DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 218

[Docket No. 170918908–8999–02]

RIN 0648–BH29

Taking and Importing Marine Mammals; Taking Marine Mammals Incidental to the U.S. Navy Training and Testing Activities in the Hawaii-Southern California Training and Testing Study Area

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

ACTION: Final rule; notification of issuance of Letters 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 training and testing activities conducted in the Hawaii-Southern California Training and Testing (HSTT) Study Area over the course of five years beginning in December 2018. These regulations, which allow for the issuance of Letters 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 from December 21, 2018 through December 20, 2023.

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: Stephanie Egger, Office of Protected Resources, National Marine Fisheries Service, 1315 East-West Highway, Silver Spring, MD 20910, (301) 427–8401.

SUPPLEMENTARY INFORMATION:

Purpose of 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 training and testing activities (categorized as military readiness activities) from the use of sonar and other transducers, in-water detonations, air guns, impact pile driving/vibratory extraction, and potential vessel strikes based on Navy movement throughout the HSTT Study Area. The HSTT Study Area (see Figure 1.1–1 of the Navy's rulemaking/LOA application) is comprised of established operating and warning areas across the north-central Pacific Ocean, from the mean high tide line in Southern California west to Hawaii and the International Date Line. The Study Area includes the at-sea areas of three existing range complexes (the Hawaii Range Complex, the Southern California (SOCAL) Range Complex, and the Silver Strand Training Complex), and overlaps a portion of the Point Mugu Sea Range (PMSR). Also included in the Study Area are Navy pierside locations in Hawaii and Southern California, Pearl Harbor, San Diego Bay, and the transit corridor [1] on the high seas where sonar training and testing may occur.

We received an application from the Navy requesting five-year regulations and authorizations to incidentally take individuals of multiple species and stocks of marine mammals (''Navy's rulemaking/LOA application'' or ''Navy's application''). Take is anticipated to occur by Level A and Level B harassment as well as a very small number of serious injuries or mortalities incidental to the Navy's training and testing activities.

Section 101(a)(5)(A) of the MMPA (16 U.S.C. 1371(a)(5)(A)) directs the Secretary of Commerce (as delegated to NMFS) to allow, upon request, the incidental, but not intentional taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if, after notice and public comment, the agency makes certain findings and issues regulations that set forth permissible methods of taking pursuant to that activity, 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 the subsequent LOAs. As directed by this legal authority, this final rule contains mitigation, monitoring, and reporting requirements.

[1] Vessel transit corridors are the routes typically used by Navy assets to traverse from one area to another. The route depicted in Figure 1–1 of the Navy's rulemaking/LOA application is the shortest route between Hawaii and Southern California, making it the quickest and most fuel efficient. The depicted vessel transit corridor is notional and may not represent the actual routes used by ships and submarines transiting from Southern California to Hawaii and back. Actual routes navigated are based on a number of factors including, but not limited to, weather, training, and operational requirements.

Summary of Major Provisions Within the Final Rule

Following is a summary of the major provisions of this final rule regarding the Navy's activities. Major provisions include, but are not limited to:

- The use of defined powerdown and shutdown zones (based on activity);
- Measures to reduce or eliminate the likelihood of ship strikes;
- Activity limitations in certain areas and times that are biologically important (*i.e.,* for foraging, migration, reproduction) for marine mammals;
- Implementation of a Notification and Reporting Plan (for dead, live stranded, or marine mammals struck by a vessel); and
- Implementation of a robust monitoring plan to improve our understanding of the environmental effects resulting from the Navy training and testing activities.

Additionally, the rule includes an adaptive management component that allows for timely modification of mitigation or monitoring measures based on new information, when appropriate.

Background

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, a notice of a proposed authorization is provided to the public for review and the opportunity to submit comments.

An authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s), will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (where relevant), and if the permissible methods of taking, other means of effecting the least practicable adverse impact on the species or stocks and their habitat, and requirements pertaining to monitoring and reporting of such takings are set forth. The MMPA states that the term ''take'' means to harass, hunt, capture, kill or attempt to harass, hunt, capture, or kill any marine mammal.

The National Defense Authorization Act of 2004 (2004 NDAA) (Pub. L. 108–136) amended section 101(a)(5) of the MMPA to remove the ''small numbers'' and ''specified geographical region'' provisions indicated above for ''military readiness activities'' and amended the definition of ''harassment'' as it applies to military readiness activities, along with certain research activities. The definitions of all applicable MMPA statutory terms cited above are included in the relevant sections below.

More recently, the John S. McCain National Defense Authorization Act for Fiscal Year 2019 (2019 NDAA) (Pub. L. 115–232) amended the MMPA to allow incidental take rules for military readiness activities to be issued for up to seven years. That recent amendment of the MMPA does not affect this final rule, however, because both the Navy's application and NMFS' proposed incidental take rule preceded passage of the 2019 NDAA and contemplated authorization for five years.

Summary and Background of Request

On September 13, 2017, NMFS received an application from the Navy for authorization to take marine mammals by Level A and B harassment incidental to training and testing activities (categorized as military readiness activities) from the use of sonar and other transducers, in-water detonations, air guns, and impact pile driving/vibratory extraction in the HSTT Study Area. In addition, the Navy requested incidental take authorization by serious injury or mortality for a combined ten takes of two marine mammal species from explosives and for up to three takes of large whales from vessel strikes over the five-year period. On October 13, 2017, the Navy sent an amendment to its application and the application was found to be adequate and complete. On October 20, 2017 (82 FR 48801), we published a notice of receipt of application (NOR) in the **Federal Register**, requesting comments and information related to the Navy's request for 30 days. On June 26, 2018, we published a notice of the proposed rulemaking (83 FR 29872) and requested comments and information related to the Navy's request for 45 days. Comments received during the NOR and the proposed rulemaking comment periods are addressed in this final rule. See further details addressing comments received in the *Comments and Responses* section.

On September 10, 2018, and October 26, 2018, Navy provided NMFS with memoranda revising the estimated takes by serious injury or mortality included in the Navy's rulemaking/LOA application for ship strike. The Navy's request for takes by serious injury or mortality of three large whales over the course of five years remains unchanged. However, specifically, after further analysis and discussion with NMFS, the Navy modified their request for takes from particular stocks in the following ways:

- Humpback whales (California, Oregon, Washington (CA/OR/WA) stock):
  - Reduced request for take from two to one individual.
  - Removed the authorization request for individuals that also are part of the Central America Distinct Population Segment (DPS) recognized under the Endangered Species Act (ESA). Both the Central America DPS and Mexico DPS overlap with the CA/OR/WA stock, but from this stock, only a humpback whale from the Mexico DPS is expected to be taken by serious injury or mortality. These individuals, that are part of both the CA/OR/WA stock and the Mexico DPS, will be referred to as ''humpback whales (CA/OR/WA stock, Mexico DPS)'' henceforth.
- Sperm whale (Hawaii or CA/OR/WA stock):
  - Original authorization request for take was for two total from any stock; reduced request for take to one individual.
  - Removed request for individuals from the CA/OR/WA stock, *i.e.,* only an individual from the Hawaii stock is requested.
- Bryde's whale (Eastern Tropical Pacific stock or Hawaii stock)—Reduced request for take from one individual to zero.
- Minke whale (Hawaii stock)—Reduced request for take from one individual to zero.
- Sei whale (Hawaii stock and Eastern North Pacific stock)—Reduced request for take from one individual to zero.

NMFS concurs that it is reasonably likely that these lethal takes could occur. The information and assessment that supports this change is included in the *Estimated Take of Marine Mammals* section.

The Navy requested two five-year LOAs, one for training activities and one for testing activities to be conducted within the HSTT Study Area. The HSTT Study Area (see Figure 1.1–1 of the Navy's rulemaking/LOA application) is comprised of established operating and warning areas across the north-central Pacific Ocean, from the mean high tide line in Southern California west to Hawaii and the International Date Line. The Study Area includes the at-sea areas of three existing range complexes (the Hawaii Range Complex, the SOCAL Range Complex, and the Silver Strand Training Complex), and overlaps a portion of the PMSR. Also included in the Study Area are Navy pierside locations in Hawaii and Southern California, Pearl Harbor, San Diego Bay, and the transit corridor on the high seas where sonar training and testing may occur.

The following types of training and testing, which are classified as military readiness activities pursuant to the MMPA, as amended by the 2004 NDAA, would be covered under the regulations and associated LOAs: Amphibious warfare (in-water detonations), anti-submarine warfare (sonar and other transducers, in-water detonations), surface warfare (in-water detonations), mine warfare (sonar and other transducers, in-water detonations), and other warfare activities (sonar and other transducers, pile driving, air guns). Also, ship strike by Navy vessels is addressed and covered, as appropriate.

This will be NMFS' third in a series of rulemakings for testing and training activities in the HSTT Study Area. Hawaii and Southern California were separate in the initial rulemaking period, and the first two rules were effective from January 5, 2009, through January 5, 2014 (74 FR 1456; January 12, 2009), and January 14, 2009, through January 14, 2014 (74 FR 3882; January 21, 2009), respectively. The rulemaking for the second five-year period, which combined Hawaii and Southern California, was in effect from December 24, 2013, through December 24, 2018 (78 FR 78106; December 24, 2013), as modified by the terms of a stipulated settlement agreement and order issued by the United States District Court for the District of Hawaii on September 14, 2015. The new regulations described here will be valid for five years, from December 21, 2018, though December 20, 2023.

The Navy's mission is to organize, train, equip, and maintain combat-ready naval forces capable of winning wars, deterring aggression, and maintaining freedom of the seas. This mission is mandated by Federal law (10 U.S.C. 5062), which ensures the readiness of the naval forces of the United States. The Navy executes this responsibility by training and testing at sea, often in designated operating areas (OPAREA) and testing and training ranges. The Navy must be able to access and utilize these areas and associated sea space and air space in order to develop and maintain skills for conducting naval activities.

The Navy plans to conduct training and testing activities within the HSTT Study Area. The Navy has been conducting similar military readiness activities in the HSTT Study Area since the 1940s. The tempo and types of training and testing activities have fluctuated because of the introduction of new technologies, the evolving nature of international events, advances in warfighting doctrine and procedures, and changes in force structure (organization of ships, weapons, and personnel). Such developments influenced the frequency, duration, intensity, and location of required training and testing activities, but the basic nature of sonar and explosive events conducted in the HSTT Study Area has remained the same.

The Navy's rulemaking/LOA application reflects the most up to date compilation of training and testing activities deemed necessary to accomplish military readiness requirements. The types and numbers of activities included in the rule account for fluctuations in training and testing in order to meet evolving or emergent military readiness requirements.

These regulations cover training and testing activities that would occur for a five-year period following the expiration of the current MMPA authorization for the HSTT Study Area, which expires on December 24, 2018.

Description of the Specified Activity

Additional detail regarding the specified activity was provided in our **Federal Register** notice of proposed rulemaking (83 FR 29872; June 26, 2018); please see that notice of proposed rulemaking or the Navy's application for more information. Since the proposed rule, NMFS and the Navy have reached agreement on additional mitigation measures which are summarized below and discussed in greater detail in the *Mitigation Measures* section of this rule.

The Navy will implement pre- and post-event observation of the mitigation zone for all in-water explosive event mitigation measures in the HSTT Study Area. The Navy expanded their mitigation areas to include the sections of the Santa Monica Bay to Long Beach and San Nicolas Island biologically important areas (BIAs) that overlap the HSTT Study Area. These areas are referred to as the Santa Monica/Long Beach and San Nicolas Island Mitigation Areas and explosive use is limited in these areas as described in the *Mitigation Measures* section. Further, the Navy will limit surface ship sonar such that it will not exceed 200 hours from June through October cumulatively within the San Diego Arc, San Nicolas Island, and Santa Monica/Long Beach, Mitigation Areas. The Navy will also add a year-round limitation on explosives to the 4-Islands Region Mitigation Area, which includes a portion of the false killer whale (Main Hawaiian Island insular stock) BIA north of Maui and Molokai in the HSTT Study Area. The Navy has agreed to issue notification messages to increase operator awareness of the presence of marine mammals. The Navy will review WhaleWatch, a program coordinated by NMFS' West Coast Region as an additional information source to inform the drafting of the seasonal awareness message to alert vessels in the area to the possible presence of concentrations of large whales, including blue, gray, and fin whales in SOCAL.

In coordination with NMFS, the Navy has also revised its estimate of and request for serious injury or mortality takes of large whales from ship strikes, as described immediately above in the *Summary and Background of Request* section. The detailed rationale for this change is provided in the *Estimated Take of Marine Mammals* section.

Overview of Training and Testing Activities

The Navy routinely trains and tests in the HSTT Study Area in preparation for national defense missions. Training and testing activities covered in these regulations are summarized below.

Primary Mission Areas

The Navy categorizes its activities into functional warfare areas called primary mission areas. These activities generally fall into the following seven primary mission areas: Air warfare; amphibious warfare; anti-submarine warfare (ASW); electronic warfare; expeditionary warfare; mine warfare (MIW); and surface warfare (SUW). Most activities addressed in the HSTT FEIS/OEIS are categorized under one of the primary mission areas; the testing community has three additional categories of activities for vessel evaluation, unmanned systems, and acoustic and oceanographic science and technology. Activities that do not fall within one of these areas are listed as ''other activities.'' Each warfare community (surface, subsurface, aviation, and special warfare) may train in some or all of these primary mission areas. The testing community also categorizes most, but not all, of its testing activities under these primary mission areas.

The Navy describes and analyzes the impacts of its training and testing activities within the HSTT FEIS/OEIS and the Navy's rulemaking/LOA application (documents available at *www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-military-readiness-activities*). In its assessment, the Navy concluded that sonar and other transducers, in-water detonations, air guns, and pile driving/removal were the stressors that would result in impacts on marine mammals that could rise to the level of harassment (and serious injury or mortality by explosives or by vessel strike) as defined under the MMPA. Therefore, the rulemaking/LOA application provides the Navy's assessment of potential effects from these stressors in terms of the various warfare mission areas in which they would be conducted. In terms of Navy's primary warfare areas, this includes:

- Amphibious warfare (in-water detonations);
- ASW (sonar and other transducers, in-water detonations);
- SUW (in-water detonations);
- MIW (sonar and other transducers, in-water detonations); and
- Other warfare activities (sonar and other transducers, impact pile driving/vibratory removal, air guns).

Overview of Major Training Exercises and Other Exercises Within the HSTT Study Area

A major training exercise (MTE) is comprised of several ''unit level'' range exercises conducted by several units operating together while commanded and controlled by a single Commander. These exercises typically employ an exercise scenario developed to train and evaluate the strike group in naval tactical tasks. In an MTE, most of the activities being directed and coordinated by the Commander are identical in nature to the activities conducted during individual, crew, and smaller unit level training events. In an MTE, however, these disparate training tasks are conducted in concert, rather than in isolation.

Some integrated or coordinated ASW exercises are similar in that they are comprised of several unit level exercises but are generally on a smaller scale than an MTE, are shorter in duration, use fewer assets, and use fewer hours of hull-mounted sonar per exercise. For the purpose of analysis, three key factors are used to identify and group major, integrated, and coordinated exercises including the scale of the exercise, duration of the exercise, and amount of hull-mounted sonar hours modeled/used for the exercise. NMFS considered the effects of all training exercises, not just these major, integrated, and coordinated training exercises in these regulations. Additional detail regarding the training activities was provided in our **Federal Register** notice of proposed rulemaking (83 FR 29872; June 26, 2018); please see that notice of proposed rulemaking or the Navy's application for more information.

Overview of Testing Activities Within the HSTT Study Area

The Navy's research and acquisition community engages in a broad spectrum of testing activities in support of the fleet. These activities include, but are not limited to, basic and applied scientific research and technology development; testing, evaluation, and maintenance of systems (*e.g.,* missiles, radar, and sonar) and platforms (*e.g.,* surface ships, submarines, and aircraft); and acquisition of systems and platforms to support Navy missions and give a technological edge over adversaries. The individual commands within the research and acquisition community included in the Navy's rulemaking/LOA application are the Naval Air Systems Command, the Naval Sea Systems Command, the Office of Naval Research, and the Space and Naval Warfare Systems Command. Additional detail regarding the testing activities was provided in our **Federal Register** notice of proposed rulemaking (83 FR 29872; June 26, 2018); please see that notice of proposed rulemaking or the Navy's application for more information.

Dates and Duration

The specified activities may occur at any time during the five-year period of validity of the regulations. Planned number and duration of training and testing activities are shown in the Planned Activities section (Tables 4 through 7).

Specific Geographic Area

The Navy's HSTT Study Area extends from the north-central Pacific Ocean, from the mean high tide line in Southern California west to Hawaii and the International Date Line, including the Hawaii and Southern California (SOCAL) Range Complexes, as well as the Silver Strand Training Complex and overlapping a small portion of the Point Mugu Sea Range (PMSR). Please refer to Figure 1–1 of the Navy's rulemaking/LOA application for a map of the HSTT Study Area, Figures 2–1 to 2–4 for the Hawaii Operating Area (where the majority of training and testing activities occur within the Hawaii Range Complex), Figures 2–5 to 2–7 for the SOCAL Range Complex, and Figure 2–8 for the Silver Strand Training Complex.

Description of Acoustic and Explosive Stressors

The Navy uses a variety of sensors, platforms, weapons, and other devices, including ones used to ensure the safety of Sailors and Marines, to meet its mission. Training and testing with these systems may introduce acoustic (sound) energy or shock waves from explosives into the environment. The Navy's rulemaking/LOA application describes specific components that could act as stressors by having direct or indirect impacts on the environment. The following subsections describe the acoustic and explosive stressors for biological resources within the HSTT Study Area. Because of the complexity of analyzing sound propagation in the ocean environment, the Navy relies on acoustic models in its environmental analyses that consider sound source characteristics and varying ocean conditions across the HSTT Study Area. Stressor/resource interactions that were determined to have de minimus or no impacts (*i.e.,* vessel, aircraft, or weapons noise) were not carried forward for analysis in the Navy's rulemaking/LOA application. NMFS reviewed the Navy's analysis and conclusions and finds them complete and supportable.

Acoustic Stressors

Acoustic stressors include acoustic signals emitted into the water for a specific purpose, such as sonar, other transducers (devices that convert energy from one form to another—in this case, to sound waves), and air guns, as well as incidental sources of broadband sound produced as a byproduct of impact pile driving and vibratory extraction. Explosives also produce broadband sound but are analyzed separately from other acoustic sources due to their unique characteristics. In order to better organize and facilitate the analysis of approximately 300 sources of underwater sound used for training and testing by the Navy, including sonars, other transducers, air guns, and explosives, a series of source classifications, or source bins, were developed. The source classification bins do not include the broadband sounds produced incidental to pile driving, vessel or aircraft transits, weapons firing, and bow shocks.

The use of source classification bins provides the following benefits: Provides the ability for new sensors or munitions to be covered under existing authorizations, as long as those sources fall within the parameters of a ''bin;'' improves efficiency of source utilization data collection and reporting requirements under the MMPA authorizations; ensures a conservative approach to all impact estimates, as all sources within a given class are modeled as the most impactful source (highest source level, longest duty cycle, or largest net explosive weight) within that bin; allows analyses to be conducted in a more efficient manner, without any compromise of analytical results; and provides a framework to support the reallocation of source usage (hours/explosives) between different source bins, as long as the total numbers of takes remain within the overall analyzed and authorized limits. This flexibility is required to support evolving Navy training and testing requirements, which are linked to real world events.

Sonar and Other Transducers

Active sonar and other transducers emit non-impulsive sound waves into the water to detect objects, safely navigate, and communicate. Passive sonars differ from active sound sources in that they do not emit acoustic signals; rather, they only receive acoustic information about the environment, or listen.

The Navy employs a variety of sonars and other transducers to obtain and transmit information about the undersea environment. Some examples are mid-frequency hull-mounted sonar used to find and track submarines; high-frequency small object detection sonars used to detect mines; high frequency underwater modems used to transfer data over short ranges; and extremely high-frequency (>200 kilohertz (kHz)). Doppler sonars used for navigation, like those used on commercial and private vessels. The characteristics of these sonars and other transducers, such as source level, beam width, directivity, and frequency, depend on the purpose of the source. Higher frequencies can carry more information or provide more information about objects off which they reflect, but attenuate more rapidly. Lower frequencies attenuate less rapidly, so may detect objects over a longer distance, but with less detail.

Additional detail regarding sound sources and platforms and categories of acoustic stressors was provided in our **Federal Register** notice of proposed rulemaking (83 FR 29872; June 26, 2018); please see that notice of proposed rulemaking or the Navy's application for more information.

Sonars and other transducers are grouped into classes that share an attribute, such as frequency range or purpose of use. Classes are further sorted by bins based on the frequency or bandwidth; source level; and, when warranted, the application in which the source would be used, as follows:

- Frequency of the non-impulsive acoustic source;
  - Low-frequency sources operate below 1 kHz;
  - Mid-frequency sources operate at and above 1 kHz, up to and including 10 kHz;
  - High-frequency sources operate above 10 kHz, up to and including 100 kHz;
  - Very high-frequency sources operate above 100 kHz but below 200 kHz;
- Sound pressure level (SPL) of the non-impulsive source;

○ Greater than 160 decibels (dB) re 1 micro Pascal (µPa), but less than 180 dB re 1 µPa;
○ Equal to 180 dB re 1 µPa and up to 200 dB re 1 µPa;
○ Greater than 200 dB re 1 µPa;
▪ Application in which the source would be used;
○ Sources with similar functions that have similar characteristics, such as pulse length (duration of each pulse), beam pattern, and duty cycle.

The bins used for classifying active sonars and transducers that are quantitatively analyzed in the HSTT Study Area are shown in Table 1 below. While general parameters or source characteristics are shown in the table, actual source parameters are classified.

TABLE 1—SONAR AND TRANSDUCERS QUANTITATIVELY ANALYZED IN THE HSTT STUDY AREA

Source class category	Bin	Description
Low-Frequency (LF): Sources that produce signals less than 1 kHz.	LF3	LF sources greater than 200 dB.
	LF4	LF sources equal to 180 dB and up to 200 dB.
	LF5	LF sources less than 180 dB.
	LF6	LF sources greater than 200 dB with long pulse lengths.
Mid-Frequency (MF): Tactical and non-tactical sources that produce signals between 1–10 kHz.	MF1	Hull-mounted surface ship sonars (*e.g.,* AN/SQS–53C and AN/SQS–60).
	MF1K	Kingfisher mode associated with MF1 sonars.
	MF2	Hull-mounted surface ship sonars (*e.g.,* AN/SQS–56).
	MF3	Hull-mounted submarine sonars (*e.g.,* AN/BQQ–10).
	MF4	Helicopter-deployed dipping sonars (*e.g.,* AN/AQS–13).
	MF5	Active acoustic sonobuoys (*e.g.,* DICASS).
	MF6	Active underwater sound signal devices (*e.g.,* MK84).
	MF8	Active sources (greater than 200 dB) not otherwise binned.
	MF9	Active sources (equal to 180 dB and up to 200 dB) not otherwise binned.
	MF10	Active sources (greater than 160 dB, but less than 180 dB) not otherwise binned.
	MF11	Hull-mounted surface ship sonars with an active duty cycle greater than 80%.
	MF12	Towed array surface ship sonars with an active duty cycle greater than 80%.
	MF13	MF sonar sources.
High-Frequency (HF): Tactical and non-tactical sources that produce signals between 10–100 kHz.	HF1	Hull-mounted submarine sonars (*e.g.,* AN/BQQ–10).
	HF2	HF Marine Mammal Monitoring System.
	HF3	Other hull-mounted submarine sonars (classified).
	HF4	Mine detection, classification, and neutralization sonar *(e.g.,* AQS–20).
	HF5	Active sources (greater than 200 dB) not otherwise binned.
	HF6	Active sources (equal to 180 dB and up to 200 dB) not otherwise binned.
	HF7	Active sources (greater than 160 dB, but less than 180 dB) not otherwise binned.
	HF8	Hull-mounted surface ship sonars (*e.g.,* AN/SQS–61).
Anti-Submarine Warfare (ASW): Tactical sources (*e.g.,* active sonobuoys and acoustic counter-measures systems) used during ASW training and testing activities.	ASW1	MF systems operating above 200 dB.
	ASW2	MF Multistatic Active Coherent sonobuoy (*e.g.,* AN/SSQ–125).
	ASW3	MF towed active acoustic countermeasure systems (*e.g.,* AN/SLQ–25).
	ASW4	MF expendable active acoustic device countermeasures (*e.g.,* MK 3).
	ASW5	MF sonobuoys with high duty cycles.
Torpedoes (TORP): Source classes associated with the active acoustic signals produced by torpedoes.	TORP1	Lightweight torpedo (*e.g.,* MK 46, MK 54, or Anti-Torpedo Torpedo).
	TORP2	Heavyweight torpedo (*e.g.,* MK 48).
	TORP3	Heavyweight torpedo (*e.g.,* MK 48).
Forward Looking Sonar (FLS): Forward or upward looking object avoidance sonars used for ship navigation and safety.	FLS2	HF sources with short pulse lengths, narrow beam widths, and focused beam patterns.
	FLS3	VHF sources with short pulse lengths, narrow beam widths, and focused beam patterns.
Acoustic Modems (M): Systems used to transmit data through the water.	M3	MF acoustic modems (greater than 190 dB).
Swimmer Detection Sonars (SD): Systems used to detect divers and submerged swimmers.	SD1–SD2	HF and VHF sources with short pulse lengths, used for the detection of swimmers and other objects for the purpose of port security.
Synthetic Aperture Sonars (SAS): Sonars in which active acoustic signals are post-processed to form high-resolution images of the seafloor.	SAS1	MF SAS systems.
	SAS2	HF SAS systems.
	SAS3	VHF SAS systems.
	SAS4	MF to HF broadband mine countermeasure sonar.
Broadband Sound Sources (BB): Sonar systems with large frequency spectra, used for various purposes.	BB4	LF to MF oceanographic source.
	BB7	LF oceanographic source.
	BB9	MF optoacoustic source.

Notes: ASW: Antisubmarine Warfare; BB: Broadband Sound Sources; FLS: Forward Looking Sonar; HF: High-Frequency; LF: Low-Frequency; M: Acoustic Modems; MF: Mid-Frequency; SAS: Synthetic Aperture Sonars; SD: Swimmer Detection Sonars; TORP: Torpedoes; VHF: Very High-Frequency.

Air Guns

Small air guns with capacities up to 60 cubic inches (in^3) would be used during testing activities in various offshore areas of the Southern California Range Complex and in the Hawaii Range Complex. Generated impulses would have short durations, typically a few hundred milliseconds, with dominant frequencies below 1 kHz. The root mean square (SPL rms) and peak pressure (SPL peak) at a distance 1 meter (m) from the air gun would be approximately 215 dB re 1 μPa and 227 dB re 1 μPa, respectively, if operated at the full capacity of 60 in^3.

Pile Driving/Extraction

Impact pile driving and vibratory pile removal would occur during construction of an Elevated Causeway System (ELCAS), a temporary pier that allows the offloading of ships in areas without a permanent port. The source levels of the noise produced by impact pile driving and vibratory pile removal from an actual ELCAS impact pile driving and vibratory removal are shown in Table 2.

TABLE 2—ELEVATED CAUSEWAY SYSTEM PILE DRIVING AND REMOVAL UNDERWATER SOUND LEVELS IN THE HSTT STUDY AREA

Pile size and type	Method	Average sound levels at 10 m
24-in. Steel Pipe Pile	Impact [1]	192 dB re 1 μPa SPL rms, 182 dB re 1 μPa^2s SEL (single strike).
24-in. Steel Pipe Pile	Vibratory [2]	146 dB re 1 μPa SPL rms, 145 dB re 1 μPa^2s SEL (per second of duration).

[1] Illingworth and Rodkin (2016), [2] Illingworth and Rodkin (2015).
Notes: in = inch, SEL = Sound Exposure Level, SPL = Sound Pressure Level, rms = root mean squared, dB re 1 μPa = decibels referenced to 1 micropascal.

The size of the pier and number of piles used in an ELCAS event is approximately 1,520 ft long, requiring 119 supporting piles. Construction of the ELCAS would involve intermittent impact pile driving over approximately 20 days. Crews work 24 hours (hrs) a day and would drive approximately 6 piles in that period. Each pile takes about 15 minutes to drive with time taken between piles to reposition the driver. When training events that use the ELCAS are complete, the structure would be removed using vibratory methods over approximately 10 days. Crews would remove about 12 piles per 24-hour period, each taking about 6 minutes to remove.

Explosive Stressors

This section describes the characteristics of explosions during naval training and testing. The activities analyzed in the Navy's rulemaking/LOA application that use explosives are described in Appendix A (Navy Activity Descriptions) of the HSTT FEIS/OEIS. Additional detail regarding explosive stressors was provided in our **Federal Register** notice of proposed rulemaking (83 FR 29872; June 26, 2018); please see that notice of proposed rulemaking or the Navy's application for more information.

Explosive detonations during training and testing activities are associated with high-explosive munitions, including, but not limited to, bombs, missiles, rockets, naval gun shells, torpedoes, mines, demolition charges, and explosive sonobuoys. Explosive detonations during training and testing involving the use of high-explosive munitions (including bombs, missiles, and naval gun shells) could occur in the air or at the water's surface. Explosive detonations associated with torpedoes and explosive sonobuoys would occur in the water column; mines and demolition charges would be detonated in the water column or on the ocean bottom. Most detonations would occur in waters greater than 200 ft in depth, and greater than 3 nautical miles (Nmi) from shore, although most mine warfare, demolition, and some testing detonations would occur in shallow water close to shore. Those that occur close to shore are typically conducted on designated ranges.

In order to better organize and facilitate the analysis of explosives used by the Navy during training and testing that could detonate in water or at the water surface, explosive classification bins were developed. Explosives detonated in water are binned by net explosive weight. The bins of explosives that are for use in the HSTT Study Area are shown in Table 3 below.

TABLE 3—EXPLOSIVES ANALYZED IN THE HSTT STUDY AREA

Bin	Net explosive weight [1] (lb)	Example explosive source
E1	0.1–0.25	Medium-caliber projectile.
E2	>0.25–0.5	Medium-caliber projectile.
E3	>0.5–2.5	Large-caliber projectile.
E4	>2.5–5	Mine neutralization charge.
E5	>5–10	5-inch projectile.
E6	>10–20	Hellfire missile.
E7	>20–60	Demo block/shaped charge.
E8	>60–100	Light-weight torpedo.
E9	>100–250	500 lb. bomb.
E10	>250–500	Harpoon missile.
E11	>500–650	650 lb. mine.
E12	>650–1,000	2,000 lb. bomb.
E13 [2]	>1,000–1,740	Multiple Mat Weave charges.

[1] Net Explosive Weight refers to the equivalent amount of TNT.
[2] E13 is not modeled for protected species impacts in water because most energy is lost into the air or to the bottom substrate due to detonation in very shallow water. In addition, activities are confined to small coves without regular marine mammal occurrence. These are not single charges, but multiple smaller charges detonated simultaneously or within a short time period.

Explosive Fragments

Marine mammals could be exposed to fragments from underwater explosions associated with the specified activities. When explosive ordnance (*e.g.,* bomb or missile) detonates, fragments of the weapon are thrown at high-velocity from the detonation point, which can injure or kill marine mammals if they are struck. These fragments may be of variable size and are ejected at supersonic speed from the detonation. The casing fragments will be ejected at velocities much greater than debris from any target due to the proximity of the casing to the explosive material. Risk of fragment injury reduces exponentially with distance as the fragment density is reduced. Fragments underwater tend to be larger than fragments produced by in-air explosions (Swisdak and Montaro, 1992). Underwater, the friction of the water would quickly slow these fragments to a point where they no longer pose a threat. In contrast, the blast wave from an explosive detonation moves efficiently through the seawater. Because the ranges to mortality and injury due to exposure to the blast wave far exceed the zone where fragments could injure or kill an animal, the thresholds are assumed to encompass risk due to fragmentation.

Other Stressor—Vessel Strike

Vessel strikes are not specific to any particular training or testing activity, but rather a potential, limited, sporadic, and incidental result of Navy vessel movement within the HSTT Study Area. Navy vessels transit at speeds that are optimal for fuel conservation or to meet training and testing requirements. Should a vessel strike occur, it would likely result in incidental take from serious injury and/or mortality and, accordingly, for the purposes of the analysis we assume that any authorized ship strike would result in serious injury or mortality. Information on Navy vessel movements is provided in the *Planned Activities* section. Additional detail on vessel strike was provided in our **Federal Register** notice of proposed rulemaking (83 FR 29872; June 26, 2018); please see that notice of proposed rulemaking or the Navy's application for more information. Additionally, as referenced above and described in more detail in the *Estimated Take of Marine Mammals* section, on September 10, 2018, and October 26, 2018, the Navy provided additional information withdrawing and reducing certain species from their request for serious injury or mortality takes from vessel strike with explanation supporting the Navy's change in requested take.

Planned Activities

Planned Training Activities

The training activities that the Navy plans to conduct in the HSTT Study Area are summarized in Table 4. The table is organized according to primary mission areas and includes the activity name, associated stressors applicable to these regulations, description of the activity, sound source bin, the number of planned activities, and the locations of those activities in the HSTT Study Area. For further information regarding the primary platform used (*e.g.,* ship or aircraft type) see Appendix A (Navy Activity Descriptions) of the HSTT FEIS/OEIS.

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Table 4. Training activities analyzed in the HSTT Study Area.

Stressor Category	*Activity Name*	*Description*	*Source Bin* [1]	*Location*[2]	*Annual # of Activities*[3]	*5-Year # of Activities*	*Duration per Activity*
Major Training Exercises – Large Integrated Anti-Submarine Warfare							
Acoustic	Composite Training Unit Exercise	Aircraft carrier and associated aircraft integrate with surface and submarine units in a challenging multi-threat operational environment in order to certify them for deployment. Only the anti-submarine warfare portion of Composite Training Unit Exercise is included in this activity; other training objectives are met via unit level training	ASW1 ASW2 ASW3 ASW4 ASW5 HF1 LF6 MF1 MF3 MF4 MF5 MF11 MF12	SOCAL, PMSR[4]	2-3	12	21 days
Acoustic	Rim of the Pacific Exercise [5]	Biennial multinational training exercise in which navies from Pacific Rim nations and others conduct training throughout the Hawaiian Islands in a number of warfare areas. Components of a Rim of the Pacific exercise, such as certain mine warfare and amphibious training, may be conducted in the Southern California Range Complex	ASW2 ASW3 ASW4 HF1 HF3 HF4 M3 MF1 MF3 MF4 MF5 MF11	HRC SOCAL, PMSR	0-1 0-1	2 2	30 days
Major Training Exercises – Medium Integrated Anti-Submarine Warfare							
Acoustic	Fleet Exercise/ Sustainment Exercise	Aircraft carrier and associated aircraft integrates with surface and submarine units in challenging multi-threat operational environment in order to maintain their ability to deploy. Fleet Exercises and Sustainment Exercises are similar to Composite Training Unit Exercises, but are shorter in duration	ASW1 ASW2 ASW3 ASW4 HF1 LF6 MF1 MF3 MF4 MF5 MF11 MF12	HRC SOCAL, PMSR	1 5	3 22	Up to 10 days
Acoustic	Undersea Warfare Exercise	Elements of anti-submarine warfare tracking exercise combine in this exercise of multiple air, surface, and subsurface units, over a period of several days	ASW3 ASW4 HF1 LF6 MF1 MF3 MF4 MF5 MF11	HRC	3	12	4 days

			MF12				
Integrated/Coordinated Training							
Acoustic	Small Integrated Anti-Submarine Warfare	Multiple ships and aircraft coordinate use of sensors, including sonobuoys, to search, detect, and track threat submarine	ASW2 ASW3 ASW4 HF1 MF1 MF1K MF3 MF4 MF5 MF6 MF12 TORP1 TORP2	HRC SOCAL	1 2-3	2 12	2-5 days
Acoustic	Medium Coordinated Anti-Submarine Warfare	Training for prospective Commanding Officers on submarines to assess officers' abilities to operate in numerous hostile environments, encompassing surface vessels, aircraft, and other submarines	ASW3 ASW4 HF1 MF1 MF3 MF4 MF5 TORP1 TORP2	HRC SOCAL	2 2	10 2	3-10 days
Acoustic	Small Coordinated Anti-Submarine Warfare	Multiple ships and helicopters integrate the use of their sensors, including sonobuoys, to search for, detect, classify, localize, and track a threat submarine to launch a torpedo	ASW2 ASW3 ASW4 HF1 MF1 MF3 MF4 MF5 MF11 MF12	HRC SOCAL	2 10-14	10 58	2-4 days
Amphibious Warfare							
Explosive	Naval Surface Fire Support Exercise – at Sea	Surface ship uses large-caliber gun to support forces ashore; Land targets are simulated at sea. Rounds impact water and scored by passive acoustic hydrophones located at or near target area	E5	HRC (W188)	15	75	8 hrs
Acoustic	Amphibious Marine Expeditionary Unit Exercise	Navy and Marine Corps forces conduct advanced integration training in preparation for deployment certification	ASW1 LF6 MF1 MF3 MF11 MF12 HF1	SOCAL	2-3	12	5-7 days
Acoustic	Marine Expeditionary Unit Composite Training Unit Exercise	Amphibious Ready Group exercises are conducted to validate the Marine Expeditionary Unit's readiness for deployment	ASW2 ASW3 ASW4 HF1 MF1	SOCAL	2-3	12	Up to 21 days

		and includes small boat raids; visit, board, search, and seizure training; helicopter and mechanized amphibious raids; and non-combatant evacuation operation	MF3 MF4 MF5 MF11				
Anti-Submarine Warfare							
Acoustic	Anti-Submarine Warfare Torpedo Exercise – Helicopter	Helicopter crews search for, track, and detect submarines. Recoverable air launched torpedoes are employed against submarine targets	MF4 MF5 TORP1	HRC SOCAL	6 104	30 520	2-5 hrs
Acoustic	Anti-Submarine Warfare Torpedo Exercise – Maritime Patrol Aircraft	Maritime patrol aircraft crews search for, track, and detect submarines. Recoverable air launched torpedoes are employed against submarine targets.	MF5 TORP1	HRC SOCAL	10 25	50 125	2-8 hrs
Acoustic	Anti-Submarine Warfare Torpedo Exercise – Ship	Surface ship crews search for, track, and detect submarines. Exercise torpedoes are used during this event	ASW3 MF1 TORP1	HRC SOCAL	50 117	250 585	2-5 hrs
Acoustic	Anti-Submarine Warfare Torpedo Exercise – Submarine	Submarine crews search for, track, and detect submarines. Exercise torpedoes are used during this event	ASW4 HF1 MF3 TORP2	HRC SOCAL	48 13	240 65	8 hrs
Acoustic	Anti-Submarine Warfare Tracking Exercise – Helicopter	Helicopter crews search for, track, and detect submarines	MF4 MF5	HRC SOCAL, PMSR HSTT Transit Corridor	159 524 6	795 2,620 30	2-4 hrs
Acoustic	Anti-Submarine Warfare Tracking Exercise – Maritime Patrol Aircraft	Maritime patrol aircraft aircrews search for, track, and detect submarines. Recoverable air launched torpedoes are employed against submarine targets	MF5	HRC SOCAL, PMSR	32 56	160 280	2-8 hrs
Acoustic	Anti-Submarine Warfare Tracking Exercise – Ship[6]	Surface ship crews search for, track, and detect submarines	ASW3 MF1 MF11 MF12	HRC SOCAL, PMSR	224 423	1,120 2,115	2-4 hrs
Acoustic	Anti-Submarine Warfare Tracking Exercise – Submarine	Submarine crews search for, track, and detect submarines	ASW4 HF1 HF3 MF3	HRC SOCAL, PMSR HSTT Transit	200 50	1,000 250	8 hrs

				Corridor	7	35	
Explosive, Acoustic	Service Weapons Test	Air, surface, or submarine crews employ explosive torpedoes against virtual targets	HF1 MF3 MF6 TORP2 E11	HRC SOCAL	2 1	10 5	8 hrs
Mine Warfare							
Acoustic	Airborne Mine Countermeasure – Mine Detection	Helicopter aircrews detect mines using towed or laser mine detection systems	HF4	SOCAL	10	50	2 hrs
Explosive, Acoustic	Civilian Port Defense – Homeland Security Anti-Terrorism/Force Protection Exercises	Maritime security personnel train to protect civilian ports against enemy efforts to interfere with access to those ports	HF4 SAS2 E2 E4	Pearl Harbor, HI San Diego, CA	1 1-3	5 12	Multiple days
Explosive	Marine Mammal Systems	Navy deploys trained bottlenose dolphins and California sea lions as part of a marine mammal mine-hunting and object-recovery system	E7	HRC SOCAL	10 175	50 875	Varies
Acoustic	Mine Countermeasure Exercise – Ship Sonar	Ship crews detect and avoid mines while navigating restricted areas or channels using active sonar	HF4 HF8 MF1K	HRC SOCAL	30 92	150 460	1.5-4 hrs
Acoustic	Mine Countermeasure Exercise - Surface	Mine countermeasure ship crews detect, locate, identify, and avoid mines while navigating restricted areas or channels, such as while entering or leaving port	HF4	SOCAL	266	1,330	1.5-4 hrs
Explosive, Acoustic	Mine Countermeasure Mine Neutralization Remotely Operated Vehicle	Ship, small boat, and helicopter crews locate and disable mines using remotely operated underwater vehicles	HF4 E4	HRC SOCAL	6 372	30 1,860	1.5 to 4 hrs
Explosive	Mine Neutralization Explosive Ordnance Disposal	Personnel disable threat mines using explosive charges	E4 E5 E6 E7	HRC (Puuloa) SOCAL (IB, SSTC, SOAR)	20 170	100 970	Up to 4 hrs
Acoustic	Submarine Mine Exercise	Submarine crews practice detecting mines in a designated area	HF1	HRC SOCAL	40 12	200 60	6 hrs
Acoustic	Surface Ship Object Detection	Ship crews detect and avoid mines while navigating restricted areas or channels	MF1K HF8	HRC SOCAL	42 164	210 820	30 minutes to 1 hr

		using active sonar					
Explosive	Underwater Demolitions Multiple Charge – Mat Weave and Obstacle Loading	Military personnel use explosive charges to destroy barriers or obstacles to amphibious vehicle access to beach areas	E10 E13	SOCAL (Northwest Harbor)	18	90	4 hrs
Explosive	Underwater Demolition Qualification and Certification	Navy divers conduct various levels of training and certification in placing underwater demolition charges	E5 E6 E7	HRC (Puuloa) SOCAL	25 120	125 600	Varies
Surface Warfare							
Explosive	Bombing Exercise Air-to-Surface	Fixed-wing aircrews deliver bombs against surface targets	E9 E10 E12	HRC SOCAL HSTT Transit Corridor	187 640 5	935 3,200 25	1 hr
Explosive	Gunnery Exercise Surface-to-Surface Boat Medium-Caliber	Small boat crews fire medium-caliber guns at surface targets	E1 E2	HRC SOCAL	10 14	50 70	1 hr
Explosive	Gunnery Exercise Surface-to-Surface Ship Large-caliber	Surface ship crews fire large-caliber guns at surface targets	E3 E5	HRC SOCAL HSTT Transit Corridor	32 200 13	160 1,000 65	Up to 3 hrs
Explosive	Gunnery Exercise Surface-to-Surface Ship Medium-Caliber	Surface ship crews fire medium-caliber guns at surface targets	E1 E2	HRC SOCAL HSTT Transit Corridor	50 180 40	1250 900 200	2-3 hrs
Acoustic, Explosive	Independent Deployer Certification Exercise/Tailored Surface Warfare Training	Multiple ships, aircraft, submarines conduct integrated multi-warfare training with surface warfare emphasis. Serves as ready-to-deploy certification for individual surface ships tasked with surface warfare missions	ASW2 ASW3 ASW4 HF1 MF1 MF3 MF4 MF5 MF11 E1 E3 E6 E10	SOCAL	1	5	15 days
Explosive	Integrated Live Fire Exercise	Naval Forces defend against swarm of surface threats (ships or small boats) with	E1 E3 E6	HRC (W188A) SOCAL	1 1	5 5	6-8 hrs

		bombs, missiles, rockets, and small-, medium- and large-caliber guns	E10	(SOAR)			
Explosive	Missile Exercise Air-to-Surface	Fixed-wing, helicopter aircrews fire air-to-surface missiles at surface targets	E6 E8 E10	HRC SOCAL	10 210	50 1,050	1 hr
Explosive	Missile Exercise Air-to-Surface Rocket	Helicopter aircrews fire precision-guided and unguided rockets at surface targets	E3	HRC SOCAL	227 246	1,135 1,120	1 hr
Explosive	Missile Exercise Surface-to-Surface	Surface ship crews defend against surface threats (ships or small boats) and engage them with missiles	E6 E10	HRC (W188A) SOCAL (W291)	20 10	100 50	2-5 hrs
Acoustic, Explosive	Sinking Exercise	Aircraft, ship, submarine crews deliberately sink seaborne target, usually decommissioned ship made environmentally safe for sinking according to U.S. Environmental Protection Agency standards, with variety of munitions	TORP2 E5 E8 E9 E10 E11 E12	HRC SOCAL	1-3 0-1	7 1	4-8 hrs, over 1-2 days
Other Training Activities							
Pile driving	Elevated Causeway System	Pier constructed off of a beach. Piles driven into bottom with impact hammer. Piles removed from seabed via vibratory extractor. Only in-water impacts are analyzed	Impact hammer or vibratory extractor	SOCAL	2	10	Up to 20 days for construct-ion; up to 10 days for removal
Acoustic	Kilo Dip	Functional check of dipping sonar prior to conducting full test or training event on the dipping sonar	MF4	HRC SOCAL	60 2,400	300 12,000	1.5 hrs
Acoustic	Submarine Navigation Exercise	Submarine crews operate sonar for navigation and object detection while transiting into and out of port during reduced visibility	HF1 MF3	Pearl Harbor, HI San Diego Bay, CA	220 80	1,100 400	Up to 2 hrs
Acoustic	Submarine Sonar Maintenance and Systems Checks	Maintenance of submarine sonar systems is conducted pierside or at sea	MF3	HRC Pearl Harbor, HI SOCAL San Diego Bay, CA HSTT Transit Corridor	260 260 93 92 10	1,300 1,300 465 460 50	Up to 1 hr

Acoustic	Submarine Under Ice Certification	Submarine crews train to operate under ice. Ice conditions are simulated during training and certification events	HF1	HRC SOCAL	12 6	60 30	Up to 1 hr
Acoustic	Surface Ship Sonar Maintenance and Systems Checks	Maintenance of surface ship sonar systems is conducted pierside or at sea	HF8 MF1	HRC Pearl Harbor, HI SOCAL San Diego Bay, CA HSTT Transit Corridor	75 80 250 250 8	375 400 1,250 1,250 40	Up to 4 hrs
Acoustic	Unmanned Underwater Vehicle Training –Certification and Development	Unmanned underwater vehicle certification involves training with unmanned platforms to ensure submarine crew proficiency. Tactical development involves training with various payloads for multiple purposes to ensure systems can be employed effectively	FLS2 M3 SAS2 SAS4	HRC SOCAL	25 10	125 50	2 days

[1] Additional activities utilizing sources not listed in the Sonar Bin column may occur durmg integrated/coordmated exercises; All acoustic sources that may be used during training and testing activities have been accounted for in the modeling and analysis.
[2] Locations given are areas where activities typically occur. However, activities could be conducted in other locations within the HSTT Study Area.Where multiple locations are provided, the number of activities could occur in any of the locations, not in each of the locations.
[3] For activities where maximum number of events could vary between years, information is presented as 'representative-maximum' number of events per year. For activities where no variation is anticipated, only maximum number of events within as single year is provided.
[4] PMSR indicates only the portion of the Point Mugu Sea Range that overlaps Southern California portion of the HSTT Study Area.
[5] Rim of the Pacific (RIMPAC) training exercises typically occur every other year. This exercise is comprised of various activities accounted for elsewhere within Table 4. Some components of RIMPAC are conducted in SOCAL.
[6] For Anti-submarine Warfare Tracking Execise-Ship, 50 percent of requirements are met through synthetic training or other training exercises.
Notes: HRC = Hawaii Range Complex portion of HSTT, SOCAL = Southern California Range Complex portion of , HSTT = Hawaii-Southern California Training and Testing, PMSR = Point Mugu Sea Range Overlap, SOAR = Southern California Anti-Submarine Warfare Range, IB = Imperial Beach Minefield

Planned Testing Activities

Testing activities covered in these regulations are described in Table 5 through Table 8.

Naval Air Systems Command

Table 5 summarizes the planned testing activities for the Naval Air Systems Command analyzed within the HSTT Study Area.

Table 5. Naval Air Systems Command testing activities analyzed in the HSTT Study Area.

Stressor Category	*Activity Name*	*Description*	*Source Bin*	*Location*	*Annual # of Activities*	*5-Year # of Activities*	*Typical Duration per Activity*
Anti-Submarine Warfare							
Acoustic	Anti-Submarine Warfare Torpedo Test	This event is similar to the training event torpedo exercise. Test evaluates anti-submarine warfare systems onboard rotary-wing and fixed-wing aircraft and the ability to search for, detect, classify, localize, track, and attack a submarine or similar target.	MF5, TORP1	HRC	17-22	95	2-6 hrs
				SOCAL	35-71	247	
Explosive, Acoustic	Anti-Submarine Warfare Tracking Test – Helicopter	This event is similar to the training event anti-submarine tracking exercise – helicopter. The test evaluates the sensors and systems used to detect and track submarines and to ensure that helicopter systems used to deploy the tracking systems perform to specifications.	MF4, MF5, E3	SOCAL	30-132	252	2 hrs
Explosive, Acoustic	Anti-Submarine Warfare Tracking Test – Maritime Patrol Aircraft	The test evaluates the sensors and systems used by maritime patrol aircraft to detect and track submarines and to ensure that aircraft systems used to deploy the tracking systems perform to specifications and meet operational requirements.	ASW2, ASW5, MF5, MF6, E1, E3	HRC	54-61	284	4-6 hrs
				SOCAL	58-68	310	
Explosive, Acoustic	Sonobuoy Lot Acceptance Test	Sonobuoys are deployed from surface vessels and aircraft to verify the integrity and performance of a lot or group of sonobuoys in advance of delivery to the fleet for operational use.	ASW2, ASW5, HF5, HF6, LF4, MF5, MF6, E1, E3, E4	SOCAL	160	800	6 hrs
Mine Warfare							
Acoustic	Airborne Dipping Sonar Minehunting Test	A mine-hunting dipping sonar system that is deployed from a helicopter and uses high-frequency sonar for the detection and classification of bottom and moored mines.	HF4	SOCAL	0-12	12	2 hrs
Explosive	Airborne Mine Neutralization System Test	A test of the airborne mine neutralization system that evaluates the system's ability to detect and destroy mines from an airborne mine countermeasures capable helicopter (*e.g.*, MH-60). The airborne mine neutralization system uses up to four unmanned underwater vehicles equipped with high-frequency sonar, video cameras, and explosive and non-explosive neutralizers.	E4	SOCAL	11-31	75	2.5 hrs
Acoustic	Airborne Sonobuoy Minehunting Test	A mine-hunting system made up of sonobuoys deployed from a helicopter. A field of sonobuoys, using high-frequency sonar, is used for detection and classification of bottom and moored mines.	HF6	SOCAL	3-9	21	2 hrs

Surface Warfare							
Explosive	Air-to-Surface Bombing Test	This event is similar to the training event bombing exercise air-to-surface. Fixed-wing aircraft test the delivery of bombs against surface maritime targets with the goal of evaluating the bomb, the bomb carry and delivery system, and any associated systems that may have been newly developed or enhanced.	E9	HRC	8	40	2 hrs
				SOCAL	14	70	
Explosive	Air-to-Surface Gunnery Test	This event is similar to the training event gunnery exercise air-to-surface. Fixed-wing and rotary-wing aircrews evaluate new or enhanced aircraft guns against surface maritime targets to test that the gun, gun ammunition, or associated systems meet required specifications or to train aircrew in the operation of a new or enhanced weapons system.	E1	HRC	5	25	2-2.5 hrs
				SOCAL	30-60	240	
Explosive	Air-to-Surface Missile Test	This event is similar to the training event missile exercise air-to-surface. Test may involve both fixed-wing and rotary-wing aircraft launching missiles at surface maritime targets to evaluate the weapons system or as part of another systems integration test.	E6, E9, E10	HRC	18	90	2-4 hrs
				SOCAL	48-60	276	
Explosive	Rocket Test	Rocket tests are conducted to evaluate the integration, accuracy, performance, and safe separation of guided and unguided 2.75-inch rockets fired from a hovering or forward flying helicopter or tilt rotor aircraft.	E3	HRC	2	10	1.5-2.5 hrs
				SOCAL	18-22	102	
Other Testing Activities							
Acoustic	Kilo Dip	Functional check of a helicopter deployed dipping sonar system (*e.g.*, AN/AQS-22) prior to conducting a testing or training event using the dipping sonar system.	MF4	SOCAL	0-6	6	1.5 hrs
Acoustic	Undersea Range System Test	Post installation node survey and test and periodic testing of range Node transmit functionality.	FLS2, BB4 MF9	HRC	11-28	90	8 hrs

Naval Sea Systems Command

Table 6 summarizes the planned testing activities for the Naval Sea Systems Command analyzed within the HSTT Study Area.

Table 6. Naval Sea Systems Command testing activities analyzed in the HSTT Study Area.

Stressor Category	*Activity Name*	*Description*	*Source Bin*	*Location*	*Annual # of Activities*	*5-Year # of Activities*	*Typical Duration per Activity*
Anti-Submarine Warfare							
Acoustic	Anti-Submarine Warfare Mission Package Testing	Ships and their supporting platforms (*e.g.*, rotary-wing aircraft and unmanned aerial systems) detect, localize, and prosecute submarines.	ASW1, ASW2, ASW3, ASW5, MF1, MF4, MF5, MF12, TORP1	HRC	22	110	4-8 hrs per day over 1-2 weeks
				SOCAL	23	115	
Acoustic	At-Sea Sonar Testing	At-sea testing to ensure systems are fully functional in an open ocean environment.	ASW3, ASW4, HF1, LF4, LF5, M3, MF1, MF1K, MF2, MF3, MF5, MF9, MF10, MF11	HRC	16	78	4 hrs-11 days
				HRC - SOCAL	1	5	
				SOCAL	20-21	99	
Acoustic	Countermeasure Testing	Countermeasure testing involves the testing of systems that will detect, localize, and track incoming weapons, including marine vessel targets. Testing includes surface ship torpedo defense systems and marine vessel stopping payloads.	ASW3, ASW4, HF5, TORP1, TORP2	HRC	8	40	4 hrs-6 days
				HRC - SOCAL	4	20	
				SOCAL	11	55	
				HSTT Transit Corridor	2	10	
Acoustic	Pierside Sonar Testing	Pierside testing to ensure systems are fully functional in a controlled pierside environment prior to at-sea test activities.	HF1, HF3, HF8, M3, MF1, MF3, MF9	Pearl Harbor, HI	7	35	Up to 3 weeks, intermittent sonar use
				San Diego, CA	7	35	
Acoustic	Submarine Sonar Testing/Maintenance	Pierside and at-sea testing of submarine systems occurs periodically following major maintenance periods and for routine maintenance.	HF1, HF3, M3, MF3	HRC	4	20	Up to 3 weeks, intermittent sonar use
				Pearl Harbor, HI	17	85	
				San Diego, CA	24	120	
Acoustic	Surface Ship Sonar Testing/Maintenance	Pierside and at-sea testing of ship systems occurs periodically following major maintenance periods and for routine	ASW3, MF1, MF1K, MF9, MF10	HRC	3	15	Up to 3 weeks, intermittent sonar use
				Pearl Harbor, HI	3	15	

		maintenance.		San Diego, CA	3	15	
				SOCAL	3	15	
Explosive, Acoustic	Torpedo (Explosive) Testing	Air, surface, or submarine crews employ explosive and non-explosive torpedoes against artificial targets.	ASW3, HF1, HF5, HF6, MF1, MF3, MF4, MF5, MF6, TORP1, TORP2, E8, E11	HRC	8	40	1-2 days, daylight hours only
				HRC SOCAL	3	15	
				SOCAL	8	40	
Acoustic	Torpedo (Non-Explosive) Testing	Air, surface, or submarine crews employ non-explosive torpedoes against submarines or surface vessels.	ASW3, ASW4, HF1, HF6, M3, MF1, MF3, MF4, MF5, MF6, TORP1, TORP2, TORP3	HRC	8	40	Up to 2 weeks
				HRC SOCAL	9	45	
				SOCAL	8	40	
Mine Warfare							
Explosive, Acoustic	Mine Countermeasure and Neutralization Testing	Air, surface, and subsurface vessels neutralize threat mines and mine-like objects.	HF4, E4	SOCAL	11	55	1-10 days, intermittent use of systems
Explosive, Acoustic	Mine Countermeasure Mission Package Testing	Vessels and associated aircraft conduct mine countermeasure operations.	HF4, SAS2, E4	HRC	19	80	1-2 weeks, intermittent use of systems
				SOCAL	58	290	
Acoustic	Mine Detection and Classification Testing	Air, surface, and subsurface vessels and systems detect and classify and avoid mines and mine-like objects. Vessels also assess their potential susceptibility to mines and mine-like objects.	HF1, HF8, MF1, MF5	HRC	2	10	Up to 24 days, up to 12 hrs acoustic daily
				HRC SOCAL	2	6	
				SOCAL	11	55	
Surface Warfare							
Explosive	Gun Testing – Large-Caliber	Surface crews test large-caliber guns to defend against surface targets.	E3	HRC	7	35	1-2 weeks
				HRC - SOCAL	72	360	
				SOCAL	7	35	
Explosive	Gun Testing – Medium-Caliber	Surface crews test medium-caliber guns to defend against surface targets.	E1	HRC	4	20	1-2 weeks
				HRC - SOCAL	48	240	
				SOCAL	4	20	
Explosive	Missile and Rocket Testing	Missile and rocket testing includes various missiles or rockets fired	E6	HRC	13	65	1 day-2 weeks
				HRC -	24	120	

		from submarines and surface combatants. Testing of the launching system and ship defense is performed.		SOCAL			
				SOCAL	20	100	
Unmanned Systems							
Acoustic	Unmanned Surface Vehicle System Testing	Testing involves the production or upgrade of unmanned surface vehicles. This may include tests of mine detection capabilities, evaluations of the basic functions of individual platforms, or complex events with multiple vehicles.	HF4, SAS2	HRC	3	15	Up to 10 days
				SOCAL	4	20	
Acoustic	Unmanned Underwater Vehicle Testing	Testing involves the production or upgrade of unmanned underwater vehicles. This may include tests of mine detection capabilities, evaluations of the basic functions of individual platforms, or complex events with multiple vehicles.	HF4, MF9	HRC	3	15	Up to 35 days
				SOCAL	291	1,455	
Vessel Evaluation							
Acoustic	Submarine Sea Trials – Weapons System Testing	Submarine weapons and sonar systems are tested at-sea to meet the integrated combat system certification requirements.	HF1, M3, MF3, MF9, MF10, TORP2	HRC	1	5	Up to 7 days
				SOCAL	1	5	
Explosive	Surface Warfare Testing	Tests the capabilities of shipboard sensors to detect, track, and engage surface targets. Testing may include ships defending against surface targets using explosive and non-explosive rounds, gun system structural test firing, and demonstration of the response to Call for Fire against land-based targets (simulated by sea-based locations).	E1, E5, E8	HRC	9	45	7 days
				HRC - SOCAL	63	313	
				SOCAL	14-16	72	
Acoustic	Undersea Warfare Testing	Ships demonstrate capability of countermeasure systems and underwater surveillance, weapons engagement, and communications systems. This tests ships ability to detect, track, and engage undersea targets.	ASW4, HF4, HF8, MF1, MF4, MF5, MF6, TORP1, TORP2	HRC	7	35	Up to 10 days
				HRC SOCAL	12-16	32	
				SOCAL	11	51	
Acoustic	Vessel Signature Evaluation	Surface ship, submarine and auxiliary system signature assessments. This may include electronic, radar, acoustic, infrared and magnetic signatures.	ASW3	HRC	4	20	Typically 1-5 days, up to 20 days
				HRC SOCAL	36	180	
				SOCAL	24	120	

Other Testing Activities							
Acoustic	Insertion/Extraction	Testing of submersibles capable of inserting and extracting personnel and payloads into denied areas from strategic distances.	M3, MF9	HRC	1	5	Up to 30 days
				SOCAL	1	5	
Acoustic	Signature Analysis Operations	Surface ship and submarine testing of electromagnetic, acoustic, optical, and radar signature measurements.	HF1, M3, MF9	HRC	2	10	Multiple days
				SOCAL	1	5	

Notes: HRC = Hawaii Range Complex, SOCAL = Southern California Range Complex, HSTT = Hawaii-Southern California Training and Testing, CA = California, HI = Hawaii

Office of Naval Research

Table 7 summarizes the planned testing activities for the Office of Naval Research analyzed within the HSTT Study Area.

Table 7. Office of Naval Research testing activities analyzed in the HSTT Study Area.

Stressor Category	***Activity Name***	***Description***	***Source Bin***	***Location***	***Annual # of Activities***	***5-Year # of Activities***	***Typical Duration per Activity***
Acoustic and Oceanographic Science and Technology							
Explosive, Acoustic	Acoustic and Oceanographic Research	Research using active transmissions from sources deployed from ships and unmanned underwater vehicles. Research sources can be used as proxies for current and future Navy systems.	AG, ASW2, BB4, BB7, BB9, LF3, LF4, LF5, MF8, MF9, E3	HRC	2	10	Up to 14 days
				SOCAL	4	20	
Acoustic	Long Range Acoustic Communications	Bottom mounted acoustic source off of the Hawaiian Island of Kauai will transmit a variety of acoustic communications sequences.	LF4	HRC	3	15	Year-round, 200 days of active transmission

Notes: HRC = Hawaii Range Complex, SOCAL = Southern California Range Complex

Space and Naval Warfare Systems Command

Table 8 summarizes the planned testing activities for the Space and Naval Warfare Systems Command analyzed within the HSTT Study Area.

Table 8. Space and Naval Warfare Systems Command testing activities in the HSTT Study Area.

Stressor Category	*Activity Name*	*Description*	*Source Bin*	*Location*	*Annual # of Activities*	*5-Year # of Activities*	*Typical Duration per Activity*
Acoustic	Anti-Terrorism/Force Protection	Testing sensor systems that can detect threats to naval piers, ships, and shore infrastructure.	SD1	San Diego, CA	14	70	1 day
				SOCAL	16	80	
Acoustic	Communications	Testing of underwater communications and networks to extend the principles of FORCEnet below the ocean surface.	ASW2, ASW5, HF6, LF4	HRC	0-1	3	5 days, 6-8 hrs per day
				SOCAL	10	50	
Acoustic	Energy and Intelligence, Surveillance, and Reconnaissance Sensor Systems	Develop, integrate, and demonstrate Intelligence, Surveillance, and Reconnaissance systems and in-situ energy systems to support deployed systems.	AG, HF2, HF7, LF4, LF5, LF6, MF10	HRC	11-15	61	5 days, 6-8 hrs per day
				SOCAL	49-55	253	
				HSTT Transit Corridor	8	40	
Acoustic	Vehicle Testing	Testing of surface and subsurface vehicles and sensor systems, which may involve Unmanned Underwater Vehicles, gliders, and Unmanned Surface Vehicles.	BB4, FLS2, FLS3, HF6, LF3, M3, MF9, MF13, SAS1, SAS2, SAS3	HRC	4	20	5 days, 6-8 hrs per day
				SOCAL	166	830	
				HSTT Transit Corridor	2	10	

Notes: HRC = Hawaii Range Complex, SOCAL = Southern California Range Complex, HSTT = Hawaii-Southern California Training and Testing, CA = California

Summary of Acoustic and Explosive Sources Analyzed for Training and Testing

Table 9 through Table 12 show the acoustic source classes and numbers, explosive source bins and numbers, air gun sources, and pile driving and removal activities associated with Navy training and testing activities in the HSTT Study Area that were analyzed in this rule. Table 9 shows the acoustic source classes (*i.e.,* LF, MF, and HF) that could occur in any year under the Planned Activities for training and testing activities. Under the Planned Activities, acoustic source class use would vary annually, consistent with the number of annual activities summarized above. The five-year total for the Planned Activities takes into account that annual variability.

Table 9. Acoustic source classes analyzed and numbers used during training and testing activities in the HSTT Study Area.

Source Class Category	*Bin*	*Description*	*Unit*[1]	*Training*		*Testing*	
				Annual[2]	*5-year Total*	*Annual*[2]	*5-year Total*
Low-Frequency (LF): Sources that produce signals less than 1 kHz	LF3	LF sources greater than 200 dB	H	0	0	195	975
	LF4	LF sources equal to 180 dB and up to 200 dB	H	0	0	589 – 777	3,131
			C	0	0	20	100
	LF5	LF sources less than 180 dB	H	0	0	1,814 – 2,694	9,950
	LF6	LF sources greater than 200 dB with long pulse lengths	H	121 – 167	668	40–80	240
Mid-Frequency (MF): Tactical and non-tactical sources that produce signals between 1 and 10 kHz	MF1	Hull-mounted surface ship sonars (e.g., AN/SQS-53C and AN/SQS-61)	H	5,779 – 6,702	28,809	1,540	5,612
	MF1K	Kingfisher mode associated with MF1 sonars	H	100	500	14	70
	MF2[3]	Hull-mounted surface ship sonars (e.g., AN/SQS-56)	H	0	0	54	270
	MF3	Hull-mounted submarine sonars (e.g., AN/BQQ-10)	H	2,080 – 2,175	10,440	1,311	6,553
	MF4	Helicopter-deployed dipping sonars (e.g., AN/AQS-22 and AN/AQS-13)	H	414 – 489	2,070	311 – 475	1,717
	MF5	Active acoustic sonobuoys (e.g., DICASS)	C	5,704 – 6,124	28,300	5,250 – 5,863	27,120
Mid-Frequency (MF): Tactical and non-tactical sources that produce signals between 1 and 10 kHz	MF6	Active underwater sound signal devices (e.g., MK 84)	C	9	45	1,141 – 1,226	5,835
	MF8	Active sources (greater than 200 dB) not otherwise	H	0	0	70	350

		binned					
	MF9	Active sources (equal to 180 dB and up to 200 dB) not otherwise binned	H	0	0	5,139 – 5,165	25,753
	MF10	Active sources (greater than 160 dB, but less than 180 dB) not otherwise binned	H	0	0	1,824– 1,992	9,288
	MF11	Hull-mounted surface ship sonars with an active duty cycle greater than 80%	H	718 – 890	3,597	56	280
	MF12	Towed array surface ship sonars with an active duty cycle greater than 80%	H	161 – 215	884	660	3,300
	MF13	MF sonar source	H	0	0	300	1,500
High-Frequency (HF): Tactical and non-tactical sources that produce signals between 10 and 100 kHz	HF1	Hull-mounted submarine sonars (e.g., AN/BQQ-10)	H	1,795 – 1,816	8,939	772	3,859
	HF2	HF Marine Mammal Monitoring System	H	0	0	120	600
	HF3	Other hull-mounted submarine sonars (classified)	H	287	1,345	110	549
High-Frequency (HF): Tactical and non-tactical sources that produce signals between 10 and 100 kHz	HF4	Mine detection, classification, and neutralization sonar (e.g., AN/SQS-20)	H	2,316	10,380	16,299 – 16,323	81,447
	HF5	Active sources (greater than 200 dB) not otherwise binned	H	0	0	960	4,800
			C	0	0	40	200
	HF6	Active sources (equal to 180 dB and up to 200 dB) not otherwise binned	H	0	0	1,000 – 1,009	5,007
	HF7	Active sources (greater than 160 dB, but less than	H	0	0	1,380	6,900

		180 dB) not otherwise binned					
	HF8	Hull-mounted surface ship sonars (e.g., AN/SQS-61)	H	118	588	1,032	3,072
Anti-Submarine Warfare (ASW): Tactical sources (e.g., active sonobuoys and acoustic countermeasures systems) used during ASW training and testing activities	ASW1	MF systems operating above 200 dB	H	194 – 261	1,048	470	2,350
	ASW2	MF Multistatic Active Coherent sonobuoy (e.g., AN/SSQ-125)	C	688–790	3,346	4,334 – 5,191	23,375
	ASW3	MF towed active acoustic countermeasure systems (e.g., AN/SLQ-25)	H	5,005 – 6,425	25,955	2,741	13,705
Anti-Submarine Warfare (ASW): Tactical sources (e.g., active sonobuoys and acoustic countermeasures systems) used during ASW training and testing activities	ASW4	MF expendable active acoustic device countermeasures (e.g., MK 3)	C	1,284 – 1,332	6,407	2,244	10,910
	ASW5 [4]	MF sonobuoys with high duty cycles	H	220– 300	1,260	522–592	2,740
Torpedoes (TORP): Source classes associated with the active acoustic signals produced by torpedoes	TORP 1	Lightweight torpedo (e.g., MK 46, MK 54, or Anti-Torpedo Torpedo)	C	231–237	1,137	923 – 971	4,560
	TORP 2	Heavyweight torpedo (e.g., MK 48)	C	521 – 587	2,407	404	1,948
	TORP 3		C	0	0	45	225
Forward Looking Sonar (FLS): Forward or upward looking object avoidance sonars used for ship navigation and safety	FLS2	HF sources with short pulse lengths, narrow beam widths, and focused beam patterns	H	28	140	448 – 544	2,432
	FLS3	VHF sources with short pulse lengths, narrow beam widths, and focused beam patterns	H	0	0	2,640	13,200
Acoustic Modems (M): Systems used to transmit data through the water	M3	MF acoustic modems (greater than 190 dB)	H	61	153	518	2,588

Swimmer Detection Sonars (SD): Systems used to detect divers and submerged swimmers	SD1 – SD2	HF and VHF sources with short pulse lengths, used for the detection of swimmers and other objects for the purpose of port security	H	0	0	10	50
Synthetic Aperture Sonars (SAS): Sonars in which active acoustic signals are post-processed to form high-resolution images of the seafloor	SAS1	MF SAS systems	H	0	0	1,960	9,800
	SAS2	HF SAS systems	H	900	4,498	8,584	42,920
	SAS3	VHF SAS systems	H	0	0	4,600	23,000
	SAS4	MF to HF broadband mine countermeasure sonar	H	42	210	0	0
Broadband Sound Sources (BB): Sonar systems with large frequency spectra, used for various purposes	BB4	LF to MF oceanographic source	H	0	0	810 – 1,170	4,434
	BB7	LF oceanographic source	C	0	0	28	140
	BB9	MF optoacoustic source	H	0	0	480	2,400

[1] H = hours; C = count (e.g., number of individual pings or individual sonobuoys).
[2] Expected annual use may vary per bin because the number of events may vary from year to year, as described in Section 1.5 (Specified Activities).
[3] MF2/MF2K are sources on frigate class ships, which were decommissioned during Phase II.
[4] Formerly ASW2 (H) in Phase II.
Notes: dB = decibel(s), kHz = kilohertz

Table 10 shows the number of air gun shots planned in the HSTT Study Area for training and testing activities.

TABLE 10—TRAINING AND TESTING AIR GUN SOURCES QUANTITATIVELY ANALYZED IN THE HSTT STUDY AREA

Source class category	Bin	Unit [1]	Training		Testing	
			Annual	5-Year total	Annual	5-Year total
Air Guns (AG): Small underwater air guns	AG	C	0	0	844	4,220

[1] C = count. One count (C) of AG is equivalent to 100 air gun firings.

Table 11 summarizes the impact pile driving and vibratory pile removal activities that would occur during a 24-hour period. Annually, for impact pile driving, the Navy will drive 119 piles, two times a year for a total of 238 piles. Over the five-year period of the rule, the Navy will drive a total of 1,190 piles by impact pile driving. Annually, for vibratory pile extraction, the Navy will extract 119 piles, two times a year for a total of 238 piles. Over the five-year period of the rule, the Navy will extract a total of 1,190 piles by vibratory pile extraction.

TABLE 11—SUMMARY OF PILE DRIVING AND REMOVAL ACTIVITIES PER 24-HOUR PERIOD IN THE HSTT STUDY AREA

Method	Piles per 24-hour period	Time per pile minutes	Total estimated time of noise per 24-hour period minutes
Pile Driving (Impact)	6	15	90
Pile Removal (Vibratory)	12	6	72

Table 12 shows the number of in-water explosives that could be used in any year under the Planned Activities for training and testing activities. Under the Planned Activities, bin use would vary annually, consistent with the number of annual activities summarized above. The five-year total for the Planned Activities takes into account that annual variability.

Table 12. Explosive source bins analyzed and numbers used during training and testing activities in the HSTT Study Area.

Bin	*Net Explosive Weight (lb)*	*Example Explosive Source*	*Modeled Underwater Detonation Depths (ft)*[1]	*Training*		*Testing*	
				Annual	*5-year Total*	*Annual*	*5-year Total*
E1	0.1–0.25	Medium-caliber projectiles	0.3, 60	2,940	14,700	8,916 – 15,216	62,880
E2	> 0.25–0.5	Medium-caliber projectiles	0.3, 50	1,746	8,730	0	0
E3	> 0.5–2.5	Large-caliber projectiles	0.3, 60	2,797	13,985	2,880 – 3,124	14,844
E4	> 2.5–5	Mine neutralization charge	10, 16, 33, 50, 61, 65, 650	38	190	634 – 674	3,065
E5	> 5–10	5 in projectiles	0.3, 10, 50	4,730 – 4,830	23,750	1,400	7,000
E6	> 10–20	Hellfire missile	0.3, 10, 50, 60	592	2,872	26 – 38	166
E7	> 20–60	Demo block/ shaped charge	10, 50, 60	13	65	0	0
E8	> 60–100	Lightweight torpedo	0.3, 150	33 – 38	170	57	285
E9	> 100–250	500 lb bomb	0.3	410 – 450	2,090	4	20
E 10	> 250–500	Harpoon missile	0.3	219 – 224	1,100	30	150
E 11	> 500–650	650 lb mine	61, 150	7 – 17	45	12	60
E 12	> 650–1,000	2,000 lb bomb	0.3	16 – 21	77	0	0
E 13	> 1,000–1,740	Multiple Mat Weave charges	NA[2]	9	45	0	0

[1] Net Explosive Weight refers to the amount of explosives; the actual weight of a munition may be larger due to other components.

[2] Not modeled because charge is detonated in surf zone; not a single E13 charge, but multiple smaller charges detonated in quick succession

Notes: in = inch(es), lb = pound(s), ft = feet

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Vessel Movement

Vessels used as part of the Planned Activities include ships, submarines, unmanned vessels, and boats ranging in size from small, 22 ft (7 m) rigid hull inflatable boats to aircraft carriers with lengths up to 1,092 ft (333 m). The average speed of large Navy ships ranges between 10 and 15 knots and submarines generally operate at speeds in the range of 8–13 knots, while a few specialized vessels can travel at faster speeds. Small craft (for purposes of this analysis, less than 18 m in length) have much more variable speeds (0–50+ knots (kn), dependent on the activity), but generally range from 10 to 14 kn. From unpublished Navy data, average median speed for large Navy ships in the HSTT Study Area from 2011–2015 varied from 5–10 kn with variations by ship class and location (*i.e.,* slower speeds close to the coast). While these speeds for large and small craft are representative of most events, some vessels need to temporarily operate outside of these parameters.

The number of Navy vessels used in the HSTT Study Area varies based on military training and testing requirements, deployment schedules, annual budgets, and other dynamic factors. Most training and testing activities involve the use of vessels. These activities could be widely dispersed throughout the HSTT Study Area, but would be typically conducted near naval ports, piers, and range areas. Navy vessel traffic would especially be concentrated near San Diego, California and Pearl Harbor, Hawaii. There is no seasonal differentiation in Navy vessel use because of continual operational requirements from Combatant Commanders. The majority of large vessel traffic occurs between the installations and the OPAREAs. Support craft would be more concentrated in the coastal waters in the areas of naval installations, ports, and ranges. Activities involving vessel movements occur intermittently and are variable in duration, ranging from a few hours up to weeks.

Standard Operating Procedures

For training and testing to be effective, personnel must be able to safely use their sensors and weapon systems as they are intended to be used in a real-world situation and to their optimum capabilities. While standard operating procedures are designed for the safety of personnel and equipment and to ensure the success of training and testing activities, their implementation often yields additional benefits to environmental, socioeconomic, public health and safety, and cultural resources.

Because standard operating procedures are essential to safety and mission success, the Navy considers them to be part of the planned activities, and has included them in the environmental analysis. Additional details on standard operating procedures were provided in our **Federal Register** notice of proposed rulemaking (83 FR 29872; June 26, 2018); please see that notice of proposed rulemaking or the Navy's application for more information.

Duration and Location

Training and testing activities would be conducted under this authorization in the HSTT Study Area throughout the years. The HSTT Study Area (see Figure 1.1–1 of the Navy's rulemaking/LOA application) is comprised of established operating and warning areas across the north-central Pacific Ocean, from the mean high tide line in Southern California west to Hawaii and the International Date Line. The Study Area includes the at-sea areas of three existing range complexes (the Hawaii Range Complex, the SOCAL Range Complex, and the Silver Strand Training Complex), and overlaps a portion of the PMSR. Also included in the Study Area are Navy pierside locations in Hawaii and Southern California, Pearl Harbor, San Diego Bay, and the transit corridor [2] on the high seas where sonar training and testing may occur.

A Navy range complex consists of geographic areas that encompass a water component (above and below the surface) and airspace, and may encompass a land component where training and testing of military platforms, tactics, munitions, explosives, and electronic warfare systems occur. Range complexes include OPAREAs and special use airspace, which may be further divided to provide better control of the area and events being conducted for safety reasons. Please refer to the regional maps provided in the Navy's rulemaking/LOA application (Figures 2–1 through 2–8) for additional detail of the range complexes and testing ranges. Additional detail on range complexes and testing ranges was provided in our **Federal Register** notice of proposed rulemaking (83 FR 29872; June 26, 2018); please see that notice of proposed rulemaking or the Navy's application for more information.

Comments and Responses

We published a notice of proposed regulations in the **Federal Register** on June 26, 2018 (83 FR 29872), with a 45-day comment period. In that notice of proposed rulemaking, we requested public input on the requests for authorization described therein, our analyses, and the proposed authorizations, and requested that interested persons submit relevant information, suggestions, and comments. During the 45-day comment period, we received 22 comment letters in total. Of this total, two submissions were from other Federal agencies, two letters were from organizations or individuals acting in an official capacity (*e.g.,* non-governmental organizations (NGOs)) and 18 submissions were from private citizens. NMFS has reviewed all public comments received on the proposed rule and issuance of the LOAs. All relevant comments and our responses are described below. We provide no response to specific comments that addressed species or statutes not relevant to our proposed actions under section 101(a)(5)(A) of the MMPA (*e.g.,* comments related to sea turtles). We organize our comment responses by major categories.

General Comments

The majority of the 18 comment letters from private citizens expressed general opposition toward the Navy's proposed training and testing activities and requested that NMFS not issue the LOAs, but without providing information relevant to NMFS' decisions. These comments appear to indicate a lack of understanding of the MMPA's requirement that NMFS ''shall issue'' requested authorizations when certain findings (see the *Background* section) can be made; therefore, these comments were not considered further. The remaining comments are addressed below.

Impact Analysis

General

Comment 1: A commenter recommended that the Navy provide NMFS with an acoustics analysis that addresses noise impacts on land, from the air, and underwater. Full environmental analysis of the noise would examine a suite of metrics appropriate to the array of resources impacted. The impacts should discuss potential effects on wildlife, visitors, and other noise-sensitive receivers.

The commenter also recommended that the Navy consider the following as it plans to conduct activities in the HSTT Study Area:

- Use appropriate metrics to assess potential environmental impacts on land and water.
- Determine natural ambient acoustic conditions as a baseline for analysis.
- Assess effects from cumulative noise output, incorporating noise generated from other anthropogenic sources.
- Determine distance at which noise will attenuate to natural levels.
- Assess effects that these noise levels would have on terrestrial wildlife, marine wildlife, and visitors.
- Appropriate and effective mitigation measures should be developed and used to reduce vessel strike (*e.g.,* timing activities to avoid migration, and searching for marine

[2] Vessel transit corridors are the routes typically used by Navy assets to traverse from one area to another. The route depicted in Figure 1–1 of the Navy's rulemaking/LOA application is the shortest route between Hawaii and Southern California, making it the quickest and most fuel efficient. The depicted vessel transit corridor is notional and may not represent the actual routes used by ships and submarines transiting from Southern California to Hawaii and back. Actual routes navigated are based on a number of factors including, but not limited to, weather, training, and operational requirements.

mammals before and during activities and taking avoidance measures).

Response: NMFS refers the commenter to the HSTT FEIS/OEIS which conducts an assessment of all of the activities which comprise the proposed action and their impacts (including cumulative impacts) to relevant resources. The Navy is not required to do ambient noise monitoring or assess impacts to wildlife other than marine mammals or to visitors/tourists. The mitigation measures in the rule include procedural measures to minimize strike (avoiding whales by 500 yards, etc.), mitigation areas to minimize strike in biologically important areas, and Awareness Notification Message areas wherein all vessels are alerted to stay vigilant to the presence of large whales.

Density Estimates

Comment 2. A commenter commented that 30 iterations or Monte Carlo simulations is low for general bootstrapping methods used in those models but understands that increasing the number of iterations in turn increases the computational time needed to run the models. Accordingly, the commenter suggested that the Navy consider increasing the iterations from 30 to at least 200 for activities that have yet to be modeled for upcoming MMPA rulemakings for Navy testing and training activities.

Response: In areas where there are four season, 30 iterations are used in NAEMO which results in a total of 120 iterations per year for each event. However, in areas where only two seasons, warm and cold, the number of iterations per season is increased to 60 so that 120 iterations per year are maintained. Navy reached this number of iterations by running two iterations of a scenario and calculating the mean of exposures, then running a third iteration and calculating the running mean of exposures, then a fourth iteration and so on. This is done until the running mean becomes stable. Through this approach, it was determined 120 iterations was sufficient to converge to a statistically valid answer and provides a reasonable uniformity of exposure predictions for most species and areas. There are a few exceptions for species with sparsely populated distributions or highly variable distributions. In these cases, the running mean may not flatten out (or become stable); however, there were so few exposures in these cases that while the mean may fluctuate, the overall number of exposures did not result in significant differences in the totals. In total, the number of simulations conducted for HSTT Phase III exceeded six million simulations and produced hundreds of terabytes of data. Increasing the number of iterations, based on the discussion above, would not result in a significant change in the results, but would incur a significant increase in resources (*e.g.,* computational and storage requirements). This would divert these resources from conducting other more consequential analysis without providing for meaningfully improved data. The Navy has communicated that it is continually looking at ways to improve NAEMO and reduce data and computational requirements. As technologies and computational efficiencies improve, Navy will evaluate these advances and incorporate them where appropriate. NMFS has reviewed the Navy's approach and concurs that it is technically sound and reflects the best available science.

Comment 3: A commenter had concerns regarding the Navy's pinniped density estimates. Given that a single density was provided for the respective areas and pinnipeds were assumed to occur at sea as individual animals, uncertainty does not appear to have been incorporated in the Navy's animat modeling for pinnipeds. The Navy primarily used sightings or abundance data, assuming certain correction factors, divided by an area to estimate pinniped densities. Many, if not all, of the abundance estimates had associated measures of uncertainty (*i.e.,* coefficients of variation (CV), standard deviation (SD), or standard error (SE)). Therefore, the commenter recommended that NMFS require the Navy to specify whether and how it incorporated uncertainty in the pinniped density estimates into its animat modeling and if it did not, require the Navy to use measures of uncertainty inherent in the abundance data (*i.e.,* CV, SD, SE) similar to the methods used for cetaceans.

Response: As noted in the cited technical report *Quantifying Acoustic Impacts on Marine Mammals and Sea Turtles: Methods and Analytical Approach for Phase III Training and Testing* (U.S. Department of the Navy, 2017a), the Navy did not apply statistical uncertainty outside the survey boundaries into non-surveyed areas, since it deemed application of statistical uncertainty would not be meaningful or appropriate. We note that there are no measures of uncertainty (*i.e.,* no CV, SD, or SE) provided in NMFS Pacific Stock Assessment Report (SAR) Appendix 3 (Carretta *et al.,* 2017) associated with the abundance data for any of the pinniped species present in Southern California or for monk seals in Hawaii. Although some measures of uncertainty are presented in some citations within the SAR and in other relevant publications for some survey findings, it is not appropriate for the Navy to attempt to derive summations of total uncertainty for an abundance when the authors of the cited studies and the SAR have not. For additional information regarding use of pinniped density data, see the cited *U.S. Navy Marine Species Density Database Phase III for the Hawaii-Southern California Training and Testing Study Area* Section 11 (U.S. Department of the Navy, 2017b). As a result of the lack of published applicable measures of uncertainty for pinnipeds, the Navy did not incorporate measures of uncertainty into the pinniped density estimates. NMFS independently reviewed the methods and densities used by the Navy and concur that they are appropriate and reflect the best available science.

Comment 4: A commenter had concerns regarding the various areas, abundance estimates, and correction factors that the Navy used for pinnipeds. The commenter referenced a lot of information in the context of both what the Navy used and what they could have used instead and summarizes the discussion with seven recommendations.

For harbor seals, the area was based on the NMFS SOCAL stratum (extending to the extent of the U.S. exclusive economic zone (EEZ), 370 km from the coast) for its vessel-based surveys (*i.e.,* Barlow 2010) and the Navy applied the density estimates from the coast to 80-km offshore. The commenter believes that this approach is inappropriate and that the Navy should use the area of occurrence to estimate the densities for harbor seals. For harbor seals, the Navy assumed that 22 percent of the stock occurred in SOCAL, citing Department of the Navy (2015). The commenter had two concerns with this approach. First, one has to go to Department of the Navy (2015) to determine the original source of the information (Lowry *et al.,* 2008; see the commenter's February 20, 2014, letter on this matter). Second, Lowry *et al.* (2008) indicated that 23.3 percent of the harbor seal population occurred in SOCAL, not 22 percent as used by the Navy. Therefore, the commenter recommended that, at the very least, NMFS require the Navy to revise the pinniped density estimates using the extent of the coastal range (*e.g.,* from shore to 80 km offshore) of harbor seals as the applicable area, 23.3 percent of the California abundance estimate based on Lowry *et al.* (2008), and an at-sea correction factor of 65 percent based on

Harvey and Goley (2011) for both seasons.

For Monk seals the area was based on the areas within the 200-m isobaths in both the Main and Northwest Hawaiian Islands (MHI and NWHI, respectively) and areas beyond the 200-m isobaths in the U.S. EEZ. The commenter asserted that some of the abundances used were not based on best available science. The Navy noted that its monk seal abundance was less than that reported by Baker *et al.* (2016), but that those more recent data were not available when the Navy's modeling process began. The Baker *et al.* (2016) data have been available for almost two years and should have been incorporated accordingly, particularly since the data would yield greater densities and the species is endangered. For monk seals, the commenter recommended using the 2015 monk seal abundance estimate from Baker *et al.* (2016) and an at-sea correction factor of 63 percent for the MHI based on Baker *et al.* (2016) and 69 percent for the NWHI based on Harting *et al.* (2017).

For the northern fur seals, the area was based on the NMFS SOCAL stratum (extending to the extent of the U.S. EEZ, 370 km from the coast) for its vessel-based surveys (*i.e.,* Barlow 2010). For elephant seals, California sea lions, and Guadalupe fur seals, the area was based on the Navy SOCAL modeling area. The commenter had concerns that these areas are not based on the biology or ecology of these species. The commenter recommended using the same representative area for elephant seals, northern fur seals, Guadalupe fur seals, and California sea lions. The commenter recommended using an increasing trend of 3.8 percent annually for the last 15 years for elephant seals as part of the California population and at least 31,000 as representative of the Mexico population based on Lowry *et al.* (2014). Additionally, the commenter recommended using an at-sea correction factor of 44 percent for the cold season and 48 percent for the warm season for California sea lions based on Lowry and Forney (2005).

Finally, the commenter recommended that NMFS require the Navy to (1) specify the assumptions made and the underlying data that were used for the at-sea correction factors for Guadalupe and northern fur seals and (2) consult with experts in academia and at the NMFS Science Centers to develop more refined pinniped density estimates that account for pinniped movements, distribution, at-sea correction factors, and density gradients associated with proximity to haul-out sites or rookeries.

Response: The Navy provided additional clarification regarding the referenced concerns about areas, abundance estimates, and correction factors that were used for pinnipeds. We note that take estimation is not an exact science. There are many inputs that go into an estimate of marine mammal exposure, and the data upon which those inputs are based come with varying levels of uncertainty and precision. Also, differences in life histories, behaviors, and distributions of stocks can support different decisions regarding methods in different situations. Different methods may be supportable in different situations, and, further, there may be more than one acceptable method to estimate take in a particular situation. Accordingly, while NMFS always ensures that the methods are technically supportable and reflect the best available science, NMFS does not prescribe any one method for estimating take (or calculating some of the specific take estimate components that the commenter is concerned about). NMFS reviewed the areas, abundances, and correction factors used by the Navy to estimate take and concurs that they are appropriate. We note the following in further support of the analysis: While some of the suggestions the commenter makes could provide alternate valid ways to conduct the analyses, these modifications are not required in order to have equally valid and supportable analyses and, further, would not change NMFS' determinations for pinnipeds. In addition, we note that (1) many of the specific recommendations that the commenter makes are largely minor in nature: ''44 not 47 percent,'' ''63 not 61 percent,'' ''23.3 not 22 percent'' or ''area being approximately 13 percent larger;'' and (2) even where the recommendation is somewhat larger in scale, given the ranges of these stocks, the size of the stocks, and the number and nature of pinniped takes, recalculating the estimated take for any of these pinniped stocks using the commenter's recommended changes would not change NMFS' assessment of impacts on the recruitment or survival of any of these stocks, or the negligible impact determination. Below, we address the Commenters issues in more detail and, while we do not explicitly note it in every section, NMFS has reviewed the Navy's analysis and choices in relation to these comments and concurs that they are technically sound and reflect the best available science.

For harbor seals—Based on the results from satellite tracking of harbor seals at Monterey, California and the documented dive depths (Eguchi and Harvey, 2005), the extent of the range for harbor seals in the HSTT Study Area used by the Navy (a 50 nmi buffer around all known haul-out sites; approximately 93 km) is more appropriate than the suggested 80 km offshore suggested by commenter.

The comment is incorrect in its claim that the Navy did not use the best available science. Regarding the appropriate percentage of the California Current Ecosystem abundance to assign to the HSTT Study Area, the 22 percent that the Navy used is based on the most recent of the two years provided in Lowry *et al.* (2008) rather than the mean of two years, which is one valid approach. Additionally, since approximately 74 percent of the harbor seal population in the Channel Islands (Lowry *et al.,* 2017) is present outside and to the north of the HSTT Study Area, it is a reasonable assumption that the 22 percent used already provides a conservative overestimate and that it would not be appropriate to apply a higher percentage of the overall population for distribution into the Navy's modeling areas.

Again the comment is incorrect in its claim that the correction factors applied to population estimates were either unsubstantiated or incorrect. Regarding the commenter's recommended use of an at-sea correction factor of 65 percent for both seasons based on Harvey and Goley (2011), that correction factor was specifically meant to apply to the single molting season when harbor seals are traditionally surveyed (see discussion in Lowry *et al.,* 2017). Additionally, the authors of that study provided a correction factor (CF = 2.86; 35 percent) for Southern California but left open the appropriateness of that factor given the limited data available at the time. For these reasons, having separate correction factors for each of the seasons is more appropriate as detailed in Section 11.1.5 (*Phoca vitulina,* Pacific harbor seal) of the *U.S. Navy Marine Species Density Database Phase III for the Hawaii-Southern California Training and Testing Study Area* (U.S. Department of the Navy, 2017b).

For monk seals, as detailed in Section 11.1.4 (*Neomonachus schauinslandi,* Hawaiian monk seal) of the *U.S. Navy Marine Species Density Database Phase III for the Hawaii-Southern California Training and Testing Study Area* (U.S. Department of the Navy, 2017b), the Navy consulted with the researchers and subject matter experts at the Pacific Science Center and the Monk Seal Recovery Team regarding the abundance estimates, at sea correction factors, and distribution for monk seals in the Hawaiian Islands during development of the HSTT FEIS/OEIS throughout 2015 and the Summer of 2016. The Navy incorporated the results of those consultations, including unpublished data, into the analysis of monk seals. Additional details in this regard to monk seal distributions and population trends as reflected by the abundance in the Hawaiian Islands are presented in the FEIS/OEIS in Section 3.7.2.2.9.2 (Habitat and Geographic Range) and Section 3.7.2.2.9.3 (Population Trends). The Navy has indicated that it has continued ongoing communications with researchers at the Pacific Islands Science Center and elsewhere, has accounted for the findings in the citations noted by the commenter (Baker *et al.,* 2016; Harting *et al.,* 2017) as well as information in forthcoming publications provided ahead of publication via those researchers (cited as in preparation), and specifically asked for and received concurrence from subject matter experts regarding specific findings presented in the HSTT FEIS/OEIS regarding monk seals. The Navy also considered (subsequent to publication of the HSTT FEIS) the new Main Hawaiian Islands haulout correction factor presented in the publication by Wilson *et al.* (2017, which would be inconsistent with the use of the Baker *et al.* (2016) correction factors suggested by the commenter), and the Harting *et al.* (2017) correction factor, and has considered the new abundance numbers presented in the 2016 Stock Assessment Report, which first became available in January 2018. It is the Navy's assessment that a revision of the monk seal at-sea density would only result in small changes to the predicted effects and certainly would not change the conclusions presented in the HSTT FEIS/OEIS regarding impact on the population or the impact on the species. The Navy has communicated that it assumes that as part of the ongoing regulatory discussions with NMFS, changes to estimates of effects can be best dealt with in the next rulemaking given Wilson *et al.* (2017) has now also provided a totally new haulout correction factor for the Main Hawaiian Islands that was not considered in Baker *et a*l. (2016), Harting *et al.* (2017), or the 2016 SAR.

For northern fur seals, elephant seals, California sea lions, and Guadalupe fur seals, the Navy consulted with various subject matter experts regarding the abundances and distributions used in the HSTT FEIS/OEIS analyses for these species and based on those consultations and the literature available, the Navy and NMFS believe that the findings presented in the HSTT FEIS/OEIS and supporting technical reports provide the most accurate assessments available for these species. Given the demonstrated differences in the at-sea distributions of elephant seals, northern fur seals, Guadalupe fur seals, and California sea lions (Gearin et al., 2017; Lowry *et al.,* 2014; Lowry,et al., 2017; Norris, 2017; Norris,et al., 2015; Robinson *et al.,* 2012; University of California Santa Cruz and National Marine Fisheries Service, 2016), it would not be appropriate to use the same representative area for distributions of these species' population abundances. For example, California sea lions forage predominantly within 20 nautical miles from shore (Lowry and Forney, 2005), while tag data shows that many elephant seals (Robinson *et al.,* 2012) and Guadalupe fur seals (Norris, 2017) seasonally forage in deep waters of the Pacific well outside the boundaries of the HSTT Study Area.

For northern elephant seals (*Mirounga angustirostris,* Northern elephant seal), as detailed in Section 11.1.3 of the technical report titled *U.S. Navy Marine Species Density Database Phase III for the Hawaii-Southern California Training and Testing Study Area* (U.S. Department of the Navy, 2017e), hereafter referred to as the Density Technical Report, the Navy considered a number of factors in the development of the data for this species, including the fact that not all of the elephant seal population is likely to occur exclusively within the Southern California portion of the HSTT Study Area. Given that the three main rookeries considered in this analysis are located at the northern boundary of the HSTT Study Area and that elephant seals migrate northward after the breeding season, the Navy, in consultation with subject matter experts, believes the current abundance used in the analysis is based on the best available science and represents a conservative overestimate of the number of elephant seals likely to be affected by Navy activities in the HSTT Study Area.

For California sea lions, the citation (Lowry and Forney, 2005) used as the basis for this recommendation specifically addressed the use of the Central and Northern California at-sea correction factor elsewhere, with the authors stating; ''In particular, [use of the Central and Northern California at-sea correction factor] would not be appropriate for regions where sea lions reproduce, such as in the Southern California Bight (SCB) and in Mexico, . . .'' Given the waters of the Southern California Bight and off Mexico overlap the HSTT Study Area and since the authors of the cited study specifically recommended not using the correction factor in the manner the commenter suggested, the Navy does not believe use of that correction factor for the HSTT Study Area would be appropriate. NMFS concurs with this approach

For Guadalupe fur seal—Additional detail regarding the data used for the analysis of Guadalupe fur seals has been added to the HSTT Final EIS/OEIS Section 3.7.2.2.8 (*Arctocephalus townsendi,* Guadalupe Fur Seal). The Navy had integrated the latest (September 2017) unpublished data for Guadalupe fur seals from researchers in the United States and Mexico into the at-sea correction factor and density distribution of the species used in the modeling, but consultations with experts in academia and at the NMFS Science Centers and their recommendations had not been finalized before release of the Draft EIS/OEIS. Subsequently, the Navy did not consider this revision of the text critical for the final NEPA document since the new data did not provide any significant change to the conclusions reached regarding the Guadalupe fur seal population. In fact, the data indicates an increase in the population and expansion of their range concurrent with decades of ongoing Navy training and testing in the SOCAL range complex.

For Northern Fur Seal—As presented in Section 11.1.2 (*Callorhinus ursinus,* Northern fur seal) of the Navy's Density Technical Report (U.S. Department of the Navy, 2017b), the correction factor percentages for northern fur seals potentially at sea were derived from the published literature as cited (Antonelis, Stewart, & Perryman, 1990; Ream, Sterling, & Loughlin, 2005; Roppel, 1984).

For future EISs, the Navy explained that it did and will continue to consult with authors of the papers relevant to the analyses as well as other experts in academia and at the NMFS Science Centers during the development of the Navy's analyses. During the development of the HSTT EIS/OEIS and as late as September 2017, the Navy had ongoing communications with various subject matter experts and specifically discussed pinniped movements, the distribution of populations within the study area to support the analyses, the pinniped haulout or at-sea correction factors, and the appropriateness of density gradients associated with proximity to haul-out sites or rookeries. As shown in the references cited, the personal communications with researchers have been made part of the public record, although many other informal discussions with colleagues have also assisted in the Navy's approach to the analyses presented.

The Navy acknowledges that there have been previous comments provided by this commenter on other Navy range complex documents regarding the use of satellite tag movement and location data to derive at-sea pinniped density data, and the Navy asserts that previous responses to those comments remain valid. Additionally, the commenter has noted that the ''. . . Commenter continues to believe that data regarding movements and dispersion of tagged pinnipeds could yield better approximations of densities than the methods the Navy currently uses.'' The Navy acknowledges that in comments to previous Navy EIS/OEIS analyses, the commenter has recommended this untried approach; responses to those previous comments have been provided. The Navy also notes that there have been papers suggesting the future application of Bayesian or Markov chain techniques for use in habitat modeling (*e.g.,* Redfern *et al.,* 2006) and overcoming the bias introduced by interpretation of population habitat use based on non-randomized tagging locations (*e.g.,* Whitehead & Jonsen, 2013). However, the use of satellite tag location data in a Bayesian approach to derive cetacean or pinniped densities at sea has yet to be accepted, implemented, or even introduced in the scientific literature.

This issue was in fact recently discussed as part of the Density Modeling Workshop associated with the October 2017 Society for Marine Mammalogy conference. The consensus of the marine mammal scientists present was that while pinniped tag data could provide a good test case, it realistically was unlikely to be a focus of the near-term research. The working group determined that a focused technical group should be established to specifically discuss pinnipeds and data available for density surface modelling in the future. It was also discussed at the Density Modeling Workshop in October 2018. The Navy has convened a pinniped working group and NMFS ASFSC is sponsoring a demonstration project to use haulout and telemetry data from seals in Alaska to determine the viability of such an approach.

Therefore, consistent with previous assessments and based on recent discussions with subject matter experts in academia, the NMFS Science Centers, and the National Marine Mammal Laboratory, and given there is no currently established methodology for implementing the approach suggested by the commenter, the Navy believes that attempting to create and apply a new density derivation method at this point would introduce additional levels of uncertainty into density estimations.

For these reasons, the Navy and NMFS will not provide density estimates based on pinniped tracking data. Publications reporting on satellite tag location data have been and will continue to be used to aid in the understanding of pinniped distributions and density calculations as referenced in the FEIS/OEIS and the *U.S. Navy Marine Species Density Database Phase III for the Hawaii-Southern California Training and Testing Study Area* (U.S. Department of the Navy, 2017b). The Navy has communicated that it will continue, as it has in the past, to refine pinniped density and distributions using telemetry data and evolving new techniques (such as passive acoustic survey data) in development of the Navy's analyses. As noted above, NMFS has reviewed the Navy's methods and concurs that they are appropriate and reflect the best available science.

Comment 5: A commenter recommended that NMFS require the Navy to (1) specify what modeling method and underlying assumptions, including any relevant source spectra and assumed animal swim speeds and turnover rates, were used to estimate the ranges to PTS and TTS for impact and vibratory pile-driving activities, (2) accumulate the energy for the entire day of proposed activities to determine the ranges to PTS and TTS for impact and vibratory pile-driving activities, and (3) clarify why the PTS and TTS ranges were estimated to be the same for LF and HF cetaceans during impact pile driving.

Response: As explained in Section 3.7.3.1.4.1 of the HSTT FEIS/OEIS, the Navy measured values for source levels and transmission loss from pile driving of the Elevated Causeway System, the only pile driving activity included in the Specified Activity. The Navy reviewed the source levels and how the spectrum was used to calculate the range to effects; NMFS supports the use of these measured values. These recorded source waveforms were weighted using the auditory weighting functions. Low-frequency and high-frequency cetaceans have similar ranges for impact pile driving since low-frequency cetaceans would be relatively more sensitive to the low-frequency sound which is below high-frequency cetaceans' best range of hearing. Neither the NMFS user spreadsheet nor NAEMO were required for calculations. An area density model was developed in MS Excel which calculated zones of influence (ZOI) to thresholds of interest (*e.g.,* behavioral response) based on durations of pile driving and the aforementioned measured and weighted source level values. The resulting area was then multiplied by density of each marine mammal species that could occur within the vicinity. This produced an estimated number of animals that could be impacted per pile, per day, and overall during the entire activity for both the impact pile driving and vibratory removal phases. NOAA HQ scientists involved in the acoustic criteria development reviewed the manner in which the Navy applied the frequency weighting and calculated all values and concurred with the approach.

Regarding the appropriateness of accumulating energy for the entire day, based on the best available science regarding animal reaction to sound, selecting a reasonable SEL calculation period is necessary to more accurately reflect the time period an animal would likely be exposed to the sound. The Navy factored both mitigation effectiveness and animal avoidance of higher sound levels into the impact pile driving analysis. For impact pile driving, the mitigation zone extends beyond the average ranges to PTS for all hearing groups; therefore, mitigation will help prevent or reduce the potential for exposure to PTS. The impact pile driving mitigation zone also extends beyond or into a portion of the average ranges to TTS; therefore, mitigation will help prevent or reduce the potential for exposure to all TTS or some higher levels of TTS, depending on the hearing group. Mitigation effectiveness and animal avoidance of higher sound levels were both factored into the impact pile driving analysis as most marine mammals should be able to easily move away from the expanding ensonified zone of TTS/PTS within 60 seconds, especially considering the soft start procedure, or avoid the zone altogether if they are outside of the immediate area upon startup. Marine mammals are likely to leave the immediate area of pile driving and extraction activities and be less likely to return as activities persist. However, some ''naive'' animals may enter the area during the short period of time when pile driving and extraction equipment is being re-positioned between piles. Therefore, an animal ''refresh rate'' of 10 percent was selected. This means that 10 percent of the single pile ZOI was added for each consecutive pile within a given 24-hour period to generate the daily ZOI per effect category. These daily ZOIs were then multiplied by the number of days of pile driving and pile extraction and then summed to generate a total ZOI per effect category (*i.e.,* behavioral response, TTS, PTS). The small size of the mitigation zone and its close proximity to the observation platform will result in a high likelihood that Lookouts would be able to detect marine mammals throughout the mitigation zone.

PTS/TTS Thresholds

Comment 6: A commenter supported the weighting functions and associated thresholds as stipulated in Finneran (2016), which are the same as those used for Navy Phase III activities, but points to additional recent studies that provide additional behavioral audiograms (*e.g.,* Branstetter *et al.* 2017; Kastelein *et al.* 2017b) and information on TTS *(e.g.,* Kastelein *et al.* 2017a, 2017c). However, they commented that the Navy should provide a discussion of whether those new data corroborate the current weighting functions and associated thresholds.

Response: The NMFS *Revised Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing* (NMFS 2018) (Acoustic Technical Guidance), which was used in the assessment of effects for this action, compiled, interpreted, and synthesized the best available scientific information for noise-induced hearing effects for marine mammals to derive updated thresholds for assessing the impacts of noise on marine mammal hearing, including the articles that the commenter referenced that were published subsequent to the publication of the first version of 2016 Acoustic Technical Guidance. The new data included in those articles are consistent with the thresholds and weighting functions included in the current version of the Acoustic Technical Guidance (NMFS 2018).

NMFS will continue to review and evaluate new relevant data as it becomes available and consider the impacts of those studies on the Acoustic Technical Guidance to determine what revisions/ updates may be appropriate. Thus far, no new information has been published or otherwise conveyed that would fundamentally change the assessment of impacts or conclusions of this rule.

Comment 7: Commenters commented that the criteria that the agency has produced to estimate temporary threshold shift (TTS) and permanent threshold shift (PTS) in marine mammals are erroneous and non-conservative. Commenters cited multiple purported issues with NMFS' Acoustic Technical Guidance, such as pseudo-replication and inconsistent treatment of data, broad extrapolation from a small number of individuals, and disregarding ''non-linear accumulation of uncertainty.'' Commenters suggested that NMFS not rely exclusively on its auditory guidance for determining Level A harassment take, but should at a minimum retain the historical 180-dB rms Level A harassment threshold as a ''conservative upper bound'' or conduct a ''sensitivity analysis'' to ''understand the potential magnitude'' of the supposed errors.

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), 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.

The Acoustic Technical Guidance updates the historical 180 dB rms injury threshold, which was based on professional judgement (*i.e.,* no data were available on the effects of noise on marine mammal hearing at the time this original threshold was derived). NMFS disagrees with any suggestion that the use of the Acoustic Technical Guidance provides erroneous results. The 180-dB rms threshold is plainly outdated, as the best available science indicates that rms SPL is not even an appropriate metric by which to gauge potential auditory injury (whereas the scientific debate regarding behavioral harassment thresholds is not about the proper metric but rather the proper level or levels and how these may vary in different contexts).

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 pseudoreplication 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 pseudoreplication within the TTS data are therefore largely irrelevant in a practical sense because there are so few data. Multiple data points were not included for the same individual at a single frequency. If multiple data 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 μPa2s. Thus, NMFS believes that the current approach makes the best use of the given data. Appropriate means of reducing pseudoreplication 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.

