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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 218

[Docket No. 170720687-8965-02]

RIN 0648-BH06

Taking and Importing Marine Mammals; Taking Marine Mammals Incidental to the U.S. Navy Training and Testing Activities in the Atlantic Fleet Training and Testing Study Area

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

ACTION: Final rule.

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 Atlantic Fleet Training and Testing (AFTT) Study Area over the course of five years beginning in November. 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 November 14, 2018 through November 13, 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 AFTT Study Area, which includes areas of the western Atlantic Ocean along the East Coast of North America, portions of the Caribbean Sea, and the Gulf of Mexico (GOMEX).

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.

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, especially for North Atlantic right whales (*Eubalaena glacialis*) (NARW);
- Operational 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 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 requirements pertaining to the 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 and amended the definition of "harassment" as it applies to a "military readiness activity," along with certain research activities. The definitions of 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.

Summary and Background of Request

On June 16, 2017, NMFS received an application from the Navy for authorization to take marine mammals 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 AFTT Study Area. In addition, the Navy requested incidental take authorization for up to nine mortalities of four marine mammal species during ship shock trials, and authorization for up to three takes by serious injury or mortality from vessel strikes over the five-year period. On August 4, 2017, the Navy sent an amendment to its application, and the application was found to be adequate and complete. On August 14, 2017 (82 FR 37851), 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 March 13, 2018, we published a notice of the proposed rulemaking (83 FR 10954) and requested comments and information related to the Navy's request for 45 days. On April 9, 2018, a proposed rule correction (83 FR 15117), which corrected *Table 4. Proposed Training* was published in the *Federal Register*. Sections of the table were missing from the preamble, specifically Amphibious Warfare, Anti-Submarine Warfare, Expeditionary Warfare, Mine Warfare, and a portion of Surface Warfare. 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 13, 2018, Navy provided NMFS with a memorandum revising the takes by serious injury or mortality included in the Navy's rulemaking/LOA application (Chapter 5, Section 5.2 *Incidental Take Request from Vessel Strikes*). Specifically, after further analysis, the Navy withdrew the inclusion of the Western North Atlantic stock of blue whale and the Northern GOMEX stock of sperm whale from its request for authorization for take of three (3) large whales by serious injury or mortality from

vessel strike. 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 and one for testing activities to be conducted within the AFTT Study Area, which includes areas of the western Atlantic Ocean along the East Coast of North America, portions of the Caribbean Sea, and the GOMEX. Please refer to the Navy's rulemaking/LOA application, specifically Figure 1.1-1 for a map of the AFTT Study Area and Figures 2.2-1 through Figure 2.2-3 for additional maps of the range complexes and testing ranges.

The following types of training and testing, which are classified as military readiness activities pursuant to the MMPA, as amended by the 2004 NDAA, will be covered under the regulations and associated LOAs: amphibious warfare (in-water detonations), anti-submarine warfare (sonar and other transducers, in-water detonations), expeditionary warfare (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, impact pile driving/vibratory extraction, air guns). In addition, ship shock trials, a specific testing activity related to vessel evaluation, will be conducted. Also, ship strike by Navy vessels is addressed and covered, as appropriate.

This will be NMFS' third series of rulemaking under the MMPA for activities in the AFTT Study Area. NMFS published the first rule effective from January 22, 2009 through January 22, 2014 on January 27, 2009 (74 FR 4844) and the second rule effective from November 14, 2013 through November 13, 2018 on December 4, 2013 (78 FR 73009). These regulations are also valid for five year years, from November 14, 2018, through November 13, 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 establishing and executing training and testing programs, including at-sea training and testing exercises, and ensuring naval forces have access to the ranges, operating areas (OPAREAs), and airspace needed to develop and maintain skills for conducting naval activities.

The Navy plans to conduct training and testing activities within the AFTT Study Area. The Navy has been conducting military readiness activities in the AFTT Study Area for well over a century and with active sonar for over 70 years. 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. This rulemaking 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 accounts 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 AFTT Study Area, which expires on November 13, 2018.

Description of the Specified Activity

Additional detail regarding the specified activity was provided in our *Federal Register* notice of proposed rulemaking (83 FR 10954; March 13, 2018); please see that proposed rule or

the Navy's application for more information. Since the proposed rule, the Navy has removed one of its testing activities in the Northeast Range Complex (four events for Undersea Warfare Testing (USWT), which decreased the number of takes by Level B harassment for the NARW by 115 takes annually. This change also decreased take by Level B harassment by approximately 200 takes annually for Endangered Species Act (ESA)-listed fin whale and 20 takes annually for sei whales as well as approximately 10,000 takes annually for harbor porpoise. NMFS and the Navy have also reached agreement on additional mitigation measures since the proposed rule, which are summarized below and discussed in greater detail in the *Mitigation Measures* section of this rule.

The Navy agrees to implement pre- and post-event observations as part of all in-water explosive event mitigations in the AFTT Study Area. The Navy has expanded the Northeast (NE) NARW Mitigation Area to match the updated NE NARW ESA-designated critical habitat. The Navy has agreed to broadcast awareness notification messages with NARW Dynamic Management Area information (*e.g.*, location and dates) to alert vessels to the possible presence of a NARW to further reduce the potential for a vessel strike. The Navy has agreed to additional coordination to aid in the implementation of procedural mitigation to minimize potential interactions with NARW in the Jacksonville Operating Area. The Navy will also report the total hours and counts of active sonar and in-water explosives used in a Southeast (SE) NARW Critical Habitat Special Reporting Area in its annual training and testing activity reports submitted to NMFS. The Navy will minimize use of explosives (March to September) in the Navy Cherry Point Range Complex Nearshore Mitigation Area to the extent practicable.

In addition, the Navy will not conduct major training exercises (MTE) in the Gulf of Maine Planning Awareness Mitigation Area and the GOMEX Planning Awareness Mitigation

Area. The Navy will also implement a 200 hour (hr)/year hull-mounted mid-frequency active sonar (MFAS) cap in the Gulf of Maine Planning Awareness Mitigation Area. The Navy has added a year-round, Bryde's Whale Mitigation Area, which will cover the biologically important area (BIA) as described in NMFS' 2016 Status Review (NMFS 2016) and implement a 200 hr/year hull-mounted MFAS cap and restrict all explosives except for mine warfare activities events in this mitigation area. The Navy has assessed and agreed to move the ship shock trial box east of the Mid-Atlantic Planning Awareness Mitigation Areas and move the northern GOMEX ship shock trial west of the Bryde's Whale Mitigation Area, including five nmi buffers from the mitigation areas.

The Navy has also revised its estimated serious injury or mortality takes of large whales and, as a result, withdrawn its request for serious injury or mortality incidental take for the Western North Atlantic stock of blue whale and Northern GOMEX stock of sperm whale due to the extremely low probability that vessel strike incidental to the training and testing activities in the AFTT Study Area would occur.

Overview of Training and Testing Activities

The Navy routinely trains and tests in the AFTT Study Area in preparation for national defense missions. Training and testing activities and exercises 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 AFTT Final

Environmental Impact Statement/Overseas Environmental Impact Statement (FEIS/OEIS) are categorized under one of the primary mission areas; the testing community has three additional categories of activities for vessel evaluation (including ship shock trials), unmanned systems, and acoustic and oceanographic science and technology. Activities that do not fall within one of these areas are listed as "other warfare activities." Each warfare community (surface, subsurface, aviation, and expeditionary 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 AFTT 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/extraction were the stressors that would result in impacts on marine mammals that could rise to the level of harassment (also serious injury or mortality in ship shock trials 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);
- anti-submarine warfare (sonar and other transducers, in-water detonations);
- expeditionary warfare (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, impact pile driving/vibratory extraction, air guns)

Overview of Training Activities and Exercises within the AFTT Study Area

An 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 a MTE, most of the activities being directed and coordinated by the strike group commander are identical in nature to the activities conducted during individual, crew, and smaller unit level training events. In a 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 a MTE, are shorter in duration, use fewer assets, and use fewer hours of hull-mounted sonar per exercise. These coordinated exercises are conducted under anti-submarine warfare. For the purpose of analysis, three key factors used to identify and group the exercises are 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 the major training exercises in these regulations. Additional detail regarding the training activities was provided in our *Federal Register* notice of proposed rulemaking (83 FR 10954; March 13, 2018) and a proposed rule correction (83 FR 15117; April 9, 2018); please see those documents or the Navy's application for more information.

Overview of Testing Activities within the AFTT 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, Naval Sea Systems Command, and the Office of Naval Research. Additional detail regarding the testing activities was provided in our *Federal Register* notice of proposed rulemaking (83 FR 10954; March 13, 2018); please see that proposed rule 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 training and testing activities conducted within the AFTT Study Area (which includes areas of the western Atlantic Ocean along the East Coast of North America, portions of the Caribbean Sea, and the GOMEX), covers approximately 2.6 million square nautical miles (nmi^2) of ocean area, oriented from the mean high tide line along the U.S. coast and extends east to the 45-degree west longitude line, north to the 65-degree north latitude line, and south to approximately the 20-degree north latitude line. Please refer to the Navy's rulemaking/LOA

application, specifically Figure 1.1-1 for a map of the AFTT Study Area and Figures 2.2-1 through Figure 2.2-3 for additional maps of the range complexes and testing ranges.

Description of Acoustic and Explosive Stressors

The planned training and testing activities were evaluated to identify specific components that could act as stressors (acoustic and explosive) by having direct or indirect impacts on the environment. This analysis included identification of the spatial variation of the identified 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 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. This analysis included identification of the spatial variation of the identified stressors. The following subsections describe the acoustic and explosive stressors for biological resources within the AFTT 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 AFTT 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 characterized 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 anticipated 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 sonars used to find and track enemy 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.

Additional detail regarding sound sources and platforms and categories of acoustic stressors was provided in our *Federal Register* notice of proposed rulemaking (83 FR 10954; March 13, 2018); please see that proposed rule 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 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 AFTT 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 AFTT 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-61)
	MF1K	Kingfisher mode associated with MF1 sonars
	MF3	Hull-mounted submarine sonars (*e.g.*, AN/BQQ-10)
	MF4	Helicopter-deployed dipping sonars (*e.g.*, AN/AQS-22 and 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%
	MF14	Oceanographic MF sonar
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)
	HF3	Other hull-mounted submarine sonars (classified)
	HF4	Mine detection, classification, and neutralization sonar (*e.g.*, AN/SQS-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)
Very High-Frequency Sonars (VHF): Non-tactical sources that produce signals between 100 – 200 kHz	VHF1	VHF sources greater than 200 dB
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

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 sub-merged 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	BB1	MF to HF mine countermeasure sonar
	BB2	HF to VHF mine countermeasure sonar
	BB4	LF to MF oceanographic source
	BB5	LF to MF oceanographic source
	BB6	HF oceanographic source
	BB7	LF oceanographic source

Notes: ASW: Anti-submarine 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; dB: decibels.

Air guns

Small air guns with capacities up to 60 cubic inches (in^3) would be used during testing activities in various offshore areas in the AFTT Study Area, as well as near shore at Newport, RI. Generated impulses would have short durations, typically a few hundred milliseconds, with dominant frequencies below 1 kHz. The root-mean-square sound pressure level (SPL) and peak pressure (SPL peak) at a distance 1 meter (m) from the airgun 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 cubic inches.

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 elevated causeway pile driving and removal are shown in Table 2.

Table 2. Elevated Causeway System Pile Driving and Removal Underwater Sound Levels in the AFTT Study Area.

Pile Size &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), 2Illingworth and Rodkin (2015)
Notes: dB re 1 µPa: decibels referenced to 1 micropascal; in.: inch; rms: root mean squared; SEL: Sound Exposure Level; SPL: Sound Pressure Level

The size of the pier 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 AFTT FEIS/OEIS. Additional detail regarding explosive stressors was provided in our *Federal Register* notice of proposed rulemaking (83 FR 10954; March 13, 2018); please see that proposed rule 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 near the water's surface. Explosive detonations associated with torpedoes and explosive sonobuoys would occur in the water column; mines and demolition charges could 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 nmi from shore, although mine warfare, demolition, and some testing detonations would occur in shallow water close to shore.

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 planned for use in the AFTT Study Area are shown in Table 3 below.

Table 3. Explosives Analyzed in the AFTT 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
E14[2]	> 1,741 – 3,625	Line charge
E16	> 7,250 – 14,500	Littoral Combat Ship full ship shock trial
E17	> 14,500 – 58,000	Aircraft carrier full ship shock trial

[1] Net Explosive Weight refers to the equivalent amount of TNT the actual weight of a munition may be larger due to other components.
[2] E14 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.

Explosive Fragments

Marine mammals could be exposed to fragments from underwater explosions associated with the specified activities. When explosive ordnance (*e.g.*, bombs or missiles) detonates, fragments of the weapons 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 seawater. Because the ranges to mortality and injury due to exposure to the blast wave are likely to far exceed the zone where fragments could injure or kill an animal, the threshold 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 AFTT Study Area. 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. Vessel strikes are likely to 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 10954; March 13, 2018); please see that proposed rule 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 13, 2018 the Navy provided additional information explaining why and withdrew certain species from their request for serious injury or mortality takes from vessel strike.

Planned Activities

Planned Training Activities

The training activities that the Navy plans to conduct in the AFTT 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, number of planned activities, and locations of those activities in the AFTT Study Area. For further information regarding the primary platform used (*e.g.*, ship or aircraft type) see Appendix A (Navy Activity Descriptions) of the AFTT FEIS/OEIS.

Table 4. Proposed Training Activities Analyzed within the AFTT Study Area.

Stressor Category	*Activity Name*	*Description*	*Source Bin*[1]	*Annual # of Activities*	*5-Year # of Activities*	*Location*[3]	*Duration per Activity*
Major Training Exercise – Large Integrated ASW							
Acoustic	Composite Training Unit Exercise	Aircraft carrier and its associated aircraft integrate with surface and submarine units in a challenging multi-threat operational environment in order to certify them for deployment.	ASW1, ASW2, ASW3, ASW4, ASW5, HF1, LF6, MF1, MF3, MF4, MF5, MF11, MF12	2–3[2]	12	VACAPES RC Navy Cherry Point RC JAX RC	21 days
Major Training Exercises – Medium Integrated Anti-Submarine Warfare							
Acoustic	Fleet Exercises/Sustainment Exercise	Aircraft carrier and its associated aircraft integrates with surface and submarine units in a challenging multi-threat operational environment in order to maintain their ability to deploy.	ASW1, ASW2, ASW3, ASW4, HF1, LF6, MF1, MF3, MF4, MF5, MF11, MF12	4	20	JAX RC	Up to 10 days
				2	10	VACAPES RC	
Integrated/Coordinated Training – Small Integrated Anti-Submarine Warfare Training							
Acoustic	Naval Undersea Warfare Training Assessment Course	Multiple ships, aircraft, and submarines integrate the use of their sensors to search for, detect, classify, localize, and track a threat submarine in order to launch an exercise torpedo.	ASW1, ASW3, ASW4, HF1, LF6, MF1, MF3, MF4, MF5, MF12	6	30	JAX RC	2-5 days
				3	15	Navy Cherry Point RC	
				3	15	VACAPES RC	
Integrated/Coordinated Training – Medium Coordinated Anti-Submarine Warfare Training							
Acoustic	Anti-Submarine Warfare Tactical Development Exercise	Surface ships, aircraft, and submarines coordinate to search for, detect, and track	ASW1, ASW3, ASW4, HF1,	2	10	JAX RC	5-7 days
				1	5	Navy Cherry Point RC	

		submarines.	LF6, MF1, MF3, MF4, MF5, MF11, MF12	1	5	VACAPES RC	
Integrated/Coordinated Training – Small Coordinated Anti-Submarine Warfare Training							
Acoustic	Group Sail	Surface ships and helicopters search for, detect, and track threat submarines.	ASW2, ASW3, ASW4, HF1, MF1, MF3, MF4, MF5, MF11, MF12	4	20	JAX RC	2-3 days
				5	25	Navy Cherry Point RC	
				5	25	VACAPES RC	
Amphibious Warfare							
Explosive	Naval Surface Fire Support Exercise – At Sea	Surface ship crews use large-caliber guns to support forces ashore; however, the land target is simulated at sea. Rounds are scored by passive acoustic buoys located at or near the target area.	E5	4	20	GOMEX RC	1-2 hrs of firing, 8 hrs total
				12	60	JAX RC	
				2	10	Navy Cherry Point RC	
				38	190	VACAPES RC	
Anti-Submarine Warfare							
Acoustic	Anti-submarine Warfare Torpedo Exercise – Helicopter	Helicopter aircrews search for, track, and detect submarines. Recoverable air launched torpedoes are employed against submarine targets.	MF4, MF5, TORP1	14	70	JAX RC	2-5 hrs
				4	20	VACAPES RC	
Acoustic	Anti-submarine Warfare Torpedo Exercise – Maritime Patrol Aircraft	Maritime patrol aircraft aircrews search for, track, and detect submarines. Recoverable air launched torpedoes are employed against submarine targets.	MF5, TORP1	14	70	JAX RC	2-8 hrs
				4	20	VACAPES RC	
Acoustic	Anti-Submarine Warfare Torpedo Exercise –Ship	Surface ship crews search for, track, and detect submarines. Exercise torpedoes are used.	ASW3, MF1, TORP1	16	80	JAX RC	2-5 hrs
				5	25	VACAPES RC	
Acoustic	Anti-Submarine Warfare Torpedo Exercise – Submarine	Submarine crews search for, track, and detect submarines. Exercise torpedoes are used.	ASW4, HF1, MF3, TORP2	12	60	JAX RC	8 hrs
				6	30	Northeast RC	
				2	10	VACAPES RC	

Acoustic	Anti-Submarine Warfare Tracking Exercise – Helicopter	Helicopter aircrews search for, track, and detect submarines.	MF4, MF5	24	120	Other AFTT Areas	2-4 hrs
				370	1,850	JAX RC	
				12	60	Navy Cherry Point RC	
				8	40	VACAPES RC	
Acoustic	Anti-Submarine Warfare Tracking Exercise – Maritime Patrol Aircraft	Maritime patrol aircraft aircrews search for, track, and detect submarines.	ASW5, ASW2, MF5	90	450	Northeast RC	2-8 hrs
				176	880	VACAPES RC	
				525	2,625	JAX RC	
				46	230	Navy Cherry Point RC	
Acoustic	Anti-Submarine Warfare Tracking Exercise – Ship	Surface ship crews search for, track, and detect submarines.	ASW1, ASW3, MF1, MF11, MF12	5*	25*	Northeast RC	2-4 hrs
				110*	550*	Other AFTT Areas	
				5*	25*	GOMEX RC	
				440*	2,200*	JAX RC	
				55*	275*	Navy Cherry Point RC	
				220*	1,100*	VACAPES RC	
Acoustic	Anti-Submarine Warfare Tracking Exercise – Submarine	Submarine crews search for, track, and detect submarines.	ASW4, HF1, MF3	44	220	Other AFTT Areas	8 hrs
				13	65	JAX RC	
				1	5	Navy Cherry Point RC	
				18	90	Northeast RC	
				6	30	VACAPES RC	
Expeditionary Warfare							
Explosive	Maritime Security Operations – Anti-Swimmer Grenades	Small boat crews engage in force protection activities by using anti-swimmer grenades to defend against hostile divers.	E2	2	10	GOMEX RC	1 hr
				2	10	JAX RC	
				2	10	Navy Cherry Point RC	
				4	20	Northeast RC	
				5	25	VACAPES RC	
Mine Warfare							
Acoustic	Airborne Mine Countermeasure -	Helicopter aircrews detect mines using	HF4	66	330	GOMEX RC	2 hrs

	Mine Detection	towed or laser mine detection systems.		317	1,585	JAX RC	
				371	1,855	Navy Cherry Point RC	
				244	1,220	NSWC Panama City	
				1,540	7,700	VACAPES RC	
Acoustic, Explosive	Civilian Port Defense – Homeland Security Anti-Terrorism/Force Protection Exercise	Maritime security personnel train to protect civilian ports against enemy efforts to interfere with access to those ports.	HF4, SAS2 E2, E4	1	3	Beaumont, TX; Boston, MA; Corpus Christi, TX; Delaware Bay, DE; Earle, NJ; GOMEX RC; Hampton Roads, VA; JAX RC; Kings Bay, GA; NS Mayport; Morehead City, NC; Port Canaveral, FL; Savannah, GA; Tampa Bay, FL; VACAPES RC; Wilmington, DE	Multiple days
Acoustic	Coordinated Unit Level Helicopter Airborne Mine Countermeasure Exercise	A detachment of helicopter aircrews train as a unit in the use of airborne mine countermeasures, such as towed mine detection and neutralization systems.	HF4	2	10	GOMEX RC	Multiple days
				2	10	JAX RC	
				2	10	Navy Cherry Point RC	
				2	10	VACAPES RC	
Acoustic, Explosive	Mine Countermeasures – Mine Neutralization – Remotely Operated Vehicle	Ship, small boat, and helicopter crews locate and disable mines using remotely operated underwater vehicles.	HF4, E4	132	660	GOMEX RC	1.5-4 hrs
				71	355	JAX RC	
				71	355	Navy Cherry Point RC	
				630	3,150	VACAPES RC	

Acoustic	Mine Countermeasures – Ship Sonar	Ship crews detect and avoid mines while navigating restricted areas or channels using active sonar.	HF4	22	110	GOMEX RC	1.5-4 hrs
				53	265	JAX RC	
				53	265	VACAPES RC	
Explosive	Mine Neutralization – Explosive Ordnance Disposal	Personnel disable threat mines using explosive charges.	E4, E5, E6, E7	6	30	Lower Chesapeake Bay	Up to 4 hrs
				16	80	GOMEX RC	
				20	100	JAX RC	
				17	85	Key West RC	
				16	80	Navy Cherry Point RC	
				524	2,620	VACAPES RC	
Surface Warfare							
Explosive	Bombing Exercise Air-to-Surface	Fixed-wing aircrews deliver bombs against surface targets.	E9, E10, E12	67	335	GOMEX RC	1 hr
				434	2,170	JAX RC	
				108	540	Navy Cherry Point RC	
				329	1,645	VACAPES RC	
Explosive	Gunnery Exercise Surface-to-Surface Boat Medium-Caliber	Small boat crews fire medium-caliber guns at surface targets.	E1	6	30	GOMEX RC	1 hr
				26	130	JAX RC	
				128	640	Navy Cherry Point RC	
				2	10	Northeast RC	
				260	1,300	VACAPES RC	
Explosive	Gunnery Exercise Surface-to-Surface Ship Large-Caliber	Surface ship crews fire large-caliber guns at surface targets.	E3,E5	10	50	Other AFTT Areas	Up to 3 hrs
				9	45	GOMEX RC	
				51	255	JAX RC	
				35	175	Navy Cherry Point RC	
				75	375	VACAPES RC	
Explosive	Gunnery Exercise Surface-to-Surface Ship Medium-Caliber	Surface ship crews fire medium-caliber guns at surface targets.	E1	41	205	Other AFTT Areas	2-3 hrs
				33	165	GOMEX RC	
				161	805	JAX RC	

				72	360	Navy Cherry Point RC	
				321	1,605	VACAPES RC	
Explosive	Integrated Live Fire Exercise	Naval forces defend against a swarm of surface threats (ships or small boats) with bombs, missiles, rockets, and small-, medium- and large-caliber guns.	E1, E3, E6, E10	2	10	VACAPES RC	6-8 hrs
				2	10	JAX RC	
Explosive	Missile Exercise Air-to-Surface	Fixed-wing and helicopter aircrews fire air-to-surface missiles at surface targets.	E6, E8, E10	102	510	JAX RC	1 hr
				52	260	Navy Cherry Point RC	
				88	440	VACAPES RC	
Explosive	Missile Exercise Air-to-Surface – Rocket	Helicopter aircrews fire both precision-guided and unguided rockets at surface targets.	E3	10	50	GOMEX RC	1 hr
				102	510	JAX RC	
				10	50	Navy Cherry Point RC	
				92	460	VACAPES RC	
Explosive	Missile Exercise Surface-to-Surface	Surface ship crews defend against surface threats (ships or small boats) and engage them with missiles.	E6, E10	16	80	JAX RC	2-5 hrs
				12	60	VACAPES RC	
Acoustic, Explosive	Sinking Exercise	Aircraft, ship, and submarine crews deliberately sink a seaborne target, usually a decommissioned ship (made environmentally safe for sinking according to U.S. Environmental Protection Agency standards), with a variety of munitions.	TORP2, E5, E8, E9, E10, E11	1	5	SINKEX Box	4-8 hrs, possibly over 1-2 days
Other Training Activities							
Acoustic	Elevated Causeway System	A temporary pier is constructed off the beach. Supporting pilings are driven into the sand and then later removed.	Impact hammer or vibratory extractor	1	5	Lower Chesapeake Bay	Up to 20 days for construction, and up to 10 days for removal
				1	5	Navy Cherry Point RC	
Acoustic	Submarine Navigation	Submarine crews operate sonar for	HF1, MF3	169	845	NSB New London	Up to 2 hrs

		navigation and object detection while transiting into and out of port during reduced visibility.		3	15	NSB Kings Bay	
				3	15	NS Mayport	
				84	420	NS Norfolk	
				23	115	Port Canaveral, FL	
Acoustic	Submarine Sonar Maintenance	Maintenance of submarine sonar systems is conducted pierside or at sea.	MF3	12	60	Other AFTT Areas	Up to 1 hr
				66	330	NSB New London	
				9	45	JAX RC	
				2	10	NSB Kings Bay	
				34	170	NS Norfolk	
				86	430	Northeast RC	
				2	10	Port Canaveral, FL	
				13	63	Navy Cherry Point RC	
				47	233	VACAPES RC	
Acoustic	Submarine Under Ice Certification	Submarine crews train to operate under ice. Ice conditions are simulated during training and certification events.	HF1	3	15	JAX RC	Up to 6 hrs per day over 5 days
				3	15	Navy Cherry Point RC	
				9	45	Northeast RC	
				9	45	VACAPES RC	
Acoustic	Surface Ship Object Detection	Surface ship crews operate sonar for navigation and object detection while transiting in and out of port during reduced visibility.	HF8, MF1K	76	380	NS Mayport	Up to 2 hrs
				162	810	NS Norfolk	
Acoustic	Surface Ship sonar Maintenance	Maintenance of surface ship sonar systems is conducted pierside or at sea.	HF8, MF1	50	250	JAX RC	Up to 4 hrs
				50	250	NS Mayport	
				120	600	Navy Cherry Point RC	
				235	1,175	NS Norfolk	
				120	600	VACAPES RC	

[1]Additional activities utilizing sources not listed in the Sonar Bin column may occur during integrated/coordinated exercises. All acoustic sources that may be used during training and testing activities have been accounted for in the modeling and analysis.

