sonar involves listening for sounds emitted by a potentially hostile submarine in order to detect, localize, and track it. As submarines become quieter through improved sound dampening technology and innovative propeller design, the usefulness of passive sonar systems has greatly diminished. These submarines have the ability to carry many different weapons systems, including torpedoes, long-range anti-ship cruise missiles, anti-helicopter missiles, anti-ship mines, and ballistic nuclear missiles. These capabilities make submarines, both nuclear and diesel-electric powered, stealthy and flexible strategic threats.

The destruction of U.S. Carrier Strike Groups (CSGs) and Expeditionary Strike Groups (ESGs) is a focal point in the naval warfare doctrine of many adversaries' navies. The main threat that a carrier strike group must defend against is the undersea threat from enemy submarines. A single diesel-electric submarine that is capable of penetrating U.S. or multinational task force defenses could cause catastrophic damage to those forces, and jeopardize the lives of thousands of sailors and Marines onboard Navy ships. Even the threat of the presence of a quiet diesel submarine could effectively deny or delay U.S. or coalition naval forces access to vital operational areas. Long-range detection of threat submarines in near-shore and open ocean environments is critical for this effort.

Adequate and effective training and testing with SURTASS LFA sonar is necessary to ensure crews can operationally detect these quieter and harder to-find foreign submarines at greater distances. The Navy has indicated that if large areas of the continental shelf or slope were restricted beyond what is in the 12nmi/22km coastal standoff, the Navy would not have the benefit of being able to train and test in these challenging environments. Coastal, shallow environments are more acoustically complex and the SURTASS LFA system was designed to penetrate these environments to find quiet assets that may use these distinctive geographic features to their advantage. Year-round access to all of these areas of challenging topography and bathymetry is necessary so that crews learn how the SURTASS LFA system will operate amidst changing oceanographic conditions, including seasonal variations that occur in sound propagation.

Because these assets are forward deployed and can rapidly switch between training and testing activities and operational missions, there is limited flexibility for these ships to maneuver any substantial distance from primary mission areas of responsibility. Therefore, avoiding continental shelf and slope waters plus a 100 km buffer for training and testing activities would constitute a significant deviation in their staging requirements for other missions. Thus, implementing this mitigation measure would be highly impracticable and would significantly adversely affect the availability of these assets to conduct their national security mission. Additionally, due to the slow speed at which these vessels transit (3 to 4 knots when towing SURTASS, 10–12 knots without) it does not allow for large scale movements on the orders of 100s of km proposed by the mitigation scheme of the White Paper to avoid a 100 km buffer around continental shelf and slope habitat.

Conclusion regarding restrictions in continental shelf waters and waters 100 km seaward of continental slope—In summary, restricting SURTASS LFA sonar use in waters 100 km seaward from the continental slope could potentially reduce individual exposures or behavioral responses for certain species and potentially provide some additional protection to individual animals in preferred habitat in some cases. However, density data indicate that certain mysticetes and sperm whales have higher densities in areas other than the continental slope and potential impacts from moving and focusing activities farther offshore would shift from more coastal species or stocks to more pelagic species or stocks, making any reduction in impacts uncertain. Further, limiting activities in these large areas of uncertain value to marine mammals when activities are comparatively low (small number of ships operating up to a maximum of 496 transmission hours total across all vessels in years 1–4 and 592 total transmission hours in years 5 and beyond pooled across all vessels, spread across several mission areas and over the course of an entire year), given the existing risks to the affected species and stocks are already so low, would provide little, if any, value for lowering the probability or severity of impacts to individual marine mammal fitness, much less species or stocks, or their habitat. Given the limited potential for additional reduction of impacts to marine mammal species beyond what the existing mitigation measures described in this rule provide, and the high degree of impracticability (significant impacts on training and testing effectiveness and the availability of these assets to support other national security missions), NMFS has determined that adopting this recommendation is not warranted under the LPAI standard.

Restrictions Within 100 km of All Islands and Seamounts That Rise to Within 500 m of the Surface

Consideration of potential reduction of adverse impacts to marine mammal species and stocks and their habitat—Currently, waters surrounding all islands are included in the coastal standoff zone. As discussed previously, this means that SURTASS LFA sonar received levels would not exceed 180 dB re: 1 μPa within 22 km (12 nmi) from the coastline. Also, SURTASS LFA sonar will not be operated within foreign territorial waters. Lastly, the Navy has agreed not to utilize SURTASS LFA sonar within the waters of Penguin Bank (to a depth of 600 ft (183 m)), and to limit ensonification of Hawaii state waters (out to 3 nmi) to 145 dB re: 1 μPa rms.

Regarding seamounts, Morato *et al.* (2010) state that seamounts were found to have higher species diversity within 30–40 km of the summit and tended to aggregate some visitor species (Morato *et al.,* 2010). However, as stated by the authors, the paper did not demonstrate that this behavior can be generalized. Further, the authors note that associations with seamounts have been described for some species of marine mammals (Morato *et al.,* 2008), mostly on an individual seamount scale.

Morato *et al.* (2008) examined seamounts for their effect on aggregating visitors and noted that seamounts may act as feeding stations for some visitors, but not all seamounts seem to be equally important for these associations. While Morato *et al.* (2008) only examined seamounts in the Azores, the authors noted that only seamounts shallower than 400 m depth showed significant aggregation effects. Their results indicated that some marine predators (common dolphin (*Delphinus delphis*) and other non-marine mammal species (such as fish and invertebrates) were significantly more abundant in the vicinity of some shallow-water seamount summits; there was no demonstrated seamount association for bottlenose dolphins (*Tursiops truncatus*), spotted dolphin (*Stenella frontalis*), or sperm whales (*Physeter macrocephalus*).

Along the northeastern U.S. continental shelf, cetaceans tend to frequent regions based on food preferences (*i.e.,* areas where preferred prey aggregate), with picscivores (fish-eating, *e.g.,* humpback, fin, and minke whales as well as bottlenose, Atlantic white-sided, and common dolphins) being most abundant over shallow banks in the western Gulf of Maine and mid-shelf east of Chesapeake Bay; planktivores (plankton-eating, *e.g.,* right, blue, and sei whales) being most abundant in the western Gulf of Maine and over the western and southern portions of Georges Bank; and teuthivores (squid eaters, *e.g.,* sperm whales) most abundant at the shelf edge (Fiedler, 2002). While there have been observations of humpback whales lingering at seamounts in the middle of the North Pacific on the way to summer feeding grounds in the Gulf of Alaska (Mate *et al.,* 2007), the purpose of these occurrences is not clear, and it may be that they are feeding, regrouping, or simply using them for navigation (Fiedler, 2002; Mate *et al.,* 2007); therefore, the role of the seamount habitat is not clear. According to Pitcher *et al.* (2007), there have been very few observations of high phytoplankton biomass (*i.e.,* high primary production, usually estimated from chlorophyll concentrations) over seamounts. Where such effects have been reported, all were from seamounts with summits shallower than 300 m, and the effects were not persistent, lasting only a few days at most. Therefore, it may be that food sources for many baleen whales are not concentrated in great enough quantities for significant enough time periods to serve as important feeding areas. While some odontocete (toothed) whales have been suggested to utilize seamount features for prey capture (Pitcher *et al.,* 2007), the authors conclude that the available evidence suggests that ''unlike many other members of seamount communities, the vast majority of marine mammal species are probably only loosely associated with particular seamounts.'' We note here that marine mammals being ''loosely associated'' with seamounts, or being observed lingering at certain seamounts, does not necessarily suggest a level of biological importance that would support geographical restrictions to avoid all seamounts, or even the specific seamounts where these loose aggregations occur. Further, as stated above, the short term, intermittent nature of the exposures to SURTASS LFA sonar would be unlikely to impact the fitness (via effects on reproduction or survival) of any individuals, especially given the existing/proposed mitigation. Therefore, considered with the uncertain potential of this proposed measure to provide meaningful additional reduction of impacts to individual marine mammals, this measure is not expected to provide a reduction in the probability or degree of effects on any marine mammal species or stocks.

Consideration of practicability for restrictions within 100 km of all islands and seamounts that rise to within 500 m of the surface—Please see the discussion of practicability for the White Paper recommendation above (protection of continental slope and a 100 km buffer), which is also applicable here. NMFS and the Navy evaluated the practicability of implementation of the White Paper's recommendation regarding island and seamounts that rise to within 500 m of the sea surface. The Navy has indicated, and NMFS concurs, that restrictions within 100 km of all islands and seamounts that rise to within 500 m of the surface beyond the existing coastal standoff and OBIAs would unacceptably impact their national security mission. Adequate and effective training and testing with SURTASS LFA is necessary to ensure crews can operationally detect quieter and harder to-find foreign submarines at greater distances. The Navy has indicated that if large areas of the continental shelf or slope were restricted beyond what is in the 12nmi/22km coastal standoff, the Navy would not have the benefit of being able to train and test in these challenging environments. Coastal, shallow environments are more acoustically complex and the SURTASS LFA system was designed to penetrate these environments to find quiet assets that may use these distinctive geographic features to their advantage. Year-round access to all of these areas of challenging topography and bathymetry is necessary so that crews learn how the SURTASS LFA system will operate amidst changing oceanographic conditions, including seasonal variations that occur in sound propagation.

As discussed previously with respect to a 100 km buffer around continental shelf and slope habitat, similar practicability concerns exist with implementing a 100 km buffer around all islands and seamounts. Because these assets are forward deployed and can rapidly switch between training and testing activities and operational missions, there is limited flexibility for these ships to maneuver any substantial distance from their primary mission areas of responsibility. Since seamounts and other areas of complex bathymetry are important training/testing features avoiding these areas would have negative impacts on training and testing preparedness and realism. Additionally, avoiding island associated and sea mount habitats by 100 km would constitute a significant deviation in the staging of these assets for other missions and would significantly impacting their potential for these vessels to conduct operational missions. Lastly, due to the slow speed at which these vessels transit (3 to 4 kt when towing SURTASS, 10–12 kt without) it does not allow for large scale movements on the orders of a 100 km proposed by the mitigation scheme of the White Paper without requiring extensive transmit time on and off station that would reduce training and testing opportunities and the ability of these assets to support other national security missions required of them.

Conclusion regarding restrictions within 100 km of all islands and seamounts that rise to within 500 m of the surface—In summary, while restricting LFA sonar training and testing in areas 100 km seaward from islands and seamounts could potentially reduce incidences of take within a limited number of species in preferred habitat in some cases (potential feeding), available data indicate that marine mammal associations within these areas are limited and the benefits would be at best limited and/or ephemeral. Also, the habitat preferences for these areas seem to be more associated with mid and high frequency species, which are less sensitive to LFA sonar, thereby further lessening concern for the potential effects of LFA sonar. Limiting SURTASS LFA sonar training

and testing activities in these large areas when activities are already comparatively low (small number of ships operating up to a maximum of 496 transmission hours total across all vessels in years 1–4 and 592 total transmission hours in years 5 and beyond pooled across all vessels, spread across several mission areas and over the course of an entire year) and the existing risks to the affected species and stocks are already so low, would provide little, if any, value for lowering the probability or severity of impacts to individual marine mammal fitness, much less species or stocks, or their habitat. Given the limited potential for additional reduction of impacts to a small number of marine mammal species and the high degree of impracticability (serious impacts on mission effectiveness), NMFS has determined that adopting this recommendation is not warranted under the LPAI standard.