Behavioral Harassment Thresholds

Comment 8: Commenters commented on what it asserts is NMFS' failure to set proper thresholds for behavioral impacts. Referencing the biphasic function that assumes an unmediated dose response relationship at higher received levels and a context-influenced response at lower received levels that NMFS uses to quantify behavioral harassment from sonar, Commenters commented that resulting functions depend on some inappropriate assumptions that tend to significantly underestimate effects. Commenters expressed concern that every data point that informs the agency's pinniped function, and nearly two-thirds of the data points informing the odontocete function (30/49), are derived from a captive animal study. Additionally, Commenters asserted that the risk functions do not incorporate (nor does NMFS apparently consider) a number of relevant studies on wild marine mammals. Commenters stated that it is not clear from the proposed rule, or from the Navy's recent technical report on acoustic ''criteria and thresholds,'' on which NMFS' approach in the rule is based, exactly how each of the studies that NMFS employed was applied in the analysis, or how the functions were fitted to the data, but the available evidence on behavioral response raises concerns that the functions are not conservative for some species. Commenters recommended NMFS make additional technical information available, including from any expert elicitation and peer review, so that the public can fully comment.

Response: The *Criteria and Thresholds for U.S. Navy Acoustic and Explosive Impacts to Marine Mammals and Sea Turtles Technical Report* (U.S. Department of the Navy, 2017) details how the Navy's proposed method, which was determined appropriate and adopted by NMFS, accounted for the differences in captive and wild animals in the development of the behavioral response functions. The Navy used the best available science, which has been reviewed by external scientists and approved by NMFS, in the analysis. The Navy and NMFS have utilized all available data that relate known or estimable received levels to observations of individual or group behavior as a result of sonar exposure (which is needed to inform the behavioral response function) for the development of updated thresholds. Limiting the data to the small number of field studies that include these necessary data would not provide enough data with which to develop the new risk functions. In addition, NMFS agrees with the assumptions made by the Navy, including the fact that captive animals may be less sensitive, in that the scale at which a moderate to severe response was considered to have occurred is different for captive animals than for wild animals, as the agency understands those responses will be different.

The new risk functions were developed in 2016, before several recent papers were published or the data were available. As new science is published, NMFS and the Navy continue to evaluate the information. The thresholds have been rigorously vetted among scientists and within the Navy community during expert elicitation and then reviewed by the public before being applied. It is unreasonable to revise and update the criteria and risk functions every time a new paper is published. These new and future papers provide additional information, and the Navy has already begun to consult them for updates to the thresholds in the future, when the next round of updated criteria will be developed. Thus far, no new information has been published or otherwise conveyed that would fundamentally change the assessment of impacts or conclusions of the HSTT FEIS/OEIS or this rule. To be included in the behavioral response function, data sets need to relate known or estimable received levels to observations of individual or group behavior. Melcon *et al.* (2012) does not relate observations of individual/group behavior to known or estimable received levels (at that individual/group). In Melcon *et al.* (2012), received levels at the HARP buoy averaged over many hours are related to probabilities of D-calls, but the received level at the blue whale individuals/group are unknown.

As noted, the derivation of the behavioral response functions is provided in the 2017 technical report titled *Criteria and Thresholds for U.S. Navy Acoustic and Explosive Effects Analysis (Phase III).* The appendices to this report detail the specific data points used to generate the behavioral response functions. Data points come from published data that is readily available and cited within the technical report.

Comment 9: Commenters stated concerns with the use of distance ''cut-offs'' in the behavioral harassment thresholds, and one commenter recommended that NMFS refrain from using cut-off distances in conjunction with the Bayesian BRFs and re-estimate the numbers of marine mammal takes based solely on the Bayesian BRFs.

Response: The consideration of proximity (cut-off distances) was part of the criteria developed in consultation between the Navy and NMFS, is appropriate based on the best available science which shows that marine mammal responses to sound vary based on both sound level and distance, and was applied within the Navy's acoustic effects model. The derivation of the behavioral response functions and associated cut-off distances is provided in the 2017 technical report titled *Criteria and Thresholds for U.S. Navy Acoustic and Explosive Effects Analysis (Phase III).* To account for non-applicable contextual factors, all available data on marine mammal reactions to actual Navy activities and other sound sources (or other large scale activities such as seismic surveys when information on proximity to sonar sources is not available for a given species group) were reviewed to find the farthest distance to which significant behavioral reactions were observed. These distances were rounded up to the nearest 5 or 10 km interval, and for moderate to large scale activities using multiple or louder sonar sources, these distances were greatly increased—doubled in most cases. The Navy's BRFs applied within these distances provide technically sound methods reflective of the best available science to estimate of impact and potential take under military readiness for the actions analyzed within the HSTT FEIS/OEIS and included in these regulations. NMFS has independently assessed the Navy's behavioral harassment thresholds and believes that they appropriately apply the best available science and it is not necessary to recalculate take estimates.

The commenter also specifically expressed concern that distance ''cut-offs'' alleviate some of the exposures that would otherwise have been counted if the received level alone were considered. It is unclear why the commenter finds this inherently inappropriate, as this is what the data show. As noted previously, there are multiple studies illustrating that in situations where one would expect a behavioral harassment because of the received levels at which previous responses were observed, it has not occurred when the distance from the source was larger than the distance of the first observed response.

Comment 10: Regarding cut-off distances, Commenters noted that dipping sonar appears to be a significant predictor of deep-dive rates in beaked whales on Southern California Anti-submarine Warfare Range (SOAR), with the dive rate falling significantly (*e.g.,* to 35 percent of that individual's control rate) during sonar exposure, and likewise appears associated with habitat abandonment. Importantly, these effects were observed at substantially greater distances (*e.g.,* 30 or more km) from dipping sonar than would otherwise be expected given the systems' source levels and the beaked whale response thresholds developed from research on hull-mounted sonar. Commenters suggested that the analysis, and associated cut-off distances, do not properly consider the impacts of dipping sonar.

Response: The Navy relied upon the best science that was available to develop the behavioral response functions in consultation with NMFS. The Navy's current beaked whale BRF acknowledges and incorporates the increased sensitivity observed in beaked whales during both behavioral response studies and during actual Navy training events, as well as the fact that dipping sonar can have greater effects than some other sources with the same source level. Specifically, the distance cut-off for beaked whales is 50 km, larger than any other group. Moreover, although dipping sonar has a significantly lower source level than hull-mounted sonar, it is included in the category of sources with larger distance cut-offs, specifically in acknowledgement of its unpredictability and association with observed effects. This means that ''takes'' are reflected at lower received levels that would have been excluded because of the distance for other source types.

The referenced article (Associating patterns in movement and diving behavior with sonar use during military training exercises: A case study using satellite tag data from Cuvier's beaked whales at the Southern California Anti-submarine Warfare Range (Falcone *et al.,* 2017) was not available at the time the BRFs were developed. However, NMFS and the Navy have reviewed the article and concur that neither this article nor any other new information that has been published or otherwise conveyed since the proposed rule was published would significantly change the assessment of impacts or conclusions in the HSTT FEIS/OEIS or in this rulemaking. Nonetheless, the new information and data presented in the new article were recently thoroughly reviewed by the Navy and will be quantitatively incorporated into future behavioral response functions, as appropriate for data available at the time that new functions are needed to inform new analyses.

Furthermore, ongoing Navy funded beaked whale monitoring at the same site where the dipping sonar tests were conducted has not documented habitat abandonment by beaked whales. Passive acoustic detections of beaked whales have not significantly changed over eight years of monitoring (DiMarzio *et al.,* 2018). From visual surveys in the area since 2006 there have been repeated sightings of: The same individual beaked whale, beaked whale mother-calf pairs, and beaked whale mother-calf pairs with mothers on their second calf (Schorr *et al.,* 2018). Satellite tracking studies of beaked whale documented high site fidelity to this area (Schorr *et al.,* 2018).''

Comment 11: Regarding the behavioral thresholds for explosives, Commenters recommended that NMFS estimate and ultimately authorize behavior takes of marine mammals during all explosive activities, including those that involve single detonations.

Response: The derivation of the explosive injury criteria is provided in the 2017 technical report titled *Criteria and Thresholds for U.S. Navy Acoustic and Explosive Effects Analysis (Phase III),* and NMFS has applied the general rule a commenter referenced to single explosives for years, *i.e.,* that marine mammals are unlikely to respond to a single instantaneous detonation in a manner that would rise to the level of a take. Neither NMFS nor the Navy are aware of evidence to support the assertion that animals will have significant behavioral reactions (*i.e.,* those that would rise to the level of a take) to temporally and spatially isolated explosions. The Navy has been monitoring detonations since the 1990s and has not observed these types of reactions. TTS and all other higher order impacts are assessed for all training and testing events that involve the use of explosives or explosive ordnance.

Further, to clarify, the current take estimate framework does not preclude the consideration of animals being behaviorally disturbed during single explosions as they are counted as ''taken by Level B harassment'' if they are exposed above the TTS threshold, which is only 5 dB higher than the behavioral harassment threshold. We acknowledge in our analysis that individuals exposed above the TTS threshold may also be behaviorally harassed and those potential impacts are considered in the negligible impact determination.

All of the Navy's monitoring projects, reports, and publications are available on the marine species monitoring web page (*https://www.navymarinespeciesmonitoring.us/*). NMFS will continue to review applicable monitoring and science data and consider modifying these criteria when and if new information suggests it is appropriate.

Mortality and injury thresholds for explosions

Comment 12: A commenter recommended that NMFS require the Navy to (1) explain why the constants and exponents for onset mortality and onset slight lung injury thresholds for Phase III have been amended, (2) ensure that the modified equations are correct, and (3) specify any additional assumptions that were made.

Response: The derivation of the explosive injury equations, including any assumptions, is provided in the 2017 technical report titled *Criteria and Thresholds for U.S. Navy Acoustic and Explosive Effects Analysis (Phase III).* It is our understanding that the constants and exponents for onset mortality and onset slight lung injury were amended by the Navy since Phase II to better account for the best available science. Specifically, the equations were modified in Phase III to fully incorporate the injury model in Goertner (1982), specifically to include lung compression with depth. NMFS independently reviewed and concurred with this approach.

Comment 13: A commenter commented that the Navy only used the onset mortality and onset slight lung injury criteria to determine the range to effects, while it used the 50 percent mortality and 50 percent slight lung injury criteria to estimate the numbers of marine mammal takes. The commenter believes that this approach is inconsistent with the manner in which the Navy estimated the numbers of takes for PTS, TTS, and behavior for explosive activities. All of those takes have been and continue to be based on onset, not 50-percent values. The commenter commented on circumstances of the deaths of multiple common dolphins during one of the Navy's underwater detonation events in March 2011 (Danil and St. Leger, 2011) and indicated that the Navy's mitigation measures are not fully effective, especially for explosive activities. The commenter believes it would be more prudent for the Navy to estimate injuries and mortalities based on onset rather than a 50-percent incidence of occurrence. The Navy did indicate that it is reasonable to assume for its impact analysis—thus its take estimation process—that extensive lung hemorrhage is a level of injury that would result in mortality for a wild animal (Department of the Navy 2017a). Thus, the commenter comments that it is unclear why the Navy did not follow through with that premise. The commenter recommends that NMFS use onset mortality, onset slight lung injury, and onset GI tract injury thresholds to estimate both the numbers of marine mammal takes and the respective ranges to effect.

Response: Based on an extensive review of the incident referred to by the commenter, in coordination with NMFS the Navy revised and updated the mitigation for these types of events. There have been no further incidents since these mitigation changes were instituted in 2011.

The Navy used the range to one percent risk of mortality and injury (referred to as ''onset'' in the Draft EIS/OEIS) to inform the development of mitigation zones for explosives. In all cases, the mitigation zones for explosives extend beyond the range to one percent risk of non-auditory injury, even for a small animal (representative mass = 5 kg). In the FEIS/OEIS, the Navy has clarified that the ''onset'' non-auditory injury and mortality criteria are actually one percent risk criteria.

Over-predicting impacts, which would occur with the use of one percent non-auditory injury risk criteria in the quantitative analysis, would not afford extra protection to any animal. The Navy, in coordination with NMFS, has determined that the 50 percent incidence of occurrence is a reasonable representation of a potential effect and appropriate for take estimation.

Although the commenter implies that the Navy did not use extensive lung hemorrhage as indicative of mortality, that statement is incorrect. Extensive lung hemorrhage is assumed to result in mortality, and the explosive mortality criteria are based on extensive lung injury data See the 2017 technical report titled *Criteria and Thresholds for U.S. Navy Acoustic and Explosive Effects Analysis (Phase III).*

Range to Effects

Comment 14: One commenter noted that regarding TTS, the ranges to effect provided in Table 25 of the **Federal Register** notice of proposed rulemaking and Table 6–4 of the LOA application appear to be incorrect. The ranges for LF cetaceans should increase with increasing sonar emission time. Therefore, the commenter recommended that NMFS determine what the appropriate ranges to TTS for bin LF5 should be and amend the ranges for the various functional hearing groups in the tables accordingly.

Response: The error in the table has been fixed; specifically, the ranges for MF cetaceans have been revised. Note that the distances are shorter than initially provided in the proposed rule, indicating that the impacts of exposure to this bin are fewer than initially implied by the table. Regardless, the error was only associated with the information presented in this table; there was no associated error in any distances used in the take estimation, and both the take estimates and our findings remain the same.

Mitigation and Avoidance Calculations

Comment 15: Commenters cited concerns that there was not enough information by which to evaluate the Navy's post-modeling calculations to account for mitigation and avoidance and imply that Level A takes and mortality takes may be underestimated. A commenter recommended that NMFS (1) authorize the total numbers of model-estimated Level A harassment (PTS) and mortality takes rather than reduce the estimated numbers of takes based on the Navy's post-model analyses and (2) use those numbers, in addition to the revised Level B harassment takes, to inform its negligible impact determination analyses.

Response: The consideration of marine mammal avoidance and mitigation effectiveness is integral to the Navy's overall analysis of impacts from sonar and explosive sources. NMFS has independently evaluated the method and agrees that it is appropriately applied to augment the model in the prediction and authorization of injury and mortality as described in the rule. Details of this analysis are provided in the Navy's 2018 technical report titled *Quantifying Acoustic Impacts on Marine Mammals and Sea Turtles: Methods and Analytical Approach for Phase III Training and Testing;* additional information on the mitigation analysis also has been included in the final rule.

Sound levels diminish quickly below levels that could cause PTS. Studies have shown that all animals observed avoid areas well beyond these zones; therefore, the vast majority of animals are likely to avoid sound levels that could cause injury to their ear. As discussed in the Navy's 2018 technical report titled *Quantifying Acoustic Impacts on Marine Mammals and Sea Turtles: Methods and Analytical Approach for Phase III Training and Testing,* animats in the Navy's acoustic effects model do not move horizontally or ''react'' to sound in any way. The current best available science based on a growing body of behavioral response research shows that animals do in fact avoid the immediate area around sound sources to a distance of a few hundred meters or more depending upon the species. Avoidance to this distance greatly reduces the likelihood of impacts to hearing such as TTS and PTS.

Specifically, behavioral response literature, including the recent 3S and SOCAL BRS studies, indicate that the multiple species from different cetacean suborders do in fact avoid approaching sound sources by a few hundred meters or more, which would reduce received sound levels for individual marine mammals to levels below those that could cause PTS. The ranges to PTS for most marine mammal groups are within a few tens of meters and the ranges for the most sensitive group, the HF cetaceans, average about 200 m, to a maximum of 270 m in limited cases.

As discussed in the Navy's 2018 technical report titled *Quantifying Acoustic Impacts on Marine Mammals and Sea Turtles: Methods and Analytical Approach for Phase III Training and Testing,* the Navy's acoustic effects model does not consider procedural mitigations (*i.e.,* power-down or shut-down of sonars, or pausing explosive activities when animals are detected in specific zones adjacent to the source), which necessitates consideration of these factors in the Navy's overall acoustic analysis. Credit taken for mitigation effectiveness is extremely conservative. For example, if Lookouts can see the whole area, they get credit for it in the calculation; if they can see more than half the area, they get half credit; if they can see less than half the area, they get no credit. Not considering animal avoidance and mitigation effectiveness would lead to a great overestimate of injurious impacts. NMFS concurs with the analytical approach used, *i.e.,* we believe the estimated Level A take numbers represent the maximum number of these takes that are likely to occur and it would not be appropriate to authorize a higher number or consider a higher number in the negligible impact analysis.

Last, the Navy's 2018 technical report titled *Quantifying Acoustic Impacts on Marine Mammals and Sea Turtles: Methods and Analytical Approach for Phase III Training and Testing* very clearly explains in detail how species sightability, the Lookout's ability to observe the range to PTS (for sonar and other transducers) and mortality (for explosives), the portion of time when mitigation could potentially be conducted during periods of reduced daytime visibility (to include inclement weather and high sea state) and the portion of time when mitigation could potentially be conducted at night, and the ability for sound sources to be positively controlled (powered down) are considered in the post-modeling calculation to account for mitigation and avoidance. It is not necessary to view the many tables of numbers generated in the assessment to evaluate the method.

Comment 16: A commenter stated in regards to the method in which the Navy's post-model calculation considers avoidance specifically (*i.e.,* assuming animals present beyond the range of PTS for the first few pings will be able to avoid it and incur only TTS, which results in a 95 percent reduction in the number of estimated PTS takes predicted by the model), given that sound sources are moving, it may not be until later in an exercise that the animal is close enough to experience PTS, and it is those few close pings that contribute to the potential to experience PTS. An animal being beyond the PTS zone initially has no bearing on whether it will come within close range later during an exercise since both sources and animals are moving. In addition, Navy vessels may move faster than the ability of the animals to evacuate the area. The Navy should have been able to query the dosimeters of the animats to verify whether its 5-percent assumption was valid. Commenters are concerned that this method underestimates the number of PTS takes.

Response: The consideration of marine mammals avoiding the area immediately around the sound source is provided in the Navy's 2018 technical report titled *Quantitative Analysis for Estimating Acoustic and Explosive Impacts to Marine Mammals and Sea Turtles.* As the commenter correctly articulates: ''For avoidance, the Navy assumed that animals present beyond the range to onset PTS for the first three to four pings are assumed to avoid any additional exposures at levels that could cause PTS. That equated to approximately 5 percent of the total pings or 5 percent of the overall time active; therefore, 95 percent of marine mammals predicted to experience PTS due to sonar and other transducers were instead assumed to experience TTS.'' In regard to the comment about vessels moving faster than animals' ability to get out of the way, as discussed in the Navy's 2018 technical report titled *Quantitative Analysis for Estimating Acoustic and Explosive Impacts to Marine Mammals and Sea Turtles,* animats in the Navy's acoustic effects model do not move horizontally or ''react'' to sound in any way, necessitating the additional step of considering animal avoidance of close-in PTS zones. NMFS independently reviewed this approach and concurs that it is fully supported by the best available science. Based on a growing body of behavioral response research, animals do in fact avoid the immediate area around sound sources to a distance of a few hundred meters or more depending upon the species. Avoidance to this distance greatly reduces the likelihood of impacts to hearing such as TTS and PTS, respectively. Specifically, the ranges to PTS for most marine mammal groups are within a few tens of meters and the ranges for the most sensitive group, the HF cetaceans, average about 200 m, to a maximum of 270 m in limited cases. Querying the dosimeters of the animats would not produce useful information since, as discussed previously, the animats do not move in the horizontal and are not programmed to ''react'' to sound or any other stimulus. The commenter references comments that they have previously submitted on the Navy's Gulf of Alaska incidental take regulations and we refer the commenter to NMFS' responses, which were included in the **Federal Register** document announcing the issuance of the final regulations (82 FR 19572, April 27, 2017).

Underestimated Beaked Whale Injury and Mortality

Comment 17: A commenter commented that the Navy and NMFS both underestimate take for Cuvier's beaked whales because they are extremely sensitive to sonar. A new study of Cuvier's beaked whales in Southern California exposed to mid and high-power sonar confirmed that they modify their diving behavior up to 100-km away (Falcone *et al.,* 2017). The commenter asserted that this science disproves NMFS' assumption that beaked whales will find suitable habitat nearby within their small range. This modified diving behavior, which was particularly strong when exposed to mid-power sonar, indicates disruption of feeding. Accordingly, impacts on Cuvier's beaked whales could include interference with essential behaviors that will have more than a negligible impact on this species. In addition, Lookouts and shutdowns do not protect Cuvier's beaked whales from Navy sonar because this is a deep-diving species that is difficult to see from ships.

Response: Takes of Cuvier's beaked whales are not underestimated. The behavioral harassment threshold for beaked whales has two components, both of which consider the sensitivity of beaked whales. First, the biphasic behavioral harassment function for beaked whales, which is based on data on beaked whale responses, has a significantly lower mid-point than other groups and also reflects a significantly higher probability of ''take'' at lower levels (*e.g.,* close to 15 percent at 120 dB). Additionally, the distance cut-off used for beaked whales is farther than for any other group (50 km, for both the MF1 and MF4 bins, acknowledging the fact that the unpredictability of dipping sonar likely results in takes at greater distances than other more predictable sources of similar levels). Regarding the referenced article, the commenter is selectively citing only part of it. The study, which compiles information from multiple studies, found that *shallow* dives were predicted to increase in duration as the distance to both high- and mid-power MFAS sources decreased, *beginning* at approximately 100 km away and, specifically, the differences only varied from approximately 20 minutes without MFAS to about 24 minutes with MFAS at the closest distance (*i.e.,* the dive time varied from 20 to 24 minutes over the distance of 100 km away to the closest distance measured). Further, the same article predicted that deep dive duration (which is more directly associated with feeding and linked to potential energetic effects) was predicted to increase with proximity to mid-power MFAS from approximately 60 minutes to approximately 90 minutes *beginning* at around 40 km (10 dives). There were four deep dives exposed high-power MFAS within 20 km, the distance at which deep dive durations increased with the lower power source types. Other responses to MFAS included deep dives that were shorter than typical and shallower, and instances where there were no observed responses at closer distances. The threshold for Level B harassment is higher than just ''any measurable response'' and NMFS and the Navy worked closely together to identify behavioral response functions and distance cut-offs that reflect the best available science to identify when marine mammal behavioral patterns will be disrupted to a point where they are abandoned or significantly altered. Further, the take estimate is in no way based on an assumption that beaked whales will always be sighted by Lookouts—and adjustment to account for Lookout effectiveness considers the variable detectability of different stocks. In this rule, both the take estimate and the negligible impact analysis appropriately consider the sensitivity of, and scale of impacts to (we address impacts to feeding and energetics), Cuvier's (and all) beaked whales.

Comment 18: A commenter commented that NMFS is underestimating serious injury and mortality for beaked whales. A commenter noted the statement in the proposed rule that because a causal relationship between Navy MFAS use and beaked whale strandings has not been established in all instances, and that, in some cases, sonar was considered to be only one of several factors that, in aggregate, may have contributed to the stranding event, NMFS does ''not expect strandings, serious injury, or mortality of beaked whales to occur as a result of training activities.'' (83 FR at 30007). The commenter asserted that this opinion is inconsistent with best available science and does not take into account the fact that the leading explanation for the mechanism of sonar-related injuries—that whales suffer from bubble growth in organs that is similar to decompression sickness, or ''the bends'' in human divers—has now been supported by numerous papers. At the same time, the commenter argued that NMFS fails to seriously acknowledge that sonar can seriously injure or kill marine mammals at distances well beyond those established for permanent hearing loss (83 FR 29916) and dismisses the risk of stranding and other mortality events (83 FR 30007) based on the argument that such effects can transpire only under the same set of circumstances that occurred during known sonar-related events—an assumption that is arbitrary and capricious. In conclusion, a commenter argued that none of NMFS' assumptions regarding the expected lack of serious injury and mortality for beaked whales are supported by the record, and all lead to an underestimation of impacts.

Response: A commenter's characterization of NMFS' analysis is incorrect. NMFS does not disregard the fact that it is possible for naval activities using hull-mounted tactical sonar to contribute to the death of marine mammals in certain circumstances (that are not present in the HSTT Study Area) via strandings resulting from behaviorally mediated physiological impacts or other gas-related injuries. NMFS discussed these potential causes and outlined the few cases where active naval sonar (in the United States or, largely, elsewhere) had either potentially contributed to or (as with the Bahamas example) been more definitively causally linked with marine mammal strandings in the proposed rule. As noted, there are a suite of factors that have been associated with these specific cases of strandings directly associated with sonar (steep bathymetry, multiple hull-mounted platforms using sonar simultaneously, constricted channels, strong surface ducts, etc.) that are not present together in the HSTT Study Area and during the specified activities (and which the Navy takes care across the world not to operate under without additional monitoring). There have been no documented beaked whale mortalities from Navy activities within the HSTT Study Area. Further, none of the beaked whale strandings causally associated with Navy sonar stranding are in the Pacific. For these reasons, NMFS does not anticipate that the Navy's HSTT training or testing activities will result in beaked whale marine mammal strandings, and none are authorized. Furthermore, ongoing Navy funded beaked whale monitoring at a heavily used training and testing area in SOCAL has not documented mortality or habitat abandonment by beaked whales. Passive acoustic detections of beaked whales have not significantly changed over eight years of monitoring (DiMarzio *et al.,* 2018). From visual surveys in the area since 2006 there have been repeated sightings of: the same individual beaked whale, beaked whale mother-calf pairs, and beaked whale mother-calf pairs with mothers on their second calf (Schorr *et al.,* 2018). Satellite tracking studies of beaked whale documented high site fidelity to this area even though the study area is located in one of the most used Navy areas in the Pacific (Schorr *et al.,* 2018).

Ship Strike

Comment 19: A commenter commented that the Navy's current approach to determine the risk of a direct vessel collision with marine mammals is flawed and fails to account for the likelihood that ship strikes since 2009 were unintentionally underreported. The commenters noted that vessel collisions are generally underreported in part because they can be difficult to detect, especially for large vessels and that the distribution, being based on reported strikes, does not account for this problem. Additionally, the commenter asserted that the Navy's analysis does not address the potential for increased strike risk of non-Navy vessels as a consequence of acoustic disturbance. For example, some types of anthropogenic noise have been shown to induce near-surfacing behavior in right whales, increasing the risk of ship-strike—by not only the source vessel but potentially by third-party vessels in the area—at relatively moderate levels of exposure (Nowacek *et al.,* 2004). An analysis based on reported strikes by Navy vessels per se does not account for this additional risk. In assessing ship-strike risk, the Navy should include offsets to account for potentially undetected and unreported collisions.

Response: While NMFS agrees that broadly speaking the number of total ship strikes may be underestimated due to incomplete information from other sectors (shipping, etc.), NMFS is confident that whales struck by Navy vessels are detected and reported, and Navy strikes are the numbers used in NMFS' analysis to support the authorized number of strikes. Navy ships have multiple Lookouts, including on the forward part of the ship that can visually detect a hit whale (which has occasionally occurred), in the unlikely event ship personnel do not feel the strike. The Navy's strict internal procedures and mitigation requirements include reporting of any vessel strikes of marine mammals, and the Navy's discipline, extensive training (not only for detecting marine mammals, but for detecting and reporting any potential navigational obstruction), and strict chain of command give NMFS a high level of confidence that all strikes actually get reported. Accordingly, NMFS is confident that the information used to support the analysis is accurate and complete.

There is no evidence that Navy training and testing activities (or other acoustic activities) increase the risk of nearby non-Navy vessels (or other nearby Navy vessels not involved in the referenced training or testing) striking marine mammals. More whales are struck by non-Navy vessels off California in areas outside of the HSTT Study Area such as approaches to Los Angeles and San Francisco.

Mitigation and Monitoring

Least Practicable Adverse Impact Determination

Comment 20: A commenter commented that deaths of, or serious injuries to marine mammals that occur pursuant to activities conducted under an incidental take authorization, while perhaps negligible to the overall health and productivity of the species or stock and of little consequence at that level, nevertheless are clearly adverse to the individuals involved and results in some quantifiable (though negligible) adverse impact on the population; it reduces the population to some degree. Under the least practicable adverse impact requirement, and more generally under the purposes and policies of the MMPA, the commenter asserted that Congress embraced a policy to minimize, whenever practicable, the risk of killing or seriously injuring a marine mammal incidental to an activity subject to section 101(a)(5)(A), including providing measures in an authorization to eliminate or reduce the likelihood of lethal taking. The commenter recommended that NMFS address this point explicitly in its analysis and clarify whether it agrees that the incidental serious injury or death of a marine mammal always should be considered an adverse impact for purposes of applying the least practicable adverse impact standard.

Response: NMFS disagrees that it is necessary or helpful to explicitly address the point the commenter raises in the general description of the least practicable adverse impact standard. The discussion of this standard already notes that there can be population-level impacts that fall below the ''negligible'' standard, but that are still appropriate to mitigate under the least practicable adverse impact standard. It is always NMFS' practice to mitigate mortality to the greatest degree possible, as death is the impact that is most easily linked to reducing the probability of adverse impacts to populations. However, we cannot agree that one mortality will always decrease any population in a quantifiable or meaningful way. For example, for very large populations, one mortality may fall well within typical known annual variation and not have any effect on population rates. Further, we do not understand the problem that the commenter's recommendation is attempting to fix. Applicants generally do not express reluctance to mitigate mortality, and we believe that modifications of this nature would confuse the issue.

Comment 21: A commenter recommended that NMFS address the habitat component of the least practicable adverse impact provision in greater detail. It asserted that NMFS' discussion of critical habitat, marine sanctuaries, and BIAs in the proposed rule is not integrated with the discussion of the least practicable adverse impact standard. It would seem that, under the least practicable adverse impact provision, adverse impacts on important habitat should be avoided whenever practicable. Therefore, to the extent that activities would be allowed to proceed in these areas, NMFS should explain why it is not practicable to constrain them further.

Response: Marine mammal habitat value is informed by marine mammal presence and use and, in some cases, there may be overlap in measures for the species or stock directly and for use of habitat. In this rule, we have identified time-area mitigations based on a combination of factors that include higher densities and observations of specific important behaviors of marine mammals themselves, but also that clearly reflect preferred habitat (*e.g.,* calving areas in Hawaii, feeding areas SOCAL). In addition to being delineated based on physical features that drive habitat function (*e.g.,* bathymetric features, among others for some BIAs), the high densities and concentration of certain important behaviors (*e.g.,* feeding) in these particular areas clearly indicate the presence of preferred habitat. The commenter seems to suggest that NMFS must always consider separate measures aimed at marine mammal habitat; however, the MMPA does not specify that effects to habitat must be mitigated in separate measures, and NMFS has clearly identified measures that provide significant reduction of impacts to both ''marine mammal species and stocks and their habitat,'' as required by the statute.

Comment 22: A commenter 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. In this regard, the commenter asserted that it seems as though the proposed ''effectiveness'' criterion more appropriately fits as an element of practicability and should be addressed under that prong of the analysis. In other words, a measure not expected to be effective should not be considered a practicable means of reducing impacts.

Response: In the *Mitigation Measures* 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. The commenter provides no support for its argument, and NMFS has not implemented the Commission's suggestion.

Comment 23: A commenter recommended that NMFS recast its conclusions to provide sufficient detail as to why additional measures either are not needed (*i.e.,* there are no remaining adverse impacts) or would not be practicable to implement. The commenter states that the most concerning element of NMFS' implementation of the least practicable adverse impact standard is its suggestion that the mitigation measures proposed by the Navy will ''sufficiently reduce impacts on the affected mammal species and stocks and their habitats'' (83 FR 11045). That phrase suggests that NMFS is applying a ''good-enough'' standard to the Navy's activities. Under the statutory criteria, however, those proposed measures are ''sufficient'' only if they have either (1) eliminated all adverse impacts on marine mammal species and stocks and their habitat or (2) if adverse impacts remain, it is impracticable to reduce them further.

Response: The statement that the commenter references does not indicate that NMFS applies a ''good-enough'' standard to determining least practicable adverse impact. Rather, it indicates that the mitigation measures are sufficient to meet the statutory legal standard. In addition, as NMFS has explained in our description of the least practicable adverse impact standard, NMFS does not view the necessary analysis through the yes/no lens that the commenter seeks to prescribe. Rather, NMFS' least practicable adverse impact analysis considers both the reduction of adverse effects and their practicability. Further, since the proposed rule was published, the Navy and NMFS have evaluated additional measures in the context of both their practicability and their ability to further reduce impacts to marine mammals and have determined that the addition of several measures (see *Mitigation Measures*) is appropriate. Regardless, beyond these new additional measures, where the Navy's HSTT activities are concerned, the Navy has indicated that further procedural or area mitigation of any kind (beyond that prescribed in this final rule) would be entirely impracticable. NMFS has reviewed documentation and analysis provided by the Navy explaining how and why specific procedural and geographic based mitigation measures impact practicability, and NMFS concurs with these assessments and has determined that the mitigation measures outlined in the final rule satisfy the statutory standard and that any adverse impacts that remain are unable to be further mitigated.

Comment 24: A commenter recommended that any ''formal interpretation'' of the least practicable adverse impact standard by NMFS be issued in a stand-alone, generally applicable rulemaking (*e.g.,* in amendments to 50 CFR 216.103 or 216.105) or in a separate policy directive, rather than in the preambles to individual proposed rules.

Response: We appreciate the commenter'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: U.S. Navy Operations of Surveillance Towed Array Sensor System Low Frequency Active (SURTASS LFA) Sonar; Geophysical Surveys Related to Oil and Gas Activities in the Gulf of Mexico; and the final rule for U.S. Navy Training and Testing Activities in the Atlantic Fleet Study Area.

Comment 25: A commenter cited two judicial decisions and commented that the ''least practicable adverse impact'' standard has not been met. A commenter stated that contrary to the *Pritzker* Court decision, NMFS, while clarifying that population-level impacts are mitigated ''through the application of mitigation measures that limit impacts to individual animals,'' has again set population-level impact as the basis for mitigation in the proposed rule. Because NMFS' mitigation analysis is opaque, it is not clear what practical effect this position may have on its rulemaking. A commenter stated that the proposed rule is also unclear in its application of the ''habitat'' emphasis in the MMPA's mitigation standard, and that while NMFS' analysis is opaque, its failure to incorporate or even, apparently, to consider viable time-area measures suggests that the agency has not addressed this aspect of the *Pritzker* decision. A commenter argues that the MMPA sets forth a ''stringent standard'' for mitigation that requires the agency to minimize impacts to the lowest practicable level, and that the agency must conduct its own analysis and clearly articulate it: it ''cannot just parrot what the Navy says.''

Response: NMFS disagrees with much of what a commenter asserts. When a suggested or recommended mitigation measure is impracticable, NMFS has explored variations of that mitigation to determine if a practicable form of related mitigation exists. This is clearly illustrated in NMFS' independent mitigation analysis process explained in this rule. First, the type of mitigation required varies by mitigation area, demonstrating that NMFS has engaged in a site-specific analysis to ensure mitigation is tailored when practicability demands, *i.e.,* some forms of mitigation were practicable in some areas but not others. Examples of NMFS' analysis on this issue appear throughout the rule. For instance, while it was not practicable for the Navy to include a mitigation area for the Tanner-Cortes blue whale BIA, the Navy did agree to expand mitigation protection to all of the other blue whale BIAs in the SOCAL region. Additionally, while the Navy cannot alleviate all training in the mitigation areas that protect small resident odontocete populations in Hawaii, has further expanded the protections in those areas such that it does not use explosives or MFAS in the areas (MF1 bin in both areas, MF4 bin in the Hawaii Island area). Nonetheless, NMFS agrees that the agency must conduct its own analysis, which it has done here, and not just accept what is provided by the Navy. That does not mean, however, that NMFS cannot review the Navy's analysis of effectiveness and practicability, and concur with those aspects of the Navy's analysis with which NMFS agrees. A commenter seems to suggest that NMFS must describe in the rule in detail the rationale for not adopting every conceivable permutation of mitigation, which is neither reasonable nor required by the MMPA. NMFS has described our well-reasoned process for identifying the measures needed to meet the least practicable adverse impact standard in the *Mitigation Measures* section in this rule, and we have followed the approach described there when analyzing potential mitigation for the Navy's activities in the HSTT Study Area. Discussion regarding specific recommendations for mitigation measures provided by a commenter on the proposed rule are discussed separately.

Procedural Mitigation Effectiveness and Recommendations

Comment 26: A commenter commented that the Navy's proposed mitigation zones are similar to the zones previously used during Phase II activities and are intended, based on the Phase III HSTT DEIS/OEIS, to avoid the potential for marine mammals to be exposed to levels of sound that could result in injury (*i.e.,* PTS). However, the commenter believed that Phase III proposed mitigation zones would not protect various functional hearing groups from PTS. For example, the mitigation zone for an explosive sonobuoy is 549 m but the mean PTS zones range from 2,113–3,682 m for HF. Similarly, the mitigation zone for an explosive torpedo is 1,920 m but the mean PTS zones range from 7,635–10,062 m for HF, 1,969–4,315 m for LF, and 3,053–3,311 for PW. The appropriateness of such zones is further complicated by platforms firing munitions (*e.g.,* for missiles and rockets) at targets that are 28 to 139 km away from the firing platform. An aircraft would clear the target area well before it positions itself at the launch location and launches the missile or rocket. Ships, on the other hand, do not clear the target area before launching the missile or rocket. In either case, marine mammals could be present in the target area unbeknownst to the Navy at the time of the launch.

Response: NMFS is aware that some mitigation zones do not fully cover the area in which an animal from a certain hearing group may incur PTS. For this small subset of circumstances, NMFS discussed potential enlargement of the mitigation zones with the Navy, but concurred with the Navy's assessment that further enlargement would be impracticable. Specifically, the Navy explained that explosive mitigation zones, as discussed in Chapter 5 (Mitigation) of the HSTT FEIS/OEIS, any additional increases in mitigation zone size (beyond what is depicted for each explosive activity), or additional observation requirements would be impracticable to implement due to implications for safety, sustainability, the Navy's ability to meet Title 10 requirements to successfully accomplish military readiness objectives, and the Navy's ability to conduct testing associated with required acquisition milestones or as required on an as-needed basis to meet operational requirements. Additionally, Navy Senior Leadership has approved and determined that the mitigation detailed in Chapter 5 (Mitigation) of the HSTT FEIS/OEIS provides the greatest extent of protection that is practicable to implement. The absence of mitigation to avoid all Level A harassment in some of these circumstances has been analyzed, however, and the Navy is authorized for any of these Level A harassment takes that may occur.

Comment 27: One commenter made several comments regarding visual and acoustic detection as related to mitigating impacts that can cause injury. The commenter noted that the Navy indicated in the HSTT DEIS/OEIS that Lookouts would not be 100 percent effective at detecting all species of marine mammals for every activity because of the inherent limitations of observing marine species and because the likelihood of sighting individual animals is largely dependent on observation conditions (*e.g.,* time of day, sea state, mitigation zone size, observation platform). The Navy has been collaborating with researchers at the University of St. Andrews to study Navy Lookout effectiveness and the commenter anticipates that the Lookout effectiveness study will be very informative once completed, but notes that in the interim, the preliminary data *do* provide an adequate basis for taking a precautionary approach. The commenter believed that rather than simply reducing the size of the mitigation zones it plans to monitor, the Navy should supplement its visual monitoring efforts with other monitoring measures including passive acoustic monitoring.

The commenter suggested that sonobuoys could be deployed with the target in the various target areas prior to the activity. This approach would allow the Navy to better determine whether the target area is clear and remains clear until the munition is launched.

Although the Navy indicated that it was continuing to improve its capabilities for using range instrumentation to aid in the passive acoustic detection of marine mammals, it also stated that it didn't have the capability or resources to monitor instrumented ranges in real time for the purpose of mitigation. That capability clearly exists. While available resources could be a limiting factor, the commenter notes that personnel who monitor the hydrophones on the operational side do have the ability to monitor for marine mammals as well. The commenter has supported the use of the instrumented ranges to fulfill mitigation implementation for quite some time (see the commenter's most recent November 13, 2017 letter) and contends that localizing certain species (or genera) provides more effective mitigation than localizing none at all.

The commenter recommended that NMFS require the Navy to use passive and active acoustic monitoring, whenever practicable, to supplement visual monitoring during the implementation of its mitigation measures for all activities that have the potential to cause injury or mortality beyond those explosive activities for which passive acoustic monitoring already was proposed, including those activities that would occur on the SCORE and PMRF ranges.

Response: For explosive mitigation zones, any additional increases in mitigation zone size (beyond what is depicted for each explosive activity) or observation requirements would be impracticable to implement due to implications for safety, sustainability, and the Navy's ability to meet Title 10 requirements to successfully accomplish military readiness objectives. We do note, however, that since the proposed rule, the Navy has committed to implementing pre-event observations for all in-water explosives events (including some that were not previously monitored) and to using additional platforms if available in the vicinity of the detonation area to help with this monitoring.

As discussed in the comment, the Navy does employ passive acoustic monitoring when practicable to do so (*i.e.,* when assets that have passive acoustic monitoring capabilities are already participating in the activity). For other explosive events, there are no platforms participating that have passive acoustic monitoring capabilities. Adding a passive acoustic monitoring capability (either by adding a passive acoustic monitoring device to a platform already participating in the activity, or by adding a platform with integrated passive acoustic monitoring capabilities to the activity, such as a sonobuoy) for mitigation is not practicable. As discussed in Section 5.5.3 (Active and Passive Acoustic Monitoring Devices) of the HSTT FEIS/OEIS, there are significant manpower and logistical constraints that make constructing and maintaining additional passive acoustic monitoring systems or platforms for each training and testing activity impracticable. Additionally, diverting platforms that have passive acoustic monitoring platforms would impact their ability to meet their Title 10 requirements and reduce the service life of those systems.

Regarding the use of instrumented ranges for realtime mitigation, the commenter is correct that the Navy continues to develop the technology and capabilities on its Ranges for use in marine mammal monitoring, which can be effectively compared to operational information after the fact to gain information regarding marine mammal response. However, as discussed above, the manpower and logistical complexity involved in detecting and localizing marine mammals in relation to multiple fast-moving sound source platforms in order to implement real-time mitigation is significant. A more detailed discussion of the limitations for on range passive acoustic detection as real-time mitigation is provided in Comment 34 and is impracticable for the Navy. The Navy's instrumented ranges were not developed for the purpose of mitigation. For example, beaked whales produce highly directed echolocation clicks that are difficult to simultaneously detect on multiple hydrophones within the instrumented range at PMRF; therefore, there is a high probability that a vocalizing animal would be assigned a false location on the range (*i.e.,* the Navy would not be able to verify its presence in a mitigation zone). Although the Navy is continuing to improve its capabilities to use range instrumentation to aid in the passive acoustic detection of marine mammals, at this time it would not be effective or practicable for the Navy to monitor instrumented ranges for the purpose of real-time mitigation for the reasons discussed in Section 5.5.3 (Active and Passive Acoustic Monitoring Devices) of the HSTT FEIS/OEIS.

Comment 28: The commenter recommended that NMFS require the Navy to conduct additional pre-activity overflights before conducting any activities involving detonations barring any safety issues (*e.g.,* low fuel), as well as post-activity monitoring for activities involving medium- and large caliber projectiles, missiles, rockets, and bombs.

Response: The Navy has agreed to implement pre-event observation mitigation, as well as post-event observation, for all in-water explosive event mitigation measures. If there are other platforms participating in these events and in the vicinity of the detonation area, they will also visually observe this area as part of the mitigation team.

Comment 29: One commenter recommended that the Navy implement larger shutdown zones.

Response: The Navy mitigation zones represent the maximum surface area the Navy can effectively observe based on the platform involved, number of personnel that will be involved, and the number and type of assets and resources available. As mitigation zone sizes increase, the potential for observing marine mammals and thus reducing impacts decreases, because the number of observers can't increase although the area to observe increases. For instance, if a mitigation zone increases from 1,000 to 2,000 yd., the area that must be observed increases five-fold. NMFS has analyzed the Navy's required mitigation and found that it will effect the least practicable adverse impact. The Navy's mitigation measures consider both the need to reduce potential impacts and the ability to provide effective observations throughout a given mitigation zone. To implement these mitigation zones, Navy Lookouts are trained to use a combination of unaided eye and optics as they search the surface around a vessel. In addition, there are other Navy personnel on a given bridge watch (in addition to designated Lookouts), who are also constantly watching the water for safety of navigation and marine mammals. Takes that cannot be mitigated are analyzed and authorized provided the necessary findings can be made.

Comment 30: Commenters commented that NMFS should cap the maximum level of activities each year.

Response: The commenters offers no rationale for why a cap is needed and nor do they suggest what an appropriate cap might be. The Navy is responsible under Title 10 for conducting the needed amount of testing and training to maintain military readiness, which is what they have proposed and NMFS has analyzed. Further, the MMPA states that NMFS shall issue MMPA authorizations if the necessary findings can be made, as they have been here. Importantly, as described in the *Mitigation Areas* section, the Navy will limit activities (active sonar, explosive use, MTE exercises, etc.) to varying degrees in multiple areas that are important to sensitive species or for critical behaviors in order to minimize impacts that are more likely to lead to adverse effects on rates of recruitment or survival.

Comment 31: A commenter suggested the Navy could improve observer effectiveness through the use of NMFS-certified marine mammal observers.

Response: The Navy currently requires at least one qualified Lookout on watch at all times a vessel is underway. In addition, on surface ships with hull-mounted sonars during sonar events, the number increases with two additional Lookouts on the forward portion of the vessel (*i.e.,* total of three Lookouts). Furthermore, unlike civilian commercial ships, there are additional bridge watch standers on Navy ships viewing the water during all activities. The Navy's Marine Species Awareness training that all bridge watchstanders including Lookouts take has been reviewed and approved by NMFS. This training is conducted annually and prior to MTEs. Note, Navy visual monitoring from Lookouts and bridge watchstanders as well as unit-based passive acoustic detection is used when available and appropriate.

As we understand from the Navy, mandating NMFS-certified marine mammal observers on all ships would require setting up and administering a certification program, providing security clearance for certified people, ensuring that all platforms are furnished with these individuals, and housing these people on ships for extended times from weeks to months. This would be an extreme logistic burden on realistic training. The requirement for additional non-Navy observers would provide little additional benefit, especially at the near ship mitigation ranges for mid-frequency active sonars on surface ships (<1,000 yds), nor be significantly better than the current system developed by the Navy in consultation with NMFS.

The purpose of Navy Lookouts is to provide sighting information for other boats and vessels in the area, in-water debris, and other safety of navigation functions. During active sonar use, additional personnel are assigned for the duration of the sonar event. In addition, the other Navy personnel on a given bridge watch along with designated Lookouts are also constantly watching the water for safety of navigation and marine mammals.

Navy training and testing activities often occur simultaneously and in various regions throughout the HSTT Study Area, with underway time that could last for days or multiple weeks at a time. The pool of certified marine mammal observers across the U.S. West Coast is rather limited, with many already engaged in regional NMFS survey efforts. Relative to the number of dedicated MMOs that would be required to implement this condition, as of July 2018, there are approximately 22 sonar-equipped Navy ships (*i.e.,* surface ships with hull-mounted active sonars) stationed in San Diego. Six additional vessels from the Pacific Northwest also transit to Southern California for training (28 ships times 2 observers per watch times 2 watches per day = minimum of 112 observers).

Senior Navy commands in the Pacific continuously reemphasize the importance of Lookout responsibilities to all ships. Further, the Navy has an ongoing study in which certified Navy civilian scientist observers embark periodically on Navy ships in support of a comparative Lookout effectiveness study. Results from this study will be used to make recommendations for further improvements to Lookout training.

Additionally, we note that the necessity to include trained NMFS-approved PSOs on Navy vessels, while adding little or no additional protective or data-gathering value, would be very expensive and those costs would need to be offset—most likely through reductions in the budget for Navy monitoring, through which invaluable data is gathered.

Comment 32: Commenters commented that NMFS should consider increasing the exclusion zone to the 120 dB isopleth because some animals are sensitive to sonar at low levels of exposure.

Response: First, it is important to note that the Commenters are suggesting that NMFS require mitigation that would eliminate all take, which is not what the applicable standard requires. Rather, NMFS is required to put in place measures that effect the ''least practicable adverse impact.'' Separately, NMFS acknowledges that some marine mammals may respond to sound at 120 dB in some circumstances; however, based on the best available data, only a subset of those exposed at that low level respond in a manner that would be considered harassment under the MMPA. NMFS and the Navy have quantified those individuals of certain stocks where appropriate, analyzed the impacts, and authorized them where needed. Further, NMFS and the Navy have identified exclusion zone sizes that are best suited to minimize impacts to marine mammal species and stocks and their habitat while also being practicable (see *Mitigation* section).

Comment 33: A commenter commented that NMFS should impose a 10-kn ship speed in biologically important areas and critical habitat for marine mammals to reduce vessel strikes. One commenter also specifically referenced this measure in regard to humpback whales and blue whales.

Response: This issue also is addressed elsewhere in the *Comments and Responses* section for specific mitigation areas. However, generally speaking, it is impracticable (because of impacts to mission effectiveness) to further reduce ship speeds for Navy activities, and, moreover, given the maneuverability of Navy ships at higher speeds and the presence of effective Lookouts, any further reduction in speed would reduce the already low probability of ship strike little, if any. The Navy is unable to impose a 10-kn ship speed limit because it would not be practical to implement and would impact the effectiveness of Navy's activities by putting constraints on training, testing, and scheduling. The Navy requires flexibility in use of variable ship speeds for training, testing, operational, safety, and engineering qualification requirements. Navy ships typically use the lowest speed practical given individual mission needs. NMFS has reviewed the Navy's analysis of these additional restrictions and the impacts they would have on military readiness and concurs with the Navy's assessment that they are impracticable.

The main driver for ship speed reduction is reducing the possibility and severity of ship strikes to large whales. However, even given the wide ranges of speeds from slow to fast that Navy ships must use to meet training and testing requirements, the Navy has a very low strike history to large whales in Southern California, with no whales struck by the Navy from 2010–2018. Current Navy Standard Operating Procedures and mitigations require a minimum of at least one Lookout on duty while underway (in addition to bridge watch personnel) and, so long as safety of navigation is maintained, to keep 500 yards away from large whales and 200 yards away from other marine mammals (except for bow-riding dolphins and pinnipeds hauled out on shore or structures). Furthermore, there is no Navy ship strike of a marine mammal on record in SOCAL that has occurred in the coastal area (~40 Nmi from shore), which is where speed restrictions are most requested. Finally, the most recent model estimate of the potential for civilian ship strike risk to blue, humpback, and fin whales off the coast of California found the highest risk near San Francisco and Long Beach associated with commercial ship routes to and from those ports (Rockwood *et al.,* 2018). There was no indication of a similar high risk to these species off San Diego, where the HSTT Study Area occurs.

Previously, the Navy commissioned a vessel density and speed report based on an analysis of Navy ship traffic in the HSTT Study Area between 2011 and 2015. Median speed of all Navy vessels within the HSTT Study Area is typically already low, with median speeds between 5 and 12 knots. Further, the presence and transits of commercial and recreational vessels, annually numbering in the thousands, poses a more significant risk to large whales than the presence of Navy vessels. The HSTT FEIS/OEIS Chapter 3 (Affected Environment and Environmental Consequences) Section 3.7.3.4.1 (Impacts from Vessels and In-Water Devices) and Appendix K, Section K.4.1.6.2 (San Diego (Arc) Blue Whale Feeding Area Mitigation Considerations), explain the important differences between most Navy vessels and their operation and commercial ships that make Navy vessels much less likely to strike a whale.

When developing Phase III mitigation measures, the Navy analyzed the potential for implementing additional types of mitigation, such as vessel speed restrictions within the HSTT Study Area. The Navy determined that based on how the training and testing activities will be conducted within the HSTT Study Area, vessel speed restrictions would be incompatible with practicability criteria for safety, sustainability, and training and testing missions, as described in Chapter 5 (Mitigation), Section 5.3.4.1 (Vessel Movement) of the HSTT FEIS/OEIS.

Comment 34: Commenters commented that NMFS should improve detection of marine mammals with restrictions on low-visibility activities and alternative detection such as thermal or acoustic methods.

Response: The Navy has compiled information related to the effectiveness of certain equipment to detect marine mammals in the context of their activities, as well as the practicality and effect on mission effectiveness of using various equipment. NMFS has reviewed this evaluation and concurs with the characterization and the conclusions below.

Low visibility—Anti-submarine warfare training involving the use of mid-frequency active sonar typically involves the periodic use of active sonar to develop the ''tactical picture,'' or an understanding of the battle space (*e.g.,* area searched or unsearched, presence of false contacts, and an understanding of the water conditions). Developing the tactical picture can take several hours or days, and typically occurs over vast waters with varying environmental and oceanographic conditions. Training during both high visibility (*e.g.,* daylight, favorable weather conditions) and low visibility (*e.g.,* nighttime, inclement weather conditions) is vital because sonar operators must be able to understand the environmental differences between day and night and varying weather conditions and how they affect sound propagation and the detection capabilities of sonar. Temperature layers move up and down in the water column and ambient noise levels can vary significantly between night and day, affecting sound propagation and how sonar systems are operated. Reducing or securing power in low-visibility conditions as a mitigation would affect a commander's ability to develop the tactical picture and would prevent sonar operators from training in realistic conditions. Further, during integrated training multiple vessels and aircraft may participate in an exercise using different dimensions of warfare simultaneously (*e.g.,* submarine warfare, surface warfare, air warfare, etc.). If one of these training elements were adversely impacted (*e.g.,* if sonar training reflecting military operations were not possible), the training value of other integrated elements would also be degraded. Additionally, failure to test such systems in realistic military operational scenarios increases the likelihood these systems could fail during military operations, thus unacceptably placing Sailors' lives and the Nation's security at risk. Some systems have a nighttime testing requirement; therefore, these tests cannot occur only in daylight hours. Reducing or securing power in low visibility conditions would decrease the Navy's ability to determine whether systems are operationally effective, suitable, survivable, and safe for their intended use by the fleet even in reduced visibility or difficult weather conditions.

Thermal detection—Thermal detection systems are more useful for detecting marine mammals in some marine environments than others. Current technologies have limitations regarding water temperature and survey conditions (*e.g.,* rain, fog, sea state, glare, ambient brightness), for which further effectiveness studies are required. Thermal detection systems are generally thought to be most effective in cold environments, which have a large temperature differential between an animal's temperature and the environment. Current thermal detection systems have proven more effective at detecting large whale blows than the bodies of small animals, particularly at a distance. The effectiveness of current technologies has not been demonstrated for small marine mammals. Thermal detection systems exhibit varying degrees of false positive detections (*i.e.,* incorrect notifications) due in part to their low sensor resolution and reduced performance in certain environmental conditions. False positive detections may incorrectly identify other features (*e.g.,* birds, waves, boats) as marine mammals. In one study, a false positive rate approaching one incorrect notification per 4 min. of observation was noted.

The Navy has been investigating the use of thermal detection systems with automated marine mammal detection algorithms for future mitigation during training and testing, including on autonomous platforms. Thermal detection technology being researched by the Navy, which is largely based on existing foreign military grade hardware, is designed to allow observers and eventually automated software to detect the difference in temperature between a surfaced marine mammal (*i.e.,* the body or blow of a whale) and the environment (*i.e.,* the water and air). Although thermal detection may be reliable in some applications and environments, the current technologies are limited by their: (1) Low sensor resolution and a narrow fields of view, (2) reduced performance in certain environmental conditions, (3) inability to detect certain animal characteristics and behaviors, and (4) high cost and uncertain long term reliability.

Thermal detection systems for military applications are deployed on various Department of Defense (DoD) platforms. These systems were initially developed for night time targeting and object detection such as a boat, vehicle, or people. Existing specialized DoD infrared/thermal capabilities on Navy aircraft and surface ships are designed for fine-scale targeting. Viewing arcs of these thermal systems are narrow and focused on a target area. Furthermore, sensors are typically used only in select training events, not optimized for marine mammal detection, and have a limited lifespan before requiring expensive replacement. Some sensor elements can cost upward of $300,000 to $500,000 per device, so their use is predicated on a distinct military need.

One example of trying to use existing DoD thermal system is being proposed by the U.S. Air Force. The Air Force agreed to attempt to use specialized U.S. Air Force aircraft with military thermal detection systems for marine mammal detection and mitigation during a limited at-sea testing event. It should be noted, however, these systems are specifically designed for and integrated into a small number of U.S. Air Force aircraft and cannot be added or effectively transferred universally to Navy aircraft. The effectiveness remains unknown in using a standard DoD thermal system for the detection of marine mammals without the addition of customized system-specific computer software to provide critical reliability (enhanced detection, cueing for an operator, reduced false positive, etc.)

Finally, current DoD thermal sensors are not always optimized for marine mammal detections verse object detection, nor do these systems have the automated marine mammal detection algorithms the Navy is testing via its ongoing research program. The combination of thermal technology and automated algorithms are still undergoing demonstration and validation under Navy funding.

Thermal detection systems specifically for marine mammal detection have not been sufficiently studied both in terms of their effectiveness within the environmental conditions found in the HSTT Study Area and their compatibility with Navy training and testing (*i.e.,* polar waters vs. temperate waters). The effectiveness of even the most advanced thermal detection systems with technological designs specific to marine mammal surveys is highly dependent on environmental conditions, animal characteristics, and animal behaviors. At this time, thermal detection systems have not been proven to be more effective than, or equally effective as, traditional techniques currently employed by the Navy to observe for marine mammals (*i.e.,* naked-eye scanning, hand-held binoculars, high-powered binoculars mounted on a ship deck). The use of thermal detection systems instead of traditional techniques would compromise the Navy's ability to observe for marine mammals within its mitigation zones in the range of environmental conditions found throughout the Study Area. Furthermore, thermal detection systems are designed to detect marine mammals and do not have the capability to detect other resources for which the Navy is required to implement mitigation, including sea turtles. Focusing on thermal detection systems could also provide a distraction from and compromise to the Navy's ability to implement its established observation and mitigation requirements. The mitigation measures discussed in Chapter 5 (Mitigation), Section 5.3 (Procedural Mitigation to be Implemented) of the HSTT FEIS/OEIS include the maximum number of Lookouts the Navy can assign to each activity based on available manpower and resources; therefore, it would be impractical to add personnel to serve as additional Lookouts. For example, the Navy does not have available manpower to add Lookouts to use thermal detection systems in tandem with existing Lookouts who are using traditional observation techniques.

The Defense Advanced Research Projects Agency funded six initial studies to test and evaluate infrared-based thermal detection technologies and algorithms to automatically detect marine mammals on an unmanned surface vehicle. Based on the outcome of these initial studies, follow-on efforts and testing are planned for 2018–2019. The Office of Naval Research Marine Mammals and Biology program funded a project (2013–2018) to test the thermal limits of infrared-based automatic whale detection technology. This project is focused on capturing whale spouts at two different locations featuring subtropical and tropical water temperatures, optimizing detector/classifier performance on the collected data, and testing system performance by comparing system detections with concurrent visual observations.

The Office of Naval Research Marine Mammals and Biology program is currently funding an ongoing project (2013–2018) that is testing the thermal limits of infrared based automatic whale detection technology (Principal Investigators: Olaf Boebel and Daniel Zitterbart). This project is focused on (1) capturing whale spouts at two different locations featuring subtropical and tropical water temperatures; (2) optimizing detector/classifier performance on the collected data; and (3) testing system performance by comparing system detections with concurrent visual observations. In addition, Defense Advanced Research Projects Agency (DARPA) has funded six initial studies to test and evaluate current technologies and algorithms to automatically detect marine mammals (IR thermal detection being one of the technologies) on an unmanned surface vehicle. Based on the outcome of these initial studies, follow-on efforts and testing are planned for 2018–2019.

The Navy plans to continue researching thermal detection systems for marine mammal detection to determine their effectiveness and compatibility with Navy applications. If the technology matures to the state where thermal detection is determined to be an effective mitigation tool during training and testing, NMFS and the Navy will assess the practicability of using the technology during training and testing events and retrofitting the Navy's observation platforms with thermal detection devices. The assessment will include an evaluation of the budget and acquisition process (including costs associated with designing, building, installing, maintaining, and manning the equipment); logistical and physical considerations for device installment, repair, and replacement (*e.g.,* conducting engineering studies to ensure there is no electronic or power interference with existing shipboard systems); manpower and resource considerations for training personnel to effectively operate the equipment; and considerations of potential security and classification issues. New system integration on Navy assets can entail up to 5 to 10 years of effort to account for acquisition, engineering studies, and development and execution of systems training. The Navy will provide information to NMFS about the status and findings of Navy-funded thermal detection studies and any associated practicability assessments at the annual adaptive management meetings.

Passive Acoustic Monitoring—The Navy does employ passive acoustic monitoring when practicable to do so (*i.e.,* when assets that have passive acoustic monitoring capabilities are already participating in the activity). For other explosive events, there are no platforms participating that have passive acoustic monitoring capabilities. Adding a passive acoustic monitoring capability (either by adding a passive acoustic monitoring device to a platform already participating in the activity, or by adding a platform with integrated passive acoustic monitoring capabilities to the activity, such as a sonobuoy) for mitigation is not practicable. As discussed in Chapter 5 (Mitigation), Section 5.5.3 (Active and Passive Acoustic Monitoring Devices) of the HSTT FEIS/OEIS, there are significant manpower and logistical constraints that make constructing and maintaining additional passive acoustic monitoring systems or platforms for each training and testing activity impracticable. Additionally, diverting platforms that have passive acoustic monitoring platforms would impact their ability to meet their Title 10 requirements and reduce the service life of those systems.

The use of real-time passive acoustic monitoring (PAM) for mitigation at the Southern California Anti-submarine Warfare Range (SOAR) exceeds the capability of current technology. The Navy has a significant research investment in the Marine Mammal Monitoring on Navy Ranges (M3R) system at three ocean locations including SOAR. However, this system was designed and intended to support marine mammal research for select species, and not as a mitigation tool. Marine mammal PAM using instrumented hydrophones is still under development and while it has produced meaningful results for marine species monitoring, abundance estimation, and research, it was not developed for nor is it appropriate for real-time mitigation. The ability to detect, classify, and develop an estimated position (and the associated area of uncertainty) differs across species, behavioral context, animal location vs. receiver geometry, source level, etc. Based on current capabilities, and given adequate time, vocalizing animals within an indeterminate radius around a particular hydrophone are detected, but obtaining an estimated position for all individual animals passing through a predetermined area is not assured. Detecting vocalizations on a hydrophone does not determine whether vocalizing individuals would be within the established mitigation zone in the timeframes required for mitigation. Since detection ranges are generally larger than current mitigation zones for many activities, this would unnecessarily delay events due to uncertainty in the animal's location and put at risk event realism.

Furthermore, PAM at SOAR does not account for animals not vocalizing. For instance, there have been many documented occurrences during PAM verification testing at SOAR of small boats on the water coming across marine mammals such as baleen whales that were not vocalizing and therefore not detected by the range hydrophones. Animals must vocalize to be detected by PAM; the lack of detections on a hydrophone may give the false impression that the area is clear of marine mammals. The lack of vocalization detections is not a direct measure of the absence of marine mammals. If an event were to be moved based upon low-confidence localizations, it may inadvertently be moved to an area where non-vocalizing animals of undetermined species are present.

To develop an estimated position for an individual, it must be vocalizing and its vocalizations must be detected on at least three hydrophones. The hydrophones must have the required bandwidth, and dynamic range to capture the signal. In addition, calls must be sufficiently loud so as to provide the required signal to noise ratio on the surrounding hydrophones. Typically, small odontocetes echolocate with a directed beam that makes detection of the call on multiple hydrophones difficult. Developing an estimated position of selected species requires the presence of whistles which may or may not be produced depending on the behavioral state. Beaked whales at SOAR vocalize only during deep foraging dives which occur at a rate of approximately 10 per day. They produce highly directed echolocation clicks that are difficult to simultaneously detect on multiple hydrophones. Current real-time systems cannot follow individuals and at best produce sparse positions with multiple false locations. The position estimation process must occur in an area with hydrophones spaced to allow the detection of the same echolocation click on at least three hydrophones. Typically, a spacing of less than 4 km in water depths of approximately 2 km is preferred. In the absence of detection, the analyst can only determine with confidence if a group of beaked whales is somewhere within 6 km of a hydrophone. Beaked whales produce stereotypic click trains during deep (<500 m) foraging dives. The presence of a vocalizing group can be readily detected by an analyst by examining the click structure and repetition rate. However, estimating position is possible only if the same train of clicks is detected on multiple hydrophones which is often precluded by the animal's narrow beam pattern. Currently, this is not an automated routine.

In summary, the analytical and technical capabilities required to use PAM such as M3R at SOAR as a required mitigation tool are not sufficiently robust to rely upon due to limitations with near real-time classification and determining estimated positions. The level of uncertainty as to a species presence or absence and location are too high to provide the accuracy required for real-time mitigation. As discussed in Chapter 5 (Mitigation) of the HSTT FEIS/OEIS, existing Navy visual mitigation procedures and measures, when performed by individual units at-sea, still remain the most practical means of protection for marine species.

Comment 35: Commenters commented that NMFS should add mitigation for other marine mammal stressors such as dipping sonar, pile driving, and multiple exposures near homeports.

Response: The Navy implements a 200-yd shutdown for dipping sonar and a 100-yd exclusion zone for pile-driving. It is unclear what the commenter means by adding mitigation for ''multiple exposures'' near homeports, and therefore no explanation can be provided.

Mitigation Areas

Introduction

The Navy included a comprehensive proposal of mitigation measures in their initial application that included procedural mitigations that reduce the likelihood of mortality, injury, hearing impairment, and more severe behavioral responses for most species. The Navy also included time/area mitigation that further protects areas where important behaviors are conducted and/or sensitive species congregate, which reduces the likelihood of takes that are likely to impact reproduction or survival (as described in the Mitigation Measures section of the final rule and the Navy's application). As a general matter, where an applicant proposes measures that are likely to reduce impacts to marine mammals, the fact that they are included in the proposal and application indicates that the measures are practicable, and it is not necessary for NMFS to conduct a detailed analysis of the measures the applicant proposed (rather, they are simply included). However, it is necessary for NMFS to consider whether there are additional practicable measures that could also contribute to the reduction of adverse effects on the species or stocks through effects on annual rates of recruitment or survival. In the case of the Navy's HSTT application, we worked with the Navy prior to the publication of the proposed rule and ultimately the Navy agreed to increase geographic mitigation areas adjacent to the island of Hawaii to more fully encompass specific biologically important areas and the Alenuihaha Channel and to limit additional anti-submarine warfare mid-frequency active sonar (ASW) source bins (MF4) within some geographic mitigation areas.

During the public comment period on the proposed rule, NMFS received numerous recommendations for the Navy to implement additional mitigation measures, both procedural and time/area limitations. Extensive discussion of the recommended mitigation measures in the context of the factors considered in the least practicable adverse impact analysis (considered in the Mitigation Measures section of the final rule and described below), as well as considerations of alternate iterations or portions of the recommended measures considered to better address practicability concerns, resulted in the addition of several procedural mitigations and expansion of multiple time/area mitigations (see the *Mitigation Measures* section in the final rule). These additional areas reflect, for example, concerns about blue whales in SOCAL and small resident odontocete populations in Hawaii (which resulted in expanded time/area mitigation), focus on areas where important behaviors and habitat are found (*e.g.,* in BIAs), and enhancement of the Navy's ability to detect and reduce injury and mortality (which resulted in expanded monitoring before and after explosive events). Through extensive discussion, NMFS and the Navy worked to identify and prioritize additional mitigation measures that are likely to reduce impacts on marine mammal species or stocks and their habitat and are also possible for the Navy to implement.

Following the publication of the 2013 HSTT MMPA incidental take rule, the Navy (and NMFS) were sued and the resulting settlement agreement prohibited or restricted Navy activities within specific areas in the HSTT Study Area. These provisional prohibitions and restrictions on activities within the HSTT Study Area were derived pursuant to negotiations with the plaintiffs in that lawsuit were specifically not evaluated or selected based on the type of thorough examination of best available science that occurs through the rulemaking process under the MMPA, or through related analyses conducted under the National Environmental Policy Act (NEPA) or the ESA. The agreement did not constitute a concession by the Navy as to the potential impacts of Navy activities on marine mammals or any other marine species, or to the practicability of the measures. The Navy's adoption of restrictions on its HSTT activities as part of a relatively short-term settlement does not mean that those restrictions are necessarily supported by the best available science, likely to reduce impacts to marine mammals species or stocks and their habitat, or practicable to implement from a military readiness standpoint over the longer term in the HSTT Study Area. Accordingly, as required by statute, NMFS analyzed the Navy's activities, impacts, mitigation and potential mitigation (including the settlement agreement measures) pursuant to the ''least practicable adverse impact'' standard to determine the appropriate mitigation to include in these regulations. Some of the measures included in the settlement agreement are included in the final rule, while some are not. Other measures that were not included in the settlement agreement are included in the final rule.

Ultimately, the Navy adopted all mitigation measures that are practicable without jeopardizing its mission and Title 10 responsibilities. In other words, a comprehensive assessment by Navy leadership of the final, entire list of mitigation measures concluded that the inclusion of any further mitigation beyond those measures identified here in the final rule would be entirely impracticable. NMFS independently reviewed the Navy's practicability determinations for specific mitigation areas and concurs with the Navy's analysis.

As we outlined in the *Mitigation Measures* section, NMFS has reviewed Appendix K (Geographic Mitigation Assessment) in the Navy's HSTT FEIS/OEIS and information contained reflects the best available science as well as a robust evaluation of the practicability of different measures, and NMFS uses Appendix K to support our independent least practicable adverse impact analysis. Below is additional discussion regarding specific recommendations for mitigation measures.

Comment 36: With respect to the national security exemption related to mitigation areas, a commenter recommended that NMFS should specify that authorization may be given only by high-level officers, consistent with the Settlement Agreement or with previous HSTT rulings.

Response: The Navy provided the technical analyses contained in Appendix K (Geographic Mitigation Assessment) of the HSTT FEIS/OEIS that included details regarding changing the measure to the appropriate delegated Command designee (see specifically Appendix K, Section K.2.2.1 (Proposed Mitigation Areas within the HSTT Study Area), for each of the proposed areas). The commenter proposed ''authorization may be given only by high-level officers'' and therefore appears to have missed the designations made within the cited sections above since those do constitute positions that could only be considered ''high level officers.'' The decision would be delegated to high-level officers. This delegation has been clarified in the Final rule as ''permission from the appropriate designated Command authority.''

SOCAL Areas

Comment 37: NPS recommended that the Navy consider the following as it plans to conduct activities in the HSTT Study Area. NPS noted the units of the NPS system that occur near the Navy's training and testing locations in Southern California and which may be affected by noise including Channel Islands National Park (NP) and Cabrillo National Monument.

Response: National Parks and marine protected areas in are addressed in Chapter 6 of the HSTT FEIS/OEIS. The Channel Islands National Marine Sanctuary consists of an area of 1,109 nmi^2 around Anacapa Island, Santa Cruz Island, Santa Rosa Island, San Miguel Island and Santa Barbara Island to the south. Only 92 nmi^2 of Santa Barbara Island, or about 8 percent of the Channel Island National Marine Sanctuary, occurs within the SOCAL portion of the HSTT Study Area, but the entirety of that piece is included in the Santa Barbara Mitigation Area. The Navy will continue to implement a mitigation area out to 6 nmi of Santa Barbara Island, which includes a portion of the Channel Island National Marine Sanctuary and the Santa Barbara Marine Protected Area where the Navy will restrict the use of MF1 sonar sources and some explosive during training. Please refer to Figure 5.4–4 in the Navy's HSTT FEIS/OEIS shows the spatial extent of the Santa Barbara Island mitigation area.

Cabrillo National Monument only contains some intertidal areas, but no marine waters. No Navy activities overlap with the Cabrillo National Monument; therefore, no impacts are expected.

Comment 38: A commenter recommended to extend the seasonality of the San Diego Arc Mitigation Area to December 31 for blue whales are present off southern California almost year round, and relatively higher levels from June 1 through December 31.

Response: Analysis of the San Diego Arc Mitigation Area and its consideration for additional geographic mitigation is provided in the HSTT FEIS/OEIS in Appendix K (Geographic Mitigation Assessment), Section K.4.1.6 (San Diego (Arc) Blue Whale Feeding Area; Settlement Areas 3–A through 3–C, California Coastal Commission 3 nmi Shore Area, and San Diego Arc Area), Section K.5.5 (Settlement Areas within the Southern California Portion of the HSTT Study Area), and Section K.6.2 (San Diego Arc: Area Parallel to the Coastline from the Gulf of California Border to just North of Del Mar). This analysis included consideration of seasonality and the potential effectiveness of restrictions to use of mid-frequency active sonar by Navy in the area. Based on the Appendix K (Geographic Mitigation Assessment) analyses, the Navy will implement additional mitigation within the San Diego Arc Mitigation Area, as detailed in Chapter 5 (Mitigation) Section 5.4.3 (Mitigation Areas for Marine Mammals in the Southern California Portion of the Study Area) of the HSTT FEIS/OEIS, to further avoid or reduce impacts on marine mammals from acoustic and explosive stressors and vessel strikes from Navy training and testing in this location. Since the proposed rule, the Navy is now limiting MF1 surface ship hull-mounted MFAS even further in the San Diego Arc Mitigation Area. The Navy will not conduct more than 200 hrs of MF1 MFAS in the *combined areas* of the San Diego Arc Mitigation Area and newly added San Nicholas Island and Santa Monica/Long Beach Mitigation Areas. As described in the proposed rule, the Navy will not use explosives that could potentially result in the take of marine mammals during large-caliber gunnery, torpedo, bombing, and missile (including 2.75″ rockets) activities during training and testing in the San Diego Mitigation Area. Regarding the recommended increase in seasonality to December 31, the San Diego Arc and current seasonality is based on the Biologically Important Area associated with this mitigation area (Calambokidis *et al.*, 2017), which identifies the primary months for feeding. While blue whale calls have been detected in Southern California through December (Rice *et al.,* 2017, Lewis and Širović, in press), given a large propagation range (10–50 km or more) for low-frequency blue whale vocalization, blue whale call detection from a Navy-funded single passive acoustic device near the San Diego Arc may not be a direct correlation with blue whale presence within the San Diego Arc from November through December. In addition, passive acoustic call detection data does not currently allow for direct abundance estimates. Calls may indicate some level of blue whale presence, but not abundance or individual residency time. In the most recent Navy-funded passive acoustic monitoring report including the one site in the northern San Diego Arc from June 2015 to April 2016, blue whale call detection frequency near the San Diego Arc starts declining in November after an October peak (Rice *et al.,* 2017, Širović, personal communication). The newest Navy-funded research on blue whale movements from 2014 to 2017 along the U.S. West Coast based on satellite tagging, has shown that individual blue whale movement is wide ranging with large distances covered daily (Mate *et al.,* 2017). Nineteen (19) blue whales were tagged in 2016, the most recent reporting year available (Mate *et al.,* 2017). Only 5 of the 19 blue whales spent time in the SOCAL portion of the HSTT Study Area, and only spent a few days within the range complex (2–13 days). Average distance from shore for blue whales was 113 km. None of the 19 blue whales tagged in 2016 spent time within the San Diego Arc. From previous year efforts (2014–2015), only a few tagged blue whales passed through the San Diego Arc. In addition, Navy and non-Navy-funded blue whale satellite tagging studies started in the early 1990s and has continued irregularly through 2017. In general, most blue whales start a south-bound migration from the ''summer foraging areas'' in the mid- to late-fall time period, unless food has not been plentiful, which can lead to a much earlier migration south. Therefore, while blue whales have been documented within the San Diego Arc previously, individual use of the area is variable, likely of short duration, and declining after October. Considering the newest passive acoustic and satellite tagging data, there is no scientific justification for extending the San Diego Arc Mitigation Area period from October 31 to December 31.

Comment 39: A commenter recommended limiting all MF1 use within the San Diego Arc Mitigation Area. A commenter also recommended NMFS should carefully consider prohibiting use of other LFAS and MFAS during the time period the San Diego Arc Mitigation Areas is in place, and for the MTEs to be planned for other months of the year.

Response: Since the proposed rule, the Navy is now limiting MF1 surface ship hull-mounted MFAS even further in the San Diego Arc Mitigation Area. The Navy will not conduct more than 200 hrs of MF1 MFAS in the *combined* areas of the San Diego Arc Mitigation Area and newly added San Nicholas Island and Santa Monica/Long Beach Mitigation Areas. Appendix K (Geographic Mitigation Assessment) of the HSTT FEIS/OEIS discusses the Navy's analysis of MFAS restrictions within the San Diego Arc Mitigation Area. Other training MFAS systems are likely to be used less frequently in the vicinity of the San Diego Arc area than surface ship MFAS. Given water depths, the San Diego Arc area is not conducive for large scale anti-submarine warfare exercises, nor near areas where other anti-submarine warfare training and testing occurs. Due to the presence of existing Navy subareas in the southern part of the San Diego Arc, a limited amount of helicopter dipping MFAS could occur. These designated range areas are required for proximity to airfields in San Diego such as Naval Air Station North Island and for airspace management. However, helicopters only used these areas in the Arc for a Kilo Dip. A Kilo Dip is a functional check of approximately 1–2 pings of active sonar to confirm the system is operational before the helicopter heads to more remote offshore training areas. This ensures proper system operation and avoids loss of limited training time, expenditure of fuel, and cumulative engine use in the event of equipment malfunction. The potential effects of dipping sonar have been accounted for in the Navy's analysis. Dipping sonar is further discussed below in Comment 40.

Comment 40: A commenter recommended prohibiting the use of air-deployed mid-frequency active sonar in the San Diego Arc Mitigation Area.

Response: The HSTT FEIS/OEIS and specifically Appendix K (Geographic Mitigation Assessment) discuss the Navy's analysis of mid-frequency and low-frequency active sonar restrictions within the San Diego Arc. Other sonar systems are likely to be used less frequently in the vicinity of the San

Diego Arc than surface ship mid-frequency active sonars. In regard to the recommendation to prohibit ''air-deployed'' or dipping mid-frequency active sonar, the only helicopter dipping sonar activity that would likely be conducted in the San Diego Arc area is a Kilo Dip, which occurs relatively infrequently and involves a functional check of approximately 1–2 pings of active sonar before moving offshore beyond the San Diego Arc to conduct the training activity. During use of this sonar, the Navy will implement the procedural mitigation as described in Section 5.3.2.1 (Active Sonar). The Kilo Dip functional check needs to occur close to Naval Air Station North Island in San Diego to insure all systems are functioning properly, before moving offshore. This ensures proper system operation and avoids loss of limited training time, expenditure of fuel, and cumulative engine use in the event of equipment malfunction. The potential effects of dipping sonar have been accounted for in the Navy's analysis. Further, due to lower power settings for dipping sonar, potential behavioral impact ranges of dipping sonar are significantly lower than surface ship sonars. For example, the HSTT average modeled range to temporary threshold shift of dipping sonar for a 1-second ping on low-frequency cetacean (*i.e.,* blue whale) is 77 m (HSTT FEIS/OEIS Table 3.7–7). This range is easily monitored for large whales by a hovering helicopter and is accounted for in the Navy's proposed mitigation ranges for dipping sonars. Limited ping time and lower power settings therefore would limit the impact from dipping sonar to any marine mammal species. It should be pointed out that the commenter's recommendation is based on new Navy behavioral response research specific to beaked whales (Falcone *et al.,* 2017). The Navy relied upon the best science that was available to develop behavioral response functions in consultation with NMFS for the HSTT FEIS/OEIS. The article cited in the comment (Falcone *et al.,* 2017) was not available at the time the HSTT EIS/OEIS was published. The new information and data presented in the article was thoroughly reviewed when it became available and further considered in discussions with some of the paper's authors. Many of the variables requiring further analysis for beaked whales and dipping sonar impact assessment are still being researched under continued Navy funding through 2019. The small portion of designated Kilo Dip areas that overlap the southern part of the San Diego Arc is not of sufficient depth for preferred habitat of beaked whales (see Figure 2.1–9 in the HSTT FEIS/OEIS). Further, passive acoustic monitoring for the past several years in the San Diego Arc confirms a lack of beaked whale detections (Rice *et al.,* 2017). Also, behavioral responses of beaked whales from dipping and other sonars cannot be universally applied to other species including blue whales. Navy-funded behavioral response studies of blue whales to simulated surface ship sonar has demonstrated there are distinct individual variations as well as strong behavioral state considerations that influence any response or lack of response (Goldbogen *et al.,* 2013).

Comment 41: A commenter recommends requiring vessel speed restrictions within the San Diego Arc Mitigation Area.

Response: Previously, the Navy commissioned a vessel density and speed report for the HSTT Study Area (CNA, 2016). Based on an analysis of Navy ship traffic in the HSTT Study Area between 2011 and 2015, median speed of all Navy vessels within Southern California is typically already low, with median speeds between 5 and 12 kn (CAN, 2016). Slowest speeds occurred closer to the coast including the general area of the San Diego Arc and approaches to San Diego Bay. The presence and transits of commercial and recreational vessels, numbering in the many hundreds, far outweighs the presence of Navy vessels. According the the SARs, blue whale mortality and injuries attributed to commercial ship strikes in California waters was zero in the most recent reporting period between 2011 and 2015 (Carretta *et al.,* 2017a). However, ship strikes were implicated in the deaths of four blue whales and the serious injury of a fifth whale between 2009 and 2013 (Carretta *et al.,* 2015). There has been no confirmed Navy ship strike to a blue whale in the entire Pacific over the 13-year period from 2005 to 2017. To minimize the possibility of ship strike in the San Diego Arc Mitigation Area, the Navy will implement procedural mitigation for vessel movements based on guidance from NMFS for vessel strike avoidance. The Navy will also issue seasonal awareness notification messages to all Navy vessel of blue, fin, and gray whale occurrence to increase ships awareness of marine mammal presence as a means of improving detection and avoidance of whales in SOCAL. When developing the mitigation for this 2018–2023 rule, the Navy analyzed the potential for implementing additional types of mitigation, such as developing vessel speed restrictions within the HSTT Study Area. The Navy determined that based on how the training and testing activities will be conducted within the HSTT Study Area under the planned activities, vessel speed restrictions would be incompatible with the practicability assessment criteria for safety, sustainability, and Title 10 requirements, as described in Section 5.3.4.1 (Vessel Movement) of the HSTT FEIS/OEIS.

Comment 42: A commenter recommended prohibiting the use of air-deployed mid-frequency active sonar in the Santa Barbara Island Mitigation Area.

Response: The commenter requested to prohibit ''air-deployed'' mid-frequency active sonar is based on one paper (Falcone *et al.,* 2017), which is a Navy-funded project designed to study behavioral responses of a single species, Cuvier's beaked whales, to mid-frequency active sonar. The Navy relied upon the best science that was available to develop behavioral response functions for beaked whales and other marine mammals in consultation with NMFS for the HSTT FEIS/OEIS. The article cited in the comment (Falcone *et al.,* 2017) was not available at the time the HSTT DEIS/OEIS was published but does not change the HSTT FEIS/OEIS criteria or conclusions. The new information and data presented in the article were thoroughly reviewed when they became available and further considered in discussions with some of the paper's authors. Many of the variables requiring further analysis for beaked whales and dipping sonar impact assessment are still being researched under continued Navy funding through 2019.

Behavioral responses of beaked whales from dipping and other sonars cannot be universally applied to other marine mammal species. For example, Navy-funded behavioral response studies of blue whales to simulated surface ship sonar has demonstrated there are distinct individual variations as well as strong behavioral state considerations that influence any response or lack of response (Goldbogen *et al.,* 2013). The same conclusion on the importance of exposure and behavioral context was stressed by Harris *et al.* (2017). Therefore, it is expected that other species would also have highly variable individual responses ranging from some response to no response to any anthropogenic sound. This variability is accounted for in the Navy's current behavioral response curves described in the HSTT FEIS/OEIS and supporting technical reports.

The potential effects of dipping sonar have been rigorously accounted for in the Navy's analysis. Parameters such as power level and propagation range for typical dipping sonar use are factored into HSTT acoustic impact analysis along with guild specific criteria and other modeling variables as detailed in the HSTT FEIS/OEIS and associated technical reports for criteria and acoustic modeling. Due to lower power settings for dipping sonar, potential impact ranges of dipping sonar are significantly lower than surface ship sonars. For example, the HSTT average modeled range to temporary threshold shift of dipping sonar for a 1-second ping on low-frequency cetacean (*i.e.,* blue whale) is 77 m, and for mid-frequency cetaceans including beaked whales is 22 m (HSTT FEIS/OEIS Table 3.7–7). This range is monitored for marine mammals by a hovering helicopter and is accounted for in the Navy's proposed mitigation ranges for dipping sonars (200 yd. or 183 m). Limited ping time and lower power settings therefore would limit the impact from dipping sonar to any marine mammal species.

For other marine mammal species, the small area around Santa Barbara Island does not have resident marine mammals, formally identified biologically important areas, nor is it identified as a breeding or persistent foraging location for cetaceans. Instead, the same marine mammals that range throughout the offshore Southern California area could pass at some point through the marine waters of Santa Barbara Island. As discussed in Appendix K (Geographic Mitigation Assessment) of the HSTT FEIS/OEIS, the Navy is already proposing year-round limitations to mid-frequency active sonar and larger explosive use. The Navy will not use MF1 surface ship hull-mounted mid-frequency active sonar during training or testing, or explosives that could potentially result in the take of marine mammals during medium-caliber or large-caliber gunnery, torpedo, bombing, and missile (including 2.75″ rockets) activities during training in the Santa Barbara Island Mitigation Area. Other mid-frequency active sonar systems for which the Navy is seeking authorization within SOCAL are used less frequently than surface ship sonars, and more importantly are of much lower power with correspondingly lower propagation ranges and reduced potential behavioral impacts.

Comment 43: A commenter recommended prohibiting other sources of mid-frequency active sonar in the Santa Barbara Mitigation Area.

Response: Appendix K (Geographic Mitigation Assessment) discusses the Navy's analysis of mid-frequency active sonar restrictions around Santa Barbara Island. Other training mid-frequency active sonar (MFAS) systems are likely to be used less frequently in the vicinity Santa Barbara Island than surface ship mid-frequency active sonars. Although not prohibiting the use of other sources of MFAS, the Navy will not use MF1 surface ship hull-mounted mid-frequency active sonar during training or testing, or explosives that could potentially result in the take of marine mammals during medium-caliber or large-caliber gunnery, torpedo, bombing, and missile (including 2.75″ rockets) activities during training in the Santa Barbara Island Mitigation Area.

Comment 44: A commenter recommended implementing vessel speed restrictions in the Santa Barbara Island Mitigation Area (Channel Islands Sanctuary Cautionary Area).

Response: The Channel Islands Sanctuary Cautionary Area was renamed the Santa Barbara Island Mitigation Area for the proposed rule. All locations within the HSTT Study Area have been used for Navy training and testing for decades. There has been no scientific evidence to indicate the Navy's activities are having adverse effects on populations of marine mammals, many of which continue to increase in number or are maintaining populations based on what regional conditions can support. This includes any marine mammal population that may transit through the Santa Barbara Island Mitigation Area. For example, the most recent NMFS U.S. West Coast survey findings (Moore and Barlow, 2017) encountered the highest estimated abundance of *Mesoplodon* beaked whales in the California Current since 1991. Multiple other surveys, monitoring efforts, and research projects continue to encounter long-term resident individuals such as populations of beaked whales in higher densities within the HSTT Study Area where various sonar systems have been in use for decades; see for example citation in the HSTT FEIS/OEIS to Debich *et al.* (2015a, 2015b), Falcone and Schorr (2012, 2014), Hildebrand *et al.* (2009), Moretti (2016), Širović *et al.* (2016), and Smultea and Jefferson (2014). The newest Navy-funded research, which was not available when the HSTT FEIS/OEIS was issued, continue to support the regular and repeated occurrence of marine mammal populations in HSTT including those thought most susceptible to behavioral response to anthropogenic sounds (DiMarzio *et al.,* 2018; Lewis and Širović, in press; Moretti *et al.,* 2017; Schorr *et al.,* 2018; Širović *et al.,* 2016, 2017, 2018; Širović *et al.,* 2018). Navy research and monitoring funding continues within the HSTT Study Area under current NMFS MMPA and ESA permits, and is planned through the duration of any future permits. Given the lack of effects to marine mammal populations in the HSTT Study Area from surface ship sonars, the effects from intermittent, less frequent use of lower powered dipping mid-frequency active sonar or other mid-frequency active sonar and low-frequency sonars would also not significantly affect local populations.

Additionally, here has not been any Navy ship strike to marine mammals in SOCAL over the 8-year period from 2010–2018, and there has never been a Navy strike within the boundary of the Channel Islands National Marine Sanctuary over the course of strike record collection dating back 20 years. Therefore, ship strike risk to marine mammals transiting the Santa Barbara Island Mitigation Area is minimal. Additionally, as detailed in the analysis in the HSTT FEIS/OEIS Section 3.7.3.4.1 (Impacts from Vessels and In-Water Devices) and in Appendix K (Geographic Mitigation Assessment), there are important differences between most Navy vessels and their operation and commercial ships that individually make Navy vessels much less likely to strike a whale. Navy vessels already operate at a safe speed given a particular transit or activity need. This also includes a provision to avoid large whales by 500 yd; so long as safety of navigation and safety of operations is maintained. Previously, the Navy commissioned a vessel density and speed report for HSTT (CNA, 2016). Based on an analysis of Navy ship traffic in HSTT between 2011 and 2015, the average speed of all Navy vessels within Southern California is typically already low, with median speeds between 5 and 12 kn (CNA, 2016). Slowest speeds occurred closer to the coast and islands. However, sometimes during training or testing activities, higher speeds are required.

Finally, given the lack of population impact to marine species throughout SOCAL from Navy activities, lack of significant and repeated use of the small portion of waters within the Santa Barbara Island Mitigation Area by marine mammals, anticipated low individual residency times within the Mitigation Area, application of mitigation and protective measures as outlined in the HSTT FEIS/OEIS, documented safe speeds Navy vessels already navigate by, detailed assessments of realistic training and testing requirements and potential impacts of further restrictions, the Navy has adequately defined the most practicable mitigation measures in the HSTT FEIS/OEIS and Appendix K (Geographic Mitigation Assessment).

Comment 45: A commenter recommended additional mitigation areas for important beaked whale habitat in the Southern California Bight. A commenter asserted that it is important to focus substantial management efforts on beaked whales within the Navy's SOCAL Range Complex, which sees the greatest annual amount of sonar and explosives activity of any Navy range in the Pacific.

Response: The basis for this comment includes incorrect or outdated information or information that does not reflect the environment present in the HSTT Study Area, such as, ''. . .beaked whale populations in the California Current have shown significant, possibly drastic declines in abundance over the last twenty years.'' The citation provided in the footnote to the comment and postulated ''decline'' was for beaked whales up until 2008 (which does not take into account information from the last 10 years) and was a postulated trend for the entire U.S. West Coast, not data which is specific to the HSTT Study Area. As noted in Section 3.7.3.1.1.7 (Long-Term Consequences) of the HSTT FEIS/OEIS, the postulated decline was in fact not present within the SOCAL portion of the HSTT Study Area, where abundances of beaked whales have remained higher than other locations off the U.S. West Coast. In addition, the authors of the 2013 citation (Moore and Barlow, 2013) have published trends based on survey data gathered since 2008 for beaked whales in the California Current, which now includes the highest abundance estimate in the history of these surveys (Barlow 2016; Carretta *et al.,* 2017; Moore and Barlow, 2017). Also, when considering the portion of the beaked whale population within the SOCAL portion of the HSTT Study Area and as presented in the HSTT FEIS/OEIS, multiple studies have documented continued high abundance of beaked whales and the long-term residency of documented individual beaked whales, specifically where the Navy has been training and testing for decades (see for example Debich *et al.,* 2015a, 2015b; Dimarzio *et al.,* 2018; Falcone and Schorr, 2012, 2014; Hildebrand *et al.,* 2009; Moretti, 2016; Schorr *et al.,* 2018; Širović *et al.,* 2016; Smultea and Jefferson, 2014). There is no evidence that there have been any population-level impacts to beaked whales resulting from Navy training and testing in the SOCAL portion of the HSTT Study Area. The Navy did provide analysis and consideration of additional geographic mitigation for beaked whales in the Southern California Bight in Appendix K (Geographic Mitigation Assessment), Section K.7.2 (Southern California Public Comment Mitigation Area Assessment) and specifically Section K.7.2.7 (Northern Catalina Basin and the San Clemente Basin) of the HSTT FEIS/OEIS regarding the stated concern over the possible presence of Perrin's beaked whale. See Chapter 5 (Mitigation), Section 5.4.1.2 (Mitigation Area Assessment) of the HSTT FEIS/OEIS for additional details regarding the assessments of areas considered for mitigation.

Comment 46: A commenter recommended additional mitigation areas in the San Nicholas Basin. A commenter notes that the settlement agreement established a ''refuge'' from sonar and explosives activities in a portion of the whales' secondary habitat, outside the Southern California Anti-submarine Warfare Range (SOAR), with more management effort being necessary in the long term a commenter recommended at a minimum that NMFS should prescribe the ''refuge'' during the next five-year operation period and should consider all possible habitat-based management efforts, including but not limited to the expansion of this area further south towards SOAR, to address impacts on the small population of Cuvier's beaked whales associated with San Clemente Island. A commenter also commented the energetic costs of displacement of beaked whales into sub-optimal foraging habitat outweigh the costs of repeated sonar exposure for whale survival, while creating conditions of a population sink, such as has been seen on the Navy's AUTEC range (Claridge 2013).

Response: Navy did provide analysis and consideration of additional geographic mitigation for beaked whales in the San Nicolas Basin in Appendix K (Geographic Mitigation Assessment), Section K.7.2 (Southern California Public Comment Mitigation Area Assessment) and specifically Section K.7.2.1 (San Nicolas Basin) of the HSTT FEIS/OEIS. See Chapter 5 (Mitigation), Section 5.4.1.2 (Mitigation Area Assessment) of the HSTT FEIS/OEIS for additional details regarding the assessments of areas considered for mitigation.

Within San Nicolas Basin, there is a documented, recurring number of Cuvier's beaked whales strongly indicating that the Navy's activities areis not having a population-level impact to this species. This is supported by repeated visual re-sighting rates of individuals, sightings of calves and, more importantly, reproductive females, and passive acoustic assessments of steady vocalization rates and abundance over at least the most recent seven-year interval. It is incorrect to consider as fact that there is a ''population sink, such as has been seen on the Navy's AUTEC range. In the citation provided (Claridge 2013), that statement is merely a hypothesis, yet to be demonstrated.

The Navy has been funding Cuvier's beaked whale research specifically in San Nicolas Basin since 2006. This research is planned to continue for at least the next five years through the duration of the planned HSTT MMPA permit. Cumulative from 2006 to 2016, over 170 individual Cuvier's beaked whales have been catalogued within San Nicolas Basin. Schorr *et al.* (2018) state for the most recent field season from 2016 to 2017 that: Identification photos of suitable quality were collected from 69 of the estimated 81 individual Cuvier's beaked whales encountered in 2016–2017. These represented 48 unique individuals, with eight of these whales sighted on two different days, and another three on three different days during the study period. Nineteen (39 percent) of these whales had been sighted in previous years. Many more whales identified in 2016 had been sighted in a previous year (16/28 individuals, 57 percent), compared to 2017 (5/22 individuals, 23 percent), though both years had sightings of whales seen as early as 2007. There were three adult females photographed in 2016 that had been sighted with calves in previous years, one of which was associated with her second calf. Additionally, a fourth adult female, first identified in 2015 without a calf, was subsequently sighted with a calf. The latter whale was sighted for a third consecutive year in 2017, this time without a calf, along with two other adult females with calves who had not been previously sighted. These sightings of known reproductive females with and without calves over time (n = 45) are providing critically needed calving and weaning rate data for Population Consequences of Disturbance (PcoD) models currently being developed for this species on SOAR.

In 2018, an estimate of overall abundance of Cuvier's beaked whales at the Navy's instrumented range in San Nicolas Basin was obtained using new dive-counting acoustic methods and an archive of passive acoustic M3R data representing 35,416 hours of data (DiMarzio, 2018; Moretti, 2017). Over the seven-year interval from 2010–2017, there was no observed change and perhaps a slight increase in annual Cuvier's beaked whale abundance within San Nicolas Basin (DiMarzio 2018). There does appear to be a repeated dip in population numbers and associated echolocation clicks during the fall centered around August and September (DiMarzio, 2018; Moretti, 2017). A similar August and September dip was noted by researchers using stand-alone off-range bottom passive acoustic devices in Southern California (Rice *et al.,* 2017; Širović *et al.,* 2016). This dip in abundance documented over 10 years of monitoring may be tied to some as yet unknown population dynamic or oceanographic and prey availability dynamic. It is unknown scientifically if this represents a movement to different areas by parts of the population, or a change in behavioral states without movement (*i.e.,* breeding verse foraging). Navy training and testing events are spatially and temporally spread out across the SOCAL portion of the HSTT Study Area. In some years events occur in the fall, yet in other years events do not. Yet, the same dip has consistently been observed lending further evidence this is likely a population biological function.

Comment 47: A commenter recommended additional mitigation areas in the Santa Catalina Basin. A commenter commented that there is likely a small, resident population of Cuvier's beaked whales resides in the Santa Catalina Basin and that this population is subject to regular acoustic disturbance due to the presence of the Shore Bombardment Area (SHOBA) and 3803XX. The population may also be exposed to training activities that occupy waters between Santa Catalina and San Clemente Islands. Similar to the San Nicholas population, the settlement agreement established a ''refuge'' from sonar and explosives activities in the northern portion of the Santa Catalina Basin. A commenter recommended that, at a minimum the Navy should carefully consider implementing the ''refuge'' during the next five-year authorization period and should continue to consider all possible habitat-based management efforts to address impacts on the population.

Response: The water space areas mentioned in the comment as ''(SHOBA)'' off the southern end of San Clemente Island are waters designated as Federal Danger and Safety Zones via formal rule making (Danger Zone—33 CFR 334.950 and Safety Zone—33 CFR 165.1141) because they are adjacent to the shore bombardment impact area that is on land at the southern end of San Clemente Island. Waters designated as ''3803XX,'' which are associated with the Wilson Cove anchorages and moorings, where ship calibration tests, sonobuoy lot testing, and special projects take place, are designated as Federal Safety and Restricted Zones via formal rule making (Safety Zone—33 CFR 165.1141 and Restricted Zone—33 CFR 334.920).

The comment states a concern that a population of Cuvier's beaked whale is, ''subject to regular acoustic disturbance due to the presence of the Shore Bombardment Area,'' is not correct. The SHOBA is a naval gun impact area located on land at the southern end of San Clemente Island. This area is an instrumented land training range used for a variety of bombardment training and testing activities. The in-water administrative boundary for SHOBA does not delineate the locations where a ship firing at land targets must be located and does not represent where gunfire rounds are targeted. The water area in Santa Catalina Basin is a controlled safety zone in the very unlikely event a round goes over the island and lands in the water. With the modern advent of better precision munitions, computers, and advanced fire control, that probability is very remote. Navy vessels use the waters south of San Clemente Island (SHOBA West and SHOBA East) from which to fire into land targets on southern San Clemente Island (see the HSTT FEIS/OEIS Figure 2.1–7). Therefore, there would not be any underwater acoustic disturbance to Cuvier's beaked whales located within the Santa Catalina Basin from in-water explosives or ship firing.

Comment 48: A commenter recommended additional mitigation areas for the southernmost edge of the California Current, west of Tanner and Cortes Banks. In light of the importance of the Southernmost edge of the California Current, west of Tanner and Cortes banks, Commenters recommend assessing the designation of the southern offshore waters of the Southern California Bight as a seasonal time-area management area for Cuvier's beaked whales between November and June. The approximate coordinates are 32.75 N, 119.46 W (referenced as Site E). As part of this assessment, a commenter recommended that the boundaries be refined via expert consideration of acoustic and other relevant information pertaining to beaked whale biology and bathymetric and oceanographic data.

Response: Baumann-Pickering *et al.* (2014a, b, 2015), as the commenter referenced, did not specify this area as biologically important and the author's data only indicated there have been detections of the Cuvier's beaked whales within this area. Further, the species is widely distributed within Southern California and across the Pacific with almost all suitable deep water habitat greater than 800 m in Southern California conceivably containing Cuvier's beaked whales. Only limited population vital rates exist for beaked whales, covering numbers of animals, populations vs. subpopulations determination, and residency time for individual animals (Schorr *et al.,* 2017, 2018). The science of passive acoustic monitoring is positioned to answer some questions on occurrence and seasonality of beaked whales, but cannot as of yet address all fundamental population parameters including individual residency time.

Furthermore, while passive acoustic monitoring within Southern California has been ongoing for 28 years, with many sites funded by the Navy, not all sites have been consecutively monitored for each year. All of the single bottom-mounted passive acoustic devices used for the analysis by Baumann-Pickering *et al.* (2014a, b, 2015), and used in the comment to support its argument, are not continuous and have various periodicities from which data have been collected. Specifically, devices have been deployed and removed from various locations with some sites having multiple years of data, others significantly less, with perhaps just a few months out of a year. For instance, Site E, located west of Tanner and Cortes Banks and used by the commenter to justify restrictions in this area, was only monitored for 322 days from September 2006 through July 2009 (obtaining slightly less than a full year's worth of data).

Site E was also used again for another 63 days from Dec 2010 through February 2011. During this second monitoring period at Site E, Gassman *et al.* (2015) reported detection of only three Cuvier's beaked whales over six separate encounters with time intervals of 10–33 minutes. As sources of data associated with a single monitoring point, the two monitoring episodes conducted at Site E may not be indicative of Cuvier's beaked whale presence at other locations within Southern California, which lack comparable monitoring devices. Nor would they be indicative of overall importance or lack of importance of the area west of Tanner and Cortes Banks. Further, more recent acoustic sampling of bathymetrically featureless areas off Southern California with drifting hydrophones conducted by NMFS, detected many beaked whales over abyssal plains and not associated with slope or seamount features. This counters a common misperception that beaked whales are primarily found over slope waters, in deep basins, or over seamounts (Griffins and Barlow 2016).

Most importantly, older passive acoustic data prior to 2009 may not be indicative of current or future occurrence of beaked whales, especially in terms of potential impact of climate change on species distributions within Southern California. To summarize, these limited periods of monitoring (322 days in a three-year period prior to 2010 and 63 days in 2011) may or may not be reflective of current beaked whale distributions within Southern California and into the future. Furthermore, passive acoustic-only detection of beaked whales, without additional population parameters, can only determine relative occurrence, which could be highly variable over sub-regions and through time.

While Cuvier's beaked whales have been detected west of Tanner and Cortes Banks, as noted above this species is also detected in most all Southern California locations greater than 800 m in depth. Furthermore, the Navy has been training and testing in and around Tanner and Cortes Banks with the same basic systems for over 40 years, with no evidence of any adverse impacts having occurred. Further, there are no indications that Navy training and testing in the Southern California portion of the HSTT Study Area has had any adverse impacts on populations of beaked whales in Southern California. In particular, a re-occurring population of Cuvier's beaked whales co-exists within San Nicolas Basin to the east, an area with significantly more in-water sonar use than west of Tanner and Cortes Banks.

To gain further knowledge on the presence of beaked whales in Southern California, the Navy continues to fund additional passive acoustic field monitoring, as well as research advancements for density derivation from passive acoustic data. For the five-year period from 2013 to 2017, U.S. Pacific Fleet on behalf of the U.S. Navy funded $14.2 million in marine species monitoring within Hawaii and Southern California. Specifically, in terms of beaked whales, the Navy has been funding beaked whale population dynamics, tagging, and passive acoustic studies within the HSTT Study Area since 2007 (DiMarzio *et al.,* 2018; Moretti, 2017; Rice *et al.,* 2017, Schorr *et al.,* 2017, 2018; Širović, *et al.,* 2017). Variations of these efforts are planned to continue through the duration of the next HSTT MMPA permit cycle using a variety of passive acoustic, visual, tagging, photo ID, and genetics research tools. This Navy effort is in addition and complementary to any planned NMFS efforts for beaked whales and other marine mammals. For instance, the Navy is co-funding with NMFS and the Bureau of Ocean Energy Management a planned Summer-Fall 2018 visual and passive acoustic survey along the U.S. West Coast and off Baja Mexico. New passive detection technologies focusing on beaked whales will be deployed during these surveys (similar to Griffiths and Barlow, 2016). The Navy continues SOCAL beaked whale occurrence and impact studies with additional effort anticipated through 2020.

Analysis of the southernmost edge of the California Current, west of Tanner-Cortes Bank and the presence of Cuvier's beaked whales was addressed in Appendix K (Geographic Mitigation Assessment), Section K.7.2.4 (Southernmost Edge of California Current, West of Tanner-Cortes Bank) and Section K.7.2.6 (Cuvier's Beaked Whale Habitat Areas Mitigation Assessment) of the HSTT FEIS/OEIS. Also see Chapter 3, Section 3.7.2.3.24 (Cuvier's Beaked Whale (*Ziphius cavirostris*)) of the HSTT FEIS/OEIS for additional information regarding this species.

As noted in Appendix K (Geographic Mitigation Assessment), the waters west of Tanner and Cortes Banks are also critical to the Navy's training and testing activities; therefore, it is not practicable to preclude activities within that water space in the SOCAL portion of the HSTT Study Area. Reasonable mitigation measures, as discussed in Appendix K (Geographic Mitigation Assessment), would limit the impact of training and testing on marine mammals, and especially beaked whales, in this area.

Given that there is no evidence that Navy training and testing activities are having significant impacts to population of beaked whales anywhere in the SOCAL portion of the HSTT Study Area, the uncertainty of current use by Cuvier's beaked whales of the area west of Tanner and Cortes Banks, the fact that general occurrence of beaked whales in Southern California may not necessarily equate to factors typically associated with biologically important areas, and consideration of the importance of Navy training and testing activities in the areas around Tanner and Cortes Banks discussed in Appendix K (Geographic Mitigation Assessment) of the HSTT FEIS/OEIS, additional geographic mitigation specifically for the area west of Tanner and Cortes Banks is not warranted.

As noted in Appendix K (Geographic Mitigation Assessment) and Chapter 5 (Mitigation), Section 5.3 (Procedural Mitigation to be Implemented) of the HSTT FEIS/OEIS, the Navy will continue to implement procedural mitigation measures throughout the HSTT Study Area.

Comment 49: A commenter commented that the same long-term passive acoustic study of the Southern California Bight as discussed for Cuvier's beaked whales above in Comment 48 also suggests that southern-central waters represent biologically important habitat for Perrin's beaked whale. A commenter recommended that the Northern Catalina Basin and the waters southeast of Santa Catalina Island (approximate coordinates of 33.28 N, −118.25 W), and the San Clemente Basin (approximate coordinates of 32.52 N, −118.32 W), both based on location of HARP deployments (referenced as sites ''A'' and ''S''), be considered as management areas for Perrin's beaked whales. A commenter recommended that the boundaries of any restrictions be established via expert consideration.

Response: All of the single bottom-mounted passive acoustic devices used for the analysis by Baumann-Pickering *et al.* (2014) and used by the commenter to support their argument are not continuous and have various periodicities for which data have been collected. As single point sources of data, these passive acoustic devices may not be indicative of Perrin's beaked whale presence at other locations within Southern California without comparable devices. Nor would older data prior to 2009 be indicative of current or future occurrence especially in terms of potential impact of climate change on species distributions.

Navy-funded passive acoustic monitoring within the SOCAL portion of the HSTT Study Area has been ongoing for the past 21 years, but not all areas are monitored continuously, and devices have been deployed and removed from various locations. Santa Catalina Basin was only monitored from August 2005 to July 2009. Santa Catalina Basin has not been monitored under Navy funding since 2009 because other areas in Southern California were prioritized for passive acoustic device placement by the researchers. For San Clemente Island, the single monitoring site ''S'' used in Baumann-Pickering *et al.* (2014) and cited as the source of the comment's claim for San Clemente Basin was only deployed for a limited time of approximately 1.5 years, resulting in 409 days of data (September 2009–May 2011). For both sites combined, only 41 hours of BW43 signal types were detected over a cumulative approximately five-and-a-half years of monitoring. The 41 hours of BW43 detections therefore only represents a small fraction of overall recording time (less than 1 percent).