[2] For activities where the maximum number of events could vary between years, the information is presented as 'representative-maximum' number of events per year. For activities where no variation is anticipated, only the maximum number of events within a single year is provided.
[3] Locations given are areas where activities typically occur. However, activities could be conducted in other locations within the AFTT Study Area. Where multiple locations are provided within a single cell, the number of activities could occur in any of the locations, not in each of the locations.
* For anti-submarine warfare tracking exercise – Ship, the Planned Activity, 50 percent of requirements are met through synthetic training or other training exercises
Notes: GOMEX: Gulf of Mexico; JAX: Jacksonville; NS: Naval Station; NSB: Naval Submarine Base; NSWC: Naval Surface Warfare Center; RC: Range Complex; VACAPES: Virginia Capes

Planned Testing Activities

Testing activities covered in these regulations are described in Table 5 through Table 7.

Naval Air Systems Command

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

Table 5. Planned Naval Air Systems Command Testing Activities Analyzed in the AFTT Study Area.

Stressor Category	*Activity Name*	*Activity Description*	*Source Bin*	*Annual # of Activities [1]*	*5-Year # of Activities*	*Location[2]*	*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 (e.g., helicopter) and fixed-wing aircraft and the ability to search for, detect, classify, localize, track, and attack a submarine or similar target.	MF5, TORP1	20–43	146	JAX RC	2-6 flight hrs per event
				40–121	362	VACAPES RC	
Acoustic, Explosive	Anti-Submarine Warfare Tracking Test	This event is similar to the training event anti-submarine warfare tracking exercise – helicopter. The test evaluates	MF4, MF5, E3	4–6	24	GOMEX RC	2 flight hrs per event
				0–12	24	JAX RC	

	– Helicopter	the sensors and systems used to detect and track submarines and to ensure that helicopter systems used to deploy the tracking system perform to specifications.		2–27	35	Key West RC	
				28–110	304	Northeast RC	
				137–280	951	VACAPES RC	
Acoustic, Explosive	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, E1, E3, MF5, MF6	10–15	60	GOMEX RC	4-6 flight hrs per event
				19	95	JAX RC	
				10–12	54	Key West RC	
				14–15	72	Navy Cherry Point RC	
				36–45	198	Northeast Point RC	
				25	125	VACAPES RC	
Acoustic	Kilo Dip	Functional check of a helicopter deployed dipping sonar system prior to conducting a testing or training event using the dipping sonar system.	MF4	2–6	14	GOMEX RC	1.5 flight hrs per event
				0–6	6	JAX RC	
				0–6	6	Key West RC	
				0–4	8	Northeast RC	
				20–40	140	VACAPES RC	

Acoustic, Explosive	Sonobuoy Lot Acceptance Test	Sonobuoys are deployed from surface vessels and aircraft to verify the integrity and performance of a production 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	160	800	Key West RC	6 flight hrs per event
Mine Warfare							
Acoustic	Airborne Dipping Sonar Minehunting Test	A mine-hunting dipping sonar system deployed from a helicopter and uses high-frequency sonar for the detection and classification of bottom and moored mines.	HF4	16-32	96	NSWC Panama City	2 flight hrs per event
				6-18	42	VACAPES RC	
Explosive	Airborne Mine Neutralization System Test	A test of the airborne mine neutralization system evaluates the system's ability to detect and destroy mines from an airborne mine countermeasures capable helicopter. 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	20-27	107	NSWC Panama City	2.5 flight hrs per event
				25-45	145	VACAPES RC	
Acoustic	Airborne Sonobuoy Minehunting Test	A mine-hunting system made up of a field of sonobuoys deployed by a helicopter. A field of sonobuoys, using high-frequency sonar, is used to detect and classify bottom and moored mines.	HF6	52	260	NSWC Panama City	2 flight hrs per event
				24	120	VACAPES RC	
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	20	100	VACAPES RC	2 flight hrs per event

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 guns, gun ammunition, or associated systems meet required specifications or to train aircrews in the operation of a new or enhanced weapon system.	E1	25–55	215	JAX RC	2-2.5 flight hrs per event
				110–140	640	VACAPES RC	
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 weapon systemor as part of another system's integration test.	E6, E9, E10	0–10	20	GOMEX RC	2-4 flight hrs per event
				29–38	167	JAX RC	
				117–148	663	VACAPES RC	
Explosive	Rocket Test	Rocket tests evaluate the integration, accuracy, performance, and safe separation of guided and unguided 2.75-inch rockets fired from a hovering or forward-flying helicopter.	E3	15–19	87	JAX RC	1.5-2.5 hrs per event
				31–35	167	VACAPES RC	
Other Testing Activities							
Acoustic	Undersea Range System Test	Following installation of a Navy underwater warfare training and testing range, tests of the nodes (components of the range) will be conducted to include node surveys and testing of node transmission functionality.	MF9 BB4	4–20	42	JAX RC	8 hrs

[1] For activities where the maximum number of events could vary between years, the information is presented as 'representative-maximum' number of events per year. For activities where no variation is anticipated, only the maximum number of events within a single year is provided.
[2] Locations given are areas where activities typically occur. However, activities could be conducted in other locations within the AFTT Study Area.
Notes: GOMEX: GOMEX; JAX: Jacksonville; NSWC: Naval Surface Warfare Center; RC: Range Complex; VACAPES: Virginia Capes

Naval Sea Systems Command

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

Table 6. Planned Naval Sea Systems Command Testing Activities Analyzed in the AFTT Study Area.

Stressor Category	*Activity Name*	*Activity Description*	*Source Bin*	*Annual # of Activities*[1]	*5-Year # of Activities*	*Location*[2]	*Duration*
Anti-Submarine Warfare							
Acoustic	Anti-Submarine Warfare Mission Package Testing	Ships and their supporting platforms (e.g., helicopters, unmanned aerial systems) detect, localize, and attack submarines.	ASW1, ASW2, ASW3, ASW5, MF1, MF4, MF5, MF12, TORP1	42	210	JAX RC	1-2 wks, with 4-8 hrs of active sonar use with intervals on non-activity in between
				4	20	Newport, RI	
				4	20	NUWC Newport	
				26	130	VACAPES RC	
Acoustic	At-Sea Sonar Testing	At-sea testing to ensure systems are fully functional in an open ocean environment.	ASW3, ASW4, HF1, LF5, M3, MF1, MF1K, MF3, MF5, MF9, MF11, TORP2	2	10	JAX RC Navy Cherry Point RC Northeast RC VACAPES RC	From 4 hrs to 11 days
				1	5	JAX RC Navy Cherry Point RC VACAPES RC	
				2	10	offshore Fort Pierce, FL GOMEX RC JAX RC SFOMF Northeast RC VACAPES RC	
				4	20	JAX RC	
				2	10	Navy Cherry Point RC	
				8	40	NUWC Newport	
				12	60	VACAPES RC	
Acoustic	Pierside Sonar Testing	Pierside testing to ensure systems are fully functional in a controlled pierside	ASW3, HF1, HF3, HF8, M3, MF1,	1	5	NSB New London NS Norfolk Port Canaveral, FL	Up to 3 wks total per ship, with each source run independently and not
				11	55	Bath, ME	

		environment prior to at-sea test activities.	MF1K, MF3, MF9, MF10	5	25	NSB New London	continuously during this time.
				4	20	NSB Kings Bay	
				8	40	Newport, RI	
				13	65	NS Norfolk	
				2	10	Pascagoula, MS	
				3	15	Port Canaveral, FL	
				2	10	PNS	
Acoustic	Submarine Sonar Testing/ Maintenance	Pierside testing of submarine systems occurs periodically following major maintenance periods and for routine maintenance.	HF1, HF3, M3, MF3	16	80	Norfolk, VA	Up to 3 wks, with intermittent use of active sonar
				24	120	PNS	
Acoustic	Surface Ship Sonar Testing/ Maintenance	Pierside and at-sea testing of ship systems occur periodically following major maintenance periods and for routine maintenance.	ASW3, MF1, MF1K, MF9, MF10	1	5	JAX RC	Up to 3 wks, with intermittent use of active sonar
				1	5	NS Mayport	
				3	15	NS Norfolk	
				3	15	VACAPES RC	
Acoustic, Explosive	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	4	20	GOMEX RC offshore Fort Pierce, FL Key West RC Navy Cherry Point RC Northeast RC VACAPES RC	1-2 day during daylight hrs
				2	10	GOMEX RC JAX RC Northeast RC VACAPES RC	
Acoustic	Torpedo (Non-	Air, surface, or submarine crews	ASW3, ASW4,	7	35	GOMEX RC	Up to 2 wks

	Explosive) Testing	employ non-explosive torpedoes against submarines or surface vessels. When performed on a testing range, these torpedoes may be launched from a range craft or fixed structures and may use artificial targets.	HF1, HF6, MF1, MF3, MF4, MF5, MF6, TORP1, TORP2, TORP 3	11	55	offshore Fort Pierce, FL	
				2	8	JAX RC	
				7	35	Navy Cherry Point RC	
				8	38	Northeast RC	
				30	150	NUWC Newport	
				11	55	VACAPES RC	
Acoustic	Counter-measure Testing	Countermeasure testing involves the testing of systems that will detect, localize, track, and attack incoming weapons including marine vessel targets. Testing includes surface ship torpedo defense systems and marine vessel stopping payloads.	ASW3, HF5, TORP1, TORP2	5	25	GOMEX RC JAX RC NUWC Newport VACAPES RC Key West RC	From 4 hrs to 6 days, depending on countermeasure being tested
				2-4	14	GOMEX RC JAX RC Northeast RC VACAPES RC	
Mine Warfare							
Explosive	Mine Counter-measure and Neutralization Testing	Air, surface, and subsurface vessels neutralize threat mines and mine-like objects.	E4, E11	13	65	NSWC Panama City	1-10 days, with intermittent use of countermeasure/ neutralization system during this period
				6	30	VACAPES RC	
Acoustic, Explosive	Mine Counter-measure Mission Package Testing	Vessels and associated aircraft conduct mine countermeasure operations.	HF4, SAS2, E4	19	95	GOMEX RC	1-2 wks with intervals of mine countermeasure mission package use during this time
				10	50	JAX RC	
				11	55	NSWC Panama City	
				2	10	SFOMF	

				5	25	VACAPES RC	
Acoustic	Mine Detection and Classification Testing	Air, surface, and subsurface vessels and systems detect, classify, and avoid mines and mine-like objects. Vessels also assess their potential susceptibility to mines and mine-like objects.	HF1,HF 4, HF8, MF1, MF1K, MF9	6	30	GOMEX RC	Up to 24 days, with up to 12 hrs of acoustic activity each day
				10	50	Navy Cherry Point RC	
				47-55	250	NSWC Panama City	
				7-12	43	Riviera Beach, FL	
				4	20	SFOMF	
				3	15	VACAPES RC	
Surface Warfare							
Explosive	Gun Testing – Large Caliber	Crews defend against targets with large-caliber guns.	E3, E5	12	60	GOMEX RC JAX RC Key West RC Navy Cherry Point RC Northeast RC VACAPES RC	1-2 wks
				1	5	GOMEX RC	
				1	5	JAX RC	
				1	5	Key West RC	
				1	5	Navy Cherry Point RC	
				1	5	Northeast RC	
				33	165	NSWC Panama City	
				5	25	VACAPES RC	
Explosive	Gun Testing – Medium-Caliber	Airborne and surface crews defend against targets with medium-caliber guns.	E1	12	60	GOMEX RC JAX RC Key West RC Navy Cherry Point RC Northeast RC VACAPES RC	1-2 wks, with intervals of gun testing
				102	510	NSWC Panama City	

				5	24	VACAPES RC	
Explosive	Missile and Rocket Testing	Missile and rocket testing includes various missiles or rockets fired from submarines and surface combatants. Testing of the launching system and ship defense is performed.	E6, E10	13	65	GOMEX RC JAX RC Key West RC Navy Cherry Point RC Northeast RC VACAPES RC	1 day to 2 wks
				1	5	GOMEX RC	
				2	10	JAX RC	
				5	25	Northeast RC	
				22	110	VACAPES RC	
Unmanned Systems							
Acoustic, Explosive	Unmanned Underwater Vehicle Testing	Testing involves the development or upgrade of unmanned underwater vehicles. This may include testing of mine detection capabilities, evaluating the basic functions of individual platforms, or complex events with multiple vehicles.	ASW4, FLS2, HF1, HF4, HF5, HF6, HF7, LF5, MF9, MF10, SAS1, SA2, SAS3, VHF1, E8	16	80	GOMEX RC JAX RC NUWC Newport	Up to 35 days. Some propulsion systems (gliders) could operate continuously for multiple months.
				41	205	GOMEX RC	
				25	125	JAX RC	
				145-146	727	NSWC Panama City	
				308-309	1,541	NUWC Newport	
				9	45	Riviera Beach, FL	
				42	210	SFOMF	
Vessel Evaluation							
Explosive	Large Ship Shock Trial	Underwater detonations are used to test new ships or major upgrades.	E17	0-1	1	GOMEX JAX RC VACAPES RC	Typically over 4 wks, with 1 detonation per week. However, smaller charges

							may be detonated on consecutive days.
Explosive	Surface Warfare Testing	Tests capability 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	2	10	GOMEX RC	7 days
				13	65	JAX RC	
				1	5	Key West RC	
				10	50	Northeast RC	
				9	45	VACAPES RC	
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 underwater targets.	ASW3, ASW4, HF4, HF8, MF1, MF1K, MF4, MF5, MF9, MF10, TORP1, TORP2	2	10	JAX RC VACAPES RC	Up to 10 days
				0-2	4	JAX RC VACAPES RC Navy Cherry Point RC SFOMF	
				2	10	GOMEX RC	
				6	30	JAX RC	
				2	10	VACAPES RC	
Explosive	Small Ship Shock Trial	Underwater detonations are used to test new ships or major upgrades.	E16	0-3	3	JAX RC VACAPES RC	Typically over 4 wks, with 1 detonation per week. However, smaller charges

							may be detonated on consecutive days.
Acoustic	Submarine Sea Trials – Weapons System Testing	Submarine weapons and sonar systems are tested at-sea to meet integrated combat system certification requirements.	HF1, M3, MF3, MF9, MF10, TORP2	2	10	Offshore Fort Pierce, FL GOMEX RC JAX RC SFOMF Northeast RC VACAPES RC	Up to 7 days
				4	20	JAX RC	
				4	20	Northeast RC	
				4	20	VACAPES RC	
Other Testing Activities							
Acoustic	Insertion/ Extraction	Testing of submersibles capable of inserting and extracting personnel and payloads into denied areas from strategic distances.	MF3, MF9	4	20	Key West RC	Up to 30 days
				264	1,320	NSWC Panama City	
Acoustic	Acoustic Component Testing	Various surface vessels, moored equipment, and materials are tested to evaluate performance in the marine environment.	FLS2, HF5, HF7, LF5, MF9, SAS2	33	165	SFOMF	1 day to multiple months
Acoustic	Semi-Stationary Equipment Testing	Semi-stationary equipment (e.g., hydrophones) is deployed to determine functionality.	AG, ASW3, ASW4, HF5, HF6, LF4, LF5, MF9, MF10, SD1,SD 2	4	20	Newport, RI	From 20 min to multiple days
				11	55	NSWC Panama City	
				190	950	NUWC Newport	

Acoustic	Towed Equipment Testing	Surface vessels or unmanned surface vehicles deploy and tow equipment to determine functionality of towed systems.	HF6, LF4, MF9	36	180	NUWC Newport	Typically 2-8 hrs
Acoustic	Signature Analysis Operations	Surface ship and submarine testing of electromagnetic, acoustic, optical, and radar signature measurements.	ASW2, HF1, LF4, LF5, LF6, M3, MF9, MF10	1	5	JAX RC	Periodically over multiple days
				59	295	SFOMF	

Notes: JEB LC-FS: Joint Expeditionary Base Little Creek-Fort Story; NS: Naval Station; NSB: Naval Submarine Base; NSWC: Naval Surface Warfare Center; NUWC: Naval Undersea Warfare Center; PNS: Portsmouth Naval Shipyard; SFOMF: South Florida Ocean Measurement Facility Testing Range

[1] For activities where the maximum number of events could vary between years, the information is presented as 'representative-maximum' number of events per year. For activities where no variation is anticipated, only the maximum number of events within a single year is provided.

[2] Locations given are areas where activities typically occur. However, activities could be conducted in other locations within the AFTT Study Area. Where multiple locations are provided within a single cell, the number of activities could occur in any of the locations, not in each of the locations.

Office of Naval Research

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

Table 7. Planned Office of Naval Research Testing Activities Analyzed within the AFTT Study Area.

Stressor Activity	*Activity Name*	*Activity Description*	*Source Bin*	*Annual # of Activities*	*5-Year # of Activities*	*Location*	*Duration*
Acoustic and Oceanographic Science and Technology							
Acoustic, Explosive	Acoustic and Oceanographic Research	Research using active transmissions from sources deployed from ships and unmanned underwater vehicles.	AG, ASW2, BB4, BB5,	2	10	Other AFTT Areas	Up to 14 days
				5	22	GOMEX RC	

		Research sources can be used as proxies for current and future Navy systems.	BB6, BB7, LF3, LF4, LF5, MF8, MF9, MF14, E1	9	43	Northeast RC	
				3	12	VACAPES RC	
Acoustic	Emerging Mine Countermeasure Technology Research	Test involves the use of broadband acoustic sources on unmanned underwater vehicles.	BB1, BB2, SAS4	1	5	JAX RC	Up to 14 days
				2	10	Northeast RC	
				1	5	VACAPES RC	

Notes: GOMEX: GOMEX; JAX: Jacksonville, Florida; RC: Range Complex; VACAPES: Virginia Capes

Summary of Acoustic and Explosive Sources Analyzed for Training and Testing

Table 8 through Table 11 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 AFTT Study Area that were analyzed in this rule. Table 8 shows the acoustic source classes (*i.e.*, LF, MF, and HF) that could occur in any year under the Planned Activity 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 8. Acoustic Source Classes Analyzed and Numbers Used during Training and Testing Activities in the AFTT 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	1,308	6,540
	LF4	LF sources equal to 180 dB and up to 200 dB	H	0	0	971	4,855
			C	0	0	20	100

	LF5	LF sources less than 180 dB	H	9	43	1,752	8,760
	LF6	LF sources greater than 200 dB with long pulse lengths	H	145 – 175	784	40	200
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-61)	H	5,005 – 5,605	26,224	3,337	16,684
	MF1K	Kingfisher mode associated with MF1 sonars	H	117	585	152	760
	MF3	Hull-mounted submarine sonars (*e.g.*, AN/BQQ-10)	H	2,078 – 2,097	10,428	1,257	6,271
	MF4	Helicopter-deployed dipping sonars (*e.g.*, AN/AQS-22 and AN/AQS-13)	H	591 – 611	2,994	370 – 803	2,624
	MF5	Active acoustic sonobuoys (*e.g.*, DICASS)	C	6,708– 6,836	33,796	5,070 – 6,182	27,412
	MF6	Active underwater sound signal devices (*e.g.*, MK84)	C	0	0	1,256 – 1,341	6,390
	MF8	Active sources (greater than 200 dB) not otherwise binned	H	0	0	348	1,740
	MF9	Active sources (equal to 180 dB and up to 200 dB) not otherwise binned	H	0	0	7,395– 7,562	37,173
	MF10	Active sources (greater than 160 dB, but less than 180 dB) not otherwise binned	H	870	4,348	5,690	28,450
	MF11	Hull-mounted surface ship sonars with an active duty cycle greater than 80%	H	873 – 1,001	4,621	1,424	7,120
	MF12	Towed array surface ship sonars with an active duty cycle	H	367 – 397	1,894	1,388	6,940

		greater than 80%					
	MF14	Oceanographic MF sonar	H	0	0	1,440	7,200
	HF1	Hull-mounted submarine sonars (*e.g.*, AN/BQQ-10)	H	1,928 – 1,932	9,646	397	1,979
	HF3	Other hull-mounted submarine sonars (classified)	H	0	0	31	154
	HF4	Mine detection, classification, and neutralization sonar (*e.g.*, AN/SQS-20)	H	5,411 – 6,371	29,935	30,772 – 30,828	117,916
High-Frequency (HF): Tactical and non-tactical sources that produce signals between 10 – 100 kHz	HF5	Active sources (greater than 200 dB) not otherwise binned	H	0	0	1,864 – 2,056	9,704
			C	0	0	40	200
	HF6	Active sources (equal to 180 dB and up to 200 dB) not otherwise binned	H	0	0	2,193	10,868
	HF7	Active sources (greater than 160 dB, but less than 180 dB) not otherwise binned	H	0	0	1,224	6,120
	HF8	Hull-mounted surface ship sonars (*e.g.*, AN/SQS-61)	H	20	100	2,084	10,419
Very High-Frequency Sonars (VHF): Non-tactical sources that produce signals between 100 – 200 kHz	VHF 1	VHF sources greater than 200 dB	H	0	0	12	60
Anti-Submarine Warfare (ASW): Tactical sources (*e.g.*, active sonobuoys and acoustic counter-measures systems) used during ASW training and testing activities	ASW 1	MF systems operating above 200 dB	H	582 – 641	3,028	820	4,100
	ASW 2	MF Multistatic Active Coherent sonobuoy (*e.g.*, AN/SSQ-125)	C	1,476 – 1,556	7,540	4,756 – 5,606	25,480
	ASW 3	MF towed active acoustic countermeasure systems (*e.g.*,	H	4,485 – 5,445	24,345	2,941– 3,325	15,472

		AN/SLQ-25)					
	ASW 4	MF expendable active acoustic device countermeasures (*e.g.*, MK 3)	C	425 – 431	2,137	3,493	17,057
	ASW 5	MF sonobuoys with high duty cycles	H	572 – 652	3,020	608 – 628	3,080
Torpedoes (TORP): Source classes associated with the active acoustic signals produced by torpedoes	TOR P1	Lightweight torpedo (*e.g.*, MK 46, MK 54, or Anti-Torpedo Torpedo)	C	57	285	806 – 980	4,336
	TOR P2	Heavyweight torpedo (*e.g.*, MK 48)	C	80	400	344 – 408	1,848
	TOR P 3	Heavyweight torpedo (*e.g.*, MK 48)	C	0	0	100	440
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	0	0	1,224	6,120
Acoustic Modems (M): Systems used to transmit data through the water	M3	MF acoustic modems (greater than 190 dB)	H	0	0	634	3,169
Swimmer Detection Sonars (SD): Systems used to detect divers and sub-merged 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	176	880
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	960	4,800
	SAS2	HF SAS systems	H	0 – 8,400	25,200	3,512	17,560
	SAS3	VHF SAS systems	H	0	0	960	4,800
	SAS4	MF to HF broadband mine countermeasure sonar	H	0	0	960	4,800
Broadband Sound Sources (BB): Sonar systems with large frequency spectra, used	BB1	MF to HF mine countermeasure sonar	H	0	0	960	4,800
	BB2	HF to VHF mine	H	0	0	960	4,800

for various purposes		countermeasure sonar					
	BB4	LF to MF oceanographic source	H	0	0	876 – 3,252	6,756
	BB5	LF to MF oceanographic source	H	0	0	672	3,360
	BB6	HF oceanographic source	H	0	0	672	3,360
	BB7	LF oceanographic source	C	0	0	120	600

1: C = Count; H = Hours
2: Expected annual use may vary per bin because the number of events may vary from year to year, as described in Chapter 1, Section 1.5 (*Planned Activity*) of the Navy's rulemaking/LOA application.

Table 9 shows the number of air gun shots planned in AFTT Study Area for training and testing activities.

Table 9. Training and Testing Airgun Sources Quantitatively Analyzed in the AFTT 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	604	3,020

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

Table 10 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 5-year period of the rule, the Navy will drive a total of 1190 piles by impact pile driving. Annually, for vibratory pile removal, the Navy will remove 119 piles, two times a year for a total of 238 piles. Over the 5-year period of the rule, the Navy will remove a total of 1190 piles by vibratory pile removal.

Table 10. Summary of Pile Driving and Removal Activities per 24-Hour Period in the AFTT Study Area.

Method	*Piles Per 24-Hour Period*	*Time Per Pile*	*Total Estimated Time of Noise Per 24-Hour Period*
Pile Driving (Impact)	6	15 minutes	90 minutes
Pile Removal (Vibratory)	12	6 minutes	72 minutes

Table 11 shows the number of in-water explosives that could be used in any year under the Planned Activity 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 Specified Activities takes into account that annual variability.

Table 11. Explosive Source Bins Analyzed and Numbers Used during Training and Testing Activities in the AFTT Study Area.