High Productivity Regions That Are Not Included in the Continental Shelf, Continental Slope, Seamount, and Island Ecosystems

Consideration of potential for reduction of adverse impacts to marine mammal species and stocks and their habitat—Regions of high productivity have the potential to provide good foraging habitat for some species of marine mammals at certain times of the year and could potentially correlate with either higher densities and/or feeding behaviors through parts of their area. Productive areas of the ocean are difficult to consistently define due to interannual spatial and temporal variability. High productivity areas have ephemeral boundaries that are difficult to define and do not always persist interannually or within the same defined region. While there is not one definitive guide to the productive areas of the oceans, NMFS and the Navy examined these areas in the SURTASS LFA sonar study area. For instance, Huston and Wolverton (2009) show areas of high/highest productivity that are either (1) confined to high latitude (polar) areas that are not in the SURTASS LFA sonar Study Area, or (2) very coastally and typically seasonally associated with areas of high coastal runoff (*i.e.,* by river mouths), which are already encompassed by the coastal standoff range.

Areas of more moderate productivity are typically very large, which means that they are not concentrating high densities or feeding areas throughout their area. In fact, areas of moderate productivity scored within the mean and thus represent ''average'' habitat and would not necessarily be biologically important. These moderately productive habitats are likely to provide ample alternative opportunities for species to move into and take advantage of areas should they avoid the area around the SURTASS LFA sonar vessel. Additionally, as noted above, given the nature of SURTASS LFA sonar activities and the other mitigation for SURTASS LFA sonar, the existing risk to marine mammal species and stocks is low and is limited to less severe Level B harassment.

Consideration of practicability for restrictions for high productivity regions that are not included in the continental shelf, continental slope, seamount, and island ecosystems—NMFS and the Navy evaluated the practicability of implementation of the White Paper's recommended restrictions on high productivity areas. Please see the discussion of practicability for the first White Paper recommendation above (continental slope plus buffer), which is also applicable here. The Navy has indicated, and NMFS concurs, that, additional restrictions in high productivity regions that are not included in the continental shelf, continental slope, seamount, and island ecosystems beyond the existing coastal standoff and OBIAs would unacceptably impact its national security mission. Because of the inconsistent and ephemeral boundaries associated with most high productivity regions, it would be difficult to define geographic restrictions that would not impinge upon the long-range detection abilities of the SURTASS LFA sonar system. The mission of SURTASS LFA sonar is to detect quieter and harder-to-find foreign submarines at greater distances. The Navy must train and test in open ocean regions to track relevant targets at long distances. If large areas of the ocean were excluded from potential usage, the Navy would not have the benefit of being able to train and test at the long ranges for which SURTASS LFA sonar has been designed to function most effectively. Further, because high productivity areas are highly variable and ephemeral, implementation would not be operationally practicable for the Navy.

Conclusion regarding restrictions in high productivity regions that are not included in the continental shelf, continental slope, seamount, and island ecosystems— Restricting use of SURTASS LFA sonar training and testing seasonally in high productivity areas could potentially reduce take numbers for certain species in preferred or feeding habitat in some cases. However, as noted above, the size of the primary productivity areas is such that animals could likely easily access adjacent high productivity areas should they be temporarily diverted away from a particular area due to a SURTASS LFA sonar source. In addition, marine mammals are not concentrated through all, or even most, of these large areas for all, or even most, of the time when productivity is highest. Therefore, a broad limitation of this nature would likely unnecessarily limit LFA sonar activities while providing only some slight benefit to a limited number of individuals, which would not rise to the level of value to marine mammal species or stocks. Limiting activities in these large areas when activities are already comparatively low (small number of ships operating up to a maximum of 496 transmission hours total across all vessels in years 1–4 and 592 total transmission hours in years 5 and beyond pooled across all vessels, spread across several mission areas and over the course of an entire year), given the existing risks to the affected species and stocks are already so low, would provide little, if any, value for lowering the probability or severity of impacts to individual marine mammal fitness, much less species or stocks, or their habitat. While we note that subjecting entire ''high productivity regions'' to geographical restrictions would provide little value, we also reiterate that over half of the existing OBIAs previously identified are in areas categorized as Class I (high productivity, >300 gC/m2-yr) or Class II (moderate productivity, 150–300 gC/m2-yr) ecosystems, based on SeaWiFS global primary productivity (see response to NRDC comment 20, 77 FR 50290, 50304 (August 20, 2012)). However, we also note that high productivity/foraging was not necessarily the qualifying criteria for all of these OBIAs, and being classified as a high productivity area does not necessarily mean the area serves as a biologically important area for marine mammal foraging. Given the limited potential for additional reduction of impacts to marine mammal species and the high degree of impracticability (serious impacts on mission effectiveness), NMFS has determined that adopting this recommendation is not warranted under the LPAI standard.

Overall Conclusion Regarding Consideration of the White Paper Recommendations

NMFS has considered the White Paper recommendations and acknowledges that some of them have the potential to reduce the numbers of take for some individual marine mammals within a limited number of

species, while in other cases, adopting the White Paper's guidelines could potentially increase take of other species. NMFS also acknowledges that the White Paper's recommendations may add some small degree of protection in preferred habitat or during feeding behaviors in certain circumstances. However, the potential for impacts on reproduction or survival of any individuals, much less accrual to population level impacts, with the existing mitigation is already very low. As explained above, the minimal training and testing impacts and the anticipated, and demonstrated, success of the significant mitigation measures that the Navy is already implementing, provide a large degree of protection and limit takes to less severe Level B harassment. Therefore, the highly limited and uncertain likelihood that the White Paper recommendations will further reduce impacts on individual marine mammal fitness, much less the affected species or stocks, and their habitat does not justify adopting the recommendations, especially when considered in light of the high degree of impracticability for Navy implementation.

Least Practicable Adverse Impact—Conclusions

Based on our evaluation of the Navy's proposed mitigation measures as well as other measures considered by NMFS or recommended by the public, NMFS has determined that the mitigation measures required by this final rule provide the means of effecting the least practicable adverse impact on the affected species or stock(s) of marine mammals and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, considering personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity.

The 2,000-yd LFA sonar mitigation (shutdown) zone, based on detection of marine mammals from the highly effective three-part mitigation monitoring efforts (visual, as well as active and passive acoustic monitoring), and geographic restrictions (coastal standoff zone and OBIAs plus the 1-km buffer as well as the limitation on transmission hours near OBIAs except when additional approval is obtained from the Navy Command authority if required for national security) will enable the Navy to: (1) Avoid Level A harassment of marine mammals; (2) minimize the incidences of marine mammals exposed to SURTASS LFA sonar sound levels associated with TTS and more severe behavioral effects under Level B harassment; and (3) minimize marine mammal takes in areas and during times of important behaviors such as feeding, migrating, calving, or breeding or in areas where small resident populations reside or there is high density, further minimizing the likelihood of adverse impacts to species or stocks.

The SURTASS LFA sonar signal is not expected to cause mortality, serious injury, or PTS, due to implementation of the 2,000-yd LFA sonar mitigation zone, which will ensure that no marine mammals are exposed to an SPL greater than about 174 dB re: 1 µPa rms. As discussed above, a low-frequency cetacean would need to remain within 41 meters (135 ft) for an entire LFA sonar transmission (60 sec) to potentially experience PTS and within 413 m (1,345 ft) for an entire LFA sonar transmission (60 sec) to potentially experience TTS, which would be unlikely given typical avoidance behaviors even in the absence of mitigation. Therefore, in addition to alleviating the likelihood of PTS, the implementation of the 2,000-yd LFA sonar shutdown zone mitigation measure will minimize the number of LF cetaceans likely exposed to LFA sonar at levels associated with the onset of TTS. The best information available indicates that effects from SPLs less than 180 dB re: 1 µPa rms will be limited to short-term, Level B harassment, and animals are expected to return to behaviors shortly after exposure.

Further, the implementation of OBIA measures and the coastal standoff allows the Navy to minimize or avoid impacts in areas where behavioral disturbance and other impacts would be more likely to have negative energetic effects, or deleterious effects on reproduction, which could reduce the likelihood of survival or reproductive success (measures to avoid or lessen exposures of marine mammals within the coastal standoff zone and OBIAs); and generally lessen the total number of takes in areas of higher density for some species (coastal standoff measures and OBIAs). These measures, taken together, constitute the means of effecting the least practicable adverse impact on the affected species and stocks in the western and central North Pacific and eastern Indian Oceans in the upcoming seven-year LOA period. As described above, we evaluated the potential inclusion of additional measures (White Paper recommendations, critical habitat, etc.) before reaching this conclusion.

The 2019 SURTASS LFA FSEIS/SOEIS evaluated the potential for impacts to marine habitats (marine mammals and otherwise) from SURTASS LFA sonar training and testing activities including critical habitat, essential fish habitat, marine protected areas, and national marine sanctuaries. SURTASS LFA sonar training and testing activities involve introduction of pressure and sound in the water column but will not alter physical habitat. Marine mammal prey will not be exposed to sustained duration and intensity of sound levels that would be expected to result in significant adverse effects to marine mammal food resources. Habitat impacts were considered within the context of the addition of sound energy to the marine environment while SURTASS LFA sonar is transmitting, which represents a vanishingly small percentage of the overall annual underwater acoustic energy budget that would not affect the ambient noise environment of marine habitats (refer to Chapter 4, Sections 4.4 and 4.5 of the 2019 SURTASS LFA FSEIS/SOEIS). Therefore, with regard to habitat, NMFS has not identified any impacts to habitat from SURTASS LFA sonar that persist beyond the time and space that the impacts to marine mammals themselves and the water column could occur. Our mitigation targeted to minimize impacts to species or stocks while in particular habitats (*i.e.,* the coastal standoff and OBIAs) will protect preferred habitat during its use, and therefore is contributing to the means of effecting the LPAI on a species or stock *and* its habitat. Therefore, the mitigation measures that address areas that serve as important habitat for marine mammals in all or part of the year help effectuate the LPAI on marine mammal species and stocks and their habitat.

The Ninth Circuit's *Pritzker* decision faulted NMFS for considering the White Paper mitigation recommendations for ''data-poor areas'' against the OBIA standards NMFS had set for the 2012 rule. We do not read the opinion as holding that the MMPA compelled a change in the criteria and process for evaluating OBIAs. NMFS addressed the Court's decision by separately and independently evaluating the White Paper's recommendations for benefits to the affected species or stocks and practicability, without regard to the OBIA criteria or process (see NMFS' evaluation of the White Paper in this rule). Using the best available information, NMFS considered the recommendations in the White Paper under our interpretation of the LPAI standard and determined the measures (as well as a smaller buffer distance)

were not warranted, as described in that section.

In reaching the conclusion that NMFS' record for the 2012 rule did not establish the agency had satisfied the LPAI standard, the Court in *Pritzker* determined that NMFS failed to consider an important aspect of the problem, ''namely the underprotection that accompanies making conclusive data an indispensable component of OBIA designation,'' and that this ''systematic underprotection of marine mammals'' cannot be consistent with the requirement that mitigation measures result in the ''least practicable adverse impact'' on marine mammals.'' *Id.* at 1140. While we have corrected the identified deficiency by evaluating the White Paper measures independent of the OBIA process, we disagree with the suggestion that our mitigation is systematically underprotective.