The beaked whale signal type detected called BW43 has been suggested as coming from Perrin's beaked whales (Baumann-Pickering et al. 2014), but not yet conclusively and scientifically confirmed.

A different Navy-funded single site south of San Clemente Island within the San Clemente Basin has had a passive acoustic device in place from July 2014 through current. Širović et al. (2016) and Rice *et al.* (2017) contain the most current results from San Clemente Basin site ''N.'' While Širović *et al.* (2016) and Rice *et al.* (2017) do report periodic passive acoustic detections of Mesoplodon beaked whales thought to be Perrin's beaked whale in San Clemente Basin, the overall detection rate, periodicity, and occurrence has not been high. Between May 2015 and June 2016, there were only seven weeks in which potential Perrin's beaked whale echolocation clicks were detected, with each week having less than 0.14 hours/week of detections. Acoustic sampling of bathymetrically featureless areas off Southern California with drifting hydrophones by NMFS detected many beaked whales over abyssal plains and not always associated with slope or seamount features, which counters a common misperception that beaked whales are primarily found over slope waters, in deep basins, or over seamounts (Griffins and Barlow 2016). One of these devices was deployed within the SOCAL portion of the HSTT Study Area. In addition, analysis of NMFS visual survey data from 2014, the most recent year available, showed an increase in Mesoplodon beaked whales along the entire U.S. West Coast, which the authors attributed to an influx of tropical species of Mesoplodon during the unusually warm water condition that year (Barlow 2016; Moore & Barlow 2017). Perrin's beaked whale, part of the Mesoplodon guild, could be part of these sightings. In summary, San Clemente Basin and Santa Catalina Basin with similar low passive acoustic detection rates are likely to be part of Perrin beaked whale's general distribution along the U.S. West Coast and in particular Southern California and Baja Mexico. This distribution is likely to be wide ranging for Perrin's beaked whales as a species and highly correlated to annual oceanographic conditions. Santa Catalina and San Clemente basins do have infrequent suspected Perrin's beaked whale passive acoustic detections from a limited number of devices, but these areas may not specifically represent unique high occurrence locations warranting geographic protection beyond existing Navy protective measures.

The Navy has been training and testing in and around the Northern Catalina Basin and waters southeast of Santa Catalina Island with the same systems for over 40 years, and there is no evidence of any adverse impacts having occurred and no indications that Navy training and testing has had any adverse impacts on populations of beaked whales in Southern California. The main source of anthropogenic noise in the Catalina Basin and waters south of San Clemente Island are associated with commercial vessel traffic concentrated in the northbound and southbound lanes of the San Pedro Channel that runs next to Santa Catalina Island and leads to and from the ports of Los Angeles/Long Beach and other commercial traffic from San Diego and ports to the north and south of Southern California. These waters in and around Northern Catalina Basin and waters southeast of Santa Catalina Island are critical to the Navy's training and testing activities, and so it is not practicable to limit or reduce access or preclude activities within that water space in the SOCAL portion of the HSTT Study Area.

The Santa Catalina Basin area and Perrin's beaked whales were addressed in Appendix K (Geographic Mitigation Assessment), Section K.7.2.3 (Catalina Basin) and K.7.2.7 (Northern Catalina Basin and the San Clemente Basin) of the HSTT FEIS/OEIS. Also see Appendix K (Geographic Mitigation Assessment), Section K.7.2.7.2 (Northern Catalina Basin and Waters Southeast of Catalina Island Perrin's Beaked Whale Habitat Mitigation Considerations) of the HSTT FEIS/OEIS for additional information regarding this species. Additional limitations as discussed in Appendix K (Geographic Mitigation Assessment) would limit training and impact readiness. Given that there is no evidence of impacts to the population of beaked whales in the area, and low potential occurrence of Perrin's beaked whales in the Southern California portion of the HSTT Study Area, geographic mitigation would not effectively balance a reduction of biological impacts with an acceptable level of impact on military readiness activities. As noted in Appendix K (Geographic Mitigation Assessment) and Chapter 5, Section 5.3 (Procedural Mitigation to be Implemented) of the HSTT FEIS/OEIS, the Navy will continue to implement procedural mitigation measures throughout the HSTT Study Area.

Comment 50: Commenters recommended additional mitigation areas for important fin whale habitat off Southern California. The commenters recommended that the waters between the 200 m and 1000 m isobaths be assessed for time-area management so that, at minimum, ship strike awareness measures for fin whales can be implemented during the months of November through February, when the whales aggregate in the area.

Response: As described and detailed in the HSTT FEIS/OEIS, the Navy implements a number of ship-strike risk reduction measures for all vessels, in all locations and seasons, and for all marine mammal species. New research by Širović *et al.* (2017) supports a hypothesis that between the Gulf of California and Southern California, there could be up to four distinct sub-populations based on fin whale call types, including a Southern California resident population. There is also evidence that there can be both sub-population shifts and overlap within Southern California (Širović *et al.,* 2017). Scales *et al.* (2017) also postulated two Southern California sub-populations of fin whales based on satellite tagging and habitat modeling. Scales *et al.* (2017) stated that some fin whales may not follow the typical baleen whale migration paradigm, with some individuals found in both warm, shallow nearshore waters <500 m, and deeper cool waters over complex seafloor topographies. Collectively, the author's spatial habitat models with highest predicted occurrence for fin whales cover the entire core training and testing portion of the SOCAL portion of the HSTT Study Area, not just areas between 200 and 1,000 m. Results from Navy-funded long-term satellite tagging of fin whales in Southern and Central California still shows some individual fin whales engage in wide-ranging movements along the U.S. West Coast, as well as large daily movements well within subareas (Mate *et al.,* 2017). In support of further refining the science on Southern California fin whales, Falcone and Schorr (2014) examined fin whale movements through photo ID and short-to-medium term (days-to-several weeks) satellite tag tracking under funding from the Navy. The authors conducted small boat surveys from June 2010 through January 2014, approximately three-and-a-half years. Of interest in terms of the comment and the 200–1,000 m isobaths occurrence, more fin whale tag locations were reported off the Palos Verdes

Peninsula and off of the Los Angeles/Long Beach commercial shipping ports in fall, both areas north of and outside of the Navy's Southern California Range Complex. Compared to the above areas, there were not as many tag locations in the similar isobaths region off San Diego associated with the Navy range area. Falcone and Schorr (2014) did document an apparent inshore-offshore distribution between Winter–Spring and Summer–Fall. Given the apparent resident nature of some fin whales in Southern California as discussed in Falcone and Schorr (2014), Scales *et al.* (2017), and Širović *et al.* (2017), it remains uncertain if the inshore-offshore seasonal pattern as well as sub-population occurrence will persist into the future, or if fin whales will change distribution based on oceanographic impacts on available prey (ex. El Nino, climate change, etc.). The efforts from Falcone and Schorr on fin whales began in 2010 and are planned to continue for the next several years under Navy monitoring funding to further refine fin whale population structure and occurrence within Southern California.

The data from the various single bottom-mounted passive acoustic devices used in the analysis are not continuous and have various periodicities for which data have been collected. Many of these devices are purposely placed in 200–1000 m of water. Given these are point sources of data, they may or may not be indicative of fin whale calling or presence at other locations within Southern California without devices. Passive acoustic analysis is only useful for those individuals that are calling and may not indicate total population occurrence. Low-frequency fin whale calls by their very nature have relatively long underwater propagation ranges so detections at a single device could account for individuals 10–50 miles away if not further, depending on local propagation conditions. This would mean calling whales are not in the 200–1000 m area. Širović *et al.* (2015) acknowledge in discussing their data biases, that their use of ''call index'' may best indicate a period of peak calling. But fin whales produce multiple call types depending on behavioral state. Based on technology limitations, some fin whale call types were not included in Širović *et al.* (2015).

1. The study cited by a commenter (Širović *et al.,* 2015) and used as the basis for ''Figure 3'' concerns trends seen within the Southern California Bight, not exclusively the SOCAL Range Complex;

2. The research used as the basis for Figure 3 was funded by the Navy to develop baseline information for the areas where Navy trains and tests and was by no means designed to or otherwise intended as a representative sample of all waters off California or the entire habitat of the fin whale population in the area;

3. It is not correct to assume detected vocalizations (a ''call index'') reported in Širović *et al.* (2015) for fin whales equates with where fin whales are aggregated in the Southern California Bight. For example, the acoustic monitoring data did not pick up or otherwise correspond to the observed seasonal distribution shift of fin whales indicated by visual survey data covering the same time periods (Campbell *et al.,* 2015; Douglas *et al.,* 2014);

4. Širović *et al.* (2015) make no such claim of aggregations during the winter months but instead compare call index rates and state that the purpose for the paper was to demonstrate that passive acoustics can be a powerful tool to monitor population trends, not relative abundances;

5. There is no science to support the contention that fin whales are ''at particular risk of ship-strike on the naval range.'' Two fin whales were struck by the Navy in 2009 in the Southern California portion of the HSTT Study Area as Navy noted in Appendix K (Geographic Mitigation Assessment), but there have been no fin whales struck and in fact no whales of any species struck in the subsequent nine-year period despite a documented increase in the fin whale population inhabiting the area (Barlow, 2016; Moore & Barlow, 2011; Smultea & Jefferson, 2014). Furthermore, one of those vessel strikes occurred at the end of the recommended mitigation timeframe (February) and the other well outside the time period (May), so the proposed mitigation would only have been marginally effective, if at all. Neither of these Navy fin whale strike locations were close to shore (both >50–60 Nmi from shore), or associated with coastal shipping lanes. Based on an analysis of Navy ship traffic in the HSTT Study Area between 2011 and 2015, median speed of all Navy vessels within Southern California is typically already low, with median speeds between 5 and 12 knots (CNA, 2016). This includes areas within and outside of 200–1000 m within Southern California, with slowest speeds closer to the coast; and

6. As presented in the EIS/OEIS, fin whales are present off all the waters of Southern California year-round (Širović *et al.,* 2015, 2017). Using available quantitative density and distribution mapping, the best available science, and expert elicitation, definitive areas of importance for fin whales could not be determined by a panel of scientists specifically attempting to do so (Calambokidis *et al.,* 2015).

Navy vessels already operate at a safe speed given a particular transit or activity need. This also includes a provision to avoid large whales by 500 yards, so long as safety of navigation and safety of operations is maintained. Previously, the Navy commissioned a vessel density and speed report for HSTT (CNA, 2016). Based on an analysis of Navy ship traffic in HSTT between 2011 and 2015, median speed of all Navy vessels within Southern California is typically already low, with median speeds between 5 and 12 knots (CNA, 2016). Slowest speeds occurred closer to the coast and islands.

In conclusion, speed restrictions within 200–1000 m is unwarranted given the wide range of fin whale movements along the U.S. West Coast including areas within and outside of 200–1000 m contours, sometimes large-scale daily movements within regional areas as documented from Navy-funded satellite tagging, the current lack of ship strike risk from Navy vessels in Southern California (2010–2017), the already safe training and testing ship speeds Navy uses within HSTT, and existing Navy mitigation measures including provisions to avoid large whales by 500 yards where safe to do so.

In addition, the Navy agreed to send out seasonal awareness messages of blue, fin, and gray whale occurrence to improve awareness of all vessels operating to the presence of these species in SOCAL.

Hawaii Areas

Comment 51: NPS recommends that the Navy consider the following as it plans to conduct activities in the HSTT Study Area. NPS notes units of the NPS system that occur near training and testing areas around Hawaii and identify which can be affected by noise. The Units are: Kaloko-Honokohau National Historical Park (NHP), Pu'uhonua o Honaunau NHP, Pu'ukolhola Heiau National Historic Site, Kalaupapa NHP, and the World War II Valor in the Pacific National Monument.

Response: National Parks and Marine protected areas in are addressed in Chapter 6 of the HSTT FEIS/OEIS. Kalaupapa National Historical Park (NHP) is discussed in Comment 52 below. No planned activities overlap with Kaloko-Honokohau NHP; therefore, no impacts are expected within the Kalaupapa NHP. The Pu'uhonua o Honaunau NHP and Pu'ukolhola Heiau National Historic Site are not specifically addressed in Chapter 6 of the FEIS/OEIS, but neither site appears to contain any marine waters. The Navy's planned activities do not occur on land except in designated training areas on Navy properties (*i.e.,* for amphibious assaults, etc.); therefore, there are no activities that overlap with these sites and no impacts are expected. The WWII Valor in the Pacific Monument is for the USS Arizona which is a Navy war memorial. No activities occur within the boundary of the site itself, and the monument was not designated to protect marine species. There are training and testing activities that occur within Pearl Harbor as a whole, and impacts to marine mammals in the waters of Pearl Harbor as a whole were include in Navy's proposed activities and therefore analyzed by NMFS in this final rule.

Comment 52: The NPS noted the presence of marine mammal species in the Kalaupapa NHP (on the north shore of Molokai), and is concerned about potential take of protected species that inhabit water out to 1000 fathoms, and recommended the Navy consider alternate training areas to avoid impacts to these species. Species that occur year-round include the false killer whale, sperm whale, pygmy sperm whale, spinner dolphin, and bottlenose dolphin. Humpback whales are seasonal visitors from November to April. The Hawaiian monk seal pups are within the Kalaupapa NHP during the Spring and Summer.

Response: Part of the Kalaupapa NHP (northern portion) is protected by the measures employed inside the 4-Islands Region Mitigation Area such as year-round prohibition on explosives and no use of MF1 surface ship hull mounted mid-frequency active sonar from November 15–April 15).

We note, however, that the majority of the Kalaupapa NHP is not in the 4-Islands Region Mitigation Area as it is mainly landbased, but just outside it. The Kalaupapa NHP was designated to protect the two historic leper colonies on the property and was not designated with the purpose of protecting marine species. The boundaries of the Kalaupapa NHP extend a quarter mile offshore. The Navy does propose conducting activities associated with the planned activities in the boundary of the the Kalaupapa NHP. There would be no effect to Hawaiian monk seal pupping on NHP land as the Navy does not have any planned activities in the boundary of the Kalaupapa NHP, especially on land. The Navy's planned activities do not include any land-based activities except for a few activities which are conducted on designated Navy property (*i.e.,* amphibious assaults on Silver Strand, etc.). Further, as the seaspace adjacent to the Kalaupapa NHP is not an established training or testing area, it is unlikely naval activity would occur in this area.

Comment 53: A commenter recommended expanding the Hawaii Island Mitigation Area westward to protect resident Cuvier's beaked whales and rough-toothed dolphins. The boundaries of the Hawaii Island Mitigation Area should be expanded westward to remain consistent with the boundaries of the BIAs defined in Baird *et al.* (2015), which informed the boundaries of Conservation Council Settlement Areas 1–C and 1–D. This expansion will cover habitat for Cuvier's beaked whales and toothed dolphins that are resident around the Big Island.

Response: Analyses of the marine mammal species mentioned in the comment and considered within the Hawaii Island Mitigation Area are discussed throughout Appendix K (Geographic Mitigation Assessment), Section K.3 (Biologically Important Areas within the Hawaii Range Complex Portion of the HSTT Study Area) and Sections K.5.1 (Settlement Areas Within the Hawaii Portion of the HSTT Study Area) through K.5.4 (Proposed Mitigation Areas that Overlap the Hawaii Portion of the HSTT Settlement Agreement Areas) of the HSTT FEIS/OEIS. Additional information on the marine mammals mentioned in the comment is also provided in the species-specific sub-sections in Chapter 3, Section 3.7.2 (Affected Environment) of the HSTT FEIS/OEIS. Based on these analyses, the Navy will implement additional mitigation within the Hawaii Island Mitigation Area (year-round) as detailed in Chapter 5, Section 5.4.2 (Mitigation Areas for Marine Mammals in the Hawaii Range Complex) of the HSTT FEIS/OEIS, to further avoid or reduce impacts on marine mammals from acoustic and explosive stressors from the planned activities.

The mitigation requirement of prohibiting the use of explosives year-round during training and testing across the entire Hawaii Island Mitigation Area satisfies the previous mitigation requirement of a prohibition on the use of in-water explosives for training and testing activities of the Settlement Agreement for Areas 1–A, 1–C, and 1–D, and further extends that requirement to the 'Alenuihāhā Channel (Area 1–B). The Hawaii Island Mitigation Area still includes 100 percent of Settlement Areas 1–C and 1–D and includes a large majority of the BIAs for Cuvier's Beaked Whale (Hawaii Island BIA) and Rough-Toothed Dolphins (Hawaii Island BIA) (the areas in question by this comment). Particularly, it covers 93.30 percent of the Cuvier's Beaked Whale BIA westward of Hawaii Island and 83.58 percent of Rough-toothed dolphins Hawaii Island BIA westward of Hawaii Island.

Only the northern portion of the Cuvier's beaked whale BIA in Alenuihaha Channel and a smaller offshore portion of the BIA west of Hawaii are not covered by mitigations included in the Hawaii Island Mitigation Area on the west and east of Hawaii Island. The BIAi s based on the known range of the island-associated population, and the authors suggest that ''the range of individuals from this population is likely to increase as additional satellite-tag data become available'' (Baird et al., 2015b). Cuvier's beaked whales are not expected to be displaced from their habitat due to training and testing activities further offshore in these small areas of the biologically important area, given that the biologically important area covers 23,583 km^2, is unbroken and continuous surrounding the island, and the BIA likely underrepresents their range. The small portion of the BIA that does not overlap the Hawaii Island Mitigation Area is offshore, and according to the most recent stock assessment approximately 95 percent of all sighting locations were within 45 km of shore. Additionally, consequences to individuals or populations are not unknown. No PTS is estimated or authorized. A small numbers of TTS and Level B behavioral harassment takes for Cuvier's beaked whales are estimated across the entire Hawaii portion of the Study Area due to acoustic stressors. Most of the TTS and Level B behavioral harassment takes for Cuvier's beaked whales are associated with testing in the Hawaii Temporary Operating Area, impacting the pelagic population (see Figure 3.7–36 of the HSTT FEIS/OEIS). It is extremely unlikely that any modeled takes would be of individuals in this small portion of the BIA that extends outside the Hawaii Island Mitigation Area.

Long-term and relatively comprehensive research has found no evidence of any apparent effects while documenting the continued existence of multiple small and resident populations of various species as well as long-term residency by individual beaked whales spanning the length of the current studies that exceed a decade. Further, the Navy has considered research showing that in specific contexts (such as associated with urban noise, commercial vessel traffic, eco-tourism, or whale watching, Chapter 3, Section 3.7.2.1.5.2 (Commercial Industries)) of the HSTT FEIS/OEIS that chronic repeated displacement and foraging disruption of populations with residency or high site fidelity can result in population-level effects. As also detailed in the HSTT FEIS/OEIS, however, the Navy training and testing activities do not equate with the types of disturbance in this body of research, nor do they rise to the level of chronic disturbance where such effects have been demonstrated because Navy activities are typically sporadic and dispersed. There is no evidence to suggest there have been any population-level effects in the waters around Oahu, Kauai, and Niihau or anywhere in the HSTT Study Area. In the waters around Oahu, Kauai, and Niihau, documented long-term residency by individuals and the existence of multiple small and resident populations are precisely where Navy training and testing have been occurring for decades, strongly suggesting a lack of significant impact to those individuals and populations from the continuation of Navy training and testing.

Mark-recapture estimates derived from photographs of rough-toothed dolphins taken between 2003 and 2006 resulted in a small and resident population estimate of 198 around the island of Hawaii (Baird *et al.,* 2008), but those surveys were conducted primarily with 40 km of shore and may underestimate the population. Data do suggest high site fidelity and low population size for the island-associated population. There are no tagging data to provide information about the range of the island-associated population; the biologically important area is based on sighting locations and encompasses 7,175 km2. Generally, this species is typically found close to shore around oceanic islands. Only approximately half of the BIA offshore is not covered by the Hawaii Island Mitigation Area, where the BIA overlaps with special use airspace. Consequences to individuals or populations are not unknown. No PTS is estimated or authorized. Some TTS and Level B behavioral harassment takes due to acoustic stressors for this species across the entire HSTT Study Area (see Figure 3.7–66). Significant impacts on rough-toothed dolphin natural behaviors or abandonment due to training with sonar and other transducers are unlikely to occur within the small and resident population area. A few minor to moderate TTS or Level B behavioral harassment to an individual over the course of a year are unlikely to have any significant costs or long-term consequences for that individual, and nothing in the planned activities is expected to cause a ''catastrophic event.'' The Navy operating areas west of Hawaii Island are used commonly for larger events for a variety of reasons described further in Section K.3 (Biologically Important Areas Within the Hawaiian Range Complex Portion of the HSTT Study Area) (*e.g.,* the relatively large group of seamounts in the open ocean offers challenging bathymetry in the open ocean far away from civilian vessel traffic and air lanes where ships, submarines, and aircraft are completely free to maneuver) and sonar may be used by a variety of platforms. Enlarging the Hawaii Island Mitigation Area is not anticipated to realistically reduce adverse impacts. Expanding the Hawaii Island Mitigation Area has a limited likelihood of further reducing impacts on marine mammal species or stocks and their habitat, while these open ocean operating areas for important for training and testing and, in consideration of these factors (and the broader least practicable adverse impact considerations discussed in the introduction), NMFS has determined that requiring this additional mitigation is not appropriate.

Comment 54: A commenter recommended limiting MTEs to reduce cumulative exposure in the Hawaii Island Mitigation Area.

Response: Prohibiting MTEs outright or spatially separating them within the Hawaii Island Mitigation Area (which includes the formerly named Planning Awareness Area) was proposed as additional mitigation to ensure that ''marine mammal populations with highly discrete site fidelity . . . are not exposed to MTEs within a single year.'' The goal of geographic mitigation is not to be an absolute, outright barrier and stop exposing animals to exercises per se; it is to reduce adverse impacts to the maximum extent practicable. Impacts associated with major training exercises, including cumulative impacts, are addressed in Chapters 3 (Affected Environment and Environmental Consequences) and Chapter 4 (Cumulative Impacts) of the HSTT FEIS/OEIS, and Navy quantitative analysis using the best available science has determined that training and testing activities will not have population-level impacts on any species. As determined in Chapter 3, Section 3.7.4 (Summary of Potential Impacts on Marine Mammals) of the HSTT FEIS/OEIS, it is not anticipated that the Proposed Action will result in significant impacts to marine mammals. To date, the findings from research and monitoring and the regulatory conclusions from previous analyses by NMFS are that the majority of impacts from Navy training and testing activities are not expected to have deleterious impacts on the fitness of any individuals or long-term consequences to populations of marine mammals.

MTEs cannot be moved around within the Hawaii Island Mitigation Area, given that those activities are specifically located to leverage particular features like the Alenuihaha Channel and the approaches to Kawaihae Harbor. This recommendation is not, therefore, appropriate in consideration of NMFS' least practicable adverse impact standard.

To limit activities, the Navy will not conduct more than 300 hours of MF1 surface ship hull-mounted mid-frequency active sonar or 20 hours of MF4 dipping sonar, or use explosives that could potentially result in takes of marine mammals during training and testing in the Hawaii Mitigation Area.

Comment 55: A commenter recommended prohibiting or restricting other sources of mid-frequency active sonar in the Hawaii Island Mitigation Area including prohibiting the use of helicopter-deployed mid-frequency active sonar in the Hawaii Island Mitigation Area.

Response: The Navy is already limiting other sources of MFAS. Between the application and the proposed rule, the Navy added new mitigation that includes a limit to the annual use of helicopter dipping sonar in the Hawaii Island Mitigation Area. Specifically, the Navy will not conduct more than 20 hours of MF4 dipping sonar that could potentially result in takes of marine mammals during training and testing. Helicopters deploy MFAS from a hover position in bouts generally lasting under 20 minutes, moving rapidly between sequential deployment and their duration of use and source level (217 dB) are generally well below those of hull-mounted frequency sonar (235 dB). All locations within the HSTT Study Area have been used for Navy training and testing for decades. There has been no scientific evidence to indicate the Navy's activities are having adverse effects on populations of marine mammals, many of which continue to increase in number or are maintaining populations based on what regional conditions can support. Navy research and monitoring funding continues within the HSTT Study Area under current NMFS MMPA and ESA permits, and is planned through the duration of any future permits. Given the lack of effects to marine mammal populations in the HSTT Study Area from larger, more powerful surface ship sonars, the effects from intermittent, less frequent use of lower powered mid-frequency dipping sonar or other mid-frequency active sonars would also not significantly affect small and resident populations.

Comment 56: A commenter recommended extending the 4-Islands Region Mitigation Area westward to encompass the Humpback Whale Special Reporting Area in Kaiwi Channel. Additionally the 4-Island Region Mitigation Area is inadequate to protect endangered Main Hawaiian Island insular false killer whales as the Main Hawaiian Island insular false killer whale is highly range-restricted to certain high-use areas, one of which includes the ESA critical habitat and the BIA north of Maui and Molokai (''False killer whale Hawaii Island to Niihau'' BIA).

Response: The portion of the special reporting area that extends into Kaiwi Channel over Penguin Bank (equivalent to settlement area 2A) is generally not a higher use area for Main Hawaiian Island insular false killer whales and does not overlap significantly with the biologically important area. As presented in Chapter 3 (Affected Environment and Environmental Consequences), Navy quantitative analysis indicates that significant impacts on false killer whale natural behaviors or abandonment due to training with sonar and other transducers are unlikely to occur within the entire small and resident population area, let alone in the small sub-portion of the biologically important area that overlaps the proposed extension. Additionally, most of the modeled takes are for the Hawaii pelagic population of false killer whale (see Figure 3.7–46 and Table 3.7–31). Also, as described in more detail in Appendix K of the HSTT FEIS/OEIS, due to training and testing needs, the expansion of this area is considered impracticable.

Comment 57: A commenter recommended extending to year-round restrictions in the 4-Island Region Mitigation Area and the proposed extension into the Kaiwi Channel Humpback Whale Special Reporting Area.

Response: The additional expansion requested in the comment is not expected to reduce adverse impacts to an extent that would outweigh the negative impacts if unit commanders were unable to conduct unit-level training and testing, especially as they pass over Penguin Bank while transiting between Pearl Harbor and other parts of the Study Area. Prohibiting mid-frequency active sonar would preclude the Submarine Command Course from meeting its objectives and leveraging the important and unique characteristics of the 4-Islands Region, as described in multiple sections of Appendix K (*e.g.,* Section K.3.1.6 (4-Islands Region and Penguin Bank Humpback Whale Reproduction Area, and Settlement Area 2–A and 2–B)). Penguin Bank is particularly used for shallow water submarine testing and anti-submarine warfare training because of its large expanse of shallow bathymetry. The conditions in Penguin Bank offer ideal bathymetric and oceanographic conditions allowing for realistic training and testing and serve as surrogate environments for active theater locations.

Additionally, this mitigation would further increase reporting requirements. As discussed in Chapter 5 (Mitigation) Section 5.5.2.6 (Increasing Reporting Requirements) of the HSTT FEIS/OEIS, the Navy developed its reporting requirements in conjunction with NMFS, balancing the usefulness of the information to be collected with the practicability of collecting it. An increase in reporting requirements as a mitigation would draw the event participants' attentions away from the complex tactical tasks they are primarily obligated to perform (such as driving a warship), which would adversely impact personnel safety, public health and safety, and the effectiveness of the military readiness activity. Expanding the Mitigation Area and extending the restrictions is not, therefore, appropriate in consideration of NMFS' least practicable adverse impact standard.

Comment 58: A commenter recommended implementing vessel speed restrictions within the 4-Islands Region Mitigation Area.

Response: This mitigation measure was proposed to address impacts on humpback whales due to both ship noise and ship strikes. As described and detailed in the Draft EIS, the Navy already implements a number of ship-strike risk reduction measures for all vessels, in all locations and seasons, and for all marine mammal species. The Navy cannot implement mitigation that restricts vessel speed during training or testing in the HSTT Study Area. Vessels must be able to maneuver freely as required by their tactics in order for training events to be effective. Imposition of vessel speed restrictions would interfere with the Navy's ability to complete tests that must occur in specific bathymetric and oceanic conditions and at specific speeds. Navy vessel operators must test and train with vessels in such a manner that ensures their ability to operate vessels as they would in military missions and combat operations (including being able to react to changing tactical situations and evaluate system capabilities). Furthermore, testing of new platforms requires testing at the full range of propulsion capabilities and is required to ensure the delivered platform meets requirements. Based on an analysis of Navy ship traffic in the HSTT Study Area between 2011 and 2015, median speed of all Navy vessels within Hawaii is typically already low, with median speeds between 8–16 kn (CNA, 2016). Speed restrictions in the Cautionary Area (renamed the 4-Islands Region Mitigation Area) are unwarranted given the movement of all social groups throughout the islands outside the Mitigation Area, the current lack of ship strike risk from Navy vessels in Hawaii (2010–2017), the already safe training and testing ship speeds the Navy uses within HSTT, and existing Navy mitigation measures, including provisions to avoid large whales by 500 yards where safe to do so. Implementing speed restrictions in the Mitigation Area is not, therefore, appropriate in consideration of NMFS' least practicable adverse impact standard.

Information on the response of baleen whales to vessel noise is presented in Section 3.7.3.1.1.5 (Behavioral Reactions) and Section 3.7.3.1.5 (Impacts from Vessel Noise). Impacts, if they did occur, would most likely be short-term masking and minor behavioral responses. Therefore, significant impacts on humpback whale reproductive behaviors from vessel noise associated with training activities are not expected. Navy vessels are intentionally designed to be quieter than civilian vessels, and ship speed reductions are not expected to reduce adverse impacts on humpback whales due to vessel noise.

Comment 59: A commenter recommended prohibiting the use of in-water explosives in the 4-Islands Region Mitigation Area.

Response: The Navy has agreed to implement a year-round restriction on the use of in-water explosives that could potentially result in takes of marine mammals during training and testing. Should national security present a requirement explosives that could potentially result in the take of marine mammals during training or testing, naval units will obtain permission from the appropriate designated Command authority prior to commencement of the activity. The Navy will provide NMFS with advance notification and include the information (*e.g.,* sonar hours or explosives usage) in its annual activity reports submitted to NMFS.

Comment 60: A commenter recommended prohibiting other sources of MFAS in the 4-Islands Region Mitigation Area.

Response: NMFS reviewed Navy's assessment for the 4-Islands Mitigation Area. This area provides a unique and irreplaceable shallow water training capability for units to practice operations in littoral areas that are both shallow and navigationally constrained (HSTT FEIS Appendix K (Geographic Mitigation Assessment), Section K.3.3.1.6). The 4-Islands Region provides an environment for anti-submarine warfare search, tracking and avoidance of opposing anti-submarine warfare forces. The bathymetry provides unique attributes and unmatched opportunity to train in searching for submarines in shallow water. Littoral training allows units to continue to deploy improved sensors or tactics in littoral waters. In the Hawaii portion of the HSTT Study Area specifically, anti-submarine warfare training in shallow water is vitally important to the Navy since diesel submarines typically hide in that extremely noisy and complex marine environment (Arabian Gulf, Strait of Malacca, Sea of Japan, and the Yellow Sea all contain water less than 200 m deep). There is no other area in this portion of the HSTT Study Area with the bathymetry and sound propagation analog to seas where Navy conducts real operations that this training could relocate to. The Navy cannot conduct realistic shallow water training exercises without training in and around the 4-Islands Region Mitigation Area. In addition, this area includes unique shallow water training opportunities for unit-level training, including opportunity to practice operations in littoral areas that are both shallow, and navigationally constrained, and in close proximity to deeper open ocean environments. While MFAS is used infrequently in this area, a complete prohibition of all active sonars would impact Navy training readiness in an area identified as important for the Navy based on its unique bathymetry. However, the Navy recognizes the biological importance of this area to humpback whales during the reproductive season and with NMFS concurrence strives to limit the use of surface ship hull-mounted MFAS during that time of year. While the Navy has been training and testing in the area with the same basic systems for over 40 years, there is no evidence of any adverse impacts having occurred, and there are multiple lines of evidence demonstrating the small odontocete population high site fidelity to the area.

Comment 61: A commenter recommended prohibiting the use of helicopter-deployed mid-frequency active sonar in the 4-Islands Region Mitigation Area.

Response: The commenter's request to prohibit ''air-deployed'' mid-frequency active sonar is based on one paper (Falcone *et al.,* 2017), which is a Navy-funded project designed to study the behavioral responses of a single species, Cuvier's beaked whales, to mid-frequency active sonar. The Navy relied upon the best science that was available to develop behavioral response functions for beaked whales and other marine mammals in consultation with NMFS for the Draft EIS/OEIS. The article cited in the comment (Falcone *et al.,* 2017) was not available at the time the Draft EIS/OEIS was published but does not change the current FEIS/OEIS criteria or conclusions. The new information and data presented in the article was thoroughly reviewed when it became available and further considered in discussions with some of the paper's authors following its first presentation in October 2017 at a recent scientific conference. Many of the variables requiring further analysis for beaked whales and dipping sonar impact assessment are still being researched under continued Navy funding through 2019.

There are no beaked whale biologically important areas in the 4-Islands Region Mitigation Area, and the Mitigation Area is generally shallower than beaked whales' preferred habitat. Behavioral responses of beaked whales from dipping and other sonars cannot be universally applied to other marine mammal species. Research indicates that there are distinct individual variations as well as strong behavioral state considerations that influence any response or lack of response (Goldbogen *et al.,* 2013; Harris *et al.,* 2017). Therefore, it is expected that other species would have highly variable individual responses ranging from some response to no response to any anthropogenic sound. This variability is accounted for in the Navy's current behavioral response curves described in the HSTT Draft EIS/OEIS and supporting technical reports.

Furthermore, the potential effects of dipping sonar have been rigorously accounted for in the Navy's analysis. Parameters such as power level and propagation range for typical dipping sonar use are factored into HSTT acoustic impact analysis along with guild specific criteria and other modeling variables, as detailed in the HSTT DEIS/OEIS and associated technical reports for criteria and acoustic modeling. Further, due to lower power settings for dipping sonar, potential impact ranges of dipping sonar are significantly lower than surface ship sonars. For example, the HSTT average modeled range to TTS of dipping sonar for a 1-second ping on low-frequency cetacean (*i.e.,* blue whale) is 77 m, and for mid-frequency cetaceans including beaked whales is 22 m (HSTT FEIS/OEIS Table 3.7–7). This range is easily monitored for marine mammals by a hovering helicopter and is accounted for in the Navy's proposed mitigation ranges for dipping sonars (200 yds. or 183 m). Limited ping time (*i.e.,* less dipping sonar use as compared to typical surface ship sonar use) and lower power settings therefore would limit the impact from dipping sonar to any marine mammal species.

This is an area of extremely low use for air-deployed mid-frequency active sonar. Prohibiting air-deployed mid-frequency active sonar in the Mitigation Area would not be any more protective to marine mammal populations generally, or the Main Hawaiian Islands insular false killer whale in particular, than currently implemented procedural mitigation measures for air-deployed mid-frequency active sonar and is not, therefore, appropriate in consideration of NMFS' least practicable adverse impact standard.

Comment 62: A commenter recommended prohibiting use of low-frequency active sonar in the 4-Islands Region Mitigation Area.

Response: The commenters suggested that ''Baleen whales are vulnerable to the impacts of low-frequency active sonar, particularly in calving areas where low-amplitude communication calls between mothers and calves can be easily masked.'' As described in Chapter 3, Section 3.7.2.3.1 (Humpback Whale (*Megaptera novaeangliae*), Hawaii DPS) of the HSTT FEIS/OEIS, the best available science has demonstrated humpback whale population increases and an estimated abundance greater than some pre-whaling estimates. This data does not indicate any population-level impacts from decades of ongoing Navy training and testing in the Hawaiian Islands.

Comment 63: A commenter recommended additional mitigation areas critical habitat for the Main Hawaiian Islands insular false killer whale. NMFS issued the Final Rule designating critical habitat under the ESA on July 24, 2018. A commenter stated that in light of the 2018 listing under the ESA, NMFS must protect this species from the noise and other disturbance resulting from naval activities, including by mitigating impacts within its critical habitat. The commenter recommended that, at minimum, the Navy establish protective

Mitigation Areas in all the BIAs identified for this species by NOAA and that NMFS should revisit and revise its Mitigation Areas and mitigation requirements based on the final critical habitat designation.

Response: Critical habitat includes waters from the 45 m depth contour to the 3,200 m depth contour around the main Hawaiian Islands from Niihau east to Hawaii (82 FR 51186). With regard to the analysis of the identified Biologically Important Areas for the Main Hawaiian Islands insular false killer whales, see Section K.3.3 (False Killer Whale Small and Resident Population Area: Main Hawaiian Island Insular stock). With regard to the identified threats to the species, see Section 3.7.2.2.7.5 (Species-Specific Threats) and specifically the documented incidental take by commercial fisheries (Bradford and Forney, 2016; Oleson *et al.,* 2010; Reeves *et al.,* 2009; West, 2016). NMFS has previously determined that Navy's current training and testing activities are not expected to have fitness consequences for individual Main Hawaiian Islands insular false killer whales and not likely to reduce the viability of the populations those individual whales represent.

The Navy is implementing the Hawaii Island Mitigation Area which encompassess all of the BIA for Main Hawaiian Islands insular false killer whales around that island, and the 4-Islands Region Mitigation Area (which captures approximately 40 percent of the BIAs in the 4-island area). As discussed in the *Mitigation Areas in Hawaii* section of this final rule, these mitigation areas are expected to significantly reduce impacts to this stock and its habitat.

Comment 64: Commenters recommended additional mitigation areas for important habitat areas off Oahu, Kauai, and Niihau—the waters off Oahu, Kauai, and Niihau include a number of important habitat areas for a variety of species, including false killer whale critical habitat (see above), five NOAA-identified BIAs off Oahu (false killer whale, humpback whale, pantropical spotted dolphin, bottlenose dolphin, and spinner dolphin) and three BIAs off Kauai and Niihau (humpback whale, spinner dolphin, and bottlenose dolphin) (Baird et al. 2012). The commenters assert that the agency must consider the implementation of Mitigation Areas off Oahu, Kau'i, and Niihau. Providing mitigation measures for select activities during even a limited season within some important habitat areas.

Response: In the HSTT FEIS/OEIS, the Navy considered the science, the Navy requirements, and the effectiveness of identified habitat areas off Oahu, Kauai, and Niihau as presented in Appendix K (Geographic Mitigation Assessment) Section K.3 (Biologically Important Areas within the Hawaii Range Complex Portion of the HSTT Study Area). This includes the five identified Biologically Important Areas off Oahu (false killer whale, humpback whale, pantropical spotted dolphin, bottlenose dolphin, and spinner dolphin) and three Biologically Important Areas off Kauai and Niihau (humpback whale, spinner dolphin, and bottlenose dolphin) as well as a discussion in Appendix K (Geographic Mitigation Assessment), Section K.1.1.5 (Mitigation Areas Currently Implemented) regarding the 4-Islands Region Mitigation Area.

Based on the Navy's analysis and as detailed in the sections referenced above, there is no scientific basis indicating the need for mitigation in the first place; see specifically the discussion in Appendix K (Geographic Mitigation Assessment), Section K.2.1.2 (Biological Effectiveness Assessment) of the HSTT FEIS/OEIS. As presented and reviewed in the HSTT FEIS/OEIS, the Navy has presented citations to research showing that in specific contexts (such as associated with urban noise, commercial vessel traffic, eco-tourism, or whale watching; see Chapter 3,Section 3.7.2.1.5.2 (Commercial Industries)) and references (Dunlop, 2016; Dyndo *et al.,* 2015; Erbe *et al.,* 2014; Frisk, 2012; Gedamke *et al.,* 2016; Hermannsen *et al.,* 2014; Li *et al.,* 2015; McKenna *et al.,* 2012; Melcón *et al.,* 2012; Miksis-Olds and Nichols, 2015; Nowacek *et al.,* 2015; Pine *et al.,* 2016; Pirotta *et al.* 2018; Williams *et al.,* 2014c) or specifically for Hawaii (Heenehan *et al.,* 2016a, 2016b; Heenehan *et al.,* 2017a, 2017b; Tyne *et al.,* 2014; Tyne, 2015; Tyne *et al.,* 2015; Tyne *et al.,* 2017), that chronic repeated displacement and foraging disruption of populations with residency or high site fidelity can result in population-level effects. As also detailed in the HSTT FEIS/OEIS, the planned Navy training and testing activities do not equate with the types of disturbance in the citations above nor do they rise to the level of chronic disturbance where such effects have been demonstrated. There is no evidence to suggest there have been any population-level effects in the waters around Oahu, Kauai, and Niihau or in the HSTT Study Area resulting from the same training and testing activities that have been ongoing for decades, which the commenter recommends the need to stop, or at a minimum, be mitigated. In the waters around Oahu, Kauai, and Niihau, documented long-term residency by individuals and the existence of multiple small and resident populations precisely where Navy training and testing have been occurring for decades strongly suggests a lack of significant impact to those individuals and populations from the continuation of Navy training and testing. Appendix K of the HSTT FEIS/OEIS further describes the importance of these areas for Navy training and testing and why implementation of additional mitigation areas would be impracticable.

Comment 65: A commenter recommended additional mitigation area for Cross Seamount, as Cross Seamount represents important foraging habitat for a potentially rare or evolutionary distinct species of beaked whale, a commenter strongly recommended that the HSTT EIS/OEIS assess the designation of a year-round management area to protect the seamount. Such a designation would have secondary benefits for a variety of other odontocete species foraging at Cross Seamount seasonally between November and May. NMFS should also consider habitat-based management measures for other nearby seamounts.

Response: Analysis and consideration of Cross Seamount and ''other nearby seamounts'' for additional geographic mitigation was provided in Appendix K (Geographic Mitigation Assessment), Section K.7.1 (Hawaii Public Comment Mitigation Area Assessment), including sub-sections K.7.1.1 (General Biological Assessment of Seamounts in the Hawaii Portion of the Study Area) and K.7.1.2 (Cross Seamount) of the HSTT FEIS/OEIS.

As discussed in Appendix K (Geographic Mitigation Assessment), Section 4.7.1.3 (Mitigation Assessment) of the HSTT FEIS/OEIS, implementing new geographic mitigation measures in addition to ongoing procedural mitigation within the vicinity of Cross Seamount would not be effective at reducing adverse impacts on beaked whales or other marine mammal populations. The Navy has been training and testing in the broad ocean area around Cross Seamount with the same basic systems for over 40 years, and there is no evidence of any adverse impacts to marine species. Additionally, the suggested mitigation would not be practicable to implement. The broad ocean area around Cross Seamount and the seamounts to the north are unique in that there are no similar broad ocean areas in the vicinity of the Hawaiian Islands that are not otherwise encumbered by commercial vessel traffic and commercial air traffic routes. In addition, beaked whales may be more widely distributed than currently believed. Ongoing passive acoustic efforts from NMFS and Navy within the Pacific have documented beaked whale detections at many locations beyond slopes and seamounts to include areas over abyssal plains (Klinck *et al.* 2015, Griffiths and Barlow 2016, Rice *et al.,* 2018).

Comment 66: A commenter commented that the NMFS must ensure that the activities are having the least practicable adverse impact, so it must do a comprehensive analysis of whether the proposed mitigation areas sufficiently protect marine mammals. NMFS must require the Navy to implement additional, practicable measures to mitigate further the adverse impacts of its activities. To ensure least practicable adverse impacts, NMFS must consider additional mitigation time/area restrictions, including but not limited to: (1) Expanded areas in Southern California to include all of the biologically important areas for whales; (2) add a Cuvier's beaked whale mitigation area in Southern California to protect that small, declining population that has high site fidelity; (3) add mitigation areas for the biologically important areas off of Oahu and Kauai; (4) the entire Humpback National Marine Sanctuary should be afforded protections from Navy activities because it is an important habitat for breeding, calving and nursing; and (5) limits on sonar and explosives should be adopted in the designated critical habitat for the Hawaiian monk seal and false killer whale.

Response: In regards to expanded areas in Southern California to include all of the biologically important areas for whales, the Navy has agreed to expanded areas in SOCAL, a portion of the San Nicholas Island BIA and the Santa Monica/Long Beach BIA are now included as part of the San Diego Arc Mitigation Area but also named the San Nicholas Island Mitigation Area and the Santa Monica/Long Beach Mitigation Area. The Santa Monica Bay/Long Beach and San Nicolas Island BIA only partially overlaps a small portion of the northern part of the SOCAL portion of the HSTT Study Area. The Santa Monica Bay/Long Beach BIA overlap in SOCAL is 13.9 percent. The San Nicolas Island BIA overlap in SOCAL is 23.5 percent.

The Navy will limit surface ship sonar and not exceed 200 hours of MFAS sensor MF1 June 1 through October 31 during unit-level training and MTEs in the Santa Monica Bay/Long Beach BIA and San Nicolas Island Mitigation Areas (as well as San Diego Arc Mitigation Area). The Navy has also agreed to limit explosives. Specifically, within the San Nicolas Island Mitigation Area, the Navy will not use explosives that could potentially result in the take of marine mammals during mine warfare, large-caliber gunnery, torpedo, bombing, and missile (including 2.75″ rockets) activities during training. Within the Santa Monica/Long Beach Mitigation Area, the Navy will not use explosives that could potentially result in the take of marine mammals during mine warfare, large-caliber gunnery, torpedo, bombing, and missile (including 2.75″ rockets) activities during training and testing.

The Tanner-Cortes Bank BIA—NMFS and the Navy have discussed this extensively, and the Navy is unable to incorporate this area into geographic mitigation because is impracticable. Specifically, it would not be practical for the Navy to implement and prevents the Navy from meeting training and testing missions. As discussed in detail in Appendix K (Geographic Mitigation Assessment) of the HSTT FEIS/OEIS, during the Navy's practicability and biological review of the Tanner Bank BIA, it was concluded that implementation of a mitigation area was not practical for this species. The area in and around Tanner Banks is a core high priority training and testing venue for SOCAL combining unique bathymetry and existing infrastructure. This includes an existing bottom training minefield adjacent to Tanner Banks, future Shallow Water Training Range (SWTR West) expansion as well as proximity to critical tactical maneuver areas to the south and the Navy's underwater instrumented range to the northeast. Furthermore, the general area is in or adjacent to critical Navy training that cannot occur at other locations due to available, existing infrastructure, operationally relevant bathymetry, sea space, proximity to San Clemente Island and San Diego, etc.). Of all the blue whale BIAs designated, the Tanner Banks BIA had the fewest blue whale sighting records supporting its designation. New science since designation funded by the Navy further highlights how infrequently Tanner Bank is used by blue whales as compared to the rest of their movements in SOCAL. Out of 73 blue whales tagged with satellite transmitters, only a few transits through Tanner Banks were documented between 2014–2017. The longest cumulative time any individual whale stayed within the boundaries of the Tanner Banks BIA was less than one and a half days. Typical average blue whale daily movement along the U.S. West Coast is often up to 13–27 nautical miles a day (Oregon State University, unpublished data). Most blue whale area restricted foraging occurred around the northern Channel Islands, north of and outside of the HSTT SOCAL Study Area.

The feeding areas as recommended by the commenter north of Los Angeles for humpbacks (Santa Barbara Channel-San Miguel BIA and Morro Bay to Pt Sal) and blue whales (Santa Barbara Channel to San Miguel BIA, Pt Conception/Arguello to Pt Sal) are outside of the HSTT Study Area; therefore are not applicable for inclusion.

In regard to adding a Cuvier's beaked whale mitigation area in Southern California to protect that small, declining population that has high site fidelity, NMFS is assuming the commenter is referring to the area west of San Clemente Island as the comment letter did not specify an exact location. The beaked whale species detected most frequently in Southern California is Cuvier's beaked whale. Cuvier's beaked whales are widely distributed within Southern California and across the Pacific with almost all suitable deep water habitat >800 m conceivably containing Cuvier's beaked whales. In new unpublished Navy funded data, beaked whales have even been detected over deep water, open abyssal plains (>14,000 feet). Only limited population vital rates exist for beaked whales, covering numbers of animals, populations vs. subpopulations determination, and residency time for individual animals. While Cuvier's beaked whales have been detected north and west of Tanner and Cortes Banks, as noted above this species is also detected in most all Southern California locations 800 m in depth. The Navy's Marine Mammal Monitoring on Navy Ranges (M3R) program has documented continual Cuvier's beaked whale presence on SOAR over 8-years from 2010–2017 with slight abundance increases through 2017 (DiMarzio *et al.,* 2018.)

Navy-funded research on Cuvier's beaked whales within the Southern California (SOCAL) Range Complex began in 2006. In 2008, researchers began deploying satellite tags as a part of this research. To date, 27 Low-Impact Minimally-Percutaneous External-electronics Transmitting (LIMPET) tags have been deployed within the complex. Twenty-five of those whales were tagged within the San Nicolas Basin and two were tagged in the Catalina Basin. Average transmission duration was 36.6 days (sd

= 29.8), with the longest transmitting for 121.3 days. Movement data suggest that Cuvier's beaked whales have a high degree of site-fidelity to the Southern California Range Complex, and the San Nicolas basin in particular. Overall, there were 3,207 filtered location estimates from the 27 tagged whales, 91 percent of which were within the SoCal Range Complex. 54 percent of all location estimates were within the San Nicolas Basin, with twelve tagged whales spending more than 80 percent of their transmission duration within the basin. The two whales tagged in the Catalina Basin never entered the San Nicolas Basin. Only three whales tagged in the San Nicolas Basin crossed into the Catalina Basin (1.3 percent of all locations); two of those whales had just one Catalina Basin location each, though the remaining whale had 28 percent of its locations there. Five whales tagged in the San Nicolas Basin moved into the Santa Cruz Basin for anywhere from 1–62 percent of their time (6 percent of all locations). In contrast, 20 of 25 whales tagged in the San Nicolas Basin moved south of the basin at some point. Of these 20 whales, most remained within either Tanner Canyon or the San Clemente Basin immediately to the south, but one traveled north to near San Miguel Island and four traveled south towards Guadalupe Island. Three of these whales have not been documented in the San Nicolas basin since, though to date at least six whales tagged in the San Nicolas Basin have been re-sighted there a year or more after the deployment. Additionally, one of the whales that was south of San Nicolas when the tag stopped transmitting has since been sighted three times since.

Given that there is the uncertainty of current residence of Cuvier's beaked whales in the areas north and west of SOAR, the fact that general occurrence of beaked whales in Southern California may not necessarily equate to factors typically associated with biologically important areas (*i.e.,* one area not more important than another), and consideration of the importance of Navy training and testing in the areas around SOAR and Tanner and Cortes Banks as discussed in Appendix K (Geographic Mitigation Assessment), *i.e.,* the impracticability of additional area mitigation in this area, additional geographic mitigation to create a ''refuge'' in the recommended area is not scientifically supported or warranted.

In regard to the comment on the entire Humpback Whale National Marine Sanctuary should be afforded protections from Navy activities because it is an important habitat for breeding, calving and nursing the Humpback National Marine Sanctuary largely overlaps both the Hawaii Island Mitigation Area as well as the 4-Islands Region Mitigation Area. In the Hawaii Island Mitigation Area (year-round), the Navy will not conduct more than 300 hours of MF1 surface ship hull-mounted mid-frequency active sonar or 20 hours of MF4 dipping sonar, or use explosives that could potentially result in takes of marine mammals during training and testing. In the 4-Islands Region Mitigation Area (November 15–April 15 for active sonar; year-round for explosives), the Navy will not use MF1 surface ship hull-mounted mid-frequency active sonar or explosives that could potentially result in takes of marine mammals during training and testing. This seasonal limitation is specifically during important breeding, calving, and nursing, times/habitat for humpback whales and was expanded for humpback whales as the previous season for this mitigation area was December 15–April 15).

There are areas of the Humpback Whale National Marine Sanctuary around the islands of Niihau, Kauai, Oahu, and west of Molokai (Penguin Bank) that are outside of the Navy's mitigation areas. However, none of the Navy's training and testing areas for explosives around Kauai and Niihau are within the Hawaiian Islands Humpback Whale National Marine Sanctuary. There may be limited sonar use as units transit to/from PMRF ranges.

Part of the Humpback Whale National Marine Sanctuary, west of the island of Molokai, Penguin Bank, is not included in the 4-Islands Region Mitigation Area. Penguin Bank particularly is used for shallow water submarine testing and anti-submarine warfare training because of its large expanse of shallow bathymetry. While submarines do not typically use mid-frequency active sonar, relying primarily on passive sonar (listening mode) to avoid detection from adversaries, submarines are required to train in counter detection tactics, techniques and procedures against threat surface vessels, airborne anti-submarine warfare units and other threat submarines using mid-frequency active sonar as part of both their perspective Commanding Officers qualification course and pre-deployment certification. The ability for surface vessels and air assets to simulate opposing forces, using mid-frequency active sonar when training with submarines, is critical to submarine crew training for deployed and combat operations. Surface ships and aircraft mimicking opposition forces present submarines with a realistic and complicated acoustic and tactical environment. The Navy expects real-world adversaries to target our submarines with active sonar. Without active sonar from opposition forces submarines do not get a realistic picture regarding if they successfully evaded detection. Surface warfare training is designed to support unit-level training requirements and group cross-platform events in 28 mission areas for surface ship certification prior to deployment.

Additionally, the Navy will implement the Humpback Whale Special Reporting Area (December 15 through April 15) is comprised of additional areas of high humpback whale densities that overlap the Humpback Whale National Marine Sanctuary. This reporting is included in the exercise and monitoring reports that are an ongoing Navy requirement and are submitted to NMFS annually. Special reporting data, along with all other reporting requirements, are considered during adaptive management to determine if additional mitigation may be required. The Navy currently reports to NMFS the total hours (from December 15 through April 15) of all hull-mounted mid-frequency active sonar usage occurring in the Humpback Whale Special Reporting Area, plus a 5 km buffer, but not including the Pacific Missile Range Facility. The Navy will continue this reporting for the Humpback Whale Special Reporting Area.

In regard to limits on sonar and explosives should be adopted in the ESA-designated critical habitat for the Hawaiian monk seal and false killer whale, the Navy will cap MFAS for the entire false killer whale BIA adjacent to the island of Hawaii and a portion of the false killer whale BIA north of Maui and Molokai as follows. The Navy already will to limit explosive use in the entire false killer whale BIA adjacent to the island of Hawaii. The Navy will now add year-round limitation on explosives to the 4-Islands Region Mitigation Area, which includes a portion of the false killer whale BIA north of Maui and Molokai. *For the Hawaii Island Mitigation Area (year-round):* The Navy will not conduct more than 300 hours of surface ship hull-mounted MFAS sonar MF1 (MF1) or 20 hours of MFAS dipping sonar MF4 (MF4), or use explosives during training and testing year-round. *For the 4-Islands Region Mitigation Area* (November 15–April 15 for active sonar, year-round for explosives): The Navy will not use surface ship hull-mounted MFAS sonar MF1 from November 15–April 15 and explosive year-round during training or testing activities. The remaining false killer whale BIA overlaps with areas (*e.g.,* Kaiwi Channel) where additional mitigations were found to be impractical.

In regard to limits on sonar and explosives in ESA-designated critical habitat for Hawaiian monk seal, the Navy's training and testing activities do occur in a portion of the ESA-designated critical habitat for Hawaiian monk seals, which is of specific importance to the species. However, monk seals in the main Hawaiian Islands have increased while the Navy has continued its activities, even though the Hawaiian monk seal overall population trend has been on a decline from 2004 through 2013, with the total number of Hawaiian monk seals decreasing by 3.4 percent per year (Carretta *et al.,* 2017). While the decline has been driven by the population segment in the northwestern Hawaiian Islands, the number of documented sightings and annual births in the main Hawaiian Islands has increased since the mid-1990s (Baker, 2004; Baker *et al.,* 2016). In the main Hawaiian Islands, the estimated population growth rate is 6.5 percent per year (Baker *et al.,* 2011; Carretta *et al.,* 2017). Of note, in the 2013 HRC Monitoring Report, tagged monk seals did not show any behavioral changes during periods of MFAS.

The Hawaii Island Mitigation Area overlaps all of their critical habitat around the Island of Hawaii (as well as the southern end of Maui) and, by not using explosives or the most impactful sonar sources in this, thereby reduces the likelihood that take might impact reproduction or survival by interfering with important feeding or resting behaviors (potentially having adverse impacts on energy budgets) or separating mothers and pups in times when pups are more susceptible to predation and less able to feed or otherwise take care of themselves. The 4-Islands Mitigation Area overlaps with ESA-designated critical habitat around Maui, Lanai, and Molokai.

Comment 67: A commenter commented that in the proposed rule, NMFS estimates 588 takes annually will cause multiple instances of exposure to insular false killer whales, taking 400 percent of the population. As the potential biological removal is 0.18 animals, the loss of a single individual, or an impairment to its health and fitness, could place the species on an extinction trajectory. NMFS must consider additional mitigation in the designated critical habitat, as well as excluded areas, to ensure a negligible impact on false killer whales.

Response: The commenter is conflating behavioral take with mortality take addressed in PBR. There are no insular false killer whale mortality takes modeled, anticipated, or authorized. 400 percent of the population would mean that all animals would be behaviorally harassed an average of 4 times per year, or once per season. The short term biological reaction of an animal for periods of minutes to hours a few times a year would not have any fitness impacts to the individual let alone any population level impacts. NMFS confirms that these impacts are negligible. Additionally, much of the Navy's mitigations on Hawaii and the 4 island region encompass areas that overlap with high use insular false killer whale habitat and thus already mitigate impacts. From the Navy consultation with NMFS under the ESA for insular false killer whale critical habitat, less than 12 percent of modeled takes would take place in or near insular false killer whale critical habitat. These takes as explained previously would be transitory (short-duration), and spread out in time and space.''

Comment 68: A commenter recommended establishing stand-off distances around the Navy's mitigation areas to the greatest extent practicable, allowing for variability in size given the location of the area, the type of operation at issue, and the species of concern.

Response: Mitigation areas are typically developed in consideration of both the area that is being protected and the distance from the stressor in question that is appropriate to maintain to ensure the protection. Sometimes this results in the identification of the area plus a buffer, and sometimes both the protected area and the buffer are considered together in the designation of the edge of the area. We note that the edges of a protected area are typically of less importance to a protected stock or behavior, since important areas often have a density gradient that lessens towards the edge. Also, while a buffer of a certain size may be ideal to alleviate all impacts of concern, a lessened buffer does not mean that the protective value is significantly reduced, as the core of the area is still protected. Also, one should not assume that activities are constantly occurring in the area immediately adjacent to the protected area.

These issues were considered here, and the Navy has indicated that the mitigation identified in Chapter 5 (Mitigation), Section 5.4 (Mitigation Areas to be Implemented) of the HSTT FEIS/OEIS represents the maximum mitigation within mitigation areas and the maximum size of mitigation areas that are practicable to implement under the Proposed Action. The Navy has communicated (and NMFS concurs with the assessment) that implementing additional mitigation (*e.g.,* stand-off distances that would extend the size of the mitigation areas) beyond what is described in Chapter 5 (Mitigation), Section 5.4 (Mitigation Areas to be Implemented) of the HSTT FEIS/OEIS would be impracticable due to implications for safety (the ability to avoid potential hazards), sustainability (based on the amount and type of resources available, such as funding, personnel, and equipment)), and the Navy's ability to continue meeting its Title 10 requirements.

Additional Mitigation Research

Comment 69: A commenter recommended NMFS consider additional mitigation measures to prescribe or research including: (1) Research into sonar signal modifications; (2) mitigation and research on Navy ship speeds (the commenter recommended that the agency require the Navy to collect and report data on ship speed as part of the EIS process); and (3) compensatory mitigation for the adverse impacts of the permitted activity on marine mammals and their habitat that cannot be prevented or mitigated.

Response: NMFS consulted with the Navy regarding potential research into additional mitigation measures and discussion is included below.

1. Research into sonar signal modification—Sonar signals are designed explicitly to provide optimum performance at detecting underwater objects (*e.g.,* submarines) in a variety of acoustic environments. The Navy acknowledges that there is very limited data, and some suggest that up or down sweeps of the sonar signal may result in different animal reactions; however, this is a very small data sample, and this science requires further development. If future studies indicate this could be an effective approach, then NMFS and the Navy will investigate the feasibility and practicability to modify signals, based on tactical considerations and cost, to determine how it will affect the sonar's performance.

2. Mitigation and research on Navy ship speeds inclusive of Navy collecting and reporting data on ship speed as part of the EIS—The Navy conducted an operational analysis of potential mitigation areas throughout the entire Study Area to consider a wide range of mitigation options, including but not limited to vessel speed restrictions. As

discussed in Chapter 3, Section 3.0.3.3.4.1 (Vessels and In-Water Devices) of the HSTT FEIS/OEIS, Navy ships transit at speeds that are optimal for fuel conservation or to meet operational requirements. Operational input indicated that implementing additional vessel speed restrictions beyond what is identified in Chapter 5 (Mitigation), Section 5.4 (Mitigation Areas to be Implemented) of the HSTT FEIS/OEIS would be impracticable to implement due to implications for safety and sustainability. In its assessment of potential mitigation, the Navy considered implementing additional vessel speed restrictions (*e.g.,* expanding the 10 kn restriction to other activities). The Navy determined that implementing additional vessel speed restrictions beyond what is described in Chapter 5 (Mitigation), Section 5.5.2.2 (Restricting Vessel Speed) of the HSTT FEIS/OEIS would be impracticable due to implications for safety (the ability to avoid potential hazards), sustainability (maintain readiness), and the Navy's ability to continue meeting its Title 10 requirements to successfully accomplish military readiness objectives. Additionally, as described in Chapter 5 (Mitigation), Section 5.5.2.2 (Restricting Vessel Speed) of the HSTT FEIS/OEIS, any additional vessel speed restrictions would prevent vessel operators from gaining skill proficiency, would prevent the Navy from properly testing vessel capabilities, or would increase the time on station during training or testing activities as required to achieve skill proficiency or properly test vessel capabilities, which would significantly increase fuel consumption. As discussed in Chapter 5 (Mitigation), Section 5.3.4.1 (Vessel Movement) of the HSTT FEIS/OEIS, the Navy implements mitigation to avoid vessel strikes throughout the Study Area. As directed by the Chief of Naval Operations Instruction (OPNAVINST) 5090.1D, Environmental Readiness Program, Navy vessels report all marine mammal incidents worldwide, including ship speed. Therefore, the data required for ship strike analysis discussed in the comment is already being collected. Any additional data collection required would create an unnecessary and impracticable administrative burden on the Navy.

3. Compensatory mitigation—For years, the Navy has implemented a very broad and comprehensive range of measures to mitigate potential impacts to marine mammals from military readiness activities. As the HSTT FEIS/OEIS documents in Chapter 5 (Mitigation), the Navy is proposing to expand these measures further where practicable. Aside from direct mitigation, as noted by the commenter, the Navy engages in an extensive spectrum of other activities that greatly benefit marine species in a more general manner that is not necessarily tied to just military readiness activities. As noted in Chapter 3, Section 3.0.1.1 (Marine Species Monitoring and Research Programs) of the HSTT FEIS/OEIS, the Navy provides extensive investment for research programs in basic and applied research. The U.S. Navy is one of the largest sources of funding for marine mammal research in the world, which has greatly enhanced the scientific community's understanding of marine species much more generally. The Navy's support and marine mammal research includes: Marine mammal detection, including the development and testing of new autonomous hardware platforms and signal processing algorithms for detection, classification, and localization of marine mammals; improvements in density information and development of abundance models of marine mammals; and advancements in the understanding and characterization of the behavioral, physiological (hearing and stress response), and potentially population-level consequences of sound exposure on marine life. 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.

Comment 70: A commenter recommended that given the paucity of information on marine mammal habitat currently available for the HSTT Study Area, that efforts be undertaken in an iterative manner by NMFS, and the Navy, to identify additional important habitat areas across the HSTT Study Area, using the full range of data and information available to the agencies (*e.g.,* habitat-based density models, NOAA-recognized BIAs, survey data, oceanographic and other environmental data, etc.).

Response: NMFS and the Navy used the best available scientific information (*e.g.,* SARs and numerous study reports from Navy-funded monitoring and research in the specific geographic region) in assessing density, distribution, and other information regarding marine mammal use of habitats in the HSTT Study Area. In addition, NMFS consulted LaBrecque *et al.* (2015), which provides a specific, detailed assessment of known BIAs, which may be region-, species-, and/or time-specific, include reproductive areas, feeding areas, migratory corridors, and areas in which small and resident populations are concentrated. While the science of marine mammal occurrence, distribution, and density resides as a core NMFS mission, the Navy does provide extensive support to the NMFS mission via ongoing HSTT specific monitoring as detailed in this final rule. Also included are direct Navy funding support to NMFS for programmatic marine mammal surveys in Hawaii and the U.S. West Coast, and spatial habitat model improvements.''

Comment 71: A commenter recommended integration of important habitat areas to improve resolution of operations. The delineation of BIAs by NOAA, the updates made by the Navy to its predictive habitat models, and evidence of additional important habitat areas within the HSTT Study Area, provide the opportunity for the agencies to improve upon their current approach to the development of alternatives by improving resolution of their analysis of operations. A commenter offered the following thoughts for consideration.

They state that recognizing that important habitat areas imply the non-random distribution and density of marine mammals in space and time, both the spatial location and the timing of training and testing events in relation to those areas is a significant determining factor in the assessment of acoustic impacts. Levels of acoustic impact derived from the NAEM are likely to be under- or over-estimated depending on whether the location of the modeled event is further from the important habitat area, or closer to it, than the actual event. Thus, there is a need for the Navy to compile more information regarding the number, nature, and timing of testing and training events that take place within, or in close proximity to, important habitat areas, and to refine its scale of analysis of operations to match the scale of the habitat areas that are considered to be important. While the proposed rule, in assessing environmental impacts on marine mammals, breaks down estimated impacts by general region (*i.e.,* HRC and SOCAL), the resolution is seldom greater than range complex or homeport and is not specifically focused on areas of higher biological importance. Current and ongoing efforts to identify important habitat areas for marine mammals should be used by NMFS and by the Navy as a guide to the most appropriate scale(s) for the analysis of operations.

Response: In their take request and effects analysis provided to NMFS, the Navy considered historic use (number and nature of training and testing activities) and locational information of training and testing activities when developing modelling boxes. The timing of training cycles and testing needs varies based on deployment requirements to meet current and emerging threats. Due to the variability, the Navy's description of its specified activities is structured to provide flexibility in training and testing locations, timing, and number. In addition, information regarding the exact location of sonar usage is classified. Due to the variety of factors, many of which influence locations that cannot be predicted in advance (*e.g.,* weather), the analysis is completed at a scale that is necessary to allow for flexibility. The purpose of the Navy's quantitative acoustic analysis is to provide the best estimate of impact/take to marine mammals and ESA listed species for the regulatory and ESA section 7 consultation analyses. Specifically, the analysis must take into account multiple Navy training and testing activities over large areas of the ocean for multiple years; therefore, analyzing activities in multiple locations over multiple seasons produces the best estimate of impacts/take to inform the HSTT FEIS/OEIS and regulators. Also, the scale at which spatially explicit marine mammal density models are structured is determined by the data collection method and the environmental variables that are used to build the model. Therefore, altogether, given the variables that determine when and where the Navy trains and tests, as well as the resolution of the density data, the analysis of potential impacts is scaled to the level that the data fidelity will support. NMFS has worked with the Navy over the years to increase the spatio-temporal specificity of the descriptions of activities planned in or near areas of biological importance, when possible (*e.g., in BIAs or Sanctuaries, where possible*), and NMFS is confident that the granularity of information provided sufficiently allows for an accurate assessment of both the impacts of the Navy's activities on marine mammal populations and the protective measures evaluated to mitigate those impacts.

Monitoring Recommendations

Comment 72: A commenter recommended that NMFS require that the Navy continue to conduct long-term monitoring with the aim to provide baseline information on occurrence, distribution, and population structure of marine mammal species and stocks, and baseline information upon which the extent of exposure to disturbance from training and testing activities at the individual, and ultimately, population level-impacts, and the effectiveness of mitigation measures, can be evaluated. The commenter recommended individual-level behavioral-response studies, such as focal follows and tagging using DTAGs, carried out before, during, and after Navy training and testing activities. The commenter recommended prioritizing DTAG studies that further characterize the suite of vocalizations related to social interactions. The commenter recommends the use of unmanned aerial vehicles. The commenter recommended that NMFS require the Navy to use these technologies for assessing marine mammal behavior before, during, and after Navy training and testings (*e.g.,* swim speed and direction, group cohesion). Additionally, the commenter recommended studies into how these technologies can be used to assess body condition be supported as this can provide an important indication of energy budget and health, which can inform the assessment of population-level impacts.

Response: Broadly speaking, NMFS works closely with the Navy in the identification of monitoring priorities and the selection of projects to conduct, continue, modify, and/or stop through the Adaptive Management process, which includes annual review and debriefs by all scientists conducting studies pursuant to the Navy's MMPA rule. The process NMFS and the Navy have developed allows for comprehensive and timely input from the Navy and other stakeholders that is based on rigorous reporting out from the Navy and the researchers doing the work. Further, the Navy is pursuing many of the topics that the commenter identifies, either through the Navy monitoring required under the MMPA and ESA, or through Navy-funded research programs (ONR and LMR). We are confident that the monitoring conducted by the Navy satisfies the requirements of the MMPA.

The Navy established the Strategic Planning Process under the marine species monitoring program to help structure the evaluation and prioritization of projects for funding. Chapter 5 (Mitigation), Section 5.1.2.2.1.3 (Strategic Planning Process) of the HSTT FEIS/OEIS provides a brief overview of the Strategic Planning Process. More detail, including the current intermediate scientific objectives, is available on the monitoring portal as well as in the Strategic Planning Process report. The Navy's evaluation and prioritization process is driven largely by a standard set of criteria that help the steering committee evaluate how well a potential project would address the primary objectives of the monitoring program. NMFS has opportunities to provide input regarding the Navy's intermediate scientific objectives as well as providing feedback on individual projects through the annual program review meeting and annual report. For additional information, please visit: *https://www.navymarinespeciesmonitoring.us/about/strategic-planning-process/*.

Details on the Navy's involvement with future research will continue to be developed and refined by the Navy and NMFS through the consultation and adaptive management processes, which regularly consider and evaluate the development and use of new science and technologies for Navy applications. The Navy has indicated that it will continue to be a leader in funding of research to better understand the potential impacts of Navy training and testing activities and to operate with the least possible impacts while meeting training and testing requirements.

(1) Individual-level behavioral-response studies—In addition to the Navy's marine species monitoring program investments for individual-level behavioral-response studies, the Office of Naval Research Marine Mammals and Biology program and the Navy's Living Marine Resources program continue to heavily invest in this topic. For example, the following studies are currently being funded:

- The Southern California Behavioral Response Study (Principal Investigators: John Calambokidis and Brandon Southall)
- Cuvier's Beaked Whale and Fin Whale Behavior During Military Sonar Operations: Using Medium-term Tag Technology to Develop Empirical Risk Functions (Principal Investigators: Greg Schorr and Erin Falcone)
- 3S3-Behavioral responses of sperm whales to naval sonar (Principal Investigators: Petter Kvadsheim and Frans-Peter Lam)
- Measuring the effect of range on the behavioral response of marine mammals through the use of Navy sonar (Principal Investigators: Stephanie Watwood and Greg Schorr)

- Behavioral response evaluations employing robust baselines and actual Navy training (BREVE) (Principal Investigators: Steve Martin, Tyler Helble, Len Thomas)
- Integrating remote sensing methods to measure baseline behavior and responses of social delphinids to Navy sonar (Principal Investigators: Brandon Southall, John Calambokidis, John Durban).

(2) DTAGS to characterize social communication between individuals of a species or stock, including mothers and calves. Furthermore, DTAGs are just one example of animal movement and acoustics tag. From the Navy's Office of Naval Research and Living Marine Resource programs, Navy funding is being used to improve a suite of marine mammal tags to increase attachment times, improve data being collected, and improve data satellite transmission—The Navy has funded a variety of projects that are collecting data that can be used to study social interactions amongst individuals. Examples of these projects include:

- Southern California Behavioral Response Study (Principal Investigators: John Calambokidis and Brandon Southall)
- Tagging and Tracking of Endangered North Atlantic Right Whales in Florida Waters (Principal Investigators: Doug Nowacek and Susan Parks). This project involves the use of DTAGs, and data regarding the tagged individual and group are collected in association with the tagging event. In addition to the vocalization data that is being collected on the DTAGs, data is collected on individual and group behaviors that are observed, including between mother/calf pairs when applicable. The Navy will continue to collect this type of data when possible.
- Integrating remote sensing methods to measure baseline behavior and responses of social delphinids to Navy sonar (Principal Investigators: Brandon Southall, John Calambokidis, John Durban)
- Acoustic Behavior of North Atlantic Right Whale (Eubalaena glacialis) Mother-Calf Pairs (Principal Investigators: Susan E. Parks and Sofie Van Parijs). The long-term goal of this project is to quantify the behavior of mother-calf pairs from the North Atlantic right whale to determine: a) why mothers and calves are more susceptible to collisions with vessels and b) the vocal behavior of this critical life stage to assess the effectiveness of passive acoustic monitoring to detect mother-calf pairs in important habitat areas (see *https://www.onr.navy.mil/reports/FY15/mbparks.pdf*).
- Social Ecology and Group Cohesion in Pilot Whales and Their Responses to Playback of Anthropogenic and Natural Sounds (Principal Investigator: Frants H. Jensen). This project investigates the social ecology and cohesion of long-finned pilot whales as part of a broad multi-investigator research program that seeks to understand how cetaceans are affected by mid-frequency sonar and other sources of anthropogenic noise (see *https://www.onr.navy.mil/reports/FY15/mbjensen.pdf*).

(3) Unmanned Aerial Vehicles to assess marine mammal behavior before, during, and after Navy training and testing activities (*e.g.,* swim speed and direction, group cohesion)—Studies that use unmanned aerial vehicles to assess marine mammal behaviors and body condition are being funded by the Office of Naval Research Marine Mammals and Biology program. Although the technology shows promise, the field limitations associated with the use of this technology has hindered the useful application in behavioral response studies in association with Navy training and testing events. For safety, research vessels cannot remain in close proximity to Navy vessels during Navy training or testing events, so battery life of the unmanned aerial vehicles has been an issue. However, as the technology improves, the Navy will continue to assess the applicability of this technology for the Navy's research and monitoring programs. An example project is Integrating Remote Sensing Methods to Measure Baseline Behavior and Responses of Social Delphinids to Navy sonar (Principal Investigators: Brandon Southall, John Calambokidis, and John Durban).

(4) NMFS asked the Navy to expand funding to explore the utility of other, simpler modeling methods that could provide at least an indicator of population-level effects, even if each of the behavioral and physiological mechanisms are not fully characterized—The Office of Naval Research Marine Mammals and Biology program has invested in the Population Consequences of Disturbance (PCoD) model, which provides a theoretical framework and the types of data that would be needed to assess population level impacts. Although the process is complicated and many species are data poor, this work has provided a foundation for the type of data that is needed. Therefore, in the future, relevant data that is needed for improving the analytical approaches for population level consequences resulting from disturbances will be collected during projects funded by the Navy's marine species monitoring program. General population level trend analysis is conducted by NMFS through its stock assessment reports and regulatory determinations. The Navy's analysis of effects to populations (species and stocks) of all potentially exposed marine species, including marine mammals and sea turtles, is based on the best available science as discussed in Sections 3.7 (Marine Mammals) and 3.8 (Reptiles) of the HSTT FEIS/OEIS. PCoD models, similar to many fisheries stock assessment models, once developed will be powerful analytical tools when mature. However, currently they are dependent on too many unknown factors for these types of models to produce a reliable answer. As discussed in the *Monitoring* section of the final rule, the Navy's marine species monitoring program typically supports 10–15 projects in the Atlantic at any given time. Current projects cover a range of species and topics from collecting baseline data on occurrence and distribution, to tracking whales and sea turtles, to conducting behavioral response studies on beaked whales and pilot whales. The Navy's marine species monitoring web portal provides details on past and current monitoring projects, including technical reports, publications, presentations, and access to available data and can be found at: *https://www.navymarinespeciesmonitoring.us/regions/atlantic/current-projects/*. A list of the monitoring studies that the Navy is currently planning under this rule are listed at the bottom of the *Monitoring* section of this final rule.

Negligible Impact Determination

General

Comment 73: Commenters commented that NMFS' analytical approach for negligible impact determination is not transparent and that the methods and resulting data cannot be substantiated with the information provided. The Commission stated that in general, NMFS has based negligible impact determinations associated with incidental take authorizations on abundance estimates provided either in its Stock Assessment Reports (SARs) or other more recent published literature. For the HSTT proposed rule, NMFS used abundance estimates as determined by the Navy's underlying density estimates rather than abundance estimates from either the SARs or published literature. NMFS did also not specify how it determined the actual abundance given that many of the densities differ on orders of kilometers. Interpolation or smoothing, and potentially extrapolation, of data likely would be necessary to achieve NMFS' intended goal—it is unclear whether any such methods were implemented. In addition, it is unclear whether NMFS estimated the abundances in the same manner beyond the U.S. EEZ as it did within the U.S. EEZ for HRC and why it did not compare takes within the U.S. EEZ and beyond the U.S. EEZ for

SOCAL, given that a larger proportion of the Navy's SOCAL action area is beyond the U.S. EEZ than HRC. Furthermore, NMFS did not specify how it determined the proportion of total takes that would occur beyond the U.S. EEZ. Moreover, the 'instances' of the specific types of taking (*i.e.,* mortality, Level A and B harassment) do not match the total takes 'inside and outside the EEZ' in Tables 69–81 (where applicable) or those take estimates in Tables 41–42 and 67–68. It also appears the 'instances' of take columns were based on only those takes in the U.S. EEZ for HRC rather than the area within and beyond the U.S. EEZ. It further is unclear why takes were not apportioned within and beyond the U.S. EEZ for SOCAL. Given that the negligible impact determination is based on the total taking in the entire study area, NMFS should have partitioned the takes in the 'instances' of take columns in Tables 69–81 for all activities that occur within *and* beyond the U.S. EEZ. One commenter further asserts that any ''small numbers'' determination that relies on abundance estimates derived simplistically from modeled densities is both arbitrary and capricious. The commenters assert that NMFS should, at least for data rich species, derive its absolute abundance estimates from NMFS' SARs or more recently published literature.

Response: NMFS' *Analysis and Negligible Impact Determination* section has been updated and expanded in the final rule to clarify the issues the Commenters raise here (as well as others). Specifically, though, NMFS uses both the Navy-calculated abundance (based on the Navy-calculated densities described in detail in the *Estimated Take of Marine Mammal* section) and the SARs abundances, where appropriate, in the negligible impact analysis—noting that the nature of the overlap of the Navy Study Area with the U.S. EEZ is different in Hawaii versus SOCAL, supporting different analytical comparisons.

NMFS acknowledges that there were a few small errors in the take numbers in the proposed rule; however, they have been corrected (*i.e.,* the take totals in Tables 41 and 42 for a given stock now equal the ''in and outside the U.S. EEZ'' take totals in Tables X–Y) and the minor changes do not affect the analysis or determinations in the rule.

Also, the Commenters are incorrect that the instances of take for HRC do not reflect the take both within and outside the U.S. EEZ. They do. Last, one commenter mentions the agency making a ''small numbers'' determination, but such a determination is not applicable in the context of military readiness activities.

Comment 74: A commenter commented that the activities proposed by the Navy include high-intensity noise pollution, vessel traffic, explosions, pile driving, and more at a massive scale. According to the commenter, NMFS has underestimated the amount of take and the adverse impact that it will have on marine mammals and their habitat.

Response: NMFS has provided extensive information demonstrating that the best available science has been used to estimate the amount of take, and further to analyze the impacts that all of these takes combined will have on the affected species and stocks. As described in the *Analysis and Negligible Impact Determination* section, this information and our associated analyses support the negligible impact determinations necessary to issue these regulations.

Comment 75: A commenter commented that blue whales exposed to mid-frequency sonar (with received levels of 110 to 120 dB re 1 μPa) are less likely to produce calls associated with feeding behavior. They cite the Goldbogen *et al.* (2013) study (and a subsequent study) as extremely concerning because of the potential impacts of sonar on the essential life functions of blue whales as it found that sonar can disrupt feeding and displace blue whales from high-quality prey patches, significantly impacting their foraging ecology, individual fitness, and population health. They also state that mid-frequency sonar has been associated with several cases of blue whale stranding events and that low-frequency anthropogenic noise can mask calling behavior, reduce communication range, and damage hearing. These impacts from sonar on blue whales suggest that the activities' impacts would have long-term, non-negligible impacts on the blue whale population.

Response: As described in this final rule in the *Analysis and Negligible Impact Determination* section, NMFS has fully considered the effects that exposure to sonar can have on blue whales, including impacts on calls and feeding and those outlined in the Goldbogen study. However, as discussed, any individual blue whale is not expected to be exposed to sonar and taken on more than several days per year. Thus, while vocalizations may be impacted or feeding behaviors temporarily disrupted, this small scale of impacts is not expected to affect reproductive success or survival of any individuals, especially given the limitations on sonar and explosive use within blue whale BIAs. Of additional note, while the blue whale behavioral response study (BRS) in Southern California documented some foraging responses by blue whales to simulated Navy sonar, any response was highly variable by individual and context of the exposure. There were, for instance, some individual blue whales that did not respond. Recent Navy-funded blue whale tracking has documented wide ranging movements through Navy areas such that any one area is not used extensively for foraging. More long-term blue whale residency occurs north of and outside of the HSTT Study Area. Further, we disagree with the assertion that MFAS has been causally associated with blue whale strandings. This topic was discussed at length in the proposed rule and there is no data causally linking MFAS use with blue whale strandings.

Comment 76: A commenter commented that NMFS cannot consider the additional mortality/serious injury, including the 0.2 in the proposed authorization for ship strike for blue whales, to have a negligible impact determination for this stock. They also state that counts of mortality/serious injury do not account for the additional takes proposed to be authorized that cumulatively can have population level impacts from auditory injury and behavioral disturbance. Similarly, the commenter commented that NMFS cannot consider the proposed authorization for 0.4 annual mortality/serious injury to have a negligible impact on the CA/OR/WA stock of humpback whales because take is already exceeding the potential biological removal, and especially concerning is any take authorized for the critically endangered Central America population that would have significant adverse population impacts.

Response: As described in detail in the *Estimated Take of Marine Mammals* section, the Navy and NMFS have revisited and re-analyzed the Navy's initial request for takes by mortality of blue and humpback whales from vessel strike and determined that only 1 strike of either would be anticipated over the course of 5 years, and therefore authorized the lesser amount. Further, NMFS has expanded and refined the discussion of mortality take, PBR, and our negligible impact finding in the *Serious Injury and Mortality* sub-section of the *Analysis and Negligible Impact Determination* section and do not repeat it here.

Comment 77: A commenter commented that the estimated population size for the Hawaii stock of sei whales is only 178 animals, and the potential biological removal is 0.2 whales per year. According to the Commenters, NMFS admits that the mortality for the Hawaii stock of sei whales is above potential biological removal. The commenter asserted that the conclusion that the action will have a negligible impact on this stock is arbitrary and capricious.

Response: As described in detail in the *Estimated Take of Marine Mammals* section, the Navy and NMFS revisited and re-analyzed the Navy's initial request for the take of a sei whale from vessel strike and determined that this take is unlikely to occur and, therefore, it is not authorized.

Comment 78: A commenter commented that any take of Hawaiian monk seal by the proposed activities will have a non-negligible impact given the precarious status of this species.

Response: NMFS' rationale for finding that the Navy's activity will have a negligible impact on monk seals is included in the *Pinniped* subsection of the *Analysis and Negligible Impact Determination* section and is not re-printed here. Nonetheless we reiterate that no mortality or injury due to tissue damage is anticipated or authorized, only one instance of PTS is estimated and authorized, and no individual monk seal is expected to be exposed to stressors that would result in take more than a few days a year. Further, the Hawaii Island and 4-Island mitigation areas provide significant protection of monk seal critical habitat in the Main Hawaiian Islands, reducing impacts form sonar and explosives around a large portion of pupping beaches and foraging habitat, as described in the *Mitigation Measures* section.

Cumulative and Aggregate Effects

Comment 79: One commenter asserted that NMFS has not apparently considered the impact of Navy activities on a population basis for many of the marine mammal populations within the HSTT Study Area. Instead, it has lodged discussion for many populations within broader categories, most prominently ''mysticetes'' (14 populations) and ''odontocetes'' (37 populations), that in some cases correspond to general taxonomic groups. Such grouping of stocks elides important differences in abundance, demography, distribution, and other population-specific factors, making it difficult to assume ''that the effects of an activity on the different stock populations'' are identical. That is particularly true where small, resident populations are concerned, and differences in population abundance, habitat use, and distribution relative to Navy activities can be profoundly significant. Additionally, the commenter states that NMFS assumed that all of the Navy's estimated impacts would not affect individuals or populations through repeated activity— even though the takes anticipated each year would affect the same populations and, indeed, would admittedly involve extensive use of some of the same biogeographic areas.

Response: NMFS provides information regarding broader groups in order to avoid repeating information that is applicable across multiple species or stocks, but analyses have been conducted and determinations made specific to each stock. The method used to avoid repeating information applicable to a number of species or stocks while also presenting and integrating all information applicable to particular species or stocks is described in the rule. Also, NMFS' analysis does address the fact that some individuals may be repeatedly impacted and how those impacts may or may not accrue to more serious effects. The *Analysis and Negligible Impacts Determination* section has been expanded and refined to better explain this.

Comment 80: NMFS' negligible impact analysis for Cuvier's beaked whales is predicated on a single take estimate for the CA/OR/WA stock. This is deeply problematic as the species is known to occur in small, resident populations within the SOCAL Range Complex. These populations are acutely vulnerable to Navy sonar. Cuvier's beaked whales have repeatedly been associated with sonar-related pathology, are known to react strongly to sonar at distances up to 100 kilometers, and are universally regarded to be among the most sensitive of all marine mammals to anthropogenic noise (Falcone *et al.,* 2017). Some populations, such as the one in San Nicholas Basin that coincides with the Navy's much-used Southern California ASW Range (SOAR), are repeatedly exposed to sonar, posing the same risk of population-wide harm documented on a Navy range in the Bahamas (Falcone and Schorr, 2013). The broad take estimates presented in the Proposed Rule, and the negligible impact analysis that they are meant to support, provide no insight into the specific impacts proposed for these small populations.

Response: NMFS acknowledges the sensitivity of small resident populations both in our analyses and in the identification of mitigation measures, where appropriate. However, we are required to make our negligible impact determination in the context of the MMPA-designated stock, which, in the case of the CA/OR/WA stock of Cuvier's beaked whale, spans the U.S. EEZ off the West Coast. As described in our responses to previous comments, NMFS and the Navy have fully accounted for the sensitivity of Cuvier's beaked whales in the behavioral thresholds and the estimation of take. Further, contrary to the assertions of the commenter, NMFS has absolutely considered the potential impacts of repeated takes on individuals that show site fidelity and that analysis can be found in the *Analysis and Negligible Impact Determination* section, which has been refined and updated since the proposed rule based on public input. Nonetheless, in 2018, an estimate of overall abundance of Cuvier's beaked whales at the Navy's instrumented range in San Nicolas Basin was obtained using new dive-counting acoustic methods and an archive of passive acoustic M3R data representing 35,416 hours of data (DiMarzio, 2018; Moretti, 2017). Over the seven-year period from 2010–2017, there was no observed decrease and perhaps a slight increase in annual Cuvier's beaked whale abundance within San Nicolas Basin (DiMarzio, 2018). There does appear to be a repeated dip in population numbers and associated echolocation clicks during the fall centered around August and September (Moretti 2017, DiMarzio 2018). A similar August and September dip was noted by researchers using stand-alone off-range bottom passive acoustic devices in Southern California (Širović *et al.,* 2016; Rice *et al.,* 2017). This dip in abundance may be tied to some as yet unknown population dynamic or oceanographic and prey availability dynamics.

Comment 81: One commenter asserted that with respect to mortalities and serious injuries, NMFS' application of potential biological removal (PBR) is unclear and may not be consistent with its prior interpretations. The agency recognizes that PBR is a factor in determining whether the negligible impact threshold has been exceeded, but argues that, since PBR and negligible impact are different statutory standards, NMFS might find that an activity that kills marine mammals beyond what PBR could support would not necessarily exceed the negligible impact threshold. Regardless, however, of whether Congress intended PBR as a formal constraint on NMFS' ability to issue incidental take permits under section 101(a)(5), NMFS' own definition of ''negligible impact'' prevents it from authorizing mortalities or other takes that would threaten the sustainability of marine mammal stocks. Mortalities and serious injuries exceeding potential biological removal levels would do just that.

Additionally, in assessing the consequences of authorized mortality below PBR, NMFS applies an ''insignificance'' standard, such that any lethal take below 10 percent of residual PBR is presumed not to exceed the negligible impact threshold. This approach seems inconsistent, however, with the regulatory thresholds established for action under the commercial fisheries provision of the Act, where bycatch of 1 percent of total PBR triggers mandatory take reduction procedures for strategic marine mammal stocks. See 16 U.S.C. 1387(f)(1); 83 FR 5349, 5349 (Feb. 7, 2018). NMFS should clarify why it has chosen 10 percent rather than, for example, 1 percent as its ''insignificance'' threshold, at least for endangered species and other populations designated as strategic under the MMPA.

Response: NMFS disagrees that the consideration of PBR is unclear and notes that the narrative describing the application of PBR has been updated in this final rule to further explain how the agency considers this metric in the context of the negligible impact determination under section 101(a)(5)(A) (see the *Serious Injury and Mortality* sub-section of the *Analysis and Negligible Impact Determination* section) and is not repeated here. That discussion includes how PBR is calculated and therefore how it is possible for anticipated M/SI to exceed PBR or residual PBR and yet not adversely affect a particular species or stock through effects on annual rates of recruitment and survival.

Regarding the insignificance threshold, as explained in the rule, residual PBR is a metric that can be used to inform the assessment of M/SI impacts, and the insignificance threshold is an analytical tool to help prioritize analyst effort. But the insignificance threshold is not applied as a strict presumption as described by the commenter. Although it is true that as a general matter M/SI that is less than 10 percent of residual PBR should have no effect on rates of recruitment or survival, the agency will consider whether there are other factors that should be considered, such as whether an UME is affecting the species or stock.

The 10 percent insignificance threshold is an analytical tool that indicates that the potential mortality or serious injury is an insignificant incremental increase in anthropogenic mortality and serious injury that alone (in the absence of any other take and any other unusual circumstances) would clearly not affect rates of recruitment or survival. As such, potential mortality and serious injury at the insignificance-threshold level or below is evaluated in light of other relevant factors (such as an ongoing UME) and then considered in conjunction with any anticipated Level A or Level B harassment take to determine if the total take would affect annual rates of recruitment or survival. Ten percent was selected because it corresponds to the insignificance threshold under the MMPA framework for authorizing incidental take of marine mammals resulting from commercial fisheries. There the insignificance threshold, which also is 10 percent of PBR, is ''the upper limit of annual incidental mortality and serious injury of marine mammal stocks by commercial fisheries that can be considered insignificant levels approaching a zero mortality and serious injury rate'' (see 50 CFR 229.2). A threshold that represents an insignificant level of mortality or serious injury approaching a zero mortality and serious injury rate was thought to be an appropriate level to indicate when, absent other factors, the agency can be confident that expected mortality and serious injury will not affect annual rates of recruitment and survival, without the need for significant additional analysis.

Regarding the claim that NMFS' interpretation of PBR may be inconsistent with prior interpretations, we disagree. Rather, NMFS' interpretation of PBR has been utilized appropriately within the context of the different MMPA programs and associated statutory standards it has informed. The application of PBR under section 101(a)(5)(A) also has developed and been refined in response to litigation and as the amount of and nature of M/SI requested pursuant to this section has changed over time, thereby calling for the agency to take a closer look at how M/SI relative to PBR relates to effects on rates of recruitment and survival. Specifically, until recently, NMFS had used PBR relatively few times to support determinations outside of the context of MMPA commercial fisheries assessments and decisions. Indeed, in *Georgia Aquarium, Inc.* v. *Pritzker,* 135 F. Supp.3d 1280 (N.D. Ga. 2015), in ruling on a lawsuit in which the plaintiffs sought to use PBR as the reason they should be allowed to import animals from the Sahklin-Amur stock of beluga whales for public display, the Court summarized a ''handful'' of cases where NMFS had used PBR to support certain agency findings. The Court agreed that the agency does not have a ''practice and policy'' of applying PBR in all circumstances. Importantly, the Court stated that ''NMFS has shown that where the Agency has considered PBR outside of the U.S. commercial fisheries context, it has treated PBR as only one 'quantitative tool' and that it is not used as the sole basis for its impact analyses,'' just as NMFS has done here for its negligible impact analyses.

The examples considered by the *Georgia Aquarium* Court involved scientific research permits or subsistence harvest decisions where reference to PBR was one consideration among several. Thus, in one of the examples referenced by the Court, PBR was included to evaluate different alternatives in a 2007 EIS developed in support of future grants and permits related to research on northern fur seals and Steller sea lions (*available at https://repository.library.noaa.gov/view/noaa/17331*). Similarly, in the 2015 draft EIS on the Makah Tribe's request to hunt gray whales, different levels of harvest were compared against PBR along with other considerations in the various alternatives (*available at https://www.westcoast.fisheries.noaa.gov/publications/protected_species/marine_mammals/cetaceans/gray_whales/makah_deis_feb_2015.pdf*). Consistent with what the *Georgia Aquarium* Court found, in both of those documents PBR was one consideration in developing alternatives for the agency's EIS and not determinative in any decision-making process.

After 2013 in response to an incidental take authorization request from NMFS' Southwest Fisheries Science Center that contained PBR analysis and more particularly in response to a District Court's March 2015 ruling that NMFS' failure to consider PBR when evaluating lethal take under section 101(a)(5)(A) violated the requirement to use the best available science (see *Conservation Council for Hawaii* v. *National Marine Fisheries Service,* 97 F. Supp.3d 1210 (D. Haw. 2015)), NMFS began to systematically consider the role of PBR when evaluating the effects of M/SI during section 101(a)(5)(A) rulemakings. Previously, in 1996 shortly after the PBR metric was first introduced, NMFS denied a request from the U.S. Coast Guard for an incidental take authorization for their vessel and aircraft operations, seemingly solely on the basis of the potential for ship strike in relation to PBR. The decision did not appear to consider other factors that might also have informed the potential for ship strike of a North Atlantic right whale in relation to the negligible impact standard.

During the following years and until the Court's decision in *Conservation Council* and the agency issuing the proposed incidental take authorization for the Southwest Fisheries Science Center, NMFS issued incidental take regulations without referencing PBR. Thereafter, however, NMFS began considering and articulating the appropriate role of PBR when processing incidental take requests for M/SI under section 101(a)(5)(A). Consistent with the interpretation of PBR across the rest of the agency, NMFS' Permits and Conservation Division has been using PBR as a tool to inform the negligible impact analysis under section 101(a)(5)(A), recognizing that it is not a dispositive threshold that automatically determines whether a given amount of M/SI either does or does not exceed a negligible impact on the affected species or stock.

Comment 82: A commenter commented that NMFS failed to adequately assess the aggregate effects of all of the Navy's activities included in the rule. The commenter alleges that NMFS' lack of analysis of these aggregate impacts, which is essential to any negligible impact determination, represents a glaring omission from the proposed rule. While NMFS states that Level B behavioral harassment (aside from those caused by masking effects) involves a stress response that may contribute to an animal's allostatic load, it assumes without further analysis that any such impacts would be insignificant.

Response: NMFS did analyze the potential for aggregate effects from mortality, injury, masking, habitat effects, energetic costs, stress, hearing loss, and behavioral harassment from the Navy's activities in reaching the negligible impact determinations. Significant additional discussion has been added to the *Analysis and Negligible Impact Determination* section of the final rule to better explain the potential for aggregate or cumulative effects on individuals as well as how these effects on individuals relate to potential effects on annual rates of recruitment and survival for each species or stock.

In addition, NMFS fully considers the potential for aggregate effects from all Navy activities. We also consider UMEs and previous environmental impacts, where appropriate, to inform the baseline levels of both individual health and susceptibility to additional stressors, as well as stock status. Further, the species and stock-specific assessments in the *Analysis and Negligible Impact Determination* section (which have been updated and expanded) pull together and address the combined mortality, injury, behavioral harassment, and other effects of the aggregate HSTT activities (and in consideration of applicable mitigation) as well as other information that supports our determinations that the Navy activities will not adversely affect any species or stocks via impacts on rates of recruitment or survival. We refer the reader to the *Analysis and Negligible Impact Determination* section for this analysis.

Widespread, extensive monitoring since 2006 on Navy ranges that have been used for training and testing for decades has demonstrated no evidence of population-level impacts. Based on the best available research from NMFS and Navy-funded marine mammal studies, there is no evidence that ''population-level harm'' to marine mammals, including beaked whales, is occurring in the HSTT Study Area. The presence of numerous small, resident populations of cetaceans, documented high abundances, and populations trending to increase for many marine mammals species in the area suggests there are not likely population-level consequences resulting from decades of ongoing Navy training and testing activities. Through the process described in the rule and the LOAs, the Navy will work with NMFS to assure that the aggregate or cumulative impacts remain at the negligible impact level.

Regarding the consideration of stress responses, NMFS does not assume that the impacts are insignificant. There is currently neither adequate data nor mechanism by which the impacts of stress from acoustic exposure can be reliably and independently quantified. However, stress effects that result from noise exposure likely often occur concurrently with behavioral harassment and many are likely captured and considered in the quantification of other takes by harassment that occur when individuals come within a certain distance of a sound source (behavioral harassment, PTS, and TTS).

Comment 83: Some Commenters asserted that in reaching our MMPA negligible impact finding, NMFS did not adequately consider the cumulative impacts of the Navy's activities when combined with the effects of other non-Navy activities.

Response: Both the statute and the agency's implementing regulations call for analysis of the effects of the applicant's activities on the affected species and stocks, not analysis of other unrelated activities and their impacts on the species and stocks. That does not mean, however, that effects on the species and stocks caused by other non-Navy activities are ignored. The preamble for NMFS' implementing regulations under section 101(a)(5) (54 FR 40338; September 29, 1989) explains in response to comments that the impacts from other past and ongoing anthropogenic activities are to be incorporated into the negligible impact analysis via their impacts on the environmental baseline. Consistent with that direction, NMFS has factored into its negligible impact analyses the impacts of other past and ongoing anthropogenic activities via their impacts on the baseline (*e.g.,* as reflected in the density/distribution and status of the species, population size and growth rate, and other relevant stressors (such as incidental mortality in commercial fisheries or UMEs)). See the *Analysis and Negligible Impact Determination* section of this rule.

Our 1989 final rule for the MMPA implementing regulations also addressed public comments regarding cumulative effects from future, unrelated activities. There we stated that such effects are not considered in making findings under section 101(a)(5) concerning negligible impact. We indicated that NMFS would consider cumulative effects that are reasonably foreseeable when preparing a NEPA analysis and also that reasonably foreseeable cumulative effects would be considered under section 7 of the ESA for ESA-listed species.

Also, as described further in the *Analysis and Negligible Impact Determination* section of the final rule, NMFS evaluated the impacts of HSTT authorized mortality on the affected stocks in consideration of other anticipated human-caused mortality, including the mortality predicted in the SARs for other activities along with other NMFS-permitted mortality (*i.e.,* authorized as part of the Southwest Fisheries Science Center rule), using multiple factors, including PBR. As described in more detail in the *Analysis and Negligible Impact Determination* section, PBR was designed to identify the maximum number of animals that may be removed from a stock (not including natural mortalities) while allowing that stock to reach or maintain its OSP and is also helpful in informing whether mortality will adversely affect annual rates of recruitment or survival in the context of a section 101(a)(5)(A).

NEPA

Comment 84: Commenters commented that NMFS cannot rely on the Navy's HSTT FEIS/OEIS to fulfill its obligations under NEPA because the purpose and need is too narrow and does not support NMFS' MMPA action, and therefore the HSTT FEIS/OEIS does not explore a reasonable range of alternatives.

Response: The proposed action at issue is the Navy's proposal to conduct testing and training activities in the HSTT Study Area. 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 HSTT FEIS/OEIS 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 HSTT FEIS/OEIS 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 development of the HSTT EIS/OEIS and role in evaluating the effects of incidental take under the MMPA ensured that the HSTT DEIS/OEIS would include adequate analysis of a reasonable range of alternatives. The HSTT FEIS/OEIS 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, if the authorization may be issued, 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 EIS, including the purpose and need statement and range of alternatives, and determined that the HSTT FEIS/OEIS fully satisfies NMFS' NEPA obligations related to its decision to issue the MMPA final rule and associated LOAs, and we have adopted it.

Endangered Species Act

Comment 85: A commenter commented that under the ESA NMFS has the discretion to impose terms, conditions, and mitigation on any authorization. They believe the proposed action clearly affects listed whales, sea turtles, and Hawaiian monk seals, triggering the duty to consult. The commenter urged NMFS to fully comply with the ESA and implement robust reasonable and prudent alternatives and conservation measures to avoid harm to endangered species and their habitats.

Response: NMFS has fully complied with the ESA. The agency consulted pursuant to section 7 of the ESA and NMFS' ESA Interagency Cooperation Division provided a biological opinion concluded that NMFS' action of issuing MMPA incidental take regulations for the Navy HSTT activities would not jeopardize the continued existence of any threatened or endangered species and nor would it adversely modify any designated critical habitat. The biological opinion may be viewed at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-military-readiness-activities.*

Description of Marine Mammals and Their Habitat in the Area of the Specified Activities

Marine mammal species and their associated stocks that have the potential to occur in the HSTT Study Area are presented in Table 13 along with an abundance estimate, an associated coefficient of variation value, and best/minimum abundance estimates. The Navy anticipates the take of 39 individual marine mammal species by Level A and B harassment incidental to training and testing activities from the use of sonar and other transducers, in-water detonations, air guns, and impact pile driving/vibratory extraction activities. In addition, the Navy requested authorization for ten serious injuries or mortalities combined of two marine mammal stocks from explosives, and three takes of large whales by serious injury or mortality from vessel strikes over the five-year period. Two marine mammal species, the Hawaiian monk seal and the Main Hawaiian Islands Insular false killer whale, have critical habitat designated under the ESA in the HSTT Study Area (described below).

The species considered but not carried forward for analysis are two American Samoa stocks of spinner dolphins—(1) the Kure and Midway stock and (2) the Pearl and Hermes stock. There is no potential for overlap with any stressors from Navy activities and therefore there would be no incidental takes, in which case, these stocks are not considered further.

We presented a detailed discussion of marine mammals and their occurrence in the planned action area, inclusive of ESA-designated critical habitat, BIAs, National Marine Sanctuaries, and unusual mortality events (UMEs) in our **Federal Register** notice of proposed rulemaking (83 FR 29872; June 26, 2018); please see that notice of proposed rulemaking or the Navy's application for more information. There have been no changes or new information on BIAs and National Marine Sanctuaries since publication of the proposed rule; therefore, they are not discussed further. Additional information on certain ESA-designated critical habitat and UMEs has become available and so both of these topics are discussed following Table 13.

TABLE 13—MARINE MAMMAL OCCURRENCE WITHIN THE HSTT STUDY AREA

Common name	Scientific name	Stock	Status		Occurrence	Seasonal absence	Stock abundance (CV)/minimum population
			MMPA	ESA			
Blue whale	*Balaenoptera musculus*.	Eastern North Pacific.	Strategic, Depleted.	Endangered	Southern California.		1,647 (0.07)/1,551
		Central North Pacific.	Strategic, Depleted.	Endangered	Hawaii	Summer	133 (1.09)/63
Bryde's whale	*Balaenoptera brydei/edeni*.	Eastern Tropical Pacific.			Southern California.		unknown
		Hawaii			Hawaii		1,751 (0.29)/1,378
Fin whale	*Balaenoptera physalus*.	CA/OR/WA	Strategic, Depleted.	Endangered	Southern California.		9,029 (0.12)/8,127
		Hawaii	Strategic, Depleted.	Endangered	Hawaii	Summer	154 (1.05)/75
Gray whale	*Eschrichtius robustus*.	Eastern North Pacific.			Southern California.		26,960 (0.05)/25,849
		Western North Pacific.	Strategic, Depleted.	Endangered	Southern California.		175 (0.05)/167
Humpback whale.	*Megaptera novaeangliae*.	CA/OR/WA	Strategic, Depleted.	Threatened/Endangered [1]	Southern California.		2,900 (0.03)/2,784
		Central North Pacific.	Strategic		Hawaii	Summer	10,103 (0.30)/7,891
Minke whale	*Balaenoptera acutorostrata*.	CA/OR/WA			Southern California.		636 (0.72)/369
		Hawaii			Hawaii	Summer	unknown
Sei whale	*Balaenoptera borealis*.	Eastern North Pacific.	Strategic, Depleted.	Endangered	Southern California.		519 (0.4)/374
		Hawaii	Strategic, Depleted.	Endangered	Hawaii	Summer	391 (0.90)/204
Sperm whale	*Physeter macrocephalus*.	CA/OR/WA	Strategic, Depleted.	Endangered	Southern California.		1,997 (0.57)/1,270
		Hawaii	Strategic, Depleted.	Endangered	Hawaii		4,559 (0.33)/3,478
Pygmy sperm whale.	*Kogia breviceps*	CA/OR/WA			Southern California.	Winter and Fall	4,111 (1.12)/1,924
		Hawaii			Hawaii		unknown
Dwarf sperm whale.	*Kogia sima*	CA/OR/WA			Southern California.		unknown
		Hawaii			Hawaii		unknown
Baird's beaked whale.	*Berardius bairdii*	CA/OR/WA			Southern California.		2,697 (0.6)/1,633
Blainville's beaked whale.	*Mesoplodon densirostris*.	Hawaii			Hawaii		2,105 (1.13)/980
Cuvier's beaked whale.	*Ziphius cavirostris*	CA/OR/WA			Southern California.		3,274 (0.67)/2,059
		Hawaii			Hawaii		723 0.69/428
Longman's beaked whale.	*Indopacetus pacificus*.	Hawaii			Hawaii		7,619 (0.66)/4,592
Mesoplodon beaked whales.	*Mesoplodon spp*	CA/OR/WA			Southern California.		3,044 (0.54)/1,967
Common Bottlenose dolphin.	*Tursiops truncatus*	California Coastal.			Southern California.		453 (0.06)/346
		CA/OR/WA Offshore.			Southern California.		1,924 (0.54)/1,255
		Hawaii Pelagic			Hawaii		21,815 (0.57)/13.957
		Kauai and Niihau.			Hawaii		NA NA/97
		Oahu			Hawaii		NA
		4-Islands			Hawaii		NA
		Hawaii Island			Hawaii		NA NA/91
False killer whale.	*Pseudorca crassidens*.	Main Hawaiian Islands Insular.	Strategic, Depleted.	Endangered	Hawaii		167 (0.14)/149

TABLE 13—MARINE MAMMAL OCCURRENCE WITHIN THE HSTT STUDY AREA—Continued

Common name	Scientific name	Stock	Status		Occurrence	Seasonal absence	Stock abundance (CV)/minimum population
			MMPA	ESA			
		Hawaii Pelagic			Hawaii		1,540 (0.66)/928
		Northwestern Hawaiian Islands.			Hawaii		617 (1.11)/290
Fraser's dolphin.	*Lagenodelphis hosei*.	Hawaii			Hawaii		51,491 (0.66)/31,034
Killer whale	*Orcinus orca*	Eastern North Pacific Offshore.			Southern California.		300 (0.1)/276
		Eastern North Pacific Transient/West Coast Transient[2].			Southern California.		243 unknown/243
		Hawaii			Hawaii		146 (0.96)/74
Long-beaked common dolphin.	*Delphinus capensis*.	California			Southern California.		101,305 (0.49)/68,432
Melon-headed whale.	*Peponocephala electra*.	Hawaiian Islands.			Hawaii		8,666 (1.00)/4,299
		Kohala Resident.			Hawaii		447 (0.12)/404
Northern right whale dolphin.	*Lissodelphis borealis*.	CA/OR/WA			Southern California.		26,556 (0.44)/18,608
Pacific white-sided dolphin.	*Lagenorhynchus obliquidens*.	CA/OR/WA			Southern California.		26,814 (0.28)/21,195
Pantropical spotted dolphin.	*Stenella attenuata*	Oahu			Hawaii		unknown
		4-Islands			Hawaii		unknown
		Hawaii Island			Hawaii		unknown
		Hawaii Pelagic			Hawaii		55,795 (0.40)/40,338
Pygmy killer whale.	*Feresa attenuata*	Tropical			Southern California.	Winter & Spring.	unknown
		Hawaii			Hawaii		10,640 (0.53)/6,998
Risso's dolphins.	*Grampus griseus*	CA/OR/WA			Southern California.		6,336 (0.32)/4,817
		Hawaii			Hawaii		11,613 (0.43)/8,210
Rough-toothed dolphin.	*Steno bredanensis*	NSD[3]			Southern California.		unknown
		Hawaii			Hawaii		72,528 (0.39)/52,833
Short-beaked common dolphin.	*Delphinus delphis*	CA/OR/WA			Southern California.		969,861 (0.17)/839,325
Short-finned pilot whale.	*Globicephala macrorhynchus*.	CA/OR/WA			Southern California.		836 (0.79)/466
		Hawaii			Hawaii		19,503 (0.49)/13,197
Spinner dolphin	*Stenella longirostris*.	Hawaii Pelagic			Hawaii		unknown
		Hawaii Island			Hawaii		665 (0.09)/617
		Oahu and 4-Islands.			Hawaii		NA
		Kauai and Niihau.			Hawaii		NA
		Kure and Midway.			Hawaii		unknown
		Pearl and Hermes.			Hawaii		unknown
Striped dolphin	*Stenella coeruleoalba*.	CA/OR/WA			Southern California.		29,211 (0.20)/24,782

TABLE 13—MARINE MAMMAL OCCURRENCE WITHIN THE HSTT STUDY AREA—Continued

Common name	Scientific name	Stock	Status		Occurrence	Seasonal absence	Stock abundance (CV)/minimum population
			MMPA	ESA			
		Hawaii			Hawaii		61,021 (0.38)/44,922
Dall's porpoise	*Phocoenoides dalli*	CA/OR/WA			Southern California.		25,750 (0.45)/17,954
Harbor seal	*Phoca vitulina*	California			Southern California.		30,968 NA/27,348
Hawaiian monk seal.	*Neomonachus schauinslandi*.	Hawaii	Strategic, Depleted.	Endangered	Hawaii		1,415 (0.03)/1,384
Northern elephant seal.	*Mirounga angustirostris*.	California			Southern California.		179,000 NA/81,368
California sea lion.	*Zalophus californianus*.	U.S. Stock			Southern California.		257,606 NA/233,515
Guadalupe fur seal.	*Arctocephalus townsendi*.	Mexico to California.	Strategic, Depleted.	Threatened	Southern California.		20,000 NA/15,830
Northern fur seal.	*Callorhinus ursinus*.	California			Southern California.		14,050 NA/7,524

[1] The two humpback whale Distinct Population Segments making up the California, Oregon, and Washington stock present in Southern California are the Mexico Distinct Population Segment, listed under the ESA as Threatened, and the Central America Distinct Population Segment, which is listed under the ESA as Endangered.