Bin	*Net Explosive Weight[1] (lb)*	*Example Explosive Source*	*Training*		*Testing*	
			Annual[2]	*5-year Total*	*Annual[2]*	*5-year Total*
E1	0.1 – 0.25	Medium-caliber projectile	7,700	38,500	17,840 – 26,840	116,200
E2	> 0.25 – 0.5	Medium-caliber projectile	210 – 214	1,062	0	0
E3	> 0.5 – 2.5	Large-caliber projectile	4,592	22,960	3,054 – 3,422	16,206
E4	> 2.5 – 5	Mine neutralization charge	127 – 133	653	746 – 800	3,784
E5	> 5 – 10	5-inch projectile	1,436	7,180	1,325	6,625
E6	> 10 – 20	Hellfire missile	602	3,010	28 – 48	200
E7	> 20 – 60	Demo block / shaped charge	4	20	0	0
E8	> 60 – 100	Light-weight torpedo	22	110	33	165
E9	> 100 – 250	500 lb bomb	66	330	4	20
E10	> 250 – 500	Harpoon missile	90	450	68 – 98	400

E11	> 500 – 650	650 lb mine	1	5	10	50
E12	> 650 – 1,000	2,000 lb bomb	18	90	0	0
E16[3]	> 7,250 – 14,500	Littoral Combat Ship full ship shock trial	0	0	0 – 12	12
E17[3]	> 14,500 – 58,000	Aircraft carrier full ship shock trial	0	0	0 – 4	4

[1] Net Explosive Weight refers to the equivalent amount of TNT the actual weight of a munition may be larger due to other components.
[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 (Planned Activity).
[3] Shock trials consist of four explosions each. In any given year there could be 0-3 small ship shock trials (E16) and 0-1 large ship shock trials (E17). Over a 5-year period, there could be three small ship shock trials (E16) and one large ship shock trial (E17).

Vessel Movement

Vessels used as part of the Planned Activity include ships, submarines 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). Large Navy ships greater than 60 ft (18 m) generally operate at speeds in the range of 10 to 15 kn for fuel conservation. Submarines generally operate at speeds in the range of 8 to 13 kn in transits and less than those speeds for certain tactical maneuvers. Small craft, less than 60 ft (18 m) in length, have much more variable speeds (dependent on the mission). For small craft types, sizes and speeds vary during training and testing. Speeds generally range from 10 to 14 kn. While these speeds for large and small crafts are representative of most events, some vessels need to temporarily operate outside of these parameters.

The number of Navy vessels used in the AFTT Study Area varies based on military training and testing requirements, deployment schedules, annual budgets, and other unpredictable factors. Most training and testing activities involve the use of vessels. These activities could be widely dispersed throughout the AFTT Study Area, but would be typically conducted near naval ports, piers, and range areas.

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 on 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 10954; March 13, 2018); please see that proposed rule or the Navy's application for more information.

Duration and Location

Training and testing activities would be conducted in the AFTT Study Area throughout the year from 2018 through 2023 for the five-year period covered by the regulations. The AFTT Study Area (see Figure 1.1-1 of the Navy's rulemaking/LOA application) includes areas of the western Atlantic Ocean along the East Coast of North America, portions of the Caribbean Sea, and the GOMEX. The AFTT Study Area begins at the mean high tide line along the U.S. coast and extends east to the 45-degree west longitude line, north to the 65-degree north latitude line, and south to approximately the 20-degree north latitude line. The AFTT Study Area also includes Navy pierside locations, bays, harbors, and inland waterways, and civilian ports where training and testing occurs. The AFTT Study Area generally follows the Commander Task Force 80 area of operations, covering approximately 2.6 million nmi^2 of ocean area, and includes designated Navy range complexes and associated operating areas (OPAREAs) and special use

airspace. While the AFTT Study Area itself is very large, it is important to note that the vast majority of Navy training and testing occurs in designated range complexes and testing ranges.

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 established OPAREAs, which may be further divided to provide better control of the area for safety reasons. Please refer to the regional maps provided in the Navy's rulemaking/LOA application (Figure 2.2-1 through Figure 2.2-3) 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 10954; March 13, 2018); please see that proposed rule or the Navy's application for more information.

Comments and Responses

We published a notice of proposed regulations in the *Federal Register* on March 13, 2018 (83 FR 10954), with a 45-day comment period. In that proposed rule, we requested public input on the request 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 28 total comment letters. Of this total, one submission was from another federal agency, two letters were from organizations or individuals acting in an official capacity (*e.g.*, non-governmental organizations (NGOs)) and 25 submissions were from private citizens. Letters from other NGOs and state departments that were received during the NOR were also considered further. 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 outline our comment responses by major categories.

General Comments

The majority of the 25 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) are met; therefore, these comments were not considered further. The remaining comments are addressed below.

Impact Analysis

General

***Comment 1*:** A Commenter recommends that NMFS consult with the Navy to collect more information regarding the number, nature, and timing of testing and training events that take place within, or within close proximity to, important habitat areas, essentially refining the scale of the analysis of training and testing activities to match the scale of the habitat areas considered to be important.

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 their 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 AFTT 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 (*i.e.*, in NARW ESA-designated critical habitat), 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.

Density Estimates

***Comment 2*:** A Commenter noted 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 suggests that the Navy consider increasing the iterations from 30 to at least 200 for activities that have yet to be modeled for Phase III and for all activities in Phase IV.

***Response*:** The 30 iterations used in NAEMO represent the number of iterations run for each of the four seasons analyzed in AFTT Phase III, which results in a total of 120 iterations per year for each event analyzed. For other areas where only warm and cold seasons are analyzed, the number of iterations per season is increased to 60 so that the same 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 AFTT 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.

Comment 3: A Commenter recommends that the Navy (1) specify what modeling method and underlying assumptions were used to estimate PTS and TTS zones for pile driving activities and (2) accumulate energy for the entire day of proposed activities, and (3) clarify why those zones were estimated to be the same for LF and HF.

***Response*:** The Navy has explained that it used measured values for source levels and transmission loss from pile driving of the Elevated Causeway System, the only pile driving activity included in the Proposed Action of the AFTT FEIS/OEIS. 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 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.

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 and sea turtles 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 zone of influence (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 and sea turtles throughout the mitigation zone.

PTS/TTS Thresholds

Comment 4: A Commenter supports 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 e*t al.*, 2017b) and information on TTS *(e.g.*, Kastelein *et al.*, 2017a; 2017c). However, the Commenter recommends 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), 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 references 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 5: A Commenter 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. The Commenter specifically cited many supposed issues with NMFS' Acoustic Technical Guidance, including adoption of "erroneous" models, broad extrapolation from a small number of individuals, and disregarding "non-linear accumulation of

uncertainty." The Commenter suggests that NMFS 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 available 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.

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 does not believe 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 Level B 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 individual's 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 μPa^2s. 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 6: A Commenter suggests that NMFS fails 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 Level B behavioral harassment from sonar, the Commenter suggests that resulting functions depend on some inappropriate assumptions that tend to significantly underestimate effects. The Commenter expresses 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, they assert that the risk

functions do not incorporate (nor does NMFS apparently consider) a number of relevant studies on wild marine mammals. 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 here 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. The Commenter recommends 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 uses 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 to include 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, the 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 AFTT 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 7: Commenters have concerns with the use of distance "cut-offs" in the Level B behavioral harassment thresholds, and the recommend 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 Navy and NMFS and was applied within the Navy's acoustic effects model. Cut-off distances were used to better reflect the take potential for military readiness activities as defined in the MMPA. 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)*. Much of the data used to derive the behavioral response functions was from nearby, scaled sources, thereby potentially confounding results since it is difficult to tell whether the focal marine mammal is reacting to the sound level or the proximity of the source and/or vessel, amongst other potentially confounding contextual factors that are unlike actual Navy events for which the behavioral response functions (BRFs) are being derived. To account for these 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, *i.e.*, harbor porpoises) 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 distance is currently the best known method for providing the public and regulators with a more realistic (but still conservative where some uncertainties exist) estimate of impact and potential take under military readiness for the proposed actions within the AFTT FEIS/OEIS. NMFS has independently

assessed the Navy's Level B behavioral harassment thresholds and believe that they appropriately apply the best available science and it is not necessary to recalculate take estimates.

A Commenter also specifically expresses 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 Level B 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 8: Regarding cut-off distances, a Commenter further notes that dipping sonar appears 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. They suggest 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, 2015)) was not available at the time the behavioral response functions 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 would significantly change the assessment of impacts or conclusions in the AFTT 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.

Comment 9: Regarding the behavioral thresholds for explosives, a Commenter recommends 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 the Commenter references 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 1990's 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. All of Navy's monitoring projects, reports, and publications are available on the marine species monitoring webpage (*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 10*:* A Commenter recommends 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. The derivation of the Phase III equations and all associated assumptions are fully documented in the Navy's 2017 technical report *Criteria and Thresholds for U.S. Navy*

Acoustic and Explosive Effects Analysis (Phase III). NMFS independently reviewed and concurred with this approach.

Comment 11: A 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 (U.S. Department of the Navy 2017a). Thus, the Commenters notes 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, the Navy, in consultation with NMFS, revised and updated the mitigation for these types of events, which did not previously include consideration of the distance an animal could travel while the detonation was "delayed." There have been no further incidents since these mitigation changes were instituted.

The Navy used the range to one percent risk of mortality, as well as injury (referred to as "onset" in the AFTT DEIS/OEIS), to inform the development of mitigation ranges for explosions. In all cases, the proposed mitigation ranges 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 AFTT FEIS/OEIS, the Navy 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 mechanism for quantifying the likely effect, given the use of mitigation zones based on onset. Ranges to effect based on one percent risk criteria were examined to ensure that explosive mitigation zones would encompass the range to any potential mortality or non-auditory injury, affording actual protection against these effects. NMFS concurs with the Navy's approach for mitigating and quantifying injury and mortality from explosives.

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 technical report titled *Criteria and Thresholds for U.S. Navy Acoustic and Explosive Effects Analysis (Phase III).*

Range to Effects

Comment 12: A Commenter notes an apparent error in Table 6.4-3 of the Navy's rulemaking/LOA application and recommends that NMFS determine what the appropriate ranges to TTS should be for bin LF5 and amend the ranges for the various functional hearing groups in the various 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 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.

Comment 13: A Commenter recommends that the Navy use its spatially and temporally dynamic simulation models (*e.g.*, randomly-generated munition trajectories and animat simulations) rather than simple probability calculations to estimate strike probabilities and number of takes from expended munitions and non-explosive materials.

***Response*:** The recommendation of the Commenter to use a dynamic simulation model to estimate expended munitions and non-explosive materials strike probability was considered, but the Navy found, and NMFS agrees, that while the current analysis used in the AFTT FEIS/OEIS is more conservative and almost certainly over-estimates the potential impacts to marine mammals, it was preferable given the uncertainty involved in the prediction. An analysis of direct strike resulting from expended materials conducted in a dynamic simulation model such as NAEMO would also be a probability analysis; however, it would be conducted in a different manner. The current analysis provides an over-estimation of the probability of a strike for the following reasons: it (1) calculates the probability of a single military item (of all the items expended over the course of the year) hitting a single animal at its species' highest seasonal density; (2) does not take into account the possibility that an animal may avoid military activities; (3) does not take into account the possibility that an animal may not be at the water surface; (4) does not take into account that most projectiles fired during training and testing activities are fired at targets, and not all projectiles would hit the water with their maximum velocity and force; and (5) does not quantitatively take into account the Navy avoiding animals

that are sighted through the implementation of mitigation measures. Given the uncertainty, and in order to be more conservative, NMFS and the Navy will continue using this method.

Mitigation and Avoidance Calculations

Comment 14: Commenters cite 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 harassment takes and mortality takes may be underestimated. A Commenter recommends that the Navy (1) provide the total numbers of model-estimated Level A harassment (PTS and slight lung and GI injuries) and mortality takes rather than reduce the estimated numbers of takes based on the Navy's post-model analyses and (2) include the model-estimated Level A harassment and mortality takes in its rulemaking/application to inform NMFS' 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.*

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; however HF cetaceans such as harbor porpoises, have been observed reacting to anthropogenic sound at greater distances than other species and are likely to avoid their zones to hearing impacts (TTS and PTS) as well.

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.

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 15: 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), 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 five-percent assumption was valid.

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 five 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; however HF cetaceans such as harbor porpoises have been observed reacting to anthropogenic sound at greater distances than other species and are likely to avoid their zones to hearing impacts (TTS and PTS) as well. 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.

Comment 16: A Commenter asserted that the Navy's adjustment of injury and mortality numbers for "mitigation effectiveness" is also problematic. The analysis starts with species-specific g(0) factors (probability of detection of animals at zero distance) applied in professional marine mammal abundance surveys, then multiplies them by a simple factor to reflect the relative effectiveness of the Navy's Lookouts in routine operating conditions. Yet the Navy's sighting effectiveness is likely to be much poorer than that of experienced biologists dedicated exclusively to marine mammal detection, operating under conditions that maximize sightings. As one recent paper observed, for example, abundance survey rates declined significantly as sea states rose above Beaufort 1, and average Beaufort sea states in the mid- and southeast Atlantic average Beaufort 3-4 throughout the year (see Table 1). Given this, it seems that Navy visual surveys can seldom approximate the sighting effectiveness of a large-vessel abundance survey.

Response: Information about the quantitative analysis process, including the consideration of mitigation effectiveness, is described in detail in the 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 quantitatively assessed the effectiveness of its mitigation measures on a per-scenario basis using four factors: (1) species sightability, (2) a Lookout's ability to observe the range to permanent threshold shift (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). The g(0) values used by the Navy for their mitigation effectiveness adjustments take into account the differences in sightability with sea state, and utilize averaged g(0) values for sea states of 1-4 and weighted as suggested by Barlow (2015). This helps to account for reduced sightability in varying conditions, as does the fact that, during active sonar activities, Navy Lookouts tend to look in the water near the vessel, within 1 km, rather than out to the horizon as Marine Mammal Observers (MMO) do. 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 for 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 account only for the minimum number of required Lookouts used for each activity; therefore, the mitigation effectiveness factors may underestimate the likelihood that some marine mammals (as well as sea turtles) may be detected during activities that are supported by additional personnel who may also be observing the mitigation zone. NMFS independently reviewed and concurs with this analysis.

Comment 17: A Commenter comments on the potential for serious injury and mortality that could occur in the event of a ship strike or as a result of marine mammal exposure to explosive detonations (ship shock trials) and suggests that NMFS' prediction that only these few takes will result from Navy's thousands of hours of training and testing activities has misrepresented the science. Specifically, the Commenter discusses the risk of ship strike to NARW and suggested that it appears as a glaring omission from the list of species authorized for lethal take. While the

Commenter concurred with NMFS' refusal to authorize a single ship strike to the NARW, they do not share the agency's level of confidence that the Navy will be able to effectively mitigate the potential for a ship strike to occur. They further suggest that NMFS has failed to consider the indirect effects of noise on ship-strike risk. They also assert that indirect ship strike risk resulting from habitat displacement must be accounted for in NMFS' analysis. The Commenter recommends additional mitigation measures slowing ships to 10 kn.

Response: As described in greater detail in the *Take from Vessel Strikes* section of the final rule, although NMFS' analysis shows that NARWs have a low probability of being struck even one time within the five-year period of the rule when strikes across all activity types (including non-Navy) are considered (10.11 percent, lower than all other stocks except North Atlantic sperm whales), when the enhanced mitigation measures the Navy will implement for NARWs are considered in combination with this low probability, the Navy and NMFS have determined that a vessel strike is highly unlikely and, therefore, it was not requested and is not authorized.

In addition to procedural mitigation, the Navy will limit MTEs and implement additional protective measures in mitigation areas used by NARW for foraging, calving, and migration (where individuals are concentrated and more likely to be struck). These measures, which go above and beyond those focused on other species (*e.g.*, funding of and communication with sightings systems, implementation of speed reductions during applicable circumstances in certain areas) have helped the Navy avoid striking a NARW during training and testing activities in the past; and eliminate the potential for future strikes to occur in the five years of the rule. In particular, the mitigation pertaining to communication among vessels, including the continued participation in and sponsoring of the Early Warning System (EWS, a comprehensive information exchange network dedicated to reducing the risk of vessel strikes to NARW in the

Southeast) and NOAA's NARW Sighting Advisory System in the Northeast, will help Navy vessels avoid NARW during transits and training and testing activities.

Implementation of these measures is expected to significantly reduce the probability of striking this particular species during the five-year period of the rule. Further, the Navy has agreed to expand the requirement for Navy vessels to contact the EWS from just the NARW ESA-designated critical habitat to the entire Jacksonville OPAREA. Additionally the Navy has developed a new mitigation measure to broadcast Dynamic Management Area information based on potential changes in NARW distribution. Platforms will use Dynamic Management Area information to assist their visual observation of applicable mitigation zones during training and testing activities. This will make units even more aware of NARW aggregations to better plan and conduct activities to minimize interactions with this species. Not only will this mitigation measure help the Navy further avoid or reduce potential impacts on NARW from vessel movements, it will also help aid the implementation of applicable procedural mitigation measures for acoustic, explosive, and physical disturbance and strike stressors when Dynamic Management Areas are in effect.

Ship strikes are a fluke encounter for which the probability can never be zero for any vessel. However, the probability for any particular ship striking a marine mammal is primarily a product of the ability of the ship to detect a marine mammal and the ability to effectively act to avoid it. Navy combat ships are inherently among the best at both of these abilities because compared to large commercial vessels, they have trained Lookouts which have received specialized MMO training and the most maneuverable ships, which means that they are more likely to sight a marine mammal and more likely to be able to maneuver to avoid it in the available time - both of which decrease the probability of striking a marine mammal below what

it would have been in the absence of those abilities. In the case of the NARW, the extensive communication/detection network described above, which is in use in the areas of highest NARW occurrence and where they may be more susceptible to strike, further increases the likelihood of detecting a NARW and thereby avoiding it, which further reduces the probability of NARW strike. Because of these additional mitigation measures combined with the already low probability that a NARW will be struck, it is extremely unlikely the Navy will strike a NARW and mortality/serious injury of a NARW from vessel strike is neither anticipated nor authorized. Regarding the likelihood of mortality from explosives, the Commenter does not offer any data or rationale to support the assertion that NMFS has underestimated the mortality from explosives. The analysis and estimates contained in the final rule are based on the best available science and accurately represent the appropriate take numbers for mortality and injury from explosives.

Underestimated Beaked Whale Injury and Mortality

Comment 18: A Commenter claims that NMFS is underestimating serious injury and mortality for beaked whales. They note 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 11084). 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 argues 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 10999) and dismisses the risk of stranding and other mortality events (83 FR 11084) 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, they argue 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*:** The 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 AFTT Study Area) via strandings resulting from behaviorally mediated physiological impacts or other gas-related injuries. NMFS discusses these potential causes and outlines the few cases where active naval sonar (in the U.S. or, largely, elsewhere) has either potentially contributed to or (as with the Bahamas example) been more definitively causally linked with marine mammal strandings. 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 AFTT Study Area and during the specified activities (and which the Navy takes care across the world not to operate under without additional monitoring). Further, there have never been any strandings associated with Navy sonar use in the AFTT Study Area. For these reasons, NMFS does not anticipate that the Navy's AFTT training or testing activities will result in marine mammal strandings, and none are authorized.

Ship Strike

***Comment 19*:** A Commenter asserted that the Navy's analysis, which NMFS used to support its vessel-strike analysis in the rule, does not address the potential for increased strike risk by 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 NARW, increasing the risk of ship-strike at relatively moderate levels of exposure. An analysis based on reported strikes by Navy vessels 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*:** 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. Further, any increase in the probability of hitting a NARW resulting from this speculated effect would already inherently be accounted for in the probability included in our analysis, which is based on the actual estimated number of NARW strikes (which accounts for unreported non-Navy vessel strikes). Lastly, the anthropogenic noise signal referred to in the comment was developed specifically to elicit a response from NARWs. This type of signal is not analogous to any sound source used by Navy.

Comment 20: A Commenter asserts that NMFS and the Navy's analyses fail to account for the likelihood that the number of ship strikes are grossly underestimated because some animals are struck and not recovered or reported.

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. Navy's strict internal procedures and implementation of past mitigation measures require reporting of any vessel strikes of marine mammals and the Navy's discipline and 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.

Mitigation and Monitoring

Least Practicable Adverse Impact Determination

Comment 21: A Commenter comments 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 asserts 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 recommends 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 LPAI 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 LPAI 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 22: A Commenter recommends that NMFS address the habitat component of the least practicable adverse impact provision in greater detail. It asserts that NMFS' discussion of ESA-designated 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.*, feeding areas in the Northeast, NARW calving areas in the Southeast). 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 23: A Commenter recommends 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 asserts 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 LPAI 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 Commenter's suggestion.

Comment 24: A Commenter recommends 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 the 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 AFTT 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.

Comment 25: A Commenter recommends 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 GOMEX; and the proposed rule for U.S. Navy Training and Testing in the Hawaii-Southern California Training and Testing (HSTT) Study Area.

Comment 26: A Commenter cites two judicial decisions and comments that while there have been some improvements in mitigation relative to NMFS' 2013-2018 final rule for AFTT activities, the "least practicable adverse impact" standard has not been met. The Commenter asserts, for example, that if in prescribing protective measures in important habitat NMFS concludes after careful analysis that complete exclusion of unit-level sonar training from the area is not practicable, the agency should consider what reductions in activity are practicable, as by looking at particular types of exercises or testing activities or by limiting the amount of activity that can take place. The 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 the 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 only when practicability demands, *i.e.*, some forms of mitigation were practicable in some areas but not others. Other examples of NMFS' analysis on this issue appear throughout the rule. For instance, while it was not practicable for the Navy to expand the SE NARW Mitigation Area to the full extent recommended, the Navy did agree to some expansion of the SE NARW Mitigation Area to provide better protection. Additionally, while the Navy cannot alleviate all training in the NE NARW Mitigation Area due to changes in requirements, Navy removed one impactful testing activity (four events) that reduced takes for NARW and other species significantly.

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. The 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 LPAI 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 AFTT Study Area. Discussion regarding specific recommendations for mitigation measures provided by the Commenter on the proposed rule are discussed separately.

Procedural Mitigation Effectiveness and Recommendations

Comment 27: A Commenter commented that the 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 2,205–3,324 m for HF cetaceans and 308–1,091 m for LF cetaceans. Similarly, the mitigation zone for an explosive torpedo is 1,920 m but the mean PTS zones range from 13,105–14,627 m for HF cetaceans, 3,133–3,705 m for LF cetaceans, and 3,072–3,232 for pinnipeds in water (PW). Mitigation effectiveness is further complicated when platforms fire munitions (*e.g.*, for missiles and rockets) at targets 28 to 140 km away from the firing platform, as described in the AFTT DEIS/OEIS. 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 at the time of the launch unbeknownst to the Navy.

***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 of the AFTT 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 AFTT 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 28: A Commenter believes 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. Specifically, the Commenter further suggests that sonobuoys could be deployed with the target in the various target areas prior to the activity for the Navy to better determine whether the target area is clear and remains clear until the munition is launched. The Commenter also suggests that the Navy's instrumented Undersea Warfare Training Range (USWTR) could be used for real-time mitigation and refers to Navy-cited improvements in the use of other ranges for monitoring. The Navy did propose to supplement visual monitoring with passive acoustic monitoring during three explosive activity types but not during the remaining explosive activities or during low-, mid-, and high-frequency active sonar activities. Further, the Commenter recommends 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 could cause injury or mortality beyond those explosive activities for which passive acoustic monitoring already was proposed. This includes use of the instrumented USWTR in the coming years.

Response: For explosive mitigation zones, as discussed in Chapter 5 of the AFTT FEIS/OEIS, 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 AFTT 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 such as USTWR for real-time mitigation, the commenter is correct that the Navy continues to develop the technology and capabilities on their

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, and occasionally used to support small-scale real-time mitigation. 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. USWTR is not scheduled to go active until late 2019 (half of USWTR); however, the Navy continues to explore mechanisms by which the Range will contribute to marine mammal mitigation and monitoring. Lastly, the mitigation zones for active sonar systems encompass the ranges to potential injury.

Comment 29: A Commenter recommends 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 events. 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 30: A Commenter discusses that since 2010, the Navy has been collaborating with researchers at the University of St. Andrews to study Navy Lookout effectiveness. The Navy does not appear to have mentioned that study in its AFTT DEIS/OEIS for Phase III and NMFS did not discuss it in the rule. For its Phase II DEISs, the Navy noted that data collected in that study were insufficient to yield statistically significant results. Nevertheless, the Commenter continues to consider the basic information provided by the studies to be useful and cites several

specific instances where MMOs sighted marine mammals that were not sighted by Navy Lookouts.

Response: The Lookout effectiveness study that the Commenter references is still ongoing. This type of study has never been conducted, is extremely complex to ensure data validity, and requires a substantial amount of data to conduct meaningful statistical analysis. The Navy has stated that it is committed to completing it; however, as noted by the Commenter, there has not been enough data collected to conduct a sufficient analysis. Therefore drawing conclusions from an incomplete data set is not scientifically valid.

Comment 31: A Commenter commented that NMFS should increase the exclusion zone to the 120 dB isopleth. Since some animals are sensitive to sonar at low levels of exposure, the exclusion zone should ensure lower exposure than 120 dB. Additionally, there should be buffer zones along the boundaries of the mitigation areas to ensure that the mitigation areas are not exposed to sources higher than the 120 dB.

Response: First, it is important to note that the Commenter is 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 Measures* section of this rule). Buffer zones are addressed in Comment 50.

Comment 32: A Commenter recommended NMFS impose a 10 kn ship speed in biologically important areas for marine mammals to reduce vessel strikes and that NMFS should mandate that ship speed be reduced to a maximum of 10 kn in mitigation areas or in the presence of marine mammals to decrease the probability of strikes and decrease sound disturbance from engines.

Response: This issue is addressed elsewhere in the *Comments and Responses* section and for specific mitigation areas, but we also reiterate here that the Navy has applied conditional ship-speed restrictions in the areas where it is practicable. 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 effective Lookouts, any further reduction in speed would reduce the already low probability of ship strike little, if any.

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 application, NMFS raised potential additional mitigation measures for consideration, and discussion between the Navy and NMFS of the multiple factors considered in a least practicable adverse impact analysis resulted in the expansion of the SE NARW Mitigation Area by 500 mi^2.

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, the concerning stock status of the NARW and Bryde's whales (which resulted in expanded time/area mitigation), focus on areas where important behaviors and habitat are found (which resulted in NARW mitigation areas expanded to better reflect ESA-designated critical habitat in the Southeast calving area and Northeast feeding areas), and enhancement of the Navy's ability to detect and reduce injury and mortality (which resulted in expanded monitoring before and after explosive events and movement of ship shock trials outside of Bryde's whale areas and the Mid-Atlantic Planning Awareness Mitigation

Areas). 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. Ultimately, the Navy adopted all mitigation measures that are possible without jeopardizing their 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.