We first emphasize that NMFS' OBIA informational standards (and other mitigation measures), while data-driven, do not require scientific certainty or conclusive data. This is illustrated by the fact that the OBIA screening criteria allow for consideration of a variety of information sources, including historic whaling data, stranding data, sightings information, and regional expertise, to name a few examples of the ''data'' considered—and, in fact, the only areas that were not considered were those considered to have entirely inconclusive data. As detailed further in Appendix D of the 2012 SURTASS LFA SEIS/SOEIS, supporting documents that are considered include peer-reviewed articles; scientific committee reports; cruise reports and transects; personal communications and unpublished reports; dissertations and theses; books, government reports, and non-governmental organization reports; and notes, abstracts, and conference proceedings. The process set up for the 2012 rule carried forward areas for consideration if they had sufficient scientific support for the relevant criterion based on a ranking of 2 or higher on a scale developed for that purpose, with zero being the lowest and four the highest. Even areas that were ranked ''2'' (''*Supporting information derived from habitat suitability models (non-peer reviewed), expert opinion, regional expertise, or gray (non-peer reviewed) literature, but requires more justification*'') were deemed ''eligible'' for further consideration (77 FR 50290, 50299 (August 20, 2012)).

In fact, NMFS has previously designated OBIAs for areas based on these types of information sources. For example, the Olympic Coast OBIA (OBIA 21) had a ranking of 2 for foraging by humpback whales as documented in one peer-reviewed report (p.D–319, DoN 2012). Based on the results of that study, the Olympic Coast OBIA was reviewed and designated. Other examples include the Southwest Australia Canyons OBIA, which considers past whaling data but also more recent sighting and stranding information; and the boundary for the Eastern Gulf of Mexico OBIA, which was drawn to ''conservatively encompass'' waters where Bryde's whales may occur based on sightings information (as opposed to scientific validation of their occurrence). In addition, even though most available data are only available for inshore waters (within the coastal standoff zone), NMFS is designating OBIAs for the Ogasawara Island region as part of this rulemaking due to the importance of the nearshore area for humpback whales and sperm whales.

Thus, NMFS does not insist on an ''unattainable'' evidentiary standard of ''conclusive data'' [7] for imposing conservation and management measures for SURTASS LFA sonar, including OBIAs. As another example, the coastal standoff zone uniformly applies not only in areas with supporting data about marine mammals (80 percent of the areas initially identified for OBIA consideration were within the 12 nmi/22 km coastal standoff) but also in areas that could be fairly characterized as ''data poor.''

Finally, because the LPAI standard authorizes NMFS to weigh a variety of factors when evaluating appropriate mitigation measures, it does not compel mitigation for every kind of individual take, even when practicable for implementation by the applicant. Thus, we do not evaluate measures strictly on the basis of whether they will reduce *taking.* The focus is on the relevant contextual factors that more meaningfully assess a measure's value in contributing to the standard of minimizing *impacts to the affected species or stock and its habitat.* It is also relevant to consider a measure in the context of the nature and extent of the expected impacts of the specified activity and the value of other mitigation that will be implemented.

NMFS has evaluated the likely effects of SURTASS LFA sonar training and testing activities and has required measures to minimize the impacts to the affected species or stocks and their habitat to achieve the LPAI. Consistent with our interpretation of LPAI, the LFA shutdown and coastal exclusion zone are practicable for the Navy and effective in minimizing impacts on marine mammals from activities that are likely to increase the probability or severity of population level effects—*wherever* marine mammals occur, even in areas where data are limited. Therefore, as we have said, NMFS' mitigation requirements are not based on the premise that the ''no data'' scenario is equivalent to ''zero population density'' or ''no biological importance.'' [8] The LFA shutdown zone will avoid or minimize auditory impacts and more severe forms of Level B harassment, *wherever* marine mammals occur. The coastal exclusion zone will reduce adverse impacts, specifically higher numbers of take or take in areas of preferred habitat for coastal species that are present in higher numbers, or through lessening the severity of impacts by minimizing take of individuals in shelf or slope areas encompassed by the standoff, when that habitat is preferred by some species (again, when NMFS assessed areas that met the OBIA biological criteria for the 2012 rule, 80 percent of the areas fell within the 12 nmi coastal exclusion zone, but the protection applies *anywhere* in the coastal exclusion zone, even in parts that are ''data poor''). In addition, NMFS designated OBIAs, where supporting information sufficiently (and not necessarily *conclusively*) demonstrated the areas met the established criteria and they were determined to be practicable, which are expected to reduce the likelihood of impacts that would adversely affect reproduction or survival.

We have assessed all recommendations and the best available science and are aware of no other practicable measures that would further reduce the probability of impacts to species or stocks and their habitats. In other words, the measures that NMFS includes in this rule will effect the least practicable adverse impact on the affected species or stocks and their habitats. As discussed in the *Adaptive Management* section, NMFS will systematically consider new information and re-evaluate as necessary if applicable new information becomes available.

Monitoring

Section 101(a)(5)(A) of the MMPA states that in order to issue an ITA for an activity, NMFS must set forth ''requirements pertaining to the monitoring and reporting of such taking.'' The MMPA implementing

[7] *NRDC* v. *Pritzker,* 828 F.3d 1125, 1140 (9th Cir. 2016).

[8] White Paper at p. 1.

regulations at 50 CFR 216.104(a)(13) indicate that requests for LOAs must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species, the level of taking, or impacts on populations of marine mammals that are expected to be present.

Monitoring measures prescribed by NMFS should accomplish one or more of the following general goals:

- An increase in our understanding of how many marine mammals are likely to be exposed to levels of LFA sonar that we associate with specific adverse effects, such as disruption of behavioral patterns, TTS, or PTS;
- An increase in our understanding of how individual marine mammals respond (behaviorally or physiologically) to LFA sonar (at specific received levels or other stimuli expected to result in take);
- An increase in our understanding of how anticipated takes of individuals (in different ways and to varying degrees) may impact the population, species, or stock (specifically through effects on annual rates of recruitment or survival);
- An increase in knowledge of the affected species;
- An increase in our understanding of the effectiveness of certain mitigation and monitoring measures;
- A better understanding and record of the manner in which the authorized entity complies with the incidental take authorization; and
- An increase in the probability of detecting marine mammals, both within the mitigation zone (thus allowing for more effective implementation of the mitigation) and in general to better achieve the above goals.

In addition to the real-time monitoring associated with mitigation, the Navy is engaging in exploring other monitoring efforts described here:

Marine Mammal Monitoring (M3) Program

Beginning in 1993, the Marine Mammal Monitoring (M3) Program was designed to assess the feasibility of detecting and tracking marine mammals. The M3 program uses the Navy's fixed and mobile passive acoustic monitoring systems to monitor the movements of some large cetaceans (principally baleen whales), including their migration and feeding patterns, by tracking them through their vocalizations. This Program has evolved into a valuable tool by which the acoustic activity levels of vocalizing whales can be quantitatively documented and trends of oceanic ocean noise levels measured over ecologically meaningful ocean scales and time periods under varying noise conditions.

As part of the research and monitoring component of the SURTASS LFA sonar program, M3 data are collected to:

- Document occurrence, distribution, and behaviors of acoustically active whale species over ocean basin and decadal scales;
- Assess changes in marine mammal activity levels under normal conditions (*e.g.,* weather, wind, time of year, or time of day) relative to acoustic conditions with varying levels of anthropogenic noise (*e.g.,* seismic activities, naval sonar, shipping, or fishing activities);
- Inform environmental assessments of current and future anti-submarine warfare systems; and
- Assemble a long-term database of ocean ambient noise data to enable scientifically-based evaluations of potential influences on cetaceans or other species.

Acoustic data collected and archived by the M3 program allow program analysts to statistically quantify how cetacean acoustic behaviors are affected by various factors, such as ocean basin topographic features, hydrographic conditions, seasonality, time, weather conditions, and ambient noise conditions. The compiled acoustic data can be used to estimate the total number of vocalizing whales per unit area as well as document the seasonal or localized movements of individual animals. In addition, observations over time can also show the interaction and influence of noise sources on large whale behavior.

At present, the M3 Program's data are classified, as are the data reports created by M3 Program analysts, due to the inclusion of sensitive national security information. The Navy continues to assess and analyze M3 Program data collected from Navy passive acoustic monitoring systems and is working toward making some portion of that data (after appropriate security reviews) available to scientists with appropriate clearances and ultimately to the public. Additionally, data summaries are shared with NMFS analysts with appropriate clearances. There has been some progress on addressing security concerns and declassifying a report of fin whale singing and swimming behaviors (DoN, 2015; Clark *et al.,* 2019). In addition, the Navy has shared information on detections of western gray whale vocalizations with the IUCN on possible wintering areas for this species.

Additional Ranked Monitoring Projects Under Consideration

Due to research indicating that beaked whales and harbor porpoises may be particularly sensitive to a range of underwater sound (Southall *et al.,* 2007; Tyack *et al.,* 2011; Kastelein *et al.,* 2012), in the 2012 rule and LOAs for these activities, NMFS included conditions for increasing understanding of the potential effects of SURTASS LFA sonar on these taxa. The Navy convened an independent Scientific Advisory Group (SAG), composed of six scientists affiliated with two universities, one Federal agency (NMFS), and three private research and consultancy firms, to investigate and assess different types of research and monitoring methods that could increase the understanding of the potential effects to beaked whales and harbor porpoises from exposure to SURTASS LFA sonar transmissions. The SAG submitted a report (''Potential Effects of SURTASS LFA sonar on Beaked Whales and Harbor Porpoises'') describing their monitoring and research recommendations. This report was submitted to the Executive Oversight Group (EOG) for SURTASS LFA sonar, which is comprised of representatives from the U.S. Navy (Chair, OPNAV N2/N6F24), Office of the Deputy Assistant Secretary of the Navy for the Environment, Office of Naval Research, Navy Living Marine Resources Program, and the NMFS Office of Protected Resources (OPR) Permits and Conservation Division. The EOG met twice in 2014 to review and further discuss the research recommendations put forth by the SAG, the feasibility of implementing any of the research efforts, and existing budgetary constraints. Representatives from the Marine Mammal Commission also attended EOG meetings as observers. In addition to the SAG recommendations, promising suggestions for monitoring and research were recommended for consideration by the EOG. The EOG considered which efforts would be most effective, given existing budgetary constraints, and the Navy has submitted the outcome of this study to NMFS.

In summary, after consideration of the SAG recommendations and the inputs provided by the EOG, the research monitoring studies were ranked as follows. In addition to the topic, the approximate cost of the research effort is also listed. Those study topics which the Navy has invested in since the EOG recommendations are also indicated below.

The category of research recommendations that were ranked

highest included those estimated to cost less than $100,000.

1. Desktop study of potential overlap of harbor porpoise habitat by SURTASS LFA sonar transmissions. The Navy funded this study and the report has been submitted to NMFS. In summary the report finds that, while harbor porpoises could potentially be exposed to SURTASS LFA sonar transmissions, exposure is likely to occur at reduced sound levels with limited potential for behavioral responses. The full report is available at *http://www.surtass-lfa-eis.com*.

2. Review of existing high frequency acoustic recording package (HARP) data to determine spatiotemporal overlap with SURTASS LFA missions. NMFS consulted with scientists at NOAA's Pacific Islands Fisheries Science Center about deployments in the western and central North Pacific and Scripps Institution of Oceanography about deployments in the eastern North Pacific. Since the EOG, Baumann-Pickering *et al.* (2014) presented the results of over eleven cumulative years of HARP deployments in the North Pacific, which may overlap with SURTASS LFA missions. It would be fairly straightforward and require minimal cost to determine the spatiotemporal overlap of HARP deployments and LFA missions. If it was determined that overlap existed, the cost for data analysis would depend on the amount of overlap.