[2] This stock is mentioned briefly in the Pacific Stock Assessment Report (Carretta *et al.,* 2017) and referred to as the ''Eastern North Pacific Transient'' stock; however, the Alaska Stock Assessment Report contains assessments of all transient killer whale stocks in the Pacific and the Alaska Stock Assessment Report refers to this same stock as the ''West Coast Transient'' stock (Muto *et al.,* 2017).

[3] NSD—No stock designation. Rough-toothed dolphin has a range known to include the waters off Southern California, but there is no recognized stock or data available for the U.S. West Coast.

The proposed rule (83 FR 29909, June 26, 2018) includes a description of ESA designated critical habitat, BIAs, National Marine Sanctuaries, and unusual mortality events that are applicable in the HSTT Study area and that material remains applicable and is not repeated here. However, we do include information where anything has changed. In this case, since the proposed rule was published, ESA designated critical habitat for main Hawaiian Islands insular false killer whales was finalized and new information regarding the California sea lion UME became available.

Critical habitat for the ESA-listed Main Hawaiian Islands insular false killer whale DPS was finalized in July 2018 (83 FR 35062; July 24, 2018) designating waters from the 45 m depth contour to the 3,200 m depth contour around the main Hawaiian Islands from Niihau east to Hawaii. This designation does not include most bays, harbors, or coastal in-water structures. NMFS excluded 14 areas (one area, with two sites, for the Bureau of Ocean Energy Management and 13 areas requested by the Navy) from the critical habitat designation because it was determined that the benefits of exclusion outweighed the benefits of inclusion, and exclusion would not result in extinction of the species. In addition, two areas, the Ewa Training Minefield and the Naval Defensive Sea Area, were ineligible for designation because they are managed under the Joint Base Pearl Harbor-Hickam Integrated Natural Resources Management Plan that was found to benefit main Hawaiian Islands insular false killer whales. The total area designated was approximately 45,504 km^2 (17,564 mi^2) of marine habitat and the designation stresses the importance of protecting: adequate space for movement and use; prey species of sufficient quantity, quality, and availability to support growth and reproduction; waters free of harmful types and amounts of pollutants; and sound levels that would not significantly impair false killer whale use or occupancy.

Regarding the California sea lion UME, although this UME has not been closed, NMFS staff recently confirmed that the mortality of pups and yearlings returned to normal in 2017 and 2018 and they plan to present it to the Working Group to discuss closure by the end of 2018 (Deb Fauquier, pers. comm.). Please refer to the proposed rule (83 FR 29872; June 26, 2018) and NMFS' website at *https://www.fisheries.noaa.gov/national/marine-life-distress/2013-2017-california-sea-lion-unusual-mortality-event-california* for more information on this UME.

Potential Effects of Specified Activities on Marine Mammals and Their Habitat

We provided a summary and discussion of the potential effects of the specified activity on marine mammals and their habitat in our **Federal Register** notice of proposed rulemaking (83 FR 29872; June 26, 2018). In the *Potential Effects of Specified Activities on Marine Mammals and Their Habitat* section of the proposed rule, NMFS provided a description of the ways marine mammals may be affected by these activities in the form 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. Therefore, we do not reprint the information here but refer the reader to that document. For additional summary and discussion of recent scientific studies not included in the proposed rulemaking, we direct the reader to the HSTT FEIS/OEIS (Chapter 3, Section 3.7 *Marine Mammals, http://www.hstteis.com/*), which NMFS participated in the development of via our cooperating agency status and adopted to meet our NEPA requirements. We highlight several studies below, but direct the reader to the HSTT FEIS/OEIS for a full compilation. As noted above, NMFS has reviewed and accepted the Navy's compilation and interpretation of the best available science contained in the HSTT FEIS/OEIS. More specifically, we have independently reviewed the more recent studies that were not included in NMFS' proposed rule, have concluded that the Navy's descriptions and interpretations of those studies in the

FEIS/OEIS are accurate, and have taken those studies into consideration in our analyses that inform our negligible impact determinations. Importantly, we note that none of the newer information highlighted here or in the HSTT FEIS/OEIS affects our analysis in a manner that changes our determinations under the MMPA from the proposed rule.

The Acoustic Technical Guidance (NMFS, 2018), which was used in the assessment of effects for this action, compiled, interpreted, and synthesized the best available scientific information for noise-induced hearing effects for marine mammals to derive updated thresholds for assessing the impacts of noise on marine mammal hearing. New data on killer whale hearing (Branstetter *et al.,* 2017), harbor porpoise hearing (Kastelein *et al.,* 2017a), harbor porpoise threshold shift (TS) in response to airguns (Kastelein *et al.,* 2017b) and mid-frequency sonar (Kastelein *et al.,* 2017c), and harbor seal TS in response to pile-driving sounds (Kastelein *et al.,* 2018) are consistent with data included and thresholds presented in the Acoustic Technical Guidance.

Recent studies with captive odontocete species (bottlenose dolphin, harbor porpoise, beluga, and false killer whale) have observed increases in hearing threshold levels when individuals received a warning sound prior to exposure to a relatively loud sound (Finneran, 2018; Nachtigall and Supin, 2013, 2015; Nachtigall *et al.,* 2016a,b,c; Nachtigall, *et al.,* 2018). These studies suggest that captive animals have a mechanism to reduce hearing sensitivity prior to impending loud sounds. Hearing change was observed to be frequency dependent and Finneran (2018) suggests hearing attenuation occurs within the cochlea or auditory nerve. Based on these observations on captive odontocetes, the authors suggest that wild animals may have a mechanism to self-mitigate the impacts of noise exposure by dampening their hearing during prolonged exposures of loud sound, or if conditioned to anticipate intense sounds (Finneran, 2018, Nachtigall *et al.,* 2018).

Recent reviews have synthesized data from experimental studies examining marine mammal behavioral response to anthropogenic sound, and have documented large variances in individual behavioral responses to anthropogenic sound both within and among marine mammal species. These reviews highlight the importance of the 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. As described in the proposed rule, in a review of experimental field studies to measure behavioral responses of cetaceans to sonar, Southall *et al.* (2016) observed that some individuals of different species display clear yet varied responses (some of which have negative implications), while others appear to tolerate high levels. Results from the studies they investigated demonstrate that responses are highly variable and may not be fully predictable with simple acoustic exposure metrics (*e.g.,* received sound level). Rather, differences among species and individuals along with contextual aspects of exposure (*e.g.,* behavioral state) appear to affect response probability (Southall *et al.,* 2016). Dunlop *et al.* (2018) combined data from the BRAHSS (Behavioural Response of Australian Humpback whales to Seismic Surveys) studies designed to examine the behavioral responses of migrating humpback whales to various seismic array sources to develop a dose-response model. The model accounted for other variables such as presence of the vessel, array towpath relative to the migration, and social and environmental parameters. Authors observed that whales were more likely to avoid the airgun or array (defined by increasing their distance from the source) when they were exposed to sounds greater than 130 dB re 1 $\mu Pa^2 \cdot s$ and they were within 4 km of the source (Dunlop *et al.,* 2018). At sound exposure levels of 150–155 dB re 1 $\mu Pa^2 \cdot s$ and less than 2.5 km from the source the model predicted a 50 percent probability of response (Dunlop *et al.,* 2018). However, it was not possible to estimate the maximum response threshold as at the highest received levels of 160–170 dB re 1 $\mu Pa^2 \cdot s$, a small number of whales moving rapidly and close to the source did not exhibit an avoidance response as defined by the study (Dunlop *et al.,* 2018).

Estimated Take of Marine Mammals

This section indicates the number of takes that NMFS is authorizing, which are based on the amount of take that NMFS anticipates could occur or is likely to occur, depending on the type of take and the methods used to estimate it, as described in detail below. NMFS coordinated closely with the Navy in the development of their incidental take application, and with one limited exception, agrees that the methods the Navy put forth in their application to estimate take (including the model, thresholds, and density estimates), and the resulting numbers are based on the best available science and appropriate for authorization. As noted elsewhere, additional discussion and subsequent analysis led both NMFS and the Navy, in coordination, to conclude that different take estimates for serious injury or mortality from vessel strikes were appropriate, and where those numbers differ from the Navy's application or our proposed rule, NMFS has explicitly described our rationale and indicated what we consider an appropriate number of takes.

Takes are predominantly in the form of harassment, but a small number of serious injuries or mortalities are also authorized. 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 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).

Authorized takes would primarily be in the form of Level B harassment, as use of the acoustic and explosive sources (*i.e.,* sonar, air guns, pile driving, explosives) is more likely to result in the disruption of natural behavioral patterns to a point where they are abandoned or significantly altered (as defined specifically in the paragraph above, but referred to generally as behavioral disruption) or TTS for marine mammals than other forms of take. There is also the potential for Level A harassment, however, in the form of auditory injury and/or tissue damage (the latter from explosives only) to result from exposure to the sound sources utilized in training and testing activities. Lastly, a limited number of serious injuries or mortalities could occur for California sea lion and short-beaked common dolphin (10 mortalities total between the two species over a five year period) from explosives, and no more than three serious injuries or mortalities total (over the five-year period) of large whales through vessel collisions. Although we analyze the impacts of these potential serious injuries or mortalities that are authorized, the required mitigation and monitoring measures are expected to minimize the likelihood that ship strike or these high level explosive exposures (and the associated serious injury or mortality) actually occur.

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 Level B harassment (in this case, as defined in the military readiness definition of Level B harassment included above) 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 and present the take estimate.

Acoustic Thresholds

Using the best available science, NMFS, in coordination with the Navy, has established acoustic thresholds that identify the most appropriate received level of underwater sound above which marine mammals exposed to these sound sources could be reasonably expected to experience a disruption in behavior patterns to a point where they are abandoned or significantly altered, or to incur TTS (equated to Level B harassment) or PTS of some degree (equated to Level A harassment). Thresholds have also been developed to identify the pressure levels above which animals may incur non-auditory injury from exposure to pressure waves from explosive detonation.

Despite the quickly evolving science, there are still challenges in quantifying expected behavioral responses that qualify as Level B harassment, especially where the goal is to use one or two predictable indicators (*e.g.,* received level and distance) to predict responses that are also driven by additional factors that cannot be easily incorporated into the thresholds (*e.g.,* context). So, while the new Level B behavioral harassment thresholds have been refined here to better consider the best available science (*e.g.,* incorporating both received level and distance), they also still, accordingly, have some built-in conservative factors to address the challenge noted. For example, while duration of observed responses in the data are now considered in the thresholds, some of the responses that are informing take thresholds are of a very short duration, such that it is possible some of these responses might not always rise to the level of disrupting behavior patterns to a point where they are abandoned or significantly altered. We describe the application of this Level B behavioral 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. In summary, we believe these Level B behavioral harassment thresholds are the most appropriate method for predicting Level B behavioral harassment given the best available science and the associated uncertainty. Hearing Impairment (TTS/PTS and Tissues Damage and Mortality)

Non-Impulsive and Impulsive

NMFS' Acoustic Technical Guidance (NMFS, 2018) identifies dual criteria to assess auditory injury (Level A harassment) to five different marine mammal groups (based on hearing sensitivity) as a result of exposure to noise from two different types of sources (impulsive or non-impulsive). The Acoustic Technical Guidance also identifies criteria to predict TTS, which is not considered injury and falls into the Level B harassment category. The Navy's planned activity includes the use of non-impulsive (sonar, vibratory pile driving/removal) and impulsive (explosives, airguns, impact pile driving) sources.

These thresholds (Tables 14–15) were developed by compiling and synthesizing the best available science and soliciting input multiple times from both the public and peer reviewers. The references, analysis, and methodology used in the development of the thresholds are described in Acoustic Technical Guidance, which may be accessed at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance.*

TABLE 14—ACOUSTIC THRESHOLDS IDENTIFYING THE ONSET OF TTS AND PTS FOR NON-IMPULSIVE SOUND SOURCES BY FUNCTIONAL HEARING GROUPS

Functional hearing group	Non-impulsive	
	TTS threshold SEL (weighted)	PTS threshold SEL (weighted)
Low-Frequency Cetaceans	179	199
Mid-Frequency Cetaceans	178	198
High-Frequency Cetaceans	153	173
Phocid Pinnipeds (Underwater)	181	201
Otarid Pinnipeds (Underwater)	199	219

Note: SEL thresholds in dB re 1 μPa²s.

Based on the best available science, the Navy (in coordination with NMFS) used the acoustic and pressure thresholds indicated in Table 15 to predict the onset of TTS, PTS, tissue damage, and mortality for explosives (impulsive) and other impulsive sound sources.

TABLE 15—ONSET OF TTS, PTS, TISSUE DAMAGE, AND MORTALITY THRESHOLDS FOR MARINE MAMMALS FOR EXPLOSIVES AND OTHER IMPULSIVE SOURCES

Functional hearing group	Species	Onset TTS	Onset PTS	Mean onset slight GI tract injury	Mean onset slight lung injury	Mean onset mortality
Low-frequency cetaceans	All mysticetes	168 dB SEL (weighted) or 213 dB Peak SPL.	183 dB SEL (weighted) or 219 dB Peak SPL.	237 dB Peak SPL.	Equation 1 ..	Equation 2.

TABLE 15—ONSET OF TTS, PTS, TISSUE DAMAGE, AND MORTALITY THRESHOLDS FOR MARINE MAMMALS FOR EXPLOSIVES AND OTHER IMPULSIVE SOURCES—Continued

Functional hearing group	Species	Onset TTS	Onset PTS	Mean onset slight GI tract injury	Mean onset slight lung injury	Mean onset mortality
Mid-frequency cetaceans	Most delphinids, medium and large toothed whales.	170 dB SEL (weighted) or 224 dB Peak SPL.	185 dB SEL (weighted) or 230 dB Peak SPL.	237 dB Peak SPL.		
High-frequency cetaceans	Porpoises and *Kogia spp*	140 dB SEL (weighted) or 196 dB Peak SPL.	155 dB SEL (weighted) or 202 dB Peak SPL.	237 dB Peak SPL.		
Phocidae	Harbor seal, Hawaiian monk seal, Northern elephant seal.	170 dB SEL (weighted) or 212 dB Peak SPL.	185 dB SEL (weighted) or 218 dB Peak SPL.	237 dB Peak SPL.		
Otariidae	California sea lion, Guadalupe fur seal, Northern fur seal.	188 dB SEL (weighted) or 226 dB Peak SPL.	203 dB SEL (weighted) or 232 dB Peak SPL.	237 dB Peak SPL.		

Notes:
Equation 1: $47.5M^{1/3}(1+[D_{Rm}/10.1])^{1/6}$ Pa-sec.
Equation 2: $103M^{1/3}(1+[D_{Rm}/10.1])^{1/6}$ Pa-sec.
M = mass of the animals in kg.
D_{Rm} = depth of the receiver (animal) in meters.
SPL = sound pressure level.

Impulsive—Air Guns and Impact Pile Driving

Impact pile driving produces impulsive noise; therefore, the criteria used to assess the onset of TTS and PTS are identical to those used for air guns, as well as explosives (see Table 15 above) (see Hearing Loss from Air Guns in Chapter 6 Section 6.4.3.1, Methods for Analyzing Impacts from air guns in the Navy's rulemaking/LOA application). Refer to the *Criteria and Thresholds for U.S. Navy Acoustic and Explosive Effects Analysis (Phase III)* report (U.S. Department of the Navy, 2017c) for detailed information on how the criteria and thresholds were derived.

Non-Impulsive—Sonar and Vibratory Pile Driving/Removal

Vibratory pile removal (that will be used during the ELCAS) creates continuous non-impulsive noise at low source levels for a short duration. Therefore, the criteria used to assess the onset of TTS and PTS due to exposure to sonars (non-impulsive, see Table 14 above) are also used to assess auditory impacts to marine mammals from vibratory pile driving (see Hearing Loss from Sonar and Other Transducers in Chapter 6, Section 6.4.2.1, Methods for Analyzing Impacts from Sonars and Other Transducers in the Navy's rulemaking/LOA application). Refer to the *Criteria and Thresholds for U.S. Navy Acoustic and Explosive Effects Analysis (Phase III)* report (U.S. Department of the Navy, 2017c) for detailed information on how the criteria and thresholds were derived. Non-auditory injury (*i.e.,* other than PTS) and mortality from sonar and other transducers is so unlikely as to be discountable under normal conditions for the reasons explained in the proposed rule under *Potential Effects of Specified Activities on Marine Mammals and Their Habitat* section—*Acoustically Mediated Bubble Growth and other Pressure-related Injury* and is therefore not considered further in this analysis.

Behavioral Harassment

Though significantly driven by received level, the onset of Level B harassment by behavioral disturbance from anthropogenic noise exposure is also informed to varying degrees by other factors related to the source (*e.g.,* frequency, predictability, duty cycle), the environment (*e.g.,* bathymetry), and the receiving animals (hearing, motivation, experience, demography, behavioral context) and can be difficult to predict (Ellison *et al.,* 2011; Southall *et al.,* 2007). Based on what the available science indicates and the practical need to use thresholds based on a factor, or factors, that are both predictable and measurable for most activities, NMFS uses generalized acoustic thresholds based primarily on received level (and distance in some cases) to estimate the onset of Level B behavioral harassment.

Air Guns and Pile Driving

For air guns and pile driving, NMFS predicts that marine mammals are likely to be taken by Level B behavioral harassment when exposed to underwater anthropogenic noise above received levels of 120 dB re 1 μPa (rms) for continuous (*e.g.,* vibratory pile-driving, drilling) and above 160 dB re 1 μPa (rms) for non-explosive impulsive (*e.g.,* seismic air guns) or intermittent (*e.g.,* scientific sonar) sources. To estimate Level B behavioral harassment from air guns, the existing NMFS Level B harassment threshold of 160 dB re 1 μPa (rms) is used. The rms calculation for air guns is based on the duration defined by 90 percent of the cumulative energy in the impulse.

The existing NMFS Level B harassment thresholds were also applied to estimate Level B behavioral harassment from impact and vibratory pile driving (Table 16).

TABLE 16—PILE DRIVING LEVEL B HARASSMENT THRESHOLDS USED IN THIS ANALYSIS TO PREDICT BEHAVIORAL RESPONSES FROM MARINE MAMMALS

Pile driving criteria (SPL, dB re 1 μPa)	Level B harassment threshold
Underwater vibratory	Underwater impact
120 dB rms	160 dB rms.

Notes: Root mean square calculation for impact pile driving is based on the duration defined by 90 percent of the cumulative energy in the impulse. Root mean square for vibratory pile driving is calculated based on a representative time series long enough to capture the variation in levels, usually on the order of a few seconds. dB: decibel; dB re 1 μPa: decibel referenced to 1 micropascal; rms: root mean square.

Sonar

As noted above, the Navy coordinated with NMFS to propose Level B behavioral harassment thresholds specific to their military readiness activities utilizing active sonar. Behavioral response criteria are used to estimate the number of animals that may exhibit a behavioral response to sonar and other transducers. The way the criteria were derived is discussed in detail in the *Criteria and Thresholds for U.S. Navy Acoustic and Explosive Effects Analysis (Phase III)* report (U.S. Department of the Navy, 2017c). Developing the new Level B harassment behavioral criteria involved multiple steps. All peer-reviewed published behavioral response studies conducted both in the field and on captive animals were examined in order to understand the breadth of behavioral responses of marine mammals to sonar and other transducers. NMFS has carefully reviewed the Navy's Level B behavioral thresholds and establishment of cutoff distances for the species, and agrees that it is the best available science and is the appropriate method to use at this time for determining impacts to marine mammals from sonar and other transducers and for calculating take and to support the determinations made in the final rule.

As noted above, marine mammal responses to sound (some of which are considered disturbances that rise to the level of a take) are highly variable and context specific, *i.e.,* they are affected by differences in acoustic conditions; differences between species and populations; differences in gender, age, reproductive status, or social behavior; or other prior experience of the individuals. This means that there is support for considering alternative approaches for estimating Level B behavioral harassment. Although the statutory definition of Level B harassment for military readiness activities means that a natural behavior pattern of a marine mammal is significantly altered or abandoned, the current state of science for determining those thresholds is somewhat unsettled.

In its analysis of impacts associated with sonar acoustic sources (which was coordinated with NMFS), the Navy used an updated conservative approach that likely overestimates the number of takes by Level B harassment due to behavioral disturbance and response. Many of the behavioral responses identified using the Navy's quantitative analysis are most likely to be of moderate severity as described in the Southall *et al.* (2007) behavioral response severity scale. These ''moderate'' severity responses were considered significant if they were sustained for the duration of the exposure or longer. Within the Navy's quantitative analysis, many reactions are predicted from exposure to sound that may exceed an animal's Level B behavioral harassment threshold for only a single exposure (a few seconds) to several minutes, and it is likely that some of the resulting estimated behavioral responses that are counted as Level B harassment would not constitute ''significantly altering or abandoning natural behavioral patterns.'' The Navy and NMFS have used the best available science to address the challenging differentiation between significant and non-significant behavioral reactions (*i.e.,* whether the behavior has been abandoned or significantly altered such that it qualifies as harassment), but have erred on the cautious side where uncertainty exists (*e.g.,* counting these lower duration reactions as take), which likely results in some degree of overestimation of Level B behavioral harassment. We consider application of this Level B behavioral harassment threshold, therefore, 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 *Analysis and Negligible Impact Determination* section and are being authorized.

In the Navy's acoustic impact analyses during Phase II, the likelihood of Level B behavioral harassment in response to sonar and other transducers was based on a probabilistic function (termed a behavioral response function—BRF), that related the likelihood (*i.e.,* probability) of a behavioral response (at the level of a Level B harassment) to the received SPL. The BRF was used to estimate the percentage of an exposed population that is likely to exhibit Level B harassment due to altered behaviors or behavioral disturbance at a given received SPL. This BRF relied on the assumption that sound poses a negligible risk to marine mammals if they are exposed to SPL below a certain ''basement'' value. Above the basement exposure SPL, the probability of a response increased with increasing SPL. Two BRFs were used in Navy acoustic impact analyses: BRF1 for mysticetes and BRF2 for other species. BRFs were not used for beaked whales during Phase II analyses. Instead, a step function at an SPL of 140 dB re 1 μPa was used for beaked whales as the threshold to predict Level B harassment by behavioral disturbance. Of note, a separate step function at an SPL of 120 dB re 1 μPa was used for harbor porpoises in the 2013–2018 rule, but there are no harbor porpoises in the HSTT Study Area (and Dall's porpoises do not have the same behavioral sensitivities), so harbor porpoises are not discussed further.

Developing the new Level B behavioral harassment criteria for Phase III involved multiple steps: All available behavioral response studies conducted both in the field and on captive animals were examined to understand the breadth of behavioral responses of marine mammals to sonar and other transducers. Six behavioral response field studies with observations of 14 different marine mammal species reactions to sonar or sonar-like signals and 6 captive animal behavioral studies with observations of 8 different species reactions to sonar or sonar-like signals were used to provide a robust data set for the derivation of the Navy's Phase III marine mammal behavioral response criteria. All behavioral response research that has been published since the derivation of the Navy's Phase III criteria (c.a. December 2016) has been examined and is consistent with the current behavioral response functions. Marine mammal species were placed into behavioral criteria groups based on their known or suspected behavioral sensitivities to sound. In most cases these divisions were driven by taxonomic classifications (*e.g.,* mysticetes, pinnipeds). The data from the behavioral studies were analyzed by looking for significant responses, or lack thereof, for each experimental session.

The Navy used cutoff distances beyond which the potential of significant behavioral responses (and therefore Level B harassment) is considered to be unlikely (see Table 17 below). This was determined by examining all available published field observations of behavioral reactions to sonar or sonar-like signals that included the distance between the sound source and the marine mammal. The longest distance, rounded up to the nearest 5-km increment, was chosen as the cutoff distance for each behavioral criteria group (*i.e.,* odontocetes, mysticetes, pinnipeds, and beaked whales). For animals within the cutoff distance, a behavioral response function based on a received SPL as presented in Chapter 3, Section 3.1.0 of the Navy's rulemaking/ LOA application was used to predict the probability of a potential significant behavioral response. For training and testing events that contain multiple platforms or tactical sonar sources that exceed 215 dB re 1 μPa @1 m, this cutoff distance is substantially increased (*i.e.,* doubled) from values derived from the literature. The use of multiple platforms and intense sound sources are factors that probably increase responsiveness in marine mammals overall (however, we note that helicopter dipping sonars were considered in the intense sound source group, despite lower source levels, because of data indicating that marine mammals are sometimes more responsive to the less predictable employment of this source). There are currently few behavioral observations under these circumstances; therefore, the Navy conservatively predicted significant behavioral responses that would rise to Level B harassment at farther ranges as shown in Table 17, versus less intense events.

TABLE 17—CUTOFF DISTANCES FOR MODERATE SOURCE LEVEL, SINGLE PLATFORM TRAINING AND TESTING EVENTS AND FOR ALL OTHER EVENTS WITH MULTIPLE PLATFORMS OR SONAR WITH SOURCE LEVELS AT OR EXCEEDING 215 dB re 1 µPa @1 m

Criteria group	Moderate SIL/single platform cutoff distance (km)	High SL/multi-platform cutoff distance (km)
Odontocetes	10	20
Pinnipeds	5	10
Mysticetes	10	20
Beaked Whales	25	50

Note: dB re 1 µPa @1 m: Decibels referenced to 1 micropascal at 1 meter; km: Kilometer; SL: Source level.

The range to received sound levels in 6-dB steps from five representative sonar bins and the percentage of animals that may be taken by Level B harassment under each behavioral response function (or step function in the case of the harbor porpoise) are shown in Table 18 through Table 22. Cells are shaded if the mean range value for the specified received level exceeds the distance cutoff range for a particular hearing group and therefore are not included in the estimated take. See Chapter 6, Section 6.4.2.1.1 (Methods for Analyzing Impacts from Sonars and Other Transducers) of the Navy's rulemaking/LOA application for further details on the derivation and use of the behavioral response functions, thresholds, and the cutoff distances to identify takes by Level B harassment, which were coordinated with NMFS. Table 18 illustrates the maximum likely percentage of exposed individuals taken at the indicated received level and associated range (in which marine mammals would be reasonably expected to experience a disruption in behavior patterns to a point where they are abandoned or significantly altered) for LFAS. As noted previously, NMFS carefully reviewed, and contributed to, the Navy's proposed level B behavioral harassment thresholds and cutoff distances for the species, and agrees that these methods represent the best available science at this time for determining impacts to marine mammals from sonar and other transducers.

Table 18. Ranges to estimated Level B behavioral harassment takes for sonar bin LF5 over a representative range of environments within the HSTT Study Area.

Received Level (dB re 1 µPa-s)	*Average Range (m) (Minimum – Maximum)*	*Probability of Level B Behavioral Harassment for Sonar Bin LF5*			
		Odontocetes	*Mysticetes*	*Pinnipeds*	*Beaked Whales*
178	1 (1–1)	97%	59%	92%	100%
172	2 (1–2)	91%	30%	76%	99%
166	3 (1–5)	78%	20%	48%	97%
160	7 (1–13)	58%	18%	27%	93%
154	16 (1–30)	40%	17%	18%	83%
148	35 (1–85)	29%	16%	16%	66%
142	81 (1–230)	25%	13%	15%	45%
136	183 (1–725)	23%	9%	15%	28%
130	404 (1–1,525)	20%	5%	15%	18%
124	886 (1–3,025)	17%	2%	14%	14%
118	1,973 (725–5,775)	12%	1%	13%	12%
112	4,472 (900–18,275)	6%	0%	9%	11%
106	8,936 (900–54,525)	3%	0%	5%	11%
100	27,580 (900–88,775)	1%	0%	2%	8%

Note: Cells are shaded if the mean range value for the specified received level exceeds the distance cutoff range for a particular hearing group. Any impacts within the cutoff range for a criteria group are included in the estimated impacts. dB re 1 µPa2 - s: decibels referenced to 1 micropascal squared second; m: meters

Tables 19 through Table 21 identify the maximum likely percentage of exposed individuals taken at the indicated received level and associated range for MFAS.

Table 19. Ranges to estimated Level B behavioral harassment takes for sonar bin MF1 over a representative range of environments within the HSTT Study Area.

Received Level (dB re 1 µPa-s)	*Average Range (m) (Minimum – Maximum)*	*Probability of Level B Behavioral Harassment for Sonar Bin MF1*			
		Odontocetes	*Mysticetes*	*Pinnipeds*	*Beaked Whales*
196	109 (100–110)	100%	100%	100%	100%
190	239 (190–250)	100%	98%	99%	100%
184	502 (310–575)	99%	88%	98%	100%
178	1,024 (550–2,025)	97%	59%	92%	100%
172	2,948 (625–5,775)	91%	30%	76%	99%
166	6,247 (625–10,025)	78%	20%	48%	97%
160	11,919 (650–20,525)	58%	18%	27%	93%
154	20,470 (650–62,025)	40%	17%	18%	83%
148	33,048 (725–63,525)	29%	16%	16%	66%
142	43,297 (2,025–71,775)	25%	13%	15%	45%
136	52,912 (2,275–91,525)	23%	9%	15%	28%
130	61,974 (2,275–100,000*)	20%	5%	15%	18%
124	66,546 (2,275–100,000*)	17%	2%	14%	14%
118	69,637 (2,525–100,000*)	12%	1%	13%	12%
112	73,010 (2,525–100,000*)	6%	0%	9%	11%
106	75,928 (2,525–100,000*)	3%	0%	5%	11%
100	78,899 (2,525–100,000*)	1%	0%	2%	8%

Note: Cells are shaded if the mean range value for the specified received level exceeds the distance cutoff range for a particular hearing group. Any impacts within the cutoff range for a criteria group are included in the estimated impacts. dB re 1 µPa2 - s: decibels referenced to 1 micropascal squared second; m: meters

* Indicates maximum range to which acoustic model was run, a distance of approximately 100 kilometers from the sound source.

Table 20. Ranges to estimated Level B behavioral harassment takes for sonar bin MF4 over a representative range of environments within the HSTT Study Area.

Received Level (dB re 1 µPa-s)	*Average Range (m) (Minimum – Maximum)*	*Probability of Level B Behavioral Harassment for Sonar Bin MF4*			
		Odontocetes	*Mysticetes*	*Pinnipeds*	*Beaked Whales*
196	8 (1–8)	100%	100%	100%	100%
190	17 (1–17)	100%	98%	99%	100%
184	34 (1–35)	99%	88%	98%	100%
178	68 (1–75)	97%	59%	92%	100%
172	145 (130–300)	91%	30%	76%	99%
166	388 (270–875)	78%	20%	48%	97%
160	841 (470–1,775)	58%	18%	27%	93%
154	1,748 (700–6,025)	40%	17%	18%	83%
148	3,163 (1,025–13,775)	29%	16%	16%	66%
142	5,564 (1,275–27,025)	25%	13%	15%	45%
136	8,043 (1,525–54,275)	23%	9%	15%	28%
130	17,486 (1,525–65,525)	20%	5%	15%	18%
124	27,276 (1,525–84,775)	17%	2%	14%	14%
118	33,138 (2,775–85,275)	12%	1%	13%	12%
112	39,864 (3,775–100,000*)	6%	0%	9%	11%
106	45,477 (5,275–100,000*)	3%	0%	5%	11%
100	48,712 (5,275–100,000*)	1%	0%	2%	8%

Note: Cells are shaded if the mean range value for the specified received level exceeds the distance cutoff range for a particular hearing group. Any impacts within the cutoff range for a criteria group are included in the estimated impacts. dB re 1 µPa2 - s: decibels referenced to 1 micropascal squared second; m: meters

* Indicates maximum range to which acoustic model was run, a distance of approximately 100 kilometers from the sound source.

Table 21. Ranges to estimated Level B behavioral harassment takes for sonar bin MF5 over a representative range of environments within the HSTT Study Area.

Received Level (dB re 1 µPa-s)	Average Range (m) (Minimum – Maximum)	Probability of Level B Behavioral Harassment for Sonar Bin MF5			
		Odontocetes	Mysticetes	Pinnipeds	Beaked Whales
196	0 (0–0)	100%	100%	100%	100%
190	2 (1–3)	100%	98%	99%	100%
184	4 (1–7)	99%	88%	98%	100%
178	14 (1–15)	97%	59%	92%	100%
172	29 (1–30)	91%	30%	76%	99%
166	59 (1–70)	78%	20%	48%	97%
160	133 (1–340)	58%	18%	27%	93%
154	309 (1–950)	40%	17%	18%	83%
148	688 (430–2,275)	29%	16%	16%	66%
142	1,471 (650–4,025)	25%	13%	15%	45%
136	2,946 (700–7,525)	23%	9%	15%	28%
130	5,078 (725–11,775)	20%	5%	15%	18%
124	7,556 (725–19,525)	17%	2%	14%	14%
118	10,183 (725–27,775)	12%	1%	13%	12%
112	13,053 (725–63,025)	6%	0%	9%	11%
106	16,283 (1,025–64,525)	3%	0%	5%	11%
100	20,174 (1,025–70,525)	1%	0%	2%	8%

Note: Cells are shaded if the mean range value for the specified received level exceeds the distance cutoff range for a particular hearing group. Any impacts within the cutoff range for a criteria group are included in the estimated impacts. dB re 1 µPa2 - s: decibels referenced to 1 micropascal squared second; m: meters

* Indicates maximum range to which acoustic model was run, a distance of approximately 100 kilometers from the sound source.

Table 22. Ranges to an estimated Level B behavioral harassment takes for sonar bin HF4 over a representative range of environments within the HSTT Study Area.

Received Level (dB re 1 µPa-s)	*Average Range (m) (Minimum – Maximum)*	*Probability of Level B Behavioral Harassment Sonar Bin HF4*			
		Odontocetes	*Mysticetes*	*Pinnipeds*	*Beaked Whales*
196	3 (1–6)	100%	100%	100%	100%
190	8 (1–16)	100%	98%	99%	100%
184	17 (1–35)	99%	88%	98%	100%
178	34 (1–90)	97%	59%	92%	100%
172	68 (1–180)	91%	30%	76%	99%
166	133 (12–430)	78%	20%	48%	97%
160	255 (30–750)	58%	18%	27%	93%
154	439 (50–1,525)	40%	17%	18%	83%
148	694 (85–2,275)	29%	16%	16%	66%
142	989 (110–3,525)	25%	13%	15%	45%
136	1,378 (170–4,775)	23%	9%	15%	28%
130	1,792 (270–6,025)	20%	5%	15%	18%
124	2,259 (320–7,525)	17%	2%	14%	14%
118	2,832 (320–8,525)	12%	1%	13%	12%
112	3,365 (320–10,525)	6%	0%	9%	11%
106	3,935 (320–12,275)	3%	0%	5%	11%
100	4,546 (320–16,775)	1%	0%	2%	8%

Note: Cells are shaded if the mean range value for the specified received level exceeds the distance cutoff range for a particular hearing group. Any impacts within the cutoff range for a criteria group are included in the estimated impacts. dB re 1 µPa2 - s: decibels referenced to 1 micropascal squared second; m: meters

* Indicates maximum range to which acoustic model was run, a distance of approximately 100 kilometers from the sound source.

Table 22 identifies the maximum likely percentage of exposed individuals taken at the indicated received level and associated range for HFAS.

Explosives

Phase III explosive criteria for Level B behavioral harassment thresholds for marine mammals is the hearing groups' TTS threshold minus 5 dB (see Table 23 below and Table 15 for the TTS thresholds for explosives) for events that contain multiple impulses from explosives underwater. This was the same approach as taken in Phase II for explosive analysis. See the *Criteria and Thresholds for U.S. Navy Acoustic and Explosive Effects Analysis (Phase III)* report (U.S. Department of the Navy, 2017c) for detailed information on how the criteria and thresholds were derived. NMFS continues to concur that this approach represents the best available science for determining impacts to marine mammals from explosives.

TABLE 23—PHASE III LEVEL B BEHAVIORAL HARASSMENT THRESHOLDS FOR EXPLOSIVES FOR MARINE MAMMALS

Medium	Functional hearing group	SEL (weighted)
Underwater	LF	163
Underwater	MF	165
Underwater	HF	135
Underwater	PW	165
Underwater	OW	183

Note: Weighted SEL thresholds in dB re 1 μPa²s underwater. PW—pinnipeds underwater, OW—otariids underwater.

Navy's Acoustic Effects Model

Sonar and Other Transducers and Explosives

The Navy's Acoustic Effects Model calculates sound energy propagation from sonar and other transducers and explosives during naval activities and the sound received by animat dosimeters. Animat dosimeters are virtual representations of marine mammals distributed in the area around the modeled naval activity and each dosimeter records its individual sound ''dose.'' The model bases the distribution of animats over the HSTT Study Area on the density values in the *Navy Marine Species Density Database* and distributes animats in the water column proportional to the known time that species spend at varying depths.

The model accounts for environmental variability of sound propagation in both distance and depth when computing the received sound level received by the animats. The model conducts a statistical analysis based on multiple model runs to compute the estimated effects on animals. The number of animats that exceed the thresholds for effects is tallied to provide an estimate of the number of marine mammals that could be affected.

Assumptions in the Navy model intentionally err on the side of overestimation when there are unknowns. Naval activities are modeled as though they would occur regardless of proximity to marine mammals, meaning that no mitigation is considered (*i.e.,* no power down or shut down modeled) and without any avoidance of the activity by the animal. The final step of the quantitative analysis of acoustic effects is to consider the implementation of mitigation and the possibility that marine mammals would avoid continued or repeated sound exposures. For more information on this process, see the discussion in the *Take Requests* subsection below. Many explosions from ordnance such as bombs and missiles actually occur upon impact with above-water targets. However, for this analysis, sources such as these were modeled as exploding underwater. This overestimates the amount of explosive and acoustic energy entering the water.

The model estimates the impacts caused by individual training and testing exercises. During any individual modeled event, impacts to individual animats are considered over 24-hour periods. The animats do not represent actual animals, but rather they represent a distribution of animals based on density and abundance data, which allows for a statistical analysis of the number of instances that marine mammals may be exposed to sound levels resulting in an effect. Therefore, the model estimates the number of instances in which an effect threshold was exceeded over the course of a year, but does not estimate the number of individual marine mammals that may be impacted over a year (*i.e.,* some marine mammals could be impacted several times, while others would not experience any impact). A detailed explanation of the Navy's Acoustic Effects Model is provided in the technical report *Quantifying Acoustic Impacts on Marine Mammals and Sea Turtles: Methods and Analytical Approach for Phase III Training and Testing report* (U.S. Department of the Navy, 2018).

Air Guns and Pile Driving

The Navy's quantitative analysis estimates the sound and energy received by marine mammals distributed in the area around planned Navy activities involving air guns. See the technical report titled *Quantifying Acoustic Impacts on Marine Mammals and Sea Turtles: Methods and Analytical Approach for Phase III Training and Testing report* (U.S. Department of the Navy, 2018) for additional details.

Underwater noise effects from pile driving and vibratory pile extraction were modeled using actual measures of impact pile driving and vibratory removal during construction of an ELCAS (Illingworth and Rodkin, 2015, 2016). A conservative estimate of spreading loss of sound in shallow coastal waters (*i.e.,* transmission loss = 16.5*Log10 (radius)) was applied based on spreading loss observed in actual measurements. Inputs used in the model are provided in Chapter 1, Section 1.4.1.3 (Pile Driving) of the Navy's rulemaking/LOA application, including source levels; the number of strikes required to drive a pile and the duration of vibratory removal per pile; the number of piles driven or removed per day; and the number of days of pile driving and removal.

Range to Effects

The following section provides range to effects for sonar and other active acoustic sources as well as explosives to specific acoustic thresholds determined using the Navy Acoustic Effects Model. Marine mammals exposed within these ranges for the shown duration are predicted to experience the associated effect. Range to effects is important information in not only predicting acoustic impacts, but also in verifying the accuracy of model results against real-world situations and determining adequate mitigation ranges to avoid higher level effects, especially physiological effects to marine mammals.

Sonar

The range to received sound levels in 6–dB steps from five representative sonar bins and the percentage of the total number of animals that may exhibit a significant behavioral response (and therefore Level B harassment) under each behavioral response function (or step function in the case of the harbor porpoise) are shown in Table 17 through Table 21 above, respectively. See Chapter 6, Section 6.4.2.1 (Methods for Analyzing Impacts from Sonars and Other Transducers) of the Navy's rulemaking/LOA application for additional details on the derivation and use of the behavioral response functions, thresholds, and the cutoff distances that are used to identify Level B behavioral harassment.

The ranges to PTS for five representative sonar systems for an exposure of 30 seconds is shown in Table 24 relative to the marine mammal's functional hearing group. This period (30 seconds) was chosen based on examining the maximum amount of time a marine mammal would realistically be exposed to levels that could cause the onset of PTS based on platform (*e.g.,* ship) speed and a nominal animal swim speed of approximately 1.5 m per second. The ranges provided in the table include the average range to PTS, as well as the range from the minimum to the maximum distance at which PTS is possible for each hearing group.

TABLE 24—RANGE TO PERMANENT THRESHOLD SHIFT (METERS) FOR FIVE REPRESENTATIVE SONAR SYSTEMS

Functional hearing group	Approximate range in meters for PTS from 30 seconds exposure				
	Sonar bin LF	Sonar bin MF1	Sonar bin MF4	Sonar bin MF5	Sonar bin HF4
Low-frequency Cetacean	0 (0–0)	65 (65–65)	14 (0–15)	0 (0–0)	0 (0–0)
Mid-frequency Cetacean	0 (0–0)	16 (16–16)	3 (3–3)	0 (0–0)	1 (0–2)
High-frequency Cetacean	0 (0–0)	181 (180–190)	30 (30–30)	9 (8–10)	30 (8–80)
Otariidae	0 (0–0)	6 (6–6)	0 (0–0)	0 (0–0)	0 (0–0)
Phocidae	0 (0–0)	45 (45–45)	11 (11–11)	0 (0–0)	0 (0–0)

[1] PTS ranges extend from the sonar or other active acoustic sound source to the indicated distance. The average range to PTS is provided as well as the range from the estimated minimum to the maximum range to PTS in parenthesis.

The tables below illustrate the range to TTS for 1, 30, 60, and 120 seconds from five representative sonar systems (see Table 25 through Table 29).

TABLE 25—RANGES TO TEMPORARY THRESHOLD SHIFT (METERS) FOR SONAR BIN LF5 OVER A REPRESENTATIVE RANGE OF ENVIRONMENTS WITHIN THE HSTT STUDY AREA

Hearing group	Approximate TTS ranges (meters) [1]			
	Sonar bin LF5M (low frequency sources <180 dB source level)			
	1 second	30 seconds	60 seconds	120 seconds
Low-frequency Cetacean	3 (0–4)	3 (0–4)	3 (0–4)	3 (0–4)
Mid-frequency Cetacean	0 (0–0)	0 (0–0)	0 (0–0)	0 (0–0)
High-frequency Cetacean	0 (0–0)	0 (0–0)	0 (0–0)	0 (0–0)
Otariidae	0 (0–0)	0 (0–0)	0 (0–0)	0 (0–0)
Phocidae	0 (0–0)	0 (0–0)	0 (0–0)	0 (0–0)

[1] Ranges to TTS represent the model predictions in different areas and seasons within the Study Area. The zone in which animals are expected to suffer TTS extend from onset-PTS to the distance indicated. The average range to TTS is provided as well as the range from the estimated minimum to the maximum range to TTS in parentheses.

TABLE 26—RANGES TO TEMPORARY THRESHOLD SHIFT (METERS) FOR SONAR BIN MF1 OVER A REPRESENTATIVE RANGE OF ENVIRONMENTS WITHIN THE HSTT STUDY AREA

Hearing group	Approximate TTS ranges (meters) [1]			
	Sonar bin MF1 (*e.g.,* SQS–53 ASW hull-mounted sonar)			
	1 second	30 seconds	60 seconds	120 seconds
Low-frequency Cetacean	903 (850–1,025)	903 (850–1,025)	1,264 (1,025–2,275)	1,839 (1,275–3,025)
Mid-frequency Cetacean	210 (210–210)	210 (210–210)	302 (300–310)	379 (370–390)
High-frequency Cetacean	3,043 (1,525–4,775)	3,043 (1,525–4,775)	4,739 (2,025–6,275)	5,614 (2,025–7,525)
Otariidae	65 (65–65)	65 (65–65)	106 (100–110)	137 (130–140)
Phocidae	669 (650–725)	669 (650–725)	970 (900–1,025)	1,075 (1,025–1,525)

[1] Ranges to TTS represent the model predictions in different areas and seasons within the Study Area. The zone in which animals are expected to suffer TTS extend from onset-PTS to the distance indicated. The average range to TTS is provided as well as the range from the estimated minimum to the maximum range to TTS in parentheses.

TABLE 27—RANGES TO TEMPORARY THRESHOLD SHIFT (METERS) FOR SONAR BIN MF4 OVER A REPRESENTATIVE RANGE OF ENVIRONMENTS WITHIN THE HSTT STUDY AREA

Hearing group	Approximate TTS ranges (meters) [1]			
	Sonar bin MF4 (*e.g.,* AQS–22 ASW dipping sonar)			
	1 second	30 seconds	60 seconds	120 seconds
Low-frequency Cetacean	77 (0–85)	162 (150–180)	235 (220–290)	370 (310–600)
Mid-frequency Cetacean	22 (22–22)	35 (35–35)	49 (45–50)	70 (70–70)
High-frequency Cetacean	240 (220–300)	492 (440–775)	668 (550–1,025)	983 (825–2,025)
Otariidae	8 (8–8)	15 (15–15)	19 (19–19)	25 (25–25)

TABLE 27—RANGES TO TEMPORARY THRESHOLD SHIFT (METERS) FOR SONAR BIN MF4 OVER A REPRESENTATIVE RANGE OF ENVIRONMENTS WITHIN THE HSTT STUDY AREA—Continued

Hearing group	Approximate TTS ranges (meters) [1]			
	Sonar bin MF4 (*e.g.,* AQS–22 ASW dipping sonar)			
	1 second	30 seconds	60 seconds	120 seconds
Phocidae	65 (65–65)	110 (110–110)	156 (150–170)	269 (240–460)

[1] Ranges to TTS represent the model predictions in different areas and seasons within the Study Area. The zone in which animals are expected to suffer TTS extend from onset-PTS to the distance indicated. The average range to TTS is provided as well as the range from the estimated minimum to the maximum range to TTS in parentheses.

TABLE 28—RANGES TO TEMPORARY THRESHOLD SHIFT (METERS) FOR SONAR BIN MF5 OVER A REPRESENTATIVE RANGE OF ENVIRONMENTS WITHIN THE HSTT STUDY AREA

Hearing group	Approximate TTS ranges (meters) [1]			
	Sonar bin MF5 (*e.g.,* SSQ–62 ASW Sonobuoy)			
	1 second	30 seconds	60 seconds	120 seconds
Low-frequency Cetacean	10 (0–12)	10 (0–12)	14 (0–18)	21 (0–25)
Mid-frequency Cetacean	6 (0–9)	6 (0–9)	12 (0–13)	17 (0–21)
High-frequency Cetacean	118 (100–170)	118 (100–170)	179 (150–480)	273 (210–700)
Otariidae	0 (0–0)	0 (0–0)	0 (0–0)	0 (0–0)
Phocidae	9 (8–10)	9 (8–10)	14 (14–16)	21 (21–25)

[1] Ranges to TTS represent the model predictions in different areas and seasons within the Study Area. The zone in which animals are expected to suffer TTS extend from onset-PTS to the distance indicated. The average range to TTS is provided as well as the range from the estimated minimum to the maximum range to TTS in parentheses.

TABLE 29—RANGES TO TEMPORARY THRESHOLD SHIFT (METERS) FOR SONAR BIN HF4 OVER A REPRESENTATIVE RANGE OF ENVIRONMENTS WITHIN THE HSTT STUDY AREA

Hearing group	Approximate TTS ranges (meters) [1]			
	Sonar bin HF4 (*e.g.,* SQS–20 mine hunting sonar)			
	1 second	30 seconds	≤60 seconds	120 seconds
Low-frequency Cetacean	1 (0–3)	2 (0–5)	4 (0–7)	6 (0–11)
Mid-frequency Cetacean	10 (4–17)	17 (6–35)	24 (7–60)	34 (9–90)
High-frequency Cetacean	168 (25–550)	280 (55–775)	371 (80–1,275)	470 (100–1,525)
Otariidae	0 (0–0)	0 (0–0)	0 (0–0)	1 (0–1)
Phocidae	2 (0–5)	5 (2–8)	8 (3–13)	11 (4–22)

[1] Ranges to TTS represent the model predictions in different areas and seasons within the Study Area. The zone in which animals are expected to suffer TTS extend from onset-PTS to the distance indicated. The average range to TTS is provided as well as the range from the estimated minimum to the maximum range to TTS in parentheses.

Explosives

The following section provides the range (distance) over which specific physiological or behavioral effects are expected to occur based on the explosive criteria (see Chapter 6, Section 6.5.2.1.1 of the Navy's rulemaking/LOA application and the *Criteria and Thresholds for U.S. Navy Acoustic and Explosive Effects Analysis (Phase III)* report (U.S. Department of the Navy, 2017c) and the explosive propagation calculations from the Navy Acoustic Effects Model (see Chapter 6, Section 6.5.2.1.3, Navy Acoustic Effects Model of the Navy's rulemaking/LOA application). The range to effects are shown for a range of explosive bins, from E1 (up to 0.25 lb net explosive weight) to E12 (up to 1,000 lb net explosive weight) (Tables 30 through 34). Ranges are determined by modeling the distance that noise from an explosion would need to propagate to reach exposure level thresholds specific to a hearing group that would cause behavioral response (to the degree of Level B behavioral harassment), TTS, PTS, and non-auditory injury. Ranges are provided for a representative source depth and cluster size for each bin. For events with multiple explosions, sound from successive explosions can be expected to accumulate and increase the range to the onset of an impact based on SEL thresholds. Ranges to non-auditory injury and mortality are shown in Tables 35 and 36, respectively. Range to effects is important information in not only predicting impacts from explosives, but also in verifying the accuracy of model results against real-world situations and determining adequate mitigation ranges to avoid higher level effects, especially physiological effects to marine mammals. For additional information on how ranges to impacts from explosions were estimated, see the technical report *Quantifying Acoustic Impacts on Marine Mammals and Sea Turtles: Methods and Analytical Approach for Phase III Training and Testing* (U.S. Navy, 2018).

Table 30 shows the minimum, average, and maximum ranges to onset of auditory and likely behavioral effects that rise to the level of Level B harassment for high-frequency cetaceans based on the developed thresholds.

TABLE 30—SEL-BASED RANGES (METERS) TO ONSET PTS, ONSET TTS, AND LEVEL B BEHAVIORAL HARASSMENT FOR HIGH-FREQUENCY CETACEANS

Range to effects for explosives: High frequency cetacean [1]					
Bin	Source depth (m)	Cluster size	PTS	TTS	Behavioral
E1	0.1	1	353 (130–825)	1,234 (290–3,025)	2,141 (340–4,775)
		25	1,188 (280–3,025)	3,752 (490–8,525)	5,196 (675–12,275)
E2	0.1	1	425 (140–1,275)	1,456 (300–3,525)	2,563 (390–5,275)
		10	988 (280–2,275)	3,335 (480–7,025)	4,693 (650–10,275)
E3	0.1	1	654 (220–1,525)	2,294 (350–4,775)	3,483 (490–7,775)
		12	1,581 (300–3,525)	4,573 (650–10,275)	6,188 (725–14,775)
	18.25	1	747 (550–1,525)	3,103 (950–6,025)	5,641 (1,000–9,275)
		12	1,809 (875–4,025)	7,807 (1,025–12,775)	10,798 (1,025–17,775)
E4	3	2	2,020 (1,025–3,275)	3,075 (1,025–6,775)	3,339 (1,025–9,775)
	15.25	2	970 (600–1,525)	4,457 (1,025–8,525)	6,087 (1,275–12,025)
	19.8	2	1,023 (1,000–1,025)	4,649 (2,275–8,525)	6,546 (3,025–11,025)
	198	2	959 (875–1,525)	4,386 (3,025–7,525)	5,522 (3,025–9,275)
E5	0.1	25	2,892 (440–6,275)	6,633 (725–16,025)	8,925 (800–22,775)
	15.25	25	4,448 (1,025–7,775)	10,504 (1,525–18,275)	13,605 (1,775–24,775)
E6	0.1	1	1,017 (280–2,525)	3,550 (490–7,775)	4,908 (675–12,275)
	3	1	2,275 (2,025–2,525)	6,025 (4,525–7,275)	7,838 (6,275–9,775)
	15.25	1	1,238 (625–2,775)	5,613 (1,025–10,525)	7,954 (1,275–14,275)
E7	3	1	3,150 (2,525–3,525)	7,171 (5,525–8,775)	8,734 (7,275–10,525)
	18.25	1	2,082 (925–3,525)	6,170 (1,275–10,525)	8,464 (1,525–16,525)
E8	0.1	1	1,646 (775–2,525)	4,322 (1,525–9,775)	5,710 (1,525–14,275)
	45.75	1	1,908 (1,025–4,775)	5,564 (1,525–12,525)	7,197 (1,525–18,775)
E9	0.1	1	2,105 (850–4,025)	4,901 (1,525–12,525)	6,700 (1,525–16,775)
E10	0.1	1	2,629 (875–5,275)	5,905 (1,525–13,775)	7,996 (1,525–20,025)
E11	18.5	1	3,034 (1,025–6,025)	7,636 (1,525–16,525)	9,772 (1,775–21,525)
	45.75	1	2,925 (1,525–6,025)	7,152 (2,275–18,525)	9,011 (2,525–24,525)
E12	0.1	1	2,868 (975–5,525)	6,097 (2,275–14,775)	8,355 (4,275–21,275)
		3	3,762 (1,525–8,275)	7,873 (3,775–20,525)	10,838 (4,275–26,525)

[1] Average distance (m) to PTS, TTS, and behavioral thresholds are depicted above the minimum and maximum distances which are in parentheses. Values depict the range produced by SEL hearing threshold criteria levels.
E13 not modeled due to surf zone use and lack of marine mammal receptors at site-specific location.

Table 31 shows the minimum, average, and maximum ranges to onset of auditory and likely behavioral effects that rise to the level of Level B harassment for mid-frequency cetaceans based on the developed thresholds.

TABLE 31—SEL-BASED RANGES (METERS) TO ONSET PTS, ONSET TTS, AND LEVEL B BEHAVIORAL HARASSMENT FOR MID-FREQUENCY CETACEANS

Range to effects for explosives: Mid-frequency cetacean [1]					
Bin	Source depth (m)	Cluster size	PTS	TTS	Behavioral
E1	0.1	1	25 (25–25)	118 (80–210)	178 (100–320)
		25	107 (75–170)	476 (150–1,275)	676 (240–1,525)
E2	0.1	1	30 (30–35)	145 (95–240)	218 (110–400)
		10	88 (65–130)	392 (140–825)	567 (190–1,275)
E3	0.1	1	50 (45–65)	233 (110–430)	345 (130–600)
		12	153 (90–250)	642 (220–1,525)	897 (270–2,025)
	18.25	1	38 (35–40)	217 (190–900)	331 (290–850)
		12	131 (120–250)	754 (550–1,525)	1,055 (600–2,525)
E4	3	2	139 (110–160)	1,069 (525–1,525)	1,450 (875–1,775)
	15.25	2	71 (70–75)	461 (400–725)	613 (470–750)
	19.8	2	69 (65–70)	353 (350–360)	621 (600–650)
	198	2	49 (0–55)	275 (270–280)	434 (430–440)
E5	0.1	25	318 (130–625)	1,138 (280–3,025)	1,556 (310–3,775)
	15.25	25	312 (290–725)	1,321 (675–2,525)	1,980 (850–4,275)
E6	0.1	1	98 (70–170)	428 (150–800)	615 (210–1,525)
	3	1	159 (150–160)	754 (650–850)	1,025 (1,025–1,025)
	15.25	1	88 (75–180)	526 (450–875)	719 (500–1,025)

TABLE 31—SEL-BASED RANGES (METERS) TO ONSET PTS, ONSET TTS, AND LEVEL B BEHAVIORAL HARASSMENT FOR MID-FREQUENCY CETACEANS—Continued

Range to effects for explosives: Mid-frequency cetacean [1]					
Bin	Source depth (m)	Cluster size	PTS	TTS	Behavioral
E7	3	1	240 (230–260)	1,025 (1,025–1,025)	1,900 (1,775–2,275)
	18.25	1	166 (120–310)	853 (500–1,525)	1,154 (550–1,775)
E8	0.1	1	160 (150–170)	676 (500–725)	942 (600–1,025)
	45.75	1	128 (120–170)	704 (575–2,025)	1,040 (750–2,525)
E9	0.1	1	215 (200–220)	861 (575–950)	1,147 (650–1,525)
E10	0.1	1	275 (250–480)	1,015 (525–2,275)	1,424 (675–3,275)
E11	18.5	1	335 (260–500)	1,153 (650–1,775)	1,692 (775–3,275)
	45.75	1	272 (230–825)	1,179 (825–3,025)	1,784 (1,000–4,275)
E12	0.1	1	334 (310–350)	1,151 (700–1,275)	1,541 (800–3,525)
	0.1	3	520 (450–550)	1,664 (800–3,525)	2,195 (925–4,775)

[1] Average distance (m) to PTS, TTS, and behavioral thresholds are depicted above the minimum and maximum distances which are in parentheses. Values depict the range produced by SEL hearing threshold criteria levels.
E13 not modeled due to surf zone use and lack of marine mammal receptors at site-specific location.

Table 32 shows the minimum, average, and maximum ranges to onset of auditory and likely behavioral effects that rise to the level of Level B harassment for low-frequency cetaceans based on the developed thresholds.

TABLE 32—SEL-BASED RANGES (METERS) TO ONSET PTS, ONSET TTS, AND LEVEL B BEHAVIORAL HARASSMENT FOR LOW-FREQUENCY CETACEANS

Range to effects for explosives: Low frequency cetacean [1]					
Bin	Source depth (m)	Cluster size	PTS	TTS	Behavioral
E1	0.1	1	51 (40–70)	227 (100–320)	124 (70–160)
		25	205 (95–270)	772 (270–1,275)	476 (190–725)
E2	0.1	1	65 (45–95)	287 (120–400)	159 (80–210)
		10	176 (85–240)	696 (240–1,275)	419 (160–625)
E3	0.1	1	109 (65–150)	503 (190–1,000)	284 (120–430)
		12	338 (130–525)	1,122 (320–7,775)	761 (240–6,025)
	18.25	1	205 (170–340)	996 (410–2,275)	539 (330–1,275)
		12	651 (340–1,275)	3,503 (600–8,275)	1,529 (470–3,275)
E4	3	2	493 (440–1,000)	2,611 (1,025–4,025)	1,865 (950–2,775)
	15.25	2	583 (350–850)	3,115 (1,275–5,775)	1,554 (1,000–2,775)
	19.8	2	378 (370–380)	1,568 (1,275–1,775)	926 (825–950)
	198	2	299 (290–300)	2,661 (1,275–3,775)	934 (900–950)
E5	0.1	25	740 (220–6,025)	2,731 (460–22,275)	1,414 (350–14,275)
	15.25	25	1,978 (1,025–5,275)	8,188 (3,025–19,775)	4,727 (1,775–11,525)
E6	0.1	1	250 (100–420)	963 (260–7,275)	617 (200–1,275)
	3	1	711 (525–825)	3,698 (1,525–4,275)	2,049 (1,025–2,525)
	15.25	1	718 (390–2,025)	3,248 (1,275–8,525)	1,806 (950–4,525)
E7	3	1	1,121 (850–1,275)	5,293 (2,025–6,025)	3,305 (1,275–4,025)
	18.25	1	1,889 (1,025–2,775)	6,157 (2,775–11,275)	4,103 (2,275–7,275)
E8	0.1	1	460 (170–950)	1,146 (380–7,025)	873 (280–3,025)
	45.75	1	1,049 (550–2,775)	4,100 (1,025–14,275)	2,333 (800–7,025)
E9	0.1	1	616 (200–1,275)	1,560 (450–12,025)	1,014 (330–5,025)
E10	0.1	1	787 (210–2,525)	2,608 (440–18,275)	1,330 (330–9,025)
E11	18.5	1	4,315 (2,025–8,025)	10,667 (4,775–26,775)	7,926 (3,275–21,025)
	45.75	1	1,969 (775–5,025)	9,221 (2,525–29,025)	4,594 (1,275–16,025)
E12	0.1	1	815 (250–3,025)	2,676 (775–18,025)	1,383 (410–8,525)
	0.1	3	1,040 (330–6,025)	4,657 (1,275–31,275)	2,377 (700–16,275)

[1] Average distance (m) to PTS, TTS, and behavioral thresholds are depicted above the minimum and maximum distances, which are in parentheses. Values depict the range produced by SEL hearing threshold criteria levels.
E13 not modeled due to surf zone use and lack of marine mammal receptors at site-specific location.

Table 33 shows the minimum, average, and maximum ranges to onset of auditory and likely behavioral effects that rise to the level of Level B harassment for phocids based on the developed thresholds.

TABLE 33—SEL-BASED RANGES (METERS) TO ONSET PTS, ONSET TTS, AND LEVEL B BEHAVIORAL HARASSMENT FOR PHOCIDS

Range to effects for explosives: Phocids [1]					
Bin	Source depth (m)	Cluster size	PTS	TTS	Behavioral
E1	0.1	1	45 (40–65)	210 (100–290)	312 (130–430)
		25	190 (95–260)	798 (280–1,275)	1,050 (360–2,275)
E2	0.1	1	58 (45–75)	258 (110–360)	383 (150–550)
		10	157 (85–240)	672 (240–1,275)	934 (310–1,525)
E3	0.1	1	96 (60–120)	419 (160–625)	607 (220–900)
		12	277 (120–390)	1,040 (370–2,025)	1,509 (525–6,275)
	18.25	1	118 (110–130)	621 (500–1,275)	948 (700–2,025)
		12	406 (330–875)	1,756 (1,025–4,775)	3,302 (1,025–6,275)
E4	3	2	405 (300–430)	1,761 (1,025–2,775)	2,179 (1,025–3,275)
	15.25	2	265 (220–430)	1,225 (975–1,775)	1,870 (1,025–3,275)
	19.8	2	220 (220–220)	991 (950–1,025)	1,417 (1,275–1,525)
	198	2	150 (150–150)	973 (925–1,025)	2,636 (2,025–3,525)
E5	0.1	25	569 (200–850)	2,104 (725–9,275)	2,895 (825–11,025)
	15.25	25	920 (825–1,525)	5,250 (2,025–10,275)	7,336 (2,275–16,025)
E6	0.1	1	182 (90–250)	767 (270–1,275)	1,011 (370–1,775)
	3	1	392 (340–440)	1,567 (1,275–1,775)	2,192 (2,025–2,275)
	15.25	1	288 (250–600)	1,302 (1,025–3,275)	2,169 (1,275–5,775)
E7	3	1	538 (450–625)	2,109 (1,775–2,275)	2,859 (2,775–3,275)
	18.25	1	530 (460–750)	2,617 (1,025–4,525)	3,692 (1,525–5,275)
E8	0.1	1	311 (290–330)	1,154 (625–1,275)	1,548 (725–2,275)
	45.75	1	488 (380–975)	2,273 (1,275–5,275)	3,181 (1,525–8,025)
E9	0.1	1	416 (350–470)	1,443 (675–2,025)	1,911 (800–3,525)
E10	0.1	1	507 (340–675)	1,734 (725–3,525)	2,412 (800–5,025)
E11	18.5	1	1,029 (775–1,275)	5,044 (2,025–8,775)	6,603 (2,525–14,525)
	45.75	1	881 (700–2,275)	3,726 (2,025–8,775)	5,082 (2,025–13,775)
E12	0.1	1	631 (450–750)	1,927 (800–4,025)	2,514 (925–5,525)
	0.1	3	971 (550–1,025)	2,668 (1,025–6,275)	3,541 (1,775–9,775)

[1] Average distance (m) to PTS, TTS, and behavioral thresholds are depicted above the minimum and maximum distances which are in parentheses. Values depict the range produced by SEL hearing threshold criteria levels.

E13 not modeled due to surf zone use and lack of marine mammal receptors at site-specific location.

Table 34 shows the minimum, average, and maximum ranges to onset of auditory and likely behavioral effects that rise to the level of Level B harassment for ottariids based on the developed thresholds.

TABLE 34—SEL-BASED RANGES (METERS) TO ONSET PTS, ONSET TTS, AND LEVEL B BEHAVIORAL HARASSMENT FOR OTARIIDS

Range to effects for explosives: Otariids [1]					
Bin	Source depth (m)	Cluster size	PTS	TTS	Behavioral
E1	0.1	1	7 (7–7)	34 (30–40)	56 (45–70)
		25	30 (25–35)	136 (80–180)	225 (100–320)
E2	0.1	1	9 (9–9)	41 (35–55)	70 (50–95)
		10	25 (25–30)	115 (70–150)	189 (95–250)
E3	0.1	1	16 (15–19)	70 (50–95)	115 (70–150)
		12	45 (35–65)	206 (100–290)	333 (130–450)
	18.25	1	15 (15–15)	95 (90–100)	168 (150–310)
		12	55 (50–60)	333 (280–750)	544 (440–1,025)
E4	3	2	64 (40–85)	325 (240–340)	466 (370–490)
	15.25	2	30 (30–35)	205 (170–300)	376 (310–575)
	19.8	2	25 (25–25)	170 (170–170)	290 (290–290)
	198	2	17 (0–25)	117 (110–120)	210 (210–210)
E5	0.1	25	98 (60–120)	418 (160–575)	626 (240–1,000)
	15.25	25	151 (140–260)	750 (650–1,025)	1,156 (975–2,025)
E6	0.1	1	30 (25–35)	134 (75–180)	220 (100–320)
	3	1	53 (50–55)	314 (280–390)	459 (420–525)
	15.25	1	36 (35–40)	219 (200–380)	387 (340–625)
E7	3	1	93 (90–100)	433 (380–500)	642 (550–800)
	18.25	1	73 (70–75)	437 (360–525)	697 (600–850)
E8	0.1	1	50 (50–50)	235 (220–250)	385 (330–450)
	45.75	1	55 (55–60)	412 (310–775)	701 (500–1,525)
E9	0.1	1	68 (65–70)	316 (280–360)	494 (390–625)

TABLE 34—SEL-BASED RANGES (METERS) TO ONSET PTS, ONSET TTS, AND LEVEL B BEHAVIORAL HARASSMENT FOR OTARIIDS—Continued

Range to effects for explosives: Otariids[1]					
Bin	Source depth (m)	Cluster size	PTS	TTS	Behavioral
E10	0.1	1	86 (80–95)	385 (240–460)	582 (390–800)
E11	18.5	1	158 (150–200)	862 (750–975)	1,431 (1,025–2,025)
	45.75	1	117 (110–130)	756 (575–1,525)	1,287 (950–2,775)
E12	0.1	1	104 (100–110)	473 (370–575)	709 (480–1,025)
	0.1	3	172 (170–180)	694 (480–1,025)	924 (575–1,275)

[1] Average distance (m) to PTS, TTS, and behavioral thresholds are depicted above the minimum and maximum distances which are in parentheses. Values depict the range produced by SEL hearing threshold criteria levels.
E13 not modeled due to surf zone use and lack of marine mammal receptors at site-specific location.

Table 35 shows the minimum, average, and maximum ranges due to varying propagation conditions to non-auditory injury as a function of animal mass and explosive bin (*i.e.,* net explosive weight). Ranges to gastrointestinal tract injury typically exceed ranges to slight lung injury; therefore, the maximum range to effect is not mass-dependent. Animals within these water volumes would be expected to receive minor injuries at the outer ranges, increasing to more substantial injuries, and finally mortality as an animal approaches the detonation point.

TABLE 35—RANGES[1] TO 50 PERCENT NON-AUDITORY INJURY RISK FOR ALL MARINE MAMMAL HEARING GROUPS

Bin	Range (m) (min-max)
E1	12 (11–13)
E2	15 (15–20)
E3	25 (25–30)
E4	32 (0–75)
E5	40 (35–140)
E6	52 (40–120)
E7	145 (100–500)
E8	117 (75–400)
E9	120 (90–290)
E10	174 (100–480)
E11	443 (350–1,775)
E12	232 (110–775)

Note: [1] Average distance (m) to mortality is depicted above the minimum and maximum distances which are in parentheses.
E13 not modeled due to surf zone use and lack of marine mammal receptors at site-specific location. Differences between bins E11 and E12 due to different ordnance types and differences in model parameters.

Ranges to mortality, based on animal mass, are show in Table 36 below.

TABLE 36—RANGES[1] TO 50 PERCENT MORTALITY RISK FOR ALL MARINE MAMMAL HEARING GROUPS AS A FUNCTION OF ANIMAL MASS

Bin	Animal mass intervals (kg)[1]					
	10	250	1,000	5,000	25,000	≤72,000
E1	3 (2–3)	0 (0–3)	0 (0–0)	0 (0–0)	0 (0–0)	0 (0–0)
E2	4 (3–5)	1 (0–4)	0 (0–0)	0 (0–0)	0 (0–0)	0 (0–0)
E3	8 (6–10)	4 (2–8)	1 (0–2)	0 (0–0)	0 (0–0)	0 (0–0)
E4	15 (0–35)	9 (0–30)	4 (0–8)	2 (0–6)	0 (0–3)	0 (0–2)
E5	13 (11–45)	7 (4–35)	3 (3–12)	2 (0–8)	0 (0–2)	0 (0–2)
E6	18 (14–55)	10 (5–45)	5 (3–15)	3 (2–10)	0 (0–3)	0 (0–2)
E7	67 (55–180)	35 (18–140)	16 (12–30)	10 (8–20)	5 (4–9)	4 (3–7)
E8	50 (24–110)	27 (9–55)	13 (0–20)	9 (4–13)	4 (0–6)	3 (0–5)
E9	32 (30–35)	20 (13–30)	10 (8–12)	7 (6–9)	4 (3–4)	3 (2–3)
E10	56 (40–190)	25 (16–130)	13 (11–16)	9 (7–11)	5 (4–5)	4 (3–4)
E11	211 (180–500)	109 (60–330)	47 (40–100)	30 (25–65)	15 (0–25)	13 (11–22)
E12	94 (50–300)	35 (20–230)	16 (13–19)	11 (9–13)	6 (5–8)	5 (4–8)

Note: [1] Average distance (m) to mortality is depicted above the minimum and maximum distances which are in parentheses.
E13 not modeled due to surf zone use and lack of marine mammal receptors at site-specific location.
Differences between bins E11 and E12 due to different ordnance types and differences in model parameters (see Table 6–42 for details).

Air Guns

Table 37 and Table 38 present the approximate ranges in meters to PTS, TTS, and likely behavioral responses that rise to the level of a take for air guns for 1 and 10 pulses, respectively. Ranges are specific to the HSTT Study Area and also to each marine mammal hearing group, dependent upon their criteria and the specific locations where animals from the hearing groups and the air gun activities could overlap. Small air guns (12–60 in^3) would be used during testing activities in the offshore areas of the Southern California Range Complex and in the Hawaii Range Complex. Generated impulses would have short durations, typically a few hundred milliseconds, with dominant frequencies below 1 kHz. The SPL and SPL peak (at a distance 1 m from the air gun) would be approximately 215 dB re 1 μPa and 227 dB re 1 μPa, respectively, if operated at the full capacity of 60 in^3. The size of the air gun chamber can be adjusted, which would result in lower SPLs and SEL per shot. Single, small air guns lack the peak pressures that could cause non-auditory injury (see Finneran *et al.,* 2015); therefore, potential impacts could include PTS, TTS, and/or Level B behavioral harassment.

TABLE 37—RANGE TO EFFECTS (METERS) FROM AIR GUNS FOR 1 PULSE

Range to effects for air guns [1] for 1 pulse (m)					
Hearing group	PTS (SEL)	PTS (Peak SPL)	TTS (SEL)	TTS (Peak SPL)	Behavioral [2]
High-Frequency Cetacean	0 (0–0)	18 (15–25)	1 (0–2)	33 (25–80)	702 (290–1,525)
Low-Frequency Cetacean	3 (3–4)	2 (2–3)	27 (23–35)	5 (4–7)	651 (200–1,525)
Mid-Frequency Cetacean	0 (0–0)	0 (0–0)	0 (0–0)	0 (0–0)	689 (290–1,525)
Otariidae	0 (0–0)	0 (0–0)	0 (0–0)	0 (0–0)	590 (290–1,525)
Phocidae	0 (0–0)	2 (2–3)	0 (0–0)	5 (4–8)	668 (290–1,525)

[1] Average distance (m) to PTS, TTS, and behavioral thresholds are depicted above the minimum and maximum distances which are in parentheses. PTS and TTS values depict the range produced by SEL and Peak SPL (as noted) hearing threshold criteria levels.
[2] Behavioral values depict the ranges produced by RMS hearing threshold criteria levels.

TABLE 38—RANGE TO EFFECTS (METERS) FROM AIR GUNS FOR 10 PULSES

Range to Effects for Air Guns [1] for 10 pulses (m)					
Hearing group	PTS (SEL)	PTS (Peak SPL)	TTS (SEL)	TTS (Peak SPL)	Behavioral [2]
High-Frequency Cetacean	0 (0–0)	18 (15–25)	3 (0–9)	33 (25–80)	702 (290–1,525)
Low-Frequency Cetacean	15 (12–20)	2 (2–3)	86 (70–140)	5 (4–7)	651 (200–1,525)
Mid-Frequency Cetacean	0 (0–0)	0 (0–0)	0 (0–0)	0 (0–0)	689 (290–1,525)
Otariidae	0 (0–0)	0 (0–0)	0 (0–0)	0 (0–0)	590 (290–1,525)
Phocidae	0 (0–0)	2 (2–3)	4 (3–5)	5 (4–8)	668 (290–1,525)

[1] Average distance (m) to PTS, TTS, and behavioral thresholds are depicted above the minimum and maximum distances which are in parentheses. PTS and TTS values depict the range produced by SEL and Peak SPL (as noted) hearing threshold criteria levels.
[2] Behavioral values depict the ranges produced by RMS hearing threshold criteria levels.

Pile Driving

Table 39 and Table 40 present the approximate ranges in meters to PTS, TTS, and/or Level B behavioral harassment that rise to the level of a take for impact pile driving and vibratory pile removal, respectively. Non-auditory injury is not predicted for pile driving activities.

TABLE 39—AVERAGE RANGES TO EFFECTS (METERS) FROM IMPACT PILE DRIVING

Hearing group	PTS (m)	TTS (m)	Behavioral (m)
Low-Frequency Cetaceans	65	529	870
Mid-Frequency Cetaceans	2	16	870
High-Frequency Cetaceans	65	529	870
Phocidae	19	151	870
Otariidae	2	12	870

Note: PTS: permanent threshold shift; TTS: temporary threshold shift.

TABLE 40—AVERAGE RANGES TO EFFECT (METERS) FROM VIBRATORY PILE EXTRACTION

Hearing group	PTS (m)	TTS (m)	Behavioral (m)
Low-Frequency Cetaceans	0	3	376
Mid-Frequency Cetaceans	0	4	376
High-Frequency Cetaceans	7	116	376
Phocidae	0	2	376
Otariidae	0	0	376

Note: PTS: permanent threshold shift; TTS: temporary threshold shift.

Marine Mammal Density

A quantitative analysis of impacts on a species or stock requires data on their abundance and distribution that may be affected by anthropogenic activities in the potentially impacted area. The most appropriate metric for this type of analysis is density, which is the number of animals present per unit area. Marine species density estimation requires a significant amount of effort to both collect and analyze data to produce a reasonable estimate. Unlike surveys for terrestrial wildlife, many marine species spend much of their time submerged, and are not easily observed. In order to collect enough sighting data to make reasonable density estimates, multiple observations are required, often in areas that are not easily accessible (*e.g.,* far offshore). Ideally, marine mammal species sighting data would be collected for the specific area and time period *(e.g.,* season) of interest and density estimates derived accordingly. However, in many places, poor weather conditions and high sea states prohibit the completion of comprehensive visual surveys.

For most cetacean species, abundance is estimated using line-transect surveys or mark-recapture studies (*e.g.,* Barlow, 2010; Barlow and Forney, 2007; Calambokidis *et al.,* 2008). The result provides one single density estimate value for each species across broad geographic areas. This is the general approach applied in estimating cetacean abundance in the NMFS' SARs. Although the single value provides a good average estimate of abundance (total number of individuals) for a specified area, it does not provide information on the species distribution or concentrations within that area, and it does not estimate density for other timeframes or seasons that were not surveyed. More recently, spatial habitat modeling developed by NMFS' Southwest Fisheries Science Center has been used to estimate cetacean densities (Barlow *et al.,* 2009; Becker *et al.,* 2010, 2012a, b, c, 2014, 2016; Ferguson *et al.,* 2006a; Forney *et al.,* 2012, 2015; Redfern *et al.,* 2006). These models estimate cetacean density as a continuous function of habitat variables (*e.g.,* sea surface temperature, seafloor depth, etc.) and thus allow predictions of cetacean densities on finer spatial scales than traditional line-transect or mark recapture analyses and for areas that have not been surveyed. Within the geographic area that was modeled, densities can be predicted wherever these habitat variables can be measured or estimated.

To characterize the marine species density for large areas such as the HSTT Study Area, the Navy compiled data from several sources. The Navy developed a protocol to select the best available data sources based on species, area, and time (season). The resulting Geographic Information System database, called the Navy Marine Species Density Database includes seasonal density values for every marine mammal species present within the HSTT Study Area. This database is described in the technical report titled *U.S. Navy Marine Species Density Database Phase III for the Hawaii-Southern California Training and Testing Study Area* (U.S. Department of the Navy, 2017e), hereafter referred to as the Density Technical Report.

A variety of density data and density models are needed in order to develop a density database that encompasses the entirety of the HSTT Study Area. Because this data is collected using different methods with varying amounts of accuracy and uncertainty, the Navy has developed a hierarchy to ensure the most accurate data is used when available. The Density Technical Report describes these models in detail and provides detailed explanations of the models applied to each species density estimate. The below list describes models in order of preference.

1. Spatial density models are preferred and used when available because they provide an estimate with the least amount of uncertainty by deriving estimates for divided segments of the sampling area. These models (see Becker e*t al.,* 2016; Forney *et al.,* 2015) predict spatial variability of animal presence as a function of habitat variables (*e.g.,* sea surface temperature, seafloor depth, etc.). This model is developed for areas, species, and, when available, specific timeframes (months or seasons) with sufficient survey data; therefore, this model cannot be used for species with low numbers of sightings.

2. Stratified design-based density estimates use line-transect survey data with the sampling area divided (stratified) into sub-regions, and a density is predicted for each sub-region (see Barlow, 2016; Becker *et al.,* 2016; Bradford *et al.,* 2017; Campbell *et al.,* 2014; Jefferson *et al.,* 2014). While geographically stratified density estimates provide a better indication of a species' distribution within the study area, the uncertainty is typically high because each sub-region estimate is based on a smaller stratified segment of the overall survey effort.

3. Design-based density estimations use line-transect survey data from land and aerial surveys designed to cover a specific geographic area (see Carretta *et al.,* 2015). These estimates use the same survey data as stratified design-based estimates, but are not segmented into sub-regions and instead provide one estimate for a large surveyed area. Although relative environmental suitability (RES) models provide estimates for areas of the oceans that have not been surveyed using information on species occurrence and inferred habitat associations and have been used in past density databases, these models were not used in the current quantitative analysis. In the HSTT analysis, due to the availability of other density methods along the hierarchy the use of RES model was not necessary.

When interpreting the results of the quantitative analysis, as described in the Density Technical Report, ''it is important to consider that even the best estimate of marine species density is really a model representation of the values of concentration where these animals might occur. Each model is limited to the variables and assumptions considered by the original data source provider. No mathematical model representation of any biological population is perfect, and with regards to marine mammal biodiversity, any single model method will not completely explain the actual distribution and abundance of marine mammal species. It is expected that there would be anomalies in the results that need to be evaluated, with independent information for each case, to support if we might accept or reject a model or portions of the model (U.S. Department of the Navy, 2017a).''

The Navy's estimate of abundance (based on the density estimates used) in the HSTT Study Area may differ from population abundances estimated in the NMFS' SARS in some cases for a variety of reasons. Models may predict different population abundances for many reasons, including being based on different data sets, different areas, or different time periods. The SARs are often based on single years of NMFS surveys, whereas the models used by the Navy generally include multiple years of survey data from NMFS, the Navy, and other sources. To present a single, best estimate, the SARs often use a single season survey where they have the best spatial coverage (generally Summer). Navy models often use predictions for multiple seasons, where appropriate for the species, even when survey coverage in non-Summer seasons is limited, to characterize impacts over multiple seasons as Navy activities may occur in any season. Predictions may be made for different spatial extents. For example, the SAR encompasses the U.S. EEZ, while the HSTT Study area overlaps only part of the U.S. EEZ (specifically, the Pacific SAR overlaps only 35 percent of the Hawaii part of the HSTT Study Area and only about 14 percent of SOCAL), but alternately extends out significantly beyond it to the West. Many different, but equally valid, habitat and density modeling techniques exist and these can also be the cause of differences in population predictions. Differences in population estimates may be caused by a combination of these factors. Even similar estimates should be interpreted with caution and differences in models fully understood before drawing conclusions.

The global population structure of humpbacks, with 14 DPSs all associated with multiple feeding areas at which individuals from multiple DPSs convene, is another reason that SAR abundance estimates can differ from other estimates and be somewhat confusing—the same individuals are addressed in multiple SARs. For some species, the stock assessment for a given species may exceed the Navy's density prediction because those species' home range extends beyond the Study Area boundaries. For other species, the stock assessment abundance may be much less than the number of animals in the Navy's modeling because the HSTT Study Area extends well beyond the U.S. waters covered by the SAR abundance estimate. The primary source of density estimates are geographically specific survey data and either peer-reviewed line-transect estimates or habitat-based density models that have been extensively validated to provide the most accurate estimates possible.

These factors and others described in the Density Technical Report should be considered when examining the estimated impact numbers in comparison to current population abundance information for any given species or stock. For a detailed description of the density and assumptions made for each species, see the Density Technical Report.

NMFS coordinated with the Navy in the development of its take estimates and concurs that the Navy's approach for density appropriately utilizes the best available science. Later, in the *Analysis and Negligible Impact Determination* section, we assess how the estimated take numbers compare to stock abundance in order to better understand the potential number of individuals impacted, and the rationale for which abundance estimate is used is included there.

Take Requests

The HSTT FEIS/OEIS considered all training and testing activities proposed to occur in the HSTT Study Area that have the potential to result in the MMPA defined take of marine mammals. The Navy determined that the three stressors below could result in the incidental taking of marine mammals. NMFS has reviewed the Navy's data and analysis and determined that it is complete and accurate and agrees that the following stressors have the potential to result in takes of marine mammals from the Navy's planned activities.

- Acoustics (sonar and other transducers; air guns; pile driving/extraction).
- Explosives (explosive shock wave and sound (assumed to encompass the risk due to fragmentation)).
- Physical Disturbance and Strike (vessel strike).

NMFS reviewed, and agrees with, the Navy's conclusion that acoustic and explosive sources have the potential to result in incidental takes of marine mammals by harassment, serious injury, or mortality. NMFS carefully reviewed the Navy's analysis and conducted its own analysis of vessel strikes, determining that the likelihood of any particular species of large whale being struck is quite low. Nonetheless, NMFS agrees that vessel strikes have the potential to result in incidental take from serious injury or mortality for certain species of large whales and the Navy has specifically requested coverage for these species. Therefore, the likelihood of vessel strikes, and later the effects of the incidental take that is being authorized, has been fully analyzed and is described below.

The quantitative analysis process used for the HSTT FEIS/OEIS and the Navy's take request in the rulemaking/LOA application to estimate potential exposures to marine mammals resulting from acoustic and explosive stressors is detailed in the technical report titled *Quantifying Acoustic Impacts on Marine Mammals and Sea Turtles: Methods and Analytical Approach for Phase III Training and Testing report* (U.S. Department of the Navy, 2018). The Navy Acoustic Effects Model estimates acoustic and explosive effects without taking mitigation into account; therefore, the model overestimates predicted impacts on marine mammals within mitigation zones. To account for mitigation for marine species in the take estimates, the Navy conducts a quantitative assessment of mitigation. The Navy conservatively quantifies the manner in which mitigation is expected to reduce model-estimated PTS to TTS for exposures to sonar and other transducers, and reduce model-estimated mortality to injury for exposures to explosives. The extent to which the mitigation areas reduce impacts on the affected species and stocks is addressed separately in the *Analysis and Negligible Impact Determination* section.

The Navy assessed the effectiveness of its procedural mitigation measures on a per-scenario basis for four factors: (1) Species sightability, (2) a Lookout's ability to observe the range to PTS (for sonar and other transducers) and range to mortality (for explosives), (3) the portion of time when mitigation could potentially be conducted during periods of reduced daytime visibility (to include inclement weather and high sea-state) and the portion of time when mitigation could potentially be conducted at night, and (4) the ability for sound sources to be positively controlled (*e.g.,* powered down).

During training and testing activities, there is typically at least one, if not numerous, support personnel involved in the activity (*e.g.,* range support personnel aboard a torpedo retrieval boat or support aircraft). In addition to the Lookout posted for the purpose of mitigation, these additional personnel observe and disseminate marine species sighting information amongst the units participating in the activity whenever possible as they conduct their primary mission responsibilities. However, as a conservative approach to assigning mitigation effectiveness factors, the Navy elected to only account for the minimum number of required Lookouts used for each activity; therefore, the mitigation effectiveness factors may underestimate the likelihood that some marine mammals may be detected during activities that are supported by additional personnel who may also be observing the mitigation zone.

The Navy used the equations in the below sections to calculate the reduction in model-estimated mortality impacts due to implementing procedural mitigation.

Equation 1:

Mitigation Effectiveness = Species Sightability × Visibility × Observation Area × Positive Control

Species Sightability is the ability to detect marine mammals and is dependent on the animal's presence at the surface and the characteristics of the animal that influence its sightability. The Navy considered applicable data from the best available science to numerically approximate the sightability of marine mammals and determined the standard ''detection probability'' referred to as g(0) is most appropriate. Also, Visibility = 1 − sum of individual visibility reduction factors; Observation Area = portion of impact range that can be continuously observed during an event; and Positive Control = positive control factor of all sound sources involving mitigation. For further details on these mitigation effectiveness factors please refer to the technical report titled *Quantifying Acoustic Impacts on Marine Mammals and Sea Turtles: Methods and Analytical Approach for Phase III Training and Testing report* (U.S. Department of the Navy, 2018).

To quantify the number of marine mammals predicted to be sighted by Lookouts during implementation of procedural mitigation in the range to injury (PTS) for sonar and other transducers, the species sightability is multiplied by the mitigation effectiveness scores and number of model-estimated PTS impacts, as shown in the equation below:

Equation 2:

Number of Animals Sighted by Lookouts = Mitigation Effectiveness × Model-Estimated Impacts

The marine mammals sighted by Lookouts during implementation of mitigation in the range to PTS, as calculated by the equation above, would avoid being exposed to these higher level impacts. To quantify the number of marine mammals predicted to be sighted by Lookouts during implementation of procedural mitigation in the range to mortality during events using explosives, the species sightability is multiplied by the mitigation effectiveness scores and number of model-estimated mortality impacts, as shown in equation 1 above. The marine mammals predicted to be sighted by Lookouts during implementation of procedural mitigation in the range to mortality, as calculated by the above equation 2, are predicted to avoid exposure in these ranges. The Navy corrects the category of predicted impact for the number of animals sighted within the mitigation zone, but does not modify the total number of animals predicted to experience impacts from the scenario. For example, the number of animals sighted (*i.e.,* number of animals that will avoid mortality) is first subtracted from the model-predicted mortality impacts, and then added to the model-predicted injurious impacts.

NMFS coordinated with the Navy in the development of this quantitative method to address the effects of procedural mitigation on acoustic and explosive exposures and takes, and NMFS independently reviewed and concurs with the Navy that it is appropriate to incorporate the quantitative assessment of mitigation into the take estimates based on the best available science. For additional information on the quantitative analysis process and mitigation measures, refer to the technical report titled *Quantifying Acoustic Impacts on Marine Mammals and Sea Turtles: Methods and Analytical Approach for Phase III Training and Testing report* (U.S. Department of the Navy, 2018) and Chapter 6 (Take Estimates for Marine Mammals) and Chapter 11 (Mitigation Measures) of the Navy's rulemaking/LOA application.

In summary, we believe the Navy's methods, including the method for incorporating mitigation and avoidance, are the most appropriate methods for predicting PTS and TTS. But even with the consideration of mitigation and avoidance, given some of the more conservative components of the methodology (*e.g.,* the thresholds do not consider ear recovery between pulses), we would describe the application of these methods as identifying the maximum number of instances in which marine mammals would be reasonably expected to incur either TTS or PTS.

Summary of Requested Take From Training and Testing Activities

As a general matter, NMFS does not prescribe the methods for estimating take for any applicant, but we review and ensure that applicants use the best available science, and methodologies that are logical and technically sound. Applicants may use different methods of calculating take (especially when using models) and still get to a result that is representative of the best available science and that allows for a rigorous and accurate evaluation of the effects on the affected populations. There are multiple pieces of the Navy take estimation methods—propagation models, animat animal movement models, and behavioral thresholds, for example. NMFS evaluates the acceptability of these pieces as they evolve and are used in different rules and impact analyses. Some of the pieces of the Navy's take estimation process have been used in their rules since 2009 and undergone multiple public comment processes, all of them have undergone extensive internal Navy review, and all of them have undergone comprehensive review by NMFS, which has sometimes resulted in modifications to methods or models.

The Navy uses rigorous review processes (verification, validation, and accreditation processes, peer and public review) to ensure the data and methodology it uses represent the best available science. For instance, the NAEMO (animal movement) model is the result of a NMFS-led Center for Independent Experts (CIE) review of the components used in earlier models. The acoustic propagation component of the NAEMO model (CASS/GRAB) is accredited by the Oceanographic and Atmospheric Master Library (OAML), and many of the environmental variables used in the NAEMO model come from approved OAML databases and are based on in-situ data collection. The animal density components of the NAEMO model are base products of the Navy Marine Species Density Database, which includes animal density components that have been validated and reviewed by a variety of scientists from NMFS Science Centers and academic institutions. Several components of the model, for example the Duke University habitat-based density models, have been published in peer reviewed literature. Others like AMAPPS, which was conducted by NMFS Science Centers, have undergone quality assurance and quality control (QA/QC) processes. Finally the NAEMO model simulation components underwent QA/QC review and validation for model parts such as the scenario builder, acoustic builder, scenario simulator, etc., conducted by qualified statisticians and modelers to ensure accuracy. Other models and methodologies have gone through similar review processes.

Based on the methods discussed in the previous sections and the Navy's model and the quantitative assessment of mitigation, the Navy provided its take request for acoustic and explosive sources for training and testing activities both annually (based on the maximum number of activities per 12-month period) and over a 5-year period. NMFS has reviewed the Navy's data and analysis and determined that it is complete and accurate and that the takes by harassment as well as the takes by serious injury or mortality from explosives requested for authorization are reasonably expected to occur and that the takes by serious injury or mortality could occur as a result of vessel strikes. Five-year total impacts may be less than the sum total of each year because although the annual estimates are based on the maximum estimated takes, five-year estimates are based on the sum of two maximum years and three nominal years.

Authorized Take From Training Activities

For training activities, Table 41 summarizes the Navy's take request and the maximum amount and type of Level A and Level B harassment that NMFS concurs is reasonably likely to occur by species or stock. Authorized mortality is addressed further below. Navy Figures 6–12 through 6–50 in Chapter 6 of the Navy's rulemaking/LOA application illustrate the comparative amounts of TTS and Level B behavioral harassment for each species, noting that if a ''taken'' animat was exposed to both TTS and Level B behavioral harassment, it was recorded as a TTS.

TABLE 41—SPECIES AND STOCK-SPECIFIC TAKE FROM ACOUSTIC AND EXPLOSIVE EFFECTS FOR ALL TRAINING ACTIVITIES IN THE HSTT STUDY AREA

Species	Stock	Annual		5-Year total **	
		Level B harassment	Level A harassment	Level B harassment	Level A harassment
Suborder Mysticeti (baleen whales)					
Family Balaenopteridae (rorquals)					
Blue whale *	Central North Pacific	34	0	139	0
	Eastern North Pacific	1,155	1	5,036	3
Bryde's whale †	Eastern Tropical Pacific	27	0	118	0
	Hawaii †	105	0	429	0
Fin whale *	CA/OR/WA	1,245	0	5,482	0
	Hawaii	33	0	133	0
Humpback whale †	CA/OR/WA †	1,254	1	5,645	3
	Central North Pacific	5,604	1	23,654	6
Minke whale	CA/OR/WA	649	1	2,920	4
	Hawaii	3,463	1	13,664	2
Sei whale *	Eastern North Pacific	53	0	236	0
	Hawaii	118	0	453	0
Family Eschrichtiidae					
Gray whale †	Eastern North Pacific	2,751	5	11,860	19
	Western North Pacific †	4	0	14	0
Suborder Odontoceti (toothed whales)					
Family Physeteridae (sperm whale)					
Sperm whale *	CA/OR/WA	1,397	0	6,257	0
	Hawaii	1,714	0	7,078	0
Family Kogiidae (sperm whales)					
Dwarf sperm whale	Hawaii	13,961	35	57,571	148
Pygmy sperm whale	Hawaii	5,556	16	22,833	64
Kogia whales	CA/OR/WA	6,012	23	27,366	105
Family Ziphiidae (beaked whales)					
Baird's beaked whale	CA/OR/WA	1,317	0	6,044	0
Blainville's beaked whale	Hawaii	3,687	0	16,364	0
Cuvier's beaked whale	CA/OR/WA	7,016	0	33,494	0
	Hawaii	1,235	0	5,497	0
Longman's beaked whale	Hawaii	13,010	0	57,172	0
Mesoplodon spp	CA/OR/WA	3,778	0	18,036	0
Family Delphinidae (dolphins)					
Bottlenose dolphin	California Coastal	214	0	876	0
	CA/OR/WA Offshore	31,986	2	142,966	9
	Hawaii Pelagic	2,086	0	9,055	0
	Kauai & Niihau	74	0	356	0
	Oahu	8,186	1	40,918	7
	4-Island	152	0	750	0
	Hawaii Island	42	0	207	0
False killer whale †	Hawaii Pelagic	701	0	3,005	0
	Main Hawaiian Islands Insular †	405	0	1,915	0
	Northwestern Hawaiian Islands	256	0	1,094	0
Fraser's dolphin	Hawaii	28,409	1	122,784	3
Killer whale	Eastern North Pacific Offshore	73	0	326	0
	Eastern North Pacific Transient/West Coast Transient.	135	0	606	0
	Hawaii	84	0	352	0

TABLE 41—SPECIES AND STOCK-SPECIFIC TAKE FROM ACOUSTIC AND EXPLOSIVE EFFECTS FOR ALL TRAINING ACTIVITIES IN THE HSTT STUDY AREA—Continued

Species	Stock	Annual		5-Year total **	
		Level B harassment	Level A harassment	Level B harassment	Level A harassment
Long-beaked common dolphin	California	128,994	14	559,540	69
Melon-headed whale	Hawaiian Islands	2,335	0	9,705	0
	Kohala Resident	182	0	913	0
Northern right whale dolphin	CA/OR/WA	56,820	8	253,068	40
Pacific white-sided dolphin	CA/OR/WA	43,914	3	194,882	12
Pantropical spotted dolphin	Hawaii Island	2,585	0	12,603	0
	Hawaii Pelagic	6,809	0	29,207	0
	Oahu	4,127	0	20,610	0
	4-Island	260	0	1,295	0
Pygmy killer whale	Hawaii	5,816	0	24,428	0
	Tropical	471	0	2,105	0
Risso's dolphin	CA/OR/WA	76,276	6	338,560	30
	Hawaii	6,590	0	28,143	0
Rough-toothed dolphin	Hawaii	4,292	0	18,506	0
	NSD [1]	0	0	0	0
Short-beaked common dolphin	CA/OR/WA	932,453	45	4,161,283	216
Short-finned pilot whale	CA/OR/WA	990	1	4,492	5
	Hawaii	8,594	0	37,077	0
Spinner dolphin	Hawaii Island	89	0	433	0
	Hawaii Pelagic	3,138	0	12,826	0
	Kauai & Niihau	310	0	1,387	0
	Oahu & 4-Island	1,493	1	7,445	5
Striped dolphin	CA/OR/WA	119,219	1	550,936	3
	Hawaii	5,388	0	22,526	0
Family Phocoenidae (porpoises)					
Dall's porpoise	CA/OR/WA	27,282	137	121,256	634
Suborder Pinnipedia					
Family Otariidae (eared seals)					
California sea lion	U.S	69,543	90	327,136	447
Guadalupe fur seal *	Mexico	518	0	2,386	0
Northern fur seal	California	9,786	0	44,017	0
Family Phocidae (true seals)					
Harbor seal	California	3,119	7	13,636	34
Hawaiian monk seal *	Hawaii	139	1	662	3
Northern elephant seal	California	38,169	72	170,926	349

Note: Kogia: Pygmy and dwarf sperm whales are difficult to distinguish between at sea, and abundance estimates are only available for Kogia spp (reported in Barlow 2016 and Carretta et al. 2017). Due to low estimated abundances of CA/OR/WA dwarf sperm whales, the majority of Kogia in the HSTT Study Area are anticipated to be CA/OR/WA pygmy sperm whales.

Mesoplodon: No methods are available to distinguish between the six species of Mesoplodon beaked whales in the CA/OR/WA 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). These six species are managed as one unit.

* ESA-listed species (all stocks) within the HSTT Study Area.

** 5-year total impacts may be less than sum total of each year. Not all activities occur every year; some activities occur multiple times within a year; and some activities only occur a few times over course of a 5-year period.

† Only designated stocks are ESA-listed.

[1] NSD: No stock designation.

Authorized Take From Testing Activities

For testing activities, Table 42 summarizes the Navy's take request and the maximum amount and type of take by Level A and Level B harassment that NMFS concurs is reasonably likely to occur and has authorized by species or stock. Navy Figures 6–12 through 6–50 in Chapter 6 of the Navy's rulemaking/ LOA application illustrate the comparative amounts of TTS and Level B behavioral harassment for each species, noting that if a ''taken'' animat was exposed to both TTS and Level B behavioral harassment in the model, it was recorded as a TTS.

TABLE 42—SPECIES AND STOCK-SPECIFIC TAKE FROM ACOUSTIC AND EXPLOSIVE SOUND SOURCE EFFECTS FOR ALL TESTING ACTIVITIES IN THE HSTT STUDY AREA

Species	Stock	Annual		5-year total **	
		Level B harassment	Level A harassment	Level B harassment	Level A harassment
Suborder Mysticeti (baleen whales)					
Family Balaenopteridae (rorquals)					
Blue whale *	Central North Pacific	14	0	65	0
	Eastern North Pacific	833	0	4,005	0
Bryde's whale †	Eastern Tropical Pacific	14	0	69	0
	Hawaii †	41	0	194	0
Fin whale *	CA/OR/WA	980	1	4,695	3
	Hawaii	15	0	74	0
Humpback whale †	CA/OR/WA †	740	0	3,508	0
	Central North Pacific	3,522	2	16,777	11
Minke whale	CA/OR/WA	276	0	1,309	0
	Hawaii	1,467	1	6,918	4
Sei whale *	Eastern North Pacific	26	0	124	0
	Hawaii	49	0	229	0
Family Eschrichtiidae					
Gray whale †	Eastern North Pacific	1,920	2	9,277	7
	Western North Pacific †	2	0	11	0
Suborder Odontoceti (toothed whales)					
Family Physeteridae (sperm whale)					
Sperm whale *	CA/OR/WA	1,096	0	5,259	0
	Hawaii	782	0	3,731	0
Family Kogiidae (sperm whales)					
Dwarf sperm whale	Hawaii	6,459	29	30,607	140
Pygmy sperm whale	Hawaii	2,595	13	12,270	60
Kogia whales	CA/OR/WA	3,120	15	14,643	67
Family Ziphiidae (beaked whales)					
Baird's beaked whale	CA/OR/WA	727	0	3,418	0
Blainville's beaked whale	Hawaii	1,698	0	8,117	0
Cuvier's beaked whale	CA/OR/WA	4,484	1	21,379	20
	Hawaii	561	0	2,675	0
Longman's beaked whale	Hawaii	6,223	0	29,746	0
Mesoplodon spp	CA/OR/WA	2,415	1	11,512	11
Family Delphinidae (dolphins)					
Bottlenose dolphin	California Coastal	1,595	0	7,968	0
	CA/OR/WA Offshore	23,436	1	112,410	4
	Hawaii Pelagic	1,242	0	6,013	0
	Kauai & Niihau	491	0	2,161	0
	Oahu	475	0	2,294	0
	4-Island	207	0	778	0
	Hawaii Island	38	0	186	0
False killer whale †	Hawaii Pelagic	340	0	1,622	0
	Main Hawaiian Islands Insular †	184	0	892	0
	Northwestern Hawaiian Islands	125	0	594	0
Fraser's dolphin	Hawaii	12,664	1	60,345	6
Killer whale	Eastern North Pacific Offshore	34	0	166	0
	Eastern North Pacific Transient/ West Coast Transient.	64	0	309	0
	Hawaii	40	0	198	0
Long-beaked common dolphin	California	118,278	6	568,020	24
Melon-headed whale	Hawaiian Islands	1,157	0	5,423	0
	Kohala Resident	168	0	795	0
Northern right whale dolphin	CA/OR/WA	41,279	3	198,917	15
Pacific white-sided dolphin	CA/OR/WA	31,424	2	151,000	8
Pantropical spotted dolphin	Hawaii Island	1,409	0	6,791	0
	Hawaii Pelagic	3,640	0	17,615	0
	Oahu	202	0	957	0

TABLE 42—SPECIES AND STOCK-SPECIFIC TAKE FROM ACOUSTIC AND EXPLOSIVE SOUND SOURCE EFFECTS FOR ALL TESTING ACTIVITIES IN THE HSTT STUDY AREA—Continued

Species	Stock	Annual		5-year total **	
		Level B harassment	Level A harassment	Level B harassment	Level A harassment
	4-Island	458	0	1,734	0
Pygmy killer whale	Hawaii	2,708	0	13,008	0
	Tropical	289	0	1,351	0
Risso's dolphin	CA/OR/WA	49,985	3	240,646	16
	Hawaii	2,808	0	13,495	0
Rough-toothed dolphin	Hawaii	2,193	0	10,532	0
	NSD [1]	0	0	0	0
Short-beaked common dolphin	CA/OR/WA	560,120	44	2,673,431	216
Short-finned pilot whale	CA/OR/WA	923	0	4,440	0
	Hawaii	4,338	0	20,757	0
Spinner dolphin	Hawaii Island	202	0	993	0
	Hawaii Pelagic	1,396	0	6,770	0
	Kauai & Niihau	1,436	0	6,530	0
	Oahu & 4-Island	331	0	1,389	0
Striped dolphin	CA/OR/WA	56,035	2	262,973	11
	Hawaiian	2,396	0	11,546	0
Family Phocoenidae (porpoises)					
Dall's porpoise	CA/OR/WA	17,091	72	81,611	338
Suborder Pinnipedia					
Family Otariidae (eared seals)					
California sea lion	U.S.	48,665	6	237,870	23
Guadalupe fur seal *	Mexico	939	0	4,357	0
Northern fur seal	California	5,505	1	26,168	4
Family Phocidae (true seals)					
Harbor seal	California	2,325	1	11,258	7
Hawaiian monk seal *	Hawaii	66	0	254	0
Northern elephant seal	California	22,702	27	107,343	131

Note: Kogia: Pygmy and dwarf sperm whales are difficult to distinguish between at sea, and abundance estimates are only available for Kogia spp (reported in Barlow 2016 and Carretta et al. 2017). Due to low estimated abundances of CA/OR/WA dwarf sperm whales, the majority of Kogia in the HSTT Study Area are anticipated to be CA/OR/WA pygmy sperm whales.