Below is additional discussion regarding specific recommendations for mitigation measures.

Mitigation Area Recommendations

Comment 33: In several places in their comment letter, a Commenter recommends that the Navy use an approach similar to that of the settlement agreement in *Conservation Council for Hawaii v. NMFS*, 97 F.Supp. 3d 1210 (D. Haw. 2015), which, while barring or restricting active sonar and explosives activities, reserved the Navy's authority to proceed regardless, provided that certain conditions were met: (1) that the Navy deemed the activity necessary for national defense; (2) that the authority could be invoked only by the highest Command authority; and (3) that any invocation of the authority be reported to NMFS and, through the Navy's Annual and Five-Year Exercise Reports, to the public.

Response: Following the publication of the 2013 HSTT Study Area MMPA incidental take rule, a settlement agreement that resulted from the litigation prohibited or restricted Navy activities within specific areas in the HSTT Study Area. As a general note, the provisional prohibitions and restrictions on activities within the HSTT Study Area were derived pursuant to negotiations with the plaintiffs in that case and 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. Furthermore, 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 either the HSTT Study Area or other Study Areas, including AFTT. The Fleet Commander and senior Navy leadership have approved the mitigation and explicitly determined that this is the maximum amount of mitigation that is practicable to implement. Permission schemes would impede on commanding officers who are empowered to train their crews and operate their vessels to maintain readiness and ensure personnel safety.

North Atlantic Right Whale

***Comment 34*:** As a general matter, several comments were provided in regards to the NARW.

***Response*:** NMFS appreciates the concerns expressed by Commenters regarding NARW in the Northeast in their feeding and mating areas and along the Atlantic Coast during migration, as well as in the Southeast during calving. As an agency, NMFS is working to address the numerous issues facing NARW, including continued work to reduce deaths due to ship strike by non-military vessels and entanglement in fishing gear, ongoing investigation of the Unusual Mortality Event (UME), and other measures to investigate and address the status of the species. The best available scientific information shows that the majority of NARW sightings in the Southeast occur in NARW calving areas from roughly November through April, with individual NARWs migrating to and from these areas through Mid-Atlantic shelf waters.

Since the proposed rule, the Navy has expanded the NE NARW Mitigation Area to match designated ESA-designated critical habitat in the Northeast. This further minimizes LFAS/MFAS/HFAS and explosives in the mitigation area year-round and incorporates mitigation measures to avoid ship strike to NARW (which will also reduce potentially ship strike to other large whales). The Navy will obtain Early Warning System NARW sightings data in the Jacksonville Operating Area and report this information to all units to help vessels and aircraft reduce potential interactions with NARW. The Navy will also broadcast awareness notification messages with NARW Dynamic Management Area information *(e.g.*, location and dates) to applicable Navy assets operating in the vicinity of the Dynamic Management Area. The Navy added the SE NARW Critical Habitat Special Reporting Area and will report the total hours and counts of active sonar and in-water explosives used in the Southeast NARW ESA-designated critical habitat). Additionally, the Navy has removed one of their testing activities in the Northeast Range Complex (four events - USWTR) which decreased the number of Level B harassment takes annually for NARW by 115 takes. Separately, this change also decreased annual Level B harassment takes by approximately 200 takes for ESA-listed fin whale, 20 takes for sei whales, and approximately 10,000 takes for harbor porpoise, which are discussed elsewhere in comments and responses. Additional discussion on NARW is provided below, organized geographically north to south.

NARW Northeast

Comment 35: Several Commenters recommended expanding the Navy's NE NARW Mitigation Area spatially and temporally to include important areas such as Jeffreys Ledge and the central Gulf of Maine. Commenters recommended that NMFS include (1) both Jeffreys Ledge and the central Gulf of Maine in the Navy's NE NARW Mitigation Area, at least during the timeframes

noted by LaBrecque *et al.* (2015a). A Commenter stated that, if NMFS chooses not to implement their recommendation for both Jeffreys Ledge and the central Gulf of Maine during the timeframes noted by LaBrecque *et al.* (2015a), that NMFS require the Navy to (1) implement speed restrictions of no more than 10 kn during vessel transits, (2) obtain the latest NARW sightings information from the Northeast Fisheries Science Center's NARW Sighting Advisory System prior to transits, (3) use the sightings information to reduce potential interactions with NARWs during transits, and (4) implement speed reductions after a vessel observes a NARW, if a vessel is within 5 nmi of a sighting reported to the NARW Sighting Advisory System within the past week, and when operating at night or during periods of reduced visibility. A Commenter also recommended that a 10 kn vessel speed restriction be required for the NE NARW Mitigation Area and also within the boundaries of Jeffreys Ledge, at a minimum between the months of June-July and October-December.

Response: In response to the recommendations of enlarging the NE NARW Mitigation Area, the Navy has agreed to expand the NE NARW Mitigation Area to match the NE NARW ESA-designated critical habitat. The expanded NE NARW Mitigation Area encompasses key BIAs, as described below. In general, the expanded NE NARW Mitigation Area encompasses all or nearly 100 percent of Cape Cod Bay, Jeffreys Ledge, the western edge of Georges Bank, and the northern portion of the Great South Channel BIAs. One hundred percent of the NARW feeding area on Jeffreys Ledge and the NARW mating area in the central Gulf of Maine are included in the expanded NE NARW Mitigation Area (as well as covering 100 percent in the Gulf of Maine Planning Awareness Area). One hundred percent of the NARW feeding area on Cape Cod Bay and Massachusetts Bay are included in the expanded NE NARW Mitigation Area. Additionally, 95.08 percent of the NARW feeding area in the Great South Channel and the northern edge of

Georges Bank is included in the expanded NE NARW Mitigation Area. The mitigation measures required in the previous NE NARW Mitigation Areas will carry over to the expanded NE NARW Mitigation Area and be implemented year-round.

In response to the recommendation to implement additional vessel speed-related mitigation measures for NARW on Jeffreys Ledge and the central Gulf of Maine, these areas are now in fact encompassed by the expanded NE NARW Mitigation Area, as described above, and vessel speed-related mitigation measures are being implemented during activities using non-explosive torpedoes (the same described in proposed rule). Specifically, in the NE NARW Mitigation Area, during non-explosive torpedo events only, the Navy will (1) maintain a ship speed of no more than 10 kn during transits and normal firing; no more than 18 kn during submarine target firing; and during vessel target firing, vessel speeds may exceed 18 kn for brief periods of time (*e.g.*, 10–15 min.); (2) before vessel transits within the NARW Mitigation Area, conduct a web query or email inquiry to the Northeast Fisheries Science Center's NARW Sighting Advisory System to obtain the latest NARW sightings information; (3) vessels will use the sightings information to reduce potential interactions with NARW during transits; and (4) in the NE NARW Mitigation Area, vessels will implement speed reductions after they observe a NARW, if they are within 5 nmi of a sighting reported to the NARW Sighting Advisory System within the past week, and when operating at night or during periods of reduced visibility.

Comment 36: A Commenter recommends that NMFS prohibit all active low-, mid-, and high-frequency sonar and limit non-explosive torpedo use from April through June in the Great South Channel and from February through April in Cape Cod Bay within the NE NARW Mitigation Area.

Response: As discussed above, the Navy has agreed to expand the NE NARW Mitigation Area to encompass all of the ESA-designated critical habitat in the Northeast year-round. Therefore, within the expanded NE NARW Mitigation Area, the Navy has agreed to minimize, but not eliminate, the use of low-frequency active sonar, mid-frequency active sonar, and high-frequency active sonar to the maximum extent practicable. The Navy will not use Improved Extended Echo Ranging sonobuoys within three nmi of the mitigation area and not use explosive and non-explosive bombs, in-water detonations, and explosive torpedoes within the mitigation area. While this does not include non-explosive torpedoes within the NE NARW Mitigation Area, there are only a small number of Level B harassment takes from this activity. The Navy analyzed this area and determine that non-explosive torpedo activities could not be removed from this area as described below. There are 33 estimated takes from TORPEX. This region provides a variety of bathymetric and environmental conditions necessary to ensure functionality and accuracy of systems and platforms in areas analogous to where the military operates. Testing locations are typically located near systems command support facilities, which provide critical safety, platform, and infrastructure support and technical expertise necessary to conduct testing. The Navy has used these same torpedo testing areas in this region for decades because they provide critical bathymetric and oceanographic features, and using these same areas provides data collection consistency, which is critical for comparative data analysis. In short, NMFS concurs with the Navy that the addition of this measure would be impracticable. However to mitigate for non-explosive torpedo events, the Navy has already agreed to several procedural mitigation steps to avoid NARW as follows. The Navy will conduct activities during daylight hours in Beaufort sea state 3 or less. The Navy will use three Lookouts (one positioned on a vessel and two in an aircraft during dedicated aerial surveys) to observe the vicinity of the activity. An additional

Lookout will be positioned on the submarine, when surfaced. Immediately prior to the start of the activity, Lookouts will observe for floating vegetation and marine mammals; if observed, the activity will not commence until the vicinity is clear or the activity is relocated to an area where the vicinity is clear. During the activity, Lookouts will observe for marine mammals; if observed, the activity will cease. To allow a sighted NARW (or any other marine mammals) to leave the area, the Navy will not recommence the activity until one of the following conditions has been met: (1) the animal is observed exiting the vicinity of the activity; (2) the animal is thought to have exited the vicinity of the activity based on a determination of its course, speed, and movement relative to the activity location; or (3) the area has been clear from any additional sightings for 30 min.

Northeast Planning Awareness Mitigation Area

Comment 37: A Commenter recommends Navy/NMFS further limiting MTEs and prohibiting/ limiting other activities to reduce cumulative exposures to range-limited beaked whale and sperm whale populations that may inhabit the NE Planning Awareness Mitigation Areas. The Commenter recommends that NMFS consult with the Navy and consider prohibiting the planning and conduct of major exercises within these areas, using the *Conservation Council* settlement-agreement approach as described earlier in the *Mitigation Areas* of this *Comments and Responses* section. If MTEs cannot absolutely be avoided, the Commenter recommends that NMFS should prohibit conduct of more than two MTEs per year, with each exercise carried out in different NE Planning Awareness Mitigation Areas (*i.e.*, one exercise in the northern Mitigation Area, and one exercise in the southern Mitigation Area), to ensure that marine mammal populations with site fidelity are not exposed to multiple major training exercises within a single year. Similarly, the Commenter asserts that NMFS should consider prohibiting

testing and unit-level sonar and in-water explosives training, or alternatively, and less preferably, reducing the number of hours allowable in a given year, with the prohibition or restriction structured as in the *Conservation Council* settlement agreement.

Response: As part of the NE Planning Awareness Mitigation Areas, the Navy already agrees to avoid conducting MTEs within the mitigation area to the maximum extent practicable. However, if Navy needs to conduct MTE's, it will not conduct more than four per year within the mitigation area. The Commenter indicated that range-limited beaked whale populations have been found on the shelf break off Cape Hatteras, areas off Canada, in the Mediterranean, off Southern California, in the Bahamas, and around the Hawaiian Islands, and range-limited sperm whale populations have been found off Cape Hatteras, the GOMEX, and off Western Australia. The Commenter assumed that beaked whales and sperm whales are also range-limited within the NE Planning Awareness Mitigation Areas, and as a result, recommended additional mitigation to limit MTEs and other activities to reduce cumulative exposure in the NE Planning Awareness Mitigation Areas. However, NMFS agrees with the Navy's assessment that the best available science does not indicate that beaked whales and sperm whales are range-limited within the NE Planning Awareness Mitigation Areas. NMFS relied on the best available scientific information (*e.g.*, NMFS' Stock Assessment Reports (SARs); Roberts *et al.*, 2016, 2017; 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 study area. In addition, NMFS consulted LaBrecque *et al.* (2015), which provides a specific, detailed assessment of known BIAs and provides the best available science to help inform regulatory and management decisions about some, though not all, important cetacean areas. 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. There are currently no BIAs for beaked whales or sperm whales along the Atlantic Coast.

As discussed in the *Analysis and Negligible Impact Determination* section, a few minor to moderate TTS or behavioral reactions to an individual over the course of a year are unlikely to have an impact on individual reproduction or survival. Considering these factors and the required mitigation measures, adverse impacts for the species or stock via effects on recruitment or survival are not expected. The Navy does not typically schedule MTEs in the Northeast Range Complexes, as indicated in Table 64. For training and testing that does occur here, this area provides a wide range of bathymetric and topographic opportunities that support critical smaller scale training and testing necessary to meet mission requirements. Additionally, MTEs originally planned for other locations may have to change during an exercise, or in exercise planning, based on an assessment of the performance of the units, or due to other conditions such as weather and mechanical issues. These contingency requirements preclude the Navy from completely eliminating MTEs from occurring in this area.

Comment 38: A Commenter recommends prohibiting/limiting sonar and in-water explosives activities within the southern portion of the Northeast Canyons and Seamounts National Marine Monument, including the Bear Seamount and Physalia Seamount.

Response: Currently the Northeast Canyons and Seamounts National Monument overlap the Gulf of Maine Planning Awareness Mitigation Area and the NE Planning Awareness Mitigation Areas, respectively. Bear Seamount and Physalia Seamount are contained within the Seamount Unit. The Navy is already limiting activities within the NE Planning Awareness Mitigation Areas by avoiding conducting MTEs to the maximum extent practicable (and avoiding MTEs

completely within the Gulf of Maine Planning Awareness Mitigation Area). In its assessment of the practicability of potential mitigation, the Navy indicated that it had considered implementing additional restrictions on active sonar and explosives in the Northeast Canyons and Seamounts National Marine Monument. Navy's operational assessment determined that implementing additional mitigation is impracticable for the reasons stated in Section 5.4.2 of the AFTT FEIS/OEIS (Mitigation Areas off the Northeastern United States) and also 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. The Navy's operational input indicates that designating additional mitigation areas (including the southern portion of the Northeast Canyons and Seamounts National Marine Monument) or implementing further restrictions on the level, number, or timing (seasonal or time of day) of training or testing activities within the mitigation areas (including, but not limited to, limiting MTEs and other activities to reduce cumulative exposures) would have a significant impact on (1) the ability of Navy units to meet their individual training and certification requirements, preventing them from deploying with the required level of readiness necessary to accomplish their missions; (2) the ability to certify strike groups to deploy to meet national security tasking, limiting the flexibility of Combatant Commanders and warfighters to project power, engage in multi-national operations, and conduct the full range of naval warfighting capability in support of national security interests; (3) the ability of program managers and weapons system acquisition programs to meet testing requirements and required acquisition milestones; (4) operational costs due to extending distance offshore, which would increase fuel consumption, maintenance, and time on station to complete required training and testing activities; (5) the safety risk associated with conducting training and

testing at extended distances offshore, farther away from critical medical and search and rescue capabilities; (6) accelerated fatigue-life of aircraft and ships, leading to increased safety risk and higher maintenance costs; (7) training and testing realism due to reduced access to necessary environmental or oceanographic conditions that replicate potential real world areas in which combat may occur; and (8) the ability for Navy sailors to train and become proficient in using the sensors and weapons systems as would be required in a real world combat situation. NMFS concurs with the Navy's determination that the recommended additional mitigation is impracticable and, accordingly, has not included it in the requirements of the rule.

Gulf of Maine Planning Awareness Mitigation Area

Comment 39: A Commenter comments that, although the Gulf of Maine Planning Awareness Area represents a significant geographic area, the mitigation requirements are less limited compared to the NE NARW Mitigation Area. Within the boundaries of this area between the months of July-September, the Commenter recommends prohibiting/further limiting mid- and high-frequency sonar and prohibit explosives activities within the biologically important area for harbor porpoise. The Commenter recommends prohibiting low-, mid-, and high-frequency sonar activities from March through November in biologically important feeding habitat for minke whales at Cashes Ledge, as well as prohibiting explosives activities in this area year-round. The Commenter also recommends prohibiting/limiting sonar and in-water explosives activities within the northern portion of the Northeast Canyons and Seamounts National Marine Monument.

Response: In regards to harbor porpoise, 81.87 percent of the small and resident population BIA within the U.S. Exclusive Economic Zone (EEZ) overlaps the now expanded year-round NE NARW Mitigation Area, and 100 percent is contained within the Gulf of Maine Planning Awareness Mitigation Area.

In regards to minke whales, 100 percent of the BIA falls within the now expanded year-round NE NARW Mitigation Area, and 100 percent also falls within the Gulf of Maine Planning Awareness Mitigation Area. The Navy is minimizing the use of low-, mid-, and high-frequency active sonar to the maximum extent practicable and limiting the use of explosives, explosive and non-explosive bombs, in-water detonations, and explosive torpedoes within the expanded NE NARW Mitigation Area year-round. Specifically, the Navy will not use Improved Extended Echo Ranging sonobuoys within 3 nmi of the mitigation area. The Navy has now agreed (since the proposed rule) not to conduct MTEs within the year-round Gulf of Maine Planning Awareness Mitigation Area and will cap the sonar use in the mitigation area to less than 200 hours of hull-mounted MFAS per year, thereby reducing impacts to harbor porpoise further. As discussed in the *Analysis and Negligible Impact Determination* section, the activities conducted by the Navy are of short duration (minutes to a few hours) and widely dispersed temporally and geographically and are not expected to significantly affect natural behavioral patterns of harbor porpoises or minke whales, such as feeding, breeding, etc., in a manner that would adversely affect either stock via impacts on rates of recruitment or survival.

In regards to the use of active sonar and in-water explosives being prohibited or limited in the area year-round within the boundaries of the northern portion of the Northeast Canyons and Seamounts Marine National Monument, the northern portion (Canyon Unit) falls inside of the Gulf of Maine Planning Awareness Mitigation area. The Navy is already limiting their use of hull-mounted MFAS by capping use at 200 hrs per year and now will not conduct MTEs within the mitigation area. However, there are no limitations on explosives in this area. The Navy has worked collaboratively with NMFS to develop mitigation areas using inputs from the operational community, the best available science discussed in Chapter 3 (Affected Environment and

Environmental Consequences) of the AFTT FEIS/OEIS, published literature, predicted activity impact footprints, and marine species monitoring and density data. The Navy has communicated that it completed an extensive biological assessment and operational analysis (based on a detailed and lengthy review by training experts and leadership responsible for meeting statutory readiness requirements) of potential mitigation areas throughout the entire Study Area. The mitigation identified in this final rule represents what the Navy has stated is the maximum mitigation that is practicable to implement under the Proposed Action. Operational input indicates that designating additional mitigation areas (including, but not limited to, within the northern portion of the Northeast Canyons and Seamounts Marine National Monument) and implementing further restrictions on the level, number, or timing (seasonal or time of day) of training or testing activities within the mitigation areas (including, but not limited to, limiting MTEs and other activities) would have a significant impact on (1) the ability for units to meet their individual training and certification requirements, preventing them from deploying with the required level of readiness necessary to accomplish their missions; (2) the ability to certify strike groups to deploy to meet national security tasking, limiting the flexibility of Combatant Commanders and warfighters to project power, engage in multi-national operations, and conduct the full range of naval warfighting capability in support of national security interests; (3) the ability of program managers and weapons system acquisition programs to meet testing requirements and required acquisition milestones; (4) operational costs due to extending distance offshore, which would increase fuel consumption, maintenance, and time on station to complete required training and testing activities; (5) the safety risk associated with conducting training and testing at extended distances offshore farther away from critical medical and search and rescue capabilities; (6) accelerated fatigue-life of aircraft and ships leading to increased safety risk and

higher maintenance costs; (7) training and testing realism due to reduced access to necessary environmental or oceanographic conditions that replicate potential real world areas in which combat may occur; and (8) the ability for Navy sailors to train and become proficient in using the sensors and weapons systems as would be required in a real world combat situation. The Navy has stated that it is unclear how it would be able to train and test without access to the ranges and locations that have been carefully developed over decades. Additionally, limiting access to ranges would deny operational commanders the ability to respond to emerging national security challenges, placing national security at risk and sailors in danger by not being properly prepared to perform their missions. Likewise, the Navy has stated that these restrictions would have a significant impact on the testing of current systems and the development of new systems. This would deny weapons system program managers and research, testing, and development program managers the flexibility to rapidly field or develop necessary systems due to the required use of multiple areas within limited timeframes. NMFS concurs with the Navy's practicability assessment.

NARW Mid-Atlantic

Comment 40: A Commenter recommends that the Navy should not plan activities in the Mid-Atlantic Planning Awareness Mitigation Areas to avoid times of predicted higher NARW occurrence, and that NMFS should consult experts in the NARW Consortium, including the New England Aquarium, for the best available information on the timing of the NARW migration and the months in which NARW are most likely to be present within the Mid-Atlantic Planning Awareness Mitigation Areas.

Response: By late March, NARW typically leave the calving grounds of the southeast and travel up the U.S. continental shelf to the Gulf of Maine (Kenney *et al.*, 2001; Knowlton *et al.*, 2002 as

cited in LaBrecque *et al.*, 2015), and during this migration, the animals will traverse these training areas (*e.g.*, Virginia Capes). Additionally, recent evidence suggests distributional shifts of NARW, with passive acoustic data indicating nearly year-round presence of this species in the mid-Atlantic area (Davis *et al.*, 2017). As described in the final rule, the Navy will avoid conducting MTEs within the mitigation area (Composite Training Unit Exercises or Fleet Exercises/Sustainment Exercises) to the maximum extent practicable but cannot avoid the area completely and will not conduct more than four MTEs per year.

Locations for training and testing activities are chosen based on their proximity of associated training and testing ranges, operating areas (*e.g.*, VACAPES), available airspace (*e.g.*, W-50), unobstructed sea space, and aircraft emergency landing fields (*e.g.*, Naval Air Station Oceana), and with consideration for public safety (*e.g.*, avoiding areas popular for recreational boating). The Navy has indicated that further restrictions in this area (*e.g.*, further restricting the number of major training events or seasonal restrictions on major training exercises based on predicted density of marine mammal species) for mitigation would be impracticable to implement and would significantly impact the scheduling, training, and certifications required to prepare naval forces for deployment. It would be impracticable to implement seasonal or temporal restrictions for all training and testing in this region because training and testing schedules are based on national tasking, the number and duration of training cycles identified in the Optimized Fleet Response Plan and various training plans, and forecasting of future testing requirements (including emerging requirements). Although the Navy has indicated that it has the ability to restrict the number of major training exercises in the Mid-Atlantic Planning Awareness Mitigation Areas, the Navy is unable to eliminate all MTEs in this area, because it provides air and sea conditions necessary to meet real-world requirements.

Additionally, MTEs originally planned for other locations may have to change during an exercise, or in exercise planning, based on an assessment of the performance of the units or due to other conditions such as weather and mechanical issues. The Navy has indicated that these contingency requirements preclude it from completely prohibiting MTEs from occurring in this area. NMFS concurs with the Navy's practicability assessment.

Mid-Atlantic Planning Awareness Mitigation Areas

Comment 41: A Commenter recommends extending the boundaries of the Mid-Atlantic Planning Awareness Mitigation Areas to fully encompass the Cape Hatteras Special Research Area (CHSRA), prohibiting all training, and testing activities within the boundary of the CHSRA.

Response: Although the Navy has the ability to restrict the number of MTEs in the Mid-Atlantic Planning Awareness Mitigation Areas (no more than four), the Navy has communicated that it is unable to prohibit all MTEs in this area, as it provides air and sea conditions necessary to meet real-world requirements. Additionally, MTEs originally planned for other locations may have to change during an exercise, or in exercise planning, based on an assessment of the performance of the units or due to other conditions such as weather and mechanical issues. These contingency requirements preclude the Navy from completely prohibiting MTEs from occurring in this area.

In its assessment of potential mitigation, the Navy considered implementing additional restrictions on active sonar and explosives in the U.S. mid-Atlantic region, including expanding the boundaries of the mitigation area to fully encompass the CHSRA, limiting MTEs, and planning activities to avoid times of predicted high NARW density. Navy operators determined that implementing additional mitigation beyond what is described in this final rule would be impracticable due to implications for safety, sustainability, and the Navy's ability to continue

meeting its Title 10 requirements to successfully accomplish military readiness objectives. Some of the Navy's considerations regarding why it would be impracticable to implement additional mitigation in the mid-Atlantic region, which NMFS has reviewed and concurs with, are provided below.

The waters off the mid-Atlantic and southeastern United States encompass part of the primary water space in the AFTT Study Area where unit-level training, integrated training, and deployment certification exercises occur and are critical for these and other training and testing activities. The Navy conducts training and testing activities off the mid-Atlantic and southeastern United States because this region provides valuable access to air and sea space conditions that are analogous to areas where the Navy operates or may need to operate in the future. This contributes to safety of personnel, skill proficiency, and validation of testing program requirements. For training and testing, areas in this region where exercises are scheduled to occur are chosen to allow for the realistic tactical development of the myriad of training and testing scenarios that Navy units are required to complete to be mission effective. Certain activities, such as deployment certification exercises using integrated warfare components, require large areas of the littorals and open ocean for realistic and safe training.

Locations for other training and testing activities are chosen due to the proximity of associated training and testing ranges and operating areas (*e.g.*, VACAPES), available airspace (*e.g.*, W-50), unobstructed sea space, and aircraft emergency landing fields (*e.g.*, Naval Air Station Oceana) and with consideration for public safety (*e.g.*, avoiding areas popular for recreational boating). Further restrictions in this area (*e.g.*, further restricting the number of major training events or seasonal restrictions on MTEs based on predicted density of marine mammal species) for mitigation would be impracticable to implement and would significantly

impact the scheduling, training, and certifications required to prepare naval forces for deployment. It would be impracticable to implement seasonal or temporal restrictions for all training and testing in this region (including within the CHSRA) because training and testing schedules are based on national tasking, the number and duration of training cycles identified in the Optimized Fleet Response Plan and various training plans, and forecasting of future testing requirements (including emerging requirements).