The second-highest ranked group of recommendations consisted of studies that are estimated to cost in the $100,000–$500,000 range, but for which methodologies exist and implementation would extend existing studies.

1. Targeted deployment of one HARP sensor in the western North Pacific for one year; approximate estimated cost of $250,000. The objective of this study would be to document beaked whale vocal behavior before, during, and after LFA sonar transmissions. Careful consideration of lessons learned from previous deployments would be needed to increase the probability of a successful project (*i.e.,* Baumann-Pickering *et al.,* 2014 and as described in the reports of previous studies using HARPs located at *https://www.navymarinespeciesmonitoring.us/*).

2. Anatomical modeling of LF sound reception by beaked whales; approximate estimated cost of $150,000–$200,000. Since the EOG meetings in 2014, Cranford and Krysl (2015) presented a synthetic audiogram for a fin whale, predicted based predominantly on bone conduction of sound through the head to the ear. NMFS (2016) noted that the predicted audiogram does not match the typical U-shaped audiogram expected with normal hearing in mammals in that there is a ''hump'' at low frequencies and shallow roll-off of sensitivity at high frequencies. Given these difficulties, additional funding would be required to determine the source of the abnormal results. The Navy is continuing to invest in LF cetacean audiogram development and recently released a Broad Agency Announcement in coordination with the Subcommittee on Ocean Science and Technology—Ocean Noise and Marine Life Task force to make further investment in this area.

The final group of recommendations are studies that require additional methodological developments and/or would cost greater than $500,000.

1. Controlled exposure estimates (CEE) for beaked whales with an appropriate LF source. There are many complexities associated with this recommendation, even more so considering the results of the ongoing mid-frequency sonar behavioral response studies (BRS) demonstrating the importance of real-world exposures for characterizing behavioral responses. It is possible that existing LF sources already in use on Navy ranges could be surrogates for SURTASS LFA sonar, but such extrapolations would need to be considered carefully. SURTASS LFA sonar is currently authorized for use in the western and central North Pacific and Indian oceans, regions in which controlled exposure experiments (CEEs) have not been conducted, making experiments with the LFA sonar system itself particularly difficult. Given the cost and complexities associated with this recommendation, it was ranked as a lower priority. This recommendation should also be revisited with future development of tagging technologies for harbor porpoises.

2. LF behavioral audiograms for harbor porpoise or LF auditory brainstem response/auditory evoked potential (ABR/AEP) audiograms for beaked whales. Since the EOG concluded, the Navy funded a study led by Dr. James Finneran (*http://greenfleet.dodlive.mil/files/2017/05/LMRFactSheet_Project9.pdf*) to correlate AEP measurements of hearing sensitivity with perceived loudness (Muslow *et al.,* 2015). Part of this study included attempts to extend the LF range of AEP measurements, which may be transferable to studies of hearing sensitivity of harbor porpoise or beaked whales. There are difficulties with the transmission of LF sounds, in achieving the required power with manageable laboratory systems and creating a far-field sound field consistent across the measurement experiment. The final results of the study have not been published yet, but the study found that AEPs were only successful down to frequencies of 10 kHz for bottlenose dolphins (where 10 kHz is the upper range of what is considered mid-frequency) and 1 kHz for California sea lions (the upper range of what is considered low-frequency). In addition, the correlation of equal latency contours only applied over a limited frequency range, providing limited benefit beyond the frequency range of auditory thresholds. Therefore, it is currently not feasible to conduct ABR/AEPs at frequencies within the range of SURTASS LFA sonar (100 to 500 Hz). Finally, the Navy funded audiograms and TTS studies for harbor porpoise across its entire frequency range (Kastelein *et al.,* 2017). This study reported the hearing sensitivity of a six-year-old female and a three-year-old male harbor porpoise as measured by using a standard psycho-acoustic technique under low ambient noise conditions. The porpoises' hearing thresholds for 13 narrow-band sweeps with center frequencies between 0.125 and 150 kHz were established. The range of most sensitive hearing (defined as within 10 dB of maximum sensitivity) was from 16 to 140 kHz. Sensitivity declined sharply above 125 kHz. Hearing sensitivity in the low frequencies 125 Hz to 1 kHz were 40–80 dB above their maximum sensitivity.

The Navy has obtained a permit from the NMFS marine mammal health and stranding program to conduct an AEP audiogram on a stranded beaked whale, but to date none have stranded alive in an area with staff suitable to conduct the testing. The Navy will continue to seek opportunities to conduct such research should they arise.

The ranking of research and monitoring recommendations has helped inform Navy and NMFS decision makers of the scientific priority, feasibility, and cost of possible experiments to increase understanding of potential effects of SURTASS LFA sonar on harbor porpoises and beaked whales. Discussions among Navy decision makers from OPNAV N2/N974B/N45, Office of the Deputy Assistant Secretary of the Navy for the Environment, Office of Naval Research, and Navy Living Marine Resources Program will continue to leverage research among various programs. Ongoing discussions between Navy and NMFS will continue to evaluate the most efficient and cost-effective way forward for Navy research and environmental compliance monitoring

efforts once the amount of funding authorized is known.

Ambient Noise Data Monitoring

Several efforts (Federal and academic) are underway to develop a comprehensive ocean noise budget (*i.e.,* an accounting of the relative contributions of various underwater sources to the ocean noise field) for the world's oceans that includes both anthropogenic and natural sources of noise. Ocean noise distribution and noise budgets are used in marine mammal masking studies, habitat characterization, and marine animal impact analyses.

The Navy will collect ambient noise data when the SURTASS passive towed horizontal line array is deployed. However, because the collected ambient noise data may also contain sensitive acoustic information, the Navy classifies the data, and thus does not make these data publicly available. The Navy is exploring the feasibility of declassifying and archiving portions of the ambient noise data for incorporation into appropriate ocean noise budget efforts after all related security concerns have been resolved.

The Navy will evaluate the feasibility and appropriate methods to collect new data to supplement the data available on behavioral responses of marine mammals to SURTASS LFA sonar using newer methods and technologies. These types of scientific inquiries fit within the scope the Navy's Living Marine Resources (LMR) program. The LMR program weighs the various Navy research needs against each other through a needs and solicitation process. The Navy has submitted a needs statement to the LMR advisory committee to research future data collection that would supplement understanding of how SURTASS LFA sonar may affect marine resources, including mysticetes and beaked whales. The LMR program assesses Navy data needs through an iterative process in which each submitted need is evaluated and ranked by an advisory committee. Prior to implementing any potential behavioral response study, the feasibility must be evaluated and a research plan must be developed. The LMR process is the primary mechanism which the Navy uses to solicit expert assistance for marine resource investigations.

Research

The Navy sponsors significant research for marine living resources to study the potential effects of its activities on marine mammals. OPNAV N974B provides a representative to the Navy's Living Marine Resources advisory board to provide input to future research projects that may address SURTASS LFA sonar needs. The most recently available data are for Fiscal Year 2015, in which the Navy reported that it spent $35.9 million that year on marine mammal research and conservation (Marine Mammal Commission, 2017). This ongoing marine mammal research relates to hearing and hearing sensitivity, auditory effects, marine mammal monitoring and detection, noise impacts, behavioral responses, diving physiology and physiological stress, and distribution. The Navy sponsors a significant portion of U.S. research on the effects of human-generated underwater sound on marine mammals and approximately 50 percent of such research conducted worldwide. These research projects may not be specifically related to SURTASS LFA sonar activities; however, they are crucial to the overall knowledge base on marine mammals and the potential effects from underwater anthropogenic noise. The Navy also sponsors research to determine marine mammal abundances and densities for all Navy ranges and other operational areas. The Navy notes that research and evaluation is being carried out on various monitoring and mitigation methods, including passive acoustic monitoring, and the results from this research could be applicable to SURTASS LFA sonar passive acoustic monitoring. The Navy has also sponsored several workshops to evaluate the current state of knowledge and potential for future acoustic monitoring of marine mammals. The workshops bring together underwater acoustic subject matter experts and marine biologists from the Navy and other research organizations to present data and information on current acoustic monitoring research efforts, and to evaluate the potential for incorporating similar technology and methods on Navy instrumented ranges.

Reporting

In order to issue an ITA 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.'' Effective reporting is critical both to compliance and to ensuring that the most value is obtained from the required monitoring. There are several different reporting requirements in these regulations:

Notification of the Discovery of a Stranded Marine Mammal [9]

The Navy will systematically observe during SURTASS LFA sonar activities for injured or disabled marine mammals. In addition, the Navy will monitor the principal marine mammal stranding networks and other media to correlate analysis of any whale mass strandings that could potentially be associated with SURTASS LFA sonar activities.

Minimization of Harm to Live-Stranded (or Milling) Marine Mammals

In the event of a live stranding (or near-shore atypical milling) event, NMFS will advise the Navy of the need to implement shutdown procedures for any use of SURTASS LFA sonar within 50 km (27 nmi) of the stranding. Following this initial shutdown, NMFS will communicate with the Navy to determine if circumstances support any modification of the shutdown zone. The Navy may decline to implement all or part of the shutdown if the holder of the LOA, or his/her designee, determines that it is necessary for national security. Shutdown procedures for live stranding or milling marine mammals include the following:

- If at any time, the marine mammal(s) die or are euthanized, or if herding/intervention efforts that were occurring are stopped, NMFS (individuals specifically identified in the Stranding Communication Protocol) will immediately advise the Navy that the shutdown around that animal(s)' location is no longer needed;
- Otherwise, shutdown procedures will remain in effect until NMFS (individuals specifically identified in the Stranding Communication Protocol) determines and advises the Navy that all live animals involved have left the area (either of their own volition or following an intervention); and
- If further observations of the marine mammals indicate the potential for re-stranding, additional coordination with the Navy may be required to determine what measures are necessary to minimize that likelihood (*e.g.,*

[9] As defined in section 410 of the MMPA (16 U.S.C. 1421h), ''stranding'' means ''*an event in the wild in which (A) a marine mammal is dead and is (i) on a beach or shore of the United States, or (ii) in waters under the jurisdiction of the United States (including any navigable waters); or (B) a marine mammal is alive and is (i) on a beach or shore of the United States and unable to return to the water; (ii) on a beach or shore of the United States and, although able to return to the water, is in need of apparent medical attention; or (iii) in the waters under the jurisdiction of the United States (including any navigable waters), but is unable to return to its natural habitat under its own power or without assistance.*''

extending the shutdown or moving operations farther away) and to implement those measures as appropriate.

Shutdown procedures are not related to the investigation of the cause of the stranding and their implementation is not intended to imply that Navy activity is the cause of the stranding. Rather, shutdown procedures are intended to protect marine mammals exhibiting indicators of distress by minimizing their exposure to possible additional stressors, regardless of the factors that contributed to the stranding.

Navy Discovery of Any Stranded Marine Mammal

In the event that Navy personnel (uniformed military, civilian, or contractors conducting Navy work) associated with operating a T–AGOS class vessel discover a live or dead stranded marine mammal at sea, the Navy shall report the incident to NMFS (see communication protocols below) as soon as is feasible. The Navy will provide NMFS with:

- Time, date, and location (latitude/longitude) of the first discovery (and updated location information if known and applicable);
- Species identification (if known) or description of the marine mammal(s) involved;
- Condition of the marine mammal(s) (including carcass condition if the marine mammal is dead);
- Observed behaviors of the marine mammal(s), if alive;
- If available, photographs or video footage of the marine mammal(s); and
- General circumstances under which the marine mammal was discovered (*e.g.,* vessel transit).