Mesoplodon: No methods are available to distinguish between the six species of Mesoplodon beaked whales in the CA/OR/WA 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). These six species are managed as one unit.

* ESA-listed species (all stocks) within the HSTT Study Area.

** 5-year total impacts may be less than sum total of each year. Not all activities occur every year; some activities occur multiple times within a year; and some activities only occur a few times over course of a 5-year period.

† Only designated stocks are ESA-listed.

[1] NSD: No stock designation.

Take From Vessel Strikes and Explosives by Serious Injury or Mortality

Vessel Strike

Vessel strikes from commercial, recreational, and military vessels are known to affect large whales and have resulted in serious injury and occasional fatalities to cetaceans (Berman-Kowalewski *et al.,* 2010; Calambokidis, 2012; Douglas *et al.,* 2008; Laggner 2009; Lammers *et al.,* 2003). Records of collisions date back to the early 17th century, and the worldwide number of collisions appears to have increased steadily during recent decades (Laist *et al.,* 2001; Ritter 2012).

Numerous studies of interactions between surface vessels and marine mammals have demonstrated that free-ranging marine mammals often, but not always (*e.g.,* McKenna *et al.,* 2015), engage in avoidance behavior when surface vessels move toward them. It is not clear whether these responses are caused by the physical presence of a surface vessel, the underwater noise generated by the vessel, or an interaction between the two (Amaral and Carlson, 2005; Au and Green, 2000; Bain *et al.,* 2006; Bauer, 1986; Bejder *et al.,* 1999; Bejder and Lusseau, 2008; Bejder *et al.,* 2009; Bryant *et al.,* 1984; Corkeron, 1995; Erbe, 2002; Félix, 2001; Goodwin and Cotton, 2004; Lemon *et al.,* 2006; Lusseau, 2003; Lusseau, 2006; Magalhaes *et al.,* 2002; Nowacek *et al.,* 2001; Richter *et al.,* 2003; Scheidat *et al.,* 2004; Simmonds, 2005; Watkins, 1986; Williams *et al.,* 2002; Wursig *et al.,* 1998). Several authors suggest that the noise generated during motion is probably an important factor (Blane and Jaakson, 1994; Evans *et al.,* 1992; Evans *et al.,* 1994). Water disturbance may also be a factor. These studies suggest that the behavioral responses of marine mammals to surface vessels are similar to their behavioral responses to predators. Avoidance behavior is expected to be even stronger in the subset of instances that the Navy is conducting training or testing activities using active sonar or explosives.

The most vulnerable marine mammals are those that spend extended periods of time at the surface in order to restore oxygen levels within their tissues after deep dives (*e.g.,* sperm whales). In addition, some baleen whales seem generally unresponsive to vessel sound, making them more susceptible to vessel collisions (Nowacek *et al.,* 2004). These species are primarily large, slow moving whales.

Some researchers have suggested the relative risk of a vessel strike can be assessed as a function of animal density and the magnitude of vessel traffic (*e.g.,* Fonnesbeck *et al.,* 2008; Vanderlaan *et al.,* 2008). Differences among vessel types also influence the probability of a vessel strike. The ability of any ship to detect a marine mammal and avoid a collision depends on a variety of factors, including environmental conditions, ship design, size, speed, and ability and number of personnel observing, as well as the behavior of the animal. Vessel speed, size, and mass are all important factors in determining if injury or death of a marine mammal is likely due to a vessel strike. For large vessels, speed and angle of approach can influence the severity of a strike. For example, Vanderlaan and Taggart (2007) found that between vessel speeds of 8.6 and 15 knots, the probability that a vessel strike is lethal increases from 0.21 to 0.79. Large whales also do not have to be at the water's surface to be struck. Silber *et al.* (2010) found when a whale is below the surface (about one to two times the vessel draft), there is likely to be a pronounced propeller suction effect. This suction effect may draw the whale into the hull of the ship, increasing the probability of propeller strikes.

There are some key differences between the operation of military and non-military vessels, which make the likelihood of a military vessel striking a whale lower than some other vessels (*e.g.,* commercial merchant vessels). Key differences include:

- Many military ships have their bridges positioned closer to the bow, offering better visibility ahead of the ship (compared to a commercial merchant vessel).
- There are often aircraft associated with the training or testing activity (which can serve as Lookouts), which can more readily detect cetaceans in the vicinity of a vessel or ahead of a vessel's present course before crew on the vessel would be able to detect them.
- Military ships are generally more maneuverable than commercial merchant vessels, and if cetaceans are spotted in the path of the ship, could be capable of changing course more quickly.
- The crew size on military vessels is generally larger than merchant ships, allowing for stationing more trained Lookouts on the bridge. At all times when vessels are underway, trained Lookouts and bridge navigation teams are used to detect objects on the surface of the water ahead of the ship, including cetaceans. Additional Lookouts, beyond those already stationed on the bridge and on navigation teams, are positioned as Lookouts during some training events.
- When submerged, submarines are generally slow moving (to avoid detection) and therefore marine mammals at depth with a submarine are likely able to avoid collision with the submarine. When a submarine is transiting on the surface, there are Lookouts serving the same function as they do on surface ships.

Vessel strike to marine mammals is not associated with any specific training or testing activity but is rather an extremely limited and sporadic, but possible, accidental result of Navy vessel movement within the HSTT Study Area or while in transit.

There have been two recorded Navy vessel strikes of large whales in the HSTT Study Area from 2009 through 2018, the period in which Navy began implementing effective mitigation measures to reduce the likelihood of vessel strikes. Both strikes occured in 2009 and both were to fin whales. In order to account for the accidental nature of vessel strikes to large whales in general, and the potential risk from any vessel movement within the HSTT Study Area within the five-year period in particular, the Navy requested incidental takes based on probabilities derived from a Poisson distribution using ship strike data between 2009–2016 in the HSTT Study Area (the time period from when current mitigations were instituted until the Navy conducted the analysis for the EIS/OEIS and rulemaking/LOA application; no new strikes have occurred since), as well as historical at-sea days in the HSTT Study Area from 2009–2016 and estimated potential at-sea days for the period from 2018 to 2023 covered by the requested regulations. This distribution predicted the probabilities of a specific number of strikes (n=0, 1, 2, etc.) over the period from 2018 to 2023. The analysis is described in detail in Chapter 6 of the Navy's rulemaking/LOA application (and further refined in the Navy's revised ship strike analysis posted on NMFS' website *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-military-readiness-activities*).

For the same reasons listed above describing why a Navy vessel strike is comparatively unlikely, it is highly unlikely that a Navy vessel would strike a whale, dolphin, porpoise, or pinniped without detecting it and, accordingly, NMFS is confident that the Navy's reported strikes are accurate and appropriate for use in the analysis. Specifically, Navy ships have multiple Lookouts, including on the forward part of the ship that can visually detect a hit animal, in the unlikely event ship personnel do not feel the strike (which has occasionally occurred). Navy's strict internal procedures and mitigation requirements include reporting of any vessel strikes of marine mammals, and the Navy's discipline, extensive training (not only for detecting marine mammals, but for detecting and reporting any potential navigational obstruction), and strict chain of command give NMFS a high level of confidence that all strikes actually get reported.

The Navy used those two fin whale strikes in their calculations to determine the number of strikes likely to result from their activities (although worldwide strike information, from all Navy activities and other strikes, was used to inform the species that may be struck) and evaluated data beginning in 2009, as that was the start of the Navy's Marine Species Awareness Training and adoption of additional mitigation measures to address ship strike, which will remain in place along with additional mitigation measures during the five years of this rule.

The probability analysis concluded that there was a 29 percent chance that zero whales would be struck by Navy vessels over the five-year period, indicating a 71 percent chance that at least one whale would be struck over the five years and a 10 percent chance of striking three whales over the five-year period. Therefore, the Navy estimates, and NMFS agrees, that there is some probability that the Navy could strike, and take by serious injury or mortality, up to three large whales incidental to training and testing activities within the HSTT Study Area over the course of the five years.

Small delphinids, porpoises, and pinnipeds are neither expected nor authorized to be struck by Navy vessels. In addition to the reasons listed above that make it unlikely that the Navy will hit a large whale (more maneuverable ships, larger crew, etc.), following are the additional reasons that vessel strike of dolphins, small whales, porpoises, and pinnipeds is considered very unlikely. Dating back more than 20 years and for as long as it has kept records, the Navy has no records of individuals of these groups being struck by a vessel as a result of Navy activities and, further, their smaller size and maneuverability make a strike unlikely. Also, NMFS has never received any reports from other authorized activities indicating that these species have been struck by vessels. Worldwide ship strike records show little evidence of strikes of these groups from the shipping sector and larger vessels and the majority of the Navy's activities involving faster-moving vessels (that could be considered more likely to hit a marine mammal) are located in offshore areas where smaller delphinid, porpoise, and pinniped densities are lower. Based on this information, NMFS concurs with the Navy's assessment and recognizes the potential for (and is authorizing) incidental take by vessel strike of large whales only (*i.e.,* no dolphins, small whales, porpoises, or pinnipeds) over the course of the five-year regulations from training and testing activities as discussed below.

For large whales, the Navy's application identified the distribution of species over which the take request would apply based on the species/stocks most likely to be present in the HSTT Study Area based on documented abundance and where overlap occurs between a species' distribution and core Navy training and testing areas within the HSTT Study Area. To determine which species may be struck, the Navy used a weight of evidence approach to qualitatively rank range complex specific species using historic and current stranding data from NMFS, relative abundance as derived by NMFS for the HSTT Biological Opinion, and the Navy-funded monitoring data within each range complex. Results of this approach are presented in Table 5–4 of the Navy's rulemaking/LOA application.

Based on the analysis described above and in its application, the Navy estimated that it has the potential to strike, and take by serious injury or mortality, up to three large whales incidental to the specified activity over the course of the five years of the HSTT regulations. The Navy initially requested incidental take authorization for up to two of any the following stocks in the five-year period: gray whale (Eastern North Pacific stock), fin whale (CA/OR/WA stock), humpback whale (CA/OR/WA stock, Mexico DPS), humpback whale (Central North Pacific stock), and sperm whale (Hawaii stock). The Navy also initially requested incidental take authorization for one of any the following species over the five-year period: blue whale (Eastern North Pacific stock), Bryde's whale (Eastern Tropical Pacific stock), Bryde's whale (Hawaii stock), humpback whale (CA/OR/WA stock, Central America DPS), minke whale (CA/OR/WA stock), minke whale (Hawaii stock), sperm whale (CA/OR/WA stock), sei whale (Hawaii stock), and sei whale (Eastern North Pacific stock).

NMFS independently reviewed this analysis and agrees that three ship strikes have at least the potential to occur and, therefore, that the request for mortal takes of three large whales over the five-year period of the rule is reasonable based on the available strike data (two strikes by Navy over approximately 10 years) and the Navy's probability analysis. Based on the reasons described below, however, NMFS does not agree that two mortal takes of humpback whale (CA/OR/WA stock) or sperm whales are likely, or that any strike of the following whale species is remotely likely: Minke whale (CA/OR/WA stock), minke whale (Hawaii stock), sei whale (Hawaii stock), sei whale (Eastern North Pacific stock), Bryde's whale (Eastern Tropical Pacific stock), sperm whale (CA/OR/WA stock) and Bryde's whale (Hawaii stock).

Since the proposed rule was published, NMFS and the Navy re-examined and re-analyzed the available information regarding how many of any given stock could be struck and should be authorized for lethal take. As noted in the proposed rule, the Navy initially considered a weight of evidence approach that considered relative abundance, historical strike data over many years, and the overlap of Navy activities with the stock distribution in their request. Since the proposed rule, NMFS and the Navy further discussed the available information and considered two factors in addition to those considered in the Navy's additional request: (1) The relative likelihood of hitting one stock versus another based on available strike data from all vessel types as denoted in the SARs and (2) whether the Navy has ever definitively struck an individual from a particular stock and, if so, how many times.

To address number (1) above, NMFS compiled information from NMFS' SARs on detected annual rates of large whale serious injury and mortality from vessel collisions. The annual rates of large whale serious injury and mortality from vessel collisions from the SARs help inform the relative susceptibility of large whale species to vessel strike in SOCAL and Hawaii as recorded systematically over the last five years. We summed the annual rates of mortality and serious injury from vessel collisions as reported in the SARs, then divided each species' annual rate by this sum to get the relative likelihood. To estimate the percent likelihood of striking a particular species of large whale, we multiplied the relative likelihood of striking each species by the total probability of striking a whale (*i.e.,* 71 percent, as described by the Navy's probability analysis above). We also calculated the percent likelihood of striking a particular species of large whale twice by squaring the value estimated for the probability of striking a particular species of whale once (*i.e.,* to calculate the probability of an event occurring twice, multiply the probability of the first event by the second). We note that these probabilities vary from year to year as the average annual mortality for a given five-year window changes (and we include the annual averages from 2017 and 2018 SARs in Table 43 to illustrate), however, over the years and through changing SARs, stocks tend to consistently maintain a relatively higher or relatively lower likelihood of being struck.

The probabilities calculated as described above are then considered in combination with the information indicating the species that the Navy has definitively hit in the HSTT Study Area since 1991 (since they started tracking consistently), as well as the information originally considered by the Navy in their application, which includes relative abundance, total recorded strikes, and the overlay of all of this information with the Navy's action area. We note that for all of the mortal take of species specifically denoted in Table 43 below, 19 percent of the individuals struck overall by any vessel type remained unidentified and 36 percent of those struck by the Navy (5 of 14 in the Pacific) remained unidentified. However, given the information on known stocks struck, the analysis below remains appropriate. We also note that Rockwood *et al.* (2017) modeled the likely vessel strike of blue whales, fin whales, and humpback whales on the U.S. West Coast (discussed in more detail in the Serious Injury and Mortality subsection of the *Analysis and Negligible Impact Determination* section), and those numbers help inform the relative likelihood that the Navy will hit those stocks.

For each indicated stock, Table 43 includes the percent likelihood of hitting an individual whale once based on SAR data, total strikes from Navy vessels and from all other vessels, relative abundance, and modeled vessel strikes from Rockwood *et al.* The last column indicates the annual mortality authorized: those stocks with one M/SI take authorized over the five-year period of the rule are shaded lightly, while those with two M/SI takes authorized over the five-year period of the rule are shaded more darkly.

Table 43. Summary of factors considered in determining the number of individuals in each stock potentially struck by a vessel.

ESA status	Species	Stock	Percent likelihood of hitting individual from stock once		Total Known ***Navy*** Strikes in HSTT Study Area	Summarized from compilation in Navy application**		Rockwood et al., 2017 modeled vessel strikes***	Annual Author-ized Take
			2017 SAR	2018 SAR		Review of all NMFS' strike data - # of total strikes**	Relative Abundan ce		
Listed	Blue whale	Central North Pacific	0	-	0	0	0.016	-	-
		Eastern North Pacific	5.8	2	1 in SOCAL	14	0.103	18	0.2
	Fin whale	CA/OR/WA	16.2	15.7	2 in SOCAL	21	0.46	43	0.4
		Hawaii	0	-	0	0	0.027	-	-
	Humpback whale*	CA/OR/WA stock, Mexico	9.9*	20.5*	No	15*	0.041	22	0.2
	Sei whale	Eastern North Pacific	0	2	No	1	0.007	-	-
		Hawaii	0	-	No	0	0.041	-	-
	Gray whale	Western North Pacific	0	0	No	-	0	-	-
	Sperm whale	CA/OR/WA	1.8	2	No	1	0.107	-	-
		Hawaii	0	-	1 in HRC	2	0.487	-	0.2
Not listed	Gray whale	Eastern North Pacific	18	7.8	3 in SOCAL	35	0.25	-	0.4
	Bryde's whale	Eastern Tropical Pacific	0.2	-	No	0	0	-	-
		Hawaii	0	-	No	0	0.048	-	-
	Minke whale	CA/OR/WA	0	-	No	0	0.032	-	-
		Hawaii	0	-	No	0	0.027	-	-
	Humpback whale	Central North Pacific	18	19.3	2 in HRC	58	0.245	-	0.4

* Humpback information applies to CA/OR/WA stock, Mexico DPS only. Text explains why takes in SOCAL come from Mexico DPS.

** The Navy compiled information related to vessel strike in Sec 5.2 of application, this column sums information presented on pg 5-11, which comes from multiple NMFS datasets and goes back to 1991 in SOCAL and 1975 in HI.

*** Rockwood et al. modeled likely annual vessel strikes off the West Coast for these three species only.

Accordingly, stocks that have no record of ever having been struck by any vessel are considered unlikely to be struck by the Navy in the five-year period of the rule. Stocks that have never been struck by the Navy, have rarely been struck by other vessels, and have a low percent likelihood based on the SAR calculation and a low relative abundance are also considered unlikely to be struck by the Navy during the five-year rule. We note that while vessel strike records have not differentiated between Eastern North Pacific and Western North Pacific gray whales, given their small population size and the comparative rarity with which individuals from the Western North Pacific stock are detected off the U.S. West Coast, it is highly unlikely that they would be encountered, much less struck. This rules out all but six stocks.

Three of the six stocks (CA/OR/WA stock of fin whale, Eastern North Pacific stock of gray whale, and Central North Pacific stock of humpback whale) are the only stocks to have been hit more than one time each by the Navy in the HSTT StudyAarea, have the three highest total strike records (21, 35, and 58 respectively), have three of the four highest percent likelihoods based on the SAR records, have three of the four significantly higher relative abundances, and have up to a 3 or 4 percent likelihood of being struck twice based on NMFS' SAR calculation (not shown in Table 43, but proportional to percent likelihood of being struck once). Based on all of these factors, it is considered reasonably likely that these stocks could be struck twice during the five-year rule.

Based on the information summarized in Table 43 and the fact that we expect three large whales could be struck, it is considered reasonably likely that one individual from the remaining three stocks could be struck. Sperm whales have only been struck a total of two times by any vessel type in the whole HSTT Study Area, however, the Navy struck a sperm whale once in Hawaii prior to 2009 and the relative abundance of sperm whales in Hawaii is the highest of any of the stocks present. Therefore, we consider it reasonably likely that the Hawaii stock of sperm whales could be struck once during the five-year rule. The total strikes of Eastern North Pacific blue whales, the percent likelihood of striking one based on the SAR calculation, and their relative abundance can all be considered moderate compared to other stocks and the Navy has struck one in the past prior to 2009 (with the likelihood of striking two based on the SAR calculation being below one percent). Therefore, we consider it reasonably likely that the Navy could strike one individual over the course of the five-year rule. The Navy has not hit a humpback whale in the HSTT Study Area and their relative abundance is very low. However, the Navy has struck a humpback whale in the Northwest and as a species, humpbacks have a moderate to high number of total strikes and percent likelihood of being struck. Although the likelihood of CA/OR/WA humpback whales being struck overall is moderate to high relative to other stocks, the distribution of the Mexico DPS versus the Central America DPS, as well as the distribution of overall vessel strikes inside versus outside of the SOCAL area (the majority are outside), supports the reasonable likelihood that the Navy could strike one individual humpback whale (not two), and that that individual would be highly likely to be from the Mexico DPS, as described below.

Specifically, regarding the likelihood of striking a humpback whale from a particular DPS, as suggested in Wade *et al.* (2016), the probability of encountering (which is thereby applied to striking) humpback whales from each DPS in the CA/OR area is 89.6 percent and 19.7 percent for the Mexico and Central America DPSs, respectively (note that these percentages reflect the upper limit of the 95 percent confidence interval to reduce the likelihood of underestimating take, and thereby do not total to 100). This suggests that the chance of striking a whale from the Central America DPS is one tenth to one fifth of the overall chance of hitting a CA/OR/WA humpback whale in general in the SOCAL part of the HSTT Study Area, which in combination with the fact that no humpback whale has been struck in SOCAL makes it highly unlikely, and thereby none from the Central America DPS are anticipated or authorized. If a humpback whale were struck in SOCAL, it is likely it would be of the Mexico DPS. However, regarding the overall likelihood of striking a humpback whale at all and the likely number of times, we note that the majority of strikes of the CA/OR/WA humpback whale (*i.e.,* the numbers reflected in Table 43) take place outside of SOCAL and, whereas the comparative DPS numbers cited above apply in the California and Oregon feeding area, in the Washington and Southern British Columbia feeding area, Wade *et al.* (2016) suggest that 52.9, 41.9, and 14.7 percent of humpback whales encountered will come from the Hawaii, Mexico, and Central America DPSs, respectively. This means that the numbers in Table 43 indicating the overall strikes of CA/OR/WA humpback whales and SAR calculations based on average annual mortality over the last five years are actually lower than indicated for the Mexico DPS, which would only be a subset of those mortalities. Last, the Rockwood *et al.* paper supports a relative likelihood of 1:1:2 for striking blue whales, humpback whales, and fin whales off the U.S. West Coast, which supports the authorized take included in this rule, which is 1, 1, and 2, respectively over the five-year period. For these reasons, one mortal take of CA/OR/WA humpback whales, which would be expected to be of the Mexico DPS, could reasonably likely occur and is authorized.

Accordingly, the Navy revised their request for take by serious injury or mortality to include up to two of any the following species in the five-year period: Gray whale (Eastern North Pacific stock), fin whale (CA/OR/WA stock), humpback whale (Central North Pacific stock); and one of any of the following species in the five year period: Blue whale (Eastern North Pacific stock), humpback whale (CA/OR/WA stock, Mexico DPS), or sperm whale (Hawaii stock).

As described above, NMFS and the Navy concur that vessel strikes to the stocks below are very unlikely to occur due to the stocks' relatively low occurrence in the HSTT Study Area, particularly in core HSTT training and testing subareas, and the fact that the stocks have not been struck by the Navy and are rarely, if ever, recorded struck by other vessels. Therefore the Navy is not requesting lethal take authorization, and NMFS is not authorizing lethal take, for the following stocks: Bryde's whale (Eastern Tropical Pacific stock), Bryde's whale (Hawaii stock), humpback whale (CA/OR/WA stock, Central America DPS), minke whale (CA/OR/WA stock), minke whale (Hawaii stock), sei whale (Hawaii stock), sei whale (Eastern North Pacific stock), and sperm whale (CA/OR/WA stock).

In conclusion, although it is generally unlikely that any whales will be struck in a year, based on the information and analysis above, NMFS anticipates that no more than three whales could be taken by serious injury or mortality over the five-year period of the rule, and that those three whales may include no more than two of any of the following stocks: Gray whale (Eastern North Pacific stock), fin whale (CA/OR/WA stock), humpback whale (Central North Pacific stock); and no more than one of any of the following stocks: Blue whale (Eastern North Pacific stock), humpback whale (CA/OR/WA, Mexico DPS), and sperm whale (Hawaii stock). Accordingly, NMFS has evaluated under the negligible impact standard the serious injury or mortality of 0.2 or 0.4 whales annually from each of these species or stocks (*i.e.,* 1 or 2 takes, respectively, divided by 5 years to get the annual number), along with other expected harassment incidental take.

Explosives

The Navy's model and quantitative analysis process used for the HSTT FEIS/OEIS and in the Navy's rulemaking/LOA application to estimate potential exposures of marine mammals to explosive stressors is detailed in the technical report titled *Quantifying Acoustic Impacts on Marine Mammals and Sea Turtles: Methods and Analytical Approach for Phase III Training and Testing report* (U.S. Department of the Navy, 2018). Specifically, over the course of a year, the Navy's model and quantitative analysis process estimates mortality of two short-beaked common dolphin and one California sea lion as a result of exposure to explosive training and testing activities (please refer to section 6 of the Navy's rule making/LOA application). Over the five-year period of the regulations requested, mortality of 10 marine mammals in total (6 short-beaked common dolphins and 4 California sea lions) is estimated as a result of exposure to explosive training and testing activities. NMFS coordinated with the Navy in the development of their take estimates and concurs with the Navy's approach for estimating the number of animals from each species that could be affected by mortality takes from explosives.

Mitigation Measures

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'' (''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.

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 a U.S. Navy Surveillance Towed Array Sensor System Low Frequency Active Sonar (SURTASS LFA) incidental take rule (77 FR 50290), 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) and the Navy Atlantic Fleet Testing and Training rule (83 FR 57076; November 14, 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 U.S. Fish and Wildlife Service's 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 least practicable adverse impact 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 *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 least practicable adverse impact 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

[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.

[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).

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.

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 *Analysis and Negligible Impact 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 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.

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 decreasing 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 meaningfully contribute 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 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)).

Assessment of Mitigation Measures for HSTT Rule

NMFS reviewed the Specified Activities and the mitigation measures as described in the Navy's rulemaking/LOA application and the HSTT FEIS/OEIS to determine if they would result in the least practicable adverse effect on marine mammals. NMFS worked with the Navy in the development of the Navy's initially proposed measures, which are informed by years of implementation and monitoring. A complete discussion of the evaluation process used to develop, assess, and select mitigation measures, which was coordinated with and informed by input from NMFS and included consideration of the measures that were added as a result of the settlement agreement (see below), can be found in Chapter 5 (Mitigation) and Appendix K (Geographic Mitigation Assessment) of the HSTT FEIS/OEIS and is summarized below in this section. The process described in Chapter 5 (Mitigation) and Appendix K (Geographic Mitigation Assessment) of the HSTT FEIS/OEIS robustly supports NMFS' independent evaluation of whether the mitigation measures required by this rule meet the least practicable adverse impact standard. The Navy is required to implement the mitigation measures identified in this rule to avoid or reduce potential impacts from acoustic, explosive, and physical disturbance and ship strike stressors.

As a general matter, where an applicant proposes measures that are likely to reduce impacts to marine mammals, the fact that they are included in the proposal and application indicates that the measures are practicable, and it is not necessary for NMFS to conduct a detailed analysis of the measures the applicant proposed (rather, they are simply included). We note that in their application, the Navy added a couple of mitigation measures that were new since the 2013–2018 HSTT incidental take regulations: (1) The Santa Barbara Island Mitigation Area—to avoid or reduce potential impacts from mid-frequency active sonar and explosives on numerous marine mammal species (including blue whales and gray whales) within the mitigation area, which contains important foraging or migration habitat and overlaps a portion of the Channel Islands National Marine Sanctuary, and (2) Blue Whale, Gray Whale, and Fin Whale Awareness Notification Message Areas—to further help avoid or reduce potential impacts from vessel strikes and training and testing activities on blue whales, gray whales, and fin whales within the Southern California portion of the Study Area, which contains important seasonal foraging or migration habitat for these species. However, it is still necessary for NMFS to consider whether there are additional practicable measures that could also contribute to the reduction of adverse effects on the species or stocks through effects on annual rates of recruitment or survival. In the case of the Navy's HSTT application, we worked with the Navy

[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.

prior to the publication of the proposed rule and ultimately, the Navy agreed to significantly expand geographic mitigation areas adjacent to the island of Hawaii to more fully encompass the Alenuihaha Channel (important habitat and migration area) and overlap the BIAs of multiple species (reproductive area for humpbacks, and overlapping the ranges of multiple small resident populations of odontocetes) and to limit additional anti-submarine warfare mid-frequency active sonar (ASW) source bins (MF4) within those mitigation areas, which is expected to further reduce the probability and severity of impacts that would be more likely to affect reproduction or survival of individuals or adversely affect the stock.

Of note, following publication of the 2013 HSTT incidental take rule, the Navy and NMFS were sued and the parties reached a settlement in *Conservation Council for Hawaii* v. *National Marine Fisheries Service,* 97 F. Supp.3d 1210 (D. Haw. 2015), in which the Navy agreed to restrict its activities within specific areas in the HSTT Study Area (beyond the areas and restrictions included as mitigation measures in the 2013 rule). Additional detail is provided below in the subsection entitled *Brief Comparison of Settlement Mitigation and Final HSTT Mitigation in the Rule.*

In summary (and as described in more detail below in this section), the Navy has agreed to procedural mitigation measures that will reduce the probability and/or severity of impacts expected to result from acute exposure to acoustic sources or explosives, ship strike, and impacts to marine mammal habitat. Specifically, the Navy will use a combination of delayed starts, powerdowns, and shutdowns to minimize or avoid serious injury or mortality, minimize the likelihood or severity of PTS or other injury, and reduce instances of TTS or more severe behavioral disruption caused by acoustic sources or explosives. The Navy also will implement multiple time/area restrictions (several of which have been added since the 2013 HSTT MMPA incidental take rule) that would reduce take of marine mammals in areas or at times where they are known to engage in important behaviors, such as feeding or calving, where the disruption of those behaviors would have a higher probability of resulting in impacts on reproduction or survival of individuals that could lead to population-level impacts.

Since publication of the proposed rule, NMFS and the Navy have agreed to additional mitigation measures that are expected to reduce the likelihood and/or severity of adverse impacts on marine species/stocks and their habitat and are practicable for implementation. Below we summarize the added measures and describe the manner in which they are expected to reduce the likelihood or severity of adverse impacts on marine mammal species or stocks and their habitat. A full description of each measure is included in Tables 45–62.

1. Pre-event in-water explosive event observations—The Navy will implement pre-event observation mitigation for all in-water explosive event mitigation measures. Additionally, if there are other platforms participating in these events and in the vicinity of the detonation area, Navy personnel on those platforms will also visually observe this area as part of the mitigation team. This added monitoring for a subset of activities for which it was not previously required (explosive bombs, missiles and rockets, projectiles, torpedoes, and grenades) in advance of explosive events increases the likelihood that marine mammals will be detected if they are in the mitigation area for that event and that, if any animals are detected, explosions will be delayed by timely mitigation implementation, thereby further reducing the already low likelihood that animals will be injured or killed by the blast.

2. Post-event in-water explosive event observations—The Navy will implement post-event observation mitigation for all in-water explosive event mitigation measures. Additionally, if there are other platforms participating in these events and in the vicinity of the detonation area, Navy personnel on those platforms will also visually observe this area as part of the mitigation team. This added monitoring for a subset of activities for which it was not previously required (explosive bombs, missiles and rockets, projectiles, torpedoes, grenades) increases the likelihood that any injured marine mammals would be detected following an explosive event, which would increase our understanding of impacts and could potentially inform mitigation changes via the adaptive management provisions.

3. The San Diego Arc Mitigation Area was the initial mitigation area for the proposed rule. For the final rule, the Navy agreed to add the San Nicolas Island and Santa Monica/Long Beach Mitigation Areas (June 1–October 31), which include all of the relatively small portions of the Santa Monica Bay/Long Beach and San Nicolas Island BIAs that overlap the HSTT Study Area (55.4 Nmi² or 13.9 percent and 33.6 Nmi² or 23.5 percent, respectively). The Navy agrees to limit explosives during training in the Santa Monica Bay/Long Beach and San Nicolas Island Mitigation Areas. This reduction of activities (as described here and in the newly expanded measure immediately below, *i.e.,* fewer explosives and MF1 sonar) in these areas with higher concentrations of blue whales engaged in important feeding behaviors is expected to reduce the probability or severity of impacts on blue whales that would be more likely to adversely affect the reproduction or survival of any individual, which in turn reduces the likelihood that any impacts would translate to adverse impacts on the stock.

4. The Navy agrees to limit surface ship sonar in the Santa Monica/Long Beach and San Nicolas Island Mitigation Areas. The Navy will not exceed 200 hrs of MFAS sensor MF1 from June 1 through October 31 in the combined San Diego Arc, San Nicolas Island, and Santa Monica/Long Beach Mitigation Areas (manner in which this helps reduce impact to marine mammals noted directly above).

5. In the proposed rule, the Navy included a seasonal restriction on the use of hull-mounted active sonar in the 4-Islands Mitigation Area, but no limit on explosive use. The Navy has added an all-year restriction on the use of explosives in this area. The 4-Islands Mitigation Area overlaps with a reproductive BIA for humpback whales, as well as BIAs for several small resident populations of multiple odontocetes (bottlenose dolphins, main Hawaiian Island false killer whales, pantropical spotted dolphins, and spinner dolphins). For humpback whales, the reduction of activities in this area with individuals that have calves or are potentially breeding is expected to reduce the probability or severity of impacts that would be more likely to adversely impact reproduction or survival of individuals by directly interfering with breeding behaviors or by separating mothers and calves at a time with calves are more susceptible to predators. For the odontocete stocks with BIAs for small resident populations, we aim to avoid overwhelming small populations (which are more susceptible to certain population effects, such as Allee effects) with large scale impacts, especially when the population is limited to a small area and less able to access alternative habitat. Limiting explosive effects in these mitigation areas that overlap the BIAs further reduces impacts to these stocks, although we note that all four of these odontocete small resident populations span multiple islands, which means that

impacts in any one location are less likely to affect the whole population.

6. The Navy has agreed to issue notification messages to increase operator awareness of the presence of marine mammals. The Navy will review WhaleWatch, a program coordinated by NMFS' West Coast Region as an additional information source to inform the drafting of the annual notification messages for blue, fin, and gray whales in SOCAL.The information will alert vessels to the possible presence of these stocks to maintain safety of navigation and further reduce the potential for a vessel strike. Any expanded mechanisms for detecting large whales, either directly around a vessel or in the wider area to increase vigilance for vessels, further reduce the probability that a whale will be struck.

The Navy assessed the new and/or expanded measures it has agreed to (above) in the context of personnel safety, practicality of implementation, and their impacts on the Navy's ability to meet their Title 10 requirements and found that the measures were supportable. As described above, NMFS has independently evaluated all of the measures the Navy has committed to (including those above added since the proposed rule was published) in the manner described earlier in this section *(i.e.,* in consideration of their ability to reduce adverse impacts on marine mammal species and stocks and their habitat and their practicability for implementation). We have determined that the additional measures will further reduce impacts on the affected marine mammal species and stocks and their habitat beyond the initial measures proposed and, further, be practicable for Navy implementation.

The Navy also evaluated numerous measures in the HSTT FEIS/OEIS that were not included in the Navy's rulemaking/LOA application, and NMFS independently reviewed and concurs with Navy's analysis that their inclusion was not appropriate under the least practicable adverse impact standard based on our assessment. The Navy considered these additional potential mitigation measures in two groups. First, Chapter 5 (Mitigation) of the HSTT FEIS/OEIS, in the Measures Considered but Eliminated section, includes an analysis of an array of different types of mitigation that have been recommended over the years by NGOs or the public, through scoping or public comment on environmental compliance documents. Appendix K (Geographic Mitigation Assessment) of the HSTT FEIS/OEIS includes an in-depth analysis of time/area restrictions that have been recommended over time or previously implemented as a result of litigation. As described in Chapter 5 (Mitigation) of the HSTT FEIS/OEIS, commenters sometimes recommend that the Navy reduce its overall amount of training, reduce explosive use, modify its sound sources, completely replace live training with computer simulation, or include time of day restrictions. Many of these mitigation measures could potentially reduce the number of marine mammals taken, via direct reduction of the activities or amount of sound energy put in the water. However, as the Navy has described in Chapter 5 (Mitigation) of the HSTT FEIS/OEIS, the Navy needs to train and test in the conditions in which it fights—and these types of modifications fundamentally change the activity in a manner that would not support the purpose and need for the training and testing (*i.e.,* are entirely impracticable) and therefore are not considered further. NMFS finds the Navy's explanation for why adoption of these recommendations would unacceptably undermine the purpose of the testing and training persuasive. After independent review, NMFS finds Navy's judgment on the impacts of potential mitigation measures to personnel safety, practicality of implementation, and the undermining of the effectiveness of training and testing persuasive, and for these reasons, NMFS finds that these measures do not meet the least practicable adverse impact standard because they are not practicable.

Second in Chapter 5 (Mitigation) of the HSTT FEIS/OEIS, the Navy evaluated additional potential procedural mitigation measures, including increased mitigation zones, ramp-up measures, additional passive acoustic and visual monitoring, and decreased vessel speeds. Some of these measures have the potential to incrementally reduce take to some degree in certain circumstances, though the degree to which this would occur is typically low or uncertain. However, as described in the Navy's analysis, the measures would have significant direct negative effects on mission effectiveness and are considered impracticable (see Chapter 5 Mitigation of HSTT FEIS/OEIS). NMFS independently reviewed the Navy's evaluation and concurred with this assessment, which supports NMFS' findings that the impracticability of this additional mitigation would greatly outweigh any potential minor reduction in marine mammal impacts that might result; therefore, these additional mitigation measures are not required under the least practicable adverse impact standard.

Last, Appendix K (Geographic Mitigation Assessment) of the HSTT FEIS/OEIS describes a comprehensive method for analyzing potential geographic mitigation that includes consideration of both a biological assessment of how the potential time/area limitation would benefit the species or stock and its habitat (*e.g.,* is a key area of biological importance or would result in avoidance or reduction of impacts) in the context of the stressors of concern in the specific area and an operational assessment of the practicability of implementation (*e.g.,* including an assessment of the specific importance of that area for training, considering proximity to training ranges and emergency landing fields and other issues). The analysis analyzes an extensive list of areas, including areas in which certain Navy activities were limited under the terms of the 2015 HSTT settlement agreement, areas identified by the California Coastal Commission, and areas suggested during scoping. For the areas that were agreed to under the settlement agreement, the Navy notes two important facts that NMFS generally concurs with: (1) The measures were derived pursuant to negotiations with plaintiffs and were specifically not evaluated or selected based on the examination of the best available science that NMFS typically applies to a mitigation assessment and (2) the Navy's adoption of restrictions on its activities as part of a relatively short-term settlement does not mean that those restrictions are practicable to implement over the longer term.

The Navy proposed (and NMFS has incorporated into this rule) several time/area mitigations that were not included in the 2013–2018 HSTT MMPA regulations (as described above). For the areas that are not included in these regulations, though, the analysis in the HSTT FEIS/OEIS (Chapter 5 and Appendix K) shows that on balance, the mitigation was not warranted because the anticipated reduction of adverse impacts on marine mammal species or stocks and their habitat was not sufficient to offset the impracticability of implementation (in some cases potential benefits to marine mammals were limited to non-existent, in others the consequences on mission effectiveness were too great). We note that in regard to the protection of marine mammal habitat, habitat value is informed by marine mammal presence and use and, in some cases, there may be overlap in measures that minimize impacts to the species or stock directly and measures that minimize impacts on habitat. In this rule, we have identified time-area mitigations based on a combination of factors that include higher densities and observations of specific important behaviors of marine mammals themselves, but also that clearly reflect preferred habitat (*e.g.,* blue whale feeding areas in SOCAL, and in-shore small resident populations of odontocetes around Hawaii). In addition to being delineated based on physical features that drive habitat function (*e.g.,* bathymetric features, among others for some BIAs), the high densities and concentration of certain important behaviors (*e.g.,* feeding) in these particular areas clearly indicate the presence of preferred habitat.

Overall, NMFS has independently reviewed the Navy's mitigation analysis Chapter 5 (Mitigation) and Appendix K (Geographic Mitigation Assessment) of the HSTT FEIS/OEIS as referenced above), which considers the same factors that NMFS considers to satisfy the least practical adverse impact standard, and concurs with the conclusions. Therefore, NMFS is not including the additional measures discussed in the HSTT FEIS/OEIS in these regulations, other than the new measures that were discussed in the proposed rule and those agreed upon after publication of the proposed rule, as described above. Below, we list and describe the mitigation measures (organized into procedural measures and mitigation areas) that NMFS has determined will ensure the least practicable adverse impact on all affected species and stocks and their habitat, including the specific considerations for military readiness activities. However, first, in the section immediately below, we provide a brief summary of the ways in which the mitigation included in this rule compares to the mitigation the Navy implemented during the settlement agreement.

Brief Comparison of 2015 Settlement Mitigation and Final HSTT Mitigation in the Rule

As noted above, following publication of the 2013 HSTT MMPA incidental take rule, the Navy and NMFS were sued and the parties reached a settlement in 2015 under which the Navy agreed to restrict its activities within specific areas in the HSTT Study Area (beyond the areas and restrictions included in the 2013 rule). While we have described above the analysis that supports the selection of mitigation measures included in the final rule (referencing the associated Navy documents, where appropriate), because the Navy has been implementing the settlement agreement measures since 2015, we provide here a summary description of the differences and additional analysis.

First, we note broadly that the provisional restrictions on activities within the HSTT Study Area were derived pursuant to negotiations with the plaintiffs as part of the lawsuit and specifically were not evaluated or selected based on the best available science as would occur through the MMPA rulemaking process or through related analyses conducted under the National Environmental Policy Act (NEPA) or the ESA. The agreement did not constitute a concession by the Navy as to the impacts of Navy activities on marine mammals or any other marine species, the extent to which the measures would reduce impacts, or the practicability of the measures. The Navy's adoption of restrictions on its HSTT testing and training activities as part of the relatively short-term settlement agreement therefore did not mean that those restrictions were supported by the best available science, likely to reduce impacts on marine mammals species or stocks and their habitat, or practicable to implement from a military readiness standpoint over the longer term in the HSTT Study Area. Accordingly, as required by statute, NMFS analyzed the Navy's activities as set forth in its application and including impacts, proposed mitigation, and additional potential mitigation (including the settlement agreement measures) pursuant to the ''least practicable adverse impact'' standard to determine the appropriate mitigation to include in these regulations. Some of the measures that were included in the 2015 settlement agreement are included in the final rule, while some are not.

As characterized elsewhere in the rule, we look here at the differences in both procedural mitigation measures and mitigation areas. The 2015 settlement agreement included two procedural mitigations (one of which was a group of related reporting measures). Regarding one of the measures, the 2015 settlement agreement indicated that ''Navy surface vessels operating within the HSTT shall avoid approaching marine mammals head-on and shall maneuver to maintain a 500 yard (457 meter) mitigation zone for observed whales and a 200 yard (183 meter) mitigation zone for all other observed marine mammals (except bow riding dolphins), providing it is safe to do so.'' This measure is fully included in this final rule. Regarding the other measure, the settlement agreement included several related reporting requirements for NMFS to implement in the event the discovery of an injured or dead marine mammal triggered certain Navy reporting requirements included in the 2013 rule. These reporting requirements are not included in this rule both because it is not the role of 101(a)(5)(A) regulations to require reporting and notifications by NMFS to others (where appropriate notice and opportunity for public involvement is already provided for under the statute) and this reporting by NMFS did not further the conservation of marine mammals. Last, these settlement agreement reporting measures highlighted inconsistencies between some of the measures required under the 2013 regulations and those inconsistencies have been resolved; the 2018 LOAs include updated reporting requirements.

NMFS' and the Navy's analysis of mitigation areas is described in the subsections above and the description of areas included in the final rule are described in the subsection below. In order to assist the reader in understanding the differences in mitigation areas between the terms of the 2015 settlement agreement (as a result of the ruling in *Conservation Council for Hawaii* v. *National Marine Fisheries Service,* 97 F. Supp.3d 1210 (D. Haw. 2015)) and this final rule, we offer the following:

- Figures 1, 2, 3, and 4 below depict the settlement mitigation areas and the HSTT Mitigation Areas for Hawaii and SOCAL.
- Table 44 below compares the mitigation requirements from the 2015 settlement agreement areas to the mitigation requirements for the areas specified in this final rule (noting also the species for which impacts will be reduced).
- Table K.2–2 of Appendix K in the HSTT FEIS/OEIS includes a comparison of the settlement agreement areas to mitigation areas for this rulemaking period by species and BIAs.
- NMFS' CetSound website includes an interactive map depicting the BIAs for all species and stocks (there are 12 overlapping BIAs in the main Hawaiian Islands, making it difficult to present them effectively in a static map). See *https://cetsound.noaa.gov/biologically-important-area-map.*

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Figure 1. 2015 Settlement Agreement Areas in the Hawaii Portion of the HSTT Study Area.

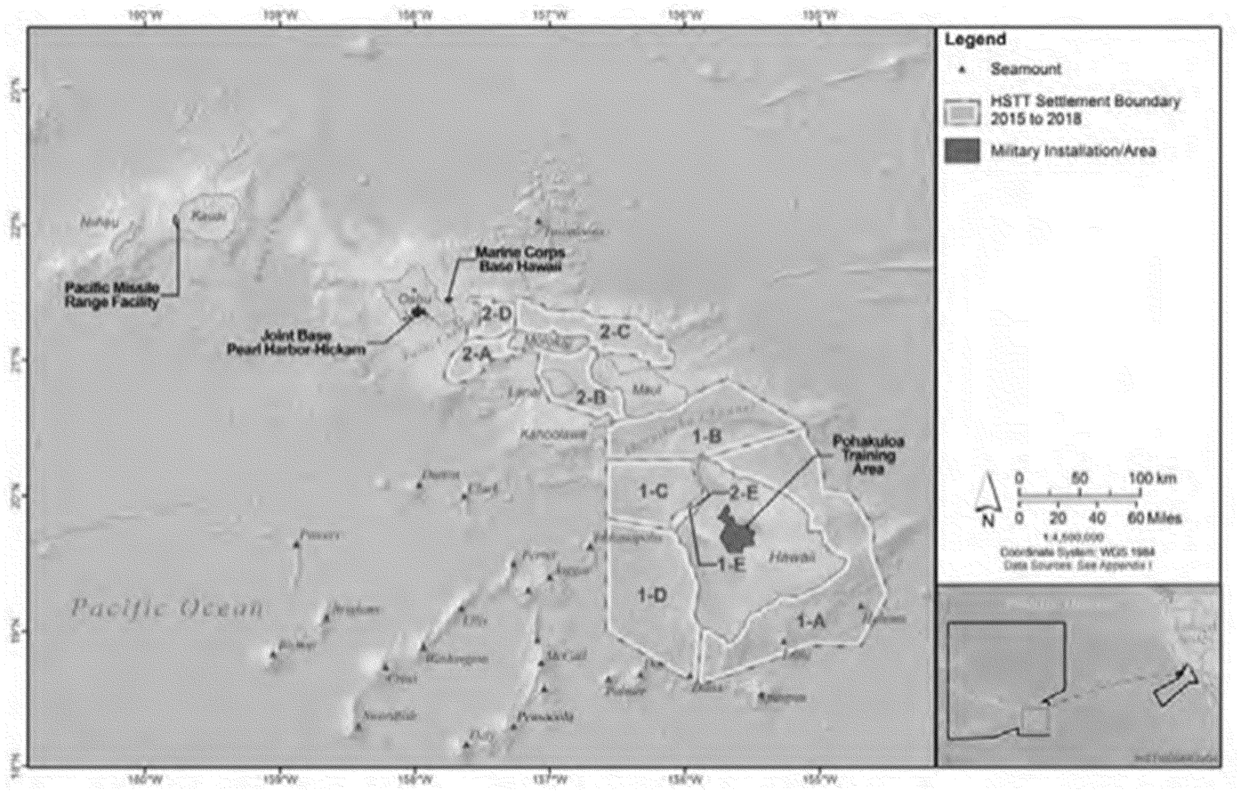

Figure 2. 2018 - 2023 Mitigation Areas in the Hawaii Portion of the HSTT Study Area.

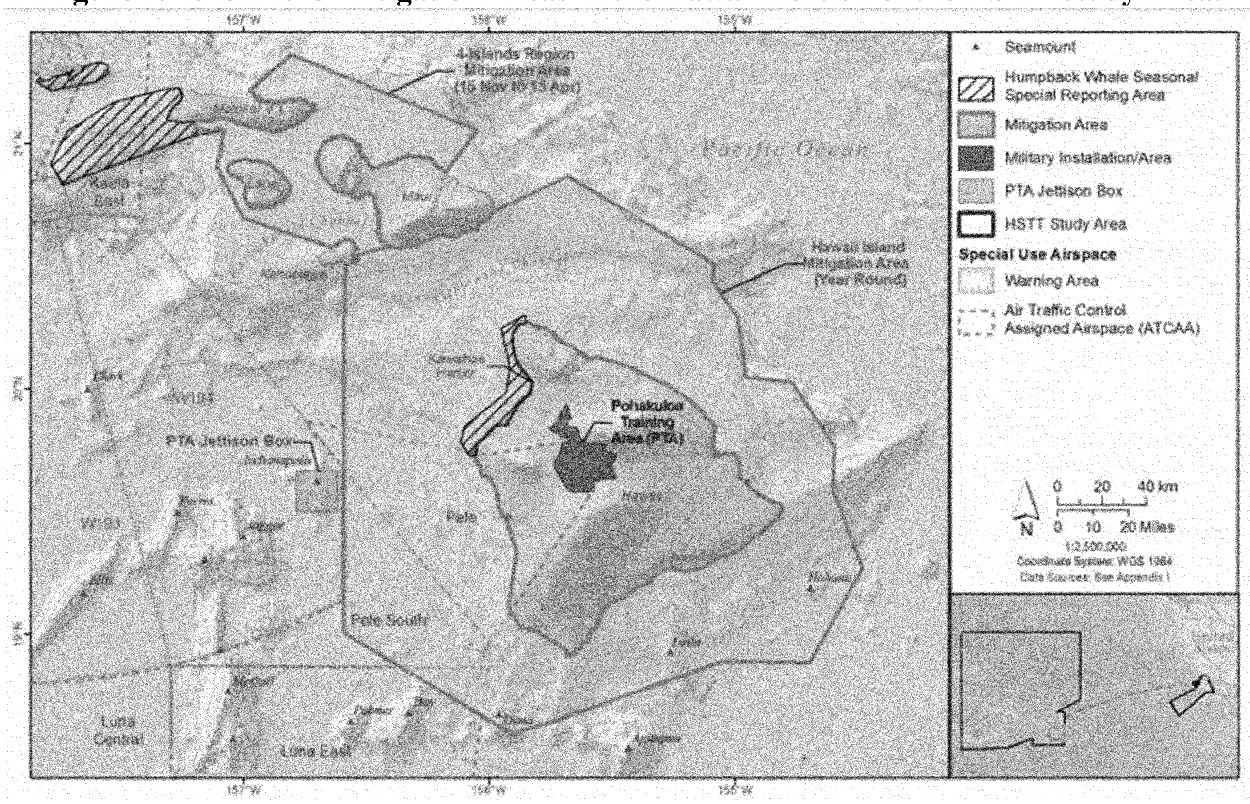

Figure 3. 2015 Settlement Agreement Areas in the Southern California Portion of the HSTT Study Area.

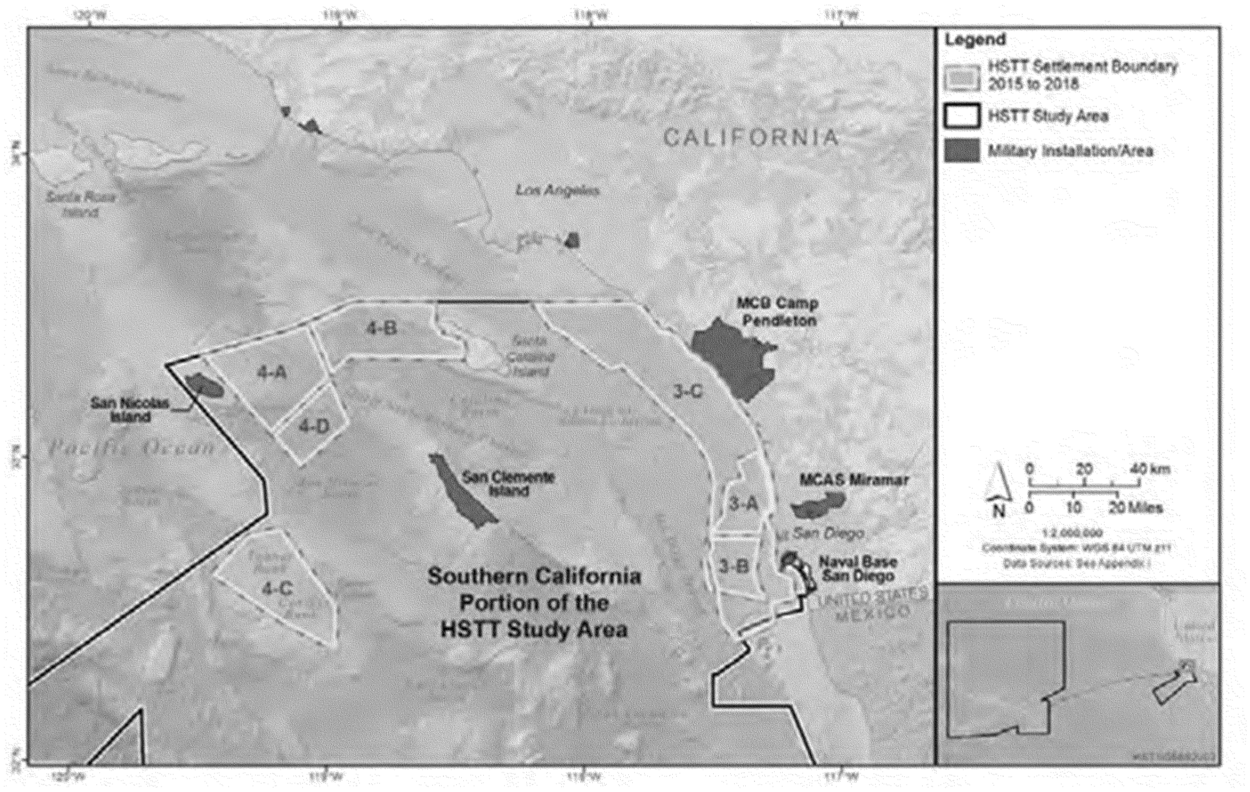

Figure 4. 2018 - 2023 Mitigation Areas in the Southern California Portion of the HSTT Study Area.

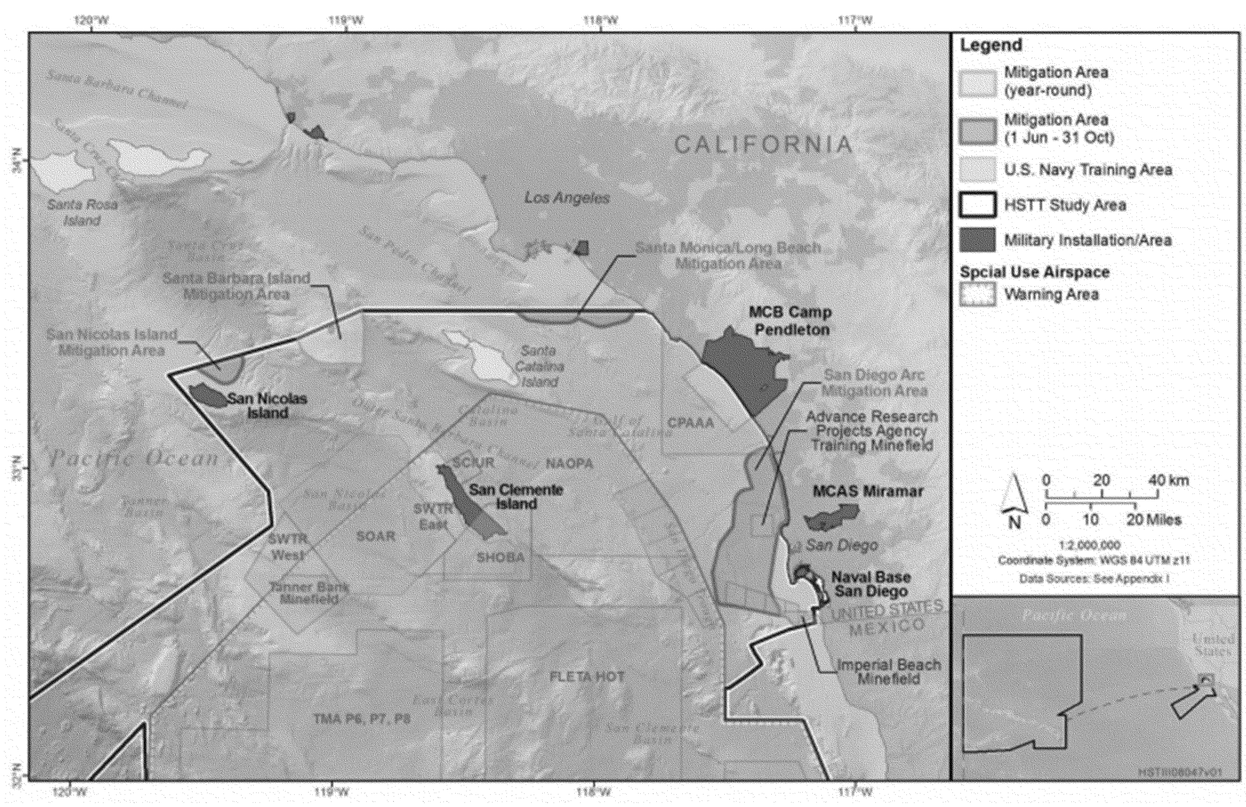

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TABLE 44—COMPARISON OF MITIGATION AREAS IN EFFECT 2015–2018 UNDER THE 2015 SETTLEMENT AGREEMENT TO MITIGATION AREAS IMPLEMENTED UNDER 2018 FINAL RULE

Litigation settlement (2015–December 2018)	HSTT final MMPA incidental take rule (December 2018–2023)
Hawaii	Hawaii
• *Area 1–A Hawaii Island (North, South, East) (year-round).* (a) Prohibit the use of MFAS for training and testing activities during both MTEs and unit-level training; and (b) prohibit the use of in-water explosives for training and testing activities. Reduces impacts to false killer whales, pygmy killer whales, short-finned pilot whales, bottlenose dolphins, spinner dolphins, Cuvier's beaked whales, and Blainville's beaked whales	• *Hawaii Island Mitigation Area (year-round).* Incorporates parts of settlement measures 1–A through 1–E and 2–A through 2–E. Navy will minimize the use of MFAS (MF1 and MF4) and will not use explosives during testing and training. Reduces impacts on ESA-listed false killer whales and monk seals, two species of beaked whales, humpback whales, and other species.
• *Area 1–B Hawaii Island (Northwest) (year-round).* Limit the use of MFAS for training and testing activities during MTEs to one Rim of the Pacific in 2016, one Rim of the Pacific in 2018, three Undersea Warfare Exercises per calendar year, and one Independent Deployer Certification Exercise per calendar year. Reduces impacts to humpback whales, false killer whales, short-finned pilot whales, melon-headed whales, bottlenose dolphins, spinner dolphins, Cuvier's beaked whales, and Blainville's beaked whales	• *4-Islands Region Mitigation Area (November 1–April 15 for active sonar, year-round for explosives).* Incorporates parts of settlement Areas 1–A, 1–B, 1–C, 1–D, 1–E, 2–A, 2–B, and 2–C and humpback reporting area. Navy will not use MFAS (MF1) or explosives in this mitigation area during training and testing. Reduces impacts to humpback whales, ESA-listed false killer whales and monk seals, and some dolphin species. • *Humpback Whale Special Reporting Areas (December 15–April 15).* Incorporates parts of settlement areas 1–B, 1–C, 1–D, 2–A, 2–B, and 2–D, humpback special reporting area and humpback cautionary area. Navy will report the hours of MF1 used in these areas in training and testing activity reports. • *Humpback Whale Awareness Notification Message Area (November–April).* Navy will issue a seasonal awareness notification message to alert ships and aircraft operating in the area to the possible presence of concentrations of large whales, including humpback whales.
• *Area 1–C Hawaii Island (West) (year-round).* (a) Limit the use of MFAS for training and testing activities during MTEs to one Rim of the Pacific in 2016, one Rim of the Pacific in 2018, three Undersea Warfare Exercises per calendar year, and one Independent Deployer Certification Exercise per calendar year; (b) prohibit the use of MFAS for training and testing activities during unit-level training (excluding unit-level training conducted by participants in an ongoing MTE; and (c) prohibit the use of in-water explosives for training and testing activities. Reduces impacts to humpback whales, false killer whales, dwarf sperm whales, pygmy killer whales, short-finned pilot whales, bottlenose dolphins, spotted dolphins, spinner dolphins, rough toothed dolphins, Cuvier's beaked whales, and Blainville's beaked whales	
• *Area 1–D Hawaii Island (Southwest) (year-round).* (a) Limit the use of MFAS for training and testing activities during MTEs to one Rim of the Pacific in 2016, one Rim of the Pacific in 2018, three Undersea Warfare Exercises per calendar year, one Independent Deployer Certification Exercise per calendar year, and one Sustainment Exercise per calendar year; (b) prohibit the use of MFAS for training and testing activities during unit-level training (excluding unit-level training conducted by participants in ongoing MTEs); and (c) prohibit the use of in-water explosives for training and testing activities. Reduces impacts to dwarf sperm whales, pygmy killer whales, short-finned pilot whales, bottlenose dolphins, spotted dolphins, spinner dolphins, rough-toothed dolphins, Cuvier's beaked whales, and Blainville's beaked whales	
• *Area 1–E and 2–E Hawaii Island (nearshore Northwest) (year-round).* Require that all surface vessels use extreme caution and proceed at safe speed so they can take proper and effective action to avoid a collision with any sighted object or disturbance, and can be stopped within a distance appropriate to the prevailing circumstances and conditions. Reduces impacts to dwarf sperm whales, false killer whales, pygmy killer whales, melon-headed whales, bottlenose dolphins, spotted dolphins, spinner dolphins, rough-toothed dolphins, and Blainville's beaked whales	

TABLE 44—COMPARISON OF MITIGATION AREAS IN EFFECT 2015–2018 UNDER THE 2015 SETTLEMENT AGREEMENT TO MITIGATION AREAS IMPLEMENTED UNDER 2018 FINAL RULE—Continued

Litigation settlement (2015–December 2018)	HSTT final MMPA incidental take rule (December 2018–2023)
• *Area 2–A (Southeast Oahu, Southwest Molokai, Penguin Bank) (year-round).* (a) Prohibit the use of MFAS for training and testing activities during MTEs; (b) prohibit the use of in-water explosives for training and testing activities; and (c) require that all surface vessels use extreme caution and proceed at safe speed so they can take proper and effective action to avoid a collision with any sighted object or disturbance, and can be stopped within a distance appropriate to the prevailing circumstances and conditions. Reduces impacts to humpback whales, false killer whales, bottlenose dolphins, and spinner dolphins • *Area 2–B (South Molokai, East Maui, Penguin Bank) (year-round).* (a) Prohibit the use of in-water explosives for training and testing activities; and (b) require that all surface vessels use extreme caution and proceed at safe speed so they can take proper and effective action to avoid a collision with any sighted object or disturbance, and can be stopped within a distance appropriate to the prevailing circumstances and conditions. Reduces impacts to humpback whales, bottlenose dolphins, spotted dolphins, and spinner dolphins • *Area 2–C (North Molokai, North Maui) (year-round).* (a) Prohibit the use of MFAS for training and testing activities during MTEs; (b) implement a Protective Measure Assessment Protocol measure advising Commanding Officers that the area is false killer whale habitat and that they should avoid using MFAS during unit-level training within the area whenever practicable; and (c) prohibit the use of in-water explosives for training and testing activities (within the overlap of Area 2–B and Area 2–C, the restrictions imposed in Area 2–B and Area 2–C both apply). Reduces impacts to false killer whales, bottlenose dolphins, and spinner dolphins • *Area 2–D (Southeast Oahu, Northwest Molokai) (year-round).* Prohibit the use of in-water explosives for training and testing activities. Reduces impacts to false killer whales, bottlenose dolphins, and spinner dolphins	
Southern California • *Area 3–A (San Diego Arc, coastal) (June 1–October 31).* (a) Prohibit the use of MFAS for training and testing activities during MTEs and unit-level training; and (b) require that all surface vessels use extreme caution and proceed at safe speed so they can take proper and effective action to avoid a collision with any sighted object or disturbance, and can be stopped within a distance appropriate to the prevailing circumstances and conditions. Reduces impacts to blue and gray whales	Southern California • *San Diego Arc, San Nicolas Island, and Santa Monica/Long Beach Mitigation Areas (June 1–October 31).* Incorporates parts of settlement areas 3–A, 3–B, 3–C, 4–A, 4–B, 4–C, and 4–D. Navy will minimize the use of MFAS (MF1) within the three Mitigation Areas during training and testing. Within the San Diego Arc Mitigation Area, Navy will not use explosives during large-caliber gunnery, torpedo, bombing, and missile activities during testing and training. Within the San Nicolas Island Mitigation Area Navy will not use explosives during mine warfare, large-caliber gunnery, torpedo, bombing and missile activities during training. Within the Santa Monica/Long Beach Mitigation Area, Navy will not use explosives during mine warfare, large-caliber gunnery, torpedo, bombing, and missile (including 2.75″ rockets) activities during training and testing. Reduces impacts primarily to blue whales, but also gray and fin whales. • *Santa Barbara Island Mitigation Area (year-round).* Incorporates parts of settlement areas 4A, Channel Island NMS. Navy will not use MFAS (MF1) and explosives in small-, medium-, and large-caliber gunnery, torpedo, bombing, and missile activities during unit-level training or MTEs. Reduces impacts to numerous marine mammal species that use the Channel Islands NMS and partially overlap areas for blue whales and gray whales. • *Blue Whale (June–October), Gray Whale (November–March), and Fin Whale (November–May) Awareness Notification Message Areas.* Navy will issue a seasonal awareness notification message to alert ships and aircraft operating in the area to the possible presence of concentrations of large whales, particularly blue, gray, and fin whales.

TABLE 44—COMPARISON OF MITIGATION AREAS IN EFFECT 2015–2018 UNDER THE 2015 SETTLEMENT AGREEMENT TO MITIGATION AREAS IMPLEMENTED UNDER 2018 FINAL RULE—Continued

Litigation settlement (2015–December 2018)	HSTT final MMPA incidental take rule (December 2018–2023)
• *Area 3–B (San Diego Arc, coastal) (June 1–October 31).* (a) Prohibit the use of MFAS for training and testing activities during MTEs and unit-level training, except for system checks; (b) implement a seasonal Protective Measure Assessment Protocol measure advising Commanding Officers that the area is blue whale habitat and that they should avoid conducting system checks within the area whenever practicable; and (c) require that all surface vessels use extreme caution and proceed at safe speed so they can take proper and effective action to avoid a collision with any sighted object or disturbance, and can be stopped within a distance appropriate to the prevailing circumstances and conditions. Reduces impacts to blue and gray whales • *Area 3–C (Santa Monica Bay to Long Beach, coastal) (November 1–May 20).* Require that all surface vessels use extreme caution and proceed at safe speed so they can take proper and effective action to avoid a collision with any sighted object or disturbance, and can be stopped within a distance appropriate to the prevailing circumstances and conditions. Reduces impacts to blue and gray whales • *Area 4–A (East of San Nicholas Island) (year-round).* (a) Prohibit the use of MFAS for training and testing activities during MTEs and unit-level training; and (b) prohibit the use of in-water explosives for training and testing activities. Reduces impacts to blue and gray whales • *Area 4–B (east of Santa Catalina Island) (year-round).* Prohibit the use of MFAS for training and testing activities during MTEs and unit-level training. Reduces impacts to gray whales • *Area 4–C (Tanner-Cortes Bank) (June 1–October 31).* Require that all surface vessels use extreme caution and proceed at safe speed so they can take proper and effective action to avoid a collision with any sighted object or disturbance, and can be stopped within a distance appropriate to the prevailing circumstances and conditions. Reduces impacts to blue and gray whales • *Area 4–D (south of 4–A) (year-round).* Require all surface vessels to use extreme caution and proceed at a safe speed so they can take proper and effective action to avoid a collision with any sighted object or disturbance, and can be stopped within a distance appropriate to the prevailing circumstances and conditions. Reduces impacts to gray whales	

As described above, NMFS analyzed the Navy's activities as set forth in its application, the impacts of those activities, the proposed mitigation, and potential additional mitigation (including the 2015 settlement agreement measures) pursuant to the ''least practicable adverse impact'' standard to determine the appropriate mitigation to include in these regulations. Some of the measures that were included in the 2015 settlement agreement are included in this final rule (for example, the vast majority of the area in Hawaii included in the mitigation for the settlement agreement is included in Mitigation Areas in this rule), while some are not (for example, because of the instrumented ranges and specific training needs in SOCAL, less of the area covered in the settlement agreement is included as Mitigation Areas in this rule). As noted previously, Appendix K (Geographic Mitigation Assessment) of the HSTT FEIS/OEIS includes a detailed analysis of all of the potential mitigation areas and associated measures (including the settlement measures addressed in this section), in the context of both reduction of marine mammal impacts and practicability. NMFS has independently reviewed Appendix K (Geographic Mitigation Assessment), determined that the analysis reflects the best available science, and used the information to support our findings outlined in this *Mitigation Measures* section. A summary of the rationale for not adopting the relatively small subset of remaining 2015 settlement agreement measures that were not carried forward follows.

In Hawaii, about 85 percent of the area that was covered by 2015 settlement areas is covered by mitigation areas in this final rule (see Figures 1 and 2 above). The protected area around the island of Hawaii is the same in this rule as it was in the 2015 settlement agreement (Hawaii Mitigation Area), with the difference being that the settlement agreement included mitigation on Penguin Bank and in a couple of areas north of Molokai and Maui that are not included in the 4-Islands Mitigation Area in this final rule. As explained in more detail in the full analysis in Section 3 of Appendix K of the HSTT FEIS/OEIS, Penguin Bank offers critical shallow and constrained conditions for Navy training (especially submarines) that are not available anywhere else in Hawaii. The areas north of Molokai and Maui that are not included in the current 4-Islands Mitigation Area are similarly critical for certain exercises that specifically include torpedo exercises deliberately conducted in this area north of the islands to avoid the other suitable training areas between the four islands where humpback whale density is higher. The 2015 settlement agreement mitigation restricted all MFAS and explosive use on Penguin Bank (area 2–A), however, as the Navy explains, this MFAS restriction is impracticable in that it would have unacceptable impacts on their training and testing capabilities. In addition, the Navy does not typically use explosives in this area. For the settlement areas north of Molokai and Maui that are not covered in the rule (area 2–B and part of area 2–C), the settlement agreement restricted explosive use but did not restrict MFAS in the 2–B area. Explosive use in these areas is also already rare, but for the reasons described in Appendix K, restricting MFAS use is impracticable and would have unacceptable impacts on training and testing. We also note that while it is not practicable to restrict MFAS use on Penguin Bank, MFAS use is relatively low and we have identified it as a special reporting area for which the Navy will report the MFAS use in that area to inform adaptive management discussions in the future. Additionally, some of the areas that the 2015 settlement agreement identified included language regarding extra vigilance intended to avoid vessel strikes. Neither NMFS nor the Navy thought that inclusion of this term as written would necessarily reduce the probability of a vessel strike, so instead we have included the Humpback Whale Awareness Notification provision, which sends out a message to all Navy vessels in Hawaii during the time that humpback whales are present. Last we note that the 2015 settlement mitigation areas with MFAS restrictions sometimes excluded all MFAS, while sometimes they limited the number of MTEs that could occur (with no limit on any particular type of sonar, meaning that hull-mounted surface ship sonar could be operated), whereas the sonar restrictions in this final rule limit the use of surface ship hull-mounted sonar, which is the source that results in the vast majority of incidental takes.

For SOCAL, the 2015 settlement areas had four primary objectives: Reducing impacts in blue whale feeding areas, reducing the likelihood of large whale vessel strikes, minimizing incidental take of gray whales, and minimizing incidental take of beaked whales in areas that the plaintiffs argued were specifically important to beaked whales. As noted previously, of the four blue whale feeding areas in SOCAL, the Navy mitigation areas in this rule fully cover three of them (those associated with settlement areas 3–A, 3–B, 4–A, and 4–B in the 2015 settlement agreement) and limit surface ship hull-mounted MFAS and explosive use. In fact, we included protections for the southern end of a blue whale feeding BIA (Santa Monica/Long Beach area), by limiting hull-mounted MFAS and explosives that were not included in the 2015 settlement areas. The fourth blue whale feeding BIA, Tanner-Cortes Banks, provides unique and irreplaceable shallow-water conditions that are critical for shallow-water training and testing (especially for submarines) and that are not available elsewhere in SOCAL, along with a shallow-water minefield training range. Notably, in a satellite tracking study of blue whales in Southern California from 2014 to 2017, Tanner-Cortes Banks was only transited minimally by individual blue whales (Mate *et al.,* 2018). Limiting activities in this area would inhibit the Navy's ability to successfully test and train and is impracticable. In fact, the 2015 settlement area at Tanner-Cortes Banks did not limit MFAS or explosive use. Rather, Tanner-Cortes Banks (area 4–C), settlement area 4–D, and the large settlement area close to shore (area 3–C) each only had one associated protective measure, which was language regarding extra vigilance intended to avoid vessel strikes. However, neither NMFS nor the Navy thought that inclusion of this term as written would necessarily reduce the probability of a vessel strike, so instead we have included the Blue Whale, Gray Whale, and Fin Whale Awareness Notification Area, which sends out a message to all Navy vessels in SOCAL during the time these large whales are present and will more effectively help to reduce the probability of ship strike.

The remaining areas covered by 2015 settlement mitigation areas that are not covered by mitigation areas in this final rule (area 4–B and the outer edges of area 4–A, which does not align exactly with the blue whale BIA like the current Navy mitigation area does) were intended to reduce impacts on gray whales and to provide some sort of protection for beaked whales. However, NMFS and the Navy disagree that the remaining 2015 settlement areas provide the protection the plaintiffs assert. As noted earlier, gray whales migrate primarily through a 5 to 10 km corridor along the West Coast, with some individuals occasionally ranging offshore (noting that mother/calf pairs always stay very close to shore), which resulted in the BIA recognizing a 47-km buffer beyond the 5 to 10 km main migration corridor, but also expanding the BIA further offshore in order to encompass the Channel Islands, where some individuals also sometimes range further. Prohibiting activities outside of the main migration corridor in an area where gray whales may be present only occasionally is not expected to meaningfully reduce effects, especially if the mitigation area is small compared to the much larger buffer area and the same amount of activities occur outside of the mitigation area, but still in the larger area that gray whales occupy. Regarding beaked whales, the plaintiffs in the *Conservation Council for Hawaii* case indicated that settlement area 4–B would provide important habitat for beaked whales based on tagging data from two whales in 2014. However, while beaked whales are present in the area, tagging data through 2018 (for 27 Cuvier's beaked whales) shows that these whales have site fidelity to the SOAR Range and typically do not move toward the 2015 settlement areas when they do leave SOAR. In other words, since the 2015 settlement area is not an area of known particular importance for these whales, protecting it would not be expected to reduce impacts. Appendix K of the HSTT FEIS/OEIS explains in detail why additional limitations in this area would inhibit training and testing and thereby be impracticable, and the *Comments and Responses* section of this rule addresses these recommendations specifically. In summary, the mitigation areas identified in this rule address the valid concerns that were targeted through the 2015 settlement agreement, but areas that were either impracticable to continue to implement or do not provide a reduction in impacts on marine mammals were not carried forward.

The final Procedural Mitigation measures and Mitigation Area measures are described in the sections below.

Final Procedural Mitigation

Procedural mitigation is mitigation that the Navy will implement whenever and wherever an applicable training or testing activity takes place within the HSTT Study Area. The Navy customizes procedural mitigation for each applicable activity category or stressor. Procedural mitigation generally involves: (1) The use of one or more trained Lookouts to diligently observe for specific biological resources (including marine mammals) within a mitigation zone, (2) requirements for Lookouts to immediately communicate sightings of specific biological resources to the appropriate watch station for information dissemination, and (3) requirements for the watch station to implement mitigation (*e.g.,* halt an activity) until certain recommencement conditions have been met. The first procedural mitigation (Table 45) is designed to aid Lookouts and other applicable personnel with their observation, environmental compliance, and reporting responsibilities. The remainder of the procedural mitigation measures (Tables 45 through Tables 64) are organized by stressor type and activity category and includes acoustic stressors (*i.e.,* active sonar, air guns, pile driving, weapons firing noise), explosive stressors (*i.e.,* sonobuoys, torpedoes, medium-caliber and large-caliber projectiles, missiles and rockets, bombs, sinking exercises, mines, underwater demolition multiple charge mat weave and obstacles loading, anti-swimmer grenades), and physical disturbance and strike stressors (*i.e.,* vessel movement, towed in-water devices, small-, medium-, and large-caliber non-explosive practice munitions, non-explosive missiles and rockets, non-explosive bombs and mine shapes).

TABLE 45—PROCEDURAL MITIGATION FOR ENVIRONMENTAL AWARENESS AND EDUCATION

Procedural Mitigation Description
Stressor or Activity: • All training and testing activities, as applicable. Mitigation Requirements: • Appropriate Navy personnel (including civilian personnel) involved in mitigation and training or testing activity reporting under the specific activities must complete one or more modules of the U.S. Navy Afloat Environmental Compliance Training Series, as identified in their career path training plan. Modules include:

TABLE 45–PROCEDURAL MITIGATION FOR ENVIRONMENTAL AWARENESS AND EDUCATION—Continued

Procedural Mitigation Description
—Introduction to the U.S. Navy Afloat Environmental Compliance Training Series. The introductory module provides information on environmental laws (*e.g.,* ESA, MMPA) and the corresponding responsibilities that are relevant to Navy training and testing activities. The material explains why environmental compliance is important in supporting the Navy's commitment to environmental stewardship. —Marine Species Awareness Training. All bridge watch personnel, Commanding Officers, Executive Officers, maritime patrol aircraft aircrews, anti-submarine warfare and mine warfare rotary-wing aircrews, Lookouts, and equivalent civilian personnel must successfully complete the Marine Species Awareness Training prior to standing watch or serving as a Lookout. The Marine Species Awareness Training provides information on sighting cues, visual observation tools and techniques, and sighting notification procedures. Navy biologists developed Marine Species Awareness Training to improve the effectiveness of visual observations for biological resources, focusing on marine mammals and sea turtles, and including floating vegetation, jellyfish aggregations, and flocks of seabirds. —U.S. Navy Protective Measures Assessment Protocol. This module provides the necessary instruction for accessing mitigation requirements during the event planning phase using the Protective Measures Assessment Protocol software tool. —U.S. Navy Sonar Positional Reporting System and Marine Mammal Incident Reporting. This module provides instruction on the procedures and activity reporting requirements for the Sonar Positional Reporting System and marine mammal incident reporting.

Procedural Mitigation for Acoustic Stressors

Mitigation measures for acoustic stressors are provided in Tables 46 through 49.

Procedural Mitigation for Active Sonar

Procedural mitigation for active sonar is described in Table 46 below.

TABLE 46—PROCEDURAL MITIGATION FOR ACTIVE SONAR

Procedural Mitigation Description
Stressor or Activity: • *Low-frequency active sonar, mid-frequency active sonar, high-frequency active sonar.* —For vessel-based activities, mitigation applies only to sources that are positively controlled and deployed from manned surface vessels *(e.g.,* sonar sources towed from manned surface platforms). —For aircraft-based activities, mitigation applies only to sources that are positively controlled and deployed from manned aircraft that do not operate at high altitudes (*e.g.,* rotary-wing aircraft). Mitigation does not apply to active sonar sources deployed from unmanned aircraft or aircraft operating at high altitudes (*e.g.,* maritime patrol aircraft). *Number of Lookouts and Observation Platform:* • *Hull-mounted sources:* —1 Lookout: Platforms with space or manning restrictions while underway (at the forward part of a small boat or ship) and platforms using active sonar while moored or at anchor (including pierside). —2 Lookouts: Platforms without space or manning restrictions while underway (at the forward part of the ship). • *Sources that are not hull-mounted:* —1 Lookout on the ship or aircraft conducting the activity. *Mitigation Requirements:* • *Mitigation zones:* —During the activity, at 1,000 yd Navy personnel must power down 6 dB, at 500 yd, Navy personnel must power down an additional 4 dB (for a total of 10 dB), and at 200 yd Navy personnel must shut down for low-frequency active sonar ≥200 decibels (dB) and hull-mounted mid-frequency active sonar. —200 yd shut down for low-frequency active sonar <200 dB, mid-frequency active sonar sources that are not hull-mounted, and high-frequency active sonar. • *Prior to the initial start of the activity (e.g., when maneuvering on station):* —Observe the mitigation zone for floating vegetation; if floating vegetation is observed, relocate or delay the start until the mitigation zone is clear. —Observe the mitigation zone for marine mammals; if marine mammals are observed, relocate or delay the start of active sonar transmission. • *During the activity:* —Low-frequency active sonar ≥200 decibels (dB) and hull-mounted mid-frequency active sonar: Navy personnel must observe the mitigation zone for marine mammals; power down active sonar transmission by 6 dB if marine mammals are observed within 1,000 yd of the sonar source; power down an additional 4 dB (for a total of 10 dB total) within 500 yd; cease transmission within 200 yd. —Low-frequency active sonar <200 dB, mid-frequency active sonar sources that are not hull-mounted, and high-frequency active sonar: Observe the mitigation zone for marine mammals; cease active sonar transmission if marine mammals are observed within 200 yd of the sonar source. • *Commencement/recommencement conditions after a marine mammal sighting before or during the activity:* —Navy personnel must allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing or powering up active sonar transmission) until one of the following conditions has been met: (1) The animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the sonar source; (3) the mitigation zone has been clear from any additional sightings for 10 min. for aircraft-deployed sonar sources or 30 min. for vessel-deployed sonar sources; (4) for mobile activities, the active sonar source has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting; or (5) for activities using hull-mounted sonar, the ship concludes that dolphins are deliberately closing in on the ship to ride the ship's bow wave, and are therefore out of the main transmission axis of the sonar (and there are no other marine mammal sightings within the mitigation zone).

Procedural Mitigation for Air Guns

Procedural mitigation for air guns is described in Table 47 below.

TABLE 47—PROCEDURAL MITIGATION FOR AIR GUNS

Procedural Mitigation Description
Stressor or Activity: • Air guns. *Number of Lookouts and Observation Platform:* • *1 Lookout must be positioned on a ship or pierside.* *Mitigation Requirements:* • *Mitigation zone:* —150 yd around the air gun • *Prior to the initial start of the activity (e.g., when maneuvering on station):* —Observe the mitigation zone for floating vegetation; if floating vegetation is observed, relocate or delay the start until the mitigation zone is clear. —Observe the mitigation zone for marine mammals; if marine mammals are observed, relocate or delay the start of air gun use. • *During the activity:* —Observe the mitigation zone for marine mammals; if marine mammals are observed, cease air gun use. • *Commencement/recommencement conditions after a marine mammal sighting before or during the activity:* —Navy personnel must allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing air gun use) until one of the following conditions has been met: (1) The animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the air gun; (3) the mitigation zone has been clear from any additional sightings for 30 min.; or (4) for mobile activities, the air gun has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting.

Procedural Mitigation for Pile Driving

Procedural mitigation for pile driving is described in Table 48 below.

TABLE 48—PROCEDURAL MITIGATION FOR PILE DRIVING

Procedural mitigation description
Stressor or Activity: • *Pile driving and pile extraction sound during Elevated Causeway System training.* *Number of Lookouts and Observation Platform:* • *1 Lookout must be positioned on the shore, the elevated causeway, or a small boat.* *Mitigation Requirements:* • *Mitigation zone:* —100 yd around the pile. • *Prior to the initial start of the activity (for 30 min.):* —Observe the mitigation zone for floating vegetation; if floating vegetation is observed, delay the start until the mitigation zone is clear. —Observe the mitigation zone for marine mammals; if marine mammals are observed, delay the start of pile driving or vibratory pile extraction. • *During the activity:* —Observe the mitigation zone for marine mammals; if marine mammals are observed, cease impact pile driving or vibratory pile extraction. • *Commencement/recommencement conditions after a marine mammal sighting before or during the activity:* —Navy personnel must allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing pile driving or pile extraction) until one of the following conditions has been met: (1) The animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the pile driving location; or (3) the mitigation zone has been clear from any additional sightings for 30 min.

Procedural Mitigation for Weapons Firing Noise

Procedural mitigation for weapons firing noise is described in Table 49 below.

TABLE 49—PROCEDURAL MITIGATION FOR WEAPONS FIRING NOISE

Procedural mitigation description
Stressor or Activity: • *Weapons firing noise associated with large-caliber gunnery activities.* *Number of Lookouts and Observation Platform:* • *1 Lookout must be positioned on the ship conducting the firing.*

TABLE 49—PROCEDURAL MITIGATION FOR WEAPONS FIRING NOISE—Continued

Procedural mitigation description
—Depending on the activity, the Lookout could be the same one provided for under Explosive Medium-Caliber and Large-Caliber Projectiles or under Small-, Medium, and Large-Caliber Non-Explosive Practice Munitions. *Mitigation Requirements:* • *Mitigation zone:* —30° on either side of the firing line out to 70 yd from the muzzle of the weapon being fired. • *Prior to the initial start of the activity:* —Observe the mitigation zone for floating vegetation; if floating vegetation is observed, relocate or delay the start of weapons firing until the mitigation zone is clear. —Observe the mitigation zone for marine mammals; if marine mammals are observed, relocate or delay the start of weapons firing. • *During the activity:* —Observe the mitigation zone for marine mammals; if marine mammals are observed, cease weapons firing. • *Commencement/recommencement conditions after a marine mammal sighting before or during the activity:* —Navy personnel must allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing weapons firing) until one of the following conditions has been met: (1) The animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the firing ship; (3) the mitigation zone has been clear from any additional sightings for 30 min.; or (4) for mobile activities, the firing ship has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting.

Procedural Mitigation for Explosive Stressors

Mitigation measures for explosive stressors are provided in Tables 50 through 59.

Procedural Mitigation for Explosive Sonobuoys

Procedural mitigation for explosive sonobuoys is described in Table 50 below.

TABLE 50—PROCEDURAL MITIGATION FOR EXPLOSIVE SONOBUOYS

Procedural mitigation description
Stressor or Activity: • *Explosive sonobuoys.* *Number of Lookouts and Observation Platform:* • *1 Lookout must be positioned must be positioned in an aircraft or on small boat.* • If additional platforms are participating in the activity, personnel positioned in those assets (*e.g.,* safety observers, evaluators) must support observing the mitigation zone for applicable biological resources while performing their regular duties. *Mitigation Requirements:* • *Mitigation zone:* —600 yd around an explosive sonobuoy. • *Prior to the initial start of the activity (e.g., during deployment of a sonobuoy field, which typically lasts 20–30 min.):* —Observe the mitigation zone for floating vegetation; if floating vegetation is observed, relocate or delay the start until the mitigation zone is clear. —Conduct passive acoustic monitoring for marine mammals; use information from detections to assist visual observations. —Visually observe the mitigation zone for marine mammals; if marine mammals are observed, relocate or delay the start of sonobuoy or source/receiver pair detonations. • *During the activity:* —Observe the mitigation zone for marine mammals; if marine mammals are observed, cease sonobuoy or source/receiver pair detonations. • *Commencement/recommencement conditions after a marine mammal sighting before or during the activity:* —Navy personnel must allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing detonations) until one of the following conditions has been met: (1) The animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the sonobuoy; or (3) the mitigation zone has been clear from any additional sightings for 10 min. when the activity involves aircraft that have fuel constraints, or 30 min. when the activity involves aircraft that are not typically fuel constrained. • *After completion of the activity (e.g., prior to maneuvering off station):* —When practical (*e.g.,* when platforms are not constrained by fuel restrictions or mission-essential follow-on commitments), observe the vicinity of where detonations occurred; if any injured or dead marine mammals are observed, follow established incident reporting procedures. —If additional platforms are supporting this activity (*e.g.,* providing range clearance), these assets must assist in the visual observation of the area where detonations occurred.

Procedural Mitigation for Explosive Torpedoes

Procedural mitigation for explosive torpedoes is described in Table 51 below.

TABLE 51—PROCEDURAL MITIGATION FOR EXPLOSIVE TORPEDOES

Procedural mitigation description
Stressor or Activity: • *Explosive torpedoes.* *Number of Lookouts and Observation Platform:* • *1 Lookout must be positioned in an aircraft.* • *If additional platforms are participating in the activity, personnel positioned in those assets (e.g., safety observers, evaluators) must support observing the mitigation zone for applicable biological resources while performing their regular duties.* *Mitigation Requirements:* • *Mitigation zone:* —2,100 yd around the intended impact location. • *Prior to the initial start of the activity (e.g., during deployment of the target):* —Observe the mitigation zone for floating vegetation; if floating vegetation is observed, relocate or delay the start until the mitigation zone is clear. —Conduct passive acoustic monitoring for marine mammals; use information from detections to assist visual observations. —Visually observe the mitigation zone for marine mammals and jellyfish aggregations; if marine mammals or jellyfish aggregations are observed, relocate or delay the start of firing. • *During the activity:* —Observe the mitigation zone for marine mammals and jellyfish aggregations; if marine mammals and jellyfish aggregations are observed, cease firing. • *Commencement/recommencement conditions after a marine mammal sighting before or during the activity:* —Navy personnel must allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing firing) until one of the following conditions has been met: (1) The animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the intended impact location; or (3) the mitigation zone has been clear from any additional sightings for 10 min. when the activity involves aircraft that have fuel constraints, or 30 min. when the activity involves aircraft that are not typically fuel constrained. • *After completion of the activity (e.g., prior to maneuvering off station):* —When practical (*e.g.,* when platforms are not constrained by fuel restrictions or mission-essential follow-on commitments), observe the vicinity of where detonations occurred; if any injured or dead marine mammals are observed, follow established incident reporting procedures. —If additional platforms are supporting this activity (*e.g.,* providing range clearance), these assets must assist in the visual observation of the area where detonations occurred.

Procedural Mitigation for Medium- and Large-Caliber Projectiles

Procedural mitigation for medium- and large-caliber projectiles is described in Table 52 below.

TABLE 52—PROCEDURAL MITIGATION FOR EXPLOSIVE MEDIUM-CALIBER AND LARGE-CALIBER PROJECTILES

Procedural mitigation description
Stressor or Activity: • *Gunnery activities using explosive medium-caliber and large-caliber projectiles.* —Mitigation applies to activities using a surface target. *Number of Lookouts and Observation Platform:* • *1 Lookout must be on the vessel or aircraft conducting the activity.* —For activities using explosive large-caliber projectiles, depending on the activity, the Lookout could be the same as the one described for Weapons Firing Noise. • *If additional platforms are participating in the activity, Navy personnel positioned in those assets (e.g., safety observers, evaluators) must support observing the mitigation zone for applicable biological resources while performing their regular duties.* *Mitigation Requirements:* • *Mitigation zones:* —200 yd around the intended impact location for air-to-surface activities using explosive medium-caliber projectiles. —600 yd around the intended impact location for surface-to-surface activities using explosive medium-caliber projectiles. —1,000 yd around the intended impact location for surface-to-surface activities using explosive large-caliber projectiles. • *Prior to the initial start of the activity (e.g., when maneuvering on station):* —Observe the mitigation zone for floating vegetation; if floating vegetation is observed, relocate or delay the start until the mitigation zone is clear. —Observe the mitigation zone for marine mammals; if marine mammals are observed, relocate or delay the start of firing. • *During the activity:* —Observe the mitigation zone for marine mammals; if marine mammals are observed, cease firing. • *Commencement/recommencement conditions after a marine mammal sighting before or during the activity:* —Navy personnel must allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing firing) until one of the following conditions has been met: (1) The animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the intended impact location; (3) the mitigation zone has been clear from any additional sightings for 10 min. for aircraft-based firing or 30 min. for vessel-based firing; or (4) for activities using mobile targets, the intended impact location has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting. • *After completion of the activity (e.g., prior to maneuvering off station):*

TABLE 52—PROCEDURAL MITIGATION FOR EXPLOSIVE MEDIUM-CALIBER AND LARGE-CALIBER PROJECTILES—Continued

Procedural mitigation description
—When practical (*e.g.,* when platforms are not constrained by fuel restrictions or mission-essential follow-on commitments), observe the vicinity of where detonations occurred; if any injured or dead marine mammals are observed, follow established incident reporting procedures. —If additional platforms are supporting this activity (*e.g.,* providing range clearance), these assets must assist in the visual observation of the area where detonations occurred.

Procedural Mitigation for Explosive Missiles and Rockets

Procedural mitigation for explosive missiles and rockets is described in Table 53 below.

TABLE 53—PROCEDURAL MITIGATION FOR EXPLOSIVE MISSILES AND ROCKETS

Procedural mitigation description
Stressor or Activity: • *Aircraft-deployed explosive missiles and rockets.* —Mitigation applies to activities using a surface target. *Number of Lookouts and Observation Platform:* • *1 Lookout must be positioned in an aircraft.* • *If additional platforms are participating in the activity, Navy personnel positioned in those assets (e.g., safety observers, evaluators) must support observing the mitigation zone for applicable biological resources while performing their regular duties.* *Mitigation Requirements:* • *Mitigation zones:* —900 yd around the intended impact location for missiles or rockets with 0.6–20 lb. net explosive weight. —2,000 yd around the intended impact location for missiles with 21–500 lb. net explosive weight. • *Prior to the initial start of the activity (e.g., during a fly-over of the mitigation zone):* —Observe the mitigation zone for floating vegetation; if floating vegetation is observed, relocate or delay the start until the mitigation zone is clear. —Observe the mitigation zone for marine mammals; if marine mammals are observed, relocate or delay the start of firing. • *During the activity:* —Observe the mitigation zone for marine mammals; if marine mammals are observed, cease firing. • *Commencement/recommencement conditions after a marine mammal sighting before or during the activity:* —Navy personnel must allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing firing) until one of the following conditions has been met: (1) The animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the intended impact location; or (3) the mitigation zone has been clear from any additional sightings for 10 min. when the activity involves aircraft that have fuel constraints, or 30 min. when the activity involves aircraft that are not typically fuel constrained. • *After completion of the activity* (*e.g., prior to maneuvering off station):* —When practical (*e.g.,* when platforms are not constrained by fuel restrictions or mission-essential follow-on commitments), observe for marine mammals in the vicinity of where detonations occurred; if any injured or dead marine mammals are observed, follow established incident reporting procedures. —If additional platforms are supporting this activity (*e.g.,* providing range clearance), these assets must assist in the visual observation of the area where detonations occurred.

Procedural Mitigation for Explosive Bombs

Procedural mitigation for explosive bombs is described in Table 54 below.

TABLE 54—PROCEDURAL MITIGATION FOR EXPLOSIVE BOMBS

Procedural mitigation description
Stressor or Activity: • *Explosive bombs.* *Number of Lookouts and Observation Platform:* • *1 Lookout must be positioned in the aircraft conducting the activity.* • *If additional platforms are participating in the activity, Navy personnel positioned in those assets (e.g., safety observers, evaluators) must support observing the mitigation zone for applicable biological resources while performing their regular duties.* *Mitigation Requirements:* • *Mitigation zone:* —2,500 yd around the intended target. • *Prior to the initial start of the activity (e.g., when arriving on station):* —Observe the mitigation zone for floating vegetation; if floating vegetation is observed, relocate or delay the start of bomb deployment until the mitigation zone is clear.

TABLE 54—PROCEDURAL MITIGATION FOR EXPLOSIVE BOMBS—Continued

Procedural mitigation description
—Observe the mitigation zone for marine mammals; if marine mammals are observed, relocate or delay the start of bomb deployment.
• *During the activity (e.g., during target approach):*
—Observe the mitigation zone for marine mammals; if marine mammals are observed, cease bomb deployment.
• *Commencement/recommencement conditions after a marine mammal sighting before or during the activity:*
—Navy personnel must allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing bomb deployment) until one of the following conditions has been met: (1) The animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the intended target; (3) the mitigation zone has been clear from any additional sightings for 10 min.; or (4) for activities using mobile targets, the intended target has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting.
• *After completion of the activity (e.g., prior to maneuvering off station):*
—When practical (*e.g.,* when platforms are not constrained by fuel restrictions or mission-essential follow-on commitments), observe for marine mammals in the vicinity of where detonations occurred; if any injured or dead marine mammals are observed, follow established incident reporting procedures.
—If additional platforms are supporting this activity (*e.g.,* providing range clearance), these assets must assist in the visual observation of the area where detonations occurred.

Procedural Mitigation for Sinking Exercises

Procedural mitigation for sinking exercises is described in Table 55 below.

TABLE 55—PROCEDURAL MITIGATION FOR SINKING EXERCISES

Procedural mitigation description
Stressor or Activity:
• *Sinking exercises.*
Number of Lookouts and Observation Platform:
• *2 Lookouts (one must be positioned in an aircraft and one must be on a vessel).*
• *If additional platforms are participating in the activity, Navy personnel positioned in those assets (e.g., safety observers, evaluators) must support observing the mitigation zone for applicable biological resources while performing their regular duties.*
Mitigation Requirements:
• *Mitigation zone:*
—2.5 nmi around the target ship hulk.
• *Prior to the initial start of the activity (90 min. prior to the first firing):*
—Conduct aerial observations of the mitigation zone for floating vegetation; delay the start of firing until the mitigation zone is clear.
—Conduct aerial observations of the mitigation zone for marine mammals and jellyfish aggregations; if marine mammals or jellyfish aggregations are observed, delay the start of firing.
• *During the activity:*
—Conduct passive acoustic monitoring for marine mammals; use information from detections to assist visual observations.
—Visually observe the mitigation zone for marine mammals from the vessel; if marine mammals are observed, Navy personnel must cease firing.
—Immediately after any planned or unplanned breaks in weapons firing of longer than 2 hours, observe the mitigation zone for marine mammals from the aircraft and vessel; if marine mammals are observed, Navy personnel must delay recommencement of firing.
• *Commencement/recommencement conditions after a marine mammal sighting before or during the activity:*
—The Navy must allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing firing) until one of the following conditions has been met: (1) The animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the target ship hulk; or (3) the mitigation zone has been clear from any additional sightings for 30 min.
• *After completion of the activity (for 2 hours after sinking the vessel or until sunset, whichever comes first):*
—Observe for marine mammals in the vicinity of where detonations occurred; if any injured or dead marine mammals are observed, Navy personnel must follow established incident reporting procedures.
—If additional platforms are supporting this activity (*e.g.,* providing range clearance), these assets must assist in the visual observation of the area where detonations occurred.

Procedural Mitigation for Explosive Mine Countermeasure and Neutralization Activities

Procedural mitigation for explosive mine countermeasure and neutralization activities is described in Table 56 below.

TABLE 56—PROCEDURAL MITIGATION FOR EXPLOSIVE MINE COUNTERMEASURE AND NEUTRALIZATION ACTIVITIES

Procedural mitigation description
Stressor or Activity:

TABLE 56—PROCEDURAL MITIGATION FOR EXPLOSIVE MINE COUNTERMEASURE AND NEUTRALIZATION ACTIVITIES—Continued

Procedural mitigation description
• *Explosive mine countermeasure and neutralization activities.* *Number of Lookouts and Observation Platform:* • *1 Lookout must be positioned on a vessel or in an aircraft when implementing the smaller mitigation zone.* • *2 Lookouts (one must be positioned in an aircraft and one must be on a small boat) when implementing the larger mitigation zone.* • *If additional platforms are participating in the activity, Navy personnel positioned in those assets (e.g., safety observers, evaluators) must support observing the mitigation zone for applicable biological resources while performing their regular duties.* *Mitigation Requirements:* • *Mitigation zones:* —600 yd around the detonation site for activities using 0.1–5-lb net explosive weight. —2,100 yd around the detonation site for activities using 6–650 lb net explosive weight (including high explosive target mines). • *Prior to the initial start of the activity (e.g., when maneuvering on station; typically, 10 min when the activity involves aircraft that have fuel constraints, or 30 min when the activity involves aircraft that are not typically fuel constrained):* —Observe the mitigation zone for floating vegetation; if floating vegetation is observed, relocate or delay the start of detonations until the mitigation zone is clear. —Observe the mitigation zone for marine mammals; if marine mammals are observed, relocate or delay the start of detonations. • *During the activity:* —Observe the mitigation zone for marine mammals, concentrations of seabirds, and individual foraging seabirds; if for marine mammals, concentrations of seabirds, and individual foraging seabirds are observed, cease detonations. • *Commencement/recommencement conditions after a marine mammal sighting before or during the activity or a sighting of seabird concentrations or individual foraging seabirds during the activity:* —Navy personnel must allow a sighted animal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing detonations) until one of the following conditions has been met: (1) The animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to detonation site; or (3) the mitigation zone has been clear from any additional sightings for 10 min. when the activity involves aircraft that have fuel constraints, or 30 min. when the activity involves aircraft that are not typically fuel constrained. • *After completion of the activity (typically 10 min. when the activity involves aircraft that have fuel constraints, or 30 min. when the activity involves aircraft that are not typically fuel constrained):* —Observe for marine mammals in the vicinity of where detonations occurred; if any injured or dead marine mammals are observed, follow established incident reporting procedures. —If additional platforms are supporting this activity (*e.g.,* providing range clearance), these assets must assist in the visual observation of the area where detonations occurred.

Procedural Mitigation for Explosive Mine Neutralization Activities Involving Navy Divers

Procedural mitigation for explosive mine neutralization activities involving Navy divers is described in Table 57 below.

TABLE 57—PROCEDURAL MITIGATION FOR EXPLOSIVE MINE NEUTRALIZATION ACTIVITIES INVOLVING NAVY DIVERS

Procedural mitigation description
Stressor or Activity: • Explosive mine neutralization activities involving Navy divers. *Number of Lookouts and Observation Platform:* • 2 Lookouts (two small boats with one Lookout each, or one Lookout must be on a small boat and one must be in a rotary-wing aircraft) when implementing the smaller mitigation zone. • 4 Lookouts (two small boats with two Lookouts each), and a pilot or member of an aircrew must serve as an additional Lookout if aircraft are used during the activity, when implementing the larger mitigation zone. • All divers placing the charges on mines must support the Lookouts while performing their regular duties and must report applicable sightings to their supporting small boat or Range Safety Officer. • If additional platforms are participating in the activity, Navy personnel positioned in those assets (*e.g.,* safety observers, evaluators) must support observing the mitigation zone for applicable biological resources while performing their regular duties. *Mitigation Requirements:* • *Mitigation zones:* —500 yd around the detonation site during activities under positive control using 0.1–20 lb net explosive weight. —1,000 yd around the detonation site during activities using time-delay fuses (0.1–29 lb net explosive weight) and during activities under positive control using 21–60 lb net explosive weight charges. • *Prior to the initial start of the activity (e.g., when maneuvering on station for activities under positive control; 30 min. for activities using time-delay firing devices):* —Observe the mitigation zone for floating vegetation; if floating vegetation is observed, relocate or delay the start of detonations or fuse initiation until the mitigation zone is clear. —Observe the mitigation zone for marine mammals; if marine mammals are observed, relocate or delay the start of detonations or fuse initiation. • *During the activity:*

TABLE 57—PROCEDURAL MITIGATION FOR EXPLOSIVE MINE NEUTRALIZATION ACTIVITIES INVOLVING NAVY DIVERS—Continued

Procedural mitigation description
—Observe the mitigation zone for marine mammals, concentrations of seabirds, and individual foraging seabirds (in the water and not on shore); if marine mammals, concentrations of seabirds, and individual foraging seabirds are observed, cease detonations or fuse initiation. —To the maximum extent practicable depending on mission requirements, safety, and environmental conditions, Navy must position boats mustnear the mid-point of the mitigation zone radius (but outside of the detonation plume and human safety zone), must position themselves on opposite sides of the detonation location (when two boats are used), and must travel in a circular pattern around the detonation location with one Lookout observing inward toward the detonation site and the other observing outward toward the perimeter of the mitigation zone. —If used, aircraft must travel in a circular pattern around the detonation location to the maximum extent practicable. —Navy personnel must not set time-delay firing devices (0.1–29 lb. net explosive weight) to exceed 10 min. —During activities conducted in shallow water, a shore-based observer must survey the mitigation zone with binoculars for birds before and after each detonation. If training involves multiple detonations, the second (or third, etc.) detonation must occur either immediately after the preceding detonation (*i.e.,* within 10 seconds) or after 30 min. to avoid potential impacts on birds foraging underwater. • *Commencement/recommencement conditions after a marine mammal sighting before or during the activity or a sighting of seabird concentrations or individual foraging seabirds during the activity:* —Navy personnel must allow a sighted animal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing detonations) until one of the following conditions has been met: (1) The animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the detonation site; or (3) the mitigation zone has been clear from any additional sightings for 10 min. during activities under positive control with aircraft that have fuel constraints, or 30 min. during activities under positive control with aircraft that are not typically fuel constrained and during activities using time-delay firing devices. • *After completion of an activity (for 30 min):* —Observe for marine mammals in the vicinity of where detonations occurred; if any injured or dead marine mammals are observed, follow established incident reporting procedures. —If additional platforms are supporting this activity (*e.g.,* providing range clearance), these assets must assist in the visual observation of the area where detonations occurred.

Procedural Mitigation for Underwater Demolition Multiple Charge—Mat Weave and Obstacle Loading

Procedural mitigation for underwater demolition multiple charge—mat weave and obstacle loading is described in Table 58 below.

TABLE 58—PROCEDURAL MITIGATION FOR UNDERWATER DEMOLITION MULTIPLE CHARGE—MAT WEAVE AND OBSTACLE LOADING

Procedural Mitigation Description
Stressor or Activity: • Underwater Demolition Multiple Charge—Mat Weave and Obstacle Loading exercises. *Number of Lookouts and Observation Platform:* • 2 Lookouts (one must be on a small boat and one must be on shore from an elevated platform). • If additional platforms are participating in the activity, Navy personnel positioned in those assets (*e.g.,* safety observers, evaluators) must support observing the mitigation zone for applicable biological resources while performing their regular duties. *Mitigation Requirements:* • *Mitigation zone:* —700 yd around the detonation location. • *Prior to the initial start of the activity:* —For 30 min. prior to the first detonation, the Lookout positioned on a small boat must observe the mitigation zone for floating vegetation and marine mammals; if floating vegetation or marine mammals are observed, delay the start of detonations. —For 10 min. prior to the first detonation, the Lookout positioned on shore must use binoculars to observe the mitigation zone for marine mammals; if marine mammals are observed, delay the start of detonations until the mitigation zone has been clear of any additional sightings for a minimum of 10 min. • *During the activity:* —Observe the mitigation zone for marine mammals; if marine mammals are observed, cease detonations. • *Commencement/recommencement conditions after a marine mammal sighting before or during the activity:* —Navy personnel must allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing detonations) until one of the following conditions has been met: (1) The animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the detonation location; or (3) the mitigation zone has been clear from any additional sightings for 10 min. (as determined by the shore observer). • *After completion of the activity (for 30 min.):* —The Lookout positioned on a small boat must observe for marine mammals in the vicinity of where detonations occurred; if any injured or dead marine mammals are observed, Navy personnel must follow established incident reporting procedures. —If additional platforms are supporting this activity (*e.g.,* providing range clearance), these assets must assist in the visual observation of the area where detonations occurred.

Procedural Mitigation for Maritime Security Operations—Anti-Swimmer Grenades

Procedural mitigation for maritime security operations—anti-swimmer grenades is described in Table 59 below.

TABLE 59—PROCEDURAL MITIGATION FOR MARITIME SECURITY OPERATIONS—ANTI-SWIMMER GRENADES

Procedural Mitigation Description
Stressor or Activity: • *Maritime Security Operations—Anti-Swimmer Grenades.* *Number of Lookouts and Observation Platform:* • *1 Lookout must be positioned on the small boat conducting the activity.* • *If additional platforms are participating in the activity, Navy personnel positioned in those assets (e.g., safety observers, evaluators) must support observing the mitigation zone for applicable biological resources while performing their regular duties.* *Mitigation Requirements:* • *Mitigation zone:* —200 yd around the intended detonation location. • *Prior to the initial start of the activity (e.g., when maneuvering on station):* —Observe the mitigation zone for floating vegetation; if floating vegetation is observed, relocate or delay the start of detonations until the mitigation zone is clear. —Observe the mitigation zone for marine mammals; if marine mammals are observed, relocate or delay the start of detonations. • *During the activity:* —Observe the mitigation zone for marine mammals; if marine mammals are observed, cease detonations. • *Commencement/recommencement conditions after a marine mammal sighting before or during the activity:* —Navy personnel must allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing detonations) until one of the following conditions has been met: (1) The animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the intended detonation location; (3) the mitigation zone has been clear from any additional sightings for 30 min.; or (4) the intended detonation location has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting. • *After completion of the activity (e.g., prior to maneuvering off station):* —When practical (*e.g.,* when platforms are not constrained by fuel restrictions or mission-essential follow-on commitments), observe for marine mammals in the vicinity of where detonations occurred; if any injured or dead marine mammals are observed, follow established incident reporting procedures. —If additional platforms are supporting this activity (*e.g.,* providing range clearance), these assets must assist in the visual observation of the area where detonations occurred.