Comment 42: A Commenter also recommends further limiting MTE and prohibiting/further limiting other activities to reduce cumulative exposures in the Mid-Atlantic Planning Awareness Mitigation Areas. Commenter asserts that if MTEs cannot absolutely be avoided, NMFS should consider limiting the number of MTEs allowable to two per year, with each exercise carried out in different Mid-Atlantic Planning Awareness Mitigation Areas (*i.e.*, one exercise in the northern Mitigation Area, and one exercise in the southern Mitigation Area), to ensure that marine mammal populations with site fidelity are not exposed to multiple MTEs within a single year. Similarly, the Commenter states that NMFS should consider prohibiting testing, unit-level sonar, and in-water explosives training in the mitigation areas, or alternatively, and less preferably, reducing the number of hours allowable in a given year, with the prohibition or restriction structured as in the *Conservation Council* settlement agreement to provide flexibility.

Response: The Navy has indicated that although it has the ability to restrict the number of MTEs in the Mid-Atlantic Planning Awareness Mitigation Areas (no more than four), the Navy is unable to prohibit all MTEs in this area, as it provides air and sea conditions necessary to meet real-world requirements. MTE locations may have to change during an exercise, or in exercise planning, based on an assessment of the performance of the units, or due to other conditions such

as weather and mechanical issues, which precludes the ability to completely prohibit major training exercises from occurring in this area.

In its assessment of potential mitigation, the Navy considered implementing additional restrictions on active sonar and explosives in the U.S. mid-Atlantic region and limiting MTEs and planning activities to further limit activities in times and areas of predicted high NARW density. Navy operators determined that implementing additional mitigation beyond what is described in Section 5.4.3 (Mitigation Areas off the mid-Atlantic and southeastern United States) of the AFTT FEIS/OEIS and this final rule (which provides a significant reduction of impacts on NARW, as discussed in the *Mitigation Measures* section in this final rule) would be impracticable due to implications for safety, sustainability, and the Navy's ability to continue meeting its Title 10 requirements to successfully accomplish military readiness objectives. As the Navy explains, it would be impracticable to implement additional mitigation in the U.S. mid-Atlantic region for several reasons. NMFS reviewed and concurs with the Navy's assessment of practicality, effects on mission effectiveness, and personnel safety. First, the waters off the mid-Atlantic and southeastern United States encompass part of the primary water space in the AFTT Study Area where unit-level training, integrated training, and deployment certification exercises occur and are critical for these and other training and testing activities. The Navy conducts training and testing activities off the mid-Atlantic and southeastern United States because this region provides valuable access to air and sea space conditions that are analogous to areas where the Navy operates or may need to operate in the future. This contributes to ensure safety of personnel, skill proficiency, and validation of testing program requirements. Areas in this region where activities are scheduled to occur are chosen to allow for the realistic tactical development of the myriad training and testing scenarios that Navy units are required to complete to be

mission effective. Certain activities, such as deployment certification exercises using integrated warfare components, require large areas of the littorals and open ocean for realistic and safe training. Locations for other training and testing activities are chosen due to the proximity of associated training and testing ranges and operating areas (*e.g.*, VACAPES), available airspace (*e.g.*, W-50 in VACAPES), unobstructed sea space, aircraft emergency landing fields (*e.g.*, Naval Air Station Oceana), and with consideration for public safety (*e.g.*, avoiding areas popular for recreational boating). Further restrictions in this area (*e.g.*, further restricting the number of major training events or seasonal restrictions on MTEs based on predicted density of marine mammal species, such as NARW) for mitigation would be impracticable to implement and would significantly impact the scheduling, training, and certifications required to prepare naval forces for deployment. It would be impracticable to implement seasonal or temporal restrictions for all training and testing in this region (including within the CHSRA) because training and testing schedules are based on national tasking, the number and duration of training cycles identified in the Optimized Fleet Response Plan and various training plans, and forecasting of future testing requirements (including emerging requirements).

Comment 43: A Commenter recommends that NMFS require the Navy to move the ship shock trial areas beyond the extents of the two Mid-Atlantic Planning Awareness Areas and allow a minimum of a five nmi buffer between the Planning Awareness Areas and the ship shock trial areas.

Response: The Navy assessed the practicality and effects on mission effectiveness and personnel safety, of this measure and agreed to move the ship shock trial box east of the Mid-Atlantic Planning Awareness Mitigation Areas, including a five nmi buffer. NMFS included the requirement in the final rule.

NARW Southeast

Comment 44: Several commenters recommended expanding the Navy's SE NARW mitigation areas to encompass additional areas of NARW occurrence or the entirety of the ESA-designated critical habitat in the Southeast, and/or expanding the limitations on Navy activities within these areas. Further, a Commenter recommended that if NMFS was not going to expand the SE NARW Mitigation Area, that NMFS should require the Navy to further implement measures of vessel speed restrictions and obtain NARW sighting information to reduce NARW and potential vessel interactions on the NARW calving BIA. A Commenter commented that NMFS should include the entire extent of the NARW calving BIA as depicted in LaBrecque *et al.* (2015a) in the SE NARW Mitigation Area. Another commenter requested that the Navy add an "expanded mitigation area" (geographically corresponding to the current SE NARW ESA-designated critical habitat, minus the Navy's current SE NARW Mitigation Area). A Commenter suggested that if NMFS chooses not to implement the NARW calving BIA as depicted in and during the timeframes noted by LaBrecque *et al.* (2015a), then they recommend that NMFS require the Navy to (1) implement speed restrictions of no more than 10 kn during vessel transits, (2) obtain the latest NARW sightings information prior to transits from the Southeast Regional Office's (SERO) NARW Early Warning System, (3) use the sightings information to reduce potential interactions with NARWs during transits, and (4) implement speed reductions after a vessel observes a NARW, if a vessel is within 5 nmi of a sighting reported to the SE Regional Office NARW Early Warning System within the past week, and when operating at night or during periods of reduced visibility. Similarly, a commenter also requested that the Navy minimize activities requiring vessel speeds greater than 10 kn for all vessels 65 ft or greater operating within the current SE NARW Mitigation Area as well as an "expanded mitigation area"

(spatially corresponding to the current SE NARW ESA-designated critical habitat, minus the Navy's current SE NARW Mitigation Area).

Response: The SE NARW Mitigation Area remains the same from the proposed rule but as a result of recommendations from and discussion with NMFS, the Navy has expanded this area from the previous rule authorizing incidental take between 2013 and 2018. The SE NARW Mitigation Area occurs off the coast of Florida and Georgia and encompasses a portion of the calving ESA-designated critical habitat for this species. The best available scientific information shows that the majority of NARW sightings in the Southeast occur in calving areas from roughly November through April, with individual NARW migrating to and from these areas through mid-Atlantic shelf waters. Because of these concerns regarding NARW, the Navy proposed mitigation in its rulemaking/LOA application in the SE NARW Mitigation Area from November 15 to April 15. These measures are expected to largely avoid disruption of behavioral patterns for NARW and to minimize overall acoustic exposures. Major training exercises and most activities using active sonar will not occur in some portions of the calving ESA-designated critical habitat in the SE NARW Mitigation Area. The Navy will not conduct: (1) low-frequency active sonar (except as noted below), (2) mid-frequency active sonar (except as noted below), (3) high-frequency active sonar, (4) missile and rocket activities (explosive and non-explosive), (5) small-, medium-, and large-caliber gunnery activities, (6) Improved Extended Echo Ranging sonobuoy activities, (7) explosive and non-explosive bombing activities, (8) in-water detonations, and (9) explosive torpedo activities within the mitigation area. Further, to the maximum extent practicable, the Navy has already agreed to minimize the use of: (1) helicopter dipping sonar, (2) low and mid-frequency active sonar for navigation training and object detection exercises within the mitigation area, and (3) other activities. The activities resulting in most of the Level B

harassment within ESA-designated critical habitat and within the Navy's SE NARW Mitigation Area are from navigation (37 takes) and ship object detection exercise (82 takes) which each last for approximately 30 min or less as the vessel or submarine is transiting into or out of port. With the exception of the Composite Training Unit Exercise, all activities using sonar that are expected to result in Level B harassment by TTS and behavioral disturbance of NARW in this area are either short-term (*e.g.*, 30 min to 4 hours during submarine navigation and signature analysis testing) or involve a limited number of sonar platforms (since there are a limited number of sonar platforms and both the sonar platforms and animals are moving, there is a low likelihood of co-occurrence for more than a short period of time). These factors limit the potential for these instances of Level B harassment by TTS and behavioral disturbance to result in long duration exposures. Consistent with literature described previously on the response of marine mammals to sonar, we anticipate that exposed animals will be able to return to normal behavior patterns shortly after the exposure is over (minutes to hours) (See, *e.g.*, Goldbogen *et al.*, 2013; Sivle *et al.*, 2015). For longer duration activities (*e.g.*, MTEs), particularly those utilizing multiple sonar platforms, the chance of a longer term exposure and associated response is increased, but as described below, we do not expect long-term exposures to occur from these activities. Depending on animal movement and where these longer duration activities actually occur within the operating areas, such exercises have the potential to result in sustained and/or repeated exposure of NARW. However, the Navy's geographic mitigations for MTEs and other exercises using active sonar (with the exception of navigation and ship object detection) minimize the likelihood of exposures of animals to these activities in ESA-designated critical habitat. MTEs will not be conducted in most of the Southeast ESA-designated critical habitat. Further, the Navy's modeling indicated very limited impacts to NARW from MTEs in the

southeast (*i.e.*, one instance of Level B behavioral harassment in the Jacksonville Range Complex, which could occur within the ESA-designated critical habitat designated for the species).

Based on this short duration of exposure, and the minor behavioral response expected to occur from the exposure, we do not expect these responses to affect the health of individual NARWs in any way that could affect reproduction or survival, even though some individual animals may experience Level B harassment more than once annually in this area. NARW may be present in or near the SE NARW Mitigation Area for approximately 20 events per year (5.48 percent) for navigation and 57 approximate events per year (15.61 percent) for object detection. This does not necessarily mean NARW will be impacted by Level B harassment takes during these short duration activities (approximately 30 min, up to 2 hrs). NMFS believes that the mitigation in the Southeast avoids impacts to the NARWs while on the calving grounds. While the Navy could not expand the SE NARW Mitigation Area to the full extent of ESA-designated critical habitat, the Navy has agreed to include the full extent of ESA-designated critical habitat in a special reporting area and annually report training and testing activities in this area to NMFS. The Navy will report the total hours and counts of active sonar and in-water explosives used in the SE NARW Critical Habitat Special Reporting Area (November 15 through April 15) (*i.e.*, the Southeast NARW ESA-designated critical habitat) in its annual training and testing activity reports submitted to NMFS.

In response to the recommendation to implement additional vessel speed related mitigation measures for NARW in the calving BIA (as depicted by LaBrecque *et al.*, 2015), the SE NARW Mitigation Area has not been expanded from the proposed rule. However, the Navy has added mitigation measures related to vessels, including the addition of the Jacksonville

Operating Area Mitigation Area (November 15 through April 15), where additional communication will occur for all training and testing activities occurring in this area to fleet vessels to minimize potential interaction with NARW. The Jacksonville Operating Area Mitigation Area overlaps with the SE NARW ESA-designated critical habitat/calving BIA. Regarding measures to avoid vessel strikes in the southeast, in the SE NARW Mitigation Area, (1) the Navy will implement vessel speed reductions after they observe a NARW; (2) before transiting or conducting training or testing activities in the SE NARW Mitigation Area, the Navy will initiate communication with the Fleet Area Control and Surveillance Facility, Jacksonville to obtain Early Warning System NARW sightings data; (3) the Fleet Area Control and Surveillance Facility, Jacksonville will advise vessels of all reported NARW sightings in the vicinity to help vessels and aircraft reduce potential interactions with NARW; and (4) vessels will implement speed reductions if they are within 5 nmi of a sighting reported within the past 12 hrs, or when operating at night or during periods of poor visibility. To the maximum extent practicable, vessels will minimize north-south transits. The Navy will use the reported sightings information as it plans specific details of events (*e.g.*, timing, location, duration) to minimize potential interactions with NARW to the maximum extent practicable. The Navy will use the reported sightings information to assist visual observations of applicable mitigation zones and to aid in the implementation of procedural mitigation.

Finally, since the proposed rule, the Navy has agreed to broadcast awareness notification messages with NARW Dynamic Management Area information (*e.g.*, location and dates) to applicable Navy assets operating in the vicinity (NARW Dynamic Management Area notification). The information will alert assets to the possible presence of a NARW to maintain safety of navigation and further reduce the potential for a vessel strike. Units will use the

information to assist their visual observation of applicable mitigation zones during training and testing activities and to aid in the implementation of procedural mitigation, including but not limited to, mitigation for vessel movement.

For this rule, within the mid-Atlantic and southeastern region, NMFS and the Navy worked to identify an opportunity to expand the mitigation area for NARW off the southeastern United States in a way that would enhance protections for the species, while balancing the practicability of implementation. The Navy expanded the SE NARW Mitigation Area to correlate with the occurrence of NARW to the maximum extent practicable based on readiness requirements.

Certain activities, such as deployment certification exercises using integrated warfare components, require large areas of the littorals and open ocean for realistic and safe training. Locations for other training activities are chosen due to the proximity of associated training ranges (*e.g.*, Jacksonville Range Complex), available airspace (*e.g.*, avoiding airspace conflicts with major airports such as Jacksonville International Airport), unobstructed sea space, aircraft emergency landing fields (*e.g.*, Naval Air Station Jacksonville), and with consideration for public safety (*e.g.*, avoiding areas popular for recreational boating). The Jacksonville Operating Area and Charleston Operating Area represent critical training sea spaces that are necessary to prepare naval forces for combat. Areas where testing events are scheduled to occur are chosen to allow the Navy to test systems and platforms in a variety of bathymetric and environmental conditions to ensure functionality and accuracy in real world environments. Test locations are typically located near the support facilities of the systems commands, which provide critical safety, platform, and infrastructure support and technical expertise necessary to conduct testing (*e.g.*, proximity to air squadrons).

In conclusion, the Navy has indicated that additional expansion of the SE NARW Mitigation Area eastward to mirror the boundary of the expanded ESA-designated critical habitat or northward to encompass all areas of potential occurrence, would require training to move farther north or farther out to sea, which would be impracticable due to implications for safety and sustainability, as detailed in Section 5.4.3 (Mitigation Areas off the Mid-Atlantic and Southeastern United States) of the AFTT FEIS/OEIS. Additionally, the Navy has explained why further limitations on activities within this area would be impracticable. NMFS reviewed, and concurs with, the Navy's assessment of practicality, effects on mission effectiveness, personnel safety.

Comment 45: A Commenter recommended dipping sonar and low-frequency sonar be prohibited in the Navy's SE NARW Mitigation Area.

Response: Regarding dipping sonar, as discussed in Section 5.4.3 (Mitigation Areas off the Mid-Atlantic and Southeastern United States) of the AFTT FEIS/OEIS, the Navy will minimize the use of helicopter dipping sonar to the maximum extent practicable. The only helicopter dipping sonar activity that could potentially be conducted in the mitigation area is Kilo Dip, which could involve 1-2 pings of active sonar infrequently. Kilo Dip is a functional check activity that needs to occur close to an air station in the event of a system failure (*i.e.*, all systems are not functioning properly). During this activity, the Navy will implement the procedural mitigation described in Section 5.3.2.1 (Active Sonar) of the AFTT FEIS/OEIS, with visual observations aided by Early Warning System NARW data.

Regarding LFAS, as discussed in Section 5.4.3 (Mitigation Areas off the Mid-Atlantic and Southeastern United States) of the AFTT FEIS/OEIS, the Navy will not conduct LFAS in the mitigation area, with the exception of LFAS used for navigation training, which will be

minimized to the maximum extent practicable. During this activity, crews train to operate sonar for navigation, an ability that is critical for safety while transiting into and out of port during periods of reduced visibility. The Navy will implement the procedural mitigation described in Section 5.3.2.1 (Active Sonar), with visual observations aided by Early Warning System NARW sightings data.

Additionally, since the proposed rule, the Navy added a SE NARW Critical Habitat Special Reporting Area (November 15 through April 15) where the Navy will report the total hours and counts of active sonar and in-water explosives used in the Special Reporting Area in its annual training and testing activity reports submitted to NMFS. Geographically speaking, this Special Reporting Area is the same area as the SE NARW ESA-designated critical habitat, and the reporting will help NMFS and the Navy understand in a more refined way the actual scale of activities occurring in NARW habitat, which will inform future analyses and, as appropriate, adaptive management.

GOMEX Planning Awareness Mitigation Areas/Bryde's Whale Mitigation Area

Comment 46: Commenters recommend that NMFS (1) expand Area 2 in the GOMEX Planning Awareness Mitigation Areas to include the waters (a) out to the 400-m isobath along Area 2's entire extent and (b) from the 100- to 400-m isobaths from Pensacola, Florida, to Mobile Bay, Alabama for the biologically important area identified by LaBrecque *et al.* (2015) for Bryde's whale, which in the proposed rule is not fully capturing the extent of important habitat within the De Soto Canyon. A Commenter also recommends moving, as necessary, the ship shock trial area farther offshore to allow a minimum of a five nmi buffer between the expanded Area 2 (as recommended above) in the GOMEX Planning Awareness Mitigation Areas and the ship shock trial area, and restricting the Navy from conducting underwater detonations in Area 2 in the

GOMEX Planning Awareness Mitigation Areas. Further, a Commenter recommends that NMFS require the Navy to implement year-round speed restrictions of no more than 10 kn during vessel transits in Area 2 of the GOMEX Planning Awareness Mitigation Areas.

Response: Since the proposed rule, the Navy has agreed to the addition of a year-round, Bryde's Whale Mitigation Area which will cover the BIA as described in NMFS' 2016 Status Review and include the area between 100 to 400 m isobaths between 87.5 degrees W to 27.5 degrees N. The Navy has agreed to move the northern GOMEX ship shock trial box west, out of the Bryde's whale BIA/Bryde's Whale Mitigation Area, including a five nmi buffer. Within the mitigation area, the Navy will not conduct more than 200 hrs of hull-mounted MFAS per year and will not use explosives (except during mine warfare activities). The Navy will report the total hours and counts of active sonar and in-water explosives used in the mitigation area in its annual training and testing activity reports submitted to NMFS. Based on the Navy's assessment of practicality and effects on mission effectiveness and personnel safety, which NMFS reviewed and concurs with, the new mitigation represents the maximum level of mitigation that is practicable to implement within this area. Due to low numbers of Bryde's whale, almost exclusively limited to the GOMEX, and limited Navy ship traffic that overlaps with Bryde's whale habitat, the Navy does not anticipate any ship strike takes. Furthermore, there have been no documented Bryde's whale ship strikes by Navy vessels; therefore, the speed restrictions would not lower the already low potential for ship strike for this species. Further, the Navy will implement procedural mitigation during any vessel movements to reduce potential ship strike for all marine mammals including Bryde's whales.

Comment 47: A Commenter recommended prohibiting or reducing deployment of all unit-level active low-, mid-, and high-frequency sonar and underwater explosives in the GOMEX Planning

Awareness Mitigation Areas or alternatively, and less preferably, reducing the number of hours allowable in a given year.

Response: Since the proposed rule, the Navy expanded and renamed a portion of the GOMEX Planning Awareness Mitigation Areas as the Bryde's Whale Mitigation Area. As described in more detail in Comment Response 46, the Bryde's Whale Mitigation Area allows a limited amount of MFAS and prohibits the use of explosives. The Navy also will now not conduct MTEs in the GOMEX Planning Awareness Mitigation Areas.

However, the Navy has communicated that the GOMEX encompasses part of the primary water space in the AFTT Study Area where unit-level training, integrated training, and deployment certification exercises occur and it is critical for these and other training and testing activities. The Navy conducts training and testing activities in the GOMEX because this region provides valuable access to air and sea space conditions that are analogous to areas where the Navy operates or may need to operate in the future. This contributes to ensure safety of personnel, skill proficiency, and validation of testing program requirements. For training, areas in this region where exercises are scheduled to occur are chosen to allow for the realistic tactical development of the myriad of training scenarios Navy units are required to complete to be mission effective. Certain activities, such as deployment certification exercises using integrated warfare components, require large areas of the littorals and open ocean for realistic and safe training. Locations for other training activities are chosen due to the proximity of associated training ranges (*e.g.*, Pensacola Operating Area); available airspace (*e.g.*, avoiding airspace conflicts with major airports, such as Key West International Airport); unobstructed sea space (*e.g.*, throughout the New Orleans Operating Area); aircraft emergency landing fields (*e.g.*, Naval Air Station Pensacola), and with consideration of public safety (*e.g.*, avoiding areas

popular for recreational boating). Areas where testing events are scheduled to occur are chosen to allow the Navy to test systems and platforms in a variety of bathymetric and environmental conditions to ensure functionality and accuracy in real world environments. Test locations are typically located near the support facilities of the systems commands, which provide critical safety, platforms, and infrastructure support and technical expertise necessary to conduct testing (*e.g.*, proximity to air squadrons). Based on the Navy's assessment of practicality and effects on mission effectiveness and personnel safety, which NMFS reviewed and concurs with, the Bryde's Whale Mitigation Area includes the maximum level of mitigation that is practicable to implement within this area.

Additional Mitigation Areas

C***omment 48***: A Commenter recommends adding additional mitigation areas for (1) the Charleston Bump (year-round), (2) coastal bottlenose dolphin habitat within the DWH oil spill area, and (3) habitat based management for the Cul de Sac, Great Bahama Canyon.

Response: First, we note regarding the Charleston Bump, the commenter cites the importance of the area to fish larvae and spawning, fishing, and sea turtles, with only a general reference to "a diversity of marine mammals," without any indication that limiting activities in the area would reduce impacts to marine mammal species and stocks or their habitat. Regarding protection of coastal bottlenose dolphins affected by the Deepwater Horizon (DWH) oil spill, we note that of all the Northern GOMEX Estuarine stocks, only one overlaps with stressors from the Navy's activities, and that stock is authorized for one take by Level B harassment.

More importantly, separate from the fact that little, if any, protection of marine mammals would be achieved through the adoption of the recommended measures, the Navy has assessed the practicality and effect of these recommendations on mission effectiveness and personnel safety

and determined that the measures would be impracticable, and NMFS concurs with this determination.

In its assessment of potential mitigation, the Navy considered implementing additional restrictions on active sonar and explosives in the U.S. mid-Atlantic and GOMEX regions, including at the Charleston Bump and areas affected by the DWH oil spill. Navy operators determined that implementing additional mitigation beyond what is described in Section 5.4.3 and Section 5.4.4 (Mitigation Areas off the mid-Atlantic and Southeastern United States and Mitigation Areas in the GOMEX) of the AFTT 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.

It would be impracticable to implement additional mitigation in the U.S. mid-Atlantic and GOMEX for several reasons. The Navy has indicated that the mitigation identified in Section 5.4 (Mitigation Areas to be Implemented) of the AFTT FEIS/OEIS represents the maximum mitigation within the identified mitigation areas that is practicable to implement under the proposed activities. The Navy has communicated that operational input indicates that designating additional mitigation areas (including the Charleston Bump and areas affected by the DWH oil spill) would (1) have a significant impact on the ability for units to meet their individual training and certification requirements, preventing them from deploying with the required level of readiness necessary to accomplish their missions); (2) the ability to certify strike groups to deploy to meet national security tasking (limiting the flexibility of Combatant Commanders and warfighters to project power, engage in multi-national operations, and conduct the full range of naval warfighting capability in support of national security interests); (3) the ability of program

managers and weapons system acquisition programs to meet testing requirements and required acquisition milestones; (4) operational costs (due to extending distance offshore, which would increase fuel consumption, maintenance, and time on station to complete required training and testing activities); (5) the safety risk associated with conducting training and testing at extended distances offshore (farther away from critical medical and search and rescue capabilities); (6) accelerated fatigue-life of aircraft and ships (leading to increased safety risk and higher maintenance costs); (7) training and testing realism (due to reduced access to necessary environmental or oceanographic conditions that replicate potential real world areas in which combat may occur); and (8) the ability for Navy Sailors to train and become proficient in using the sensors and weapons systems as would be required in a real world combat situation.

Furthermore, the iterative and cumulative impact of all commenter-proposed mitigation areas and seasonal or temporal restrictions would deny national command authorities the flexibility to respond to national security challenges and incur significant restrictions to required training and testing that entail movements to multiple operational areas along the Eastern seaboard and the GOMEX to conduct training within set time frames. Likewise, this iterative and cumulative impact would deny weapons system program managers and research, testing, and development program managers the flexibility to rapidly field or develop necessary systems due to the required use of multiple areas within limited timeframes. Additional information regarding the operational importance, significant negative impacts on Navy training and testing activities, and impracticability of implementing the mitigation area in each geographic region mentioned is provided in Chapter 5 (Mitigation) of the AFTT FEIS/OEIS.

Regarding Cul de Sac, Bahamas, the Navy did not consider mitigation for the Cul de Sac because it is not part of the AFTT Study Area. Therefore, NMFS did not consider mitigation in the final rule for the Cul de Sac because it is not part of the AFTT Study Area.

***Comment 49*:** A Commenter recommends that efforts be undertaken to identify additional important habitat areas across the AFTT Study Area, using the full range of data and information available (*e.g.*, habitat-based density models, NOAA-recognized BIAs, survey data, etc.).

Response: NMFS and the Navy used the best available scientific information (*e.g.*, SARs; Roberts *et al.*, 2016, 2017; 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 AFTT 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.

Comment 50: 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. In addition, 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 Section 5.4 (Mitigation Areas to be Implemented) of the AFTT FEIS/OEIS represents the maximum mitigation within mitigation areas and the maximum size of mitigation areas that are practicable to implement under the proposed activities. 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 Section 5.4 (Mitigation Areas to be Implemented) of the AFTT 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 51: Commenters recommend that NMFS consider additional mitigation measures to prescribe or research including (1) research into sonar signal modifications, (2) thermal detection systems, (3) mitigation and research on Navy ship speeds, including requiring the Navy to collect and report data on ship speed as part of the EIS process; and (4) 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, as follows:

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.Thermal detection - 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, the 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.