Vessel Strike

In the event of a ship strike of a marine mammal by any T–AGOS class vessel, the Navy shall immediately report, or as soon as security clearance procedures and safety conditions allow, the information above in *Discovery of Any Stranded Marine Mammal* subsection, to NMFS. As soon as feasible, but no later than seven (7) business days, the Navy shall additionally report to NMFS, the:

- Vessel's speed during and leading up to the incident;
- Vessel's course/heading and what training or testing activity was being conducted (if applicable);
- Status of all sound sources in use (*e.g.,* active sonar);
- 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 marine mammal strike;
- Environmental conditions (*e.g.,* wind speed and direction, Beaufort sea state, cloud cover, visibility) immediately preceding the marine mammal strike;
- Estimated size and length of marine mammal that was struck;
- Description of the behavior of the marine mammal immediately preceding and following the strike;
- If available, description of the presence and behavior of any other marine mammals immediately preceding the strike;
- Estimated fate of the marine mammal (*e.g.,* dead, injured but alive, injured and moving, blood or tissue observed in the water, status unknown, disappeared, etc.);
- To the extent practicable, photographs or video footage of the struck marine mammal(s); and
- Any relevant information discovered during Navy's investigation of the ship strike.

Annual Report

The classified and unclassified annual reports, which are due annually no later than 90 days after the anniversary of the effective date of the seven-year LOA, will provide NMFS with a summary of the prior year's training and testing transmission hours. Specifically, the classified reports will include dates/times of exercises, location of vessel, mission operational area, marine mammal observations, and records of any delays or suspensions of activities. Marine mammal observations will include animal type and/or species, number of animals sighted by species, date and time of observations, type of detection (visual, passive acoustic, HF/M3 sonar), the animal's bearing and range from vessel, behavior, and remarks/narrative (as necessary). The classified reports will also include the Navy's analysis of take by Level B harassment and estimates of the percentage of marine mammal stocks affected for the year by SURTASS LFA sonar training and testing activities. The Navy's estimates of the percentage of marine mammal stocks and number of individual marine mammals affected by exposure to SURTASS LFA sonar transmissions will be derived using acoustic impact modeling based on operating locations, season of missions, system characteristics, oceanographic environmental conditions, and marine mammal demographics.

Additionally, the annual report will include: (1) Analysis of the effectiveness of the mitigation measures with recommendations for improvements where applicable; (2) assessment of any long-term effects from SURTASS LFA sonar activities; and (3) any discernible or estimated cumulative impacts from SURTASS LFA sonar training and testing activities.

Comprehensive Report

The Navy will provide to NMFS and the public a final comprehensive report analyzing the impacts of SURTASS LFA sonar training and testing activities on marine mammal species and stocks. This report will include an in-depth analysis of all monitoring and Navy-funded research pertinent to SURTASS LFA sonar activities conducted during the seven-year period of this rule, a scientific assessment of cumulative impacts on marine mammal stocks, and an analysis on the advancement of alternative (passive) technologies as a replacement for LFA sonar. This report will be a key document for NMFS' review and assessment of impacts for any future rulemaking.

The Navy will respond to NMFS' comments and requests for additional information or clarification on the annual or comprehensive reports. These reports will be considered final after the Navy has adequately addressed NMFS' comments or provided the requested information, or three months after the submittal of the draft if NMFS does not comment within the three-month time period. NMFS will post the annual and comprehensive reports online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-military-readiness-activities.*

Adaptive Management

Our understanding about marine mammals and the potential effects of SURTASS LFA sonar on marine mammals is continually evolving. Reflecting this, this final rule again includes an adaptive management framework. This allows the agencies to consider new/revised peer-reviewed and published scientific data and/or other information from qualified and recognized sources within academia, industry, and government/non-government organizations to determine (with input regarding practicability) whether SURTASS LFA sonar mitigation, monitoring, or reporting measures should be modified (including additions or deletions), and to make such modification if new scientific data indicate that they would be appropriate. Under this final rule, substantial modifications will be made only after a 30-day period of public review and comment. Substantial modifications include a change in training and testing areas, or significant changes to mitigation.

As discussed in the *Mitigation* section above, NMFS and Navy have refined the adaptive management process for this rule compared to previous rulemakings. In the 2012 rule, NMFS and the Navy annually considered how new information, from anywhere in the world, should be considered in an adaptive management context—including whether this new information would support the identification of new OBIAs or other mitigation measures. Moving forward, new information will still be considered annually, but only for the purposes of OBIA identification in the context of the areas covered by this rule (*i.e.,* the Study Area in the western and central North Pacific and eastern Indian Oceans in which SURTASS LFA assets will train and test).

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 the numbers of marine mammals that might be taken through mortality, serious injury, and Level A harassment or Level B harassment (although only Level B harassment is considered for authorization under this final rule), NMFS considers other factors, such as the likely nature of any responses (*e.g.,* intensity and duration), the context of any response (*e.g.,* critical reproductive time or location, migration, etc.), as well as effects on habitat, the status of the affected stocks, and the likely effectiveness of the 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' implementing regulations (54 FR 40338; September 29, 1989), the impacts from other past and ongoing anthropogenic activities are incorporated into these analyses 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, or ambient noise levels).

To avoid repetition, the discussion of our analyses applies to all the stocks listed in Table 17 (including those for which density and take estimates have been pooled), because the anticipated effects of the specified activities on these different marine mammal stocks are expected to be similar, given the operational parameters of the activities. While there are differences in the hearing sensitivity of different groups, these differences have been factored into the analysis for auditory impairment. However, the nature of their behavioral responses is expected to be similar for SURTASS LFA sonar, especially given the context of their short duration and open ocean exposures. Additionally, with the operational avoidance of areas (and additional transmission hour limitations year, no more than 124 hours in years 1–4 and 148 hours in years 5–7) that are designated for specific biologically important reasons and coastal standoff zones, and the anticipated low-level effects, there is no need to differentially evaluate species or stocks based on varying status. Where there is a notable difference in the proportion of authorized takes (as compared to abundance) for two species, we explicitly address it below.

The Navy has described its specified activities based on best estimates of the number of hours that the Navy will conduct SURTASS LFA sonar training and testing activities. The exact number of transmission hours may vary from year to year, but will not exceed the annual total of 496 transmission hours for all vessels in years 1–4 (currently four vessels), or the annual total of 592 transmission hours for all vessels in years 5–7 regardless of the number of vessels in use (previous SURTASS LFA sonar rulemakings evaluated and authorized 432 transmission hours per vessel per year).

As mentioned previously, NMFS estimates that 46 species of marine mammals representing 139 stocks could be taken by Level B harassment over the course of the seven-year period. For reasons stated previously, no mortalities or injuries are anticipated to occur as a result of the Navy's proposed SURTASS LFA sonar training and testing activities, and none are authorized by NMFS. The Navy has operated SURTASS LFA sonar under NMFS regulations for the last 17 years without any reports of serious injury or death. The evidence to date, including recent scientific reports, annual monitoring reports, and 17 years of Navy experience conducting SURTASS LFA sonar activities, further supports the conclusion that the potential for injury, and particularly serious injury, to occur is minimal.

Regarding the potential for mortality, as described previously, neither acoustic impacts resulting in stranding nor ship strikes are expected to result from SURTASS LFA sonar training and testing activities. There is no empirical evidence of strandings or ship strikes of marine mammals associated spatially or temporally with the employment of SURTASS LFA sonar. Moreover, the sonar system acoustic characteristics differ between LFA sonar and MF sonars that have been associated with strandings: LFA sonars use frequencies from 100 to 500 Hz, with relatively long signals (pulses, with average length of 60 sec), while MF sonars use frequencies greater than 1,000 Hz, with relatively short signals on the order of 1 sec. NMFS also makes a distinction between the common features shared by the stranding events associated with MF sonar in Greece (1996), Bahamas (2000), Madeira (2000), Canary Islands (2002), Hanalei Bay (2004), and Spain (2006), referenced in the *Potential Effects of Specified Activities on Marine Mammals and Their Habitat* section of the proposed rule (84 FR 7186; March 1, 2019). These included operation of MF sonar, deep water close to land (such as offshore canyons), presence of an acoustic waveguide (surface duct conditions), and periodic sequences of transient pulses (*i.e.,* rapid onset and decay times) generated at depths less than 32.8 ft (10 m) by sound sources moving at speeds of 2.6 m/s (5.1 knots) or more during sonar operations (D'Spain *et al.,* 2006). None of these factors are present in SURTASS LFA sonar training and testing activities. Regarding the potential for ship strike, given the small number of vessels, low densities of marine mammals in the area of operation, mitigation, and slow ship speeds, the potential of strike is so low as to be discountable.

NMFS neither anticipates nor authorizes Level A harassment of marine mammals as a result of specified activities. The mitigation measures (including visual monitoring along with active and passive acoustic monitoring, which together have been shown to be over 98 percent effective at detecting marine mammals, approaching 100 percent for multiple HF/M3 pings of any sized marine mammal), and implementing a shutdown zone of 2,000 yds around the LFA sonar array and vessel) would allow the Navy to avoid exposing marine mammals to received levels of SURTASS LFA sonar or HF/M3 sonar sound that would result in injury (Level A harassment). Additionally, as discussed in the *Estimated Take of*

Marine Mammals section, TTS and more severe behavioral reactions will also be minimized due to mitigation measures, so that the majority of takes will be expected to be in the form of less severe Level B harassment.

As noted above, the context of exposures is important in evaluating the ultimate impacts of Level B harassment on individuals. In the case of SURTASS LFA sonar, the approaching sound source would be moving through the open ocean at low speeds, so concerns of noise exposure are somewhat lower in this context compared to situations where animals may not be as able to avoid strong or rapidly approaching sound sources. In addition, the duration of the take is important; in the case of SURTASS LFA sonar, the vessel continues to move and any interruption of behavior would be of relatively short duration. Further, NMFS and the Navy have imposed geographic restrictions that minimize behavioral disruption in times and areas where impacts would be more likely to lead to effects on individual fitness that could impact the species or stock.

For SURTASS LFA sonar training and testing activities, the Navy provided information (Table 7–1 of the Navy's application) estimating incidental take numbers and percentages of marine mammal stocks that could potentially occur due to SURTASS LFA sonar training and testing activities based on the 15 model areas in the central and western North Pacific and eastern Indian Oceans. Based on our evaluation, incidental take from the specified activities associated with SURTASS LFA sonar training and testing activities will most likely fall within the realm of short-term and temporary, or ephemeral, disruption of behavioral patterns (Level B harassment), will not include Level A harassment, and is not expected to impact reproduction or survival of individuals. NMFS bases this assessment on a number of factors (discussed in more detail in previous sections) considered together:

(1) Geographic Restrictions—The coastal standoff and OBIA geographic restrictions on SURTASS LFA sonar training and testing activities are expected to minimize the likelihood of disruption of marine mammals in areas where important behavior patterns such as migration, calving, breeding, feeding, or sheltering occur, or in areas with small resident populations or higher densities of marine mammals. As a result, the takes that occur are less likely to result in energetic effects or disturbances of other important behaviors that would reduce reproductive success or survivorship.