Procedural Mitigation for Physical Disturbance and Strike Stressors

Mitigation measures for physical disturbance and strike stressors are provided in Table 60 through Table 64.

Procedural Mitigation for Vessel Movement

Procedural mitigation for vessel movement is described in Table 60 below.

TABLE 60—PROCEDURAL MITIGATION FOR VESSEL MOVEMENT

Procedural mitigation description
Stressor or Activity: • *Vessel movement:* —The mitigation must not be applied if: (1) The vessel's safety is threatened, (2) the vessel is restricted in its ability to maneuver (*e.g.,* during launching and recovery of aircraft or landing craft, during towing activities, when mooring), (3) the vessel is operated autonomously, or (4) when impractical based on mission requirements (*e.g.,* during Amphibious Assault—Battalion Landing exercises). *Number of Lookouts and Observation Platform:* • *1 Lookout must be on the vessel that is underway.* *Mitigation Requirements:* • *Mitigation zones:* —500 yd around whales. —200 yd around other marine mammals (except bow-riding dolphins and pinnipeds hauled out on man-made navigational structures, port structures, and vessels). • *During the activity:* —When underway, observe the mitigation zone for marine mammals; if marine mammals are observed, Navy personnel must maneuver to maintain distance. • *Additional requirements:* —If a marine mammal vessel strike occurs, Navy personnel must follow the established incident reporting procedures.

Procedural Mitigation for Towed In-Water Devices

Procedural mitigation for towed in-water devices is described in Table 61 below.

TABLE 61—PROCEDURAL MITIGATION FOR TOWED IN-WATER DEVICES

Procedural mitigation description
Stressor or Activity: • Towed in-water devices: —Mitigation applies to devices that are towed from a manned surface platform or manned aircraft. —The mitigation must not be applied if the safety of the towing platform or in-water device is threatened. *Number of Lookouts and Observation Platform:* • 1 Lookout must be positioned on the manned towing platform. *Mitigation Requirements:* • *Mitigation zones:* —250 yd around marine mammals. • *During the activity (i.e., when towing an in-water device):* —Observe the mitigation zone for marine mammals; if marine mammals are observed, Navy personnel must maneuver to maintain distance.

Procedural Mitigation for Small-, Medium-, and Large-Caliber Non-Explosive Practice Munitions

Procedural mitigation for small-, medium-, and large-caliber non-explosive practice munitions is described in Table 62 below.

TABLE 62—PROCEDURAL MITIGATION FOR SMALL-, MEDIUM-, AND LARGE-CALIBER NON-EXPLOSIVE PRACTICE MUNITIONS

Procedural mitigation description
Stressor or Activity: • *Gunnery activities using small-, medium-, and large-caliber non-explosive practice munitions:* —Mitigation applies to activities using a surface target. *Number of Lookouts and Observation Platform:* • *1 Lookout must be positioned on the platform conducting the activity.* —Depending on the activity, the Lookout could be the same as the one described for Weapons Firing Noise. *Mitigation Requirements:* • *Mitigation zone:* —200 yd around the intended impact location. • *Prior to the initial start of the activity (e.g., when maneuvering on station):* —Observe the mitigation zone for floating vegetation; if floating vegetation is observed, relocate or delay the start of firing until the mitigation zone is clear. —Observe the mitigation zone for marine mammals; if marine mammals are observed, relocate or delay the start of firing. • *During the activity:* —Observe the mitigation zone for marine mammals; if marine mammals are observed, cease firing. • *Commencement/recommencement conditions after a marine mammal sighting before or during the activity:* —Navy personnel must allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing firing) until one of the following conditions has been met: (1) The animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the intended impact location; (3) the mitigation zone has been clear from any additional sightings for 10 min. for aircraft-based firing or 30 min. for vessel-based firing; or (4) for activities using a mobile target, the intended impact location has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting.

Procedural Mitigation for Non-Explosive Missiles and Rockets

Procedural mitigation for non-explosive missiles and rockets is described in Table 63 below.

TABLE 63—PROCEDURAL MITIGATION FOR NON-EXPLOSIVE MISSILES AND ROCKETS

Procedural mitigation description
Stressor or Activity: • *Aircraft-deployed non-explosive missiles and rockets:* —Mitigation applies to activities using a surface target. *Number of Lookouts and Observation Platform:* • 1 Lookout must be positioned in an aircraft.

TABLE 63—PROCEDURAL MITIGATION FOR NON-EXPLOSIVE MISSILES AND ROCKETS—Continued

Procedural mitigation description
Mitigation Requirements: • *Mitigation zone:* —900 yd around the intended impact location. • *Prior to the initial start of the activity (e.g., during a fly-over of the mitigation zone):* —Observe the mitigation zone for floating vegetation; if floating vegetation is observed, relocate or delay the start of firing until the mitigation zone is clear. —Observe the mitigation zone for marine mammals; if marine mammals are observed, relocate or delay the start of firing. • *During the activity:* —Observe the mitigation zone for marine mammals; if marine mammals are observed, cease firing. • *Commencement/recommencement conditions after a marine mammal sighting prior to or during the activity:* —Navy personnel must allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing firing) until one of the following conditions has been met: (1) The animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the intended impact location; or (3) the mitigation zone has been clear from any additional sightings for 10 min. when the activity involves aircraft that have fuel constraints, or 30 min. when the activity involves aircraft that are not typically fuel constrained.

Procedural Mitigation for Non-Explosive Bombs and Mine Shapes

Procedural mitigation for non-explosive bombs and mine shapes is described in Table 64 below.

TABLE 64—PROCEDURAL MITIGATION FOR NON-EXPLOSIVE BOMBS AND MINE SHAPES

Procedural mitigation description
Stressor or Activity: • *Non-explosive bombs.* • *Non-explosive mine shapes during mine laying activities.* *Number of Lookouts and Observation Platform:* • *1 Lookout must be positioned in an aircraft.* *Mitigation Requirements:* • *Mitigation zone:* —1,000 yd around the intended target. • *Prior to the start of the activity (e.g., when arriving on station):* —Observe the mitigation zone for floating vegetation; if floating vegetation is observed, relocate or delay the start of bomb deployment or mine laying until the mitigation zone is clear. —Observe the mitigation zone for marine mammals; if marine mammals are observed, relocate or delay the start of bomb deployment or mine laying. • *During the activity (e.g., during approach of the target or intended minefield location):* —Observe the mitigation zone for marine mammals and; if marine mammals are observed, cease bomb deployment or mine laying. • *Commencement/recommencement conditions after a marine mammal sighting prior to or during the activity:* —Navy personnel must allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing bomb deployment or mine laying) until one of the following conditions has been met: (1) The animal is observed exiting the mitigation zone; (2) the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the intended target or minefield location; (3) the mitigation zone has been clear from any additional sightings for 10 min.; or (4) for activities using mobile targets, the intended target has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting.

Final Mitigation Areas

In addition to procedural mitigation, the Navy will implement mitigation measures within mitigation areas to avoid or minimize potential impacts on marine mammals (see Figures 2 and 4 above and the revised figures provided in the HSTT FEIS/OEIS for specific information on the location and boundaries of each mitigation area). A full technical analysis (for which the methods were summarized above) of the mitigation areas that the Navy considered for marine mammals is provided in Appendix K (Geographic Mitigation Assessment) of the HSTT FEIS/OEIS. The Navy has taken into account public comments received on the HSTT DEIS/OEIS, best available science, and the practicability of implementing additional mitigation measures and has enhanced its mitigation areas and mitigation measures to further reduce impacts to marine mammals. The Navy has therefore revised their mitigation areas since their application (changes noted at the beginning of this section). The Navy re-analyzed existing mitigation areas and considered new habitat areas suggested by the public, NMFS, and other non-governmental organizations, including main Hawaiian Islands insular false killer whale ESA designated critical habitat, important habitat for large whales in SOCAL, BIAs, and National Marine Sanctuaries. The Navy worked collaboratively with NMFS to develop mitigation areas using inputs from the Navy's operational community, the best available science discussed in Chapter 3 of the HSTT FEIS/OEIS (Affected Environment and Environmental Consequences section), published literature, predicted activity impact footprints, marine species monitoring and density data, and the practicability of implementing additional mitigations.

NMFS conducted an independent analysis of the mitigation areas that the Navy will implement and that are included in this rule, which are described below. NMFS concurs with the Navy's analysis, which indicates that the measures in these mitigation areas are both practicable and will reduce the likelihood or severity of adverse impacts to marine mammal species or stocks or their habitat in the manner described in the Navy's analysis and this rule. We note that NMFS is heavily reliant on the Navy's assessment of practicability, since the Navy is best equipped to judge the degree to which a given mitigation measure affects personnel safety or mission effectiveness, and is practical to implement. The Navy considers the measures in this rule to be practicable. We further describe and summarize the manner in which the Area Mitigations in the rule will reduce the likelihood or severity of adverse impacts to marine mammal species or stocks or their habitat below.

Mitigation Areas in Hawaii

Hawaii Island Mitigation Area: The Navy will not use more than 300 hours of MF1 surface hull-mounted MFAS (the source that results in, by far, the highest numbers of take) or 20 hours of MF4 dipping sonar in a year, or explosives across this large area at any time of the year. This mitigation area overlaps the entirety of several small, resident populations (BIAs) of odontocetes that occur only around the island of Hawaii (Hawaii stocks of dwarf sperm whale, pygmy killer whale, short-finned pilot whale, melon-headed whale, bottlenose dolphin, and Blaineville's beaked whale) and about 80 and 90 percent, respectively, of the Hawaii stocks of the rough-toothed dolphin and Cuvier's beaked whale. For small resident populations, we aim to avoid overwhelming small populations (which are more susceptible to certain adverse impacts on population rates of growth and survival, such as Allee effects) with large scale impacts, especially when the population is limited to a small area and less able to access alternative habitat. By minimizing exposure to the most impactful sonar sources and not using explosives, both the magnitude and severity of both behavioral impacts and potential hearing impairment are greatly reduced. There are also several small resident populations (BIAs) of odontocetes that span multiple islands, and this mitigation area overlaps all of the stock's range around the island of Hawaii for false killer whales (Main Hawaiian Island insular stock) and spinner dolphins (Hawaiian Islands stock), and about 90 percent of the range around the island of Hawaii for pantropical spotted dolphins (Hawaii stock). Additionally, critical habitat has been designated, pursuant to the ESA, for false killer whales (Main Hawaiian Island insular stock) in waters between 45 and 3,200 meters depth around all of the main Hawaiian islands, and this mitigation area captures more than 95 percent of this area around the island of Hawaii. Stocks that span multiple islands and have larger total area within their range are generally considered somewhat less vulnerable than those with smaller ranges, but nonetheless, this mitigation area (along with the addition of the 4-Islands Mitigation Area discussed immediately below) offers significant reduction of impacts to these stocks.

This mitigation area also overlaps an important breeding and calving area (BIA) for the Central North Pacific stock of humpback whales (of note, the BIA entirely contains, and is slightly larger than, the Hawaii Humpback Whale National Marine Sanctuary). This BIA includes areas adjacent to all of the Main Hawaiian Islands, and this mitigation area encompasses the important area adjacent to the island of Hawaii. For humpback whales, the reduction of activities and associated impacts (behavioral disturbance or TTS) in this area for individuals that have calves or are potentially breeding is expected to reduce the probability or severity of impacts that would be more likely to adversely impact reproduction or survival of individuals by directly interfering with breeding behaviors or by separating mothers and calves at a time when calves are more susceptible to predators and less able to care for and feed themselves.

Critical habitat has been designated, pursuant to the ESA, for the Hawaiian monk seal from the shore out to the 200-m depth line (but only between the bottom and 10 meters above the bottom) in multiple areas on 10 islands of the Northwestern Hawaiian Islands and six islands of the Main Hawaiian Islands. These areas include: (1) Significant coastal areas where seals haul out for resting, molting, socializing, and avoiding predators; (2) preferred coastal and marine nursery grounds where seals haul out for pupping and nursing, and (3) marine areas where seals hunt and feed. This mitigation area overlaps all of their critical habitat around the Island of Hawaii and, by not using explosives or the most impactful sonar sources in this area, thereby reduces the likelihood that take might impact reproduction or survival by interfering with important feeding or resting behaviors (potentially having adverse impacts on energy budgets) or separating mothers and pups in times when pups are more susceptible to predation and less able to feed or otherwise take care of themselves.

4-Islands Region Mitigation Area: The Navy will not use MF1 surface hull-mounted MFAS (the source that results in, by far, the highest numbers of take) from November 15 through April 15 or use explosives in this area at any time of the year. The Maui/Molokai area (4-Islands Region) is an important reproductive and calving area for humpback whales (another section of the BIA, and including a greater area than the Hawaii island section), and the mitigation area overlaps the entirety of this BIA between the islands of Maui, Molokai, Lanai, and Kaho'alawe. As noted above, the reduction of activities in this area with individuals that have calves or are potentially breeding is expected to reduce the probability or severity of impacts that would be more likely to adversely impact reproduction or survival of individuals by directly interfering with breeding behaviors or by separating mothers and calves at a time when calves are more susceptible to predators and less able to care for and feed themselves.

In addition, as noted above, there are also several small resident populations of marine mammals (BIAs) that span multiple islands, and this mitigation area overlaps about 80 percent of the pantropical spotted dolphin (Hawaii stock) area adjacent to these four islands (one of three discrete areas of the BIA), about 40 percent of the portion of the false killer whale's (Main Hawaiian Island insular stock) range that spans an area north of Molokai and Maui (one of the two significantly larger areas that comprise the false killer whale BIA), and a good portion of the BIA for spinner dolphins (Hawaiian Islands stock), which spans the Main Hawaiian Islands in one large continuous area. As noted above, the critical habitat for false killer whales extends fairly far out (to 3,200 meters depth) around all the Main Hawaiian Islands. As described in the Hawaii Island Mitigation Area section above, by limiting exposure to the most impactful sonar source and explosives for these stocks, in this 4-Islands Region Mitigation Area in addition to the Hawaii Island Mitigation Area both the magnitude and severity of both behavioral impacts and potential hearing impairment are greatly reduced.

Also as noted first above, critical habitat has been designated for the Hawaiian monk seal from the shore out to the 200-m depth line around the four islands targeted with this mitigation area. The mitigation area overlaps more than half of the critical habitat around these four islands and by not using explosives or the most impactful sonar sources in this area, the likelihood that take might impact reproduction or survival by interfering with important feeding or resting behaviors (potentially having adverse impacts on energy budgets) or separating mothers and pups in times when pups are more susceptible to predation and less able to feed or otherwise take care of themselves is greatly reduced.

Humpback Whale Awareness Notification Message Area: The Navy will issue a seasonal awareness notification message that will alert Navy ships and aircraft in the area of the possible presence of whales and instruct them to remain vigilant to the presence of large whales that when seasonally concentrated (like humpbacks) may become vulnerable to vessel strikes. The message is issued to all vessels in Hawaii from November through April. This message will further increase the vigilance of Navy Lookouts in a place and time where humpback whale density is high, which will further reduce the chance that a humpback whale (or other large whale) may be struck.

Humpback Whale Special Reporting Areas: The Navy will report the total hours of surface ship hull-mounted MFAS used between December 15 and April 15 in three special reporting areas, including Penguin Banks and two other much smaller areas that also overlap the humpback whale BIA. These reporting areas are not mitigation areas, however, we describe them here because they were identified in order to inform the adaptive management process. Specifically, Penguin Bank is an area with high humpback whale density that is also critical for Navy training and testing. Because of the impracticability of implementing activity limitations in this important area, we designated this reporting requirement so that NMFS could remain aware of the level of activity in the area and revisit mitigation discussions, if appropriate. To date the Navy's reporting has not lead to changes in NMFS' least practicable adverse impact analysis for the mitigation in this area.

Mitigation Areas Off the U.S. West Coast

Santa Barbara Island Mitigation Area (Year-round): The Navy will not use ship hull-mounted MFAS during training or testing (the source responsible for the most take), or explosives during medium-calibre or large-calibre gunnery, torpedo, bombing, and missile (including 2.75-inch rockets) activities during training, year-round. The boundary of this mitigation area is conterminous with the boundary of the portion of the Channel Islands NMS that is within the HSTT Study Area, and overlaps the extensive coastal gray whale migration BIA. The Channel Islands NMS is considered a highly productive and diverse area of high-value habitat that is more typically free of anthropogenic stressors (because many activities are prohibited or limited within the Sanctuary boundaries), and, therefore, limiting sonar and explosive activities in this area would be expected to reduce the likelihood that marine mammals feeding or resting in the area (which is more likely because of the higher value habitat) would be disrupted in a manner that would have adverse effects on their energy budgets and potentially impact reproduction or survival, or that marine mammals using the area would incur TTS or PTS. Activity limitations in this mitigation area are considered protection of generally higher quality habitat (because of the diversity of prey species and protected space, including acoustic habitat, that is generally freer from stressors) for the myriad marine mammal species that use it or may pass through the area, which could include any of the species identified as being present in the SOCAL portion of the HSTT Study Area. Though the gray whale migration area primarily consists of a relatively narrow coastal strip, some gray whales migrate through this area, either north or south, in all months of the year except August and September.

San Diego Arc, San Nicolas Island, and Santa Monica/Long Beach Mitigation Areas: From June 1 through October 31, the Navy will not conduct more than 200 hours of surface ship hull-mounted MFAS in these combined areas during training or testing, and will limit explosive use in the three areas as described in Table 66 below. The San Diego Arc Mitigation Area is conterminous with the entirety of a blue whale feeding BIA and the other two mitigation areas are conterminous with the portions of two blue whale feeding BIAs that overlap the HSTT Study Area. One blue whale feeding BIA in SOCAL is not protected by a mitigation area (Tanner-Cortes Banks) because it would be impracticable due to the significant importance of the area for Navy testing and training (described in detail in the HSTT FEIS/OEIS). All of these mitigation areas overlap the gray whale migratory route. Reducing harassing exposures (behavioral disturbance or hearing impairment) of marine mammals to sonar and explosives in feeding areas, even when the animals have demonstrated some tolerance for disturbance when in a feeding state, is expected to reduce the likelihood that feeding would be interrupted to a degree that energetic reserves might be affected in a manner that could reduce survivorship or reproductive success. This mitigation area will also partially overlap with an important migration area for gray whales.

Blue whale (June–October), Gray Whale (November–March), and Fin Whale (November–May) Awareness Notification Message Area: The Navy will issue a seasonal awareness notification message that will alert ships and aircraft in the area of the possible presence of whales and instruct them to remain vigilant to the presence of large whales that, when seasonally concentrated (like blue whales, gray whales, or fin whales) may become vulnerable to vessel strikes. The message is issued to all Navy vessels in SOCAL in the indicated time periods. This message is will further increase the vigilance of Navy Lookouts in a place and time where blue, gray, and fin whale density is high, which will further reduce the chance that one of these species (or other large whale) may be struck.

Information on the mitigation measures that the Navy will implement within mitigation areas is provided in Tables 65 and 66. The mitigation applies year-round unless specified otherwise in the tables.

Mitigation Areas for the Hawaii Range Complex (HRC)

Mitigation areas for the HRC are described in Table 65 below. The location of each mitigation area is depicted in Figures 1 and 2 above and may also be found in Chapter 5 of the 2018 HSTT FEIS/OEIS.

TABLE 65—MITIGATION AREAS FOR MARINE MAMMALS IN THE HAWAII RANGE COMPLEX

Mitigation area description
Stressor or Activity: • Sonar. • Explosives. • Vessel strikes. *Mitigation Area Requirements:* • *Hawaii Island Mitigation Area (year-round):* —Navy personnel must not conduct more than 300 hours of MF1 surface ship hull-mounted mid-frequency active sonar or 20 hours of MF4 dipping sonar, or use explosives that could potentially result in takes of marine mammals during training and testing. Should national security require conduct of more than 300 hours of MF1 surface ship hull-mounted mid-frequency active sonar or 20 hours of MF4 dipping sonar, or use of explosives that could potentially result in the take of marine mammals during training or testing, Naval units must obtain permission from the appropriate designated Command authority prior to commencement of the activity. Navy personnel must provide NMFS with advance notification and include the information (*e.g.,* sonar hours or explosives usage) in its annual activity reports submitted to NMFS. • *4-Islands Region Mitigation Area (November 15–April 15 for active sonar; year-round for explosives):* —Navy personnel must not use MF1 surface ship hull-mounted mid-frequency active sonar or explosives that could potentially result in takes of marine mammals during training and testing. Should national security require use of MF1 surface ship hull-mounted mid-frequency active sonar or explosives that could potentially result in the take of marine mammals during training or testing, Naval units must obtain permission from the appropriate designated Command authority prior to commencement of the activity. Navy personnel must provide NMFS with advance notification and include the information (*e.g.,* sonar hours or explosives usage) in its annual activity reports submitted to NMFS. • *Humpback Whale Special Reporting Areas (December 15–April 15):* —Navy personnel must report the total hours of surface ship hull-mounted mid-frequency active sonar used in the special reporting areas in its annual training and testing activity reports submitted to NMFS. • *Humpback Whale Awareness Notification Message Area (November–April):* —Navy personnel must issue a seasonal awareness notification message to alert ships and aircraft operating in the area to the possible presence of concentrations of large whales, including humpback whales. —To maintain safety of navigation and to avoid interactions with large whales during transits, Navy personnel must instruct vessels to remain vigilant to the presence of large whale species (including humpback whales), that when concentrated seasonally, may become vulnerable to vessel strikes. —Platforms must use the information from the awareness notification message to assist their visual observation of applicable mitigation zones during training and testing activities and to aid in the implementation of procedural mitigation.

Mitigation Areas for the SOCAL Portion of the Study Area

Mitigation areas for the SOCAL portion of the Study Area are described in Table 66 below. The location of each mitigation area is depicted in Figures 3 and 4 above and may also be found in Chapter 5 of in the 2018 HSTT FEIS/OEIS.

TABLE 66—MITIGATION AREAS FOR MARINE MAMMALS IN THE SOUTHERN CALIFORNIA PORTION OF THE STUDY AREA

Mitigation area description
Stressor or Activity • Sonar. • Explosives. • Vessel strikes. *Mitigation Area Requirements:* • *San Diego Arc, San Nicolas Island, and Santa Monica/Long Beach Mitigation Areas (June 1–October 31):* —Navy personnel must not conduct more than a total of 200 hours of MF1 surface ship hull-mounted mid-frequency active sonar in the combined areas, excluding normal maintenance and systems checks, during training and testing. Should national security require conduct of more than 200 hours of MF1 surface ship hull-mounted mid-frequency active sonar in the combined areas during training and testing (excluding normal maintenance and systems checks), naval units must obtain permission from the appropriate designated Command authority prior to commencement of the activity. Navy personnel must provide NMFS with advance notification and include the information (*e.g.,* sonar hours) in its annual activity reports submitted to NMFS. —Within the San Diego Arc Mitigation Area, Navy personnel must not use explosives that could potentially result in the take of marine mammals during large-caliber gunnery, torpedo, bombing, and missile (including 2.75″ rockets) activities during training and testing. Should national security require use of explosives that could potentially result in the take of marine mammals during large-caliber gunnery, torpedo, bombing, and missile (including 2.75″ rockets) activities during training or testing, naval units must obtain permission from the appropriate designated Command authority prior to commencement of the activity. Navy personnel must provide NMFS with advance notification and include the information (*e.g.,* explosives usage) in its annual activity reports submitted to NMFS. —Within the San Nicolas Island Mitigation Area, Navy personnel must not use explosives that could potentially result in the take of marine mammals during mine warfare, large-caliber gunnery, torpedo, bombing, and missile (including 2.75″ rockets) activities during training. Should national security require use of explosives that could potentially result in the take of marine mammals during mine warfare, large-caliber gunnery, torpedo, bombing, and missile (including 2.75″ rockets) activities during training, Naval units must obtain permission from the appropriate designated Command authority prior to commencement of the activity. The Navy must provide NMFS with advance notification and include the information (*e.g.,* explosives usage) in its annual activity reports submitted to NMFS. —Within the Santa Monica/Long Beach Mitigation Area, Navy personnel must not use explosives that could potentially result in the take of marine mammals during mine warfare, large-caliber gunnery, torpedo, bombing, and missile (including 2.75″ rockets) activities during training and testing. Should national security require use of explosives that could potentially result in the take of marine mammals during mine warfare, large-caliber gunnery, torpedo, bombing, and missile (including 2.75″ rockets) activities during training or testing, Naval units must obtain permission from the appropriate designated Command authority prior to commencement of the activity. Navy must provide NMFS with advance notification and include the information (*e.g.,* explosives usage) in its annual activity reports submitted to NMFS. • *Santa Barbara Island Mitigation Area (year-round):* —Navy personnel must not use MF1 surface ship hull-mounted mid-frequency active sonar during training or testing, or explosives that could potentially result in the take of marine mammals during medium-caliber or large-caliber gunnery, torpedo, bombing, and missile (including 2.75″ rockets) activities during training. Should national security require use of MF1 surface ship hull-mounted mid-frequency active sonar during training or testing, or explosives that could potentially result in the take of marine mammals during medium-caliber or large-caliber gunnery, torpedo, bombing, and missile (including 2.75″ rockets) activities during training, Naval units must obtain permission from the appropriate designated Command authority prior to commencement of the activity. Navy personnel must provide NMFS with advance notification and include the information (*e.g.,* sonar hours or explosives usage) in its annual activity reports submitted to NMFS. • *Blue Whale (June–October), Gray Whale (November–March), and Fin Whale (November–May) Awareness Notification Message Areas:* —Navy personnel must issue a seasonal awareness notification message to alert ships and aircraft operating in the area to the possible presence of concentrations of large whales, including blue whales, gray whales, or fin whales. —To maintain safety of navigation and to avoid interactions with large whales during transits, Navy personnel must instruct vessels to remain vigilant to the presence of large whale species, that when concentrated seasonally, may become vulnerable to vessel strikes. —Platforms must use the information from the awareness notification messages to assist their visual observation of applicable mitigation zones during training and testing activities and to aid in the implementation of procedural mitigation.

Summary of Mitigation

The Navy's mitigation measures are summarized in Tables 67 (Procedural Mitigation) and 68 (Mitigation Areas).

Summary of Procedural Mitigation

TABLE 67—SUMMARY OF PROCEDURAL MITIGATION

Stressor or activity	Mitigation zone sizes and other requirements
Environmental Awareness and Education	• Afloat Environmental Compliance Training program for applicable personnel.
Active Sonar	Depending on sonar source: • 1,000 yd power down, 500 yd power down, and 200 yd shut down • 200 yd shut down.
Air Guns	• 150 yd.
Pile Driving	• 100 yd.
Weapons Firing Noise	• 30° on either side of the firing line out to 70 yd.
Explosive Sonobuoys	• 600 yd.

TABLE 67—SUMMARY OF PROCEDURAL MITIGATION—Continued

Stressor or activity	Mitigation zone sizes and other requirements
Explosive Torpedoes	• 2,100 yd.
Explosive Medium-Caliber and Large-Caliber Projectiles	• 1,000 y. (large-caliber projectiles). • 600 yd (medium-caliber projectiles during surface-to-surface activities). • 200 yd (medium-caliber projectiles during air-to-surface activities).
Explosive Missiles and Rockets	• 2,000 yd (21–500 lb. net explosive weight). • 900 yd (0.6–20 lb. net explosive weight).
Explosive Bombs	• 2,500 yd.
Sinking Exercises	• 2.5 nmi.
Explosive Mine Countermeasure and Neutralization Activities	• 2,100 yd (6–650 lb net explosive weight). • 600 yd (0.1–5 lb net explosive weight).
Explosive Mine Neutralization Activities Involving Navy Divers	• 1,000 yd (21–60 lb net explosive weight for positive control charges and charges using time-delay fuses). • 500 yd (0.1–20 lb net explosive weight for positive control charges).
Underwater Demolition Multiple Charge—Mat Weave and Obstacle Loading.	• 700 yd.
Maritime Security Operations—Anti-Swimmer Grenades	• 200 yd.
Vessel Movement	• 500 yd (whales). • 200 yd (other marine mammals).
Towed In-Water Devices	• 250 yd (marine mammals).
Small-, Medium-, and Large-Caliber Non-Explosive Practice Munitions.	• 200 yd.
Non-Explosive Missiles and Rockets	• 900 yd.
Non-Explosive Bombs and Mine Shapes	• 1,000 yd.

Summary of Mitigation Areas

TABLE 68—SUMMARY OF MITIGATION AREAS FOR MARINE MAMMALS

Summary of mitigation area requirements
Mitigation Areas for Shallow-water Coral Reefs and Precious Coral Beds (year-round) • The Navy must not conduct precision anchoring (except in designated anchorages), explosive or non-explosive mine countermeasure and neutralization activities, explosive or non-explosive mine neutralization activities involving Navy divers, explosive or non-explosive small-, medium-, and large-caliber gunnery activities using a surface target, explosive or non-explosive missile and rocket activities using a surface target, and explosive or non-explosive bombing or mine laying activities (except in designated locations). • The Navy must not place mine shapes, anchors, or mooring devices on the seafloor (except in designated locations).
Hawaii Island Mitigation Area (year-round) • Navy personnel must not conduct more than 300 hours of MF1 surface ship hull-mounted mid-frequency active sonar or 20 hours of MF4 dipping sonar, or use explosives that could potentially result in takes of marine mammals during training and testing.[1]
4-Islands Region Mitigation Area (November 15–April 15 for active sonar; year-round for explosives) • Navy personnel must not use MF1 surface ship hull-mounted mid-frequency active sonar or explosives that could potentially result in takes of marine mammals during training and testing.[1]
Humpback Whale Special Reporting Areas (December 15–April 15) • Navy personnel must report the total hours of surface ship hull-mounted mid-frequency active sonar used in in the special reporting areas in its annual training and testing activity reports submitted to NMFS.
San Diego Arc, San Nicolas Island, and Santa Monica/Long Beach Mitigation Areas (June 1–October 31) • Navy personnel must not conduct more than a total of 200 hours of MF1 surface ship hull-mounted mid-frequency active sonar in the combined areas, excluding normal maintenance and systems checks, during training and testing.[1] • Within the San Diego Arc Mitigation Area, Navy personnel must not use explosives that could potentially result in the take of marine mammals during large-caliber gunnery, torpedo, bombing, and missile (including 2.75″ rockets) activities during training and testing.[1] • Within the San Nicolas Island Mitigation Area, Navy personnel must not use explosives that could potentially result in the take of marine mammals during mine warfare, large-caliber gunnery, torpedo, bombing, and missile (including 2.75″ rockets) activities during training.[1] • Within the Santa Monica/Long Beach Mitigation Area, Navy personnel must not use explosives that could potentially result in the take of marine mammals during mine warfare, large-caliber gunnery, torpedo, bombing, and missile (including 2.75″ rockets) activities during training and testing.[1]
Santa Barbara Island Mitigation Area (year-round) • Navy personnel must not use MF1 surface ship hull-mounted mid-frequency active sonar during training and testing, or explosives that could potentially result in the take of marine mammals during medium-caliber or large-caliber gunnery, torpedo, bombing, and missile (including 2.75″ rockets) activities during training.[1]
Awareness Notification Message Areas (seasonal according to species) • Navy personnel must issue awareness notification messages to alert ships and aircraft to the possible presence of humpback whales (November–April), blue whales (June–October), gray whales (November–March), or fin whales (November–May).

[1] If Naval units need to conduct more than the specified amount of training or testing, they will obtain permission from the appropriate designated Command authority prior to commencement of the activity. The Navy will provide NMFS with advance notification and include the information in its annual activity reports submitted to NMFS.

Mitigation Conclusions

NMFS has carefully evaluated the Navy's mitigation measures—many of which were developed with NMFS' input during the previous phases of Navy training and testing authorizations, or during the development of the proposed or final rule for these HSTT Phase 3 activities. NMFS and the Navy also considered a broad range of other measures (*i.e.,* the measures considered but eliminated, as discussed in the HSTT FEIS/OEIS, which reflect many of the comments that have arisen via public input in past years) to ensure that NMFS prescribes the means of effecting the least practicable adverse impact on the affected marine mammal species and stocks and their habitat. In particular for this rule, we carefully and thoroughly evaluated those additional measures that were put in place in 2015 as a result of the settlement agreement in *Conservation Council for Hawaii* v. *National Marine Fisheries Service.* Our evaluation of mitigation measures included consideration of the following factors in relation to one another: The manner in which, and the degree to which, the successful implementation of the mitigation measures is expected to reduce the likelihood and/or magnitude of adverse impacts to marine mammal species and stocks and their habitat; the proven or likely efficacy of the measures; and the practicability of the measures for applicant implementation, including consideration of personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity. Ultimately, the Navy adopted all mitigation measures that are practicable by, among other things, not jeopardizing its mission and Title 10 responsibilities. A comprehensive assessment by Navy leadership of the final, entire list of mitigation measures concluded that the inclusion of any further mitigation beyond those measures identified here in the final rule would be entirely impracticable. NMFS independently reviewed the Navy's practicability determinations for specific mitigation areas and concurs with the Navy's analysis.

Based on our evaluation of the Navy's planned measures, as well as other measures considered by the Navy and NMFS, NMFS has determined that the mitigation measures included in this rule are appropriate means of effecting the least practicable adverse impacts on marine mammals species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, considering specifically personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity.

Additionally, as described in more detail below, the final rule includes an adaptive management provision, which ensures that mitigation is regularly assessed and provides a mechanism to improve the mitigation, based on the factors above, through modification as appropriate.

Monitoring

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

Although the Navy has been conducting research and monitoring in the HSTT Study Area for over 20 years, it developed a formal marine species monitoring program in support of the MMPA and ESA authorizations for the Hawaii and Southern California range complexes in 2009. This robust program has resulted in hundreds of technical reports and publications on marine mammals that have informed Navy and NMFS analyses in environmental planning documents, rules, and Biological Opinions. The reports are made available to the public on the Navy's marine species monitoring website (*www.navymarinespeciesmonitoring.us*) and the data on the Ocean Biogeographic Information System Spatial Ecological Analysis of Megavertebrate Populations (OBIS–SEAMAP) (*www.seamap.env.duke.edu*).

The Navy will continue collecting monitoring data to inform our understanding of the occurrence of marine mammals in the HSTT Study Area; the likely exposure of marine mammals to stressors of concern in the HSTT Study Area; the response of marine mammals to exposures to stressors; the consequences of a particular marine mammal response to their individual fitness and, ultimately, populations; and the effectiveness of implemented mitigation measures. Taken together, mitigation and monitoring comprise the Navy's integrated approach for reducing environmental impacts from the specified activities. The Navy's overall monitoring approach seeks to leverage and build on existing research efforts whenever possible.

As agreed upon between the Navy and NMFS, monitoring measures presented here, as well as the mitigation measures described above, focus on the protection and management of potentially affected marine mammals. A well-designed monitoring program can provide important feedback for validating assumptions made in analyses and allow for adaptive management of marine resources. Monitoring is required under the MMPA, and details of the monitoring program for the specified activities have been developed through coordination between NMFS and the Navy through the regulatory process for previous Navy at-sea training and testing actions.

Integrated Comprehensive Monitoring Program (ICMP)

The Navy's ICMP is intended to coordinate marine species monitoring efforts across all regions and to allocate the most appropriate level and type of effort for each range complex based on a set of standardized objectives, and in acknowledgement of regional expertise and resource availability. The ICMP is designed to be flexible, scalable, and adaptable through the adaptive management and strategic planning processes to periodically assess progress and reevaluate objectives. This process includes conducting an annual adaptive management review meeting, at which the Navy and NMFS jointly consider the prior-year goals, monitoring results, and related scientific advances to determine if monitoring plan modifications are warranted to more effectively address program goals. Although the ICMP does not specify actual monitoring field work or individual projects, it does establish a matrix of goals and objectives that have been developed in coordination with NMFS. As the ICMP is implemented through the Strategic Planning Process, detailed and specific studies will be developed which support the Navy's and NMFS top-level monitoring goals. In essence, the ICMP directs that monitoring activities relating to the effects of Navy training and testing activities on marine species should be designed to contribute towards one or more of the following top-level goals:

- An increase in our understanding of the likely occurrence of marine mammals and/or ESA-listed marine species in the vicinity of the action (*i.e.,* presence, abundance, distribution, and/or density of species);
- An increase in our understanding of the nature, scope, or context of the likely exposure of marine mammals and/or ESA-listed species to any of the potential stressor(s) associated with the action (*e.g.,* sound, explosive detonation, or military expended materials) through better understanding of one or more of the following: (1) The action and the environment in which it occurs (*e.g.,* sound source characterization, propagation, and ambient noise levels); (2) the affected species (*e.g.,* life history or dive patterns); (3) the likely co-occurrence of marine mammals and/or ESA-listed marine species with the action (in whole or part); and/or (4) the likely biological or behavioral context of exposure to the stressor for the marine mammal and/or ESA-listed marine species (*e.g.,* age class of exposed animals or known pupping, calving or feeding areas);
- An increase in our understanding of how individual marine mammals or ESA-listed marine species respond (behaviorally or physiologically) to the specific stressors associated with the action (in specific contexts, where possible, *e.g.,* at what distance or received level);
- An increase in our understanding of how anticipated individual responses, to individual stressors or anticipated combinations of stressors, may impact either: (1) The long-term fitness and survival of an individual or (2) the population, species, or stock (*e.g.,* through effects on annual rates of recruitment or survival);
- An increase in our understanding of the effectiveness of mitigation and monitoring measures;
- A better understanding and record of the manner in which the authorized entity complies with the incidental take regulations and LOAs and the ESA Incidental Take Statement;
- An increase in the probability of detecting marine mammals (through

improved technology or methods), both specifically within the mitigation zone (thus allowing for more effective implementation of the mitigation) and in general, to better achieve the above goals; and

▪ Ensuring that adverse impact of activities remains at the least practicable level.

Strategic Planning Process for Marine Species Monitoring

The Navy also developed the Strategic Planning Process for Marine Species Monitoring, which establishes the guidelines and processes necessary to develop, evaluate, and fund individual projects based on objective scientific study questions. The process uses an underlying framework designed around intermediate scientific objectives and a conceptual framework incorporating a progression of knowledge spanning occurrence, exposure, response, and consequence. The Strategic Planning Process for Marine Species Monitoring is used to set overarching intermediate scientific objectives; develop individual monitoring project concepts; identify potential species of interest at a regional scale; evaluate, prioritize and select specific monitoring projects to fund or continue supporting for a given fiscal year; execute and manage selected monitoring projects; and report and evaluate progress and results. This process addresses relative investments to different range complexes based on goals across all range complexes, and monitoring would leverage multiple techniques for data acquisition and analysis whenever possible. The Strategic Planning Process for Marine Species Monitoring is also available online (*http://www.navymarinespeciesmonitoring.us/*).

Past and Current Monitoring in the HSTT Study Area

The monitoring program has undergone significant changes since the first rules were issued for HRC and SOCAL in 2009, which highlights its evolution through the process of adaptive management. The monitoring program developed for the first cycle of environmental compliance documents (*e.g.,* U.S. Department of the Navy, 2008) utilized effort-based compliance metrics that were somewhat limiting. Through adaptive management discussions, the Navy designed and conducted monitoring studies according to scientific objectives, thereby eliminating basing requirements upon metrics of level-of-effort. Furthermore, refinements of scientific objective have continued through the latest permit cycle through 2018.

Progress has also been made on the monitoring program's conceptual framework categories from the Scientific Advisory Group for Navy Marine Species Monitoring (U.S. Department of the Navy, 2011e), ranging from occurrence of animals to their exposure, response, and population consequences. Lessons-learned with monitoring in the first two MMPA rulemaking periods in HRC and SOCAL suggested that ''layering'' multiple components of monitoring simultaneously provides a way to leverage an increase in return of the progress toward answering scientific monitoring questions.

Specific monitoring under the 2013–2018 regulations has included:

▪ HRC
  ○ Long-term Trends in Abundance of Marine Mammals at the Pacific Missile Range Facility (PMRF);
  ○ Estimation of Received Levels of Mid-Frequency Active Sonar on Marine Mammals at PMRF;
  ○ Behavioral Response of Marine Mammals to Navy Training and Testing at PMRF; and
  ○ Navy Civilian Marine Mammal Observers on MFAS Ships in Offshore Waters of HRC.
▪ SOCAL
  ○ Blue and Fin Whale Satellite Tagging;
  ○ Cuvier's Beaked Whale Impact Assessment at the Southern California Offshore Antisubmarine Warfare Range (SOAR);
  ○ Cuvier's Beaked Whale, Blue Whale, and Fin Whale Impact Assessments at Non-Instrumented Range Locations in SOCAL; and
  ○ Marine Mammal Sightings during California Cooperative Oceanic Fisheries Investigation (CalCOFI) Cruises.

Numerous publications, dissertations, and conference presentations have resulted from research conducted under the Navy's marine species monitoring program (*https://www.navymarinespeciesmonitoring.us/reading-room/publications/*), resulting in a significant contribution to the body of marine mammal science. Publications on occurrence, distribution, and density have fed the modeling input, and publications on exposure and response have informed Navy and NMFS analyses of behavioral response and consideration of mitigation measures.

Furthermore, collaboration between the monitoring program and the Navy's research and development (*e.g.,* the Office of Naval Research) and demonstration-validation (*e.g.,* Living Marine Resources) programs has been strengthened, leading to research tools and products that have already transitioned to the monitoring program. These include Marine Mammal Monitoring on Ranges (M3R), controlled exposure experiment behavioral response studies (CEE BRS), acoustic sea glider surveys, and global positioning system-enabled satellite tags. Recent progress has been made with better integration of monitoring across all Navy at-sea study areas, including study areas in the Pacific and the Atlantic Oceans, and various testing ranges. Publications from the Living Marine Resources and Office of Naval Research programs have also resulted in significant contributions to hearing, acoustic criteria used in effects modeling, exposure, and response, as well as developing tools to assess biological significance (*e.g.,* population-level consequences).

NMFS and the Navy also consider data collected during procedural mitigations as monitoring. Data are collected by shipboard personnel on hours spent training, hours of observation, hours of sonar, and marine mammals observed within the mitigation zone during Major Training Exercises when mitigations are implemented. These data are provided to NMFS in both classified and unclassified annual exercise reports.

NMFS has received multiple years' worth of annual exercise and monitoring reports addressing active sonar use and explosive detonations within the HSTT Study Area and other Navy range complexes. The data and information contained in these reports have been considered in developing mitigation and monitoring measures for the training and testing activities within the HSTT Study Area. The Navy's annual exercise and monitoring reports may be viewed at: *http://www.nmfs.noaa.gov/pr/permits/incidental/military.htm* and *http://www.navymarinespeciesmonitoring.us.*

The Navy has been funding various marine mammal studies and research within the HSTT Study Area for the past 20 years. Under permitting from NMFS starting in 2009, this effort has transitioned from a specific metric based approach, to a broader new research only approach (*e.g.,* set number of visual surveys, specific number of passive acoustic recording devices, etc.), and more recently since 2014 a more regional (Hawaii or Southern California) species-specific study question design (*e.g.,* what is distribution of species A within the HSTT Study Area, what is response of species B to Navy activities, etc.).

In adaptive management consultation with NMFS, some variation of these ongoing studies or planned new studies will continue within the HSTT Study Area for either the duration of these new regulations, or for a set period as specified in a given project's scope. Some projects may only require one or two years of field effort. Other projects could entail multi-year field efforts (two to five years). For instance, in the SOCAL portion of the HSTT Study Area, the Navy has funded development and application of new passive acoustic technology since the early 2000's for detecting Cuvier's beaked whales. This also includes ongoing effort to further identify and update population demographics for Cuvier's beaked whales (re-sighting rates, population growth, calving rates, movements, etc.) specific to Navy training and testing areas, as well as responses to Navy activity. Variations of these Cuvier's beaked whale monitoring studies will likely continue under future authorizations. The Navy's marine species monitoring web portal provides details on past and current monitoring projects, including technical reports, publications, presentations, and access to available data, and can be found at: *https://www.navymarinespeciesmonitoring.us/regions/pacific/current-projects/*.

The Navy's marine species monitoring program typically supports 6–10 monitoring projects in the HSTT Study Area at any given time. Projects can be either major multi-year efforts, or one to two year special studies. The Navy's monitoring projects going into 2019 include:

- Long-term Trends in Abundance of Marine Mammals at PMRF (Hawaii)—Analysis of long-term archive of hydrophone recordings from the instrumented range at PMRF to uncover long-term trends in the occurrence of marine mammals on the range, including minke whale, humpback whale, fin whale, Bryde's whale, and Blainville's beaked whale.
- Estimation of Received Levels of MFAS and an opportunistic Behavioral Response Study of Marine Mammals at PMRF (Hawaii)—Estimation of the received level of mid-frequency active sonar (MFAS) of marine mammals (including blackfish species, mysticetes, sperm whale, and beaked whales) near PMRF as well as their short-term behavioral responses. Analysts will perform acoustic propagation modeling from Navy platforms to localized animals. Animals may be localized either acoustically by the range hydrophones, or by a satellite tagging effort. The tagging component will also provide information on spatial movement and habitat-use patterns. Both received-level and behavioral response studies will be an opportunistic protocol performed during actual Navy training deploying MFAS.
- Humpback Whale Tagging at PMRF (Hawaii)—A combination of acoustic pinger and satellite tags will be applied to humpback whales to investigate the movement patterns, habitat use, and behavior of humpback whales (nearshore and offshore) of different age-sex classes on and off the instrumented range at PMRF. The tags will also enable enhanced validation of localization algorithms using the range hydrophones, as well as provide locations of animals when they are not vocalizing.
- Navy Civilian Marine Mammal Observers on guided missile destroyers (DDGs) (Hawaii and Southern California)—Visual survey for marine mammals will be performed by biologist observers embarked aboard Navy DDGs during training exercises involving deployment of MFAS. The acquired data will be incorporated in a long-term project investigating the mitigation effectiveness of Navy Lookouts that spans all Navy at-sea training ranges in both the Atlantic and Pacific oceans.
- Cuvier's Beaked Whale Impact Assessment at SOAR (Southern California)—The instrumented hydrophone range at the Navy's Southern California Antisubmarine Warfare Range (SOAR), combined with concurrent field efforts with satellite tagging and visual surveys will investigate key baseline population demographics and movement patterns for Cuvier's beaked whale. Short-term behavioral and/or vocal responses when Cuvier's beaked whales are exposed to sonar will also be investigated.
- Beaked Whale Occurrence In Southern California From Passive Acoustic Monitoring (Southern California)—This project has three field components. Bottom-moored passive acoustic devices will investigate the seasonality and spatial distribution of beaked whale species in Southern California including new deployments in Baja. Also, ocean profiling gliders outfitted with a high frequency acoustic recording system will perform a survey on a larger geographic scale and across a diverse range of habitats in Southern California to investigate the spatial distribution and occurrence of beaked whale species. Finally, passive acoustic data from towed arrays deployed during quarterly California Cooperative Oceanic Fisheries Investigations surveys will be analyzed for beaked whales across a large geographic scale.
- Guadalupe Fur Seal Population Census and Satellite Tracking (Southern California)—Satellite tagging as well as land-based visual survey will investigate the habitat use by age-sex class of Guadalupe fur seals across both the Southern California Range Complex and Northwest Training and Testing study areas, as well as other areas including epipelagic waters.
- Blue and Fin Whale Satellite Tagging and Genetics (Southern California)—Satellite tagging of blue whales and fin whales at various locations off southern California occurred from 2014–2017. The project investigated movement patterns, occurrence, and residence times of blue and fin whales within Navy training and testing areas along the U.S. West Coast as compared to other areas visited by tagged whales outside of Navy training and testing areas. While field efforts for this project are complete, additional analysis will continue beyond 2018 and include peer-reviewed result publication.

Additional scientific projects may have field efforts within Hawaii and Southern California under separate Navy funding from the Navy's two marine species research programs, the Office of Naval Research Marine Mammals and Biology Program and the Living Marine Resources Program. The periodicity of these research projects are more variable than the Navy's compliance monitoring described above.

Adaptive Management

The final regulations governing the take of marine mammals incidental to Navy training and testing activities in the HSTT Study Area contain an adaptive management component. Our understanding of the effects of Navy training and testing activities (*e.g.,* acoustic and explosive stressors) on marine mammals continues to evolve, which makes the inclusion of an adaptive management component both valuable and necessary within the context of five-year regulations.

The reporting requirements associated with this rule are designed to provide NMFS with monitoring data from the previous year to allow NMFS to consider whether any changes to existing mitigation and monitoring requirements are appropriate. The use of adaptive management allows NMFS to consider new information from different sources to determine (with input from the Navy regarding practicability) on an annual or biennial basis if mitigation or monitoring measures should be modified (including additions or deletions). Mitigation measures could be modified if new data suggests that such modifications would have a reasonable likelihood of more effectively accomplishing the goals of the mitigation and monitoring and if the measures are practicable. If the modifications to the mitigation, monitoring, or reporting measures are substantial, NMFS will publish a notice of the planned LOA in the **Federal Register** and solicit public comment.

The following are some of the possible sources of applicable data to be considered through the adaptive management process: (1) Results from monitoring and exercises reports, as required by MMPA authorizations; (2) compiled results of Navy funded R&D studies; (3) results from specific stranding investigations; (4) results from general marine mammal and sound research; and (5) any information which reveals that marine mammals may have been taken in a manner, extent, or number not authorized by these regulations or subsequent LOAs. The results from monitoring reports and other studies may be viewed at *https://www.navymarinespeciesmonitoring.us/.*

Reporting

In order to issue an incidental take authorization for an activity, section

101(a)(5)(A) of the MMPA states that NMFS must set forth ''requirements pertaining to the monitoring and reporting of such taking.'' Effective reporting is critical both to compliance as well as ensuring that the most value is obtained from the required monitoring. Reports from individual monitoring events, results of analyses, publications, and periodic progress reports for specific monitoring projects would be posted to the Navy's Marine Species Monitoring web portal: *http://www.navymarinespeciesmonitoring.us*. Currently, there are several different reporting requirements pursuant to these regulations:

Notification of Injured, Live Stranded or Dead Marine Mammals

The Navy will consult the Notification and Reporting Plan, which sets out notification, reporting, and other requirements when injured, live stranded, or dead marine mammals are detected. The Notification and Reporting Plan is available for review at *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-military-readiness-activities*.

Annual HSTT Monitoring Report

The Navy will submit an annual report to NMFS of the HSTT monitoring describing the implementation and results from the previous calendar year. Data collection methods will be standardized across range complexes and HSTT Study Area to allow for comparison in different geographic locations. The draft of the annual monitoring report will be submitted either three months after the calendar year, or three months after the conclusion of the monitoring year to be determined by the Adaptive Management process. Such a report would describe progress of knowledge made with respect to intermediate scientific objectives within the HSTT Study Area associated with the Integrated Comprehensive Monitoring Program. Similar study questions will be treated together so that summaries can be provided for each topic area. The report need not include analyses and content that do not provide direct assessment of cumulative progress on the monitoring plan study questions. NMFS will submit comments on the draft monitoring report, if any, within three months of receipt. The report will be considered final after the Navy has addressed NMFS' comments, or three months after the submittal of the draft if NMFS does not have comments.

As an alternative, the Navy may submit a multi-Range Complex annual Monitoring Plan report to fulfill this requirement. Such a report will describe progress of knowledge made with respect to monitoring study questions across multiple Navy ranges associated with the ICMP. Similar study questions will be treated together so that progress on each topic will be summarized across multiple Navy ranges. The report need not include analyses and content that does not provide direct assessment of cumulative progress on the monitoring study question. This will continue to allow Navy to provide a cohesive monitoring report covering multiple ranges (as per ICMP goals), rather than entirely separate reports for the HSTT, Gulf of Alaska, Mariana Islands, and the Northwest Study Areas.

Annual HSTT Training Exercise Report and Testing Activity Report

Each year, the Navy will submit two preliminary reports (Quick Look Reports) to NMFS detailing the status of authorized sound sources within 21 days after the anniversary of the date of issuance of the LOAs. Each year, the Navy will also submit detailed reports to NMFS within three months after the one-year anniversary of the date of issuance of the LOAs. The annual reports will contain information on MTEs, Sinking Exercise (SINKEX) events, and a summary of all sound sources used (total hours or quantity (per the LOA) of each bin of sonar or other non-impulsive source; total annual number of each type of explosive exercises; and total annual expended/detonated rounds (missiles, bombs, sonobuoys, etc.) for each explosive bin). The report will also include the details regarding specific requirements associated with specific mitigation areas. The analysis in the detailed reports will be based on the accumulation of data from the current year's report and data collected from previous reports. Information included in the classified annual reports may be used to inform future adaptive management of activities within the HSTT Study Area.

The Annual HSTT Training Exercise Report and Testing Activity Navy reports (classified or unclassified versions) can be consolidated with other exercise reports from other range complexes in the Pacific Ocean for a single Pacific Exercise Report, if desired. Specific sub-reporting in these annual reports include:

- Humpback Whale Special Reporting Area (December 15–April 15): The Navy will report the total hours of operation of surface ship hull-mounted mid-frequency active sonar used in the special reporting area; and
- HSTT Mitigation Areas (see Chapter 11 of the Navy's rulemaking/LOA application): The Navy will report any use of surface ship hull-mounted mid-frequency active sonar that occurred as specifically described in these areas.
- *Major Training Exercises Notification*

The Navy shall submit an electronic report to NMFS within fifteen calendar days after the completion of any major training exercise indicating: Location of the exercise; beginning and end dates of the exercise; and type of exercise.

Other Reporting and Coordination

The Navy will continue to report and coordinate with NMFS for the following:

- Annual marine species monitoring technical review meetings with researchers and the Marine Mammal Commission (currently, every two years a joint Pacific-Atlantic meeting is held); and
- Annual Adaptive Management meetings with the Marine Mammal Commission (recently modified to occur in conjunction with the annual monitoring technical review meeting).

Analysis and Negligible Impact Determination

Negligible Impact Analysis

Introduction

NMFS has defined negligible impact as ''an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival (50 CFR 216.103). A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (*i.e.,* population-level effects). An estimate of the number of takes alone is not enough information on which to base an impact determination. In addition to considering estimates of the number of marine mammals that might be ''taken'' through mortality, serious injury, and Level A or Level B harassment (as presented in Tables 41 and 42), NMFS considers other factors, such as the likely nature of any responses (*e.g.,* intensity, duration), the context of any responses (*e.g.,* critical reproductive time or location, migration), as well as effects on habitat, 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 this analysis via their impacts on the environmental baseline (*e.g.,* as reflected in the regulatory status of the species, population size and growth rate where known, other ongoing sources of human-caused mortality, ambient noise levels, and specific consideration of take by Level A harassment or serious injury or mortality (hereafter referred to as M/SI) previously authorized for other NMFS activities).

In the *Estimated Take of Marine Mammals* section, we identified the subset of potential effects that would be expected to rise to the level of takes, and then identified the number of each of those mortality takes that we believe could occur or harassment takes that are likely to occur based on the methods described. The impact that any given take will have is dependent on many case-specific factors that need to be considered in the negligible impact analysis (*e.g.,* the context of behavioral exposures such as duration or intensity of a disturbance, the health of impacted animals, the status of a species that incurs fitness-level impacts to individuals, etc.). Here we evaluate the likely impacts of the enumerated harassment takes that are proposed for authorization and anticipated to occur under this rule, in the context of the specific circumstances surrounding these predicted takes. We also include a specific assessment of serious injury or mortality takes that could occur, as well as consideration of the traits and statuses of the affected species and stocks. Last, we collectively evaluate this information, as well as other more taxa-specific information and mitigation measure effectiveness, in group-specific discussions that support our negligible impact conclusions for each stock.

Harassment

The Navy's Specified Activities reflect representative levels/ranges of training and testing activities, accounting for the natural fluctuation in training, testing, and deployment schedules. This approach is representative of how the Navy's activities are conducted over any given year over any given five-year period. Specifically, the Navy provided a range of levels for each activity/source type for a year—they used the maximum annual level to calculate annual takes, and they used the sum of three nominal years (average level) and two maximum years to calculate five-year takes for each source type. The *Description of the Specified Activity* section contains a more realistic annual representation of activities, but includes years of a higher maximum amount of training and testing to account for these fluctuations. There may be some flexibility in the exact number of hours, items, or detonations that may vary from year to year, but take totals would not exceed the five-year totals indicated in Tables 41 and 42. We base our analysis and negligible impact determination (NID) on the maximum number of takes that would be reasonably expected to occur and are being authorized, although, as stated before, the number of takes are only a part of the analysis, which includes extensive qualitative consideration of other contextual factors that influence the degree of impact of the takes on the affected individuals. To avoid repetition, we provide some general analysis immediately below that applies to all the species listed in Tables 41 and 42, given that some of the anticipated effects of the Navy's training and testing activities on marine mammals are expected to be relatively similar in nature. However, below that, we break our analysis into species (and/or stock), or groups of species (and the associated stocks) where relevant similarities exist, to provide more specific information related to the anticipated effects on individuals of a specific stock or where there is information about the status or structure of any species that would lead to a differing assessment of the effects on the species or stock. Organizing our analysis by grouping species or stocks that share common traits or that will respond similarly to effects of the Navy's activities and then providing species- or stock-specific information allows us to avoid duplication while assuring that we have analyzed the effects of the specified activities on each affected species or stock.

The Navy's harassment take request is based on its model and quantitative assessment of mitigation, which NMFS believes appropriately predicts that maximum amount of harassment that is likely to occur. In the discussions below, the ''acoustic analysis'' refers to the Navy's modeling results and quantitative assessment of mitigation. The model calculates sound energy propagation from sonar, other active acoustic sources, and explosives during naval activities; the sound or impulse received by animat dosimeters representing marine mammals distributed in the area around the modeled activity; and whether the sound or impulse energy received by a marine mammal exceeds the thresholds for effects. Assumptions in the Navy model intentionally err on the side of overestimation when there are unknowns. Naval activities are modeled as though they would occur regardless of proximity to marine mammals, meaning that no mitigation is considered (*e.g.,* no power down or shut down) and without any avoidance of the activity by the animal. The final step of the quantitative analysis of acoustic effects, which occurs after the modeling, is to consider the implementation of mitigation and the possibility that marine mammals would avoid continued or repeated sound exposures. NMFS provided input to, independently reviewed, and concurred with the Navy on this process and the Navy's analysis, which is described in detail in Section 6 of the Navy's rulemaking/LOA application (*https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-military-readiness-activities*), was used to quantify harassment takes for this rule.

Generally speaking, the Navy and NMFS anticipate more severe effects from takes resulting from exposure to higher received levels (though this is in no way a strictly linear relationship for behavioral effects throughout species, individuals, or circumstances) and less severe effects from takes resulting from exposure to lower received levels. However, there is also growing evidence of the importance of distance in predicting marine mammal behavioral response to sound—*i.e.,* sounds of a similar level emanating from a more distant source have been shown to be less likely to evoke a response of equal magnitude (DeRuiter 2012). The estimated number of Level A and Level B harassment takes does not 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 A and Level B harassment threshold) that are anticipated to occur over the five-year period. These instances may represent either brief exposures (seconds or minutes) or, in some cases, longer durations of exposure within a day. 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 smaller than the total estimated takes. In other words, where the instances of take exceed the number of individuals in the population, repeated takes (on more than one day) of some individuals are predicted. 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. We look at this comparative metric to give us a relative sense of where a larger portion of a stock is being taken by Navy activities, where there is a higher likelihood that the same individuals are being taken across multiple days, and where that number of days might be higher or more likely sequential. In the ocean, the use of sonar and other active acoustic sources is often transient and is unlikely to repeatedly expose the same individual animals within a short period, for example within one specific exercise. However, for some individuals of some stocks repeated exposures across different activities could occur over the year, especially where events occur in generally the same area with more resident species. In short, for some stocks we expect that the total anticipated takes represent exposures of a smaller number of individuals of which some were exposed multiple times, but based on the nature of the Navy activities and the movement patterns of marine mammals, it is unlikely that individuals from most species or stocks would be taken over more than a few sequential days. This means that even where repeated takes of individuals are likely to occur, they are more likely to result from non-sequential exposures from different activities, and, even if sequential, individual animals are not predicted to be taken for more than several days in a row, at most. As described elsewhere, the nature of the majority of the exposures would be expected to be of a less severe nature and based on the numbers it is likely that any individual exposed multiple times is still only taken on a small percentage of the days of the year. The greater likelihood is that not every individual is taken, or perhaps a smaller subset is taken with a slightly higher average and larger variability of highs and lows, but still with no reason to think that any individuals would be taken a significant portion of the days of the year, much less that many of the days of disturbance would be sequential.

Some of the lower level physiological stress responses (*e.g.,* orientation or startle response, change in respiration, change in heart rate) discussed earlier would likely co-occur with the predicted harassments, although these responses are more difficult to detect and fewer data exist relating these responses to specific received levels of sound. Level B harassment takes, then, may have a stress-related physiological component as well; however, we would not expect the Navy's generally short-term, intermittent, and (typically in the case of sonar) transitory activities to create conditions of long-term, continuous noise leading to long-term physiological stress responses in marine mammals.

The estimates calculated using the behavioral response function do not differentiate between the different types of behavioral responses that rise to the level of Level B harassments. As described in the Navy's application, the Navy identified (with NMFS' input) the types of behaviors that would be considered a take (moderate behavioral responses as characterized in Southall *et al.* (2007) (*e.g.,* altered migration paths or dive profiles, interrupted nursing, breeding or feeding, or avoidance) that also would be expected to continue for the duration of an exposure). The Navy then compiled the available data indicating at what received levels and distances those responses have occurred, and used the indicated literature to build biphasic behavioral response curves that are used to predict how many instances of Level B behavioral harassment occur in a day. Take estimates alone do not provide information regarding the potential fitness or other biological consequences of the reactions on the affected individuals. We therefore consider the available activity-specific, environmental, and species-specific information to determine the likely nature of the modeled behavioral responses and the potential fitness consequences for affected individuals.

Use of sonar and other transducers would typically be transient and temporary. The majority of acoustic effects to individual animals from sonar and other active sound sources during testing and training activities would be primarily from ASW events. It is important to note that although ASW is one of the warfare areas of focus during MTEs, there are significant periods when active ASW sonars are not in use. Nevertheless, behavioral reactions are assumed more likely to be significant during MTEs than during other ASW activities due to the duration (*i.e.,* multiple days), scale (*i.e.,* multiple sonar platforms), and use of high-power hull-mounted sonar in the MTEs. In other words, in the range of potential behavioral effects that might expect to be part of a response that qualifies as an instance of Level B behavioral harassment (which by nature of the way it is modeled/counted, occurs within one day), the less severe end might include exposure to comparatively lower levels of a sound, at a detectably greater distance from the animal, for a few or several minutes, that could result in a behavioral response such as avoiding an area that an animal would otherwise have chosen to move through or feed in for some amount of time or breaking off one or a few feeding bouts. More severe effects could occur when the animal gets close enough to the source to receive a comparatively higher level, is exposed continuously to one source for a longer time, or is exposed intermittently to different sources throughout a day. Such effects might result in an animal having a more severe flight response and leaving a larger area for a day or more or potentially losing feeding opportunities for a day. However, such severe behavioral effects are expected to occur infrequently.

To help assess this, for sonar (LFAS/MFAS/HFAS) used in the HSTT Study Area, the Navy provided information estimating the percentage of animals that may be taken by Level B harassment under each behavioral response function that would occur within 6-dB increments (percentages discussed below in the *Group and Species-Specific Analyses* section). As mentioned above, all else being equal, an animal's exposure to a higher received level is more likely to result in a behavioral response that is more likely to lead to adverse effects, which could more likely accumulate to impacts on reproductive success or survivorship of the animal, but other contextual factors (such as distance) are important also. The majority of Level B harassment takes are expected to be in the form of milder responses *(i.e.,* lower-level exposures that still rise to the level of take, but would likely be less severe in the range of responses that qualify as take) of a generally shorter duration. We anticipate more severe effects from takes when animals are exposed to higher received levels or at closer proximity to the source. Because stocks belonging to the same species and species belonging to taxa that share common characteristics are likely to respond and be affected in similar ways, these discussions are presented within each species group below in the *Group and Species-Specific Analyses* section. Specifically, given a range of behavioral responses that may be classified as Level B harassment, to the degree that higher received levels are expected to result in more severe behavioral responses, only a smaller percentage of the anticipated Level B harassment from Navy activities might necessarily be expected to potentially result in more severe responses (see the *Group and Species-Specific Analyses* section below for more detailed information). To fully understand the likely impacts of the predicted/authorized take on an individual (*i.e.,* what is the likelihood or degree of fitness impacts), one must look closely at the available contextual information, such as the duration of likely exposures and the likely severity of the exposures (*e.g.,* whether they will occur for a longer duration over sequential days or the comparative sound level that will be received). Moore and Barlow (2013) emphasizes the importance of context (*e.g.,* behavioral state of the animals, distance from the sound source, etc.) in evaluating behavioral responses of marine mammals to acoustic sources.

Diel Cycle

As noted previously, many animals perform vital functions, such as feeding, resting, traveling, and socializing on a diel cycle (24-hour cycle). Behavioral reactions to noise exposure, when taking place in a biologically important context, such as disruption of critical life functions, displacement, or avoidance of important habitat, are more likely to be significant if they last more than one diel cycle or recur on subsequent days (Southall *et al.,* 2007). Henderson *et al.* (2016) found that ongoing smaller scale events had little to no impact on foraging dives for Blainville's beaked whale, while multi-day training events may decrease foraging behavior for Blainville's beaked whale (Manzano-Roth *et al.,* 2016). Consequently, a behavioral response lasting less than one day and not recurring on subsequent days is not considered severe unless it could directly affect reproduction or survival (Southall *et al.,* 2007). Note that there is a difference between multiple-day substantive behavioral reactions and multiple-day anthropogenic activities. For example, just because an at-sea exercise lasts for multiple days does not necessarily mean that individual animals are either exposed to those exercises for multiple days or, further, exposed in a manner resulting in a sustained multiple day substantive behavioral response. Large multi-day Navy exercises such as ASW activities, typically include vessels that are continuously moving at speeds typically 10–15 kn, or higher, and likely cover large areas that are relatively far from shore (typically more than 3 nmi from shore) and in waters greater than 600 ft deep. Additionally marine mammals are moving as well, which would make it unlikely that the same animal could remain in the immediate vicinity of the ship for the entire duration of the exercise. Further, the Navy does not necessarily operate active sonar the entire time during an exercise. While it is certainly possible that these sorts of exercises could overlap with individual marine mammals multiple days in a row at levels above those anticipated to result in a take, because of the factors mentioned above, it is considered unlikely for the majority of takes. However, it is also worth noting that the Navy conducts many different types of noise-producing activities over the course of the year and it is likely that some marine mammals will be exposed to more than one and taken on multiple days, even if they are not sequential.

Durations of Navy activities utilizing tactical sonar sources and explosives vary and are fully described in Appendix A (Navy Activity Descriptions) of the HSTT FEIS/OEIS. Sonar used during ASW would impart the greatest amount of acoustic energy of any category of sonar and other transducers analyzed in the Navy's rulemaking/LOA application and include hull-mounted, towed, sonobuoy, helicopter dipping, and torpedo sonars. Most ASW sonars are MFAS (1–10 kHz); however, some sources may use higher or lower frequencies. ASW training activities using hull mounted sonar proposed for the HSTT Study Area generally last for only a few hours. Some ASW training and testing can generally last for 2–10 days, or as much as 21 days for an MTE-Large Integrated ASW (see Table 4). For these multi-day exercises there will typically be extended intervals of non-activity in between active sonar periods. Because of the need to train in a large variety of situations, the Navy does not typically conduct successive ASW exercises in the same locations. Given the average length of ASW exercises (times of sonar use) and typical vessel speed, combined with the fact that the majority of the cetaceans would not likely remain in proximity to the sound source, it is unlikely that an animal would be exposed to LFAS/MFAS/HFAS at levels or durations likely to result in a substantive response that would then be carried on for more than one day or on successive days.

Most planned explosive events are scheduled to occur over a short duration (1–8 hours); however, the explosive component of the activity only lasts for minutes (see Tables 4 through 7). Although explosive exercises may sometimes be conducted in the same general areas repeatedly, because of their short duration and the fact that they are in the open ocean and animals can easily move away, it is similarly unlikely that animals would be exposed for long, continuous amounts of time, or demonstrate sustained behavioral responses. Although SINKEXs may last for up to 48 hrs (4–8 hrs, possibly 1–2 days), they are almost always completed in a single day and only one event is planned annually for the HSTT training activities. They are stationary and conducted in deep, open water where fewer marine mammals would typically be expected to be encountered. They also have shutdown procedures and rigorous monitoring, *i.e.,* during the activity, the Navy conducts passive acoustic monitoring and visually observes for marine mammals 90 min prior to the first firing, during the event, and 2 hrs after sinking the vessel. All of these factors make it unlikely that individuals would be exposed to the exercise for extended periods or on consecutive days.

Assessing the Number of Individuals Taken and the Likelihood of Repeated Takes

As described previously, Navy modeling uses the best available science to predict the instances of exposure above certain acoustic thresholds, which are equated, as appropriate, to harassment takes (and further corrected to account for mitigation and avoidance). As further noted, for active acoustics it is more challenging to parse out the number of individuals taken by Level B harassment and the number of times those individuals are taken from this larger number of instances. One method that NMFS can use to help better understand the overall scope of the impacts is to compare these total instances of take against the abundance of that stock. For example, if there are 100 harassment takes in a population of 100, one can assume either that every individual was exposed above acoustic thresholds in no more than one day, or that some smaller number were exposed in one day but a few of those individuals were exposed multiple days within a year. Where the instances of take exceed 100 percent of the population, multiple takes of some individuals are predicted and expected to occur within a year. Generally speaking, the higher the number of takes as compared to the population abundance, the more multiple 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. We look at this comparative metric to give us a relative sense of where larger portions of the stocks are being taken by Navy activities and where there is a higher likelihood that the same individuals are being taken across multiple days and where that number of days might be higher. It also provides a relative picture of the scale of impacts to each stock.

In the ocean, unlike a modeling simulation with static animals, the use of sonar and other active acoustic sources is often transient, and is unlikely to repeatedly expose the same individual animals within a short period, for example within one specific exercise. However, some repeated exposures across different activities would likely occur over the year, especially where numerous activities occur in generally the same area (for example on instrumented ranges) with more resident species. In short, we expect that the total anticipated takes represent exposures of a smaller number of individuals of which some would be exposed multiple times, but based on the nature of the Navy's activities and the movement patterns of marine mammals, it is unlikely that any particular subset would be taken over more than several sequential days (with a few possible exceptions discussed in the stock-specific conclusions).

When calculating the proportion of a population affected by takes (*e.g.,* the number of takes divided by population abundance), which can also be helpful in estimating the number of days over which some individuals may be taken, it is important to choose an appropriate population estimate against which to make the comparison. The SARs provide the official population estimate for a given species or stock in U.S. waters in a given year (and are typically based solely on the most recent survey data). When the stock is known to range well outside of U.S. EEZ boundaries, population estimates based on surveys conducted only within the U.S. EEZ are known to be underestimates. In the case of both Hawaii and Southern California (near which mutually exclusive sets of stocks are impacted by Navy activities), the areas of Navy activities across which take is estimated have boundaries that vary significantly from the U.S. EEZ boundaries, and further vary differently in Hawaii versus Southern California. For example, the Study Area encompasses large areas of ocean space outside U.S. waters (*i.e.,* extending seaward beyond the U.S. EEZ) or, separately, many stocks range up and down the U.S., Canada, and/or Mexican West Coast, while Navy activities covered in this rule are confined north-south to the Southern California area included in the Navy study area. Additionally, the information used to estimate take includes the data underlying the SAR abundances, as well as other survey data, used together to model density layers. If takes are calculated from another dataset (for example a broader sample of survey data) and compared to the population estimate from the SARs, it may distort the percent of the population affected or an assessment of how many days a year individuals may be taken because of different population baselines. However, when the SAR considers the larger area within which the stock ranges it may contribute to a more appropriate sense of the proportion of the population taken. Accordingly, in calculating the percentage of takes versus abundance for each stock in order to assist in understanding both the percentage of the stock affected, as well as how many days across a year individuals could be taken, we use the data most appropriate for the situation.

For Hawaii, a fair number of stocks range outside of the U.S. EEZ, the majority of the take occurs inside the U.S. EEZ, and a fair number of stocks do not have abundance estimates in the SAR. Therefore, for the purposes of this analytical exercise, the tables included in the group-specific analyses below include percentages calculated for the Navy's take in the U.S. EEZ versus the Navy-estimated abundances within the U.S. EEZ, as well as the take in the whole Study Area versus the Navy-estimated abundances in the whole area. However, where appropriate for a given stock (and the explanation will be provided in the narrative), the SAR abundance may also be used for comparison. For Southern California, while a fair number of stocks range seaward from the U.S. EEZ, many also range significantly north and south outside the Navy Study Area and that abundance is captured by the SAR. Additionally, generally speaking, except where stocks are more coastal, a higher percentage of the take occurs outside of the U.S. EEZ than around Hawaii (though the majority are still inside the U.S. EEZ). Accordingly, rather than focus on the take in the U.S. EEZ, the tables included in the group-specific analyses below include percentages calculated for the Navy's take in the entire Study Area as compared against both the Navy-calculated abundance in the entire Study Area and the SARs.

The estimates found in NMFS' SARs remain the official estimates of stock abundance where they are current. These estimates are typically generated from the most recent shipboard and/or aerial surveys conducted. Studies based on abundance and distribution surveys restricted to U.S. waters are unable to detect temporal shifts in distribution beyond U.S. waters that might account for any changes in abundance within U.S. waters. In some cases, NMFS' abundance estimates show substantial year-to-year variability. However, for highly migratory species (*e.g.,* large whales) or those whose geographic distribution extends well beyond the boundaries of the Navy's study area (*e.g.,* populations with distribution along the entire California Current versus just SOCAL), comparisons to the SAR may be more appropriate. This is because the Navy's acoustic modeling process does not horizontally move animats, and therefore does not account for immigration and emigration within the study area. For instance, while it may be accurate that the abundance of animals in Southern California at any one time for a particular species is 200 individuals, if the species is highly migratory or has large daily home ranges, it is not likely that the same 200 individuals would be present every day. A good descriptive example is blue whales, which tagging data have shown traverse the SOCAL area in a few days to weeks on their migrations. Therefore, at any one time there may be a stable number of animals, but over the course of the entire year the entire population may cycle through SOCAL. Therefore, when comparing the estimated takes to an abundance, in this case the SAR, which represents the total population, may be more appropriate than the Navy's modeled abundance for SOCAL. In each of the species write-ups for the negligible impact assessment we explain which abundance was used for making the comparison of takes to the impacts to the population.

NMFS' Southwest Fisheries Science Center derived densities for the Navy, and NMFS supports the use of spatially and temporally explicit density models that vary in space and time to estimate their potential impacts to species. See the *U.S. Navy Marine Species Density Database Phase III Hawaii-Southern California Training and Testing Area Technical Report* to learn more on how the Navy selects density information and the models selected for individual species. These models may better characterize how Navy impacts can vary in space and time but often predict different population abundances than the SARs.

Models may predict different population abundances for many reasons. The models may be based on different data sets or different temporal predictions may be made. The SARs are often based on single years of NMFS surveys, whereas the models used by the Navy generally include multiple years of survey data from NMFS, the Navy, and other sources. To present a single, best estimate, the SARs often use a single season survey where they have the best spatial coverage (generally Summer). Navy models often use predictions for multiple seasons, where appropriate for the species, even when survey coverage in non-Summer seasons is limited, to characterize impacts over multiple seasons as Navy activities may occur in any season. Predictions may be made for different spatial extents. Many different, but equally valid, habitat and density modeling techniques exist and these can also be the cause of differences in population predictions. Differences in population estimates may be caused by a combination of these factors. Even similar estimates should be interpreted with caution and differences in models should be fully understood before drawing conclusions.

Temporary Threshold Shift

NMFS and the Navy have estimated that some individuals of some species of marine mammals may sustain some level of TTS from active sonar. As mentioned previously, in general, TTS can last from a few minutes to days, be of varying degree, and occur across various frequency bandwidths, all of which determine the severity of the impacts on the affected individual, which can range from minor to more severe. Tables 72–77 indicate the number of takes by TTS that may be incurred by different stocks from exposure to active sonar and explosives. The modeling predicts that no TTS will result from air guns or pile driving activities. The TTS sustained by an animal is primarily classified by three characteristics:

1. Frequency—Available data (of mid-frequency hearing specialists exposed to mid- or high-frequency sounds; Southall *et al.,* 2007) suggest that most TTS occurs in the frequency range of the source up to one octave higher than the source (with the maximum TTS at ½ octave above). The Navy's MF sources, which are the highest power and most numerous sources and the ones that cause the most take, utilize the 1–10 kHz frequency band, which suggests that if TTS were to be induced by any of these MF sources it would be in a frequency band somewhere between approximately 2 and 20 kHz, which is in the range of communication calls for many odontocetes, but below the range of the echolocation signals used for foraging. There are fewer hours of HF source use and the sounds would attenuate more quickly, plus they have lower source levels, but if an animal were to incur TTS from these sources, it would cover a higher frequency range (sources are between 10 and 100 kHz, which means that TTS could range up to 200 kHz), which could overlap with the range in which some odontocetes communicate or echolocate. However, HF systems are typically used less frequently and for shorter time periods than surface ship and aircraft MF systems, so TTS from these sources is unlikely. There are fewer LF sources and the majority are used in the more readily mitigated testing environment, and TTS from LF sources would most likely occur below 2 kHz, which is in the range where many mysticetes communicate and also where other non-communication auditory cues are located (waves, snapping shrimp, fish prey). TTS from explosives would be broadband. Also of note, the majority of sonar sources from which TTS may be incurred occupy a narrow frequency band, which means that the TTS incurred would also be across a narrower band (*i.e.,* not affecting the majority of an animal's hearing range). This frequency provides information about the cues to which a marine mammal may be temporarily less sensitive, but not the degree or duration of sensitivity loss.

2. Degree of the shift (*i.e.,* by how many dB the sensitivity of the hearing is reduced)—Generally, both the degree of TTS and the duration of TTS will be greater if the marine mammal is exposed to a higher level of energy (which would occur when the peak dB level is higher or the duration is longer). The threshold for the onset of TTS was discussed previously in this rule. An animal would have to approach closer to the source or remain in the vicinity of the sound source appreciably longer to increase the received SEL, which would be difficult considering the Lookouts and the nominal speed of an active sonar vessel (10–15 kn) and the relative motion between the sonar vessel and the animal. In the TTS studies discussed in the proposed rule, some using exposures of almost an hour in duration or up to 217 SEL, most of the TTS induced was 15 dB or less, though Finneran *et al.* (2007) induced 43 dB of TTS with a 64-second exposure to a 20 kHz source. However, since any hull-mounted sonar such as the SQS–53 (MFAS), emits a ping typically every 50 seconds, incurring those levels of TTS is highly unlikely. In short, given the anticipated duration and levels of sound exposure, we would not expect marine mammals to incur more than relatively low levels of TTS (*i.e.,* single digits of sensitivity loss). To add context to this degree of TTS, individual marine mammals may regularly experience variations of 6dB differences in hearing sensitivity across time (Finneran *et al.,* 2000, 2002; Schlundt *et al.,* 2000).

3. Duration of TTS (recovery time)—In the TTS laboratory studies (as discussed in the proposed rule), some using exposures of almost an hour in duration or up to 217 SEL, almost all individuals recovered within 1 day (or less, often in minutes), although in one study (Finneran *et al.,* 2007), recovery took 4 days.

Based on the range of degree and duration of TTS reportedly induced by exposures to non-pulse sounds of energy higher than that to which free-swimming marine mammals in the field are likely to be exposed during LFAS/MFAS/HFAS training and testing exercises in the HSTT Study Area, it is unlikely that marine mammals would ever sustain a TTS from MFAS that alters their sensitivity by more than 20 dB for more than a few hours—and any incident of TTS would likely be far less severe due to the short duration of the majority of the events and the speed of a typical vessel, especially given the fact that the higher power sources resulting in TTS are predominantly intermittent, which have been shown to result in shorter durations of TTS. Also, for the same reasons discussed in the *Analysis and Negligible Impact Determination—Diel Cycle* section, and because of the short distance within which animals would need to approach the sound source, it is unlikely that animals would be exposed to the levels necessary to induce TTS in subsequent time periods such that their recovery is impeded. Additionally, though the frequency range of TTS that marine mammals might sustain would overlap with some of the frequency ranges of their vocalization types, the frequency range of TTS from MFAS (the source from which TTS would most likely be sustained because the higher source level and slower attenuation make it more likely that an animal would be exposed to a higher received level) would not usually span the entire frequency range of one vocalization type, much less span all types of vocalizations or other critical auditory cues.

Tables 72–77 indicate the number of incidental takes by TTS that are likely to result from the Navy's activities. As a general point, the majority of these TTS takes are the result of exposure to hull-mounted MFAS (MF narrower band sources), with fewer from explosives (broad-band lower frequency sources), and even fewer from LF or HF sonar sources (narrower band). As described above, we expect the majority of these takes to be in the form of mild (single-digit), short-term (minutes to hours), narrower band (only affecting a portion of the animal's hearing range) TTS. This means that for one to several times per year, for several minutes to maybe a few hours (high end) each, a taken individual will have slightly diminished hearing sensitivity (slightly more than natural variation, but nowhere near total deafness) more often within a narrower mid- to higher frequency band that may overlap part (but not all) of a communication, echolocation, or predator range, but sometimes across a lower or broader bandwidth. The significance of TTS is also related to the auditory cues that are germane within the time period that the animal incurs the TTS—for example, if an odontocete has TTS at echolocation frequencies, but incurs it at night when it is resting and not feeding, for example, it is not impactful. In short, the expected results of any one of these small number of mild TTS occurrences could be that (1) it does not overlap signals that are pertinent to that animal in the given time period, (2) it overlaps parts of signals that are important to the animal, but not in a manner that impairs interpretation, or (3) it reduces detectability of an important signal to a small degree for a short amount of time—in which case the animal may be aware and be able to compensate (but there may be slight energetic cost), or the animal may have some *reduced* opportunities (*e.g.,* to detect prey) or *reduced* capabilities to react with maximum effectiveness (*e.g.,* to detect a predator or navigate optimally). However, given the small number of times that any individual might incur TTS, the low degree of TTS and the short anticipated duration, and the low likelihood that one of these instances would occur in a time period in which the specific TTS overlapped the entirety of a critical signal, it is unlikely that TTS of the nature expected to result from Navy activities would result in behavioral changes or other impacts that would impact any individual's (of any hearing sensitivity) reproduction or survival.

Acoustic Masking or Communication Impairment

The ultimate potential impacts of masking on an individual (if it were to occur) are similar to those discussed for TTS, but an important difference is that masking only occurs during the time of the signal (and potential secondary arrivals of indirect rays) versus TTS, which continues beyond the duration of the signal. Fundamentally, masking is referred to as a chronic effect because one of the key harmful components of masking is its duration—the fact that an animal would have reduced ability to hear or interpret critical cues becomes much more likely to cause a problem the longer it is occurring. Also inherent in the concept of masking is the fact that the potential for the effect is only present during the times that the animal and the source are in close enough proximity for the effect to occur (and further, this time period would need to coincide with a time that the animal was utilizing sounds at the masked frequency). As our analysis has indicated, because of the relative movement of vessels and the species involved in this rule, we do not expect the exposures with the potential for masking to be of a long duration. In addition, masking is fundamentally more of a concern at lower frequencies, because low frequency signals propagate significantly further than higher frequencies and because they are more likely to overlap both the narrower LF calls of mysticetes, as well as many non-communication cues such as fish and invertebrate prey, and geologic sounds that inform navigation. Masking is also more of a concern from continuous sources (versus intermittent sonar signals) where there is no quiet time between pulses within which auditory signals can be detected and interpreted. For these reasons, dense aggregations of, and long exposure to, continuous LF activity, such as shipping or seismic airgun operation (the latter signal changes from intermittent to continuous at distance), are much more of a concern for masking, whereas comparatively short-term exposure to the predominantly intermittent pulses of often narrow frequency range MFAS or HFAS, or explosions are not expected to result in a meaningful amount of masking. While the Navy occasionally uses LF and more continuous sources, it is not in the contemporaneous aggregate amounts that would accrue to a masking concern. Specifically, the nature of the activities and sound sources used by the Navy do not support the likelihood of a level of masking accruing that would have the potential to affect reproductive success or survival. Additional detail is provided below.

Standard hull-mounted MFAS typically ping every 50 seconds for hull-mounted sources. Some hull-mounted anti-submarine sonars can also be used in an object detection mode known as ''Kingfisher'' mode (*e.g.,* used on vessels when transiting to and from port) where pulse length is shorter but pings are much closer together in both time and space since the vessel goes slower when operating in this mode. For the majority of sources, the pulse length is significantly shorter than hull-mounted active sonar, on the order of several microseconds to tens of milliseconds. Some of the vocalizations that many marine mammals make are less than one second long, so, for example with hull-mounted sonar, there would be a 1 in 50 chance (only if the source was in close enough proximity for the sound to exceed the signal that is being detected) that a single vocalization might be masked by a ping. However, when vocalizations (or series of vocalizations) are longer than one second, masking would not occur. Additionally, when the pulses are only several microseconds long, the majority of most animals' vocalizations would not be masked.

Most ASW sonars and countermeasures use MF frequencies and a few use LF and HF frequencies. Most of these sonar signals are limited in the temporal, frequency, and spatial domains. The duration of most individual sounds is short, lasting up to a few seconds each. A few systems operate with higher duty cycles or nearly continuously, but they typically use lower power, which means that an animal would have to be closer, or in the vicinity for a longer time, to be masked to the same degree as by a higher level source. Nevertheless, masking could occasionally occur at closer ranges to these high-duty cycle and continuous active sonar systems, but as described previously, it would be expected to be of a short duration when the source and animal are in close proximity. Most ASW activities are geographically dispersed and last for only a few hours, often with intermittent sonar use even within this period. Most ASW sonars also have a narrow frequency band (typically less than one-third octave). These factors reduce the likelihood of sources causing significant masking. HF signals (above 10 kHz) attenuate more rapidly in the water due to absorption than do lower frequency signals, thus producing only a very small zone of potential masking. If masking or communication impairment were to occur briefly, it would more likely be in the frequency range of MFAS (the more powerful source), which overlaps with some odontocete vocalizations (but few mysticete vocalizations); however, it would likely not mask the entirety of any particular vocalization, communication series, or other critical auditory cue, because the signal length, frequency, and duty cycle of the MFAS/HFAS signal does not perfectly resemble the characteristics of any single marine mammal species' vocalizations.

Masking could occur briefly in mysticetes due to the overlap between their low-frequency vocalizations and the dominant frequencies of airgun pulses. However, masking in odontocetes or pinnipeds is less likely unless the airgun activity is in close range when the pulses are more broadband. Masking is more likely to occur in the presence of broadband, relatively continuous noise sources such as during vibratory pile driving and from vessels, however, the duration of temporal and spatial overlap with any individual animal and the spatially separated sources that the Navy uses would not be expected to result in more than short-term, low impact masking that would not affect reproduction or survival.

The other sources used in Navy training and testing, many of either higher frequencies (meaning that the sounds generated attenuate even closer to the source) or lower amounts of operation, are similarly not expected to result in masking. For the reasons described here, any limited masking that could potentially occur would be minor and short-term and not expected to have adverse impacts on reproductive success or survivorship.

PTS From Sonar Acoustic Sources and Explosives and Tissue Damage From Explosives

Tables 72–77 indicate the number of individuals of each of species and stock for which Level A harassment in the form of PTS resulting from exposure to active sonar and/or explosives is estimated to occur. Tables 72–77 also indicate the number of individuals of each species and stock for which Level A harassment in the form of tissue damage resulting from exposure to explosive detonations is estimated to occur. The number of individuals to potentially incur PTS annually (from sonar and explosives) for the predicted species ranges from 0 to 209 (209 is for Dall's porpoise), but is more typically 0–10 (with the exception of several other species that range up to 97). Only five stocks (three dolphins and two pinnipeds) have the potential to incur tissue damage from explosives and the number of individuals from any given stock ranges from one to ten.

NMFS believes that many marine mammals would deliberately avoid exposing themselves to the received levels of active sonar necessary to induce injury by moving away from or at least modifying their path to avoid a close approach. Additionally, in the unlikely event that an animal approaches the sonar-emitting vessel at a close distance, NMFS believes that the mitigation measures (*i.e.,* shutdown/powerdown zones for active sonar) would typically ensure that animals would not be exposed to injurious levels of sound. As discussed previously, the Navy utilizes both aerial (when available) and passive acoustic monitoring (during ASW exercises, passive acoustic detections are used as a cue for Lookouts' visual observations when passive acoustic assets are already participating in an activity) in addition to Lookouts on vessels to detect marine mammals for mitigation implementation. As discussed previously, the Navy utilized a post-modeling quantitative assessment to adjust the take estimates based on avoidance and the likely success of some portion of the mitigation measures. As is typical in predicting biological responses, it is challenging to predict exactly how avoidance and mitigation will affect the take of marine mammals, and therefore the Navy erred on the side of caution in choosing a method that would more likely still overestimate the take by PTS to some degree. Nonetheless, these modified Level A harassment take numbers represent the maximum number of instances in which marine mammals would be reasonably expected to incur either PTS or tissue damage, and we have analyzed them accordingly.

If a marine mammal is able to approach a surface vessel within the distance necessary to incur PTS in spite of the mitigation measures, the likely speed of the vessel (nominally 10–15 kn) and relative motion of the vessel would make it very difficult for the animal to remain in range long enough to accumulate enough energy to result in more than a mild case of PTS. As mentioned previously in relation to TTS, the likely consequences to the health of an individual that incurs PTS can range from mild to more serious dependent upon the degree of PTS and the frequency band it is in. The majority of any PTS incurred as a result of exposure to Navy sources would be expected to be in the 2–20 kHz region (resulting from the most powerful hull-mounted sonar) and could overlap a small portion of the communication frequency range of many odontocetes, whereas other marine mammal groups have communication calls at lower frequencies. Regardless of the frequency band though, the more important point in this case is that any PTS accrued as a result of exposure to Navy activities would be expected to be of a small amount (single digits). Permanent loss of some degree of hearing is a normal occurrence for older animals, and many animals are able to compensate for the shift, both in old age or at younger ages as the result of stressor exposure. While a small loss of hearing sensitivity may include some degree of energetic costs for compensating or may mean some small loss of opportunities or detection capabilities, at the expected scale it would be unlikely to impact behaviors, opportunities, or detection capabilities to a degree that would interfere with reproductive success or survival.

We also assume that the acoustic exposures sufficient to trigger onset PTS (or TTS) would be accompanied by physiological stress responses, although the sound characteristics that correlate with specific stress responses in marine mammals are poorly understood. As discussed above for Level B behavioral harassment, we would not expect the Navy's generally short-term, intermittent, and (in the case of sonar) transitory activities to create conditions of long-term, continuous noise leading to long-term physiological stress responses in marine mammals that could affect reproduction or survival.

The Navy implements mitigation measures (described in the *Mitigation Measures* section) during explosive activities, including delaying detonations when a marine mammal is observed in the mitigation zone. Nearly all explosive events will occur during daylight hours to improve the sightability of marine mammals and thereby improve mitigation effectiveness. Observing for marine mammals during the explosive activities will include aerial and passive acoustic detection methods (when they are available and part of the activity) before the activity begins, in order to cover the mitigation zones that can range from 200 yds (183 m) to 2,500 yds (2,286 m) depending on the source (*e.g.,* explosive sonobuoy, explosive torpedo, explosive bombs), and 2.5 nmi for sinking exercise (see Tables 48–57).

We analyze the type and amount of take by Level A harassment in Tables 39 through 41. Generally speaking, tissue damage injuries from explosives could range from minor lung injuries (the most sensitive organ and first to be affected) that consist of some short-term reduction of health and fitness immediately following the injury that heals quickly and will not have any discernible long-term effects, up to more impactful permanent injuries across multiple organs that may cause health problems and negatively impact reproductive success (*i.e.,* increase the time between pregnancies or even render reproduction unlikely) but fall just short of a ''serious injury'' by virtue of the fact that the animal is not expected to die. Nonetheless, due to the Navy's mitigation and detection capabilities, we would not expect marine mammals to typically be exposed to a more severe blast located closer to the source—so the impacts likely would be on the less severe end. It is still difficult to evaluate how these injuries may or may not impact an animal's fitness, however, these effects are only seen in very small numbers (single digits with the exception of two stocks) and in species of fairly high to very high abundances. In short, it is unlikely that any, much less all, of the small number of injuries accrued to any one stock would result in reduced reproductive success of any individuals, but even if a few did, the status of the affected stocks are such that it would not be expected to adversely impact rates of reproduction (and PTS of the low severity anticipated here is not expected to affect the survival of any individual marine mammals).

Serious Injury and Mortality

NMFS is authorizing a very small number of serious injuries or mortalities that could occur in the event of a ship strike or as a result of marine mammal exposure to explosive detonations. We note here that the takes from potential ship strikes or explosive exposures enumerated below could result in non-serious injury, but their worst potential outcome (mortality) is analyzed for the purposes of the negligible impact determination.

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

PBR is defined in section 3 of the MMPA as ''the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population'' (OSP) and, although not controlling, can be one measure considered among other factors when evaluating the effects of M/SI on a marine mammal species or stock during the section 101(a)(5)(A) process. OSP is defined in section 3 of the MMPA as ''the number of animals which will result in the maximum productivity of the population or the species, keeping in mind the carrying capacity of the habitat and the health of the ecosystem of which they form a constituent element.'' Through section 2, an overarching goal of the statute is to ensure that each species or stock of marine mammal is maintained at or returned to its OSP.

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

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

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

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

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

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

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

Where the anticipated M/SI is near, at, or above residual PBR, consideration of other factors (positive or negative), including those outlined above, as well as mitigation is especially important to assessing whether the M/SI will have a negligible impact on the species or stock. PBR is a conservative metric and not sufficiently precise to serve as an absolute predictor of population effects upon which mortality caps would appropriately be based. For example, in some cases stock abundance (which is one of three key inputs into the PBR calculation) is underestimated because marine mammal survey data within the

U.S. EEZ are used to calculate the abundance even when the stock range extends well beyond the U.S. EEZ. An underestimate of abundance could result in an underestimate of PBR. Alternatively, we sometimes may not have complete M/SI data beyond the U.S. EEZ to compare to PBR, which could result in an overestimate of residual PBR. The accuracy and certainty around the data that feed any PBR calculation, such as the abundance estimates, must be carefully considered to evaluate whether the calculated PBR accurately reflects the circumstances of the particular stock. M/SI that exceeds PBR may still potentially be found to be negligible in light of other factors that offset concern, especially when robust mitigation and adaptive management provisions are included.

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

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

As noted above, in some cases the ongoing human-caused mortality from activities other than those being evaluated already exceeds PBR and, therefore, residual PBR is negative. In these cases (such as is specifically discussed for the Eastern North Pacific stock of blue whales and the CA/OR/WA stock of humpback whales), any additional mortality, no matter how small, and no matter how small relative to the mortality caused by other human activities, would result in greater exceedance of PBR. PBR is helpful in informing the analysis of the effects of mortality on a species or stock because it is important from a biological perspective to be able to consider how the total mortality in a given year may affect the population. However, section 101(a)(5)(A) of the MMPA indicates that NMFS shall authorize the requested incidental take from a specified activity if we find that ''the total of such taking [*i.e.,* from the specified activity] will have a negligible impact on such species or stock.'' In other words, the task under the statute is to evaluate the applicant's anticipated take in relation to their take's impact on the species or stock, not other entities' impacts on the species or stock. Neither the MMPA nor NMFS' implementing regulations call for consideration of other unrelated activities and their impacts on the species or stock. In fact, in response to public comments on the implementing regulations NMFS explained that such effects are not considered in making negligible impact findings under section 101(a)(5), although the extent to which a species or stock is being impacted by other anthropogenic activities is not ignored. Such effects are reflected in the baseline of existing impacts as reflected in the species' or stock's abundance, distribution, reproductive rate, and other biological indicators.

NMFS guidance for commercial fisheries provides insight when evaluating the effects of an applicant's incidental take as compared to the incidental take caused by other entities. Parallel to section 101(a)(5)(A), section 101(a)(5)(E) of the MMPA provides that NMFS shall allow the incidental take of ESA-listed endangered or threatened marine mammals by commercial fisheries if, among other things, the incidental M/SI from the commercial fisheries will have a negligible impact on the species or stock. As discussed earlier, the authorization of incidental take resulting from commercial fisheries and authorization for activities other than commercial fisheries are under two separate regulatory frameworks. However when it amended the statute in 1994 to provide a separate incidental take authorization process for commercial fisheries, Congress kept the requirement of a negligible impact determination for this one category of species, thereby applying the standard to both programs. Therefore, while the structure and other standards of the two programs differ such that evaluation of negligible impact under one program may not be fully applicable to the other program (*e.g.,* the regulatory definition of ''negligible impact'' at 50 CFR 216.103 applies only to activities other than commercial fishing), guidance on determining negligible impact for commercial fishing take authorizations can be informative when considering incidental take outside the commercial fishing context. In 1999, NMFS published criteria for making a negligible impact determination pursuant to section 101(a)(5)(E) of the MMPA in a notice of proposed permits for certain fisheries (64 FR 28800; May 27, 1999). Criterion 2 stated ''If total human-related serious injuries and mortalities are greater than PBR, and fisheries-related mortality is less than 0.1 PBR, individual fisheries may be permitted if management measures are being taken to address non-fisheries-related serious injuries and mortalities. When fisheries-related serious injury and mortality is less than 10 percent of the total, the appropriate management action is to address components that account for the major portion of the total.'' This criterion addresses when total human-caused mortality is exceeding PBR, but the activity being assessed is responsible for only a small portion of the mortality. In the HSTT proposed rule and other incidental take authorizations in which NMFS has recently articulated a fuller description of how we consider PBR under section 101(a)(5)(A), this situation had not arisen, and NMFS' description of how we consider PBR in the section 101(a)(5) authorization process did not, therefore, include consideration of this scenario.

However, the analytical framework we use here appropriately incorporates elements of the one developed for use under section 101(a)(5)(E) and because the negligible impact determination under section 101(a)(5)(A) focuses on the activity being evaluated, it is appropriate to utilize the parallel concept from the framework for section 101(a)(5)(E).

Accordingly, we are using a similar criterion in our negligible impact analysis under section 101(a)(5)(A) to evaluate the relative role of an applicant's incidental take when other sources of take are causing PBR to be exceeded, but the take of the specified activity is comparatively small. Where this occurs, we may find that the impacts of the taking from the specified activity may (alone) be negligible even when total human-caused mortality from all activities exceeds PBR if (in the context of a particular species or stock): The authorized mortality or serious injury would be less than or equal to 10 percent of PBR and management measures are being taken to address serious injuries and mortalities from the other activities (*i.e.,* other than the specified activities covered by the incidental take authorization under consideration). We must also determine, though, that impacts on the species or stock from other types of take (*i.e.,* harassment) caused by the applicant do not combine with the impacts from mortality or serious injury to result in adverse effects on the species or stock through effects on annual rates of recruitment or survival.

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

Our evaluation of the M/SI for each of the species and stocks for which mortality or serious injury could occur follows. No mortalities or serious injuries are anticipated from the Navy's sonar activities. In addition, all mortality authorized for some of the same species or stocks over the next several years pursuant to our final rulemaking for the NMFS Southwest and Pacific Islands Fisheries Science Centers has been incorporated into the residual PBR.

We first consider maximum potential incidental M/SI from the Navy's ship strike analysis for the affected mysticetes and sperm whales (see Table 69) and from the Navy's explosive detonations for California sea lions and short-beaked common dolphin (see Table 70) in consideration of NMFS' threshold for identifying insignificant M/SI take. By considering the maximum potential incidental M/SI in relation to PBR and ongoing sources of anthropogenic mortality, we begin our evaluation of whether the potential incremental addition of M/SI through Navy's ship strikes and explosive detonations may affect the species' or stocks' annual rates of recruitment or survival. We also consider the interaction of those mortalities with incidental taking of that species or stock by harassment pursuant to the specified activity.

Based on the methods discussed previously, NMFS believes that mortal takes of three large whales may occur over the course of the five-year rule. The rule authorizes no more than two from any of the following species/stocks over the five-year period: gray whale (Eastern North Pacific stock), fin whale (CA/OR/WA stock), and humpback whale (Central North Pacific stock). The rule authorizes no more than one mortality from any of the following species/stocks over the five-year period: blue whale (Eastern North Pacific stock), humpback whale (CA/OR/WA stock, Mexico DPS), and sperm whale (Hawaii stock). We do not anticipate, nor authorize, ship strike takes to blue whale (Central North Pacific stock), fin whale (Hawaii stock), gray whale (Western North Pacific stock), minke whale (either CA/OR/WA stock or Hawaii stock), sei whale (either Hawaii stock or Eastern North Pacific stock), Bryde's whale (either Hawaii stock or Eastern Tropical Pacific stock) or sperm whale (CA/OR/WA stock). This means an annual average of 0.2 whales from each species or stock where one mortality may occur and an annual average of 0.4 whales from each species or stock where two mortalities may occur as described in Table 69 (*i.e.,* 1 or 2 takes over 5 years divided by 5 to get the annual number) is authorized.

TABLE 69—SUMMARY INFORMATION RELATED TO MORTALITIES REQUESTED FOR SHIP STRIKE, 2018–2023

Species (stock)	Stock abundance (Nbest) *	Annual authorized take by serious injury or mortality [1]	Total annual M/SI * [2]	Fisheries interactions (Y/N); annual rate of M/SI from fisheries interactions *	Vessel collisions (Y/N); annual rate of M/SI from vessel collision*	PBR *	Residual PBR–PBR minus annual M/SI [3]	Stock trend * [4]	Recent UME (Y/N); number and year (since 2007)
Fin whale (CA/OR/WA stock).	9,029	0.4	≥43.5	Y; ≥0.5	Y, 1.6	81	37.5	↑	N.
Gray whale (Eastern North Pacific stock).	26,960	0.4	138	Y, 7.7	Y, 0.8	801	663	stable since 2003	N.
Humpback whale (CA/OR/WA stock, Mexico DPS).	2,900	0.2	≥38.6	Y; ≥14.1	Y, 22	16.7	−21.9	↑	N.
Humpback whale (Central North Pacific stock).	10,103	0.4	40.76	Y; 18.76	Y, 22	33.4	−7.36	stable	N.
Sperm whale (Hawaii stock).	5,559	0.2	0.7	Y, 0.7	N	13.9	13.2	?	N.

TABLE 69—SUMMARY INFORMATION RELATED TO MORTALITIES REQUESTED FOR SHIP STRIKE, 2018–2023—Continued

Species (stock)	Stock abundance (Nbest) *	Annual authorized take by serious injury or mortality [1]	Total annual M/SI * [2]	Fisheries interactions (Y/N); annual rate of M/SI from fisheries interactions *	Vessel collisions (Y/N); annual rate of M/SI from vessel collision*	PBR *	Residual PBR–PBR minus annual M/SI [3]	Stock trend * [4]	Recent UME (Y/N); number and year (since 2007)
Blue whale (Eastern North Pacific Stock).	1,647	0.2	≥19	≥0.96	Y, 18	2.3	−16.7	stable	Y; 3, 2007.

* Presented in the SARS.
[1] This column represents the annual take by serious injury or mortality by vessel collision and was calculated by the number of mortalities for authorization divided by five years (the length of the rule and LOAs).
[2] This column represents the total number of incidents of M/SI that could potentially accrue to the specified species or stock. This number comes from the SAR, but deducts the takes accrued from either Navy strikes or NMFS' Southwest Fisheries Science Center (SWFSC) takes in the SARs to ensure not double-counted against PBR. However, for these species, there were no takes from either other Navy activities or SWFSC in the SARs to deduct that would be considered double-counting.
[3] This value represents the calculated PBR less the average annual estimate of ongoing anthropogenic mortalities (*i.e.,* total annual human-caused M/SI, which is presented in the SARs).
[4] See relevant SARs for more information regarding stock status and trends.

The Navy has also requested a small number of takes by serious injury or mortality from explosives. To calculate the annual average of mortalities for explosives in Table 70 we used the same method as described for vessel strikes. The annual average is the total number of takes divided by five years to get the annual number. Specifically, NMFS is authorizing the following serious injury or mortality takes from explosions: 4 California sea lions and 6 short-beaked common dolphins over the 5-year period (therefore 0.8 mortalities annually for California sea lions and 1.2 mortalities annually for short-beaked common dolphin), as described in Table 70.

TABLE 70—SUMMARY INFORMATION RELATED TO MORTALITIES FROM EXPLOSIVES, 2018–2023

Species (stock)	Stock abundance (Nbest) *	Annual authorized take by serious injury or mortality * [1]	Total annual M/SI * [2]	Fisheries interactions (Y/N); annual rate of M/SI from fisheries interactions *	PBR *	SWFSC authorized take (annual) [3]	Residual PBR—PBR minus annual M/SI and SWFSC [4]	Stock trend * [5]	UME (Y/N); number and year
California sea lion (U.S. stock).	257,606	0.8	318.4	Y; 197	14,011	6.6	13,686	↑	Y; 2013.
Short-beaked common dolphin (CA/OR/WA stock).	969,861	1.2	≥40	Y; ≥40	8,393	2.8	8,350.2	?	N.

* Presented in the SARS.
[1] This column represents the annual take by serious injury or mortality during explosive detonations and was calculated by the number of mortalities planned for authorization divided by five years (the length of the rule and LOAs).
[2] This column represents the total number of incidents of M/SI that could potentially accrue to the specified species or stock. This number comes from the SAR, but deducts the takes accrued from either Navy activities or NMFS' SWFSC takes in the SARs to ensure not double-counted against PBR. In this case, for California sea lion 0.8 annual M/SI from the U.S. West Coast during scientific trawl and longline operations conducted by NMFS and 1.8 annual M/SI from marine mammal research related mortalities authorized by NMFS was deducted from total annual M/SI (321).
[3] This column represents annual take authorized through NMFS' SWFSC rulemaking/LOAs (80 FR 58982).
[4] This value represents the calculated PBR less the average annual estimate of ongoing anthropogenic mortalities (*i.e.,* total annual human-caused M/SI column and the annual authorized take from the SWFSC column. In the case of California sea lion the M/SI column (318.4) and the annual authorized take from the SWFSC (6.6) were subtracted from the calculated PBR.of 14,011. In the case of Short-beaked common dolphin the M/SI column (40) and the annual authorized take from the SWFSC (2.8) were subtracted from the calculated PBR of 8,393.
[5] See relevant SARs for more information regarding stock status and trends.