3.Mitigation for the Navy to collect and report 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 Section 3.0.3.3.4.1 (Vessels and In-Water Devices) of the AFTT

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 Section 5.4 (Mitigation Areas to be Implemented) of the AFTT 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 Section 5.5.2.2 (Restricting Vessel Speed) of the AFTT 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 Section 5.5.2.2 (Restricting Vessel Speed) of the AFTT 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 Section 5.3.4.1 (Vessel Movement) of the AFTT 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.

4.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 AFTT 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 a 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 Section 3.0.1.1 (Marine Species Monitoring and Research Programs) of the AFTT 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. In addition, the Navy is a critical sponsor of the NARW Early Warning System and the winter aerial surveys, which have contributed to a marked reduction in vessel strikes of the NARW in the Southeast ESA-designated critical habitat, particularly by commercial vessels, which represent one of the biggest threats to the NARW. 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.

Monitoring Recommendations

Comment 52: A Commenter recommends that NMFS prioritize Navy research projects of long-term monitoring that aim to provide baseline information and quantify the impact of training and testing activities at the individual, and ultimately, population level, and the effectiveness of mitigation. The Commenter recommends 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 recommends 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 recommends that NMFS require the Navy to use these technologies for assessing marine mammal behavior before, during, and after Navy training and testing (*e.g.*, swim speed and direction, group cohesion). The Commenter recommends NMFS ask 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 Commenter recommends studies aimed at exploring other potential proxy measures of changes in population-level abundance in order to develop an early-detection system for populations that may be experiencing a decline as a result of Navy activities.

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. Section 5.1.2.2.1.3 (Strategic Planning Process) of the AFTT 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 Navy and NMFS through the consultation and adaptive management processes, which

regularly considers and evaluates 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.

- 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 - 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 NARW 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 NARW (*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 NARW 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 SARs 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 AFTT 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 this 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 53: A Commenter commented that NMFS' analytical approach is not transparent. NMFS applied both qualitative and quantitative analyses to inform its negligible impact determination. In general, NMFS has based negligible impact determinations associated with incidental take authorizations on abundance estimates provided either in its SARs or other more recent published literature. For the AFTT proposed rule, NMFS used the average population estimate as determined by the Navy's density models across all seasons from Roberts *et al.* (2016) rather than abundance estimates from either the SARs or published literature. For some species, NMFS indicated that it had apportioned the takes at the species or population level based on takes predicted at higher taxonomic levels. However, NMFS did not specify for which species/populations this method was used or the assumptions made. NMFS also did not specify how it determined the actual "population" size given that 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 used data from Mannocci *et al.* (2017) in a similar manner to the Roberts *et al.* (2016) data, which informed abundance estimates for the majority of species within the U.S. EEZ. Furthermore, NMFS did not specify how it determined the proportion of total takes that would occur beyond the U.S. EEZ. Presumably, that was based on modeling assumptions and model-estimated takes provided by the Navy, but this is not certain. 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 U.S. EEZ" in Tables 72–77 or

those take estimates in Tables 39–41. It appears the "instances" of take columns were based on only those takes in the U.S. EEZ rather than the entire AFTT Study Area. Sperm whales, for example, have 3,880 takes that presumably would occur outside the U.S. EEZ and were not enumerated in the "instances" of take columns. Thus, it is unclear what types of takes those constitute. 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 72–77 for all activities that occur within and beyond the U.S. EEZ.

Response: NMFS has added explanation in the *Analysis and Negligible Impact Determination* section to better describe the take-specific analysis for each stock, species, or group, as appropriate. As described in the footnotes, the Navy abundances referenced in the tables in the *Analysis and Negligible Impact Determination* section, both in and outside of the U.S. EEZ, are a reflection of summing the densities that are used to calculate take for each species as described in the *Estimated Take of Marine Mammals* section (*i.e.*, including Roberts *et al.* and/or Mannocci *et al.* where appropriate), which means using Roberts *et al.* (2016), where available (inside the U.S EEZ), and Mannocci *et al.* (2017) outside the U.S. EEZ, as the commenter suggests. 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 39, 40, and 41 for a given stock now equal the "in and outside the U.S. EEZ" take totals in Tables 72-77) and the minor changes do not affect the analysis or determinations in the rule.

Comment 54: A Commenter asserts that NMFS assumes that it is unlikely any particular subset of a stock would be taken over more than a few sequential days—*i.e.*, where repeated takes of individuals are likely to occur, they are more likely to result from non-sequential exposures from different activities, and marine mammals are not predicted to be taken for more than a few days

in a row, at most. Yet NMFS presents no details of the Navy's training and testing activities in support of this position. The Commenter cites to the fact that the Navy reuses certain geographic areas regularly for some specific exercises as a reason that repeat exposures are likely to be sequential.

Response: The Commenter ignores the fact that marine mammals still move around (some for long distances), and even if they are resident and Navy activities are geographically concentrated, it does not naturally follow that their exposures to these activities are necessarily temporally concentrated.

In addition, NMFS' analyses do not uniformly assume that where repeated takes are likely to occur, they are more likely to result from non-sequential exposures. NMFS negligible impact analyses suggest that individuals of some stocks are likely to be taken across sequential days, while others are not. Multiple factors are taken into consideration in predicting the relative likelihood that repeated takes of an individual will occur sequentially, including the approximate predicted number of takes to an individual within a year and the manner in which the activities overlap the species range. For example, if the number of average takes per individual is less than two, the entire species range is contained within the AFTT Study Area, and that range includes a migratory pathway that moves through an area dense with training and testing activities (*e.g.*, NARW), it is reasonably likely that every or almost every individual gets taken on at least one day. This means that there are relatively few takes left to distribute. There is no reason to think (based on species movement and activities) that these takes would all accrue to a few animals, or that the takes would occur on sequential days. In other words, even if activities occur in focused areas, it is highly unlikely that individual animals (*e.g.*, NARW) are staying in those areas, especially given how limited activities are in the areas that animals (*e.g.*, NARW) aggregate due

to the mitigation. Alternately, if the average number of takes per animal is notably higher (either altogether or in a limited area such as the U.S. EEZ), such as 18 for beaked whales, it follows that some number of individuals are likely actually taken at an even higher number, and the higher that number, the higher the probability that when spread across the years, some days will be sequential. NMFS addresses these differences in our negligible impact analyses.

Comment 55: A Commenter states that NMFS must consider new information for sperm whales in the GOMEX prior to authorizing take for the AFTT specified activities, particularly because of the five reported stranded sperm whale calves in the Gulf since October 2016. The Commenter asserts that NMFS must protect the Mississippi Canyon that provides year-round sperm whale habitat. The Commenter also states that NMFS should ensure heightened protection for this area for sperm whales as well as Bryde's whales and Cuvier's beaked whales that are vulnerable to harm from military activities.

Response: NMFS considered the sperm whale information provided by the commenter in its negligible impact determination. There have been six documented sperm whales strandings in the GOMEX between 2016 and 2018. Five sperm whales stranded in 2016, 1 whale in 2017, and zero whales in 2018. Based on the examination data that was available (the condition of the whale ranged from fresh dead to moderate/advanced decomposition to mummified/skeletal) there were four whales where findings of human interaction could not be determined. Of the two whales that remained, one whale showed evidence of a fishery interaction, and the other showed no evidence of human interaction. NMFS' SERO requested a consultation with the Working Group on Marine Mammal Unusual Mortality Events about the elevated 2016 sperm whale strandings, but the Working Group determined the data did not qualify as a UME at that time. The Working Group noted that the current number of four strandings for the year was only at the

upper limit of the 10 year average, that there was a very low total number of strandings in general in the region, and the animals were stranding during months that they would be expected, and therefore the findings did not meet the UME criteria. The SERO and our Southeast Fisheries Science Center will continue to coordinate with the Working Group for sharing of histopathology results and formulation of hypotheses.

Separately, and as described in more detail elsewhere in the rule, after additional discussion with NMFS, the Navy withdrew its request for mortal take by vessel strike for sperm whale (GOMEX stock) due to the following considerations that showed that vessel strike of a whale from this stock is unlikely: 1) the lower number of Navy steaming days in the GOMEX; 2) that there have been no vessel strikes of any large whales since 2009 per the SAR and no Navy strikes of any large whales since 1995 (based on our records) in the GOMEX; 3) the lower abundance of sperm whales in the GOMEX, and 4) the Navy's adherence to Marine Species Awareness Training and adoption of additional mitigation measures. NMFS concurs that the strike of sperm whales in the GOMEX is unlikely and has not authorized mortal take. Further, nearly the entire important sperm whale habitat (Mississippi Canyon) is included in the GOMEX Planning Awareness Mitigation Areas. As stated in this final rule and the AFTT FEIS/OEIS, the Navy is not planning to conduct any MTEs in the GOMEX.

Cumulative and Aggregate Effects

Comment 56: 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. Further, they assert that the agency assumes 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. 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. The commenter states that both statements are factually insupportable given the lack of any population analysis or quantitative assessment of long-term effects in the proposed rule and the numerous deficiencies in the thresholds and modeling that NMFS has adopted from the Navy.

Response: We respond to the aggregate effect comment here, and address the consideration of impacts from other activities in the response to Comment 57 immediately below.

NMFS did analyze the aggregate effects of mortality, injury, masking, 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 agency's analysis and how the potential for aggregate or cumulative effects on individuals relate to the overall negligible impact determination for each species or stock.

In our analysis, NMFS fully considers the potential for aggregate effects from all Navy activities. We also consider UMEs and previous environmental impacts (*i.e.*, DWH oil spill) 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 AFTT 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.

Comment 57: Some commenters asserted that in reaching our MMPA findings, NMFS did not adequately consider the cumulative impacts of the Navy's activities when combined with the effects of other non-Navy activities. A Commenter adds that NMFS needs to include consideration of the most up-to-date information on NARW, humpback whales, and sperm whales, including UMEs, deaths, and recent strandings.

Response: The preamble for NMFS' implementing regulations under section 101(a)(5) (54 FR 40338; September 29, 1989) explains in responses 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 here 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, UMEs, or oil spills)). See the *Analysis and Negligible Impact Determination* section of this rule.

Also, as described further in the *Analysis and Negligible Impact Determination* section of the final rule, NMFS evaluated the impacts of AFTT 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 Northeast Fisheries Science Center (NEFSC) rule), using multiple factors, including Potential Biological Removal (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 optimum sustainable population (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).

In addition, NMFS did consider the most up-to-date information on the three large whale species referenced by the commenter, along with the other potentially affected species and stocks. See the relevant sections of the final rule for extensive discussion on the effects of UMEs, deaths, recent strandings, and other factors that are affecting, or have the potential to affect, the species and stocks that will also be affected by the Navy's activities.

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.

We recognize the potential for cumulative impacts, and that the aggregate impacts of the Navy's training and testing activities will be greater than the impacts of any one particular activity. The direct aggregate impacts of the Navy's training and testing activities were addressed through the associated NEPA analyses in the AFTT FEIS/OEIS (with NMFS as a cooperating agency), which addressed the impacts of a maximum amount of activities, and which NMFS has adopted as the basis for its Record of Decision for the issuance of the final rule and LOAs.

In order to meet the responsibility to analyze cumulative effects under NEPA, the Navy, in cooperation with NMFS, evaluated the cumulative effects of the incremental impact of its proposed action when added to other past, present, and future actions (as well as the effects of climate change), against the appropriate resources and regulatory baselines. The Navy used the best available science and a comprehensive review of past, present, and reasonably foreseeable actions to develop its Cumulative Impacts analysis. This analysis is contained in Chapter 4 of the AFTT FEIS/OIES. As required under NEPA, the level and scope of the analysis is commensurate with the scope of potential impacts of the action and the extent and character of the potentially-impacted resources (*e.g.*, the geographic boundaries for cumulative impacts analysis for some resources are expanded to include activities outside the AFTT Study Area that might impact migratory or wide-ranging animals), as reflected in the resource-specific discussions in Chapter 3 (Affected Environment and Environmental consequences) of the AFTT FEIS/OEIS. The AFTT FEIS/OEIS considered the proposed training and testing activities alongside other actions in the region whose impacts may be additive to those of the proposed training and testing. Past and present actions are also included in the analytical process as part of the affected environmental baseline conditions presented in Chapter 3 of the AFTT FEIS/OEIS. The Navy has done so in accordance with 1997 Council on Environmental Quality (CEQ) guidance. Per the guidance, a qualitative approach and best professional judgment are appropriate where precise measurements are not available. Where precise measurements and/or methodologies were available they were used. Guidance from CEQ states it "is not practical to analyze cumulative effects of an action on the universe; the list of environmental effects must focus on those that are truly meaningful." Further, the U.S. EPA has reviewed the AFTT FEIS/OEIS and rated the document as LO - lack of objections - which means it has not identified

any environmental impact requiring substantive changes to the proposal. Information on the NEPA analysis is provided in Section 4.1.1 (Determination of Significance). Lastly, all of the potential effects on marine mammals from Navy training and testing were analyzed in Section 3.7 (Affected Environment and Environmental Consequences - Marine mammals) of the AFTT FEIS/OEIS. Based on the best available science, it was determined that population-level impacts would not occur.

Comment 58: A Commenter cites to the status and trajectory of NARWs and asserts that the negligible impact finding is unsupported for this species specifically. The commenter asserts that the negligible impact analysis must take into account all of the baseline activities that are known to have contributed to the species' decline, as well as other reasonably foreseeable activities (*e.g.*, five seismic surveys planned for the Atlantic in the near future) that would affect the same populations impacted by the Navy's activities. The Commenter also cites to the number of Level B harassment takes (585) included in the proposed rule to support their assertions. To satisfy the negligible impact requirement for NARWs, the Commenter asserts that NMFS must revise its impacts analysis and incorporate additional mitigation, such as those recommended in section II of Commenter's letter.

Response: The analysis for NARW in the final rule has been updated and expanded since the proposed rule and more clearly addresses the pertinent points the commenter raises. See also the responses above for how NMFS took into account other activities that have or may contribute to the species' status (*Comments and Responses* 35, 36, 40, 44, and 45). In addition, since publication of the proposed rule, the Navy has removed an exercise that would have occurred in the Northeast, decreasing estimated takes by approximately 20 percent to 471. Further, the Navy has expanded the NE NARW Mitigation Area (and its associated protections) to match the

updated NARW ESA-designated critical habitat and further added a requirement not to conduct MTEs in the Gulf of Maine Planning Awareness Area. Both of these mitigation measures further reduce impacts to NARW in important feeding areas. Given all of this, and as described in more detail in the *Analysis and Negligible Impact Determination* section of the rule, any individual NARW is likely to be disturbed at a low-moderate level on no more than a few likely non-sequential days per year, and not in biologically important areas. Even given the fact that some of the affected individuals may already have compromised health, there is nothing to suggest that such a low magnitude and severity of effects would result in impacts on reproduction or survival of any individual. For these reasons, we determined that the expected take will have a negligible impact on NARW.

NEPA

Comment 59: A Commenter comments that NMFS cannot rely on the Navy's AFTT 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 AFTT FEIS/OEIS does not explore a reasonable range of alternatives.

***Response*:** The proposed action at issue is the Navy's proposal to conduct training activities in the AFTT 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 AFTT EIS/OEIS 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 AFTT 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 AFTT FEIS/OEIS is sufficient for purposes of NMFS' own NEPA obligations related to its issuance of an Incidental Take Authorization under the MMPA.

Regarding the alternatives, NMFS' early involvement in development of the AFTT DEIS/OEIS and role in evaluating the effects of incidental take under the MMPA ensured that the AFTT DEIS/OEIS would include adequate analysis of a reasonable range of alternatives. The AFTT 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 AFTT EIS/OEIS, including the purpose and need statement and range of alternatives, and determined that the Navy's AFTT FEIS/OEIS fully satisfies NMFS' NEPA obligations related to its decision to issue the MMPA final rule and associated Letters of Authorization, and we have adopted it.

Use of NMFS' Acoustic Technical Guidance

Comment 60: A Commenter does not agree with the Navy's use of NMFS 2016 Acoustic Technical Guidance (NMFS, 2016) for purposes of evaluating potential auditory injury. The Commenter claims that (1) NOAA is considering rescinding or revising the Acoustic Technical Guidance (2) NMFS' use of the guidance conflicts with Executive Order (EO) 13795 ("Implementing an America-First Offshore Energy Strategy"); (2) Several industry groups have identified Data Quality flaws in the Acoustic Technical guidance; (3) the Commenter has also identified significant Data Quality flaws in the Acoustic Technical Guidance; and (4) NMFS and/or Navy's continued use of the Acoustic Technical Guidance violates Information Quality Act (IQA) guidelines. Regarding the IQA, the Commenter states that NMFS does not have an Office of Management and Budget (OMB)-approved Information Collection Request (ICR) associated with the guidance, and is therefore violating the IQA.

Response: NMFS disagrees that use of the Acoustic Technical Guidance results in any of the claims listed by the Commenter. NMFS is not considering rescinding the Acoustic Technical Guidance. First, the use of the Acoustic Technical Guidance does not conflict with Executive Order 13795. Section 10 of the Executive Order called for a review of the technical guidance as follows: "The Secretary of Commerce shall review for consistency with the policy set forth in Section 2 of this order and, after consultation with the appropriate Federal agencies, take all steps permitted by law to rescind or revise that guidance, if appropriate." To assist the Secretary in the

review of the Acoustic Technical Guidance, NMFS solicited public comment via a 45-day public comment period (82 FR 24950; May 31, 2017) and hosted an interagency consultation meeting with representatives from ten federal agencies (September 25, 2017). NMFS received 62 comments directly related to the 2016 Acoustic Technical Guidance. Comments were submitted by federal agencies (Bureau of Ocean Energy Management (BOEM), the Navy, the Marine Mammal Commission), oil and gas industry representatives, Members of Congress, subject matter experts, NGOs, a foreign statutory advisory group, a regulatory advocacy group, and members of the public. Most of the comments (85 percent) recommended no changes to the Acoustic Technical Guidance, and no public commenter suggested rescinding the Acoustic Technical Guidance. The U.S. Navy, the Marine Mammal Commission, Members of Congress, and subject matter experts expressed support for the Acoustic Technical Guidance thresholds and weighting functions as reflecting the best available science. The remaining comments (15 percent) focused on additional scientific publications for consideration or recommended revisions to improve implementation of the Acoustic Technical Guidance. All public comments received during this review can be found at *www.regulations.gov*. At the September 25, 2017, Federal Interagency Consultation, *none* of the federal agencies recommended rescinding the Acoustic Technical Guidance. Federal agencies were supportive of the Acoustic Technical Guidance thresholds and auditory weighting functions and the science behind their derivation and were appreciative of the opportunity to provide input. Comments received at the meeting focused on improvements to implementation of the Acoustic Technical Guidance and recommendations for future working group discussions to address implementation of the Acoustic Technical Guidance based on any new scientific information as it becomes available.

NMFS has already released a revised 2018 Acoustic Technical Guidance document (June 21, 2018) as a result of the review under EO 13795 (see *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance*), and the thresholds and weighting functions in the revised document (2018 Acoustic Technical Guidance) are identical to those in the 2016 Acoustic Technical Guidance. Thus, the revised version does not change the analysis already completed by the Navy, which relied on the 2016 version. Additional information on the review process under Executive Order 13795 can be found in Appendix C of the Acoustic Technical Guidance.

In addition, NMFS did comply with the OMB Peer Review Bulletin and IQA Guidelines in development of the technical guidance. The Acoustic 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. Responses to public comments were provided in a previous *Federal Register* notice (81 FR 51694; August 4, 2016). Detailed information on the peer reviews and public comment periods conducted during development of the Acoustic Technical Guidance are included as an appendix to the Acoustic Technical Guidance.

The Commenter is incorrect in their assumption that the Acoustic Technical Guidance is only based on non-impulsive Navy sonar and that it is radically different from impulsive sound like seismic air guns used in the oil and gas industry. The Commenter is also incorrect in stating that the application of the Acoustic Technical Guidance cannot practically be used to regulate seismic and other impulsive sounds sources and that explosives, like those used by the Navy, are not subject to the Acoustic Technical Guidance, but instead to a completely different explosive

risk guidance. While it is true that there are less marine mammal TTS onset data available for impulsive sources compared to non-impulsive sources, the Acoustic Technical Guidance impulsive thresholds are specifically derived from data from two impulsive sources: 1) a seismic water gun (Finneran *et al.*, 2002) and 2) a single air gun exposure (Lucke *et al.*, 2009) *(i.e.*, these sources are more similar to those used by the oil and gas industry than tactical sonar or tonal signals). For the evaluation of PTS onset, underwater explosives are subject to the same impulsive thresholds from the Acoustic Technical Guidance as other impulsive sources, such as seismic air guns or impact pile drivers (*i.e.*, they do not have a separate set of criteria for potential impacts on hearing). Underwater explosives do have additional thresholds based on their potential to induce lung or gastrointestinal injury via exposure to shock waves, which are based on net explosive weight, as well as charge depth and animal mass.

Regarding the comment that industry impulsive sound would be more appropriately assessed and regulated through Navy's explosive risk guidance than through the Acoustic Technical Guidance, we disagree. Please see our comments above regarding explosives. Overall, the Acoustic Technical Guidance is a scientific tool that assists in impact assessments and explicitly states that while it can inform regulatory decisions, it in no way directly mandates any specific regulatory decisions, actions, or mitigations. Discretion is left to regulators to interpret the best way to use this best available information.

Last, regarding the Paperwork Reduction Act, there is no collection of information requirement associated with the Acoustic Technical Guidance. Rather, NMFS information collection for Applications and Reporting Requirements for Incidental Taking of Marine Mammals by Specified Activities Under the Marine Mammal Protection Act, OMB control number 0648-0151, was recently renewed and fully considers any potential additional time

required as a result of using the Acoustic Technical Guidance, which is included in the estimated burden hours.

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 AFTT Study Area are presented in Table 12 along with an abundance estimate, an associated coefficient of variation value, and best/minimum abundance estimates. Some marine mammal species, such as manatees, are not managed by NMFS, but by the U.S. Fish and Wildlife Service and therefore not discussed below. The Navy anticipates the take of individuals of 39 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. In addition, the Navy requested authorization for nine serious injuries or mortalities of four marine mammal stocks during ship shock trials, and three takes by serious injury or mortality from vessel strikes over the five-year period. One marine mammal species, the NARW, has critical habitat designated under the ESA in the AFTT Study Area (described below).

The species carried forward for analysis are those likely to be found in the AFTT Study Area based on the most recent data available, and do not include stocks or species that may have once inhabited or transited the area but have not been sighted in recent years and therefore are extremely unlikely to occur in the AFTT Study Area (*e.g.*, species which were extirpated because of factors such as nineteenth and twentieth century commercial exploitation).

The species not carried forward for analysis include the bowhead whale, beluga whale, and narwhal as these would be considered extralimital species and are not part of the AFTT seasonal species assemblage. Bowhead whales are likely to be found only in the Labrador

Current open ocean area, even if in 2012 and 2014, the same bowhead whale was observed in Cape Cod Bay, which represents the southernmost record of this species in the western North Atlantic. In June 2014, a beluga whale was observed in several bays and inlets of Rhode Island and Massachusetts (Swaintek, 2014). This sighting likely represents a single extralimital beluga whale occurrence in the Northeast United States Continental Shelf Large Marine Ecosystem. There is no stock of narwhal that occurs in the U.S. EEZ in the Atlantic Ocean; however, populations from Hudson Strait and Davis Strait may extend into the AFTT Study Area at its northwest extreme. However, narwhals prefer cold Arctic waters and those wintering in Hudson Strait occur in smaller numbers. For these reasons, the likelihood of any Navy activities encountering and having any effect on any of these three species is so slight as to be unlikely; therefore, these species do not require further analysis.

Additionally, for multiple bottlenose dolphin stocks, there was no potential for overlap with any stressors from Navy activities and therefore there would be no adverse effects (or takes), in which case, those stocks were not considered further. Specifically, with the exception of the Mississippi Sound, Lake Borgne, Bay Boudreau stock of bottlenose dolphins (which is addressed in the *Analysis and Negligible Impact Determination* section below), there is no potential for overlap of any Navy stressor with any other Northern GOMEX Bay, Sound, and Estuary stocks. Also, the following bottlenose dolphin stocks for the Atlantic do not have any potential for overlap with Navy activity stressors (or take), and therefore are not considered further: Northern South Carolina Estuarine System, Charleston Estuarine System, Northern Georgia/Southern South Carolina Estuarine System, Central Georgia Estuarine System, Southern Georgia Estuarine System, Biscayne Bay, and Florida Bay stocks. For the same reason, bottlenose dolphins off of Puerto Rico and the U.S. Virgin Islands were also not considered

further. We note that in NMFS' draft 2018 SARs (made available since the proposed rule was published), NMFS has further delineated stocks within the Northern GOMEX Bay, Sound, and Estuary stocks since the 2017 SAR and the Navy's application. However, the Mississippi Sound, Lake Borgne, Bay Boudreau stock of bottlenose dolphins remains the same, and the fact that no Navy stressors overlap any of the other stocks remains accurate, so our analysis of these stocks is unchanged. NMFS is in the process of writing individual SARs for each of the 31 Northern GOMEX Bay, Sound, and Estuary stocks. To date, six have been completed (including the Mississippi Sound, Lake Borgne, Bay Boudreau stock).We presented a detailed discussion of marine mammals and their occurrence in the planned action area, inclusive of important marine mammal habitat (*e.g.*, critical habitat), BIAs, national marine sanctuaries, and UMEs in our *Federal Register* notice of proposed rulemaking (83 FR 10954; March 13, 2018); please see that proposed rule or the Navy's application for more information. There have been no changes to important marine mammal habitat, BIAs, National Marine Sanctuaries, or ESA-designated critical habitat since the issuance of the proposed rule; therefore, they are not discussed further (though we note that NARW ESA-designated critical habitat was updated in 2016, since the last Navy AFTT rule, and some of the discussion in the rule references that). Additional information on UMEs has become available and is discussed following Table 12.

Table 12. Marine mammals with the potential to occur within the AFTT Study Area.