(2) Low Frequency Sonar Scientific Research Program (LFS SRP)—The Navy designed the three-phase LFS SRP study to assess the potential impacts of SURTASS LFA sonar on the behavior of low-frequency hearing specialists, those species believed to be at (potentially) greatest risk due to the presumed overlap in hearing of these species and the frequencies at which SURTASS LFA sonar is operated. This field research addressed three important behavioral contexts for baleen whales: (1) Blue and fin whales feeding in the southern California Bight, (2) gray whales migrating past the central California coast, and (3) humpback whales breeding off Hawaii. These experiments, which exposed baleen whales to received levels ranging from 120 to approximately 155 dB re: 1 µPa, confirmed that some portion of the total number of whales exposed to LFA sonar responded behaviorally by changing their vocal activity, moving away from the source vessel, or both, but the responses were short-lived and animals returned to their normal activities within tens of minutes after initial exposure. While some of the observed responses would likely be considered ''take'' under the MMPA, these short-term behavioral responses do not necessarily constitute significant changes in biologically important behaviors, such as those that might be expected to affect individual fitness. In addition, these experiments illustrated that the context of an exposure scenario is important for determining the probability, magnitude, and duration of a response. This was shown by the fact that migrating gray whales responded to a sound source in the middle of their migration route but showed no response to the same sound source when it was located father offshore, outside the migratory corridor, even when the source level was increased to maintain the same received levels within the migratory corridor.

Although the LFS SRP study is two decades old, the collected behavioral response data remain valid and highly relevant because of the lack of additional studies utilizing this specific source, but also because the data show, as reflected in newer studies with other sound sources, that the context of an exposure (novelty of the sound source, distance from the sound source and activity of the animals experiencing exposure, and whether the source is perceived as approaching or moving away, etc.) is as important as, the source level and frequency in terms of assessing reactions (see the Behavioral Response/Disturbance section of the *Potential Effects of Specified Activities on Marine Mammals and Their Habitat* section in the proposed rule (84 FR 7186) for discussion of more recent studies regarding context). Therefore, take estimates for SURTASS LFA sonar are likely conservative (though we analyze them here nonetheless), and takes that do occur will primarily be in the form of lower levels of take by Level B harassment.

(3) Efficacy of the Navy's Three-Part Mitigation Monitoring Program—Review of Final Comprehensive and Annual Reports, from August 2002 through December 2018, indicates that the HF/M3 active sonar system has proven to be the most effective of the mitigation monitoring measures to detect possible marine mammals in proximity to the transmitting LFA sonar array, and use of this system substantially increases the probability of detecting marine mammals within the mitigation zone (and beyond), providing a superior monitoring capability. Because the HF/M3 active sonar is able to monitor marine mammals out to an effective range of 2 to 2.5 km (1.2 to 1.5 mi; 1.1 to 1.3 nmi) from the vessel, it is unlikely that the SURTASS LFA sonar operations would expose marine mammals to an SPL greater than approximately 174 dB re: 1 µPa rms. The combination of visual, passive acoustic, and active acoustic (HF/M3) monitoring results in near 100 percent probability of detection for a medium-sized (approximately 33 ft (10 m)) marine mammal swimming towards the system before the animal enters the LFA sonar mitigation zone (see Ellison and Stein, 2001 and Chapter 5, section 5.4.3 of the 2019 SURTASS LFA FSEIS/SOEIS for a summary of the effectiveness of the HF/M3 monitoring system). Lastly, as noted above, from the commencement of SURTASS LFA sonar use in 2002 through the present, neither operation of LFA sonar, nor operation of the T–AGOS vessels, has been associated with any mass or individual strandings of marine mammals. In addition, required monitoring reports indicate that there have been no apparent marine mammal avoidance reactions observed, and no observed marine mammal exposures to sound levels associated with Level A harassment takes due to SURTASS LFA sonar since its use began in 2002.

In examining the results of the mitigation monitoring procedures over the previous 17 years of SURTASS LFA activities, NMFS has concluded that the mitigation and monitoring measures for triggering shutdowns of the LFA sonar system have been implemented properly and have successfully minimized the

potential adverse effects of SURTASS LFA sonar to marine mammals in the LFA sonar mitigation zone around the vessel. This conclusion is further supported by documentation that no known mortality or injury to marine mammals has occurred over this period.

For reasons discussed in the *Potential Effects of the Specified Activity on Marine Mammals and their Habitat* section (see the proposed rule (84 FR 7186)), NMFS anticipates that the effect of masking will be limited and the chances of an LFA sonar sound overlapping whale calls at levels that would interfere with their detection and recognition will be extremely low. NMFS does not expect any short- or long-term effects to marine mammal food resources from SURTASS LFA sonar training and testing activities. It is unlikely that the activities of the SURTASS LFA sonar vessels transmitting LFA sonar at any place in the action area over the course of a year would implicate all of the areas for a given species or stock in any year. It is anticipated that ample similar nearby habitat areas are available for species/stocks in the event that portions of preferred areas are ensonified. Implementation of the 2,000-yd LFA sonar mitigation zone (shutdown zone) would ensure that most marine mammal takes are limited to lower-level Level B harassment. Further, potential impacts in areas of known or likely biological importance for functions such as feeding, reproduction, etc., effects are mitigated by the coastal standoff zone and OBIAs.

As noted above, because of the nature, scale, and locations of SURTASS LFA sonar training and testing, there is no reason to expect meaningfully differential impacts on any particular species or stock that warrant additional discussion. However, we include the following to ensure understanding of the two cases where the percentages of stocks taken are notably higher compared to other stocks. As also noted previously, the modeling the Navy uses allows for the enumeration of instances of take—each representing an exposure above the Level B harassment threshold of a single marine mammal for some amount of time (likely relatively short) within a single day. The model does not predict how many of these instances for a given species or stock may occur as multiple, or repeated, takes to a single individual. Given the nature (small number of ships and relatively few hours across two ocean basins) and location of the activity (beyond coastal exclusion in open ocean, areas where species/stocks are not concentrated as much), as well as the relatively small percentages of take compared to abundance for most stocks (the vast majority below 10 percent, 12 stocks in the 10–20 percent range, and a handful ranging from 20–67 percent) and the fact that takes of single stocks are expected across multiple regions, we expect that most individuals taken are taken only once in a year with some small subset taken perhaps a few times in the course of a year. However, two stocks have somewhat higher percentages that we note here. When estimated instances of take are compared to the estimated stock abundances, the percentages are 117 and 321 for the Western North Pacific stock of killer whales and the Western North Pacific stock of humpback whales, respectively. Acknowledging the uncertainty surrounding abundance estimates for the Navy's action area, it is still worth noting that these percentages are notably higher than others, and would suggest that some number of individuals are expected to be taken more than once. It indicates the possibility that some individuals are taken several times within a year, as the percentage exceeds 100 percent. For example, for the Western North Pacific stock of humpback whales, the average number of takes would be three or more per individual. It is unlikely that takes would be exactly evenly distributed across all individuals, and it is therefore more reasonable to assume that some number of individuals would be taken fewer than three times, while others would be taken on more than three days, and we assume up to twice this (*i.e.,* one individual could be taken on six days) for the sake of analysis. Even where one individual may be taken by Level B harassment (in the form of behavioral disturbance or a small degree of TTS) on up to six days within a year, given the nature of the activities, there is no reason to expect that these takes would be likely to occur on sequential days or that this magnitude of exposure within a year would be likely to result in impacts on reproduction or survival, especially given the implementation of mitigation to reduce the severity of impacts.

For the following summarized reasons, pulling in the supporting information both in this section and previous sections, including material not repeated from the proposed rule because it was unchanged, NMFS finds that the total authorized taking from SURTASS LFA sonar training and testing activities will have a negligible impact on the affected species or stocks:

(1) The small number of SURTASS LFA sonar systems that will be operating in the Study Area (likely not in close proximity to one another) and the low total number of hours of operation planned across all vessels;

(2) The relatively low duty cycle, short duration of training and testing events, and offshore nature of the SURTASS LFA sonar use;

(3) The fact that marine mammals in unspecified migration corridors and open ocean concentrations would be adequately protected from exposure to sound levels that would result in injury, most TTS (and any accrued would be expected to be of a small degree), and more severe levels of behavioral disruption by the historical demonstrated effectiveness of the Navy's three-part monitoring program in detecting marine mammals and triggering shutdowns;

(4) Geographic restrictions requiring the SURTASS LFA sonar sound field not exceed 180 re: 1 μPa rms within 22 km of any shoreline, including islands, or at a distance of one km from the perimeter of an OBIA, as well as limitations on amount of activity near an OBIA absent additional approvals through the Navy chain of command, thereby further limiting the severity and number of behavioral disturbances in those areas; and

(5) The proven effectiveness of the required three-part monitoring and mitigation protocols.

In summary, 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, the authorized takes are not expected to adversely affect any species or stock through impacts on recruitment or survival. Therefore, NMFS finds that the total authorized marine mammal take from the proposed activity will have a negligible impact on all affected marine mammal species or stocks.

Subsistence Harvest of Marine Mammals

The Navy will not operate SURTASS LFA sonar in Arctic waters nor in the Gulf of Alaska, or off the Aleutian Island chain where subsistence uses of marine mammals protected under the MMPA occur. Therefore, there are no relevant subsistence uses of marine mammals implicated by this action and there will be no impact on subsistence hunting. SURTASS LFA sonar will not cause abandonment of any harvest/hunting locations, displace any subsistence users, or place physical barriers between marine mammals and hunters. NMFS has determined that the total taking affecting species or stocks will not have an unmitigable adverse impact on the

availability of such species or stocks for taking for subsistence purposes.

Endangered Species Act

Eleven marine mammal species under NMFS' jurisdiction with confirmed or possible occurrence in the central and western North Pacific and eastern Indian Oceans are listed as endangered or threatened under the ESA: Blue whale; fin whale; humpback whale (Western North Pacific DPS); North Pacific right whale; sei whale; gray whale (Western North Pacific DPS); sperm whale; false killer whale (Main Hawaiian Islands Insular DPS); Steller sea lion (western DPS); spotted seal (Southern DPS); and Hawaiian monk seal. ESA-designated critical habitat for Hawaiian monk seals and Main Hawaiian Island insular false killer whales is also located in the Study Area. The Navy consulted with NMFS pursuant to section 7 of the ESA, and NMFS also consulted internally on the issuance of these regulations and LOA under section 101(a)(5)(A) of the MMPA for SURTASS LFA sonar training and testing activities. NMFS issued a Biological Opinion concluding that the issuance of the rule and subsequent LOA is not likely to jeopardize the continued existence of the threatened and endangered species under NMFS' jurisdiction and is not likely to result in the destruction or adverse modification of critical habitat in the SURTASS LFA Study Area. The Biological Opinion for this action is available at *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-military-readiness-activities.*

The USFWS is responsible for regulating the take of the several marine mammal species including the polar bear, walrus, and dugong. The Navy has determined that none of these species occur in geographic areas that overlap with SURTASS LFA sonar activities and, therefore, that SURTASS LFA sonar activities will have no effect on the endangered or threatened species or the critical habitat of ESA-listed species under the jurisdiction of the USFWS. Thus, no consultation with the USFWS pursuant to Section 7 of the ESA occurred.

National Marine Sanctuaries Act

Under section 304(d) of the National Marine Sanctuaries Act (NMSA), federal agencies are required to consult with NOAA's Office of National Marine Sanctuaries (ONMS) on activities that are likely to destroy, cause the loss of, or injure any sanctuary resource, unless it is determined that consultation is not required. Based on NMFS' assessment of its action of authorizing incidental take through MMPA regulations and an LOA for these Navy activities, NMFS determined that consultation under the NMSA is not required.