Stocks With M/SI Below the Insignificance Threshold

As noted above, for a species or stock with incidental M/SI less than 10 percent of residual PBR, we consider M/SI from the specified activities to represent an insignificant incremental increase in ongoing anthropogenic M/SI that alone (*i.e.,* in the absence of any other take and barring any other unusual circumstances) will clearly not adversely affect annual rates of recruitment and survival. In this case, as shown in Tables 69 and 70, the following species or stocks have potential or estimated (from ship strike and explosive takes, respectively), and authorized, M/SI below their insignificance threshold: fin whale (CA/OR/WA stock), gray whale (Eastern North Pacific stock), humpback whale (Central North Pacific stock), sperm whale (Hawaii stock), California sea lion (U.S stock), and short-beaked common dolphin (CA/OR/WA stock). While the authorized mortality of California sea lions (U.S. stock) are below the insignificance threshold, because of the recent UMEs, we further address how the authorized serious injury or mortality and the UME inform the negligible impact determination immediately below. For the other five stocks with authorized mortality below the insignificance threshold, there are no other known factors, information, or unusual circumstances that indicate anticipated M/SI below the insignificance threshold could have adverse effects on annual rates of recruitment or survival and they are not discussed further. For the remaining two stocks with anticipated potential M/SI above the insignificance threshold, how that M/SI compares to residual PBR, as well as additional factors, as appropriate, are discussed below as well.

California Sea Lion (U.S. Stock)

The estimated (and authorized) lethal take of California sea lions is well below the insignificance threshold (0.8 as compared to a residual PBR of 13,686) and NMFS classifies the stock as ''increasing'' in the SARs. Nonetheless, we consider here how the 2013-present California Sea Lion Unusual Mortality Event informs our negligible impact determination. This UME was confined to pup and yearling sea lions and many were emaciated, dehydrated, and underweight. Although this UME has not been closed, NMFS staff confirmed that the mortality of pups and yearlings returned to normal in 2017 and 2018 and we plan to present it to the Working Group to discuss closure by the end of 2018 (Deb Fauquier, pers. comm.). NMFS' findings to date indicate that a change in the availability of sea lion prey, especially sardines, a high value food source for nursing mothers, was a likely contributor to the large number of strandings. Sardine spawning grounds shifted further offshore in 2012 and 2013, and while other prey were available (market squid and rockfish), these may not have provided adequate nutrition in the milk of sea lion mothers supporting pups, or for newly-weaned pups foraging on their own. Although the pups showed signs of some viruses and infections, findings indicate that this event was not caused by disease, but rather by the lack of high quality, close-by food sources for nursing mothers. Average mortalities from 2013–2017 averaged about 1,000–3,000 more annually than they had in the previous 10 years. However, even if these unusual mortalities were still occurring (with current data suggesting they are not), combined with other annual human-caused mortalities, and viewed through the PBR lens (for human-caused mortalities), total human-caused mortality (inclusive of the potential for additional UME deaths) would still fall well below residual PBR. Further, the loss of pups and yearlings would not be expected to have as much of an effect on annual population rates as the death of adult females. In conclusion, because of the abundance, population trend, and residual PBR of this stock, as well as the fact that the increased mortality stopped two years ago and the UME is expected to be closed soon, this UME is not expected to have any impacts on individuals in the coming five years, nor is it thought to have had impacts on the population rate when it was occurring that would influence our evaluation of the effects of authorized mortality on the stock.

Stocks With M/SI Above Residual PBR

Humpback Whale (CA/OR/WA Stock, Mexico DPS)

For this stock, PBR is currently set at 33.4 and the total annual M/SI is estimated at greater than or equal to 40.76, yielding a residual PBR of −7.36. NMFS is authorizing one serious injury or mortality over the five-year duration of the rule (indicated as 0.2 annually for the purposes of comparing to PBR), which means that residual PBR is exceeded by 7.56. However, as described previously, in the commercial fisheries setting for ESA-listed marine mammals (which is similar to the non-fisheries incidental take setting, in that a negligible impact determination is required that is based on the assessment of take caused by the activity being analyzed) NMFS may find the impact of the authorized take from a specified activity to be negligible even if total human-caused mortality exceeds PBR, if the authorized mortality is less than 10 percent of PBR and management measures are being taken to address serious injuries and mortalities from the other activities causing mortality (*i.e.,* other than the specified activities covered by the incidental take authorization in consideration). When those considerations are applied in the section 101(a)(5)(A) context, the authorized lethal take (0.2 annually) of humpback whales from the CA/OR/WA stock is significantly less than 10 percent of PBR (in fact less than 1 percent of 33.4) and there are management measures in place to address serious injury and mortality from activities other than those the Navy is conducting (summarized below).

Based on identical simulations as those conducted to identify Recovery Factors for PBR in Wade et al. (1998), but where values less than 0.1 were investigated (P. Wade, pers. comm.), we predict that where the mortality from a specified activity does not exceed Nmin *1/2 Rmax * 0.013, the contemplated mortality for the specific activity will not delay the time to recovery by more than 1 percent. For this stock of humpback whales, Nmin *1/2 Rmax * 0.013 = 1.45 and the annual authorized mortality is 0.2 (*i.e.,* less than 1.45), which means that the mortality authorized in this rule for HSTT activities will not delay the time to recovery by more than 1 percent.

As described previously, NMFS must also ensure that impacts by the applicant on the species or stock from other types of take (*i.e.,* harassment) do not combine with the impacts from mortality and serious injury to adversely affect the species or stock via impacts on annual rates of recruitment or survival, which is discussed further below in the stock-specific conclusion sections.

We discuss here the nature in which the predicted average annual mortality from other sources has changed since the proposed rule. The proposed rule included the information from the 2017 SAR, which indicated that PBR was 11 and the total observed annual average mortality was greater than or equal to 6.5 (one from vessel strikes and >5.5 from fisheries interactions). The total human-caused mortality did not exceed residual PBR, and our analysis, which considered other factors as well, concluded that lethal take, alone, from the Navy's activities would not have more than a negligible impact on humpback whales (CA/OR/WA stock, Mexico DPS) (we also went on to analyze the effects of the potential lethal take in conjunction with the estimated harassment take under the negligible impact standard). In August 2018, NMFS published draft 2018 SARs in which PBR increased to 33.4 and the predicted average annual mortality increased to greater than or equal to 40.76 (22 estimated from vessel collisions, >14.1 observed fisheries interactions, and 2.16 predicted fisheries interactions if unidentified entanglements are prorated based on a model based on known species entanglements). While the observed mortality from vessel strikes remains low at 2.1, the draft 2018 SAR relies on a new method to estimate annual deaths by ship strike utilizing an encounter theory model that combined species distribution models of whale density, vessel traffic characteristics, along with whale movement patterns obtained from satellite-tagged animals in the region to estimate encounters that would result in mortality (Rockwood *et al.,* 2017). The model predicts 22 annual mortalities of humpback whales from vessel strikes. The authors (Rockwood *et al.,* 2017) do not suggest that ship strike suddenly increased to 22 this year. In fact, the model is not specific to a year, but rather offers a generalized prediction of ship strike off the U.S. West Coast. Therefore, if the Rockwood *et al.* (2017) model is an accurate representation of vessel strike, then similar levels of ship strike have been occurring in past years as well. Put another way, if the model is correct, for some number of years total human-caused mortality has been significantly underestimated, and PBR has been similarly exceeded by a notable amount, and yet the CA/OR/WA stock of humpback whales is considered stable nevertheless. We note that as of the date this final rule was signed and transmitted to the Office of the Federal Register, the public comment period for the draft 2018 SAR was still open. This means that NMFS has not yet considered any comments that other experts and the public might have regarding the propriety of the model for identifying annual mortality in the SAR.

The CA/OR/WA stock of humpback whales experienced a steady increase from the 1990s through approximately 2008, and more recent estimates through 2014 indicate a leveling off of the population size. This stock is comprised of the feeding groups of three DPSs. Two DPSs associated with this stock are listed under the ESA as either endangered (Central America DPS) or threatened (Mexico DPS), while the third is not listed. The mortality authorized by this rule is for an individual from the Mexico DPS only. As described in the Final Rule Identifying 14 DPSs of the Humpback Whale and Revision of Species-Wide Listing (81 FR 62260, September 8, 2016), the Mexico DPS was initially proposed not to be listed as threatened or endangered, but the final decision was changed in consideration of a new abundance estimate using a new methodology that was more accurate (less bias from capture heterogeneity and lower coefficient of variation) and resulted in a lower abundance than was previously estimated. To be clear, the new abundance estimate did not indicate that the numbers had decreased, but rather, the more accurate new abundance estimate (3,264), derived from the same data but based on an integrated spatial multi-strata mark recapture model (Wade *et al.,* 2016) was simply notably lower than earlier estimates, which were 6,000–7,000 from the SPLASH project (Calambokidis *et al.,* 2008) or higher (Barlow et al., 20111). The updated abundance was still higher than 2,000, which is the Biological Review Team's (BRT) threshold between ''not likely to be at risk of extinction due to low abundance alone'' and ''increasing risk from factors associated with low abundance.'' Further, the BRT concluded that the DPS was unlikely to be declining because of the population growth throughout most of its feeding areas, in California/Oregon and the Gulf of Alaska, but they did not have evidence that the Mexico DPS was actually increasing in overall population size.

As discussed, we also take into consideration management measures in place to address serious injury and mortality caused by other activities. The California swordfish and thresher shark drift gillnet fishery is one of the primary causes of M/SI take from fisheries interactions for humpback whales on the West Coast. NMFS established the Pacific Offshore Cetacean Take Reduction Team in 1996 and prepared an associated Plan (PCTRP) to reduce the risk of M/SI via fisheries interactions. In 1997, NMFS published final regulations formalizing the requirements of the PCTRP, including the use of pingers following several specific provisions and the employment of Skipper education workshops.

Crab pot fisheries are also a significant source of mortality for humpback whales and, unfortunately, have increased mortalities over recent years. However, the draft 2018 SAR notes that a recent increase in disentanglement efforts has resulted in an increase in the fraction of cases that are reported as non-serious injuries as a result of successful disentanglement. More importantly, since 2015, NMFS has engaged in a multi-stakeholder process in California (including California State resource managers, fishermen, NGOs, and scientists) to identify and develop solutions and make recommendations to regulators and the fishing industry for reducing whale entanglements (see *http://www.opc.ca.gov/whale-entanglementworking-group/*), referred to as the Whale Entanglement Working Group. More recently, similar efforts to address the entanglement issue have also been initiated in Oregon and Washington. The Whale Entanglement Working Group has made significant progress since 2015 and is tackling the problem from multiple angles, including:

- Development of Fact Sheets and Best Practices for specific Fisheries issues (*e.g.,* California Dungeness Crab Fishing BMPs, or the 2018–2019 Best Fishing Practices Guide);
- 2018–2019 Risk Assessment and Mitigation Program (RAMP) to support the state of California in working collaboratively with experts (fishermen, researchers, NGOs, etc.) to identify and assess elevated levels of entanglement risk and determine the need for management options to reduce risk of entanglement; and
- Support of pilot studies to test new fisheries technologies to reduce take (*e.g.,* Exploring Ropeless Fishing Technologies for the California Dungeness Crab Fishery).

The Working Group meets regularly, posts reports and annual recommendations, and makes all of their products and guidance documents readily accessible for the public. The April 2018 Working Group Report reports on the progress of the RAMP (though there is a separate RAMP report), summarized new ideas for Fisheries BMPs, and indicated next steps.

We also note that on November 26, 2018, NMFS' West Coast Regional Office received a notice of intent from the California Department of Fish and Wildlife to apply for a Section 10 Incidental Take Permit under the ESA to address protected species interactions in certain California state-managed fixed gear fisheries. Any request for such a permit must include a Habitat Conservation Plan that specifies, among other things, what steps the applicant will take to minimize and mitigate the impacts, and the funding that will be available to implement such steps.

Further regarding measures in place to reduce mortality from sources other than the Navy, the Channel Islands NMS staff coordinates, collects, and monitors whale sightings in and around the Whale Advisory Zone and the Channel Islands NMS region, which is within the area of highest strike mortality (90th percentile) for humpback whales on the U.S. West coast (Rockwood *et al.,* 2017). The seasonally established Whale Advisory Zone spans from Point Arguello to Dana Point, including the Traffic Separation Schemes in the Santa Barbara Channel and San Pedro Channel. Vessels transiting the area from June through November are recommended to exercise caution and voluntarily reduce speed to 10 kn or less for blue, humpback, and fin whales. Channel Island NMS observers collect information from aerial surveys conducted by NOAA, the U.S. Coast Guard, California Department of Fish and Game, and Navy chartered aircraft. Information on seasonal presence, movement, and general distribution patterns of large whales is shared with mariners, NMFS' Office of Protected Resources, the U.S. Coast Guard, the California Department of Fish and Game, the Santa Barbara Museum of Natural History, the Marine Exchange of Southern California, and whale scientists. Real time and historical whale observation data collected from multiple sources can be viewed on the Point Blue Whale Database.

We also note that in this case, 0.2 M/SI annually means the potential for one mortality in one of the five years and zero mortalities in four of those five years. Therefore, the Navy would not be contributing to the total human-caused mortality at all in four of the five, or 80 percent, of the years covered by this rule. That means that even if a humpback whale from the CA/OR/WA stock were to be struck, in four of the five years there could be no effect on annual rates of recruitment or survival from Navy-caused M/SI. Additionally, as noted previously, the loss of a male would have far less, if any, of an effect on population rates and absent any information suggesting that one sex is more likely to be struck than another, one could reasonably assume that there is a 50 percent chance that the single strike authorized by this rule would be a male, thereby further decreasing the likelihood of impacts on the population rate. In situations like this where potential M/SI is fractional, consideration must be given to the lessened impacts anticipated due to the absence of mortality or serious injury in four of the five years and due to the fact that a single strike could be a male. Lastly, we reiterate that PBR is a conservative metric and also not sufficiently precise to serve as an absolute predictor of population effects upon which mortality caps would appropriately be based. This is especially important given the minor difference between zero and one across the five-year period covered by this rule, which is the smallest distinction possible when considering mortality. Wade et al. (1998), authors of the paper from which the current PBR equation is derived, note that ''Estimating incidental mortality in one year to be greater than the PBR calculated from a single abundance survey does not prove the mortality will lead to depletion; it identifies a population worthy of careful future monitoring and possibly indicates that mortality-mitigation efforts should be initiated.''

The information included here illustrates that this humpback whale stock is stable, the potential (and authorized) mortality is well below 10 percent (0.6 percent) of PBR, and management actions are in place to minimize both fisheries interactions and ship strike from other vessel activity in the one of the highest-risk areas for strikes. More specifically, although the total human-mortality exceeds PBR, the authorized mortality for the Navy's specified activities would incrementally contribute less than 1 percent of that and, further, given the fact that it would occur in only one of five years and could be comprised of a male (far less impactful to the population), the potential impacts on population rates are even less. Based on the presence of the factors described above, including consideration of the fact that the authorized mortality of 0.2 will not delay the time to recovery by more than 1 percent, we do not expect lethal take from Navy activities, alone, to adversely affect the CA/OR/WA stock of humpback whales through effects on annual rates of recruitment or survival. Nonetheless, the fact that total human-caused mortality exceeds PBR necessitates close attention to the remainder of the impacts (*i.e.,* harassment) on the CA/OR/WA stock of humpback whales from the Navy's activities to ensure that the total authorized takes have a negligible impact on the species and stock. Therefore this information will be considered in combination with our assessment of the impacts of harassment takes later in the section, in the humpback whale conclusion section.

Blue Whale (Eastern North Pacific Stock)

For blue whales (Eastern North Pacific stock), PBR is currently set at 2.3 and the total annual M/SI is estimated at greater than or equal to 19, yielding a residual PBR of -16.7. NMFS is authorizing one serious injury or mortality for the Navy over the five-year duration of the rule (indicated as 0.2 annually for the purposes of comparing to PBR), which means that residual PBR is exceeded by 16.9. However, as described previously, in the commercial fisheries setting for ESA-listed marine mammals (which is similar to the incidental take setting, in that the negligible impact determination is based on the assessment of take of the activity being analyzed) NMFS may find the impact of the authorized take from a specified activity to be negligible even if total human-caused mortality exceeds PBR, if the authorized mortality is less than 10 percent of PBR and management measures are being taken to address serious injuries and mortalities from the other activities causing mortality (*i.e.,* other than the specified activities covered by the incidental take authorization in consideration). When those considerations are applied in the section 101(a)(5)(A) context, the authorized lethal take (0.2 annually) of blue whales from the Eastern North Pacific stock is less than 10 percent of PBR (which is 2.3) and there are management measures in place to address serious injury and mortality from activities other than those the Navy is conducting (summarized below). Perhaps more importantly, the population is considered ''stable'' and, specifically, the available data suggests that the current number of ship strikes is not likely to have an adverse impact on the population, despite the fact that it exceeds PBR, with the Navy's minimal additional mortality of one whale in the five years not creating the likelihood of adverse impact. Immediately below, we explain the information that supports our finding that the Navy's authorized mortality is not expected to result in more than a negligible impact on this stock. As described previously, NMFS must also ensure that impacts by the applicant on the species or stock from other types of take (*i.e.,* harassment) do not combine with the impacts from mortality to adversely affect the species or stock via impacts on annual rates of recruitment or survival, which occurs further below in the stock-specific conclusion sections.

We discuss here the nature in which the predicted average annual mortality from other sources has changed since the proposed rule. The proposed rule included the information from the 2017 SAR, which indicated that PBR was 2.3 and the total observed annual average mortality (which was all from ship strike) was 0.9. There were no other observed sources of mortality, the total human-caused mortality did not exceed residual PBR, and our analysis, which considered other factors as well, concluded that lethal take, alone, from the Navy's activities would not have more than a negligible impact on blue whales (Eastern North Pacific stock) (we also went on to analyze the effects of the potential lethal take in conjunction with the estimated harassment take under the negligible impact standard). In August 2018, NMFS published draft 2018 SARs in which PBR remained at 2.3 and observed average annual mortality went down to 0.2 (from ship strike). However, the draft 2018 SAR relies on a new method to estimate annual deaths by ship strike utilizing an encounter theory model that combined species distribution models of whale density, vessel traffic characteristics, along with whale movement patterns obtained from satellite-tagged animals in the region to estimate encounters that would result in mortality (Rockwood *et al.,* 2017). The model predicts 18 annual mortalities of blue whales from vessel strikes, which, with the additional M/SI of 0.96 from fisheries interactions, results in the current estimate of residual PBR being −16.7. We note that as of the date this final rule was signed and transmitted to the Office of Federal Register, the public comment period for the draft 2018 SAR was still open. This means that NMFS has not yet considered any comments that other experts and the public might have regarding the propriety of the model for identifying annual mortality in the SAR.

Although NMFS' Permits and Conservation Division in the Office of Protected Resources has independently reviewed the new ship strike model and its results and agrees that it is appropriate for estimating blue whale mortality by ship strike on the U.S. West Coast, for analytical purposes we also note that if the historical method were used to predict vessel strike (*i.e.,* using observed mortality by vessel strike, or 0.2, instead of 18), then total human-caused mortality including the Navy's potential take would not exceed PBR. We further note that the authors (Rockwood *et al.,* 2017) do not suggest that ship strike suddenly increased to 18 this past year. In fact, the model is not specific to a year, but rather offers a generalized prediction of ship strike off the U.S. West Coast. Therefore, if the Rockwood *et al.* (2017) model is an accurate representation of vessel strike, then similar levels of ship strike have been occurring in past years as well. Put another way, if the model is correct, for some number of years total-human-caused mortality has been significantly underestimated and PBR has been similarly exceeded by a notable amount, and yet the Eastern North Pacific stock of blue whales remains stable nevertheless.

NMFS' draft 2018 SAR states that the stock is ''stable'' and there is no indication of a population size increase in this blue whale population since the early 1990s. The lack of a species' or stock's population increase can have several causes, some of which are positive. The draft SAR further cites to Monnahan *et al.* (2015), which used a population dynamics model to estimate that the Eastern North Pacific blue whale population was at 97 percent of carrying capacity in 2013 and to suggest that the observed lack of a population increase since the early 1990s was explained by density dependence, not impacts from ship strike. This would mean that this stock of blue whales shows signs of stability and is not increasing in population size because the population size is at or nearing carrying capacity for its available habitat. And, in fact, we note that this stable population has maintained this status throughout the years that Navy has consistently tested and trained at similar levels (with similar vessel traffic) in areas that overlap with blue whale occurrence.

Monnahan *et al.* (2015) modeled vessel numbers, ship strikes, and the population of the Eastern North Pacific blue whale population from 1905 out to 2050 using a Bayesian framework to incorporate informative biological information and assign probability distributions to parameters and derived quantities of interest. The authors tested multiple scenarios with differing assumptions, incorporated uncertainty, and further tested the sensitivity of multiple variables. Their results indicated that there is no immediate threat (*i.e.* through 2050) to the population from any of the scenarios tested, which included models with 10 and 35 strike mortalities per year. Broadly, the authors concluded that, unlike other blue whale stocks, the Eastern North Pacific blue whales have recovered from 70 years of whaling and are in no immediate threat from ship strikes. They further noted that their conclusion conflicts with the depleted and strategic designation under the MMPA, as well as PBR specifically.

As discussed, we also take into consideration management measures in place to address serious injury and mortality caused by other activities. The Channel Islands NMS staff coordinates, collects, and monitors whale sightings in and around the Whale Advisory Zone and the Channel Islands NMS region. Redfern *et al.* (2013) note that the most risky area for blue whales is the Santa Barbara Channel, where shipping lanes intersect with common feeding areas. The seasonally established Whale Advisory Zone spans from Point Arguello to Dana Point, including the Traffic Separation Schemes in the Santa Barbara Channel and San Pedro Channel. Vessels transiting the area from June through November are recommended to exercise caution and voluntarily reduce speed to 10 kn or less for blue, humpback, and fin whales. Channel Island NMS observers collect information from aerial surveys conducted by NOAA, the U.S. Coast Guard, California Department of Fish and Game, and U.S. Navy chartered aircraft. Information on seasonal presence, movement, and general distribution patterns of large whales is shared with mariners, NMFS Office of Protected Resources, U.S. Coast Guard, California Department of Fish and Game, the Santa Barbara Museum of Natural History, the Marine Exchange of Southern California, and whale scientists. Real time and historical whale observation data collected from multiple sources can be viewed on the Point Blue Whale Database.

We also note that in this case, 0.2 M/SI means one mortality in one of the five years and zero mortalities in four of those five years. Therefore, the Navy would not be contributing to the total human-caused mortality at all in four of the five, or 80 percent, of the years covered by this rule. That means that even if a blue whale were to be struck, in four of the five years there could be no effect on annual rates of recruitment or survival from Navy-caused M/SI. Additionally, as noted previously, the loss of a male would have far less, if any, of an effect on population rates and absent any information suggesting that one sex is more likely to be struck than another, one could reasonably assume that there is a 50 percent chance that the single strike authorized by this rule would be a male, thereby further decreasing the likelihood of impacts on the population rate. In situations like this where potential M/SI is fractional, consideration must be given to the lessened impacts anticipated due to the absence of mortality or serious injury in four of the five years and the fact that the single strike could be a male. Lastly, we reiterate that PBR is a conservative metric and also not sufficiently precise to serve as an absolute predictor of population effects upon which mortality caps would appropriately be based. This is especially important given the minor difference between zero and one across the five-year period covered by this rule, which is the smallest distinction possible when considering mortality. Wade *et al.* (1998), authors of the paper from which the current PBR equation is derived, note that ''Estimating incidental mortality in one year to be greater than the PBR calculated from a single abundance survey does not prove the mortality will lead to depletion; it identifies a population worthy of careful future monitoring and possibly indicates that mortality-mitigation efforts should be initiated.'' The information included here illustrates that this blue whale stock is stable, approaching carrying capacity, and has leveled off because of density-dependence, not human-caused mortality, in spite of what might be otherwise indicated from the calculated PBR. Further, potential (and authorized) mortality is below 10 percent of PBR and management actions are in place to minimize ship strike from other vessel activity in the one of the highest-risk areas for strikes. Based on the presence of the factors described above, we do not expect lethal take from Navy activities, alone, to adversely Eastern North Pacific blue whales through effects on recruitment or survival. Nonetheless, the fact that total human-caused mortality exceeds PBR necessitates close attention to the remainder of the impacts (*i.e.,* harassment) on the Eastern Central Pacific stock of blue whales from the Navy's activities to ensure that the total authorized takes have a negligible impact on the species or stock. Therefore, this information will be considered in combination with our assessment of the impacts of harassment takes later in the section.

Group and Species-Specific/Stock-Specific Analyses

The maximum amount and type of incidental take of marine mammals reasonably likely to occur and therefore authorized from exposures to sonar and other active acoustic sources and explosions during the five-year training and testing period are shown in Tables 41 and 42 along with the discussion in the *Estimated Take of Marine Mammals* section on Vessel Strike and Explosives. The vast majority of predicted exposures (greater than 99 percent) are expected to be Level B harassment (non-injurious TTS and behavioral reactions) from acoustic and explosive sources during training and testing activities at relatively low received levels.

As noted previously, the estimated Level B harassment takes represent instances of take, not the number of individuals taken (the much lower and less frequent Level A harassment takes are far more likely to be associated with separate individuals), and in many cases some individuals are expected to be taken more than one time, while in other cases a portion of individuals will not be taken at all. Below, we compare the total take numbers (including PTS, TTS, and behavioral harassment) for stocks to their associated abundance estimates to evaluate the magnitude of impacts across the stock and to individuals. Specifically, when an abundance percentage comparison is below 100, it means that that percentage or less of the individuals in the stock will be affected (*i.e.,* some individuals will not be taken at all), that the average for those taken is one day per year, and that we would not expect any individuals to be taken more than a few times in a year. When it is more than 100 percent, it means there will definitely be some number of repeated takes of individuals. For example, if the percentage is 300, the average would be each individual is taken on three days in a year if all were taken, but it is more likely that some number of individuals will be taken more than three times and some number of individuals fewer or not at all. While it is not possible to know the maximum number of days across which individuals of a stock might be taken, in acknowledgement of the fact that it is more than the average, for the purposes of this analysis, we assume a number approaching twice the average. For example, if the percentage of take compared to the abundance is 800, we estimate that some individuals might be taken as many as 16 times. Those comparisons are included in the sections below. For some stocks these numbers have been adjusted slightly (with these adjustments being in the single digits) since the proposed rule so as to more consistently apply this approach, but these minor changes did not change the analysis or findings.

To assist in understanding what this analysis means, we clarify a few issues related to estimated takes and the analysis here. An individual that incurs a PTS or TTS take may sometimes, for example, also be behaviorally disturbed at the same time. As described in more detail previously, the degree of PTS, and the degree and duration of TTS, expected to be incurred from the Navy's activities are not expected to impact marine mammals such that their reproduction or survival could be affected. Similarly, data do not suggest that a single instance in which an animal accrues PTS or TTS and is also behaviorally harassed would result in impacts to reproduction or survival. Alternately, we recognize that if an individual is behaviorally harassed repeatedly for a longer duration and on consecutive days, effects could accrue to the point that reproductive success is jeopardized (as discussed below in the stock-specific conclusions). Accordingly, as described in the previous paragraph, in analyzing the number of takes and the likelihood of repeated and sequential takes (which could accrue to reproductive impacts), we consider the total takes, not just the behavioral harassment takes, so that individuals exposed to both TS and behavioral harassment are appropriately considered. We note that the same logic applies with the potential addition of behavioral harassment to tissue damage from explosives, the difference being that we do already consider the likelihood of reproductive impacts whenever tissue damage occurs. Further, the number of level A harassment takes by either PTS or tissue damage are so low compared to abundance numbers that it is considered highly unlikely that any individual would be taken at those levels more than once.

Use of sonar and other transducers would typically be transient and temporary. The majority of acoustic effects to mysticetes from sonar and other active sound sources during testing and training activities would be primarily from ASW events. It is important to note that although ASW is one of the warfare areas of focus during MTEs, there are significant periods when active ASW sonars are not in use. Nevertheless, behavioral reactions are assumed more likely to be significant during MTEs than during other ASW activities due to the duration (*i.e.,* multiple days) and scale (*i.e.,* multiple sonar platforms) of the MTEs. On the less severe end, exposure to comparatively lower levels of sound at a detectably greater distance from the animal, for a few or several minutes, could result in a behavioral response such as avoiding an area that an animal would otherwise have moved through or fed in, or breaking off one or a few feeding bouts. More severe behavioral effects could occur when an animal gets close enough to the source to receive a comparatively higher level of sound, is exposed continuously to one source for a longer time, or is exposed intermittently to different sources throughout a day. Such effects might result in an animal having a more severe flight response and leaving a larger area for a day or more, or potentially losing feeding opportunities for a day. However, such severe behavioral effects are expected to occur infrequently.

Occasional, milder behavioral reactions are unlikely to cause long-term consequences for individual animals or populations, and even if some smaller subset of the takes are in the form of a longer (several hours or a day) and more severe responses, if they are not expected to be repeated over sequential days, impacts to individual fitness are not anticipated. Nearly all studies and experts agree that infrequent exposures of a single day or less are unlikely to impact an individual's overall energy budget (Farmer *et al.,* 2018; Harris e*t al.,* 2017; King *et al.,* 2015; NAS 2017; New *et al.,* 2014; Southall *et al.,* 2007; Villegas-Amtmann *et al.,* 2015). When impacts to individuals increase in magnitude or severity such that either repeated and sequential higher severity impacts occur (the probability of this goes up for an individual the higher total number of takes it has) or the total number of moderate to more severe impacts increases substantially, especially if occurring across sequential days, then it becomes more likely that the aggregate effects could potentially interfere with feeding enough to reduce energy budgets in a manner that could impact reproductive success via longer cow-calf intervals, terminated pregnancies, or calf mortality. It is important to note that these impacts only accrue to females, which only comprise a portion of the population (typically approximately 50 percent). Based on energetic models, it takes energetic impacts of a significantly greater magnitude to cause the death of an adult marine mammal, and females will always terminate a pregnancy or stop lactating before allowing their health to deteriorate. Also, the death of an adult female has significantly more impact on population growth rates than reductions in reproductive success, and death of males has very little effect on population growth rates. However, as explained earlier, such severe impacts from the Navy's activities would be very infrequent and not likely to occur at all for most species and stocks. Even for those species or stocks where it is possible for a small number of females to experience reproductive effects, we explain below why there still will be no effect on rates of recruitment or survival.

The analyses below in some cases address species collectively if they occupy the same functional hearing group (*i.e.,* low, mid, and high-frequency cetaceans and pinnipeds in water), share similar life history strategies, and/or are known to behaviorally respond similarly to acoustic stressors. Because some of these groups or species share characteristics that inform the impact analysis similarly, it would be duplicative to repeat the same analysis for each species or stock. In addition, animals belonging to each stock within a species typically have the same hearing capabilities and behaviorally respond in the same manner as animals in other stocks within the species. Thus, our analysis below considers the effects of Navy's activities on each affected stock even where discussion is organized by functional hearing group and/or information is evaluated at the species level. Where there are meaningful differences between stocks within a species that would further differentiate the analysis (*e.g.,* the status of the stock or mitigation related to biologically important areas for the stock), they are either described within the section or the discussion for those species or stocks is included as a separate subsection. Specifically below, we first give broad descriptions of the mysticete, odontocete, and pinniped groups and then differentiate into further groups as appropriate.

Mysticetes

This section builds on the broader discussion above and brings together the discussion of the different types and amounts of take that different stocks will incur, the applicable mitigation for each stock, and the status of the stocks to support the negligible impact determinations for each stock. We have already described above why we believe the incremental addition of the small number of low-level PTS takes will not have any meaningful effect towards inhibiting reproduction or survival. We have also described (above in this section and in the proposed rule, respectively, with no new applicable information received since publication of the proposed rule) the unlikelihood of any masking or habitat impacts having effects that would impact the reproduction or survival of any of the individual marine mammals affected by the Navy's activities. For mysticetes, there is no predicted tissue damage from explosives for any stock. Much of the discussion below focuses on the behavioral effects and the mitigation measures that reduce the probability or severity of effects in biologically important areas. Because there are multiple stock-specific factors in relation to the status of the species, as well as mortality take for several stocks, at the end of the section we break out our findings for most stocks on a stock-specific basis, however we do consider five of the stocks in Hawaii with low-level impacts together.

In Table 71 and Table 72 below, for mysticetes, we indicate the total annual mortality, Level A and Level B harassment, and a number indicating the instances of total take as a percentage of abundance.

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Table 71. Annual takes of Level B and Level A harassment, mortality for mysticetes in the HRC portion of the HSTT Study Area and number indicating the instances of total take as a percentage of stock abundance.

		Instances of indicated types of incidental take (not all takes represent separate individuals, especially for disturbance)										
		Level B Harassment		Level A Harassment		Mortality	Total Takes		Abundance		Instance of total take as percent of abundance	
Species	Stock	Behavioral Disturbance	TTS (may also include disturbance)	PTS	Tissue Damage		TOTAL TAKES (entire Study Area)	Takes (within NAVY EEZ)	Total Navy Abundance in and out EEZ (HRC)	Within Navy EEZ Abundance HRC	Total take as percentage of total Navy abundance (HRC)	EEZ take as percentage of EEZ abundance (HRC)
Blue whale	Central North Pacific	15	33	0	0	0	48	40	43	33	112	121
Bryde's whale	Hawaii	40	106	0	0	0	146	123	108	89	135	138
Fin whale	Hawaii	21	27	0	0	0	48	41	52	40	92	103
Humpback whale	Central North Pacific	2837	6289	3	0	0.4	9129	7389	5078	4595	180	161
Minke whale	Hawaii	1233	3697	2	0	0	4932	4030	3652	2835	135	142
Sei whale	Hawaii	46	121	0	0	0	167	135	138	107	121	126

Note: For the HI take estimates, we compare predicted takes to abundance estimates generated from the same underlying density estimates, both in and outside of the U.S. EEZ. Because the portion of the Navy's study area inside the U.S. EEZ is generally concomitant with the area used to generate the abundance estimates in the SARs, and the abundance predicted by the same underlying density estimates is the preferred abundance to use, there is no need to separately compare the take to the SARs abundance estimate.

Table 72. Annual takes of Level B and Level A harassment, mortality for mysticetes in the SOCAL portion of the HSTT Study Area and number indicating the instances of total take as a percentage of stock abundance.

		Instances of indicated types of incidental take (not all takes represent separate individuals, especially for disturbance)									
		Level B Harassment		Level A Harassment			Total Takes	Abundance		Instance of total take as percent of abundance	
Species	Stock	Behavioral Disturbance	TTS (may also include disturbance)	PTS	Tissue Damage	Mortality	TOTAL TAKES (entire Study Area)	NAVY abundance in Action Area SOCAL	NMFS SARS	Total take as percentage of total Navy abundance in Action Area	Total take as percentage of total SAR abundance
Blue whale	Eastern North Pacific	792	1196	1	0	0.2	1989	785	1647	253	121
Bryde's whale	Eastern Tropical Pacific	14	27	0	0	0	41	1.3	unknown	3154	unknown
Fin whale	CA/OR/WA	835	1390	1	0	0.4	2226	363	9029	613	25
Humpback whale	CA/OR/WA	480	1514	1	0	0.2	1995	247	1918	808	104
Minke whale	CA/OR/WA	259	666	1	0	0	926	163	636	568	146
Sei whale	Eastern North Pacific	27	52	0	0	0	79	3	519	2633	15
Gray whale	Eastern North Pacific	1316	3355	7	0	0.4	4678	193	20990	2424	22
Gray whale	Western North Pacific	2	4	0	0	0	6	0	140	0	4

Note: For the SOCAL take estimates, because of the manner in which the Navy study area overlaps the ranges of many MMPA stocks (*i.e.*, a stock may range far north to Washington state and beyond and abundance may only be predicted within the U.S. EEZ, while the Navy study area is limited to Southern California and northern Mexico, but extends beyond the U.S. EEZ), we compare predicted takes to both the abundance estimates for the study area, as well as the SARs.

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The majority of takes by harassment of mysticetes in the HSTT Study Area are caused by sources from the MF1 active sonar bin (which includes hull-mounted sonar) because they are high level, narrowband sources in the 1–10 kHz range, which intersect what is estimated to be the most sensitive area of hearing for mysticetes. They also are used in a large portion of exercises (see Table 1.5–5 in the Navy's application). Most of the takes (62 percent) from the MF1 bin in the HSTT Study Area would result from received levels between 154 and 172 dB SPL, while another 35 percent would result from exposure between 172 and 178 dB SPL. For the remaining active sonar bin types, the percentages are as follows: LF3 = 96 percent between 142 and 160 dB SPL, LF5 = 98 percent between 100 and 130 dB SPL, MF4 = 98 percent between 136 and 154 dB SPL, MF5 = 97 percent between 118 and 142 dB SPL, and HF4 = 98 percent between 100 and 148 dB SPL. These values may be derived from the information in Tables 6.4–8 through 6.4–12 in the Navy's rulemaking/LOA application (though they were provided directly to NMFS upon request). For mysticetes, explosive training and testing activities do not result in any Level B behavioral harassment, PTS from explosives is fewer than 3 for every stock, and the TTS takes from explosives comprise a small fraction (approximately 1–10 percent) of those caused by exposure to active sonar. There are only two Level B harassment takes of mysticetes by pile driving and airguns each, one gray whale and one blue whale for each activity type. Based on this information, the majority of the Level B behavioral harassment is expected to be of low to sometimes moderate severity and of a relatively shorter duration.

Research and observations show that if mysticetes are exposed to sonar or other active acoustic sources they may react in a number of ways depending on the characteristics of the sound source, their experience with the sound source, and whether they are migrating or on seasonal feeding or breeding grounds. Behavioral reactions may include alerting, breaking off feeding dives and surfacing, diving or swimming away, or no response at all (DOD, 2017; Nowacek, 2007; Richardson, 1995; Southall *et al.,* 2007). Overall, mysticetes have been observed to be more reactive to acoustic disturbance when a noise source is located directly on their migration route. Mysticetes disturbed while migrating could pause their migration or route around the disturbance, while males en route to breeding grounds have been shown to be less responsive to disturbances. Although some may pause temporarily, they will resume migration shortly after the exposure ends. Animals disturbed while engaged in other activities such as feeding or reproductive behaviors may be more likely to ignore or tolerate the disturbance and continue their natural behavior patterns. Alternately, adult females with calves may be more responsive to stressors. As noted in the *Potential Effects of Specified Activities on Marine Mammals and Their Habitat* section, there are multiple examples from behavioral response studies of odontocetes ceasing their feeding dives when exposed to sonar pulses at certain levels, but alternately, blue whales were less likely to show a visible response to sonar exposures at certain levels when feeding than when traveling. However, Goldbogen *et al.* (2013) indicated some horizontal displacement of deep foraging blue whales in response to simulated MFA sonar. Most Level B behavioral harassment of mysticetes is likely to be short-term and low to moderate severity, with no anticipated effect on reproduction or survival from Level B harassment.

Richardson *et al.* (1995) noted that avoidance (temporary displacement of an individual from an area) reactions are the most obvious manifestations of disturbance in marine mammals. Avoidance is qualitatively different from the startle or flight response, but also differs in the magnitude of the response (*i.e.,* directed movement, rate of travel, etc.). Oftentimes avoidance is temporary, and animals return to the area once the noise has ceased. Some mysticetes may avoid larger activities such as a MTE as it moves through an area, although these activities do not typically use the same training locations day-after-day during multi-day activities, except periodically in instrumented ranges. Therefore, displaced animals could return quickly after the MTE finishes. Due to the limited number and geographic scope of MTEs, it is unlikely that most mysticetes would encounter a major training exercise more than once per year and additionally, total hull-mounted sonar hours are limited in several areas that are important to mysticetes (described below). In the ocean, the use of sonar and other active acoustic sources is transient and is unlikely to expose the same population of animals repeatedly over a short period of time, especially given the broader-scale movements of mysticetes.

The implementation of procedural mitigation and the sightability of mysticetes (due to their large size) further reduces the potential for a significant behavioral reaction or a threshold shift to occur (*i.e.,* shutdowns are expected to be successfully implemented), though we have analyzed the impacts that are anticipated to occur and that we are therefore authorizing.

As noted previously, when an animal incurs a threshold shift, it occurs in the frequency from that of the source up to one octave above. This means that the vast majority of threshold shifts caused by Navy sonar sources will typically occur in the range of 2–20 kHz (from the 1–10 kHz MF1 bin, though in a specific narrow band within this range as the sources are narrowband), and if resulting from hull-mounted sonar, will be in the range of 3.5–7 kHz. The majority of mysticete vocalizations occur in frequencies below 1 kHz, which means that TTS incurred by mysticetes will not interfere with conspecific communication. Additionally, many of the other critical sounds that serve as cues for navigation and prey (*e.g.,* waves, fish, invertebrates) occur below a few kHz, which means that detection of these signals will not be inhibited by most threshold shift either. When we look in ocean areas where the Navy has been intensively training and testing with sonar and other active acoustic sources for decades, there is no data suggesting any long-term consequences to reproduction or survival rates of mysticetes from exposure to sonar and other active acoustic sources.

The Navy will also limit activities and employ other measures in mitigation areas that will avoid or reduce impacts to mysticetes and where BIAs for large whales have been identified in the HSTT Study Area.

In the SOCAL portion of the HSTT Study Area, the Navy will implement the San Diego Arc, San Nicolas Island, and Santa Monica/Long Beach Mitigation Areas from June 1 through October 31, which will reduce impacts primarily to blue whales, but also potentially gray whales and fin whales. These mitigation areas fully overlap the three associated blue whale Feeding Areas (all three of which are BIAs) in the HSTT Study Area both temporally and spatially (see also the HSTT FEIS/OEIS Appendix K (Geographic Mitigation Assessment), Section K.4); only the Tanner-Cortes Bank BIA is not included for practicability reasons discussed previously. Within these three Mitigation Areas, the Navy will not exceed 200 hrs of MFAS sensor MF1 use (with the exception of active sonar maintenance and systems checks) in all three of the areas combined, annually, and will not use explosives during large-caliber gunnery, torpedo, bombing, and missile (including 2.75-inch (in) rockets) activities during training (or for mine warfare in the San Nicolas and Santa Monica areas).

In addition, the Navy will implement the year-round Santa Barbara Island Mitigation Area, which encompasses the portion of the Channel Islands NMS that overlaps with the HSTT Study Area. The Navy will not use MFAS sensor MF1 surface hull-mounted sonar or explosives used in gunnery (all calibers), torpedo, bombing, and missile exercises (including 2.75-in rockets) during training. This Mitigation area overlaps a blue whale feeding BIA and also the Channel Islands NMS is consider a highly productive and diverse area of high-value habitat that is more typically free of anthropogenic stressors, and, therefore, limiting activities in this area is considered habitat protection for the myriad marine mammal species that use it or may pass through the area.

In the HRC portion of the HSTT Study Area, the Navy will implement the 4-Islands Region Mitigation Area, which is expected to reduce impacts to humpback whales (during an important breeding/calving time period), as well as the Main Hawaiian Island Insular stock of false killer whale, monk seals, and several dolphin species. In this area, the Navy will not use MFAS sensor MF1 during training or testing activities from November 15 through April 15 nor will the Navy use any explosives throughout the year that could potentially result in takes of marine mammals. Since 2009, the Navy has adhered to a Humpback Whale Cautionary Area as a mitigation area within the Hawaiian Islands Humpback Whale NMS, an area identified as having one of the highest concentrations of humpback whales, with calves, during the critical winter months. As added protection, the Navy has expanded the size and extended the season of the current Humpback Whale Cautionary Area, renaming this area the 4-Islands Region Mitigation Area to reflect the benefits afforded to multiple species. The season is currently between December 15 and April 15 and the Navy has extended it from November 15 through April 15 for the purposes of this mitigation because the peak humpback whale season has expanded. The size of the 4-Islands Region Mitigation Area has also expanded since the last HSTT regulation to include an area north of Maui and Molokai and overlaps an area identified as a BIA for the endangered Main Hawaiian Islands insular false killer whales (Baird *et al.,* 2015; Van Parijs, 2015) (see Figure 5.4–3, in Chapter 5 Mitigation Areas for Marine Mammals in the Hawaii Range Complex of the HSTT FEIS/OEIS).

Within the 4-Islands Region Mitigation Area is the Hawaiian Islands Humpback Whale Reproduction Area BIA (4-Islands Region and Penguin Bank). The use of sonar and other transducers primarily occur farther offshore than the delineated boundaries of the Hawaiian Islands Humpback Whale Reproduction Area BIA. Explosive events are typically conducted in areas that are designated for explosive use, which are areas outside of the Hawaiian Islands Humpback Whale Reproduction Area BIA.

The restrictions on MFAS sensor MF1 in this area and the fact that the Navy does not plan to use any explosives in this area mean that the number of takes of humpback whales will be lessened, as will their potential severity, in that the Navy is avoiding exposures in an area and time where the takes would be more likely to interfere with cow/calf communication or result in potentially heightened impacts on sensitive or naïve individuals (calves).

The Navy is also implementing the Hawaii Island Mitigation Area. The Hawaii Island Mitigation Area is effective year-round and the Navy will not use more than 300 hrs of MFAS sensory MF1 and will not exceed 20 hrs of MFAS sensory MF4. Also within the Hawaii Island Mitigation Area, the Navy will not use any explosives (*e.g.,* surface-to-surface or air-to-surface missile and gunnery events, BOMBEX, and mine neutralization) during testing and training year-round. Of note here, this measure would provide additional protection in this important reproductive area for humpback whales, reducing impacts in an area and time where impacts would likely be more severe if incurred. Separately (and addressed more later), these protected areas also reduce impacts for identified biologically important areas for endangered Main Hawaiian Islands insular false killer whales, two species of beaked whales (Cuvier and Blainville's), dwarf sperm whale, pygmy killer whale, melon-headed whale, short-finned pilot whale, and several small resident populations of dolphins (Baird *et al.,* 2015; Van Parijs, 2015).

The 4-Islands Region Mitigation Area and the Hawaii Island Mitigation Area both also overlap with portions (approximately 55 percent) of the Hawaiian Islands Humpback Whale NMS. The Navy will continue to issue an annual humpback whale awareness notification message to remind ships and aircraft to be extra vigilant during times of high densities of humpback whales while in transit and to maintain certain distances from animals during the operation of ships and aircraft.

Below we compile and summarize the information that supports our determination that the Navy's activities will not adversely impact rates of recruitment or survival for any of the affected mysticete stocks:

Blue Whale (Eastern North Pacific stock)—The SAR identifies this stock as ''stable'' even though the larger species is listed as endangered under the ESA. We further note that this stock was originally listed under the ESA as a result of the impacts from commercial whaling, which is no longer affecting the species. As discussed above, both the abundance and PBR are likely underestimated to some degree in the SAR. NMFS will authorize one mortality over the five years covered by this rule, or 0.2 mortality annually. With the addition of this 0.2 annual mortality, residual PBR is exceeded, resulting in the total human-caused mortality exceeding PBR by 16.9. However, as described in more detail above in the *Serious Injury and Mortality* subsection, when total human-caused mortality exceeds PBR, we consider whether the incremental addition of a small amount of authorized mortality from the specified activity may still result in a negligible impact, in part by identifying whether it is less than 10 percent of PBR. In this case, the authorized mortality is well below 10 percent of PBR, management measures are in place to reduce mortality from other sources, and the incremental addition of a single mortality over the course of the five-year Navy rule is not expected to, alone, lead to adverse impacts on the stock through effects on annual rates of recruitment or survival.

Regarding the magnitude of Level B harassment takes (TTS and behavioral disruption), the number of estimated total instances of take compared to the abundance (measured against both the Navy-estimated abundance and the SAR) is 253 and 121 percent, respectively (Table 72). Given the range of blue whales, this information suggests that only some portion of individuals in the stock are likely impacted, but that there will likely be some repeat exposure (maybe 5 or 6 days within a year) of some subset of individuals that spend extended time within the SOCAL Range. Regarding the severity of those individual takes by Level B behavioral harassment, we have explained that the duration of any exposure is expected to be between minutes and hours (*i.e.,* relatively short) and the received sound levels largely below 172 dB with a portion up to 178 dB (*i.e.,* of a moderate or lower level, less likely to evoke a severe response). Additionally, the Navy implements time/area mitigation in SOCAL in the majority of the BIAs, which will reduce the severity of impacts to blue whales by reducing interference in feeding that could result in lost feeding opportunities or necessitate additional energy expenditure to find other good opportunities. Regarding the severity of TTS takes, we have explained that they are expected to be low-level, of short duration, and mostly not in a frequency band that would be expected to interfere with blue whale communication or other important low-frequency cues—and that the associated lost opportunities and capabilities are not at a level that would impact reproduction or survival. For similar reasons (described above) the single estimated Level A harassment take by PTS for this stock is unlikely to have any effect on the reproduction or survival of that one individual, even if it were to be experienced by an animal that also experiences one or more Level B harassment behavioral disruptions.

Altogether, only a small portion of the stock is impacted and any individual blue whale is likely to be disturbed at a low-moderate level, with likely many animals exposed only once or twice and a subset potentially disturbed across five or six days, but minimized in biologically important areas. This low magnitude and severity of harassment effects is not expected to result in impacts on the reproduction or survival of any individuals and, therefore, when combined with the authorized mortality (which our earlier analysis indicated would not, alone, have more than a negligible impact on this stock of blue whales), the total take is not expected to adversely affect this stock through impacts on annual rates of recruitment or survival. For these reasons, we have determined, in consideration of all of the effects of the Navy's activities combined, that the authorized take will have a negligible impact on the Eastern North Pacific stock of blue whales.

Bryde's whale (Eastern Tropical Pacific stock)—Little is known about this stock, or its status, and it is not listed under the ESA. No mortality or Level A harassment is anticipated or authorized. Regarding the magnitude of Level B harassment takes (TTS and behavioral disruption), the number of estimated total instances of take compared to the abundance is 3,154 percent, however, the abundance upon which this percentage is based (1.3 whales from the Navy estimate, which is extrapolated from density estimates based on very few sightings) is clearly erroneous and the SAR does not include an abundance estimate because all of the survey data is outdated (Table 72). However, the abundance in the early 1980s was estimated as 22,000 to 24,000, a portion of the stock was estimated at 13,000 in 1993, and the minimum number in the Gulf of California was estimated at 160 in 1990. Given this information and the fact that 41 total takes of Bryde's whales were estimated, this information suggests that only a small portion of the individuals in the stock are likely impacted, and few, if any, are likely taken over more than one day. Regarding the severity of those individual takes by Level B behavioral harassment, we have explained that the duration of any exposure is expected to be between minutes and hours (*i.e.,* relatively short) and the received sound levels largely below 172 dB with a portion up to 178 dB (*i.e.,* of a moderate or lower level, less likely to evoke a severe response). Regarding the severity of TTS takes, we have explained that they are expected to be low-level, of short duration, and mostly not in a frequency band that would be expected to interfere with Bryde's whale communication or other important low-frequency cues. Any associated lost opportunities and capabilities are not at a level that would impact reproduction or survival.

Altogether, only a small portion of the stock is impacted and any individual Bryde's whale is likely to be disturbed at a low-moderate level, with few, if any, individuals exposed over more than one day in the year. This low magnitude and severity of harassment effects is not expected to result in impacts on individual reproduction or survival, much less annual rates of recruitment or survival. For these reasons, we have determined, in consideration of all of the effects of the Navy's activities combined, that the authorized take will have a negligible impact on the Eastern Tropical Pacific stock of Bryde's whales.

Fin whale (CA/OR/WA stock)—The SAR identifies this stock as ''increasing,'' even though the larger species is listed as endangered under the ESA. NMFS will authorize two mortalities over the five years covered by this rule, or 0.4 mortality annually. The addition of this 0.4 annual mortality still leaves the total human-caused mortality well under residual PBR.

Regarding the magnitude of Level B harassment takes (TTS and behavioral disruption), the number of estimated total instances of take compared to the abundance (measured against both the Navy-estimated abundance and the SAR) is 613 and 25 percent, respectively (Table 72). This information suggests that only some portion (less than 25 percent) of individuals in the stock are likely impacted, but that there is likely some repeat exposure (perhaps up to 12 days within a year) of some subset of individuals that spend extended time within the SOCAL complex. Some of these takes could occur on a few sequential days for some small number of individuals, for example, if they resulted from a multi-day exercise on a range while individuals were in the area for multiple days feeding. Regarding the severity of those individual takes by Level B behavioral harassment, we have explained that the duration of any exposure is expected to be between minutes and hours (*i.e.,* relatively short) and the received sound levels largely below 172 dB with a portion up to 178 dB (*i.e.,* of a moderate or lower level, less likely to evoke a severe response). Additionally, while there are no designated BIAs for fin whales in the SOCAL range, the Navy implements time/area mitigation in SOCAL in blue whale BIAs, and fin whales are known to sometimes feed in some of the same areas, which means they could potentially accrue some benefits from the mitigation. Regarding the severity of TTS takes, we have explained that they are expected to be low-level, of short duration, and mostly not in a frequency band that would be expected to interfere with fin whale communication or other important low-frequency cues—and that the associated lost opportunities and capabilities are not at a level that would impact reproduction or survival. For similar reasons (described above) the single estimated Level A harassment take by PTS for this stock is unlikely to have any effects on the reproduction or survival of that one individual.

Altogether, this population is increasing, only a small portion of the stock is impacted, and any individual fin whale is likely to be disturbed at a low-moderate level, with the taken individuals likely exposed between one and twelve days, with a few individuals potentially taken on a few sequential days. This low magnitude and severity of harassment effects is not expected to result in impacts on individual reproduction or survival, nor are these harassment takes combined with the authorized mortality expected to adversely affect this stock through impacts on annual rates of recruitment or survival. For these reasons, we have determined, in consideration of all of the effects of the Navy's activities combined, that the authorized take will have a negligible impact on the CA/OR/WA stock of fin whales.

Humpback whale (CA/OR/WA stock)—The SAR identifies this stock as stable (having shown a long-term increase from 1990 and then leveling off between 2008 and 2014) and the individuals in this stock are associated with three DPSs, one of which is not listed under the ESA (Hawaii), one of which is designated as threatened (Mexico), and one of which is designated as endangered (Central America) (individuals encountered in the SOCAL portion of the HSTT Study Area are likely to come from the latter two). NMFS will authorize one mortality over the five years covered by this rule, or 0.2 mortality annually (Mexico DPS only). With the addition of this 0.2 annual mortality, the total human-caused mortality exceeds PBR by 7.56. However, as described in more detail above in the *Serious Injury and Mortality* subsection, when total human-caused mortality exceeds PBR, we consider whether the incremental addition of a small amount of authorized mortality from the specified activity may still result in a negligible impact, in part by identifying whether it is less than 10 percent of PBR, which is 33.4. In this case, the authorized mortality is well below 10 percent of PBR (less than one percent, in fact) and management measures are in place to reduce mortality from other sources. More importantly, as described above in *Serious Injury and Mortality,* the authorized mortality of 0.2 will not delay the time to recovery by more than 1 percent. Given these factors, the incremental addition of a single mortality over the course of the five-year Navy rule is not expected to, alone, lead to adverse impacts on the stock through effects on annual rates of recruitment or survival.

Regarding the magnitude of Level B harassment takes (TTS and behavioral disruption), the number of estimated total instances of take compared to the abundance (measured against both the Navy-estimated abundance and the SAR) is 808 and 104 percent, respectively (Table 72). Given the range of humpback whales, this information suggests that only some portion of individuals in the stock are likely impacted, but that there is likely some repeat exposure (maybe perhaps up to 16 days within a year) of some subset of individuals that spend extended time within the SOCAL complex. Regarding the severity of those individual takes by Level B behavioral harassment, we have explained that the duration of any exposure is expected to be between minutes and hours (*i.e.,* relatively short) and the received sound levels largely below 172 dB with a portion up to 178 dB (*i.e.,* of a moderate or lower level, less likely to evoke a severe response). Some of these takes could occur on several sequential days for some small number of individuals, for example, if they resulted from a multi-day exercise on a range while individuals were in the area for multiple days feeding, however, in these amounts it would still not be expected to adversely impact reproduction or survival of any individuals.

Regarding the severity of TTS takes, we have explained that they are expected to be low-level, of short duration, and mostly not in a frequency band that would be expected to interfere with humpback whale communication or other important low-frequency cues—and that the associated lost opportunities and capabilities are not at a level that would impact reproduction or survival. For similar reasons (described above) the single estimated Level A harassment take by PTS for this stock is unlikely to have any effects on the reproduction or survival of that one individual.

Altogether, only a small portion of the stock is impacted and any individual humpback whale is likely to be disturbed at a low-moderate level, with likely many animals exposed only once or twice and a subset potentially disturbed up to 16 days, but with no reason to think that more than a few of those days would be sequential. This low magnitude and severity of harassment effects is not expected to result in impacts on the reproduction or survival of any individuals and, therefore, when combined with the authorized mortality (which our earlier analysis indicated would not, alone, have more than a negligible impact on this stock of humpback whales), the total take is not expected to adversely affect this stock through impacts on annual rates of recruitment or survival. For these reasons, we have determined, in consideration of all of the effects of the Navy's activities combined, that the authorized take will have a negligible impact on the CA/OR/WA stock of humpback whales.

Minke whale (CA/OR/WA stock)—The status of this stock is unknown and it is not listed under the ESA. No mortality from vessel strike or tissue damage from explosive exposure is anticipated or authorized for this species. Regarding the magnitude of Level B harassment takes (TTS and behavioral disruption), the number of estimated total instances of take compared to the abundance (measured against both the Navy-estimated abundance and the SAR) is 568 and 146 percent, respectively (Table 72). Based on the behaviors of minke whales, which often occur along continental shelves and sometimes establish home ranges along the West Coast, this information suggests that only a portion of individuals in the stock are likely impacted, but that there is likely some repeat exposure (perhaps up to 11 days within a year) of some subset of individuals that spend extended time within the SOCAL complex. Some of these takes could occur on a few sequential days for some small number of individuals, for example, if they resulted from a multi-day exercise on a range while individuals were in the area for multiple days feeding. Regarding the severity of those individual takes by Level B behavioral harassment, we have explained that the duration of any exposure is expected to be between minutes and hours (*i.e.,* relatively short) and the received sound levels largely below 172 dB with a portion up to 178 dB (*i.e.,* of a moderate or lower level, less likely to evoke a severe response). Regarding the severity of TTS takes, we have explained that they are expected to be low-level, of short duration, and mostly not in a frequency band that would be expected to interfere with minke whale communication or other important low-frequency cues—and that the associated lost opportunities and capabilities are not at a level that would impact reproduction or survival. For similar reasons (described above) the single estimated Level A harassment take by PTS for this stock is unlikely to have any effects on the reproduction or survival of any individuals.

Altogether, only a portion of the stock is impacted and any individual minke whale is likely to be disturbed at a low-moderate level, with the taken individuals likely exposed between one and eleven days, with a few individuals potentially taken on a few sequential days. This low magnitude and severity of harassment effects is not expected to result in impacts on individual reproduction or survival, much less annual rates of recruitment or survival. For these reasons, we have determined, in consideration of all of the effects of the Navy's activities combined, that the authorized take will have a negligible impact on the CA/OR/WA stock of minke whales.

Sei whale (Eastern North Pacific stock)—The status of this stock is unknown and it is listed under the ESA. No mortality or Level A harassment is anticipated or authorized. Regarding the magnitude of Level B harassment takes (TTS and behavioral disruption), the number of estimated total instances of take compared to the abundance (measured against both the Navy-estimated abundance and the SAR) is 2,633 and 15 percent, respectively (Table 72), however, the abundance upon which the Navy percentage is based (3 from the Navy estimate, which is extrapolated from density estimates based on very few sightings) is likely an underestimate of the number of individuals in the HSTT study Area, resulting in an overestimated percentage. Nonetheless, even given this information and the large range of sei whales, and the fact that only 79 total Level B harassment takes of sei whales were estimated, it is likely that some very small number of sei whales is taken repeatedly, potentially up to 15 days in a year (typically 2,633 percent would lead to the estimate of 52 days/year, however, given that there are only 79 sei whale total takes, we used the conservative assumption that five individuals might be taken up to 15 times, with the few remaining takes distributed among other individuals). Regarding the severity of those individual takes by Level B behavioral harassment, we have explained that the duration of any exposure is expected to be between minutes and hours (*i.e.,* relatively short) and the received sound levels largely below 172 dB with a portion up to 178 dB (*i.e.,* of a moderate or lower level, less likely to evoke a severe response). Some of these takes could occur on a few sequential days for some small number of individuals, for example, if they resulted from a multi-day exercise on a range while individuals were in the area for multiple days feeding, however, in these amounts it would still not be expected to adversely impact reproduction or survival of any individuals. Regarding the severity of TTS takes, we have explained that they are expected to be low-level, of short duration, and mostly not in a frequency band that would be expected to interfere with sei whale communication or other important low-frequency cues—and that the associated lost opportunities and capabilities are not at a level that would impact reproduction or survival.

Altogether, only a small portion of the stock is impacted and any individual sei whale is likely to be disturbed at a low-moderate level, with only a few individuals exposed over one to 15 days in a year, with no more than a few sequential days. This low magnitude and severity of harassment effects is not expected to result in impacts on individual reproduction or survival, much less annual rates of recruitment or survival. For these reasons, we have determined, in consideration of all of the effects of the Navy's activities combined, that the authorized take will have a negligible impact on the Eastern North Pacific stock of sei whales.

Gray whale (Eastern North Pacific stock)—The SAR identifies this stock as ''increasing'' and the species is not listed under the ESA. NMFS will authorize two mortalities over the five years covered by this rule, or 0.4 mortality annually. The addition of this 0.4 annual mortality still leaves the total human-caused mortality well under the insignificance threshold of residual PBR.

Regarding the magnitude of Level B harassment takes (TTS and behavioral disruption), the number of estimated total instances of take compared to the abundance (measured against both the Navy-estimated abundance and the SAR) is 2,424 and 22 percent, respectively (Table 72). This information suggests that only some small portion of individuals in the stock are likely impacted (less than 22 percent), but that there is likely some level of repeat exposure of some subset of individuals that spend extended time within the SOCAL complex. Typically 2,424 percent would lead to the estimate of 48 days/year, however, given that a large number of gray whales are known to migrate through the SOCAL complex and the fact that there are only 4,678 total takes, we believe that it is more likely that a large number of individuals are taken one to a few times, while a small number staying in an area to feed for several days may be taken on 5–10 days. Regarding the severity of those individual takes by Level B behavioral harassment, we have explained that the duration of any exposure is expected to be between minutes and hours (*i.e.,* relatively short) and the received sound levels largely below 172 dB with a portion up to 178 dB (*i.e.,* of a moderate or lower level, less likely to evoke a severe response). Some of these takes could occur on a couple of sequential days for some small number of individuals, however, in these amounts it would still not be expected to adversely impact reproduction or survival of any individuals.

Regarding the severity of TTS takes, we have explained that they are expected to be low-level, of short duration, and mostly not in a frequency band that would be expected to interfere with gray whale communication or other important low-frequency cues and that the associated lost opportunities and capabilities are not at a level that would impact reproduction or survival. For these same reasons (low level and frequency band), while a small permanent loss of hearing sensitivity may include some degree of energetic costs for compensating or may mean some small loss of opportunities or detection capabilities, at the expected scale the 7 estimated Level A harassment takes by PTS for gray whales would be unlikely to impact behaviors, opportunities, or detection capabilities to a degree that would interfere with reproductive success or survival of any individuals.

Altogether, gray whales are not endangered or threatened under the ESA and the Eastern North Pacific stock is increasing. Only a small portion of the stock is impacted and any individual gray whale is likely to be disturbed at a low-moderate level, with likely many animals exposed only once or twice and a subset potentially disturbed across five to ten days. This low magnitude and severity of harassment effects is not expected to result in impacts to reproduction or survival for any individuals and nor are these harassment takes combined with the authorized mortality of two whales over the five year period expected to adversely affect this stock through impacts on annual rates of recruitment or survival. For these reasons, we have determined, in consideration of all of the effects of the Navy's activities combined, that the authorized take will have a negligible impact on the Eastern North Pacific stock of gray whales.

Gray whale (Western North Pacific stock)—The Western North Pacific stock of gray whales is considered ''increasing,'' but is listed as endangered under the ESA. No mortality or Level A harassment is anticipated or authorized. This stock is expected and authorized to incur the very small number of 6 Level B harassment takes (2 behavioral and 4 TTS) to a stock with a SAR-estimated abundance of 140. These takes will likely accrue to different individuals, the behavioral disturbances will be of a low-moderate level, and the TTS instances will be at a low level and short duration. This low magnitude and severity of harassment effects is not expected to result in impacts on individual reproduction or survival, much less to adversely affect this stock through impacts on annual rates of recruitment or survival. For these reasons, we have determined, in consideration of all of the effects of the Navy's activities combined, that the authorized take will have a negligible impact on the Western North Pacific stock of gray whales.

Humpback whale (Central North Pacific stock)—The SAR identifies this stock as ''increasing'' and the DPS is not listed under the ESA. No Level A harassment by tissue damage is authorized. NMFS will authorize two mortalities over the five years covered by this rule, or 0.4 mortalities annually. The addition of this 0.4 annual mortality still leaves the total human-caused mortality well under the insignificance threshold for residual PBR.

Regarding the magnitude of Level B harassment takes (TTS and behavioral disruption), the number of estimated instances of take compared to the abundance, both throughout the HSTT Study Area and within the U.S. EEZ, respectively, is 180 and 161 percent (Table 71). This information and the complicated far-ranging nature of the stock structure suggests that some portion of the stock (but not all) are likely impacted, over one to several days per year, with little likelihood of take across sequential days. Regarding the severity of those individual takes by Level B behavioral harassment, we have explained that the duration of any exposure is expected to be between minutes and hours (*i.e.,* relatively short) and the received sound levels largely below 172 dB with a portion up to 178 dB (*i.e.,* of a moderate or lower level, less likely to evoke a severe response). Additionally, as noted above, there are two mitigation areas implemented by the Navy that span a large area of this important humpback reproductive area (BIA) and minimize impacts by limiting the use of MF1 active sonar and explosives, thereby reducing both the number and severity of takes of humpback whales. Regarding the severity of TTS takes, we have explained that they are expected to be low-level, of short duration, and mostly not in a frequency band that would be expected to interfere with humpback whale communication or other important low-frequency cues, and that the associated lost opportunities and capabilities are not at a level that would impact reproduction or survival. For these same reasons (low level and frequency band), while a small permanent loss of hearing sensitivity may include some degree of energetic costs for compensating or may mean some small loss of opportunities or detection capabilities, at the expected scale the 3 estimated Level A harassment takes by PTS for humpback whales would be unlikely to impact behaviors, opportunities, or detection capabilities to a degree that would interfere with reproductive success or survival of any individuals.

Altogether, this stock is increasing and the DPS is not listed as endangered or threatened under the ESA. Only a small portion of the stock is impacted and any individual humpback whale is likely to be disturbed at a low-moderate level, with the taken individuals likely exposed between one and twelve days, with a few individuals potentially taken on a few sequential days. This low magnitude and severity of harassment effects is not expected to result in impacts on individual reproduction or survival, nor are these harassment takes combined with the authorized mortality expected to adversely affect this stock through effects on annual rates of recruitment or survival. For these reasons, we have determined, in consideration of all of the effects of the Navy's activities combined, that the authorized take will have a negligible impact on the Central North Pacific stock of humpback whales.

Blue whale (Central North Pacific stock) and the Hawaii stocks of Bryde's whale, Fin whale, Minke whale, and Sei whale—The status of these stocks are not identified in the SARs. Blue whale (Central North Pacific stock) and the Hawaii stocks of fin whale and sei whale are listed as endangered under the ESA; the Hawaii stocks of minke whales and Bryde's whales are not listed under the ESA. No mortality or Level A harassment by tissue damage is anticipated or authorized for any of these stocks.

Regarding the magnitude of Level B harassment takes (TTS and behavioral disruption), the number of estimated instances of take compared to the abundance, both throughout the HSTT Study Area and within the U.S. EEZ, respectively, is 92–135 and 103–142 percent (Table 71). This information suggests that some portion of the stocks (but not all) are likely impacted, over one to several days per year, with little likelihood of take across sequential days. Regarding the severity of those individual takes by Level B behavioral harassment, we have explained that the duration of any exposure is expected to be between minutes and hours (*i.e.,* relatively short) and the received sound levels largely below 172 dB with a portion up to 178 dB (*i.e.,* of a moderate or lower level, less likely to evoke a severe response). Regarding the severity of TTS takes, we have explained that they are expected to be low-level, of short duration, and mostly not in a frequency band that would be expected to interfere with mysticete communication or other important low-frequency cues—and that the associated lost opportunities and capabilities are not at a level that would impact reproduction or survival. For similar reasons (described above) the two estimated Level A harassment takes by PTS for the Hawaii stock of minke whales are unlikely to have any effects on the reproduction or survival of any individuals.

Altogether, only a portion of these stocks are impacted and any individuals of these stocks are likely to be disturbed at a low-moderate level, with the taken individuals likely exposed between one and several days, with little chance that any are taken across sequential days. This low magnitude and severity of harassment effects is not expected to result in impacts on individual reproduction or survival, much less impacts on annual rates of recruitment or survival. For these reasons, we have determined, in consideration of all of the effects of the Navy's activities combined, that the authorized take will have a negligible impact on these stocks.

Odontocetes

This section builds on the broader discussion above and brings together the discussion of the different types and amounts of take that different stocks will incur, the applicable mitigation for each stock, and the status of the stocks to support the negligible impact determinations for each stock. We have previously described (above in this section and in the proposed rule, respectively, with no new applicable information received since publication of the proposed rule) the unlikelihood of any masking or habitat impacts having effects that would impact the reproduction or survival of any of the individual marine mammals affected by the Navy's activities. Here, we include information that applies to all of the odontocete species and stocks, which are then further divided and discussed in more detail in the following subsections: Sperm whales, dwarf sperm whales, and pygmy sperm whales; Dolphins and small whales; Beaked whales; and Dall's porpoise. These sub-sections include more specific information about the groups, as well as conclusions for each stock represented.

The majority of takes by harassment of odontocetes in the HSTT Study Area are caused by sources from the MF1 active sonar bin (which includes hull-mounted sonar) because they are high level, typically narrowband sources at a frequency (in the 1–10 kHz range), which overlap a more sensitive portion (though not the most sensitive) of the MF hearing range, and they are used in a large portion of exercises (see Table 1.5–5 in the Navy's rulemaking/LOA application). For odontocetes other than beaked whales (for which these percentages are indicated separately in that section), most of the takes (98 percent) from the MF1 bin in the HSTT Study Area would result from received levels between 154 and 172 dB SPL. For the remaining active sonar bin types, the percentages are as follows: LF3 = 97 percent between 142 and 160 dB SPL, LF5M = 99 percent between 106 and 118 dB SPL, MF4 = 99 percent between 136 and 160 dB SPL, MF5 = 97 percent between 118 and 148 dB SPL, and HF4 = 96 percent between 100 and 148 dB SPL. These values may be derived from the information in Tables 6.4–8 through 6.4–12 in the Navy's rulemaking/LOA application (though they were provided directly to NMFS upon request). Based on this information, the majority of the takes by Level B behavioral harassment are expected to be low to sometimes moderate in nature, but still of a generally shorter duration.

For all odontocetes, takes from explosives (Level B behavioral harassment, TTS, or PTS if present) comprise a very small fraction (and low number) of those caused by exposure to active sonar. Specifically, for all but six odontocete stocks the instances of PTS and TTS from explosives are five or fewer and 12 or fewer per stock, respectively. By virtue of the sheer density and abundance of these two stocks, long-beaked and short-beaked dolphins incur a slightly higher number—13 or fewer and 30 or fewer instances of PTS and TTS, respectively. And, because of the lower threshold for HF species, pygmy and dwarf sperm whales have about 10–20 PTS takes and 30–100 TTS takes from explosives per stock, while Dall's porpoises have about 50 PTS takes and 300 PTS takes from explosives. Only five stocks incur take by harassment in the form of TTS or PTS from exposure to air guns and in all five cases it is limited to fewer than 10 takes each for TTS and PTS. No odontocetes incur PTS from exposure to pile driving, and only two stocks incur TTS in the amounts of one and three takes, respectively, from pile driving.

Because the majority of harassment take of odontocetes results from the sources in the MF1 bin (typically a narrowband source in the 1–10 kHz range), the vast majority of threshold shift caused by Navy sonar sources will typically occur across a narrower band in the range of 2–20 kHz. This frequency range falls directly within the range of most odontocete vocalizations. However, odontocete vocalizations typically span a much wider range than this, and alternately, threshold shift from active sonar will often be in a narrower band (reflecting the narrower band source that caused it), which means that TTS incurred by odontocetes would typically only interfere with communication within a portion of their range (if it occurred during a time when communication with conspecifics was occurring) and as discussed earlier, it would only be expected to be of a short duration and relatively small degree. Odontocete echolocation occurs predominantly at frequencies significantly higher than 20 kHz, though there may be some small overlap at the lower part of their echolocating range for some species, which means that there is little likelihood that threshold shift, either temporary or permanent would interfere with feeding behaviors. Many of the other critical sounds that serve as cues for navigation and prey (*e.g.,* waves, fish, invertebrates) occur below a few kHz, which means that detection of these signals will not be inhibited by most threshold shift either. The low number of takes by threshold shifts that might be incurred by individuals exposed to explosives, pile driving, or air guns would likely be lower frequency (5 kHz or less) and spanning a wider frequency range, which could slightly lower an individual's sensitivity to navigational or prey cues, or a small portion of communication calls, for several minutes to hours (if temporary) or permanently. There is no reason to think that any of the individual odontocetes taken by TTS would incur these types of takes over more than a few days of the year (with the exception of a few stocks, which are explicitly discussed below), at the most, and therefore they are unlikely to incur impacts on reproduction or survival.

PTS takes from these sources are very low, and while spanning a wider frequency band, are still expected to be of a low degree (*i.e.,* low amount of hearing sensitivity loss).

The range of potential behavioral effects of sound exposure on marine mammals generally, and odontocetes specifically, has been discussed in detail previously. There are behavioral patterns that differentiate the likely impacts on odontocetes as compared to mysticetes. First, odontocetes echolocate to find prey, which means that they actively send out sounds to detect their prey. While there are many strategies for hunting, one common pattern, especially for deeper diving species, is many repeated deep dives within a bout, and multiple bouts within a day, to find and catch prey. As discussed above, studies demonstrate that odontocetes cease their foraging dives in response to sound exposure. If enough foraging interruptions occur over multiple sequential days, and the individual either does not take in the necessary food, or must exert significant effort to find necessary food elsewhere, energy budget deficits can occur that could potentially result in impacts to reproductive success, such as increased cow/calf intervals (the time between successive calving). Second, many mysticetes rely on seasonal migratory patterns that position them in a geographic location at a specific time of the year to take advantage of ephemeral large abundances of prey (*i.e.,* invertebrates or small fish, which they eat by the thousands), whereas odontocetes forage more homogeneously on one fish or squid at a time. Therefore, if odontocetes are interrupted while feeding, it is often possible to find more prey relatively nearby.

Sperm Whales, Dwarf Sperm Whales, and Pygmy Sperm Whales

In this section, we bring together the discussion of marine mammals generally and odontocetes in particular regarding the different types and amounts of take that different stocks will incur, the applicable mitigation for each stock, and the status of the stocks to support the negligible impact determinations for each. We have also previously described the unlikelihood of any masking or habitat impacts to any marine mammals that would rise to the level of affecting individual fitness. The discussion in this section fairly narrowly focuses information that applies specifically to the sperm whale group, and then because there are multiple stock-specific factors in relation to differential Level B harassment effects and potential (and authorized) mortality, we break out specific findings into a few groups—CA/OR/WA stocks of sperm whales, dwarf sperm whales, and pygmy sperm whales; sperm whale (Hawaii stock); and Pygmy and dwarf sperm whales (Hawaii stocks).

In Table 73 and Table 74 below, for sperm whales, dwarf sperm whales, and pygmy sperm whales, we indicate the total annual mortality, Level A and Level B harassment, and a number indicating the instances of total take as a percentage of abundance. No tissue damage is anticipated.

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Table 73. Annual takes of Level B and Level A harassment, mortality for sperm whales in the HRC of the HSTT Study Area and number indicating the instances of total take as a percentage of stock abundance.

		Instances of indicated types of incidental take (not all takes represent separate individuals, especially for disturbance)										
		Level B Harassment		Level A Harassment			Total Takes		Abundance		Instances of total take as percent of abundance	
Species	Stock	Behavioral Disturbance	TTS (may also include disturbance)	PTS	Tissue Damage	Mortality	TOTAL TAKES (entire Study Area)	Takes (within NAVY EEZ)	Total Navy Abundance in and out EEZ (HRC)	Within Navy EEZ Abundance	Total take as percentage of total Navy abundance (HRC)	EEZ take as percentage of EEZ abundance (HRC)
Dwarf sperm whale	Hawaii	5870	14550	64	0	0	20484	15310	8218	6379	249	240
Pygmy sperm whale	Hawaii	2329	5822	29	0	0	8180	6098	3349	2600	244	235
Sperm Whale	Hawaii	2466	30	0	0	0.2	2496	1317	1656	1317	151	147

Note: For the HI take estimates, we compare predicted takes to abundance estimates generated from the same underlying density estimates, both in and outside of the U.S. EEZ. Because the portion of the Navy's action area inside the U.S. EEZ is generally concomitant with the study area used to generate the abundance estimates in the SARs, and the abundance predicted by the same underlying density estimates is the preferred abundance to use, there is no need to separately compare the take to the SARs abundance estimate.

Table 74. Annual takes of Level B and Level A harassment, mortality for sperm whales in SOCAL portion of the HSTT Study Area and number indicating the instances of total take as a percentage of stock abundance.

		Instances of indicated types of incidental take (not all takes represent separate individuals, especially for disturbance)									
		Level B Harassment		Level A Harassment			Total Takes	Abundance		Instances of total take as percent of abundance	
Species	Stock	Behavioral Disturbance	TTS (may also include disturbance)	PTS	Tissue Damage	Mortality	TOTAL TAKES (entire Study Area)	NAVY abundance in Action Area	NMFS SARS Abundance [2]	Total take as percentage of total Navy abundance in Action Area	Total take as percentage of total SAR abundance
Kogia whales	CA/OR/WA	2779	6353	38	0	0	9170	757	4111	1211	223
Sperm whale	CA/OR/WA	2437	56	0	0	0	2493	273	1997	913	125

Note: For the SOCAL take estimates, because of the manner in which the Navy action area overlaps the ranges of many MMPA stocks (*i.e.*, a stock may range far north to Washington state and beyond and abundance may only be predicted within the U.S. EEZ, while the Navy action area is limited to Southern California and northern Mexico, but extends beyond the U.S. EEZ), we compare predicted takes to both the abundance estimates for the action area, as well as the SARs.

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As discussed above, the majority of Level B harassment behavioral takes of odontocetes, and thereby sperm whales, is expected to be in the form of low to occasionally moderate severity of a generally shorter duration. As mentioned earlier in this section, we anticipate more severe effects from takes when animals are exposed to higher received levels or for longer durations. Occasional milder Level B behavioral harassment is unlikely to cause long-term consequences for individual animals or populations, even if some smaller subset of the takes are in the form of a longer (several hours or a day) and more moderate response. However, impacts across higher numbers of days, especially where sequential, have an increased probability of resulting in energetic deficits that could accrue to effects on reproductive success.

We note here that dwarf and pygmy sperm whales, as HF-sensitive species, have a lower PTS threshold than all other groups and therefore are likely to experience larger amounts of TTS and PTS, and NMFS will accordingly authorize higher numbers. However, *Kogia* whales are still likely to avoid sound levels that would cause higher levels of TTS (greater than 20 dB) or PTS. Even though the number of TTS and PTS takes are relatively high, all of the reasons described above for why TTS and PTS are not expected to impact reproduction or survival still apply.

We also note that impacts to dwarf sperm whale stocks will be reduced through the Hawaii Island Mitigation Area, which overlaps (but is larger than) the entirety of two BIAs for small resident populations of dwarf and pygmy sperm whales. In this mitigation area, the Navy will not conduct more than 300 hours of MF1 surface ship hull-mounted mid-frequency active sonar or 20 hours of MF4 dipping sonar and will not use explosives during testing and training.

Below we compile and summarize the information that supports our determination that the Navy's activities will not adversely impact recruitment or survival for any of the affected stocks addressed in this section.

Sperm whale, dwarf sperm whale, and pygmy sperm whale (CA/OR/WA stocks)—The SAR identifies the CA/OR/WA stock of sperm whales as ''stable'' and the species is listed as endangered under the ESA. The status of the CA/OR/WA stocks of pygmy and dwarf sperm whales is unknown and neither are listed under the ESA. Neither mortality nor Level A harassment by tissue damage from exposure to explosives is expected or authorized for any of these three stocks.

Due to their pelagic distribution, small size, and cryptic behavior, pygmy sperm whales and dwarf sperm whales are rarely sighted during at-sea surveys and difficult to distinguish between when visually observed in the field. Many of the relatively few observations of Kogia spp. off the U.S. West Coast were not identified to species. All at-sea sightings of Kogia spp. have been identified as pygmy sperm whales or Kogia spp. Stranded dwarf sperm and pygmy sperm whales have been found on the U.S. West Coast, however dwarf sperm whale strandings are rare. NMFS SARs suggest that the majority of Kogia sighted off the U.S. West Coast were likely pygmy sperm whales. As such, the stock estimate in the NMFS SAR for pygmy sperm whales is the estimate derived for all Kogia spp. in the region (Barlow 2016), and no separate abundance estimate can be determined for dwarf sperm whales, though some low number likely reside in the U.S. EEZ. Due to the lack of abundance estimate it is not possible to predict the take of dwarf sperm whales and take estimates are identified as Kogia spp. (including both pygmy and dwarf sperm whales). We assume only a small portion of those takes are likely to be dwarf sperm whales as the density and abundance in the U.S. EEZ is thought to be low.

Regarding the magnitude of Level B harassment takes (TTS and behavioral disruption), the number of estimated total instances of take compared to the abundance (measured against both the Navy-estimated abundance and the SAR) is, respectively, 913 and 125 for sperm whales and 1,211 and 223 for Kogia spp., with a large proportion of these anticipated to be pygmy sperm whales due to the low abundance and density of dwarf sperm whales in the HSTT Study Area. (Table 74). Given the range of these stocks (which extends the entire length of the West Coast, as well as beyond the U.S. EEZ boundary), this information suggests that some portion of the individuals in these stocks will not be impacted, but that there is likely some repeat exposure (perhaps up to 24 days within a year for Kogia spp. and 18 days a year for sperm whales) of some small subset of individuals that spend extended time within the SOCAL Range. Additionally, while interrupted feeding bouts are a known response and concern for odontocetes, we also know that there are often viable alternative habitat options in the relative vicinity. Regarding the severity of those individual takes by Level B behavioral harassment, we have explained that the duration of any exposure is expected to be between minutes and hours (*i.e.,* relatively short) and the received sound levels largely below 172 dB (*i.e.,* of a lower, to occasionally moderate, level and less likely to evoke a severe response). However, some of these takes could occur on a fair number of sequential days for some number on individuals.

Regarding the severity of TTS takes, we have explained that they are expected to be low-level, of short duration, and mostly not in a frequency band that would be expected to interfere with sperm whale communication or other important low-frequency cues, and that the associated lost opportunities and capabilities are not at a level that would impact reproduction or survival. For these same reasons (low level and frequency band), while a small permanent loss of hearing sensitivity (PTS) may include some degree of energetic costs for compensating or may mean some small loss of opportunities or detection capabilities, at the expected scale the estimated Level A harassment takes by PTS for the dwarf and pygmy whale stocks would be unlikely to impact behaviors, opportunities, or detection capabilities to a degree that would interfere with reproductive success or survival of any individuals. Thus the 38 total Level A harassment takes by PTS for these two stocks would be unlikely to affect rates of recruitment and survival for the stocks.

Altogether, most members of the stocks will likely be taken by Level B harassment (at a low to occasionally moderate level) over several days a year, and some smaller portion of the stocks are expected to be taken on a relatively moderate to high number of days (up to 18 or 24) across the year, some of which could be sequential days. Though the majority of impacts are expected to be of a lower to sometimes moderate severity, the larger number of takes for a subset of individuals makes it more likely that a small number of individuals could be interrupted during foraging in a manner and amount such that impacts to the energy budgets of females (from either losing feeding opportunities or expending considerable energy to find alternative feeding options) could cause them to forego reproduction for a year. Energetic impacts to males are generally meaningless to population rates unless they cause death, and it takes extreme energy deficits beyond what would ever be likely to result from these activities to cause the death of an adult marine mammal. As noted previously, however, foregone reproduction (especially for one year, which is the maximum predicted because the small number anticipated in any one year makes the probability that any individual would be impacted in this way twice in five years very low) has far less of an impact on population rates than mortality and a small number of instances of foregone reproduction would not be expected to adversely affect these stocks through effects on annual rates of recruitment or survival, and we note that residual PBR is 19 for pygmy dwarf sperm whales and 1.6 for sperm whales. Both the abundance and PBR are unknown for dwarf sperm whales, however, we know that take of this stock is likely significantly lower in magnitude and severity (*i.e.,* lower number of total takes and repeated takes any individual) than pygmy sperm whales. For these reasons, in consideration of all of the effects of the Navy's activities combined, we have determined that the authorized take will have a negligible impact on the CA/OR/WA stocks of sperm whales and pygmy and dwarf sperm whales.

Sperm whale (Hawaii stock)—The SAR does not identify a trend for this stock and the species is listed as endangered under the ESA. No Level A harassment by PTS or tissue damage is expected or authorized. NMFS will authorize one mortality over the 5 years covered by this rule, which is 0.2 mortalities annually. The addition of this 0.2 annual mortality still leaves the total human-caused mortality well under the insignificance threshold for residual PBR.

Regarding the magnitude of Level B harassment takes (TTS and behavioral disruption), the number of estimated instances of take compared to the abundance, both throughout the HSTT Study Area and within the U.S. EEZ, respectively, is 151 and 147 percent (Table 73). This information and the sperm whale stock range suggest that likely only a smaller portion of the stock is impacted, over one to several days per year, with little likelihood of take across sequential days. Regarding the severity of those individual takes by Level B behavioral harassment, we have explained that the duration of any exposure is expected to be between minutes and hours (*i.e.,* relatively short) and the received sound levels largely below 172 dB (*i.e.,* of a lower, to occasionally moderate, level and less likely to evoke a severe response). Regarding the severity of TTS takes, we have explained that they are expected to be low-level, of short duration, and mostly not in a frequency band that would be expected to interfere with sperm whale communication or other important low-frequency cues, and that the associated lost opportunities and capabilities are not at a level that would impact reproduction or survival.

Altogether, a relatively small portion of this stock is impacted and any individuals are likely to be disturbed at a low-moderate level, with the taken individuals likely exposed between one and several days, with little chance that any are taken across sequential days. This low magnitude and severity of harassment effects is not expected to result in impacts on individual reproduction or survival, nor are these harassment takes combined with the single authorized mortality expected to adversely affect the stock through annual rates of recruitment or survival. For these reasons, we have determined, in consideration of all of the effects of the Navy's activities combined, that the authorized take will have a negligible impact on the Hawaii stock of sperm whales.

Pygmy and dwarf sperm whales (Hawaii stocks)—The SAR does not identify a trend for these stocks and the species are not listed under the ESA. No Level A harassment by tissue damage is authorized. Regarding the magnitude of Level B harassment takes (TTS and behavioral disruption), the number of estimated instances of take compared to the abundance, both throughout the HSTT Study Area and within the U.S. EEZ, respectively, is 244–249 and 235–240 percent (Table 73). This information and the pygmy and dwarf sperm whale stock ranges (at least throughout the U.S. EEZ around the entire Hawaiian Islands) suggest that likely a fair portion of each stock is not impacted, but that a subset of individuals may be over one to perhaps five days per year, with little likelihood of take across sequential days. Regarding the severity of those individual takes by Level B behavioral harassment, we have explained that the duration of any exposure is expected to be between minutes and hours (*i.e.,* relatively short) and the received sound levels largely below 172 dB (*i.e.,* of a lower, to occasionally moderate, level and less likely to evoke a severe response). Additionally, as noted earlier, within the Hawaii Island Mitigation Area, explosives are not used and the use of MF1 and MF4 active sonar is limited, greatly reducing the severity of impacts within the small resident population BIA for dwarf sperm whales, which is entirely contained within this mitigation area.

Regarding the severity of TTS takes, we have explained that they are expected to be low-level, of short duration, and mostly not in a frequency band that would be expected to interfere with sperm whale communication or other important low-frequency cues—and that the associated lost opportunities and capabilities are not at a level that would impact reproduction or survival. For these same reasons (low level and frequency band), while a small permanent loss of hearing sensitivity may include some degree of energetic costs for compensating or may mean some small loss of opportunities or detection capabilities, at the expected scale, estimated Level A harassment takes by PTS for dwarf and pygmy sperm whales would be unlikely to impact behaviors, opportunities, or detection capabilities to a degree that would interfere with reproductive success or survival of any individuals, even if it were to be experienced by an animal that also experiences one or more Level B harassment behavioral disruptions. Thus the 29 and 64 total Level A harassment takes by PTS for dwarf and pygmy sperm whales, respectively, would be unlikely to affect rates of recruitment and survival for these stocks.

Altogether, a portion of these stocks are likely to be impacted and any individuals are likely to be disturbed at a low-moderate level, with the taken individuals likely exposed between one and five days, with little chance that any are taken across sequential days. This low magnitude and severity of Level A and Level B harassment effects is not expected to result in impacts on individual reproduction or survival, much less impacts on annual rates of recruitment or survival. For these reasons, we have determined, in consideration of all of the effects of the Navy's activities combined, that the expected (and authorized) take will have a negligible impact on the Hawaii stocks of pygmy and dwarf sperm whales.

Beaked Whales

In this section, we build on the broader odontocete discussion above (*i.e.,* that information applies to beaked whales as well), except where we offer alternative information about the received levels for beaked whale Level B behavioral harassment. We bring together the discussion of the different types and amounts of take that different stocks will incur, the applicable mitigation for each stock, and the status of the stocks to support the negligible impact determinations for each stock. None of these species are listed as endangered or threatened under the ESA. For beaked whales, there is no predicted mortality or tissue damage for any stock. We have also described the unlikelihood of any masking or habitat impacts to any groups that would rise to the level of affecting individual fitness. The discussion below focuses on additional information that is specific to beaked whales (in addition to the general information on odontocetes provided above, which is relevant to these species) to support the conclusions for each stock. Because there are differential magnitudes of effect to the Hawaii stocks of beaked whales versus the CA/OR/WA stocks of beaked whales, we break out specific findings into those two groups.

In Tables 75 and 76 below, for beaked whales, we indicate the total annual mortality, Level A and Level B harassment, and a number indicating the instances of total take as a percentage of abundance. No Level A harassment (PTS and Tissue Damage) takes are anticipated or authorized.

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Table 75. Annual takes of Level B and Level A harassment, mortality for beaked whales in HRC of the HSTT Study Area and number indicating the instances of total take as a percentage of stock abundance.

		Instances of indicated types of incidental take (not all takes represent separate individuals, especially for disturbance)										
		Level B Harassment		Level A Harassment			Total Takes		Abundance		Instances of total take as percent of abundance	
Species	Stock	Behavioral Disturbance	TTS (may also include disturbance)	PTS	Tissue Damage	Mortality	TOTAL TAKES (entire Study Area)	Takes (within NAVY EEZ)	Total Navy Abundance in and out EEZ (HRC)	Within Navy EEZ Abundance	Total take as percentage of total Navy abundance (HRC)	EEZ take as percentage of EEZ abundance (HRC)
Blainville's beaked whale	Hawaii	5369	16	0	0	0	5385	4140	989	768	545	539
Cuvier's beaked whale	Hawaii	1792	4	0	0	0	1796	1377	345	268	521	514
Longman's beaked whale	Hawaii	19152	81	0	0	0	19233	14585	3568	2770	539	527

Note: For the HI take estimates, we compare predicted takes to abundance estimates generated from the same underlying density estimates, both in and outside of the U.S. EEZ. Because the portion of the Navy's action area inside the U.S. EEZ is generally concomitant with the area used to generate the abundance estimates in the SARs, and the abundance predicted by the same underlying density estimates is the preferred abundance to use, there is no need to separately compare the take to the SARs abundance estimate.

Table 76. Annual takes of Level B and Level A harassment, mortality for beaked whales in SOCAL portion in the HSTT Study Area and number indicating the instances of total take as a percentage of stock abundance.

		Instances of indicated types of incidental take (not all takes represent separate individuals, especially for disturbance)									
		Level B Harassment		Level A Harassment			Total Takes	Abundance		Instances of total take as percent of abundance	
Species	Stock	Behavioral Disturbance	TTS (may also include disturbance)	PTS	Tissue Damage	Mortality	TOTAL TAKES (entire Study Area)	NAVY abundance in Action Area	NMFS SARS Abundance [2]	Total take as percentage of total Navy abundance	Total take as percentage of total SAR abundance
Baird's beaked whale	CA/OR/WA	2030	14	0	0	0	2044	74	2697	2762	76
Cuvier's beaked whale	CA/OR/WA	11373	127	1	0	0	11501	520	3274	2212	351
Mesoplodon spp.	CA/OR/WA	6125	68	1	0	0	6194	89	3044	6960	203

Note: For the SOCAL take estimates, because of the manner in which the Navy action area overlaps the ranges of many MMPA stocks (*i.e.*, a stock may range far north to Washington state and beyond and abundance may only be predicted within the U.S. EEZ, while the Navy action area is limited to Southern California and northern Mexico, but extends beyond the U.S. EEZ), we compare predicted takes to both the abundance estimates for the action area, as well as the SARs.

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This first paragraph provides specific information that is in lieu of the parallel information provided for odontocetes as a whole. The majority of takes by harassment of beaked whales in the HSTT Study Area are caused by sources from the MF1 active sonar bin (which includes hull-mounted sonar) because they are high level narrowband sources in the 1–10 kHz range, which overlap a more sensitive portion (though not the most sensitive) of the MF hearing range, and of the sources expected to result in take, they are used in a large portion of exercises (see Table 1.5–5 in the Navy's rulemaking/LOA application). Most of the takes (94 percent) from the MF1 bin in the HSTT Study Area would result from received levels between 154 and 160 dB SPL. For the remaining active sonar bin types, the percentages are as follows: LF3 = 90 percent between 136 and 148 dB SPL, LF5M = 99 percent between 100 and 118 dB SPL, MF4 = 95 percent between 130 and 148 dB SPL, MF5 = 95 percent between 100 and 142 dB SPL, and HF4 = 96 percent between 100 and 148 dB SPL. These values may be derived from the information in Tables 6.4–8 through 6.4–12 in the Navy's rulemaking/LOA application (though they were provided directly to NMFS upon request). Given the levels they are exposed to and their sensitivity, some responses would be of a lower severity, but many would likely be considered moderate.

As is the case with harbor porpoises, research has shown that beaked whales are especially sensitive to the presence of human activity (Pirotta *et al.,* 2012; Tyack *et al.,* 2011) and therefore have been assigned a lower harassment threshold, *i.e.,* a more distant distance cutoff (50 km for high source level, 25 km for moderate source level).

Beaked whales have been documented to exhibit avoidance of human activity or respond to vessel presence (Pirotta *et al.,* 2012). Beaked whales were observed to react negatively to survey vessels or low altitude aircraft by quick diving and other avoidance maneuvers, and none were observed to approach vessels (Wursig *et al.,* 1998). It has been speculated for some time that beaked whales might have unusual sensitivities to sonar sound due to their likelihood of stranding in conjunction with MFAS use, although few definitive causal relationships between MFAS use and strandings have been documented, and no such findings have been documented with Navy use in Hawaii and Southern California.

Research and observations show that if beaked whales are exposed to sonar or other active acoustic sources, they may startle, break off feeding dives, and avoid the area of the sound source to levels of 157 dB re 1 μPa, or below (McCarthy *et al.,* 2011). Acoustic monitoring during actual sonar exercises revealed some beaked whales continuing to forage at levels up to 157 dB re 1 μPa (Tyack *et al.,* 2011). Stimpert *et al.* (2014) tagged a Baird's beaked whale, which was subsequently exposed to simulated MFAS. Changes in the animal's dive behavior and locomotion were observed when received level reached 127 dB re 1 μPa. However, Manzano-Roth *et al.* (2013) found that for beaked whale dives that continued to occur during MFAS activity, differences from normal dive profiles and click rates were not detected with estimated received levels up to 137 dB re 1 μPa while the animals were at depth during their dives. And in research done at the Navy's fixed tracking range in the Bahamas, animals were observed to leave the immediate area of the anti-submarine warfare training exercise (avoiding the sonar acoustic footprint at a distance where the received level was ''around 140 dB'' SPL, according to Tyack *et al.* (2011) but return within a few days after the event ended (Claridge and Durban, 2009; McCarthy *et al.,* 2011; Moretti *et al.,* 2009, 2010; Tyack *et al.,* 2010, 2011). Tyack *et al.* (2011) report that, in reaction to sonar playbacks, most beaked whales stopped echolocating, made long slow ascent to the surface, and moved away from the sound. A similar behavioral response study conducted in Southern California waters during the 2010–2011 field season found that Cuvier's beaked whales exposed to MFAS displayed behavior ranging from initial orientation changes to avoidance responses characterized by energetic fluking and swimming away from the source (DeRuiter *et al.,* 2013b). However, the authors did not detect similar responses to incidental exposure to distant naval sonar exercises at comparable received levels, indicating that context of the exposures (*e.g.,* source proximity, controlled source ramp-up) may have been a significant factor. The study itself found the results inconclusive and meriting further investigation. Cuvier's beaked whale responses suggested particular sensitivity to sound exposure as consistent with results for Blainville's beaked whale.

Populations of beaked whales and other odontocetes on the Bahamas and other Navy fixed ranges that have been operating for decades, appear to be stable. Behavioral reactions (avoidance of the area of Navy activity) seem likely in most cases if beaked whales are exposed to anti-submarine sonar within a few tens of kilometers, especially for prolonged periods (a few hours or more) since this is one of the most sensitive marine mammal groups to anthropogenic sound of any species or group studied to date and research indicates beaked whales will leave an area where anthropogenic sound is present (De Ruiter *et al.,* 2013; Manzano-Roth *et al.,* 2013; Moretti *et al.,* 2014; Tyack *et al.,* 2011). Research involving tagged Cuvier's beaked whales in the SOCAL Range Complex reported on by Falcone and Schorr (2012, 2014) indicates year-round prolonged use of the Navy's training and testing area by these beaked whales and has documented movements in excess of hundreds of kilometers by some of those animals. Given that some of these animals may routinely move hundreds of kilometers as part of their normal pattern, leaving an area where sonar or other anthropogenic sound is present may have little, if any, cost to such an animal. Photo identification studies in the SOCAL Range Complex, a Navy range that is utilized for training and testing, have identified approximately 100 individual Cuvier's beaked whale individuals with 40 percent having been seen in one or more prior years, with re-sightings up to seven years apart (Falcone and Schorr, 2014). These results indicate long-term residency by individuals in an intensively used Navy training and testing area, which may also suggest a lack of long-term consequences as a result of exposure to Navy training and testing activities. Over eight years of passive acoustic monitoring on the Navy's instrumented range west of San Clemente Island documented no significant changes in annual and monthly beaked whale echolocation clicks, with the exception of repeated fall declines likely driven by a natural beaked whale life history functions (DiMarzio *et al.,* 2018). Finally, results from passive acoustic monitoring estimated regional Cuvier's beaked whale densities were higher than indicated by the NMFS' broad scale visual surveys for the U.S. west coast (Hildebrand and McDonald, 2009).

As mentioned earlier in the odontocete overview, we anticipate more severe effects from takes when animals are exposed to higher received levels or sequential days of impacts. Occasional instances of take by Level B behavioral harassment of a low to moderate severity are unlikely to affect reproduction or survival. Here, some small number of takes by Level B behavioral harassment could be in the form of a longer (several hours or a day) and more moderate response, and/or some small number could be repeated over more than several sequential days. Impacts to reproduction could be possible for some small number of individuals, but given the information presented regarding beaked whale movement patterns, their return to areas within hours to a few days after a disturbance, and their continued presence and abundance in the area of instrumented Navy ranges, these impacts seem somewhat less likely. Nonetheless, even where some smaller number of animals could experience effects on reproduction, those responses would not be expected to adversely affect rates of recruitment or survival.

We also note that impacts to beaked whale stocks will be reduced through the Hawaii Island Mitigation Area, which overlaps (but is larger than) almost the entirety of two BIAs for small resident populations of Blainville's and Cuvier's beaked whales (the mitigation area covers all of the BIA for Blainville's and all but a very small portion of the BIA for Cuvier's). In this mitigation area, the Navy will not conduct more than 300 hours of MF1 surface ship hull-mounted mid-frequency active sonar and not more than 20 hours of MF4 dipping sonar and will not use explosives during testing and training.

Below we synthesize and summarize the information that supports our determination that the Navy's activities will not adversely impact recruitment or survival rates for any of the affected stocks addressed in this section:

Blainville's, Cuvier's, and Longman's beaked whales (Hawaii stocks)—The SAR does not identify a trend for these stocks and the species are not listed under the ESA. No mortality or Level A harassment are expected or authorized for any of these three stocks. Regarding the magnitude of Level B harassment takes (TTS and behavioral disruption), the number of estimated instances of take compared to the abundance, both throughout the HSTT Study Area and within the U.S. EEZ, respectively, is 521–545 and 514–539 percent (Table 75). This information and the stock ranges (at least of the small, resident Island associated stocks around Hawaii) suggest that likely a fair portion of the stocks (but not all) will be impacted, over one to perhaps eleven days per year, with little likelihood of much take across sequential days. Regarding the severity of those individual takes by Level B behavioral harassment, we have explained that the duration of any exposure is expected to be between minutes and hours (*i.e.,* relatively short) and the received sound levels largely below 160 dB, though with beaked whales, which are considered somewhat more sensitive, this could mean that some individuals will leave preferred habitat for a day or two (*i.e.,* moderate level takes). However, while interrupted feeding bouts are a known response and concern for odontocetes, we also know that there are often viable alternative habitat options nearby. Additionally, as noted earlier, within the Hawaii Island mitigation area (which entirely contains the BIAs for Cuvier's and Blainville's beaked whales), explosives are not used and the use of MF1 and MF4 active sonar is limited, greatly reducing the severity of impacts within these two small resident populations.

Regarding the severity of TTS takes, we have explained that they are expected to be low-level, of short duration, and mostly not in a frequency band that would be expected to interfere with beaked whale communication or other important low-frequency cues, and that the associated lost opportunities and capabilities are not at a level that would impact reproduction or survival.

Altogether, a fair portion of these stocks are impacted and any individuals are likely to be disturbed at a moderate level, with the taken individuals likely exposed between one and eleven days, with little chance that individuals are taken across more than a few sequential days. This low, to occasionally moderate, magnitude and severity of harassment effects is not expected to result in impacts on individual reproduction or survival, much less impacts on annual rates of recruitment or survival. For these reasons, we have determined, in consideration of all of the effects of the Navy's activities combined, that the authorized take will have a negligible impact on the Hawaii stocks of beaked whales.

Baird's and Cuvier's beaked whales and Mesoplodon species (all CA/OR/WA stocks)—The species are not listed under the ESA and their populations have been identified as "stable," "decreasing," and "increasing," respectively. No mortality or Level A harassment are expected or authorized for any of these three stocks.

No methods are available to distinguish between the six species of Mesoplodon beaked whale CA/OR/WA 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). Bycatch and stranding records from the region indicate that the Hubb's beaked whale is most commonly encountered (Carretta *et al.,* 2008, Moore and Barlow, 2013). As indicated in the SAR, no species-specific abundance estimates are available, the abundance estimate includes all CA/OR/WA Mesoplodon spp, and the six species are managed as one unit. Due to the lack of species-specific abundance estimates it is not possible to predict the take of individual species and take estimates are identified as Mesoplodon spp.

Regarding the magnitude of Level B harassment takes (TTS and behavioral disruption), the number of estimated total instances of take compared to the abundance for these stocks is 2762, 2212, and 6960 percent (measured against Navy-estimated abundance) and 76, 351, and 203 percent (measured against the SAR) for Baird's beaked whales, Cuvier's beaked whales, and Mesoplodon spp., respectively (Table 76). Given the ranges of these stocks, this information suggests that some smaller portion of the individuals of these stocks will be taken, and that some subset of individuals within the stock will be taken repeatedly within the year (perhaps up to 20–25 days)—potentially over a fair number of sequential days, especially where individuals spend extensive time in the SOCAL Range (note that we predicted lower days of repeated exposure for these stocks than their percentages might have suggested because of the lower overall number of takes). While interrupted feeding bouts are a known response and concern for odontocetes, we also know that there are often viable alternative habitat options in the relative vicinity. Regarding the severity of those individual takes by Level B behavioral harassment, we have explained that the duration of any exposure is expected to be between minutes and hours (*i.e.,* relatively short) and the received sound levels largely below 160 dB, though with beaked whales, which are considered somewhat more sensitive, this could mean that some individuals will leave preferred habitat for a day or two (*i.e.,* of a moderate level). However, as noted, some of these takes could occur on a fair number of sequential days for these stocks.

As described previously, the severity of TTS takes, is expected to be low-level, of short duration, and mostly not in a frequency band that would be expected to interfere significantly with conspecific communication, echolocation, or other important low-frequency cues. Therefore, the associated lost opportunities and capabilities would not be expected to impact reproduction or survival. For similar reasons (described above) the single estimated Level A harassment take by PTS for this stock is unlikely to have any effects on the reproduction or survival of any individuals.

Altogether, a portion of these stocks will likely be taken (at a moderate or sometimes low level) over several days a year, and some smaller portion of the stock is expected to be taken on a relatively moderate to high number of days across the year, some of which could be sequential days. Though the majority of impacts are expected to be of a moderate severity, the repeated takes over a potentially fair number of sequential days for some individuals makes it more likely that a small number of individuals could be interrupted during foraging in a manner and amount such that impacts to the energy budgets of females (from either losing feeding opportunities or expending considerable energy to find alternative feeding options) could cause them to forego reproduction for a year. Energetic impacts to males are generally meaningless to population rates unless they cause death, and it takes extreme energy deficits beyond what would ever be likely to result from these activities to cause the death of an adult marine mammal). As noted previously, however, foregone reproduction (especially for only one year in five, as discussed previously) has far less of an impact on population rates than mortality and a small number of instances of foregone reproduction would not be expected to adversely affect these stocks through effects on annual rates of recruitment or survival, especially given the residual PBR of these three beaked whale stocks (16, 21, and 20, respectively).

Further, Navy activities have been conducted in SOCAL for many years at similar levels and the SAR considers Mesoplodon spp. as increasing and Baird's beaked whales as stable. While NMFS' SAR indicates that Cuvier's beaked whales on the U.S. West Coast are declining based on a Bayesian trend analysis of NMFS' survey data collected from 1991 through 2014, results from passive acoustic monitoring and other research have estimated regional Cuvier's beaked whale densities that were higher than indicated by NMFS' broad-scale visual surveys for the U.S. West Coast (Debich *et al.,* 2015a; Debich *et al.,* 2015b; Falcone and Schorr, 2012, 2014; Hildebrand *et al.,* 2009; Moretti, 2016; Širović *et al.,* 2016; Smultea and Jefferson, 2014). Research also indicates higher than expected residency in the Navy's instrumented Southern California Anti-Submarine Warfare Range in particular (Falcone and Schorr, 2012) and photo identification studies in the SOCAL have identified approximately 100 individual Cuvier's beaked whale individuals with 40 percent having been seen in one or more prior years, with re-sightings up to 7 years apart (Falcone and Schorr, 2014). The documented residency by many Cuvier's beaked whales over multiple years suggest that a stable population may exist in that small portion of the stock's overall range (Falcone *et al.,* 2009; Falcone and Schorr, 2014; Schorr *et al.,* 2017).