Common Name	*Scientific Name*[1]	*Stock*[2]	*ESA/MMPA Status*[3]	*Stock Abundance*[4] *Best / Minimum Population*	*Occurrence in AFTT Study Area*[5]		
					Open Ocean	*Large Marine Ecosystems*	*Inland Waters*
Order Cetacea							
Suborder Mysticeti (baleen whales)							
Family Balaenidae (right whales)							

Bowhead whale	*Balaena mysticetus*	Eastern Canada-West Greenland	Endangered, strategic, depleted	7,660 (4,500-11,100)[6]	Labrador Current	Newfoundland-Labrador Shelf, West Greenland Shelf, Northeast U.S. Continental Shelf	NA
North Atlantic right whale	*Eubalaena glacialis*	Western	Endangered, strategic, depleted	451 (0) / 445	Gulf Stream, Labrador Current, North Atlantic Gyre	Southeast U.S. Continental Shelf, Northeast U.S. Continental Shelf, Scotian Shelf, Newfoundland-Labrador Shelf, Gulf of Mexico (extralimital)	NA
Family Balaenopteridae (rorquals)							
Blue whale	*Balaenoptera musculus*	Western North Atlantic (Gulf of St. Lawrence)	Endangered, strategic, depleted	Unknown / 440[11]	Gulf Stream, North Atlantic Gyre, Labrador Current	Northeast U.S. Continental Shelf, Scotian Shelf, Newfoundland-Labrador Shelf, Southeast U.S. Continental Shelf, Caribbean Sea, and Gulf of Mexico (strandings only)	NA
Bryde's whale	*Balaenoptera brydei/edeni*	Northern Gulf of Mexico	Planned Endangered, strategic	33 (1.07) / 16	Gulf Stream, North Atlantic Gyre	Gulf of Mexico	NA
Fin whale	*Balaenoptera physalus*	Western North Atlantic	Endangered, strategic, depleted	1,618 (0.33) / 1,234	Gulf Stream, North Atlantic Gyre, Labrador Current	Caribbean Sea, Gulf of Mexico, Southeast U.S. Continental Shelf, Northeast U.S. Continental Shelf, Scotian Shelf, Newfoundland-Labrador Shelf	NA
		West Greenland	Endangered, strategic, depleted	4,468 (1,343-14,871)[9]	Labrador Current	West Greenland Shelf	NA
		Gulf of St. Lawrence	Endangered, strategic, depleted	328 (306-350)[10]		Newfoundland-Labrador Shelf, Scotian Shelf	NA

Humpback whale	*Megaptera novaeangliae*	Gulf of Maine	NA	896 (0) / 896	Gulf Stream, North Atlantic Gyre, Labrador Current	Gulf of Mexico, Caribbean Sea, Southeast U.S. Continental Shelf, Northeast U.S. Continental Shelf, Scotian Shelf, Newfoundland-Labrador Shelf	NA
Minke whale	*Balaenoptera acutorostrata*	Canadian Eastern Coastal	NA	2,591 (0.81) / 1,425	Gulf Stream, North Atlantic Gyre, Labrador Current	Caribbean Sea, Southeast U.S. Continental Shelf, Northeast U.S. Continental Shelf, Scotian Shelf, Newfoundland-Labrador Shelf	NA
		West Greenland[7]	NA	16,609 (7,172-38,461) / NA [7]	Labrador Current	West Greenland Shelf	NA
Sei whale	*Balaenoptera borealis*	Nova Scotia	Endangered, strategic, depleted	357 (0.52) / 236	Gulf Stream, North Atlantic Gyre	Gulf of Mexico, Caribbean Sea, Southeast Northeast U.S. Continental Shelf, Scotian Shelf, Newfoundland-Labrador Shelf	NA
		Labrador Sea	Endangered, strategic, depleted	Unknown[8]	Labrador Current	Newfoundland-Labrador Shelf, West Greenland Shelf	NA
Family Physeteridae (sperm whale)							
Suborder Odontoceti (toothed whales)							
Sperm whale	*Physeter macrocephalus*	North Atlantic	Endangered, strategic, depleted	2,288 (0.28) / 1,815	Gulf Stream, North Atlantic Gyre, Labrador Current	Southeast U.S. Continental Shelf, Northeast U.S. Continental Shelf, Scotian Shelf, Newfoundland-Labrador Shelf, Caribbean Sea	NA
		Northern Gulf of Mexico	Endangered, strategic, depleted	763 (0.38) / 560	NA	Gulf of Mexico	NA
		Puerto Rico and U.S. Virgin Islands	Endangered, strategic, depleted	Unknown	North Atlantic Gyre	Caribbean Sea	NA
Family Kogiidae (sperm whales)							

Pygmy and dwarf sperm whales	*Kogia breviceps* and *Kogia sima*	Western North Atlantic	NA	3,785 (0.47) / 2,598[12]	Gulf Stream, North Atlantic Gyre	Southeast U.S. Continental Shelf, Northeast U.S. Continental Shelf, Scotian Shelf, Newfoundland-Labrador Shelf, Caribbean Sea	NA
		Northern Gulf of Mexico	NA	186 (1.04) / 90[12]	NA	Gulf of Mexico, Caribbean Sea	NA
Family Monodontidae (beluga whale and narwhal)							
Beluga whale	*Delphinapterus leucas*	Eastern High Arctic/Baffin Bay[13]	NA	21,213 (10,985–32,619) [13]	Labrador Current	West Greenland Shelf	NA
		West Greenland[14]	NA	10,595 (4.904–24,650) [14]	NA	West Greenland Shelf	NA
Narwhal	*Monodon monoceros*	NA[15]	NA	NA[15]	NA	Newfoundland-Labrador Shelf, West Greenland Shelf	NA
Family Ziphiidae (beaked whales)							
Blainville's beaked whale	*Mesoplodon densirostris*	Western North Atlantic[16]	NA	7,092 (0.54) / 4,632[17]	Gulf Stream, North Atlantic Gyre, Labrador Current	Southeast U.S. Continental Shelf, Northeast U.S. Continental Shelf, Scotian Shelf, Newfoundland-Labrador Shelf	NA
		Northern Gulf of Mexico	NA	149 (0.91) / 77[18]	NA	Gulf of Mexico, Caribbean Sea	NA
Cuvier's beaked whale	*Ziphius cavirostris*	Western North Atlantic[16]	NA	6,532 (0.32) / 5,021	Gulf Stream, North Atlantic Gyre	Southeast U.S. Continental Shelf, Northeast U.S. Continental Shelf, Scotian Shelf, Newfoundland-Labrador Shelf	NA
		Northern Gulf of Mexico[16]	NA	74 (1.04) / 36	NA	Gulf of Mexico, Caribbean Sea	NA
		Puerto Rico and U.S. Virgin Islands	Strategic	Unknown	NA	Caribbean Sea	NA
Gervais' beaked whale	*Mesoplodon europaeus*	Western North Atlantic[16]	NA	7,092 (0.54) / 4,632 [17]	Gulf Stream, North Atlantic	Southeast U.S. Continental Shelf, Northeast United States	NA

					Gyre	Continental Shelf	
		Northern Gulf of Mexico[16]	NA	149 (0.91) / 77 [18]	Gulf Stream, North Atlantic Gyre	Gulf of Mexico, Caribbean Sea	NA
Northern bottlenose whale	*Hyperoodon ampullatus*	Western North Atlantic	NA	Unknown	Gulf Stream, North Atlantic Gyre, Labrador Current	Northeast U.S. Continental Shelf, Scotian Shelf, Newfoundland-Labrador Shelf	NA
Sowerby's beaked whale	*Mesoplodon bidens*	Western North Atlantic[16]	NA	7,092 (0.54) / 4,632 [17]	Gulf Stream, North Atlantic Gyre	Northeast U.S. Continental Shelf, Scotian Shelf, Newfoundland-Labrador Shelf	NA
True's beaked whale	*Mesoplodon mirus*	Western North Atlantic[16]	NA	7,092 (0.54) / 4,632 [17]	Gulf Stream, North Atlantic Gyre	Southeast U.S. Continental Shelf, Northeast U.S. Continental Shelf, Scotian Shelf, Newfoundland-Labrador Shelf	NA
Family Delphinidae (dolphins)							
Atlantic spotted dolphin	*Stenella frontalis*	Western North Atlantic[16]	NA	44,715 (0.43) / 31,610	Gulf Stream	Southeast U.S. Continental Shelf, Northeast U.S. Continental Shelf	NA
		Northern Gulf of Mexico	NA	Unknown	NA	Gulf of Mexico, Caribbean Sea	NA
		Puerto Rico and U.S. Virgin Islands	Strategic	Unknown	NA	Caribbean Sea	NA
Atlantic white-sided dolphin	*Lagenorhynchus acutus*	Western North Atlantic	NA	48,819 (0.61) / 30,403	Gulf Steam, Labrador Current	Northeast U.S. Continental Shelf, Scotian Shelf, Newfoundland-Labrador Shelf	NA
Clymene dolphin	*Stenella clymene*	Western North Atlantic[16]	NA	Unknown	Gulf Stream	Southeast U.S. Continental Shelf, Northeast U.S. Continental Shelf	NA
		Northern Gulf of Mexico[16]	NA	129 (1.0) / 64	NA	Gulf of Mexico, Caribbean Sea	NA
Common bottlenose dolphin	*Tursiops truncatus*	Western North Atlantic Offshore[19]	Strategic, depleted	77,532 (0.40) / 56,053	Gulf Stream, North Atlantic	Southeast U.S. Continental Shelf, Northeast U.S. Continental	NA

					Gyre	Shelf, Scotian Shelf	
		Western North Atlantic Northern Migratory Coastal[20]	NA	6,639 (0.41) / 4,759	NA	Southeast U.S. Continental Shelf, Northeast U.S. Continental Shelf	Long Island Sound, Sandy Hook Bay, Lower Chesapeake Bay, James River, Elizabeth River
		Western North Atlantic Southern Migratory Coastal[20]	Strategic, depleted	3,751 (0.06) / 2,353	NA	Southeast U.S. Continental Shelf	Lower Chesapeake Bay, James River, Elizabeth River, Beaufort Inlet, Cape Fear River, Kings Bay, St. Johns River
		Western North Atlantic South Carolina/Georgia Coastal[20]	Strategic, depleted	6,027 (0.34) / 4,569	NA	Southeast U.S. Continental Shelf	Kings Bay, St. Johns River
		Northern North Carolina Estuarine System[20]	Strategic	823 (0.06) / 782	NA	Southeast U.S. Continental Shelf, Northeast U.S. Continental Shelf	Beaufort Inlet, Cape Fear River
		Southern North Carolina Estuarine System[20]	Strategic	Unknown	NA	Southeast U.S. Continental Shelf	Beaufort Inlet, Cape Fear River
		Northern South Carolina Estuarine System[20]	Strategic	Unknown	NA	Southeast U.S. Continental Shelf	NA
		Charleston Estuarine System[20]	Strategic	Unknown	NA	Southeast U.S. Continental Shelf	NA
Common bottlenose dolphin (continued)	*Tursiops truncatus*	Northern Georgia/ Southern South Carolina Estuarine System[20]	Strategic	Unknown	NA	Southeast U.S. Continental Shelf	NA
		Central Georgia	Strategic	192 (0.04) /	NA	Southeast U.S.	NA

Estuarine System[20]		185		Continental Shelf	
Southern Georgia Estuarine System[20]	Strategic	194 (0.05) / 185	NA	Southeast U.S. Continental Shelf	Kings Bay, St. Johns River
Western North Atlantic Northern Florida Coastal[20]	Strategic, depleted	877 (0.49) / 595	NA	Southeast U.S. Continental Shelf	Kings Bay, St. Johns River
Jacksonville Estuarine System[20]	Strategic	Unknown	NA	Southeast U.S. Continental Shelf	Kings Bay, St. Johns River
Western North Atlantic Central Florida Coastal[20]	Strategic, depleted	1,218 (0.35) / 913	NA	Southeast U.S. Continental Shelf	Port Canaveral
Indian River Lagoon Estuarine System[20]	Strategic	Unknown	NA	Southeast U.S. Continental Shelf	Port Canaveral
Biscayne Bay[16]	Strategic	Unknown	NA	Southeast U.S. Continental Shelf	NA
Florida Bay[16]	NA	Unknown	NA	Gulf of Mexico	NA
Northern Gulf of Mexico Continental Shelf[20]	Na	51,192 (0.10) / 46,926	NA	Gulf of Mexico	NA
Gulf of Mexico Eastern Coastal[20]	NA	12,388 (0.13) / 11,110	NA	Gulf of Mexico	NA
Gulf of Mexico Northern Coastal[20]	NA	7,185 (0.21) / 6,044	NA	Gulf of Mexico	St. Andrew Bay, Pascagoula River
Gulf of Mexico Western Coastal[20]	NA	20,161 (0.17) / 17,491	NA	Gulf of Mexico	Corpus Christi Bay, Galveston Bay
Northern Gulf of Mexico Oceanic[20]	NA	5,806 (0.39) / 4,230	NA	Gulf of Mexico	NA
Laguna Madre	Strategic	80 (1.57) / Unknown	NA	Gulf of Mexico	NA
Nueces Bay/Corpus Christi Bay	Strategic	58 (0.61) / Unknown	NA	Gulf of Mexico	NA
Copano Bay/Aransas Bay/San Antonio Bay/Redfish Bay/Espiritu Santo Bay	Strategic	55 (0.82) / Unknown	NA	Gulf of Mexico	NA
Matagorda Bay/Tres Palacios Bay/Lavaca Bay	Strategic	61 (0.45) / Unknown	NA	Gulf of Mexico	NA

		West Bay	NA	48 (0.03) / 46	NA	Gulf of Mexico	NA
		Galveston Bay/East Bay/Trinity Bay	Strategic	152 (0.43) / Unknown	NA	Gulf of Mexico	NA
		Sabine Lake	Strategic	0	NA	Gulf of Mexico	NA
		Calcasieu Lake	Strategic	0	NA	Gulf of Mexico	NA
		Vermilion Bay/West Cote Blanche Bay/Atchafalaya Bay	Strategic	0	NA	Gulf of Mexico	NA
		Terrebonne Bay/Timbalier Bay	NA	3,870 (0.15) / 3,426	NA	Gulf of Mexico	NA
		Barataria Bay Estuarine System[20]	Strategic	2,306 (0.09) / 2,138	NA	Gulf of Mexico	NA
		Mississippi River Delta	Strategic	332 (0.93) / 170	NA	Gulf of Mexico	NA
		Mississippi Sound, Lake Borgne, Bay Boudreau[20]	Strategic	3,046 (0.06) / 2,896	NA	Gulf of Mexico	NA
		Mobile Bay/Bonsecour Bay	Strategic	122 (0.34) / Unknown	NA	Gulf of Mexico	NA
		Perdido Bay	Strategic	0	NA	Gulf of Mexico	NA
		Pensacola Bay/East Bay	Strategic	33 (0.80) / Unknown	NA	Gulf of Mexico	NA
		Choctawhatchee Bay	Strategic	179 (0.04) / Unknown	NA	Gulf of Mexico	NA
		St. Andrew Bay	Strategic	124 (0.57) / Unknown	NA	Gulf of Mexico	NA
		St. Joseph Bay[20]	Strategic	152 (0.08) / Unknown	NA	Gulf of Mexico	NA
		St. Vincent Sound/Apalachicola Bay/St. George Sound	Strategic	439 (0.14) / Unknown	NA	Gulf of Mexico	NA
		Apalachee Bay	Strategic	491 (0.39) / Unknown	NA	Gulf of Mexico	NA
		Waccasassa Bay/Withlacoochee Bay/Crystal Bay	Strategic	Unknown	NA	Gulf of Mexico	NA

		St. Joseph Sound/Clearwater Harbor	Strategic	Unknown	NA	Gulf of Mexico	NA
		Tampa Bay	Strategic	Unknown	NA	Gulf of Mexico	NA
		Sarasota Bay/Little Sarasota Bay	Strategic	158 (0.27) / 126	NA	Gulf of Mexico	NA
		Pine Island Sound/Charlotte Harbor/Gasparilla Sound/Lemon Bay	Strategic	826 (0.09) / Unknown	NA	Gulf of Mexico	NA
		Caloosahatchee River	Strategic	0	NA	Gulf of Mexico	NA
		Estero Bay	Strategic	Unknown	NA	Gulf of Mexico	NA
		Chokoloskee Bay/Ten Thousand Islands/Gullivan Bay	Strategic	Unknown	NA	Gulf of Mexico	NA
		Whitewater Bay	Strategic	Unknown	NA	Gulf of Mexico	NA
		Florida Keys (Bahia Honda to Key West)	Strategic	Unknown	NA	Gulf of Mexico	NA
		Puerto Rico and U.S. Virgin Islands	Strategic	Unknown	NA	Caribbean Sea	NA
False killer whale	*Pseudorca crassidens*	Western North Atlantic[22]	Strategic	442 (1.06) / 212	NA	Southeast U.S. Continental Shelf, Northeast U.S. Continental Shelf	NA
		Northern Gulf of Mexico[16]	NA	Unknown	NA	Gulf of Mexico, Caribbean Sea	NA
Fraser's dolphin	*Lagenodelphis hosei*	Western North Atlantic[23]	NA	Unknown	Gulf Stream	Northeast U.S. Continental Shelf, Southeast U.S. Continental Shelf	NA
		Northern Gulf of Mexico[16]	NA	Unknown	NA	Gulf of Mexico, Caribbean Sea	NA
Killer Whale	*Orcinus orca*	Western North Atlantic[22]	NA	Unknown	Gulf Stream, North Atlantic Gyre, Labrador Current	Southeast U.S. Continental Shelf, Northeast United States Continental Shelf, Scotian Shelf, Newfoundland – Labrador Shelf	NA

		Northern Gulf of Mexico[16]	NA	28 (1.02) / 14	NA	Gulf of Mexico, Caribbean Sea	NA
Long-finned pilot whale	*Globicephala melas*	Western North Atlantic	NA	5,636 (0.63) / 3,464	Gulf Stream	Northeast U.S. Continental Shelf, Scotian Shelf, Newfoundland-Labrador Shelf	NA
Melon-headed Whale	*Peponocephala electra*	Western North Atlantic[23]	NA	Unknown	Gulf Stream, North Atlantic Gyre	Southeast U.S. Continental Shelf	NA
		Northern Gulf of Mexico[16]	NA	2,235 (0.75) / 1,274	NA	Gulf of Mexico, Caribbean Sea	NA
Pantropical spotted-dolphin	*Stenella attenuate*	Western North Atlantic[16]	NA	3,333 (0.91) / 1,733	Gulf Stream	Southeast U.S. Continental Shelf, Northeast U.S. Continental Shelf	NA
		Northern Gulf of Mexico[22]	NA	50,880 (0.27) / 40,699	NA	Gulf of Mexico, Caribbean Sea	NA
Pygmy Killer Whales	*Feresa attenuata*	Western North Atlantic[16]	NA	Unknown	Gulf Stream, North Atlantic Gyre	Southeast U.S. Continental Shelf	NA
		Northern Gulf of Mexico[16]	NA	152 (1.02) / 75	NA	Gulf of Mexico, Caribbean Sea	NA
Risso's dolphin	*Grampus griseus*	Western North Atlantic	NA	18,250 (0.46) / 12,619	Gulf Stream, North Atlantic Gyre	Southeast U.S. Continental Shelf, Northeast United States Continental Shelf, Scotian Shelf, Newfoundland – Labrador Shelf	NA
		Northern Gulf of Mexico	NA	2,442 (0.57) / 1,563	NA	Gulf of Mexico, Caribbean Sea	NA
Rough-toothed dolphin	*Steno bredanensis*	Western North Atlantic[16]	NA	136 (1.00) / 67	Gulf Stream, North Atlantic Gyre	Caribbean Sea Southeast U.S. Continental Shelf, Northeast U.S. Continental Shelf	NA
		Northern Gulf of Mexico	NA	624 (0.99) / 311	NA	Gulf of Mexico, Caribbean Sea	NA
Short-finned pilot whale	*Globicephala macrorhynchus*	Western North Atlantic	NA	28,924 (0.24) / 23,637	NA	Northeast Continental Shelf, Southeast U.S. Continental Shelf	NA
		Northern Gulf of	NA	2,415 (0.66) /	NA	Gulf of Mexico,	NA

		Mexico[22]		1,456		Caribbean Sea	
		Puerto Rico and U.S. Virgin Islands	Strategic	Unknown	NA	Caribbean Sea	NA
Spinner dolphin	*Stenella longirostris*	Western North Atlantic[16]	NA	Unknown	Gulf Stream, North Atlantic Gyre	Southeast U.S. Continental Shelf, Northeast U.S. Continental Shelf	NA
		Northern Gulf of Mexico[16]	NA	11,441 (0.83) / 6,221	NA	Gulf of Mexico, Caribbean Sea	NA
		Puerto Rico and U.S. Virgin Islands	Strategic	Unknown	NA	Caribbean Sea	NA
Striped dolphin	*Stenella coeruleoalba*	Western North Atlantic[16]	NA	54,807 (0.30) / 42,804	Gulf Stream	Northeast U.S. Continental Shelf, Scotian Shelf	NA
		Northern Gulf of Mexico[16]	NA	1,849 (0.77) / 1,041	NA	Gulf of Mexico, Caribbean Sea	NA
Short-beaked common dolphin	*Delphinus delphis*	Western North Atlantic	NA	70,184 (0.28) / 55,690	Gulf Stream	Southeast U.S. Continental Shelf, Northeast U.S. Continental Shelf, Scotian Shelf, Newfoundland-Labrador Shelf	NA
White-beaked dolphin	*Lagenorhynchus albirostris*	Western North Atlantic[23]	NA	2,003 (0.94) / 1,023	Labrador Current	Northeast U.S. Continental Shelf, Scotian Shelf, Newfoundland-Labrador Shelf	NA
Family Phocoenidae (porpoises)							
Harbor porpoise	*Phocoena*	Gulf of Maine/Bay of Fundy	NA	79,883 (0.32) / 61,415	NA	Northeast U.S. Continental Shelf, Scotian Shelf, Newfoundland-Labrador Shelf	Narragansett Bay, Rhode Island Sound, Block Island Sound, Buzzards Bay, Vineyard Sound, Long Island Sound, Piscataqua River, Thames River, Kennebec River
		Gulf of St. Lawrence[24]	NA	Unknown[24]	Labrador Current	Northeast U.S. Continental Shelf, Scotian Shelf, Newfoundland-Labrador Shelf	NA

		Newfoundland[25]	NA	Unknown[25]	Labrador Current	Northeast U.S. Continental Shelf, Scotian Shelf, Newfoundland-Labrador Shelf	NA
		Greenland[26]	NA	Unknown[26]	Labrador Current	Northeast U.S. Continental Shelf, Scotian Shelf, Newfoundland-Labrador Shelf, West Greenland Shelf	NA
Order Carnivora							
Suborder Pinnipedia							
Family Phocidae (true seals)							
Gray seal	*Halichoerus grypus*	Western North Atlantic	NA	27,131 (0.19) / 23,158	NA	Northeast U.S. Continental Shelf, Scotian Shelf, Newfoundland-Labrador Shelf	Narragansett Bay, Rhode Island Sound, Block Island Sound, Buzzards Bay, Vineyard Sound, Long Island Sound, Piscataqua River, Thames River, Kennebeck River
Harbor seal	*Phoca vitulina*	Western North Atlantic	NA	75,834 (0.15) / 66,884	NA	Southeast U.S. Continental Shelf, Northeast U.S. Continental Shelf, Scotian Shelf, Newfoundland-Labrador Shelf	Chesapeake Bay, Narragansett Bay, Rhode Island Sound, Block Island Sound, Buzzards Bay, Vineyard Sound, Long Island Sound, Piscataqua River, Thames River, Kennebeck River
Harp seal	*Pagophilus groenlandicus*	Western North Atlantic	NA	Unknown	NA	Northeast U.S. Continental Shelf, Scotian Shelf, Newfoundland-	NA

						Labrador Shelf	
Hooded seal	*Cystophora cristata*	Western North Atlantic	NA	Unknown	NA	Southeast U.S. Continental Shelf, Northeast U.S. Continental Shelf, Scotian Shelf, Newfoundland-Labrador Shelf, West Greenland Shelf	Narragansett Bay, Rhode Island Sound, Block Island Sound, Buzzards Bay, Vineyard Sound, Long Island Sound, Piscataqua River, Thames River, Kennebec River

Notes: CV: coefficient of variation; ESA: Endangered Species Act; MMPA: Marine Mammal Protection Act; NA: not applicable

[1] Taxonomy follows (Committee on Taxonomy, 2016)
[2] Stock designations for the U.S. EEZ and abundance estimates are from Atlantic and Gulf of Mexico SARS prepared by NMFS *(Hayes et al.*, 2017) and the draft 2018 SARs, unless specifically noted.
[3] Populations or stocks defined by the MMPA as "strategic" for one of the following reasons: (1) the level of direct human-caused mortality exceeds the potential biological removal level; (2) based on the best available scientific information, numbers are declining and species are likely to be listed as threatened species under the ESA within the foreseeable future; (3) species are listed as threatened or endangered under the ESA; (4) species are designated as depleted under the MMPA.
[4] Stock abundance, CV, and minimum population are numbers provided by the Stock Assessment Reports *(Hayes et al.*, 2017). The stock abundance is an estimate of the number of animals within the stock. The CV is a statistical metric used as an indicator of the uncertainty in the abundance estimate. The minimum population estimate is either a direct count (*e.g.*, pinnipeds on land) or the lower 20th percentile of a statistical abundance estimate.
[5] Occurrence in the AFTT Study Area includes open ocean areas—Labrador Current, North Atlantic Gyre, Gulf Stream, and coastal/shelf waters of seven large marine ecosystems—West Greenland Shelf, Newfoundland-Labrador Shelf, Scotian Shelf, and Northeast U.S. Continental Shelf, Southeast U.S. Continental Shelf, Caribbean Sea, Gulf of Mexico, and inland waters of Kennebec River, Piscataqua River, Thames River, Narragansett Bay, Rhode Island Sound, Block Island Sound, Buzzards Bay, Vineyard Sound, Long Island Sound, Sandy Hook Bay, Lower Chesapeake Bay, James River, Elizabeth River, Beaufort Inlet, Cape Fear River, Kings Bay, St. Johns River, Port Canaveral, St. Andrew Bay, Pascagoula River, Sabine Lake, Corpus Christi Bay, and Galveston Bay.
[6] The bowhead whale population off the West Coast of Greenland is not managed by NMFS and, therefore, does not have an associated Stock Assessment Report. Abundance and 95 percent highest density interval were presented in (Frasier *et al.*, 2015).
[7] The West Greenland stock of minke whales is not managed by NMFS and, therefore, does not have an associated Stock Assessment Report. Abundance and 95 percent confidence interval were presented in (Heide-Jørgensen *et al.*, 2010).
[8] The Labrador Sea stock of sei whales is not managed by NMFS and, therefore, does not have an associated Stock Assessment Report. Information was obtained in (Prieto *et al.*, 2014).
[9] The West Greenland stock of fin whales is not managed by NMFS and, therefore, does not have an associated Stock Assessment Report. Abundance and 95 percent confidence interval were presented in (Heide-Jørgensen *et al.*, 2010).
[10] The Gulf of St. Lawrence stock of fin whales is not managed by NMFS and, therefore, does not have an associated Stock Assessment Report. Abundance and 95 percent confidence interval were presented in (Ramp *et al.*, 2014).
[11] Photo identification catalogue count of 440 recognizable blue whale individuals from the Gulf of St. Lawrence is considered a minimum population estimate for the western North Atlantic stock (Waring *et al.*, 2010).
[12] Estimates include both the pygmy and dwarf sperm whales in the western North Atlantic (Waring *et al.*, 2014) and the northern Gulf of Mexico (Waring *et al.*, 2013).
[13] Beluga whales in the Atlantic are not managed by NMFS and have no associated Stock Assessment Report. Abundance and 95 percent confidence interval for the Eastern High Arctic/Baffin Bay stock were presented in (Innes *et al.*, 2002).
[14] Beluga whales in the Atlantic are not managed by NMFS and have no associated Stock Assessment Report. Abundance and 95 percent confidence interval for the West Greenland stock were presented in (Heide-Jørgensen *et al.*, 2009).
[15] NA = Not applicable. Narwhals in the Atlantic are not managed by NMFS and have no associated Stock Assessment Report.
[16] Estimates for these western North Atlantic stocks are from Waring *et al.* (2014) and the northern Gulf of Mexico stock are from (Waring *et al.*, 2013) as applicable.
[17] Estimate includes undifferentiated Mesoplodon species.
[18] Estimate includes Gervais' and Blainville's beaked whales.
[19] Estimate may include sightings of the coastal form.
[20] Estimates for these Gulf of Mexico stocks are from SARs
[21] NMFS is in the process of writing individual stock assessment reports for each of the 32 bay, sound, and estuary stocks.