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 issuance of the LOA) and alternatives with respect to potential impacts on the human environment. NMFS participated as a cooperating agency on the 2019 SURTASS LFA sonar Final Supplemental Environmental Impact Statement/Supplemental Overseas Environmental Impact Statement (SURTASS LFA FSEIS/SOEIS) which was published on July 5, 2019 (84 FR 32168), and is available at *http://www.surtass-lfa-eis.com.* In accordance with 40 CFR 1506.3, NMFS independently reviewed and evaluated the 2019 SURTASS LFA FSEIS/SOEIS and determined that it is adequate and sufficient to meet our responsibilities under NEPA for the issuance of this rule and associated LOA, and adopted the Navy's SURTASS LFA FSEIS/SOEIS. NMFS has prepared a separate Record of Decision. NMFS' Record of Decision for adoption of the SURTASS LFA FSEIS/SOEIS and issuance of this final rule and subsequent LOAs can be found at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-military-readiness-activities.*

Classification

This action does not contain any collection of information requirements for purposes of the Paperwork Reduction Act of 1980 (44 U.S.C. 3501 *et seq.*).

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

Pursuant to the Regulatory Flexibility Act (RFA), the Chief Counsel for Regulation of the Department of Commerce certified to the Chief Counsel for Advocacy of the Small Business Administration at the proposed rule stage that this action will not have a significant economic impact on a substantial number of small entities. The RFA requires a Federal agency to prepare an analysis of a rule's impact on small entities whenever the agency is required to publish a notice of proposed rulemaking. However, a Federal agency may certify, pursuant to 5 U.S.C. 605(b), that the action will not have a significant economic impact on a substantial number of small entities. The Navy is the sole entity that will be affected by this rulemaking and is not a small governmental jurisdiction, small organization, or small business, as defined by the RFA. Any requirements imposed by an LOA issued pursuant to these regulations, and any monitoring or reporting requirements imposed by these regulations, will be applicable only to the Navy. NMFS does not expect the issuance of these regulations or the associated LOA to result in any impacts to small entities pursuant to the RFA. Because this action will directly affect the Navy and not a small entity, NMFS concludes the action will not result in a significant economic impact on a substantial number of small entities. No comments were received regarding this certification. As a result, a regulatory flexibility analysis is not required and none has been prepared.

Waiver of Delay in Effective Date

NMFS has determined that there is good cause under the Administrative Procedure Act (5 U.S.C. 553(d)(3)) to waive the 30-day delay in the effective date of this final rule. No individual or entity other than the Navy is affected by the provisions of these regulations. The Navy has informed NMFS that it requests that this final rule take effect on or by August 13, 2019, so as to not cause a disruption in training and testing activities when the NDE expires on August 12, 2019. The Navy has a compelling national security reason to continue military readiness activities without interruption to the SURTASS LFA sonar activities. Suspension or interruption of the Navy's ability to conduct those activities disrupts adequate and realistic military readiness, proper operations, and suitability for combat essential to national security. NMFS was unable to accommodate the 30-day delay of the effectiveness period due to the need for more time to consider additional mitigation measures and finalize NEPA obligations. The waiver of the 30-day delay of the effective date of the final rule will ensure that the MMPA final rule and LOA are in place by the time the NDE expires. Any delay in finalizing the rule would result in either: (1) A suspension of planned naval training and testing, which would disrupt vital training and testing essential to national security; or (2) absent another NDE, the potential for unauthorized takes of marine mammals by Navy (should the Navy conduct training and testing without an LOA). Moreover, the Navy is ready to implement the rule

immediately. For these reasons, NMFS finds good cause to waive the 30-day delay in the effective date. In addition, the rule authorizes incidental take of marine mammals that would otherwise be prohibited under the statute. Therefore, the rule is granting an exception to the Navy and relieving restrictions under the MMPA, which is a separate basis for waiving the 30-day effective date for the rule.

List of Subjects in 50 CFR Part 218

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

Dated: July 31, 2019.

Samuel D. Rauch III,

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

For reasons set forth in the preamble, 50 CFR part 218 is amended as follows:

PART 218–REGULATIONS GOVERNING THE TAKING AND IMPORTING OF MARINE MAMMALS

■ 1. The authority citation for part 218 continues to read as follows:

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

■ 2. Add subpart X to read as follows:

Subpart X—Taking and Importing of Marine Mammals; U.S. Navy Surveillance Towed Array Sensor System Low Frequency Active (SURTASS LFA) Sonar Training and Testing in the Central and Western North Pacific and Eastern Indian Oceans

Sec.

Subpart X—Taking and Importing of Marine Mammals; U.S. Navy Surveillance Towed Array Sensor System Low Frequency Active (SURTASS LFA) Sonar Training and Testing in the Central and Western North Pacific and Eastern Indian Oceans

§ 218.230 Specified activity, level of taking, and species/stocks.

Regulations in this subpart apply to the U.S. Navy (Navy) for the taking of marine mammals that occurs incidental to the Navy's SURTASS LFA sonar training and testing activities under authority of the Secretary of the Navy within the central and western North Pacific and eastern Indian Oceans (SURTASS LFA Sonar Study Area) (Table 1 to § 218.230).

TABLE 1 TO § 218.230—SPECIES/STOCKS PROPOSED FOR AUTHORIZATION BY LEVEL B HARASSMENT FOR THE 7-YEAR PERIOD OF THE PROPOSED RULE BY SURTASS LFA SONAR TRAINING AND TESTING ACTIVITIES

Species	Stock [1]
Antarctic minke whale	ANT.
Blue whale	CNP.
	NIND.
	WNP.
	SIND.
Bryde's whale	ECS.
	Hawaii.
	WNP.
	NIND.
	SIND.
Common minke whale	Hawaii.
	IND.
	WNP JW.
	WNP OE.
	YS.
Fin whale	ECS.
	Hawaii.
	IND.
	SIND.
	WNP.
Humpback whale	CNP stock and Hawaii DPS.
	WAU stock and DPS.
	WNP stock and DPS.
North Pacific right whale	WNP.
Omura's whale	NIND.
	SIND.
	WNP.
Sei whale	Hawaii.
	SIND.
	NP.
	NIND.
Western North Pacific gray whale	WNP stock and Western DPS.
Baird's beaked whale	WNP.
Blainville's beaked whale	Hawaii.
	WNP.
	IND.
Common bottlenose dolphin	4-Islands.
	Hawaii Island.
	Hawaii Pelagic.
	IA.
	IND.
	Japanese Coastal.
	Kauai/Niihau.

TABLE 1 TO § 218.230—SPECIES/STOCKS PROPOSED FOR AUTHORIZATION BY LEVEL B HARASSMENT FOR THE 7-YEAR PERIOD OF THE PROPOSED RULE BY SURTASS LFA SONAR TRAINING AND TESTING ACTIVITIES—Continued

Species	Stock [1]
	Oahu.
	WNP Northern Offshore.
	WNP Southern Offshore.
	WAU.
Common dolphin	IND.
	WNP.
Cuvier's beaked whale	Hawaii.
	IND.
	SH.
	WNP.
Dall's porpoise	SOJ *dalli* type.
	WNP *dalli* ecotype.
	WNP *truei* ecotype.
Deraniyagala's beaked whale	IND.
	NP.
Dwarf sperm whale	Hawaii.
	IND.
	WNP.
False killer whale	Hawaii Pelagic.
	IA.
	IND.
	Main Hawaiian Islands Insular stock and DPS.
	Northwestern Hawaiian Islands.
	WNP.
Fraser's dolphin	CNP.
	Hawaii.
	IND.
	WNP.
Ginkgo-toothed beaked whale	IND.
	NP.
Harbor porpoise	WNP.
Hubbs' beaked whale	NP.
Indo-Pacific bottlenose dolphin	IND.
Killer whale	Hawaii.
	IND.
	WNP.
Kogia spp.	WNP.
Longman's beaked whale	Hawaii.
	IND.
	WNP.
Melon-headed whale	Hawaiian Islands.
	IND.
	Kohala Resident.
	WNP.
Mesoplodon spp.	WNP.
Northern right whale dolphin	NP.
Pacific white-sided dolphin	NP.
Pantropical spotted dolphin	4-Islands.
	Hawaii Island.
	Hawaiian Pelagic.
	IND.
	Oahu.
	WNP.
Pygmy killer whale	Hawaii.
	IND.
	WNP.
Pygmy sperm whale	Hawaii.
	IND.
	WNP.
Risso's dolphin	Hawaii.
	IA.
	WNP.
	IND.
Rough-toothed dolphin	Hawaii.
	IND.
	WNP.
Short-finned pilot whale	Hawaii.
	IND.
	WNP Northern Ecotype.
	WNP Southern Ecotype.
Southern bottlenose whale	IND.

TABLE 1 TO § 218.230—SPECIES/STOCKS PROPOSED FOR AUTHORIZATION BY LEVEL B HARASSMENT FOR THE 7-YEAR PERIOD OF THE PROPOSED RULE BY SURTASS LFA SONAR TRAINING AND TESTING ACTIVITIES—Continued

Species	Stock [1]
Spade-toothed beaked whale	IND.
Sperm whale	Hawaii.
	NIND.
	NP.
	SIND.
Spinner dolphin	Hawaii Island.
	Hawaii Pelagic.
	IND.
	Kauai/Niihau.
	Kure/Midway Atoll.
	Oahu/4-Islands.
	Pearl and Hermes Reef.
	WNP.
Stejneger's beaked whale	WNP.
Striped dolphin	Hawaii.
	IND.
	Japanese Coastal.
	WNP Northern Offshore.
	WNP Southern Offshore.
Hawaiian monk seal	Hawaii.
Northern fur seal	Western Pacific.
Ribbon seal	NP.
Spotted seal	Alaska stock/Bering Sea DPS.
	Southern stock and DPS.
Steller sea lion	Western/Asian stock and Western DPS.

[1] ANT = Antarctic; CNP = Central North Pacific; NP = North Pacific; NIND = Northern Indian; SIND = Southern Indian; IND = Indian; WNP = Western North Pacific; ECS = East China Sea; WP = Western Pacific; SOJ = Sea of Japan; IA = Inshore Archipelago; WAU = Western Australia; YS = Yellow Sea; OE = Offshore Japan; OW = Nearshore Japan; JW = Sea of Japan/Minke; JE = Pacific coast of Japan; SH = Southern Hemisphere; DPS = distinct population segment.

§ 218.231 Effective dates.

Regulations in this subpart are effective from August 13, 2019, through August 12, 2026.

§ 218.232 Permissible methods of taking.

Under a Letter or Letters of Authorization (LOA) issued pursuant to §§ 216.106 of this chapter and 218.237, the Holder of the LOA (hereinafter ''Navy'') may incidentally, but not intentionally, take marine mammals within the area described in § 218.230 by Level B harassment associated with SURTASS LFA sonar training and testing provided the activity is in compliance with all terms, conditions, and requirements of the regulations in this subpart and the applicable LOA.

§ 218.233 Prohibitions.

Notwithstanding takings contemplated in § 218.230 and authorized by a LOA issued under §§ 216.106 of this chapter and 218.237, no person in connection with the activities described in § 218.230 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 218.237;

(b) Take any marine mammal not specified in such LOAs;

(c) Take any marine mammal specified in such LOAs in any manner other than Level B harassment;

(d) Take any marine mammal specified in the LOA if NMFS makes a determination that such taking is having, or may have, more than a negligible impact on the species or stocks concerned; or

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

§ 218.234 Mitigation.