For these reasons, in consideration of all of the effects of the Navy's activities combined, we have determined that the authorized take will have a negligible impact on the CA/OR/WA stocks of Baird's and Cuvier's beaked whales, as well as all six species included within the Mesoplodon spp.

Small Whales and Dolphins

This section builds on the broader discussion above and compiles the discussion of the different types and amounts of take that different stocks will incur, the applicable mitigation for each stock, and the status of the stocks to support the negligible impact determinations for each stock. None of these species are listed as endangered or threatened under the ESA. We also have described the unlikelihood of any masking or habitat impacts to any groups that would rise to the level of affecting individual fitness. The discussion below focuses on additional information that is specific to the dolphin taxa (in addition to the general information on odontocetes provided above, which is relevant to these species) and to support the summarized group-specific conclusions in the subsequent sections. Because of several factors, we break out specific findings into three groups: 1) long-beaked common dolphin (California stock), Northern right whale dolphin, and short-beaked common dolphin (CA/OR/WA stocks), which all have authorized mortality or tissue damage; 2) all other SOCAL dolphin stocks except those identified in 1; and 3) all HRC dolphin stocks.

In Tables 77 and 78 below, for odontocetes (in this section odontocetes refers specifically to the small whales and dolphins indicated in Tables 77 and 78), we indicate the total annual mortality, Level A and Level B harassment, and a number indicating the instances of total take as a percentage of abundance.

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Table 77. Annual takes of Level B and Level A harassment, mortality for odontocetes in the HRC of the HSTT Study Area and number indicating the instances of total take as a percentage of stock abundance.

		Instances of indicated types of incidental take (not all takes represent separate individuals, especially for disturbance)										
		Level B Harassment		Level A Harassment			Total Takes		Abundance		Instance of total take as percent of abundance	
Species	Stock	Behavioral Disturbance	TTS (may also include disturbance)	PTS	Tissue Damage	Mortality	TOTAL TAKES (entire Study Area)	Takes (within NAVY EEZ)	Total Navy Abundance in and out EEZ (HRC)	Within Navy EEZ Abundance	Total take as percentage of total Navy abundance	EEZ take as percentage of EEZ abundance (HRC)
Bottlenose dolphin	Hawaii Pelagic	3196	132	0	0	0	3328	2481	1528	1442	218	172
Bottlenose dolphin	Kauai & Niihau	534	31	0	0	0	565	264	184	184	307	143
Bottlenose dolphin	Oahu	8600	61	1	0	0	8662	8376	743	743	1169	1130
Bottlenose dolphin	4-Island	349	10	0	0	0	359	316	189	189	190	167
Bottlenose dolphin	Hawaii	74	6	0	0	0	80	42	131	131	61	32
False killer whale	Hawaii Pelagic	999	42	0	0	0	1041	766	645	507	161	151
False killer whale	Main Hawaiian Islands Insular	572	17	0	0	0	589	476	147	147	400	324
False killer whale	Northwestern Hawaiian Islands	365	16	0	0	0	381	280	215	169	177	166
Fraser's dolphin	Hawaii	39784	1289	2	0	0	41075	31120	5408	18763	760	166
Killer whale	Hawaii	118	6	0	0	0	124	93	69	54	180	172
Melon-headed whale	Hawaii Islands	3261	231	0	0	0	3492	2557	1782	1782	196	143
Melon-headed whale	Kohala Resident	341	9	0	0	0	350	182	447	447	78	41
Pantropical spotted dolphin	Hawaii Island	3767	227	0	0	0	3994	2576	2405	2405	166	107
Pantropical spotted dolphin	Hawaii Pelagic	9973	476	0	0	0	10449	7600	5462	4637	191	164
Pantropical spotted dolphin	Oahu	4284	45	0	0	0	4329	4194	372	372	1164	1127
Pantropical spotted dolphin	4-Island	701	17	0	0	0	718	634	657	657	109	96
Pygmy killer whale	Hawaii	8122	402	0	0	0	8524	6538	4928	3931	173	166
Pygmy killer whale	Tropical	710	50	0	0	0	760	490	159	23	478	2130
Risso's dolphin	Hawaii	8950	448	0	0	0	9398	7318	1210	4199	777	174
Rough-toothed dolphin	Hawaii	6112	373	0	0	0	6485	4859	3054	2808	212	173
Short-finned pilot whale	Hawaii	12499	433	0	0	0	12932	9946	6433	5784	201	172
Spinner dolphin	Hawaii Island	279	12	0	0	0	291	89	629	629	46	14
Spinner dolphin	Hawaii Pelagic	4332	202	0	0	0	4534	3491	2885	2229	157	157
Spinner dolphin	Kauai & Niihau	1683	63	0	0	0	1746	812	604	604	289	134
Spinner dolphin	Oahu & 4-Island	1790	34	1	0	0	1825	1708	354	354	516	482
Striped dolphin	Hawaii	7379	405	0	0	0	7784	6034	4779	3646	163	165

Note: For the HI take estimates, we compare predicted takes to abundance estimates generated from the same underlying density estimates, both in and outside of the U.S. EEZ. Because the portion of the Navy's action area inside the U.S. EEZ is generally concomitant with the area used to generate the abundance estimates in the SARs, and the abundance predicted by the same underlying density estimates is the preferred abundance to use, there is no need to separately compare the take to the SARs abundance estimate.

Table 78. Annual takes of Level B and Level A harassment, mortality for odontocetes in SOCAL portion of the HSTT Study Area and number indicating the instances of total take as a percentage of stock abundance.

		Instances of indicated types of incidental take (not all takes represent separate individuals, especially for disturbance)									
		Level B Harassment		Level A Harassment			Total Takes	Abundance		Instance of total take as percent of abundance	
Species	Stock	Behavioral Disturbance	TTS (may also include disturbance)	PTS	Tissue Damage	Mortality	TOTAL TAKES (entire Study Area)	NAVY Abundance in Action Area SOCAL	NMFS SARS Abundance	Total take as percentage of total Navy abundance in Action Area	Total take as percentage of total SAR abundance
Bottlenose dolphin	California Coastal	1771	38	0	0	0	1809	238	515	760	351
Bottlenose dolphin	CA/OR/WA Offshore	51727	3695	3	0	0	55425	5946	1924	932	2881
Killer whale	Eastern North Pacific (ENP) Offshore	96	11	0	0	0	107	4	240	2675	45
Killer whale	ENP Transient/ West Coast Transient	179	20	0	0	0	199	30	243	663	82
Long-beaked common dolphin	California	233485	13787	18	2	0	247292	10258	101305	2411	244
Northern right whale dolphin	CA/OR/WA	90052	8047	10	1	0	98110	7705	26556	1273	369
Pacific white-sided dolphin	CA/OR/WA	69245	6093	5	0	0	75343	6626	26814	1137	281
Risso's dolphin	CA/OR/WA	116143	10118	9	0	0	126270	7784	6336	1622	1993
Short-beaked common dolphin	CA/OR/WA	1374048	118525	79	10	2	1492664	261438	969861	571	154
Short-finned pilot whale	CA/OR/WA	1789	124	1	0	0	1914	208	836	920	229
Striped dolphin	CA/OR/WA	163640	11614	3	0	0	175257	39862	29211	440	600

Note: For the SOCAL take estimates, because of the manner in which the Navy action area overlaps the ranges of many MMPA stocks (*i.e.*, a stock may range far north to Washington state and beyond and abundance may only be predicted within the U.S. EEZ, while the Navy action area is limited to Southern California and northern Mexico, but extends beyond the U.S. EEZ), we compare predicted takes to both the abundance estimates for the action area, as well as the SARs.

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As described above, the large majority of Level B behavioral harassments to odontocetes, and thereby dolphins and small whales, from hull-mounted sonar (MF1) in the HSTT Study Area would result from received levels between 160 and 172 dB SPL. Therefore, the majority of Level B harassment takes are expected to be in the form of low to occasionally moderate responses of a generally shorter duration. As mentioned earlier in this section, we anticipate more severe effects from takes when animals are exposed to higher received levels. Occasional milder occurrences of Level B behavioral harassment are unlikely to cause long-term consequences for individual animals or populations that have any effect on reproduction or survival. Some behavioral responses could be in the form of a longer (several hours or a day) and more moderate response, but because they are not expected to be repeated over more than several sequential days at the most, impacts to reproduction or survival for most animals are not anticipated. Even where a few animals could experience effects on reproduction, for the reasons explained below this would not affect rates of recruitment or survival.

Research and observations show that if delphinids are exposed to sonar or other active acoustic sources they may react in a number of ways depending on their experience with the sound source and what activity they are engaged in at the time of the acoustic exposure. Delphinids may not react at all until the sound source is approaching within a few hundred meters to within a few kilometers depending on the environmental conditions and species. Some dolphin species (the more surface-dwelling taxa—typically those with ''dolphin'' in the common name, such as bottlenose dolphins, spotted dolphins, common dolphins, spinner dolphins, rough-toothed dolphins, etc., but not Risso's dolphin), especially those residing in more industrialized or busy areas, have demonstrated more tolerance for disturbance and loud sounds and many of these species are known to approach vessels to bow-ride. These species are often considered generally less sensitive to disturbance. Deep-diving dolphins that reside in deeper waters and generally have fewer interactions with human activities are more likely to demonstrate more typical avoidance reactions and foraging interruptions as described above in the odontocete overview.

Identified important areas for odontocetes (BIAs for small resident populations) will be protected by the Navy's mitigation areas. The size of the 4-Islands Region Mitigation Area has been expanded to include an area north of Maui and Molokai and overlaps an area identified as a BIA for the endangered Main Hawaiian Islands insular false killer whale (Baird *et al.,* 2015; Van Parijs, 2015) (see Figure 5.4–3, in Chapter 5 *Mitigation Areas for Marine Mammals in the Hawaii Range Complex* of the HSTT FEIS/OEIS). The 4-Islands Region Mitigation Area provides partial protection for identified biologically important areas that span multiple islands for four species (small and resident populations) including false killer whales, common bottlenose dolphin, pantropical spotted dolphin, and spinner dolphin, by not using mid-frequency active anti-submarine warfare sensor MF1 in the area during testing or training.

The Navy's Hawaii Island Mitigation Area also provides additional protection for identified biologically important areas (small and resident populations) for multiple Main Hawaii Island species by not conducting more than 300 hours of MF1 surface ship hull-mounted mid-frequency active sonar or 20 hours of MF4 dipping sonar and not using explosives during testing and training. Specifically, this Mitigation Area entirely encompasses the BIAs for insular pygmy killer whales, melon-headed whales, short-finned pilot whales, and the Hawaii population of pantropical spotted dolphins; encompasses a large portion of the rough-toothed dolphin BIA; and overlaps the Hawaii Island portion of the multi-Island BIAs for false killer whales, common bottlenose dolphin, and spinner dolphin.

Below we synthesize and summarize the information that supports our determination that the Navy's activities will not adversely impact recruitment or survival for any of the affected stocks addressed in this section:

Long-beaked common dolphin (California stock), northern right whale dolphin (CA/OR/WA stock), and short-beaked common dolphin (CA/OR/WA stock)—None of these stocks is listed under the ESA and their stock statuses are considered ''increasing,'' ''unknown,'' and ''stable,'' respectively. Short-beaked common dolphins are authorized for six takes by mortality over the five-year rule, or 1.2 M/SI annually. The addition of this 1.2 annual mortality still leaves the total human-caused mortality well under the insignificance threshold for residual PBR. The three stocks are expected and authorized to accrue 2, 1, and 10 Level A harassment takes from tissue damage resulting from exposure to explosives, respectively. As described in greater detail previously, the impacts of a Level A harassment take by tissue damage could range in impact from minor to something just less than M/SI that could seriously impact fitness. However, given the Navy's procedural mitigation, exposure at the closer to the source and more severe end of the spectrum is less likely and we cautiously assume some moderate impact for these takes that could lower the affected individual's fitness within the year such that a female (assuming a 50 percent chance of it being a female) might forego reproduction for one year. As noted previously, foregone reproduction has less of an impact on population rates than death (especially for only one year in five), and 1 to 10 instances would not be expected to impact annual rates of recruitment or survival for these stocks.

Regarding the magnitude of Level B harassment takes (TTS and behavioral disruption), the number of estimated total instances of take compared to the abundance (measured against both the Navy-estimated abundance and the SAR) is 2411, 1273, and 571 (respective to the stocks listed in the heading) and 244, 369, and 229 (respective to the stocks listed in the heading) percent (Table 78). Given the range of these stocks, this information suggests that likely some portion (but not all or even the majority) of the individuals in the Northern right whale dolphin and short-beaked common dolphin stocks are likely impacted, while it is entirely possible that most or all of the range-limited long-beaked common dolphin is taken. All three stocks likely will experience some repeat Level B harassment exposure (perhaps up to 48, 25, or 11 days within a year, respective to the stocks listed in the heading) of some subset of individuals that spend extended time within the SOCAL range complex. While interrupted feeding bouts are a known response and concern for odontocetes, we also know that there are often viable alternative habitat options in the relative vicinity. Regarding the severity of those individual takes by Level B behavioral harassment, we have explained that the duration of any exposure is expected to be between minutes and hours (*i.e.,* relatively short) and the received sound levels largely below 172 dB with a portion up to 178 dB (*i.e.,* of a moderate or lower level, less likely to evoke a severe response). However, some of these takes could occur on a fair number of sequential days for long-beaked common dolphins or northern right whale dolphins, or even some number of short-beaked common dolphins, given the high number of total takes (*i.e.,* the probability that some number of individuals get taken on a higher number of sequential days is higher, because the total take number is relatively high, even though percentage not that high).

As described previously, the severity of TTS takes, is expected to be low-level, of short duration, and mostly not in a frequency band that would be expected to interfere significantly with conspecific communication, echolocation, or other important low-frequency cues, and the associated lost opportunities and capabilities would not be expected to impact reproduction or survival. For these same reasons (low level and frequency band), while a small permanent loss of hearing sensitivity may include some degree of energetic costs for compensating or may mean some small loss of opportunities or detection capabilities, as discussed above, it would be unlikely to impact behaviors, opportunities, or detection capabilities to a degree that would interfere with reproductive success or survival of any individuals.

Altogether and as described in more detail immediately above, short-beaked common dolphins are authorized for 1.2 annual lethal takes, all three stocks may experience a very small number of takes by tissue damage or PTS (relative to the stock abundance and PBR), and a moderate to large portion of all three stocks will likely be taken (at a low to occasionally moderate level) over several days a year, and some smaller portion of these stocks is expected to be taken on a relatively moderate to high number of days across the year, some of which could be sequential days. Though the majority of impacts are expected to be of a lower to sometimes moderate severity, the larger number of takes (in total and for certain individuals) makes it more likely (probabilistically) that a small number of individuals could be interrupted during foraging in a manner and amount such that impacts to the energy budgets of females (from either losing feeding opportunities or expending considerable energy to find alternative feeding options) could cause them to forego reproduction for a year. Energetic impacts to males are generally meaningless to population rates unless they cause death, and it takes extreme energy deficits beyond what would ever be likely to result from these activities to cause the death of an adult marine mammal. As noted previously, however, foregone reproduction (especially for only one year out of five) has far less of an impact on population rates than mortality and a small number of instances of foregone reproduction (including in combination with that which might result from the small number of tissue damage takes) would not be expected to adversely affect the stocks through effects on annual rates of recruitment or survival, especially given the very high residual PBRs of these stocks (621, 175, and 8353, respectively). For these reasons, in consideration of all of the effects of the Navy's activities combined (mortality, Level A harassment, and Level B harassment), we have determined that the authorized take will have a negligible impact on these three stocks of dolphins.

All other SOCAL dolphin stocks (except Long-beaked common dolphin, Northern right whale dolphin, and short-beaked common dolphin)—None of these stocks is listed under the ESA and their stock statuses are considered ''unknown,'' except for the bottlenose dolphin (California coastal stock) and killer whale (Eastern North Pacific stock), which are considered ''stable.'' No M/SI or Level A harassment via tissue damage from exposure to explosives is expected or authorized for these stocks.

Regarding the magnitude of Level B harassment takes (TTS and behavioral disruption), the number of estimated total instances of take compared to the abundance (measured against both the Navy-estimated abundance and the SAR) is from 440–2675 and 45 to 2881, respectively (Table 78). Given the range of these stocks (along the entire U.S. West Coast, or even beyond, with some also extending seaward of the HSTT Study Area boundaries), this information suggests that some portion (but not all or even the majority) of the individuals of any of these stocks will be taken, with the exception that most or all of the individuals of the more range-limited California coastal stock of bottlenose dolphin may be taken. It is also likely that some subset of individuals within most of these stocks will be taken repeatedly within the year (perhaps up to 10–15 days within a year), but with no more than several potentially sequential days, although the CA/OR/WA stocks of bottlenose dolphins, Pacific white-sided dolphins, and Risso's dolphins may include individuals that are taken repeatedly within the year over a higher number of days (up to 57, 22, and 40 days, respectively) and potentially over a fair number of sequential days, especially where individuals spend extensive time in the SOCAL range complex. Note that though percentages are high for the Eastern North Pacific stock of killer whales and short-finned pilot whales, given the low overall number of takes, it is highly unlikely that any individuals would be taken across the number of days their percentages would suggest. While interrupted feeding bouts are a known response and concern for odontocetes, we also know that there are often viable alternative habitat options in the relative vicinity. Regarding the severity of those individual takes by Level B behavioral harassment, we have explained that the duration of any exposure is expected to be between minutes and hours (*i.e.,* relatively short) and the received sound levels largely below 172 dB (*i.e.,* of a lower, or sometimes moderate level, less likely to evoke a severe response). However, as noted, some of these takes could occur on a fair number of sequential days for the three stocks listed earlier.

As described previously, regarding the severity of TTS takes, is expected to be low-level, of short duration, and mostly not in a frequency band that would be expected to interfere significantly with conspecific communication, echolocation, or other important low-frequency cues. For these same reasons (low level and frequency band), while a small permanent loss of hearing sensitivity may include some degree of energetic costs for compensating or may mean some small loss of opportunities or detection capabilities, it would be unlikely to impact behaviors, opportunities, or detection capabilities to a degree that would interfere with reproductive success or survival of any individuals.

Altogether, a portion of all of these stocks will likely be taken (at a low to occasionally moderate level) over several days a year, and some smaller portion of CA/OR/WA stocks of bottlenose dolphins, Pacific white-sided dolphins, and Risso's dolphins, specifically, are expected to be taken on a relatively moderate to high number of days across the year, some of which could be sequential days. Though the majority of impacts are expected to be of a lower to sometimes moderate severity, the larger number of takes (in total and for certain individuals) for the CA/OR/WA stocks of bottlenose dolphins, Pacific white-sided dolphins, and Risso's dolphins makes it more likely (probabilistically) that a small number of individuals could be interrupted during foraging in a manner and amount such that impacts to the energy budgets of females (from either losing feeding opportunities or expending considerable energy to find alternative feeding options) could cause them to forego reproduction for a year. Energetic impacts to males are generally meaningless to population rates unless they cause death, and it takes extreme energy deficits beyond what would ever be likely to result from these activities to cause the death of an adult marine mammal. As noted previously, however, foregone reproduction (especially for only one year in five) has far less of an impact on population rates than mortality and a small number of instances of foregone reproduction would not be expected to adversely affect the stocks through effects on annual rates of recruitment or survival, especially given the residual PBRs of the CA/OR/WA stocks of bottlenose dolphins, Pacific white-sided dolphins, and Risso's dolphins (9.4, 183, and 84, respectively). For these reasons, in consideration of all of the effects of the Navy's activities combined, we have determined that the authorized take will have a negligible impact on these stocks of dolphins.

All HRC dolphin stocks—With the exception of the Main Hawaiian Island stock of false killer whales (listed as endangered under the ESA, with the MMPA stock identified as ''decreasing''), none of these stocks are listed under the ESA and their stock statuses are considered ''unknown.'' No M/SI or Level A harassment via tissue damage from exposure to explosives is expected or authorized for these stocks.

Regarding the magnitude of Level B harassment takes (TTS and behavioral disruption), the number of estimated total instances of take compared to the abundance (measured against both the Navy-estimated abundance and the SAR) is from 46–1169 percent and 41 to 2130 percent, respectively (Table 77). Given the ranges of these stocks (many of them are small, resident, island-associated stocks), this information suggests that a fairly large portion of the individuals of many of these stocks will be taken, but that most individuals will only be impacted across a smaller to moderate number of days within the year (1–15), and with no more than several potentially sequential days, although two stocks (the Oahu stocks of bottlenose dolphin and pantropical spotted dolphin) have a slightly higher percentage, suggesting they could be taken up to 23 days within a year, with perhaps a few more of those days being sequential. We note that although the percentage is higher for the tropical stock of pygmy killer whale within the U.S. EEZ (2130), given (1) the low overall number of takes (760) and (2) the fact that the small within-U.S. EEZ abundance is not a static set of individuals, but rather individuals moving in and out of the U.S. EEZ making it more appropriate to use the percentage comparison for the total takes versus total abundance—it is highly unlikely that any individuals would be taken across the number of days the within-U.S. EEZ percentage suggests (42). While interrupted feeding bouts are a known response and concern for odontocetes, we also know that there are often viable alternative habitat options in the relative vicinity. Regarding the severity of those individual takes by Level B behavioral harassment, we have explained that the duration of any exposure is expected to be between minutes and hours (*i.e.,* relatively short) and the received sound levels largely below 172 dB (*i.e.,* of a lower, or sometimes moderate level, less likely to evoke a severe response). However, as noted, some of these takes could occur on a fair number of sequential days for the Oahu stocks of bottlenose dolphin and pantropical spotted dolphins.

Regarding the severity of TTS takes, as described previously they are expected to be low-level, of short duration, and mostly not in a frequency band that would be expected to interfere significantly with conspecific communication, echolocation, or other important low-frequency cues. For these same reasons (low level and frequency band), while a small permanent loss of hearing sensitivity may include some degree of energetic costs for compensating or may mean some small loss of opportunities or detection capabilities, they would be unlikely to impact behaviors, opportunities, or detection capabilities to a degree that would interfere with reproductive success or survival of any individuals, even if accrued to individuals that are also taken by behavioral harassment at the same time.

Altogether, most of these stocks (all but the Oahu stocks of bottlenose dolphin and pantropical spotted dolphins) will likely be taken (at a low to occasionally moderate level) over several days a year, with some smaller portion of the stock potentially taken on a more moderate number of days across the year (perhaps up to 15 days for Fraser's dolphin, though others notably less), some of which could be across a few sequential days, which is not expected to affect the reproductive success or survival of individuals. For the Oahu stocks of bottlenose dolphin and pantropical spotted dolphins, some subset of individuals could be taken up to 23 days in a year, with some small number being taken across several sequential days, such that a small number of individuals could be interrupted during foraging in a manner and amount such that impacts to the energy budgets of females (from either losing feeding opportunities or expending considerable energy to find alternative feeding options) could cause them to forego reproduction for a year. Energetic impacts to males are generally meaningless to population rates unless they cause death, and it takes extreme energy deficits beyond what would ever be likely to result from these activities to cause the death of an adult marine mammal. As noted previously, however, foregone reproduction (especially for one year, which is the maximum predicted because the small number anticipated in any one year makes the probability that any individual would be impacted in this way twice in five years very low) has far less of an impact on population rates than mortality and a small number of instances of foregone reproduction would not be expected to adversely affect these two stocks through effects on annual rates of recruitment or survival.

For these reasons, in consideration of all of the effects of the Navy's activities combined, we have determined that the authorized take will have a negligible impact on all of the stocks of dolphins found in the vicinity of the HRC (Table 77).

Dall's Porpoise

In this section, we build on the broader odontocete discussion above (*i.e.,* that information applies to Dall's porpoises as well), except where we offer alternative information about the received levels for Dall's porpoise Level B behavioral harassment. We discuss the different types and amounts of take that the stock will incur, the applicable mitigation for the stock, and the status of the stock to support the negligible impact determination. The discussion below focuses on additional information that is specific to porpoises (in addition to the general information on odontocetes provided above, which is relevant to this species) to support the conclusion for this stock. We have described previously (above in this section and in the proposed rule, respectively, with no new applicable information received since publication of the proposed rule) the unlikelihood of any masking or habitat impacts to Dall's porpoises that would affect reproduction or survival.

In Table 79 below, for Dall's porpoise, we indicate the total annual mortality, Level A and Level B harassment, and a number indicating the instances of total take as a percentage of abundance.

Table 79: Annual takes of Level B and Level A harassment, mortality for porpoises in the HSTT Study Area and number indicating the instances of total take as a percentage of stock abundance.

		Instances of indicated types of incidental take (not all takes represent separate individuals, especially for disturbance)									
		Level B Harassment		Level A Harassment			Total Takes	Abundance		Instances of total take as percent of abundance	
Species	Stock	Behavioral Disturbance	TTS (may also include disturbance)	PTS	Tissue Damage	Mortality	TOTAL TAKES (entire Study Area)	NAVY abundance in Action Area	NMFS SARS Abundance	Total take as percentage of total Navy abundance	Total take as percentage of total SAR abundance
Dall's porpoise	CA/OR/WA	14482	29891	209	0	0	44582	2054	25750	2170	173

Note: For the SOCAL take estimates, because of the manner in which the Navy action area overlaps the ranges of many MMPA stocks (*i.e.,* a stock may range far north to Washington state and beyond and abundance may only be predicted within the U.S. EEZ, while the Navy action area is limited to Southern California and northern Mexico, but extends beyond the U.S. EEZ), we compare predicted takes to both the abundance estimates for the action area, as well as the SARs.

Most Level B harassments to Dall's porpoise from hull-mounted sonar (MF1) in the HSTT Study Area would result from received levels between 154 and 166 dB SPL (85 percent). While harbor porpoises have been observed to be especially sensitive to human activity, the same types of responses have not been observed in Dall's porpoises. Dall's porpoises are typically notably longer than, and weigh more than twice as much as, harbor porpoises, making them generally less likely to be preyed upon and likely differentiating their behavioral repertoire somewhat from harbor porpoises. Further, they are typically seen in large groups and feeding aggregations, or exhibiting bow-riding behaviors, which is very different from the group dynamics observed in the more typically solitary, cryptic harbor porpoises, which are not often seen bow-riding. For these reasons, Dall's porpoises are not treated as especially sensitive species (versus harbor porpoises which have a lower behavioral harassment threshold and more distant cutoff) but, rather, are analyzed similarly to other odontocetes. Therefore, the majority of Level B takes are expected to be in the form of milder responses compared to higher level exposures. As mentioned earlier in this section, we anticipate more severe effects from takes when animals are exposed to higher received levels.

Dall's porpoise is not listed under the ESA and the stock status is considered "unknown." No M/SI or Level A harassment via tissue damage from exposure to explosives is expected or authorized for this stock.

Regarding the magnitude of Level B harassment takes (TTS and behavioral disruption), the number of estimated total instances of take compared to the abundance (measured against both the Navy-estimated abundance and the SAR) is 2170 and 173, respectively (Table 79). Given the range of this stock (up the U.S. West Coast through Washington and sometimes beyond the U.S. EEZ), this information suggests that some smaller portion of the individuals of these stocks will be taken, and that some subset of individuals within the stock will be taken repeatedly within the year (perhaps up to 42 days)—potentially over a fair number of sequential days, especially where individuals spend extensive time in the SOCAL range complex. While interrupted feeding bouts are a known response and concern for odontocetes, we also know that there are often viable alternative habitat options in the relative vicinity. Regarding the severity of those individual takes by Level B behavioral harassment, we have explained that the duration of any exposure is expected to be between minutes and hours (*i.e.,* relatively short) and the received sound levels largely below 172 dB (*i.e.,* of a lower, or sometimes moderate level, less likely to evoke a severe response). However, as noted, some of these takes could occur on a fair number of sequential days for this stock.

As described previously, the severity of TTS takes, is expected to be low-level, of short duration, and mostly not in a frequency band that would be expected to interfere significantly with conspecific communication, echolocation, or other important low-frequency cues. Therefore, the associated lost opportunities and capabilities would not be expected to impact reproduction or survival. For these same reasons (low level and the likely frequency band), while a small permanent loss of hearing sensitivity may include some degree of energetic costs for compensating or may mean some small loss of opportunities or detection capabilities, the estimated 209 Level A harassment takes by PTS for Dall's porpoise would be unlikely to impact behaviors, opportunities, or detection capabilities to a degree that would interfere with reproductive success or survival for most individuals. Because of the high number of PTS takes, however, we acknowledge that a few animals could potentially incur permanent hearing loss of a higher degree that could potentially interfere with their successful reproduction and growth. Given the status of the stock, even if this occurred, it would not adversely impact rates of recruitment or survival.

Altogether, a portion of this stock will likely be taken (at a low to occasionally moderate level) over several days a year, and some smaller portion of the stock is expected to be taken on a relatively moderate to high number of days across the year, some of which could be sequential days. Though the majority of impacts are expected to be of a lower to sometimes moderate severity, the larger number of takes (in total and for certain individuals) for the Dall's porpoise makes it more likely (probabilistically) that a small number of individuals could be interrupted during foraging in a manner and amount such that impacts to the energy budgets of females (from either losing feeding opportunities or expending considerable energy to find alternative feeding options) could cause them to forego reproduction for a year. Energetic impacts to males are generally meaningless to population rates unless they cause death, and it takes extreme energy deficits beyond what would ever be likely to result from these activities to cause the death of an adult marine mammal. Similarly, we acknowledge the potential for this to occur to a few individuals out of the 209 total that might incur a higher degree of PTS. As noted previously, however, foregone reproduction (especially for only one year in five) has far less of an impact on population rates than mortality. Further, the small number of instances of foregone reproduction that could potentially result from PTS and/or the few repeated, more severe behavioral harassment takes would not be expected to adversely affect the stock through effects on annual rates of recruitment or survival, especially given the status of the species (not endangered or threatened; minimum population of 25,170 just within the U.S. EEZ) and residual PBR of Dall's porpoise (171.4). For these reasons, in consideration of all of the effects of the Navy's activities combined, we have determined that the authorized take will have a negligible impact on Dall's porpoise.

Pinnipeds

In this section, we build on the broader discussion above and bring together the discussion of the different types and amounts of take that different species and stocks will incur, the applicable mitigation for each stock, and the status of the stocks to support the negligible impact determinations for each stock. Of these stocks, only Hawaiian monk seals and Guadalupe fur seals are listed under the ESA (endangered and threatened, respectively) and the SARs identify both stocks as ''increasing.'' The other stocks are not ESA-listed. All of the pinniped stocks are considered ''increasing,'' except for harbor seal (California stock), which is considered stable, and Hawaiian monk seals, which are increasing in the main Hawaiian islands, but decreasing in the Northwest Hawaiian islands (the SAR says that therefore they are not certain whether to consider the whole stock as decreasing, stable, or possible increasing). Broadly, we have already described above why we believe the incremental addition of the comparatively small number of low-level PTS takes in predominantly narrow frequency bands will not have any meaningful effect towards inhibiting reproduction or survival. Other than for California sea lions, no mortality is expected or authorized. We have described (above in this section and in the proposed rule, respectively, with no new applicable information received since publication of the proposed rule) the unlikelihood of any masking or habitat impacts to any groups that would rise to the level of affecting reproduction or survival.

In Tables 80 and 81 below, for pinnipeds, we indicate the total annual mortality, Level A and Level B harassment, and a number indicating the instances of total take as a percentage of abundance.

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Table 80. Annual takes of Level B and Level A harassment, mortality for pinnipeds in the HRC of the HSTT Study Area and number indicating the instances of total take as a percentage of stock abundance.

	Instances of indicated types of incidental take (not all takes represent separate individuals, especially for disturbance)										
	Level B Harassment		Level A Harassment			Total Takes		Abundance		Instance of total take as percent of abundance	
Species	Behavioral Disturbance	TTS (may also include disturbance)	PTS	Tissue Damage	Mortality	TOTAL TAKES (entire Study Area)	Takes (within NAVY EEZ)	Total Navy Abundance in and out EEZ (HRC)	Within Navy EEZ Abundance	Total take as percentage of total Navy abundance (HRC)	EEZ take as percentage of EEZ abundance (HRC)
Hawaiian monk seal	143	62	1	0	0	206	195	169	169	122	115

Note: For the HI take estimates, we compare predicted takes to abundance estimates generated from the same underlying density estimates, both in and outside of the U.S. EEZ. Because the portion of the Navy's action area inside the U.S. EEZ is generally concomitant with the area used to generate the abundance estimates in the SARs, and the abundance predicted by the same underlying density estimates is the preferred abundance to use, there is no need to separately compare the take to the SARs abundance estimate.

Table 81. Annual takes of Level B and Level A harassment, mortality for pinnipeds in the SOCAL portion of the HSTT Study Area and number indicating the instances of total take as a percentage of stock abundance.

		Instances of indicated types of incidental take (not all takes represent separate individuals, especially for disturbance)									
		Level B Harassment		Level A Harassment			Total Takes	Abundance		Instance of total take as percent of abundance	
Species	Stock	Behavioral Disturbance	TTS (may also include disturbance)	PTS	Tissue Damage	Mortality	TOTAL TAKES (entire Study Area)	NAVY abundance in Action Area SOCAL	NMFS SARS Abundance	Total take as percentage of total Navy abundance in Action Area	Total take as percentage of total SAR abundance
California sea lion	U.S.	113419	4789	87	9	0.8	118305	4085	296750	2896	40
Guadalupe fur seal	Mexico	1442	15	0	0	0	1457	1171	20000	124	7
Northern fur seal	California	15167	124	1	0	0	15292	886	14050	1726	109
Harbor seal	California	2450	2994	8	0	0	5452	321	30968	1698	18
Northern elephant seal	California	42916	17955	97	2	0	60970	4108	179000	1484	34

Note: For the SOCAL take estimates, because of the manner in which the Navy action area overlaps the ranges of many MMPA stocks (*i.e.*, a stock may range far north to Washington state and beyond and abundance may only be predicted within the U.S. EEZ, while the Navy action area is limited to Southern California and northern Mexico, but extends beyond the U.S. EEZ), we compare predicted takes to both the abundance estimates for the action area, as well as the SARs.

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The majority of takes by harassment of pinnipeds in the HSTT Study Area are caused by sources from the MF1 active sonar bin (which includes hull-mounted sonar) because they are high level sources at a frequency (1–10 kHz) which overlaps the most sensitive portion of the pinniped hearing range, and of the sources expected to result in take, they are used in a large portion of exercises (see Table 1.5–5 in the Navy's rulemaking/LOA application). Most of the takes (83 percent) from the MF1 bin in the HSTT Study Area would result from received levels between 160 and 172 dB SPL, while another 16 percent would result from exposure between 172 and 178 dB SPL. For the remaining active sonar bin types, the percentages are as follows: LF3 = 92 percent between 154 and 166 dB SPL, LF5M = 99 percent between 112 and 124 dB SPL, MF4 = 98 percent between 148 and 166 dB SPL, MF5 = 97 percent between 130 and 160 dB SPL, and HF4 = 96 percent between 100 and 160 dB SPL. These values may be derived from the information in Tables 6.4–8 through 6.4–12 in the Navy's rulemaking/LOA application (though they were provided directly to NMFS upon request). Exposures at these levels would be considered of low to occasionally moderate severity. As mentioned earlier in this section, we anticipate more severe effects from takes when animals are exposed to higher received levels. Occasional milder takes by Level B behavioral harassment are unlikely to cause long-term consequences for individual animals or populations, especially when they are not expected to be repeated over sequential multiple days. For all pinnipeds, harassment takes from explosives (behavioral, TTS, or PTS if present) comprise a very small fraction of those caused by exposure to active sonar. No PTS is expected to result from pile driving or air guns for pinnipeds and TTS from pile driving and air guns is limited to single digits for elephant seals.

Because the majority of harassment take of pinnipeds results from narrowband sources in the range of 1–10 kHz, the vast majority of threshold shift caused by Navy sonar sources will typically occur in the range of 2–20 kHz. This frequency range falls within the range of pinniped hearing, however, pinniped vocalizations typically span a somewhat lower range than this (<0.2 to 10 kHz) and threshold shift from active sonar will often be in a narrower band (reflecting the narrower band source that caused it), which means that TTS incurred by pinnipeds would typically only interfere with communication within a portion of a pinniped's range (if it occurred during a time when communication with conspecifics was occurring). As discussed earlier, it would only be expected to be of a short duration and relatively small degree. Many of the other critical sounds that serve as cues for navigation and prey (*e.g.,* waves, fish, invertebrates) occur below a few kHz, which means that detection of these signals will not be inhibited by most threshold shifts either. The very low number of takes by threshold shifts that might be incurred by individuals exposed to explosives or air guns would likely be lower frequency (5 kHz or less) and spanning a wider frequency range, which could slightly lower an individual's sensitivity to navigational or prey cues, or a small portion of communication calls, for several minutes to hours (if temporary) or permanently.

We note that as described previously, the Hawaii and 4-Islands mitigation areas protect (by not using explosives and limiting MFAS within) a significant portion of the designated critical habitat for Hawaiian monk seals in the Main Hawaiian Islands, including all of it around the islands of Hawaii and Lanai, most around Maui, and good portions around Molokai and Kaho'olawe. As discussed, this protection reduces the overall number of takes, and further reduces the severity of effects by minimizing impacts near pupping beaches and in important foraging habitat.

Regarding behavioral disturbance, research and observations show that pinnipeds in the water may be tolerant of anthropogenic noise and activity (a review of behavioral reactions by pinnipeds to impulsive and non-impulsive noise can be found in Richardson *et al.* (1995) and Southall *et al.* (2007). Available data, though limited, suggest that exposures between approximately 90 and 140 dB SPL do not appear to induce strong behavioral responses in pinnipeds exposed to non-pulse sounds in water (Costa *et al.,* 2003; Jacobs and Terhune, 2002; Kastelein *et al.,* 2006c). Based on the limited data on pinnipeds in the water exposed to multiple pulses (small explosives, impact pile driving, and seismic sources), exposures in the approximately 150 to 180 dB SPL range generally have limited potential to induce avoidance behavior in pinnipeds (Blackwell *et al.,* 2004; Harris *et al.,* 2001; Miller *et al.,* 2004). If pinnipeds are exposed to sonar or other active acoustic sources they may react in a number of ways depending on their experience with the sound source and what activity they are engaged in at the time of the acoustic exposure. Pinnipeds may not react at all until the sound source is approaching within a few hundred meters and then may alert, ignore the stimulus, change their behaviors, or avoid the immediate area by swimming away or diving. Effects on pinnipeds in the HSTT Study Area that are taken by Level B harassment, on the basis of reports in the literature as well as Navy monitoring from past activities, will likely be limited to reactions such as increased swimming speeds, increased surfacing time, or decreased foraging (if such activity were occurring). Most likely, individuals will simply move away from the sound source and be temporarily displaced from those areas, or not respond at all, which would have no effect on reproduction or survival. In areas of repeated and frequent acoustic disturbance, some animals may habituate or learn to tolerate the new baseline or fluctuations in noise level. Habituation can occur when an animal's response to a stimulus wanes with repeated exposure, usually in the absence of unpleasant associated events (Wartzok *et al.,* 2003). While some animals may not return to an area, or may begin using an area differently due to training and testing activities, most animals are expected to return to their usual locations and behavior. Given their documented tolerance of anthropogenic sound (Richardson *et al.,* 1995 and Southall *et al.,* 2007), repeated exposures of individuals of any of these species to levels of sound that may cause Level B harassment are unlikely to result in hearing impairment or to significantly disrupt foraging behavior.

Thus, even repeated Level B harassment of some small subset of individuals of an overall stock is unlikely to result in any significant realized decrease in fitness to those individuals that would result in any adverse impact on rates of recruitment or survival for the stock as a whole.

The Navy is authorized for four M/SI takes of California sea lions and when this mortality is combined with the other human-caused mortality from other sources, it still falls well below the insignificance threshold for residual PBR. A small number of Level A harassment takes by tissue damage will also be authorized (9 and 2 for California sea lions and northern elephant seals, respectively), which, as noted previously, could range in impact from minor to something just less than M/SI that could seriously impact fitness. However, given the Navy's mitigation, exposure at the closer to the source and more severe end of the spectrum is less likely. Nevertheless, we cautiously assume some moderate impact on the individuals that experience these small numbers of take that could lower the individual's fitness within the year such that a female (assuming a 50 percent chance of it being a female) might forego reproduction for one year. As noted previously, foregone reproduction has less of an impact on population rates than death (especially for only one within five years) and these low numbers of instances (especially assuming the likelihood that only 50 percent of the takes would affect females) would not be expected to impact annual rates of recruitment or survival, especially given the population sizes of these species.

Regarding the magnitude of Level B harassment takes (TTS and behavioral disruption), for Hawaiian monk seals and Guadalupe fur seals, the two species listed under the ESA, the estimated instances of takes as compared to the stock abundance does not exceed 124 percent, which suggests that some portion of these two stocks would be taken on one to a few days per year. For the remaining stocks, the number of estimated total instances of take compared to the abundance (measured against both the Navy-estimated abundance and the SAR) for these stocks is 1,484–2,896 percent and 18–40 percent, respectively (Table 81). Given the ranges of these stocks (*i.e.,* very large ranges, but with individuals often staying in the vicinity of haulouts), this information suggests that some very small portion of the individuals of these stocks will be taken, but that some subset of individuals within the stock will be taken repeatedly within the year (perhaps up to 58 days)—potentially over a fair number of sequential days. Regarding the severity of those individual takes by Level B behavioral harassment, we have explained that the duration of any exposure is expected to be between minutes and hours (*i.e.,* relatively short) and the received sound levels largely below 172 dB, which is considered a relatively low to occasionally moderate level for pinnipeds. However, as noted, some of these takes could occur on a fair number of sequential days for this stock.

As described previously, the severity of TTS takes, expected to be low-level, of short duration, and mostly not in a frequency band that would be expected to interfere significantly with conspecific communication, echolocation, or other important low-frequency cues that would affect the individual's reproduction or survival. For these same reasons (low level and frequency band), while a small permanent loss of hearing sensitivity may include some degree of energetic costs for compensating or may mean some small loss of opportunities or detection capabilities, the one to eight estimated Level A harassment takes by PTS for monk seals, northern fur seals, and harbor seals would be unlikely to impact behaviors, opportunities, or detection capabilities to a degree that would interfere with reproductive success or survival of any individuals. Because of the high number of PTS takes for California sea lions and northern elephant seals (87 and 97, respectively); however, we acknowledge that a few animals could potentially incur permanent hearing loss of a higher degree that could potentially interfere with their successful reproduction and growth. Given the status of the stock, even if this occurred, it would not adversely impact rates of recruitment or survival (residual PBR of 13,686 and 4,873, respectively).

Altogether, Hawaiian monk seals and Guadalupe fur seals individuals will be taken no more than a few days in any year, with none of the expected take anticipated to affect individual reproduction or survival, let alone annual rates of recruitment and survival. With all other stocks, only a very small portion of the stock will be taken in any manner. Of those taken, some individuals will be taken by Level B harassment (at a moderate or sometimes low level) over several days a year, and some smaller portion of those taken will be on a relatively moderate to high number of days across the year (up to 58), a fair number of which would likely be sequential days. Though the majority of impacts are expected to be of a lower to sometimes moderate severity, the repeated takes over a potentially fair number of sequential days for some individuals makes it more likely that some number of individuals could be interrupted during foraging in a manner and amount such that impacts to the energy budgets of females (from either losing feeding opportunities or expending considerable energy to find alternative feeding options) could cause them to forego reproduction for a year (energetic impacts to males are generally meaningless to population rates unless they cause death, and it takes extreme energy deficits beyond what would ever be likely to result from these activities to cause the death of an adult marine mammal). As noted previously, however, foregone reproduction (especially for only one year within five) has far less of an impact on population rates than mortality and a relatively small number of instances of foregone reproduction (as compared to the stock abundance and residual PBR) would not be expected to adversely affect the stock through effects on annual rates of recruitment or survival, especially given the status of these stocks. Accordingly, we do not anticipate the relatively small number of individual Northern fur seals or harbor seals that might be taken over repeated days within the year in a manner that results in one year of foregone reproduction to adversely affect the stocks through effects on rates of recruitment or survival, given the status of the stocks, which are respectively increasing and stable with abundances and residual PBRs of 14,050/30,968 and 449/1,598.

For California sea lions, given the very high abundance and residual PBR (296,750 and 13,686), as well as the increasing status of the stock in the presence of similar levels of Navy activities over past years—the impacts of 0.2 annual mortalities, potential foregone reproduction for up to nine individuals in a year taken by tissue damage and some relatively small number of individuals taken as a result of repeated behavioral harassment over a fair number of sequential days are not expected to adversely affect the stock through effects on annual rates of recruitment or survival. similarly, for Northern elephant seals, given the very high abundance and residual PBR (179,000 and 4,873), as well as the increasing status of the stock in the presence of similar levels of Navy activities over past years—the impacts of potential foregone reproduction for up to two individuals in a year taken by tissue damage and some relatively small number of individuals taken as a result of repeated behavioral harassment over a fair number of sequential days are not expected to adversely affect the stock through effects on annual rates of recruitment or survival. For these reasons, in consideration of all of the effects of the Navy's activities combined (mortality, Level A harassment, and Level B harassment), we have determined that the authorized take will have a negligible impact on all pinniped species and stocks (Tables 80 and 81).

Determination

Based on the analysis contained herein of the likely effects of the specified activities on marine mammals and their habitat, and taking into consideration the implementation of the monitoring and mitigation measures, NMFS finds that the total marine mammal take from the specified activities will have a negligible impact on all affected marine mammal species and stocks.

Subsistence Harvest of Marine Mammals

There are no relevant subsistence uses or harvest of marine mammals implicated by this action. Therefore, NMFS has determined that the total taking affecting species or stocks would not have an unmitigable adverse impact on the availability of such species or stocks for taking for subsistence purposes.

Endangered Species Act

There are nine marine mammal species under NMFS jurisdiction that are listed as endangered or threatened under the ESA with confirmed or possible occurrence in the HSTT Study Area: Blue whale (Eastern and Central North Pacific stocks), fin whale (CA/OR/WA and Hawaii stocks), gray whale (Western North Pacific stock), humpback whale (Mexico and Central America DPSs), sei whale (Eastern North Pacific and Hawaii stocks), sperm whale (CA/OR/WA and Hawaii stocks), false killer whale (Main Hawaii Islands Insular), Hawaiian monk seal (Hawaii stock), and Guadalupe fur seal (Mexico to California). There is also ESA-designated critical habitat for Hawaiian monk seals and Main Hawaiian Island insular false killer whales. The Navy consulted with NMFS pursuant to section 7 of the ESA, and NMFS also consulted internally on the issuance of these regulations and LOAs under section 101(a)(5)(A) of the MMPA for HSTT activities. NMFS issued a Biological Opinion concluding that the issuance of the rule and subsequent LOAs is not likely to jeopardize the continued existence of the threatened and endangered species under NMFS' jurisdiction and are not likely to result in the destruction or adverse modification of critical habitat in the HSTT 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*.

National Marine Sanctuaries Act

Federal agencies are subject to the National Marine Sanctuaries Act (NMSA), as applicable. NMFS has fulfilled its responsibilities and completed all requirements under the NMSA.

National Environmental Policy Act

NMFS participated as a cooperating agency on the HSTT FEIS/OEIS, which was published on October 26, 2018, and is available at *https://www.hstteis.com/*. In accordance with 40 CFR 1506.3, NMFS independently reviewed and evaluated the HSTT FEIS/OEIS and determined that it is adequate and sufficient to meet our responsibilities under NEPA for the issuance of this rule and associated LOAs. NOAA therefore adopted the Navy's HSTT FEIS/OEIS. NMFS has prepared a separate Record of Decision. NMFS' Record of Decision for adoption of the HSTT FEIS/OEIS 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

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 has certified to the Chief Counsel for Advocacy of the Small Business Administration that this final rule will not have a significant economic impact on a substantial number of small entities. The RFA requires Federal agencies 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 would be affected by this rulemaking, and the Navy 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, would be applicable only to the Navy. 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.

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 December 21, 2018, to accommodate the Navy's current LOAs expiring December 24, 2018, so as to not cause a disruption in training and testing activities. NMFS was unable to accommodate the 30-day delay of effectiveness period due to the need for additional time to consider additional mitigation measures presented by the Navy as well as new analysis of information showing that incidental mortality and serious injury of seven stocks previously analyzed is unlikely to occur. The waiver of the 30-day delay of the effective date of the final rule will ensure that the MMPA final rule and LOAs are in place by the time the previous authorizations expire. 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) the Navy's procedural non-compliance with the MMPA (should the Navy conduct training and testing without LOAs), thereby resulting in the potential for unauthorized takes of marine mammals. 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, Incidental take, Indians, Labeling, Marine mammals, Navy, Penalties, Reporting and recordkeeping requirements, Seafood, Sonar, Transportation.

Dated: December 13, 2018.

Alan D. Risenhoover,

Acting 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.,* unless otherwise noted.

■ 2. Revise subpart H to part 218 to read as follows:

Subpart H—Taking and Importing Marine Mammals; U.S. Navy's Hawaii-Southern California Training and Testing (HSTT)

Sec.
218.70 Specified activity and geographical region.
218.71 Effective dates.
218.72 Permissible methods of taking.
218.73 Prohibitions.
218.74 Mitigation requirements.
218.75 Requirements for monitoring and reporting.
218.76 Letters of Authorization.
218.77 Renewals and modifications of Letters of Authorization.
218.78 [Reserved]
218.79 [Reserved]

Subpart H—Taking and Importing Marine Mammals; U.S. Navy's Hawaii-Southern California Training and Testing (HSTT)

§ 218.70 Specified activity and geographical region.

(a) Regulations in this subpart apply only to the U.S. Navy for the taking of marine mammals that occurs in the area described in paragraph (b) of this section and that occurs incidental to the activities listed in paragraph (c) of this section.

(b) The taking of marine mammals by the Navy under this subpart may be authorized in Letters of Authorization (LOAs) only if it occurs within the Hawaii-Southern California Training and Testing (HSTT) Study Area, which includes established operating and warning areas across the north-central Pacific Ocean, from the mean high tide line in Southern California west to Hawaii and the International Date Line. The Study Area includes the at-sea areas of three existing range complexes the Hawaii Range Complex (HRC), the Southern California Range Complex (SOCAL), and the Silver Strand Training Complex, and overlaps a portion of the Point Mugu Sea Range (PMSR). Also included in the Study Area are Navy pierside locations in Hawaii and Southern California, Pearl Harbor, San Diego Bay, and the transit corridor on the high seas where sonar training and testing may occur.

(c) The taking of marine mammals by the Navy is only authorized if it occurs incidental to the Navy conducting training and testing activities, including:

(1) *Training.* (i) Amphibious warfare;

(ii) Anti-submarine warfare;

(iii) Electronic warfare;

(iv) Expeditionary warfare;

(v) Mine warfare; and

(vi) Surface warfare.

(2) *Testing.* (i) Naval Air Systems Command Testing Activities;

(ii) Naval Sea System Command Testing Activities; and

(iii) Office of Naval Research Testing Activities.

§ 218.71 Effective dates.

Regulations in this subpart are effective December 21, 2018 through December 20, 2023.

§ 218.72 Permissible methods of taking.

(a) Under LOAs issued pursuant to §§ 216.106 of this chapter and 218.76, the Holder of the LOAs (hereinafter ''Navy'') may incidentally, but not intentionally, take marine mammals within the area described in § 218.70(b) by Level A harassment and Level B harassment associated with the use of active sonar and other acoustic sources and explosives as well as serious injury or mortality associated with vessel strikes and explosives, provided the activity is in compliance with all terms, conditions, and requirements of these regulations in this subpart and the applicable LOAs.

(b) The incidental take of marine mammals by the activities listed in § 218.80(c) is limited to the following species:

TABLE 1 TO § 218.72

Species	Stock
Blue whale	Central North Pacific.
Blue whale	Eastern North Pacific.
Bryde's whale	Eastern Tropical Pacific.
Bryde's whale	Hawaii.
Fin whale	CA/OR/WA.
Fin whale	Hawaiian.
Humpback whale	CA/OR/WA.
Humpback whale	Central North Pacific.
Minke whale	CA/OR/WA.
Minke whale	Hawaii.
Sei whale	Eastern North Pacific.
Sei whale	Hawaii.
Gray whale	Eastern North Pacific.
Gray whale	Western North Pacific.
Sperm whale	CA/OR/WA.
Sperm whale	Hawaii.
Dwarf sperm whale	Hawaii.
Pygmy sperm whale	Hawaii.
Kogia whales	CA/OR/WA.
Baird's beaked whale	CA/OR/WA.
Blainville's beaked whale	Hawaii.
Cuvier's beaked whale	CA/OR/WA.
Cuvier's beaked whale	Hawaii.
Longman's beaked whale	Hawaii.
Mesoplodon spp	CA/OR/WA.
Bottlenose dolphin	California Coastal.
Bottlenose dolphin	CA/OR/WA Offshore.
Bottlenose dolphin	Hawaii Pelagic.
Bottlenose dolphin	Kauai & Niihau.
Bottlenose dolphin	Oahu.
Bottlenose dolphin	4-Island.
Bottlenose dolphin	Hawaii.
False killer whale	Hawaii Pelagic.
False killer whale	Main Hawaiian Islands Insular.
False killer whale	Northwestern Hawaiian Islands.
Fraser's dolphin	Hawaii.
Killer whale	Eastern North Pacific (ENP) Offshore.
Killer whale	ENP Transient/West Coast Transient.
Killer whale	Hawaii.
Long-beaked common dolphin	California.
Melon-headed whale	Hawaiian Islands.
Melon-headed whale	Kohala Resident.
Northern right whale dolphin	CA/OR/WA.
Pacific white-sided dolphin	CA/OR/WA.
Pantropical spotted dolphin	Hawaii Island.
Pantropical spotted dolphin	Hawaii Pelagic.
Pantropical spotted dolphin	Oahu.
Pantropical spotted dolphin	4-Island.
Pygmy killer whale	Hawaii.
Pygmy killer whale	Tropical.
Risso's dolphin	CA/OR/WA.
Risso's dolphin	Hawaii.
Rough-toothed dolphin	Hawaii.
Short-beaked common dolphin	CA/OR/WA.
Short-finned pilot whale	CA/OR/WA.
Short-finned pilot whale	Hawaii.
Spinner dolphin	Hawaii Island.
Spinner dolphin	Hawaii Pelagic.
Spinner dolphin	Kauai & Niihau.
Spinner dolphin	Oahu & 4-Island.
Striped dolphin	CA/OR/WA.

TABLE 1 TO § 218.72—Continued

Species	Stock
Striped dolphin	Hawaii.
Dall's porpoise	CA/OR/WA.
California sea lion	U.S.
Guadalupe fur seal	Mexico.
Northern fur seal	California.
Harbor seal	California.
Hawaiian monk seal	Hawaii.
Northern elephant seal	California.

Note to Table 1: CA/OR/WA = California/Oregon/Washington.

§ 218.73 Prohibitions.

Notwithstanding incidental takings contemplated in § 218.72(a) and authorized by LOAs issued under §§ 216.106 of this chapter and 218.76, no person in connection with the activities listed in § 218.70(c) may:

(a) Violate, or fail to comply with, the terms, conditions, and requirements of this subpart or an LOA issued under §§ 216.106 of this chapter and 218.76;

(b) Take any marine mammal not specified in § 218.72(b);

(c) Take any marine mammal specified in § 218.72(b) in any manner other than as specified in the LOAs; or

(d) Take a marine mammal specified in § 218.72(b) if NMFS determines such taking results in more than a negligible impact on the species or stocks of such marine mammal.

§ 218.74 Mitigation requirements.

When conducting the activities identified in § 218.70(c), the mitigation measures contained in any LOAs issued under §§ 216.106 of this chapter and 218.76 must be implemented. These mitigation measures include, but are not limited to:

(a) *Procedural mitigation.* Procedural mitigation is mitigation that the Navy must implement whenever and wherever an applicable training or testing activity takes place within the HSTT Study Area for each applicable activity category or stressor category and includes acoustic stressors (*i.e.,* active sonar, air guns, pile driving, weapons firing noise), explosive stressors (*i.e.,* sonobuoys, torpedoes, medium-caliber and large-caliber projectiles, missiles and rockets, bombs, sinking exercises, mines, anti-swimmer grenades, and mat weave and obstacle loading), and physical disturbance and strike stressors (*i.e.,* vessel movement; towed in-water devices; small-, medium-, and large-caliber non-explosive practice munitions; non-explosive missiles and rockets; and non-explosive bombs and mine shapes).

(1) *Environmental awareness and education.* Appropriate Navy personnel (including civilian personnel) involved in mitigation and training or testing activity reporting under the specified activities must complete one or more modules of the U.S Navy Afloat Environmental Compliance Training Series, as identified in their career path training plan. Modules include: Introduction to the U.S. Navy Afloat Environmental Compliance Training Series, Marine Species Awareness Training; U.S. Navy Protective Measures Assessment Protocol; and U.S. Navy Sonar Positional Reporting System and Marine Mammal Incident Reporting.

(2) *Active sonar.* Active sonar includes low-frequency active sonar, mid-frequency active sonar, and high-frequency active sonar. For vessel-based activities, mitigation applies only to sources that are positively controlled and deployed from manned surface vessels (*e.g.,* sonar sources towed from manned surface platforms). For aircraft-based activities, mitigation applies only to sources that are positively controlled and deployed from manned aircraft that do not operate at high altitudes (*e.g.,* rotary-wing aircraft). Mitigation does not apply to active sonar sources deployed from unmanned aircraft or aircraft operating at high altitudes (*e.g.,* maritime patrol aircraft).

(i) *Number of Lookouts and observation platform*—(A) *Hull-mounted sources.* One Lookout for platforms with space or manning restrictions while underway (at the forward part of a small boat or ship) and platforms using active sonar while moored or at anchor (including pierside); and two Lookouts for platforms without space or manning restrictions while underway (at the forward part of the ship).

(B) *Sources that are not hull-mounted sources.* One Lookout on the ship or aircraft conducting the activity.

(ii) *Mitigation zone and requirements.* During the activity, at 1,000 yards (yd) Navy personnel must power down 6 decibels (dB), at 500 yd Navy personnel must power down an additional 4 dB (for a total of 10 dB), and 200 yd Navy personnel must shut down for low-frequency active sonar ≥200 dB and hull-mounted mid-frequency active sonar; or at 200 yd Navy personnnel must shut down for low-frequency active sonar <200 dB, mid-frequency active sonar sources that are not hull-mounted, and high-frequency active sonar.

(A) Prior to the start of the activity (*e.g.,* when maneuvering on station), Navy personnel must observe the mitigation zone for floating vegetation; if floating vegetation is observed, Navy personnel must relocate or delay the start of active sonar transmission until the mitigation zone is clear. Navy personnel must also observe the mitigation zone for marine mammals; if marine mammals are observed, Navy personnel must relocate or delay the start of active sonar transmission.

(B) During the activity for low-frequency active sonar at or above 200 dB and hull-mounted mid-frequency active sonar, Navy personnel must observe the mitigation zone for marine mammals and power down active sonar transmission by 6 dB if marine mammals are observed within 1,000 yd of the sonar source; power down by an additional 4 dB (for a total of 10 dB total) if marine mammals are observed within 500 yd of the sonar source; and cease transmission if marine mammals are observed within 200 yd of the sonar source.

(C) During the activity for low-frequency active sonar below 200 dB, mid-frequency active sonar sources that are not hull mounted, and high-frequency active sonar, Navy personnel must observe the mitigation zone for marine mammals and cease active sonar transmission if marine mammals are observed within 200 yd of the sonar source.

(D) Commencement/recommencement conditions after a marine mammal sighting before or during the activity. Navy personnel must allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing or powering up active sonar transmission) until one of the following conditions has been met: The animal is observed exiting the mitigation zone; the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the sonar source; the mitigation zone has been clear from any additional sightings for 10 minutes (min) for aircraft-deployed sonar sources or 30 min for vessel-deployed sonar sources; for mobile activities, the active sonar source has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting; or for activities using hull-mounted sonar where a dolphin(s) is observed in the mitigation zone, the Lookout concludes that the dolphin(s) are deliberately closing in on the ship to ride the ship's bow wave, and are therefore out of the main transmission axis of the sonar (and there are no other marine mammal sightings within the mitigation zone).

(3) *Air guns*—(i) *Number of Lookouts and observation platform.* One Lookout positioned on a ship or pierside.

(ii) *Mitigation zone and requirements.* 150 yd around the air gun.

(A) Prior to the initial start of the activity (*e.g.,* when maneuvering on station), Navy personnel must observe the mitigation zone for floating vegetation; if floating vegetation is observed, Navy personnel must relocate or delay the start until the mitigation zone is clear. Navy personnel must also observe the mitigation zone for marine mammals; if marine mammals are observed, Navy personnel must relocate or delay the start of air gun use.

(B) During the activity, Navy personnel must observe the mitigation zone for marine mammals; if marine mammals are observed, Navy personnel must cease air gun use.

(C) Commencement/recommencement conditions after a marine mammal sighting before or during the activity. Navy personnel must allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing air gun use) until one of the following conditions has been met: The animal is observed exiting the mitigation zone; the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the air gun; the mitigation zone has been clear from any additional sightings for 30 min; or for mobile activities, the air gun has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting.

(4) *Pile driving.* Pile driving and pile extraction sound during Elevated Causeway System training.

(i) *Number of Lookouts and observation platform.* One Lookout must be positioned on the shore, the elevated causeway, or a small boat.

(ii) *Mitigation zone and requirements.* 100 yd around the pile driver.

(A) Prior to the initial start of the activity (for 30 min), Navy personnel must observe the mitigation zone for floating vegetation; if floating vegetation is observed, Navy personnel must delay the start until the mitigation zone is clear. Navy personnel also must observe the mitigation zone for marine mammals; if marine mammals are observed, Navy personnel must delay the start of pile driving or vibratory pile extraction.

(B) During the activity, Navy personnel must observe the mitigation zone for marine mammals; if marine mammals are observed, Navy personnel must cease impact pile driving or vibratory pile extraction.

(C) Commencement/recommencement conditions after a marine mammal sighting before or during the activity. The Navy personnel must allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing pile driving or pile extraction) until one of the following conditions has been met: The animal is observed exiting the mitigation zone; the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the pile driving location; or the mitigation zone has been clear from any additional sightings for 30 min.

(5) *Weapons firing noise.* Weapons firing noise associated with large-caliber gunnery activities.

(i) *Number of Lookouts and observation platform.* One Lookout must be positioned on the ship conducting the firing. Depending on the activity, the Lookout could be the same as the one provided for under ''Explosive medium-caliber and large-caliber projectiles'' or under ''Small-, medium-, and large-caliber non-explosive practice munitions'' in paragraphs (a)(8)(i) and (a)(18)(i) of this section.

(ii) *Mitigation zone and requirements.* Thirty degrees on either side of the firing line out to 70 yd from the muzzle of the weapon being fired.

(A) Prior to the start of the activity, Navy personnel must observe the mitigation zone for floating vegetation; if floating vegetation is observed, Navy personnel must relocate or delay the start of weapons firing until the mitigation zone is clear. Navy personnel must also observe the mitigation zone for marine mammals; if marine mammals are observed, Navy personnel must relocate or delay the start of weapons firing.

(B) During the activity, Navy personnel must observe the mitigation zone for marine mammals; if marine mammals are observed, Navy personnel must cease weapons firing.

(C) Commencement/recommencement conditions after a marine mammal sighting before or during the activity. Navy personnel must allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing weapons firing) until one of the following conditions has been met: The animal is observed exiting the mitigation zone; the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the firing ship; the mitigation zone has been clear from any additional sightings for 30 min; or for mobile activities, the firing ship has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting.

(6) *Explosive sonobuoys*—(i) *Number of Lookouts and observation platform.* One Lookout must be positioned in an aircraft or on small boat. If additional platforms are participating in the activity, Navy personnel positioned in those assets (*e.g.,* safety observers, evaluators) must support observing the mitigation zone for applicable biological resources while performing their regular duties.

(ii) *Mitigation zone and requirements.* 600 yd around an explosive sonobuoy.

(A) Prior to the initial start of the activity (*e.g.,* during deployment of a sonobuoy field, which typically lasts 20–30 min), Navy personnel must observe the mitigation zone for floating vegetation; if floating vegetation is observed, Navy personnel must relocate or delay the start of sonobuoy or source/receiver pair detonations until the mitigation zone is clear. Navy personnel must conduct passive acoustic monitoring for marine mammals and use information from detections to assist visual observations. Navy personnel also must visually observe the mitigation zone for marine mammals; if marine mammals are observed, Navy personnel must relocate or delay the start of sonobuoy or source/receiver pair detonations.

(B) During the activity, Navy personnel must observe the mitigation zone for marine mammals; if marine mammals are observed, Navy personnel must cease sonobuoy or source/receiver pair detonations.

(C) Commencement/recommencement conditions after a marine mammal sighting before or during the activity. Navy personnel must allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing detonations) until one of the following conditions has been met: The animal is observed exiting the mitigation zone; the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the sonobuoy; or the mitigation zone has been clear from any additional sightings for 10 min when the activity involves aircraft that have fuel constraints (*e.g.,* helicopter), or 30 min when the activity involves aircraft that are not typically fuel constrained.

(D) After completion of the activity (*e.g.,* prior to maneuvering off station), when practical (*e.g.,* when platforms are not constrained by fuel restrictions or mission-essential follow-on commitments), Navy personnel must observe for marine mammals in the vicinity of where detonations occurred; if any injured or dead marine mammals are observed, Navy personnel must follow established incident reporting procedures. If additional platforms are supporting this activity (*e.g.,* providing range clearance), these Navy assets must assist in the visual observation of the area where detonations occurred.

(7) *Explosive torpedoes*—(i) *Number of Lookouts and observation platform.* One Lookout positioned in an aircraft. If additional platforms are participating in the activity, Navy personnel positioned in those assets *(e.g.,* safety observers, evaluators) must support observing the mitigation zone for applicable biological resources while performing their regular duties.

(ii) *Mitigation zone and requirements.* 2,100 yd around the intended impact location.

(A) Prior to the initial start of the activity (*e.g.,* during deployment of the target), Navy personnel must observe the mitigation zone for floating vegetation; if floating vegetation is observed, Navy personnel must relocate or delay the start of firing until the mitigation zone is clear. Navy personnel must conduct passive acoustic monitoring for marine mammals and use the information from detections to assist visual observations. Navy personnel must visually observe the mitigation zone for marine mammals and jellyfish aggregations; if marine mammals or jellyfish aggregations are observed, Navy personnel must relocate or delay the start of firing.

(B) During the activity, Navy personnel must observe for marine mammals and jellyfish aggregations; if marine mammals or jellyfish aggregation are observed, Navy personnel must cease firing.

(C) Commencement/recommencement conditions after a marine mammal sighting before or during the activity, Navy personnel must allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing firing) until one of the following conditions has been met: the animal is observed exiting the mitigation zone; the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the intended impact location; or the mitigation zone has been clear from any additional sightings for 10 min when the activity involves aircraft that have fuel constraints, or 30 min when the activity involves aircraft that are not typically fuel constrained.

(D) After completion of the activity (*e.g.,* prior to maneuvering off station), Navy personnel must when practical *(e.g.,* when platforms are not constrained by fuel restrictions or mission-essential follow-on commitments), observe for marine mammals in the vicinity of where detonations occurred; if any injured or dead marine mammals are observed, Navy personnel must follow established incident reporting procedures. If additional platforms are supporting this activity (*e.g.,* providing range clearance), these Navy assets must assist in the visual observation of the area where detonations occurred.

(8) *Explosive medium-caliber and large-caliber projectiles.* Gunnery activities using explosive medium-caliber and large-caliber projectiles. Mitigation applies to activities using a surface target.

(i) *Number of Lookouts and observation platform.* One Lookout must be on the vessel or aircraft conducting the activity. For activities using explosive large-caliber projectiles, depending on the activity, the Lookout could be the same as the one described in ''Weapons firing noise'' in paragraph (a)(5)(i) of this section. If additional platforms are participating in the activity, Navy personnel positioned in those assets (*e.g.,* safety observers, evaluators) must support observing the mitigation zone for applicable biological resources while performing their regular duties.

(ii) *Mitigation zone and requirements.* (A) 200 yd around the intended impact location for air-to-surface activities using explosive medium-caliber projectiles.

(B) 600 yd around the intended impact location for surface-to-surface activities using explosive medium-caliber projectiles.

(C) 1,000 yd around the intended impact location for surface-to-surface activities using explosive large-caliber projectiles.

(D) Prior to the start of the activity (*e.g.,* when maneuvering on station), Navy personnel must observe the mitigation zone for floating vegetation; if floating vegetation is observed, Navy personnel must relocate or delay the start of firing until the mitigation zone is clear. Navy personnel must observe the mitigation zone for marine mammals; if marine mammals are observed, Navy personnel must relocate or delay the start of firing.

(E) During the activity, Navy personnel must observe for marine mammals; if marine mammals are observed, Navy personnel must cease firing.

(F) Commencement/recommencement conditions after a marine mammal sighting before or during the activity, Navy personnel must allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing firing) until one of the following conditions has been met: The animal is observed exiting the mitigation zone; the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the intended impact location; the mitigation zone has been clear from any additional sightings for 10 min for aircraft-based firing or 30 min for vessel-based firing; or for activities using mobile targets, the intended impact location has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting.

(G) After completion of the activity (*e.g.,* prior to maneuvering off station), Navy personnel must, when practical (*e.g.,* when platforms are not constrained by fuel restrictions or mission-essential follow-on commitments), observe for marine mammals in the vicinity of where detonations occurred; if any injured or dead marine mammals are observed, Navy personnel must follow established incident reporting procedures. If additional platforms are supporting this activity (*e.g.,* providing range clearance), these Navy assets must assist in the visual observation of the area where detonations occurred.

(9) *Explosive missiles and rockets.* Aircraft-deployed explosive missiles and rockets. Mitigation applies to activities using a surface target.

(i) *Number of Lookouts and observation platform.* One Lookout must be positioned in an aircraft. If additional platforms are participating in the activity, Navy personnel positioned in those assets (*e.g.,* safety observers, evaluators) must support observing the mitigation zone for applicable biological resources while performing their regular duties.

(ii) *Mitigation zone and requirements.* (A) 900 yd around the intended impact location for missiles or rockets with 0.6–20 lb net explosive weight.

(B) 2,000 yd around the intended impact location for missiles with 21–500 lb net explosive weight.

(C) Prior to the initial start of the activity (*e.g.,* during a fly-over of the mitigation zone), Navy personnel must observe the mitigation zone for floating vegetation; if floating vegetation is observed, Navy personnel must relocate or delay the start of firing until the mitigation zone is clear. Navy personnel must observe the mitigation zone for marine mammals; if marine mammals are observed, Navy personnel must relocate or delay the start of firing.

(D) During the activity, Navy personnel must observe for marine mammals; if marine mammals are observed, Navy personnel must cease firing.

(E) Commencement/recommencement conditions after a marine mammal sighting before or during the activity. Navy personnel must allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing firing) until one of the following conditions has been met: The animal is observed exiting the mitigation zone; the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the intended impact location; or the mitigation zone has been clear from any additional sightings for 10 min when the activity involves aircraft that have fuel constraints, or 30 min when the activity involves aircraft that are not typically fuel constrained.

(F) After completion of the activity (*e.g.,* prior to maneuvering off station), Navy personnel must, when practical (*e.g.,* when platforms are not constrained by fuel restrictions or mission-essential follow-on commitments), observe for marine mammals in the vicinity of where detonations occurred; if any injured or dead marine mammals are observed, Navy personnel must follow established incident reporting procedures. If additional platforms are supporting this activity (*e.g.,* providing range clearance), these Navy assets will assist in the visual observation of the area where detonations occurred.

(10) *Explosive bombs*—(i) *Number of Lookouts and observation platform.* One Lookout must be positioned in an aircraft conducting the activity. If additional platforms are participating in the activity, Navy personnel positioned in those assets (*e.g.,* safety observers, evaluators) must support observing the mitigation zone for applicable biological resources while performing their regular duties.

(ii) *Mitigation zone and requirements.* 2,500 yd around the intended target.

(A) Prior to the initial start of the activity (*e.g.,* when arriving on station), Navy personnel must observe the mitigation zone for floating vegetation; if floating vegetation is observed, Navy personnel must relocate or delay the start of bomb deployment until the mitigation zone is clear. Navy personnel must observe the mitigation zone for marine mammals; if marine mammals are observed, Navy personnel must relocate or delay the start of bomb deployment.

(B) During the activity (*e.g.,* during target approach), Navy personnel must observe the mitigation zone for marine mammals; if marine mammals are observed, Navy personnel must cease bomb deployment.

(C) Commencement/recommencement conditions after a marine mammal sighting before or during the activity. Navy personnel must allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing bomb deployment) until one of the following conditions has been met: The animal is observed exiting the mitigation zone; the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the intended target; the mitigation zone has been clear from any additional sightings for 10 min; or for activities using mobile targets, the intended target has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting.

(D) After completion of the activity (*e.g.,* prior to maneuvering off station), Navy personnel must, when practical (*e.g.,* when platforms are not constrained by fuel restrictions or mission-essential follow-on commitments), observe for marine mammals in the vicinity of where detonations occurred; if any injured or dead marine mammals are observed, Navy personnel must follow established incident reporting procedures. If additional platforms are supporting this activity (*e.g.,* providing range clearance), these Navy assets must assist in the visual observation of the area where detonations occurred.

(11) *Sinking exercises*—(i) *Number of Lookouts and observation platform.* Two Lookouts (one must be positioned in an aircraft and one must be positioned on a vessel). If additional platforms are participating in the activity, Navy personnel positioned in those assets (*e.g.,* safety observers, evaluators) must support observing the mitigation zone for applicable biological resources while performing their regular duties.

(ii) *Mitigation zone and requirements.* 2.5 nautical miles (nmi) around the target ship hulk.

(A) Prior to the initial start of the activity (90 min prior to the first firing), Navy personnel must conduct aerial observations of the mitigation zone for floating vegetation; if floating vegetation is observed, Navy personnel must delay the start of firing until the mitigation zone is clear. Navy personnel also must conduct aerial observations of the mitigation zone for marine mammals and jellyfish aggregations; if marine mammals or jellyfish aggregations are observed, Navy personnel must delay the start of firing.

(B) During the activity, Navy personnel must conduct passive acoustic monitoring for marine mammals and use the information from detections to assist visual observations. Navy personnel must visually observe the mitigation zone for marine mammals from the vessel; if marine mammals are observed, Navy personnel must cease firing. Immediately after any planned or unplanned breaks in weapons firing of longer than two hours, Navy personnel must observe the mitigation zone for marine mammals from the aircraft and vessel; if marine mammals are observed, Navy personnel must delay recommencement of firing.

(C) Commencement/recommencement conditions after a marine mammal sighting before or during the activity. Navy personnel must allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing firing) until one of the following conditions has been met: The animal is observed exiting the mitigation zone; the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the target ship hulk; or the mitigation zone has been clear from any additional sightings for 30 min.

(D) After completion of the activity (for two hours after sinking the vessel or until sunset, whichever comes first), Navy personnel must observe for marine mammals in the vicinity of where detonations occurred; if any injured or dead marine mammals are observed, Navy personnel must follow established incident reporting procedures. If additional platforms are supporting this activity (*e.g.,* providing range clearance), these Navy assets will assist in the visual observation of the area where detonations occurred.

(12) *Explosive mine countermeasure and neutralization activities*—(i) *Number of Lookouts and observation platform.* (A) One Lookout must be positioned on a vessel or in an aircraft when implementing the smaller mitigation zone.

(B) Two Lookouts (one must be positioned in an aircraft and one must be on a small boat) when implementing the larger mitigation zone.

(C) If additional platforms are participating in the activity, Navy personnel positioned in those assets (*e.g.,* safety observers, evaluators) must support observing the mitigation zone for applicable biological resources while performing their regular duties.

(ii) *Mitigation zone and requirements.* (A) 600 yd around the detonation site for activities using 0.1–5 lb net explosive weight.

(B) 2,100 yd around the detonation site for activities using 6–650 lb net explosive weight (including high explosive target mines).

(C) Prior to the initial start of the activity (*e.g.,* when maneuvering on station; typically, 10 min when the activity involves aircraft that have fuel constraints, or 30 min when the activity involves aircraft that are not typically fuel constrained), Navy personnel must observe the mitigation zone for floating vegetation; if floating vegetation is observed, Navy personnel must relocate or delay the start of detonations until the mitigation zone is clear. Navy personnel must observe the mitigation zone for marine mammals; if marine mammals are observed, Navy personnel must relocate or delay the start of detonations.

(D) During the activity, Navy personnel must observe the mitigation zone for marine mammals, concentrations of seabirds, and individual foraging seabirds; if marine mammals, concentrations of seabirds, and individual foraging seabirds are observed, Navy personnel must cease detonations.

(E) Commencement/recommencement conditions after a marine mammal sighting before or during the activity or a sighting of seabird concentrations or individual foraging seabirds during the activity. Navy personnel must allow a sighted animal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing detonations) until one of the following conditions has been met: The animal is observed exiting the mitigation zone; the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to detonation site; or the mitigation zone has been clear from any additional sightings for 10 min when the activity involves aircraft that have fuel constraints, or 30 min when the activity involves aircraft that are not typically fuel constrained.

(F) After completion of the activity (typically 10 min when the activity involves aircraft that have fuel constraints, or 30 min when the activity involves aircraft that are not typically fuel constrained), Navy personnel must observe for marine mammals in the vicinity of where detonations occurred; if any injured or dead marine mammals are observed, Navy personnel must follow established incident reporting procedures. If additional platforms are supporting this activity (*e.g.,* providing range clearance), these Navy assets must assist in the visual observation of the area where detonations occurred.

(13) *Explosive mine neutralization activities involving Navy divers*—(i) *Number of Lookouts and observation platform.* (A) Two Lookouts (two small boats with one Lookout each, or one Lookout must be on a small boat and one must be in a rotary-wing aircraft) when implementing the smaller mitigation zone.

(B) Four Lookouts (two small boats with two Lookouts each), and a pilot or member of an aircrew must serve as an additional Lookout if aircraft are used during the activity, when implementing the larger mitigation zone.

(C) All divers placing the charges on mines will support the Lookouts while performing their regular duties and will report applicable sightings to their supporting small boat or Range Safety Officer.

(D) If additional platforms are participating in the activity, Navy personnel positioned in those assets (*e.g.,* safety observers, evaluators) must support observing the mitigation zone for applicable biological resources while performing their regular duties.

(ii) *Mitigation zone and requirements.* (A) 500 yd around the detonation site during activities under positive control using 0.1–20 lb net explosive weight.

(B) 1,000 yd around the detonation site during all activities using time-delay fuses (0.1–29 lb net explosive weight) and during activities under positive control using 21–60 lb net explosive weight charges.

(C) Prior to the initial start of the activity (*e.g.,* when maneuvering on station for activities under positive control; 30 min for activities using time-delay firing devices), Navy personnel must observe the mitigation zone for floating vegetation; if floating vegetation is observed, Navy personnel must relocate or delay the start of detonations or fuse initiation until the mitigation zone is clear. Navy personnel also must observe the mitigation zone for marine mammals; if marine mammals are observed, Navy personnel must relocate or delay the start of detonations or fuse initiation.

(D) During the activity, Navy personnel must observe the mitigation zone for marine mammals, concentrations of seabirds, and individual foraging seabirds (in the water and not on shore); if marine mammals, concentrations of seabirds, and individual foraging seabirds are observed, Navy personnel must cease detonations or fuse initiation. To the maximum extent practicable depending on mission requirements, safety, and environmental conditions, Navy personnel must position boats near the mid-point of the mitigation zone radius (but outside of the detonation plume and human safety zone), must position themselves on opposite sides of the detonation location (when two boats are used), and must travel in a circular pattern around the detonation location with one Lookout observing inward toward the detonation site and the other observing outward toward the perimeter of the mitigation zone. If used, Navy aircraft must travel in a circular pattern around the detonation location to the maximum extent practicable. Navy personnel must not set time-delay firing devices (0.1–29 lb. net explosive weight) to exceed 10 min.

(E) During activities conducted in shallow water, a shore-based Navy observer must survey the mitigation zone with binoculars for birds before and after each detonation. If training involves multiple detonations, the second (or third, etc.) detonation will occur either immediately after the preceding detonation (*i.e.,* within 10 seconds) or after 30 min to avoid potential impacts on birds foraging underwater.

(F) Commencement/recommencement conditions after a marine mammal sighting before or during the activity or a sighting of seabird concentrations or individual foraging seabirds during the activity. Navy personnel must allow a sighted animal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing detonations) until one of the following conditions has been met: the animal is observed exiting the mitigation zone; the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the detonation site; or the mitigation zone has been clear from any additional sightings for 10 min during activities under positive control with aircraft that have fuel constraints, or 30 min during activities under positive control with aircraft that are not typically fuel constrained and during activities using time-delay firing devices.

(G) After completion of an activity (for 30 min), the Navy must observe for marine mammals for 30 min. Navy personnel must observe for marine mammals in the vicinity of where detonations occurred; if any injured or dead marine mammals are observed, Navy personnel must follow established incident reporting procedures. If additional platforms are supporting this activity (*e.g.,* providing range clearance), these Navy assets must assist in the visual observation of the area where detonations occurred.

(14) *Maritime security operations—anti-swimmer grenades*—(i) *Number of Lookouts and observation platform.* One Lookout must be positioned on the small boat conducting the activity. If additional platforms are participating in the activity, Navy personnel positioned in those assets (*e.g.,* safety observers, evaluators) must support observing the mitigation zone for applicable biological resources while performing their regular duties.

(ii) *Mitigation zone and requirements.* 200 yd around the intended detonation location.

(A) Prior to the initial start of the activity (*e.g.,* when maneuvering on station), Navy personnel must observe the mitigation zone for floating vegetation; if floating vegetation is observed, Navy personnel must relocate or delay the start of detonations until the mitigation zone is clear. Navy personnel must observe the mitigation zone for marine mammals; if marine mammals are observed, Navy personnel must relocate or delay the start of detonations.

(B) During the activity, Navy personnel must observe the mitigation zone for marine mammals; if marine mammals are observed, Navy personnel must cease detonations.

(C) Commencement/recommencement conditions after a marine mammal sighting before or during the activity. Navy personnel must allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing detonations) until one of the following conditions has been met: the animal is observed exiting the mitigation zone; the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the intended detonation location; the mitigation zone has been clear from any additional sightings for 30 min; or the intended detonation location has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting.

(D) After completion of the activity (*e.g.,* prior to maneuvering off station), Navy personnel must, when practical (*e.g.,* when platforms are not constrained by fuel restrictions or mission-essential follow-on commitments), observe for marine mammals in the vicinity of where detonations occurred; if any injured or dead marine mammals are observed, Navy personnel must follow established incident reporting procedures. If additional platforms are supporting this activity (*e.g.,* providing range clearance), these Navy assets will assist in the visual observation of the area where detonations occurred.

(15) *Underwater demolition multiple charge—mat weave and obstacle loading exercises*—(i) *Number of Lookouts and observation platform.* Two Lookouts (one must be positioned on a small boat and one must be positioned on shore from an elevated platform). If additional platforms are participating in the activity, Navy personnel positioned in those assets (*e.g.,* safety observers, evaluators) must support observing the mitigation zone for applicable biological resources while performing their regular duties.

(ii) *Mitigation zone and requirements.* 700 yd around the intended detonation location.

(A) Prior to the initial start of the activity, or 30 min prior to the first detonation, the Lookout positioned on a small boat must observe the mitigation zone for floating vegetation and marine mammals; if floating vegetation or marine mammals are observed, Navy personnel must delay the start of detonations. For 10 min prior to the first detonation, the Lookout positioned on shore must use binoculars to observe the mitigation zone for marine mammals; if marine mammals are observed, Navy personnel must delay the start of detonations until the mitigation zone has been clear of any additional sightings for a minimum of 10 min.

(B) During the activity, Navy personnel must observe the mitigation zone for marine mammals; if marine mammals are observed, Navy personnel must cease detonations.

(C) Commencement/recommencement conditions after a marine mammal sighting before or during the activity. Navy personnel must allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing detonations) until one of the following conditions has been met: the animal is observed exiting the mitigation zone; the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the detonation location; or the mitigation zone has been clear from any additional sightings for 10 min (as determined by the Navy shore observer).

(D) After completion of the activity (for 30 min), the Lookout positioned on a small boat must observe for marine mammals in the vicinity of where detonations occurred; if any injured or dead marine mammals are observed, Navy personnel must follow established incident reporting procedures. If additional platforms are supporting this activity (*e.g.,* providing range clearance), these Navy assets must assist in the visual observation of the area where detonations occurred.

(16) *Vessel movement.* The mitigation will not be applied if: the vessel's safety is threatened; the vessel is restricted in its ability to maneuver (*e.g.,* during launching and recovery of aircraft or landing craft, during towing activities, when mooring); the vessel is operated autonomously; or when impracticable based on mission requirements (*e.g.,* during Amphibious Assault—Battalion Landing exercise).

(i) *Number of Lookouts and observation platform.* One Lookout must be on the vessel that is underway.

(ii) *Mitigation zone and requirements.* (A) 500 yd around whales.

(B) 200 yd around all other marine mammals (except bow-riding dolphins and pinnipeds hauled out on man-made navigational structures, port structures, and vessels).

(iii) *During the activity.* When underway Navy personnel must observe the mitigation zone for marine mammals; if marine mammals are observed, Navy personnel must maneuver to maintain distance.

(iv) *Incident reporting procedures.* Additionally, if a marine mammal vessel strike occurs, Navy personnel must follow the established incident reporting procedures.

(17) *Towed in-water devices.* Mitigation applies to devices that are towed from a manned surface platform or manned aircraft. The mitigation will not be applied if the safety of the towing platform or in-water device is threatened.

(i) *Number of Lookouts and observation platform.* One Lookout must be positioned on a manned towing platform.

(ii) *Mitigation zone and requirements.* 250 yd around marine mammals.

(iii) *During the activity.* During the activity (*i.e.,* when towing an in-water device), Navy personnel must observe the mitigation zone for marine mammals; if marine mammals are observed, Navy personnel must maneuver to maintain distance.

(18) *Small-, medium-, and large-caliber non-explosive practice munitions.* Mitigation applies to activities using a surface target.

(i) *Number of Lookouts and observation platform.* One Lookout must be positioned on the platform conducting the activity. Depending on the activity, the Lookout could be the same as the one described for ''Weapons firing noise'' in paragraph (a)(5)(i) of this section.

(ii) *Mitigation zone and requirements.* 200 yd around the intended impact location.

(A) Prior to the start of the activity (*e.g.,* when maneuvering on station), Navy personnel must observe the mitigation zone for floating vegetation; if floating vegetation is observed, Navy personnel must relocate or delay the start of firing until the mitigation zone is clear. Navy personnel must observe the mitigation zone for marine mammals; if marine mammals are observed, Navy personnel must relocate or delay the start of firing.

(B) During the activity, Navy personnel must observe the mitigation zone for marine mammals; if marine mammals are observed, Navy personnel must cease firing.

(C) Commencement/recommencement conditions after a marine mammal sighting before or during the activity. Navy personnel must allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing firing) until one of the following conditions has been met: the animal is observed exiting the mitigation zone; the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the intended impact location; the mitigation zone has been clear from any additional sightings for 10 min for aircraft-based firing or 30 min for vessel-based firing; or for activities using a mobile target, the intended impact location has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting.

(19) *Non-explosive missiles and rockets.* Aircraft-deployed non-explosive missiles and rockets. Mitigation applies to activities using a surface target.

(i) *Number of Lookouts and observation platform.* One Lookout must be positioned in an aircraft.

(ii) *Mitigation zone and requirements.* 900 yd around the intended impact location.

(A) Prior to the initial start of the activity (*e.g.,* during a fly-over of the mitigation zone), Navy personnel must observe the mitigation zone for floating vegetation; if floating vegetation is observed, Navy personnel must relocate or delay the start of firing until the mitigation zone is clear. Navy personnel must observe the mitigation zone for marine mammals; if marine mammals are observed, Navy personnel must relocate or delay the start of firing.

(B) During the activity, Navy personnel must observe the mitigation zone for marine mammals; if marine mammals are observed, Navy personnel must cease firing.

(C) Commencement/recommencement conditions after a marine mammal sighting prior to or during the activity. Navy personnel must allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing firing) until one of the following conditions has been met: the animal is observed exiting the mitigation zone; the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the intended impact location; or the mitigation zone has been clear from any additional sightings for 10 min when the activity involves aircraft that have fuel constraints, or 30 min when the activity involves aircraft that are not typically fuel constrained.

(20) *Non-explosive bombs and mine shapes.* Non-explosive bombs and non-explosive mine shapes during mine laying activities.

(i) *Number of Lookouts and observation platform.* One Lookout must be positioned in an aircraft.

(ii) *Mitigation zone and requirements.* 1,000 yd around the intended target.

(A) Prior to the initial start of the activity (*e.g.,* when arriving on station), Navy personnel must observe the mitigation zone for floating vegetation; if floating vegetation is observed, Navy personnel must relocate or delay the start of bomb deployment or mine laying until the mitigation zone is clear. Navy personnel also must observe the mitigation zone for marine mammals; if marine mammals are observed, Navy personnel must relocate or delay the start of bomb deployment or mine laying.

(B) During the activity (*e.g.,* during approach of the target or intended minefield location), Navy personnel must observe the mitigation zone for marine mammals and, if marine mammals are observed, Navy personnel must cease bomb deployment or mine laying.

(C) Commencement/recommencement conditions after a marine mammal sighting prior to or during the activity. Navy personnel must allow a sighted marine mammal to leave the mitigation zone prior to the initial start of the activity (by delaying the start) or during the activity (by not recommencing bomb deployment or mine laying) until one of the following conditions has been met: the animal is observed exiting the mitigation zone; the animal is thought to have exited the mitigation zone based on a determination of its course, speed, and movement relative to the intended target or minefield location; the mitigation zone has been clear from any additional sightings for 10 min; or for activities using mobile targets, the intended target has transited a distance equal to double that of the mitigation zone size beyond the location of the last sighting.

(b) *Mitigation areas.* In addition to procedural mitigation, Navy personnel must implement mitigation measures within mitigation areas to avoid or reduce potential impacts on marine mammals.

(1) *Mitigation areas for marine mammals in the Hawaii Range Complex for sonar, explosives, and vessel strikes*—(i) *Mitigation area requirements*—(A) *Hawaii Island Mitigation Area (year-round).* (*1*) Except as provided in paragraph (b)(1)(i)(A)(*2*)

of this section, Navy personnel must not conduct more than 300 hours of MF1 surface ship hull-mounted mid-frequency active sonar or 20 hours of MF4 dipping sonar annually, or use explosives that could potentially result in takes of marine mammals during training and testing.

(*2*) Should national security require conduct of more than 300 hours of MF1 surface ship hull-mounted mid-frequency active sonar or 20 hours of MF4 dipping sonar, or use of explosives that could potentially result in the take of marine mammals during training or testing, Naval units must obtain permission from the appropriate designated Command authority prior to commencement of the activity. Navy personnel must provide NMFS with advance notification and include the information (*e.g.,* sonar hours or explosives usage) in its annual activity reports submitted to NMFS.

(B) *4-Islands Region Mitigation Area (November 15–April 15 for active sonar; year-round for explosives).* (*1*) Except as provided in paragraph (b)(1)(i)(B)(*2*) of this section, Navy personnel must not use MF1 surface ship hull-mounted mid-frequency active sonar or explosives that could potentially result in takes of marine mammals during training and testing.

(*2*) Should national security require use of MF1 surface ship hull-mounted mid-frequency active sonar or explosives that could potentially result in the take of marine mammals during training or testing, Naval units must obtain permission from the appropriate designated Command authority prior to commencement of the activity. Navy personnel must provide NMFS with advance notification and include the information (*e.g.,* sonar hours or explosives usage) in its annual activity reports submitted to NMFS.

(C) *Humpback Whale Special Reporting Areas (December 15–April 15).* Navy personnel must report the total hours of surface ship hull-mounted mid-frequency active sonar used in the special reporting areas in its annual training and testing activity reports submitted to NMFS.

(D) *Humpback Whale Awareness Notification Message Area (November–April).* (*1*) Navy personnel must issue a seasonal awareness notification message to alert ships and aircraft operating in the area to the possible presence of concentrations of large whales, including humpback whales.

(*2*) To maintain safety of navigation and to avoid interactions with large whales during transits, Navy personnel must instruct vessels to remain vigilant to the presence of large whale species (including humpback whales), that when concentrated seasonally, may become vulnerable to vessel strikes.

(*3*) Platforms must use the information from the awareness notification message to assist their visual observation of applicable mitigation zones during training and testing activities and to aid in the implementation of procedural mitigation.

(ii) [Reserved]

(2) *Mitigation areas for marine mammals in the Southern California portion of the study area for sonar, explosives, and vessel strikes*—(i) *Mitigation area requirements*—(A) *San Diego Arc, San Nicolas Island, and Santa Monica/Long Beach Mitigation Areas (June 1–October 31).* (*1*) Except as provided in paragraph (b)(2)(i)(A)(*2*) of this section, Navy personnel must not conduct more than a total of 200 hours of MF1 surface ship hull-mounted mid-frequency active sonar in the combined areas, excluding normal maintenance and systems checks, during training and testing.

(*2*) Should national security require conduct of more than 200 hours of MF1 surface ship hull-mounted mid-frequency active sonar in the combined areas during training and testing (excluding normal maintenance and systems checks), Naval units must obtain permission from the appropriate designated Command authority prior to commencement of the activity. Navy personnel must provide NMFS with advance notification and include the information (*e.g.,* sonar hours) in its annual activity reports submitted to NMFS.

(*3*) Except as provided in paragraph (b)(2)(i)(A)(*4*) of this section, within the San Diego Arc Mitigation Area, Navy personnel must not use explosives that could potentially result in the take of marine mammals during large-caliber gunnery, torpedo, bombing, and missile (including 2.75-inch rockets) activities during training and testing.

(*4*) Should national security require use of explosives that could potentially result in the take of marine mammals during large-caliber gunnery, torpedo, bombing, and missile (including 2.75-inch rockets) activities during training or testing within the San Diego Arc Mitigation Area, Naval units must obtain permission from the appropriate designated Command authority prior to commencement of the activity. Navy personnel must provide NMFS with advance notification and include the information (*e.g.,* explosives usage) in its annual activity reports submitted to NMFS.

(*5*) Except as provided in paragraph (b)(2)(i)(A)(*6*) of this section, within the San Nicolas Island Mitigation Area, Navy personnel must not use explosives that could potentially result in the take of marine mammals during mine warfare, large-caliber gunnery, torpedo, bombing, and missile (including 2.75-inch rockets) activities during training.

(*6*) Should national security require use of explosives that could potentially result in the take of marine mammals during mine warfare, large-caliber gunnery, torpedo, bombing, and missile (including 2.75-inch rockets) activities during training in the San Nicolas Island Mitigation Area, Naval units must obtain permission from the appropriate designated Command authority prior to commencement of the activity. Navy personnel must provide NMFS with advance notification and include the information (*e.g.,* explosives usage) in its annual activity reports submitted to NMFS.

(*7*) Except as provided in paragraph (b)(2)(i)(A)(*8*) of this section, within the Santa Monica/Long Beach Mitigation Area, Navy personnel must not use explosives that could potentially result in the take of marine mammals during mine warfare, large-caliber gunnery, torpedo, bombing, and missile (including 2.75-inch rockets) activities during training and testing.

(*8*) Should national security require use of explosives that could potentially result in the take of marine mammals during mine warfare, large-caliber gunnery, torpedo, bombing, and missile (including 2.75-inch rockets) activities during training or testing in the Santa Monica/Long Beach Mitigation Area, Naval units must obtain permission from the appropriate designated Command authority prior to commencement of the activity. Navy personnel must provide NMFS with advance notification and include the information (*e.g.,* explosives usage) in its annual activity reports submitted to NMFS.

(B) *Santa Barbara Island Mitigation Area (year-round).* (*1*) Except as provided in paragraph (b)(2)(i)(B)(*2*) of this section, Navy personnel must not use MF1 surface ship hull-mounted mid-frequency active sonar during training or testing, or explosives that could potentially result in the take of marine mammals during medium-caliber or large-caliber gunnery, torpedo, bombing, and missile (including 2.75-inch rockets) activities during training.

(*2*) Should national security require use of MF1 surface ship hull-mounted mid-frequency active sonar during training or testing, or explosives that could potentially result in the take of marine mammals during medium-caliber or large-caliber gunnery, torpedo, bombing, and missile (including 2.75-inch rockets) activities during training, Naval units must obtain permission from the appropriate designated Command authority prior to commencement of the activity. Navy personnel must provide NMFS with advance notification and include the information (*e.g.,* sonar hours or explosives usage) in its annual activity reports submitted to NMFS.

(C) *Blue Whale (June–October), Gray Whale (November–March), and Fin Whale (November–May) Awareness Notification Message Areas.* (*1*) Navy personnel must issue a seasonal awareness notification message to alert ships and aircraft operating in the area to the possible presence of concentrations of large whales, including blue whales, gray whales, and fin whales.

(*2*) To maintain safety of navigation and to avoid interactions with large whales during transits, Navy personnel must instruct vessels to remain vigilant to the presence of large whale species, that when concentrated seasonally, may become vulnerable to vessel strikes.

(*3*) Platforms must use the information from the awareness notification messages to assist their visual observation of applicable mitigation zones during training and testing activities and to aid in the implementation of procedural mitigation.

(ii) [Reserved]

§ 218.75 Requirements for monitoring and reporting.

(a) *Unauthorized take.* Navy personnel must notify NMFS immediately (or as soon as operational security considerations allow) if the specified activity identified in § 218.70 is thought to have resulted in the mortality or serious injury of any marine mammals, or in any Level A or Level B harassment take of marine mammals not identified in this subpart.

(b) *Monitoring and reporting under the LOAs.* The Navy must conduct all monitoring and reporting required under the LOAs, including abiding by the HSTT Study Area monitoring program. Details on program goals, objectives, project selection process, and current projects are available at *www.navymarinespeciesmonitoring.us.*

(c) *Notification of injured, live stranded, or dead marine mammals.* The Navy must consult the Notification and Reporting Plan, which sets out notification, reporting, and other requirements when dead, injured, or live stranded marine mammals are detected. The Notification and Reporting Plan is available at *www.fisheries.noaa.gov/national/marine-mammal-protection/incidentaltake-authorizations-military-readinessactivities.*

(d) *Annual HSTT Study Area marine species monitoring report.* The Navy must submit an annual report of the HSTT Study Area monitoring describing the implementation and results from the previous calendar year. Data collection methods must be standardized across range complexes and study areas to allow for comparison in different geographic locations. The report must be submitted to the Director, Office of Protected Resources, NMFS, either three months after the end of the calendar year, or three months after the conclusion of the monitoring year, to be determined by the Adaptive Management process. This report will describe progress of knowledge made with respect to intermediate scientific objectives within the HSTT Study Area associated with the Integrated Comprehensive Monitoring Program (ICMP). Similar study questions must be treated together so that progress on each topic must be summarized across all Navy ranges. The report need not include analyses and content that does not provide direct assessment of cumulative progress on the monitoring plan study questions. As an alternative, the Navy may submit a multi-Range Complex annual Monitoring Plan report to fulfill this requirement. Such a report will describe progress of knowledge made with respect to monitoring study questions across multiple Navy ranges associated with the ICMP. Similar study questions must be treated together so that progress on each topic can be summarized across multiple Navy ranges. The report need not include analyses and content that does not provide direct assessment of cumulative progress on the monitoring study question. This will continue to allow the Navy to provide a cohesive monitoring report covering multiple ranges (as per ICMP goals), rather than entirely separate reports for the HSTT, Gulf of Alaska, Mariana Islands, and Northwest Study Areas.

(e) *Annual HSTT Study Area training exercise report and testing activity report.* Each year, the Navy must submit two preliminary reports (Quick Look Report) detailing the status of authorized sound sources within 21 days after the anniversary of the date of issuance of each LOA to the Director, Office of Protected Resources, NMFS. Each year, the Navy must submit detailed reports to the Director, Office of Protected Resources, NMFS, within 3 months after the one-year anniversary of the date of issuance of the LOA. The HSTT annual Training Exercise Report and Testing Activity Report can be consolidated with other exercise reports from other range complexes in the Pacific Ocean for a single Pacific Exercise Report, if desired. The annual reports must contain information on major training exercises (MTEs), Sinking Exercise (SINKEX) events, and a summary of all sound sources used, including within specific mitigation reporting areas as described in paragraph (e)(3) of this section. The analysis in the detailed reports must be based on the accumulation of data from the current year's report and data collected from previous reports. The detailed reports must contain information identified in paragraphs (e)(1) through (7) of this section.

(1) *MTEs.* This section of the report must contain the following information for MTEs conducted in the HSTT Study Area.

(i) Exercise Information (for each MTE).

(A) Exercise designator.

(B) Date that exercise began and ended.

(C) Location.

(D) Number and types of active sonar sources used in the exercise.

(E) Number and types of passive acoustic sources used in exercise.

(F) Number and types of vessels, aircraft, and other platforms participating in exercise.

(G) Total hours of all active sonar source operation.

(H) Total hours of each active sonar source bin.

(I) Wave height (high, low, and average) during exercise.

(ii) Individual marine mammal sighting information for each sighting in each exercise when mitigation occurred:

(A) Date/Time/Location of sighting.

(B) Species (if not possible, indication of whale/dolphin/pinniped).

(C) Number of individuals.

(D) Initial Detection Sensor (*e.g.,* sonar, Lookout).

(E) Indication of specific type of platform observation was made from (including, for example, what type of surface vessel or testing platform).

(F) Length of time observers maintained visual contact with marine mammal.

(G) Sea state.

(H) Visibility.

(I) Sound source in use at the time of sighting.

(J) Indication of whether animal was less than 200 yd, 200 to 500 yd, 500 to 1,000 yd, 1,000 to 2,000 yd, or greater than 2,000 yd from sonar source.

(K) Whether operation of sonar sensor was delayed, or sonar was powered or shut down, and how long the delay.

(L) If source in use was hull-mounted, true bearing of animal from the vessel, true direction of vessel's travel, and estimation of animal's motion relative to vessel (opening, closing, parallel).

(M) Lookouts must report, in plain language and without trying to categorize in any way, the observed behavior of the animal(s) (such as animal closing to bow ride, paralleling course/speed, floating on surface and not swimming, etc.) and if any calves were present.

(iii) An evaluation (based on data gathered during all of the MTEs) of the effectiveness of mitigation measures designed to minimize the received level to which marine mammals may be exposed. This evaluation must identify the specific observations that support any conclusions the Navy reaches about the effectiveness of the mitigation.

(2) *SINKEXs.* This section of the report must include the following information for each SINKEX completed that year.

(i) Exercise information (gathered for each SINKEX).

(A) Location.

(B) Date and time exercise began and ended.

(C) Total hours of observation by Lookouts before, during, and after exercise.

(D) Total number and types of explosive source bins detonated.

(E) Number and types of passive acoustic sources used in exercise.

(F) Total hours of passive acoustic search time.

(G) Number and types of vessels, aircraft, and other platforms, participating in exercise.

(H) Wave height in feet (high, low, and average) during exercise.

(I) Narrative description of sensors and platforms utilized for marine mammal detection and timeline illustrating how marine mammal detection was conducted.

(ii) Individual marine mammal observation (by Navy Lookouts) information (gathered for each marine mammal sighting) for each sighting where mitigation was implemented.

(A) Date/Time/Location of sighting.

(B) Species (if not possible, indicate whale, dolphin, or pinniped).

(C) Number of individuals.

(D) Initial detection sensor (*e.g.,* sonar or Lookout).

(E) Length of time observers maintained visual contact with marine mammal.

(F) Sea state.

(G) Visibility.

(H) Whether sighting was before, during, or after detonations/exercise, and how many minutes before or after.

(I) Distance of marine mammal from actual detonations (or target spot if not yet detonated): Less than 200 yd, 200 to 500 yd, 500 to 1,000 yd, 1,000 to 2,000 yd, or greater than 2,000 yd.

(J) Lookouts must report, in plain language and without trying to categorize in any way, the observed behavior of the animal(s) (such as animal closing to bow ride, paralleling course/speed, floating on surface and not swimming etc.), including speed and direction and if any calves were present.

(K) The report must indicate whether explosive detonations were delayed, ceased, modified, or not modified due to marine mammal presence and for how long.

(L) If observation occurred while explosives were detonating in the water, indicate munition type in use at time of marine mammal detection.

(3) *Summary of sources used.* This section of the report must include the following information summarized from the authorized sound sources used in all training and testing events:

(i) Total annual hours or quantity (per the LOA) of each bin of sonar or other acoustic sources *(e.g.,* pile driving and air gun activities); and

(ii) Total annual expended/detonated ordinance (missiles, bombs, sonobuoys, etc.) for each explosive bin.

(4) *Humpback Whale Special Reporting Area (December 15—April 15).* The Navy must report the total hours of operation of surface ship hull-mounted mid-frequency active sonar used in the special reporting area.

(5) *HSTT Study Area Mitigation Areas.* The Navy must report any use that occurred as specifically described in these areas. Information included in the classified annual reports may be used to inform future adaptive management of activities within the HSTT Study Area.

(6) *Geographic information presentation.* The reports must present an annual (and seasonal, where practical) depiction of training and testing bin usage (as well as pile driving activities) geographically across the HSTT Study Area.

(7) *Sonar exercise notification.* The Navy must submit to NMFS (contact as specified in the LOA) an electronic report within fifteen calendar days after the completion of any MTE indicating:

(i) Location of the exercise;

(ii) Beginning and end dates of the exercise; and

(iii) Type of exercise.

§ 218.76 Letters of Authorization.

(a) To incidentally take marine mammals pursuant to the regulations in this subpart, the Navy must apply for and obtain LOAs in accordance with § 216.106 of this chapter.

(b) LOAs, unless suspended or revoked, may be effective for a period of time not to exceed December 20, 2023.

(c) If an LOA expires prior to December 20, 2023, the Navy may apply for and obtain a renewal of the LOA.

(d) In the event of projected changes to the activity or to mitigation, monitoring, or reporting (excluding changes made pursuant to the adaptive management provision of § 218.77(c)(1)) required by an LOA issued under this subpart, the Navy must apply for and obtain a modification of the LOA as described in § 218.77.

(e) Each LOA must set forth:

(1) Permissible methods of incidental taking;

(2) Geographic areas for incidental taking;

(3) Means of effecting the least practicable adverse impact (*i.e.,* mitigation) on the species or stocks of marine mammals and their habitat; and

(4) Requirements for monitoring and reporting.

(f) Issuance of the LOA(s) must be based on a determination that the level of taking must be consistent with the findings made for the total taking allowable under the regulations in this subpart.

(g) Notice of issuance or denial of the LOA(s) must be published in the **Federal Register** within 30 days of a determination.

§ 218.77 Renewals and modifications of Letters of Authorization.

(a) An LOA issued under §§ 216.106 of this chapter and 218.76 for the activity identified in § 218.70(c) 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 applicant 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 result in no more than a minor change in the total estimated number of takes (or distribution by species or stock or years), NMFS may publish a notice of 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 218.76 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 218.76, 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.

§§ 218.78–218.79 [Reserved]

[FR Doc. 2018–27342 Filed 12–20–18; 8:45 am]

BILLING CODE 3510–22–P