When conducting activities identified in § 218.230, the mitigation measures described in this section and in any LOA issued under §§ 216.106 of this chapter and 218.237 must be implemented.

(a) *Personnel training—lookouts.* The Navy will utilize one or more trained marine biologists qualified in conducting at-sea marine mammal visual monitoring to conduct at-sea marine mammal visual monitoring training and qualify designated ship personnel to conduct at-sea visual monitoring. Training will ensure quick and effective communication within the command structure in order to facilitate implementation of protective measures if they detect marine mammals and may be accomplished either in-person, or via video training.

(b) *General operating procedures.* (1) Prior to SURTASS LFA sonar activities, the Navy will promulgate executive guidance for the administration, execution, and compliance with the environmental regulations under these regulations and LOA.

(2) The Navy must not transmit the SURTASS LFA sonar signal at a frequency greater than 500 Hz.

(c) *2,000-yard LFA sonar mitigation zone; suspension and delay.* If a marine mammal is detected, through monitoring required under § 218.235, within or about to enter within 2,000 yards of the SURTASS LFA source (*i.e.,* the LFA mitigation zone), the Navy must immediately delay or suspend SURTASS LFA sonar transmissions.

(d) *Resumption of SURTASS LFA sonar transmissions.* (1) The Holder of a LOA may not resume SURTASS LFA sonar transmissions earlier than 15 minutes after:

(i) All marine mammals have left the area of the 2,000-yard LFA sonar mitigation zone; and

(ii) There is no further detection of any marine mammal within the 2,000-yard LFA sonar mitigation zone as determined by the visual, passive acoustic, and active acoustic high frequency monitoring described in § 218.235.

(2) [Reserved]

(e) *Ramp-up procedures for the high-frequency marine mammal monitoring (HF/M3) sonar required under § 218.235.* (1) The Navy must ramp up the HF/M3 sonar power level beginning at a maximum source sound pressure level of 180 dB: re 1 μPa at 1 meter in 10-dB increments to operating levels over a period of no less than five minutes:

(i) At least 30 minutes prior to any SURTASS LFA sonar transmissions; and

(ii) Anytime after the HF/M3 source has been powered down for more than two minutes.

(2) The Navy must not increase the HF/M3 sound pressure level once a marine mammal is detected; ramp-up may resume once marine mammals are no longer detected.

(f) *Geographic restrictions on the SURTASS LFA sonar sound field.* (1) LFA sonar training and testing activities must be conducted such that:

(i) The received level of SURTASS LFA sonar transmissions will not exceed 180 dB re: 1 μPa rms within 22 km (12 nmi) from any emergent land, including offshore islands;

(ii) The received level of SURTASS LFA sonar transmissions will not exceed 180 dB re: 1 μPa rms at a distance of 1 km (0.5 nmi) seaward of the outer perimeter of any Offshore Biologically Important Area (OBIA) designated in the Study Area for SURTASS LFA sonar in paragraph (f)(2) of this section, or subsequently identified through the Adaptive Management process specified in § 218.241, during the period specified. The boundaries and periods of such OBIAs will be kept on file in NMFS' Office of Protected Resources and on its website at *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-military-readiness-activities.*

(iii) No more than 25 percent of the authorized amount (transmission hours) of SURTASS LFA sonar for training and testing will be conducted within 10 nmi (18.5 km) of any single OBIA during any year (no more than 124 hours in years 1–4 and 148 hours in years 5–7) unless the following conditions are met: Should national security present a requirement to conduct more than 25 percent of authorized hours of SURTASS LFA sonar within 10 nmi (18.5 km) of any single OBIA during any year, naval units will obtain permission from the appropriate designated Command authority prior to commencement of the activity. The Navy will provide NMFS with notification as soon as is practicable and include the information (*e.g.,* sonar hours) in its annual activity reports submitted to NMFS.

(iv) No activities with the SURTASS LFA system will occur within territorial seas of foreign nations, which are areas from 0 up to 12 nmi from shore, depending on the distance that individual nations claim; and

(v) No activities with the SURTASS LFA sonar system will occur in the waters of Penguin Bank, Hawaii (defined as water depth of 600 ft (183 m)), and ensonification of Hawaii state waters (out to 3 nmi) will not exceed 145 dB re: 1 μPa rms.

(2) Offshore Biologically Important Areas (OBIAs) for marine mammals (with specified periods) for SURTASS LFA sonar training and testing activities include the following (Table 1 to paragraph (f)(2)):

TABLE 1 TO PARAGRAPH (f)(2)—OFFSHORE BIOLOGICALLY IMPORTANT AREAS (OBIAS)

OBIA name	Ocean area	Effective seasonal period
Main Hawaiian Islands	Central North Pacific	November to April.
Northwestern Hawaiian Islands	Central North Pacific	December to April.
Mariana Islands	Western North Pacific	February to April.
Ryukyu-Philippines	Western North Pacific	January to April.
Ogasawara Islands (Sperm Whale)	Western North Pacific	June to September.
Ogasawara-Kazin Islands (Humpback Whale)	Western North Pacific	December to May.
Honshu	Western North Pacific	January to May.
Southeast Kamchatka	Western North Pacific	June to September.
Gulf of Thailand	Eastern Indian Ocean	April to November.
Western Australia (Blue Whale)	Eastern Indian Ocean	May to November.
Western Australia (Humpback Whale)	Eastern Indian Ocean	May to December.
Southern Bali	Eastern Indian Ocean	October to November.
Swatch-of-No-Ground (SoNG)	Northern Bay of Bengal	Year-round.
Sri Lanka	Eastern Indian Ocean	October to April.

(g) *Minimization of additional harm to live-stranded (or milling) mammals.* The Navy must consult the Notification and Reporting Plan, which sets out the requirements for when live stranded marine mammals are reported in the Study Area. The Stranding and Notification Plan is available at: *https://www.fisheries.noaa.gov/action/incidental-take-authorization-us-navy-operations-surveillance-towed-array-sensor-system-0.*

§ 218.235 Requirements for monitoring.

(a) The Navy must:

(1) Conduct visual monitoring from the ship's bridge during all daylight hours (30 minutes before sunrise until 30 minutes after sunset). During training and testing activities that employ SURTASS LFA sonar in the active mode, the SURTASS vessels must have Lookouts to maintain a topside watch with standard binoculars (7x) and with the naked eye. If the lookout sights a possible marine mammal, the lookout will use big-eye binoculars (25x) to confirm the sighting and potentially identify the marine mammal species.

(2) Use the passive SURTASS sonar component to detect vocalizing marine mammals; and

(3) Use the HF/M3 sonar to locate and track marine mammals in relation to the SURTASS LFA sonar vessel and the LFA mitigation zone, subject to the ramp-up requirements in § 216.234(e) of this chapter.

(b) Monitoring under paragraph (a) of this section must:

(1) Commence at least 30 minutes before the first SURTASS LFA sonar training and testing transmission;

(2) Continue between transmission pings; and

(3) Continue either for at least 15 minutes after completion of the SURTASS LFA sonar training and testing transmission, or, if marine mammals are exhibiting unusual changes in behavioral patterns, until behavior patterns return to normal or conditions prevent continued observations.

(c) The Navy must designate qualified on-site individuals to conduct the mitigation, monitoring, and reporting activities specified in these regulations and LOA issued under §§ 216.106 of this chapter and 218.237.

(d) The Navy must continue to assess data from the Marine Mammal Monitoring Program and work toward making some portion of that data, after appropriate security reviews, available to scientists with appropriate clearances. Any portions of the analyses conducted by these scientists based on these data that are determined to be unclassified after appropriate security reviews will be made publically available.

(e) The Navy must collect ambient noise data and will explore the feasibility of declassifying and archiving the ambient noise data for incorporation into appropriate ocean noise budget efforts.

(f) The Navy must conduct all monitoring required under LOAs.

§ 218.236 Requirements for reporting.

(a) The Navy must submit classified and unclassified annual training and testing activity reports to the Director, Office of Protected Resources, NMFS, no later than 90 days after the end of each year covered by the LOA beginning on the date of effectiveness of a LOA. Each annual training and testing activity report will include a summary of all active-mode training and testing activities completed during that year. At a minimum, each classified training and testing activity report must contain the following information:

(1) Dates, times, and location of each vessel during each training and testing activity;

(2) Information on sonar transmissions during each training and testing activity;

(3) Results of the marine mammal monitoring program specified in the LOA; and

(4) Estimates of the percentages of marine mammal species and stocks affected (both for the year and cumulatively for each successive year) covered by the LOA.

(b) The seventh annual report must be prepared as a final comprehensive report, which will include information for the final year as well as the prior six years of activities under the rule. This final comprehensive report must also contain an unclassified analysis of new passive sonar technologies and an assessment of whether such a system is feasible as an alternative to SURTASS LFA sonar, and be submitted to the Director, Office of Protected Resources, NMFS as described in this paragraph (b).

(c) The Navy will continue to assess the data collected by its undersea arrays and work toward making some portion of that data, after appropriate security reviews, available to scientists with appropriate clearances. Any portions of the analyses conducted by these scientists based on these data that are determined to be unclassified after appropriate security reviews will be made publically available.

(d) The Navy must consult the Notification and Reporting Plan, which sets out notification, reporting, and other requirements for when dead, injured, or live stranded marine mammals are reported in the Study Area. The Stranding and Notification Plan is available at: *https://www.fisheries.noaa.gov/action/incidental-take-authorization-us-navy-operations-surveillance-towed-array-sensor-system-0.*

§ 218.237 Letter of Authorization.

(a) To incidentally take marine mammals pursuant to these regulations, Navy must apply for and obtain a Letter of Authorization (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, Navy 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 (excluding changes made pursuant to the adaptive management provision of § 218.239), the Navy must apply for and obtain a modification of the LOA as described in § 218.238.

(e) The LOA shall set forth:

(1) Permissible methods of incidental taking;

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

(3) Requirements for monitoring and reporting.

(f) Issuance of the LOA will 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 will be published in the **Federal Register** within thirty days of a determination.

§ 218.238 Renewals and modifications of a Letter of Authorization.

(a) An LOA issued under §§ 216.106 of this chapter and 218.237 for the activity identified in § 218.230 may be renewed or modified upon request by the applicant, provided that:

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

(2) NMFS determines that the mitigation, monitoring, and reporting measures required by the previous LOA(s) were implemented.

(b) For LOA modification or renewal requests by the Navy that include changes to the activity or to the mitigation, monitoring, or reporting measures (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 that do not result in more than a minor change in the total estimated number of takes (or distribution by species or stock or years), NMFS may publish notification of a planned 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 218.237 may be modified by NMFS under the following circumstances:

(1) *Adaptive management.* After consulting with the Navy regarding the practicability of the modifications, NMFS may modify (including adding or removing measures) the existing mitigation, monitoring, or reporting measures if doing so creates a reasonable likelihood of more effectively accomplishing the goals of the mitigation and monitoring.

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

(A) Results from the Navy's monitoring from the previous year(s);

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

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

(ii) If, through adaptive management, the modifications to the mitigation, monitoring, or reporting measures are substantial, NMFS will publish a notice

of planned LOA in the **Federal Register** and solicit public comment.

(2) *Emergencies.* If NMFS 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 218.237, 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.

[FR Doc. 2019–16695 Filed 8–12–19; 8:45 am]

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