[22] Estimates for these stocks are from Waring *et al.*, (2015).
[23] Estimates for these western North Atlantic stocks are from (Waring *et al.*, 2007).
[24] Harbor porpoise in the Gulf of St. Lawrence are not managed by NMFS and have no associated Stock Assessment Report.
[25] Harbor porpoise in Newfoundland are not managed by NMFS and have no associated Stock Assessment Report.
[26] Harbor porpoise in Greenland are not managed by NMFS and have no associated Stock Assessment Report.

A UME is defined under section 410(6) of the MMPA as a stranding that is unexpected; involves a significant die-off of any marine mammal population; and demands immediate response. From 1991 to the present, there have been 36 formally recognized UMEs affecting marine mammals along the Atlantic Coast and the GOMEX involving species under NMFS' jurisdiction. Two additional UME's have been declared in 2018 since publication of the proposed rule that inform our analysis: the Northeast Pinniped UME (harbor and gray seals) in the Atlantic and the Southwest Florida Bottlenose dolphin UME in the GOMEX. The NARW, humpback whale, and minke whale UMEs on the Atlantic Coast are still active and involve ongoing investigations. The impacts to Barataria Bay bottlenose dolphins from the expired UME (discussed in the proposed rule) associated with the DWH oil spill in the GOMEX are thought to be persistent and continue to inform population analyses. The other UMEs expired several years ago and little is known about how the effects of those events might be appropriately applied to an impact assessment several years later. The five UMEs that could inform the current analysis are discussed below.

NARW UME

Since June 7, 2017, elevated mortalities of NARW have been documented. To date, a total of 19 confirmed dead stranded NARW (12 in Canada; 7 in the United States), and five live whale entanglements in Canada have been observed, predominantly in the Gulf of St. Lawrence region of Canada and around the Cape Cod area of Massachusetts. Historically (2006-2016), the annual average for dead NARW strandings in Canada and the United States combined is 3.8 whales per year. This event was declared a UME and is under investigation. Full necropsy

examinations have been conducted on 11 of the 19 whales and final results from the examinations are pending. Necropsy results from seven of the Canadian whales suggest mortalities of four whales were compatible with blunt trauma likely caused by vessel collision and two mortalities were confirmed from chronic entanglement in fishing gear (Daoust *et al.*, 2017; M. Hardy personal communication to D. Fauquier on October 5, 2017; Meyer-Gutbrod *et al.*, 2018; Pettis *et al.*, 2017a). The seventh whale was too decomposed to determine the cause of mortality, but some observations in this animal suggested blunt trauma. Limited samples from another whale suggest acute death (Daoust *et al.*, 2018). Daoust *et al.* (2018) also concluded there were no oil and gas seismic surveys authorized in the months prior to or during the period over which these mortalities occurred, as well as no blasting or major marine development projects. All of the NARW that stranded in the United States that are part of the UME had been significantly decomposed at the time of stranding, and investigations have been limited. Navy was consulted as to sonar use and they confirmed none was used in the vicinity of any of the strandings.

As part of the UME process, an independent team of scientists (Investigative Team) was assembled to coordinate with the Working Group on Marine Mammal Unusual Mortality Events to review the data collected, sample future whales that strand and to determine the next steps for the investigation. For more information on this UME, please refer to *https://www.fisheries.noaa.gov/national/marine-life-distress/2017-2018-north-atlantic-right-whale-unusual-mortality-event*.

While data are not yet available to statistically estimate the population's trend beyond 2015, three lines of evidence indicate the population is still in decline. First, calving rates in 2016, 2017, and 2018 were low. Only five new calves were documented in 2017 (Pettis *et al.*,

2017a), well below the number needed to compensate for expected mortalities (Pace *et al.*, 2017), and no new calves were reported for 2018. Long-term photographic identification data indicate new calves rarely go undetected, so these years likely represent a continuation of the low calving rates that began in 2012 (Kraus *et al.*, 2007; Pace *et al.*, 2017). Second, as noted above, the preliminary abundance estimate for 2016 is 451 individuals, down approximately 1.5 percent from 458 in 2015. Third, since June 2017, at least 19 NARWs have died in what has been declared an UME as discussed above, and at least one calf died prior to this in April 2017 (Meyer-Gutbrod *et al.*, 2018; NMFS 2017).

Humpback Whale UME along the Atlantic Coast

Since January 2016, elevated mortalities of humpback whales along the Atlantic coast from Maine through Florida have occurred. As of August 29, 2018 a total of 81 humpback strandings have occurred (26, 33, and 22 whales in 2016, 2017, and 2018 respectively). As of April 2017, partial or full necropsy examinations were conducted on 20 cases, or approximately half of the 42 strandings (at that time). Of the 20 whales examined, 10 had evidence of blunt force trauma or pre-mortem propeller wounds indicative of vessel strike, which is over six times above the 16-year average of 1.5 whales showing signs of vessel strike in this region. Vessel strikes were documented for stranded humpback whales in Virginia (3), New York (3), Delaware (2), Massachusetts (1) and New Hampshire (1). NOAA, in coordination with our stranding network partners, continues to investigate the recent mortalities, environmental conditions, and population monitoring to better understand the recent humpback whale mortalities. At this time, vessel parameters (including size) are not known for each vessel-whale collision that lead to the death of the whales. Therefore, NOAA considers all sizes of vessels to be risks for whale species in highly trafficked areas. The Navy has investigated potential strikes and confirmed that it had

none. This investigation is ongoing. Please refer to *http://www.nmfs.noaa.gov/pr/health/mmume/2017humpbackatlanticume.html* for more information on this UME.

Minke Whale UME along the Atlantic Coast

Since January 2017, elevated mortalities of minke whale along the Atlantic coast from Maine through South Carolina have occurred. As of September 9, 2018, a total of 43 strandings have occurred (27 and 16 whales in 2017 and 2018, respectively). As of February 16, 2018 full or partial necropsy examinations were conducted on over 60 percent of the whales. Preliminary findings in several of the whales have shown evidence of human interactions, primarily fisheries interactions, or infectious disease. These findings are not consistent across all of the whales examined, and final diagnostic results are still pending for many of the cases. This investigation is ongoing. Please refer to *https://www.fisheries.noaa.gov/national/marine-life-distress/2017-2018-minke-whale-unusual-mortality-event-along-atlantic-coast* for more information on this UME.

Northeast Pinniped UME along the Atlantic Coast

Since July 2018, elevated numbers of harbor seal and gray seal mortalities have occurred across Maine, New Hampshire and Massachusetts. As of September 25, 2018, a total of 1,036 seal strandings have been confirmed. Full or partial necropsy examinations have been conducted on many of the seals and samples have been collected for testing. Based on testing conducted so far, the main pathogen found in the seals is phocine distemper virus. While initially detected in some animals, there is not strong evidence that avian influenza virus is a cause of this UME. This investigation is ongoing. Please refer to *https://www.fisheries.noaa.gov/new-england-mid-*

atlantic/marine-life-distress/2018-pinniped-unusual-mortality-event-along-northeast for more information on this UME.

Southwest Florida Bottlenose Dolphin UME along the GOMEX

Since July 2018, elevated bottlenose dolphin mortalities have occurred along the Southwest coast of Florida including Collier, Lee, Charlotte, Sarasota, Manatee, Hillsborough, and Pinellas counties. As of September 27, 2018, 65 dolphins have been confirmed stranded in this event. Our stranding network partners have conducted full or partial necropsy examinations on several dolphins, with positive results for the red tide toxin (brevetoxin) indicating this UME is related to the severe bloom of a red tide that has been ongoing since November 2017. This investigation is ongoing. Please refer to *https://www.fisheries.noaa.gov/southeast/marine-life-distress/2018-bottlenose-dolphin-unusual-mortality-event-southwest-florida* 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 10954; March 13, 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 shifts 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 AFTT FEIS/OEIS (Chapter 3, Section 3.7 *Marine*

Mammals, http://www.aftteis.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 AFTT 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 AFTT FEIS/OEIS. More specifically, we have independently reviewed the more recent studies that were not included in NMFS' proposed rule and have concluded that the descriptions and interpretations of those studies are accurate. Importantly, we note that none of the newer information highlighted here or in the AFTT FEIS/OEIS affects our analysis in a manner that changes our determinations under the MMPA.

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 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 (Nachtigall and Supin, 2013, 2015, Nachtigall *et al.*, 2016a,b,c, Finneran, 2018, 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 *at 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% 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 being authorized, are appropriate and based on the best available science. 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 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 at the beginning of this section, 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 (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 four species of mid-frequency cetaceans during ship shock trials and three serious injuries or mortalities total (over the five-year period) of mysticetes (except for blue whales) and North Atlantic sperm whales could occur 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) and 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 choices 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. 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. 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."

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, air guns, impact pile driving) sources.

These thresholds (Tables 13-14) 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 13. Acoustic thresholds identifying the onset of TTS and PTS for Non-impulsive sound sources by functional hearing group.

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

Note: SEL thresholds in dB re 1 μPa^2s.

Based on the best available science, the Navy (in coordination with NMFS) used the acoustic and pressure thresholds indicated in Table 14 to predict the onset of TTS, PTS, tissue damage, and mortality for explosives (impulsive) and other impulsive sound sources.

Table 14. 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
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, Gray, Bearded, Harp, Hooded, and Ringed seals	170 dB SEL (weighted) or 212 dB Peak SPL	185 dB SEL (weighted) or 218 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 14 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 Impacts to Marine Mammals and Sea Turtles technical report* (U.S. Department of the Navy, 2017d) 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 13 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 Impacts to Marine*

Mammals and Sea Turtles technical report (U.S. Department of the Navy, 2017d) 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 (Southall *et al.*, 2007, Ellison *et al.*, 2011). 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 root mean square 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 15).

Table 15. 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, the Navy coordinated with NMFS to propose Level B behavioral harassment thresholds specific to their military readiness activities utilizing active sonar. The way the criteria were derived is discussed in detail in 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, 2017d). 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 proposed 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 calculating take and to support the determinations made in the proposed 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 proposed 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.

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 harbor porpoises and beaked whales during Phase II analyses. Instead, step functions at SPLs of

120 dB re 1 μPa and 140 dB re 1 μPa were used for harbor porpoises and beaked whales, respectively, as thresholds to predict Level B harassment by behavioral disturbance.

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. 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 16 below). 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. 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 further ranges as shown in Table 16, versus less intense events.

Table 16. 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 SL / Single Platform Cutoff Distance*	*High SL / Multi-Platform Cutoff Distance*
Odontocetes	10 km	20 km
Pinnipeds	5 km	10 km
Mysticetes and Manatees	10 km	20 km
Beaked Whales	25 km	50 km
Harbor Porpoise	20 km	40 km

Notes: dB re 1 µPa @ 1 m: decibels referenced to 1 micropascal at 1 meter; km: kilometer; SL: source level

The information currently available regarding harbor porpoises suggests a very low threshold level of response for both captive and wild animals. Threshold levels at which both captive (Kastelein *et al.*, 2000; Kastelein *et al.*, 2005) and wild harbor porpoises (Johnston, 2002) responded to sound (*e.g.*, acoustic harassment devices, acoustic deterrent devices, or other non-impulsive sound sources) are very low, approximately 120 dB re 1 µPa. Therefore, a SPL of 120 dB re 1 µPa was used in the analysis as a threshold for predicting Level B behavioral harassment in harbor porpoises.

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 17 through Table 21. 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 17 illustrates the maximum likely takes (maximum number of instances 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, 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 17. Ranges to an Estimated Level B Behavioral Harassment Takes for Sonar Bin LF5 over a Representative Range of Environments within the AFTT Study Area.

Received Level (dB re 1 µPa)	*Mean Range (m) with minimum to maximum values in parentheses*	*Probability of Level B Behavioral Harassment*				
		Odontocetes	*Mysticetes*	*Pinnipeds*	*Beaked Whales*	*Harbor Porpoises*
178	1 (0—1)	97%	59%	92%	100%	100%
172	2 (1—2)	91%	30%	76%	99%	100%
166	4 (1—6)	78%	20%	48%	97%	100%
160	10 (1—13)	58%	18%	27%	93%	100%
154	21 (1—25)	40%	17%	18%	83%	100%
148	46 (1—60)	29%	16%	16%	66%	100%
142	104 (1—140)	25%	13%	15%	45%	100%
136	242 (120—430)	23%	9%	15%	28%	100%
130	573 (320—1,275)	20%	5%	15%	18%	100%
124	1,268 (550—2,775)	17%	2%	14%	14%	100%
118	2,733 (800—6,525)	12%	1%	13%	12%	0%
112	5,820 (1,025—18,275)	6%	0%	9%	11%	0%
106	13,341 (1,275—54,525)	3%	0%	5%	11%	0%
100	31,026 (2,025—100,000*)	1%	0%	2%	8%	0%

* Indicates maximum range of acoustic model, a distance of approximately 100 kilometers from the sound source.
Notes: 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. Cut-off ranges in this table are for activities with high source levels and/or multiple platforms (see Table 16 for behavioral cut-off distances).
dB re 1 µPa2 - s: decibels referenced to 1 micropascal squared second; m: meters

Table 18 through Table 20 enumerate the maximum likely takes for MFAS.

Table 18. Ranges to an Estimated Level B Behavioral Harassment Takes for Sonar Bin MF1 over a Representative Range of Environments within the AFTT Study Area.

Received Level (dB re 1 µPa)	*Mean Range (m) with minimum to maximum values in parentheses*	*Probability of Level B Behavioral Harassment*				
		Odontocetes	*Mysticetes*	*Pinnipeds*	*Beaked Whales*	*Harbor Porpoises*
196	109 (100—150)	100%	100%	100%	100%	100%
190	257 (220—370)	100%	98%	99%	100%	100%
184	573 (400—1,000)	99%	88%	98%	100%	100%
178	1,235 (725—3,525)	97%	59%	92%	100%	100%
172	3,007 (875—9,775)	91%	30%	76%	99%	100%
166	6,511 (925—19,525)	78%	20%	48%	97%	100%
160	11,644 (975—36,275)	58%	18%	27%	93%	100%
154	18,012 (975—60,775)	40%	17%	18%	83%	100%
148	26,037 (1,000—77,525)	29%	16%	16%	66%	100%
142	33,377 (1,000—100,000*)	25%	13%	15%	45%	100%
136	41,099 (1,025—100,000*)	23%	9%	15%	28%	100%
130	46,618 (3,275—100,000*)	20%	5%	15%	18%	100%
124	50,173 (3,525—100,000*)	17%	2%	14%	14%	100%
118	52,982 (3,775—100,000*)	12%	1%	13%	12%	0%
112	56,337 (4,275—100,000*)	6%	0%	9%	11%	0%
106	60,505 (4,275—100,000*)	3%	0%	5%	11%	0%
100	62,833 (4,525—100,000*)	1%	0%	2%	8%	0%

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

Notes: 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. Cut-off ranges in this table are for activities with high source levels and/or multiple platforms (see Table 16 for behavioral cut-off distances). dB re 1 μPa^2 - s: decibels referenced to 1 micropascal squared second; m: meters

Table 19. Ranges to an Estimated Level B Behavioral Harassment Takes for Sonar Bin MF4 over a Representative Range of Environments within the AFTT Study Area.

Received Level (dB re 1 µPa)	*Mean Range (m) with minimum to maximum values in parentheses*	*Probability of Level B Behavioral Harassment*				
		Odontocetes	*Mysticetes*	*Pinnipeds*	*Beaked Whales*	*Harbor Porpoises*
196	8 (1—10)	100%	100%	100%	100%	100%
190	17 (1—21)	100%	98%	99%	100%	100%
184	35 (1—40)	99%	88%	98%	100%	100%
178	71 (1—95)	97%	59%	92%	100%	100%
172	156 (110—410)	91%	30%	76%	99%	100%
166	431 (280—1,275)	78%	20%	48%	97%	100%
160	948 (490—3,525)	58%	18%	27%	93%	100%
154	1,937 (750—10,025)	40%	17%	18%	83%	100%
148	3,725 (1,025—20,525)	29%	16%	16%	66%	100%
142	7,084 (1,525—38,525)	25%	13%	15%	45%	100%
136	11,325 (1,775—56,275)	23%	9%	15%	28%	100%
130	16,884 (1,775—74,275)	20%	5%	15%	18%	100%
124	24,033 (2,275—80,775)	17%	2%	14%	14%	100%
118	31,950 (2,275—100,000*)	12%	1%	13%	12%	0%
112	37,663 (2,525—100,000*)	6%	0%	9%	11%	0%
106	41,436 (2,775—100,000*)	3%	0%	5%	11%	0%
100	44,352 (2,775—100,000*)	1%	0%	2%	8%	0%

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

Notes: 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. Cut-off ranges in this table are for activities with high source levels and/or multiple platforms (see Table 16 for behavioral cut-off distances). dB re 1 μPa^2 - s: decibels referenced to 1 micropascal squared second; m: meters

Table 20. Ranges to an Estimated Level B Behavioral Harassment Takes for Sonar Bin MF5 over a Representative Range of Environments within the AFTT Study Area.

Received Level (dB re 1 µPa)	*Mean Range (m) with minimum to maximum values in parentheses*	*Probability of Level B Behavioral Harassment*				
		Odontocetes	*Mysticetes*	*Pinnipeds*	*Beaked Whales*	*Harbor Porpoises*
190	2 (1—3)	100%	98%	99%	100%	100%
184	4 (1—9)	99%	88%	98%	100%	100%
178	14 (1—18)	97%	59%	92%	100%	100%
172	29 (1—35)	91%	30%	76%	99%	100%
166	61 (1—80)	78%	20%	48%	97%	100%
160	141 (1—400)	58%	18%	27%	93%	100%
154	346 (1—1,000)	40%	17%	18%	83%	100%
148	762 (420—2,525)	29%	16%	16%	66%	100%
142	1,561 (675—5,525)	25%	13%	15%	45%	100%
136	2,947 (1,025—10,775)	23%	9%	15%	28%	100%
130	5,035 (1,025—17,275)	20%	5%	15%	18%	100%
124	7,409 (1,275—22,525)	17%	2%	14%	14%	100%
118	10,340 (1,525—29,525)	12%	1%	13%	12%	0%
112	13,229 (1,525—38,025)	6%	0%	9%	11%	0%
106	16,487 (1,525—46,025)	3%	0%	5%	11%	0%
100	20,510 (1,775—60,525)	1%	0%	2%	8%	0%

Notes: 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. Cut-off ranges in this table are for activities with high source levels and/or multiple platforms (see Table 16 for behavioral cut-off distances). dB re 1 μPa^2 - s: decibels referenced to 1 micropascal squared second; m: meter

Table 21. Ranges to an Estimated Level B Behavioral Harassment Takes for Sonar Bin HF4 over a Representative Range of Environments within the AFTT Study Area.

Received Level (dB re 1 µPa)	*Mean Range (m) with minimum to maximum values in parentheses*	*Probability of Level B Behavioral Harassment*				
		Odontocetes	*Mysticetes*	*Pinnipeds*	*Beaked Whales*	*Harbor Porpoises*
196	3 (1—6)	100%	100%	100%	100%	100%
190	8 (1—14)	100%	98%	99%	100%	100%
184	18 (1—35)	99%	88%	98%	100%	100%
178	37 (1—100)	97%	59%	92%	100%	100%
172	78 (1—300)	91%	30%	76%	99%	100%
166	167 (1—725)	78%	20%	48%	97%	100%
160	322 (25—1,525)	58%	18%	27%	93%	100%
154	555 (45—3,775)	40%	17%	18%	83%	100%
148	867 (70—6,775)	29%	16%	16%	66%	100%
142	1,233 (150—12,775)	25%	13%	15%	45%	100%
136	1,695 (260—20,025)	23%	9%	15%	28%	100%
130	2,210 (470—29,275)	20%	5%	15%	18%	100%
124	2,792 (650—40,775)	17%	2%	14%	14%	100%
118	3,421 (950—49,775)	12%	1%	13%	12%	0%
112	4,109 (1,025—49,775)	6%	0%	9%	11%	0%
106	4,798 (1,275—49,775)	3%	0%	5%	11%	0%
100	5,540 (1,275—49,775)	1%	0%	2%	8%	0%

Notes: dB re 1 μPa^2 - s: decibels referenced to 1 micropascal squared second; m: meters

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 22 and Table 14 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 Impacts to Marine Mammals and Sea Turtles Technical Report* (U.S. Department of the Navy, 2017d) for detailed information on how the criteria and thresholds were derived. NMFS continues to concur that this approach is the best available science for determining impacts to marine mammals from explosives.

Table 22. 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

Note: Weighted SEL thresholds in dB re 1 μPa^2s 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 AFTT 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 on 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 *Quantitative Analysis for Estimating Acoustic and Explosive Impacts to Marine Mammals and Sea Turtles* (U.S. Department of the Navy, 2017a).

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 *Quantitative Analysis for Estimating Acoustic and Explosive Impacts to Marine Mammals and Sea Turtles* (U.S. Department of the Navy, 2017a) 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 5 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 the PTS for 5 representative sonar systems for an exposure of 30 seconds is shown in Table 23 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 23. Range to Permanent Threshold Shift (meters) for Five Representative Sonar Systems.

Functional Hearing Group	*Approximate PTS (30 seconds) Ranges (meters)*[1]				
	Sonar Bin LF5 (Low Frequency Sources <180 dB Source Level)	*Sonar Bin MF1 (e.g., SQS-53 ASW Hull Mounted Sonar)*	*Sonar Bin MF4 (e.g., AQS-22 ASW Dipping Sonar)*	*Sonar Bin MF5 (e.g., SSQ-62 ASW Sonobuoy)*	*Sonar Bin HF4 (e.g., SQS-20 Mine Hunting Sonar)*
Low-frequency Cetaceans	0 (0—0)	66 (65—80)	15 (15—18)	0 (0—0)	0 (0—0)
Mid-frequency Cetaceans	0 (0—0)	16 (16—16)	3 (3—3)	0 (0—0)	1 (0—2)
High-frequency Cetaceans	0 (0—0)	192 (170—270)	31 (30—40)	9 (8—13)	34 (20—85)
Phocid Seals	0 (0—0)	46 (45—55)	11 (11—13)	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.
Notes: ASW: anti-submarine warfare; HF: high frequency; LF: low frequency; MF: mid-frequency; PTS: permanent threshold shift; NA: Not applicable because there is no overlap between species and sound source.

The tables below illustrate the range to TTS for 1, 30, 60, and 120 seconds from five representative sonar systems (see Table 24 through Table 28).

Table 24. Ranges to Temporary Threshold Shift (meters) for Sonar Bin LF5 over a Representative Range of Environments within the AFTT Study Area.

Functional Hearing Group	*Approximate TTS Ranges (meters)*[1]			
	Sonar Bin LF5 (Low Frequency Sources <180 dB Source Level)			
	1 second	*30 seconds*	*60 seconds*	*120 seconds*
Low-frequency Cetaceans	4 (0—5)	4 (0—5)	4 (0—5)	4 (0—5)
Mid-frequency Cetaceans	222 (200—310)	222 (200—310)	331 (280—525)	424 (340—800)
High-frequency Cetaceans	0 (0—0)	0 (0—0)	0 (0—0)	0 (0—0)

Phocid Seals	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 parenthesis. Notes: Ranges for 1-sec and 30-sec periods are identical for Bin MF1 because this system nominally pings every 50 seconds, therefore these periods encompass only a single ping. PTS: permanent threshold shift; TTS: temporary threshold shift

Table 25. Ranges to Temporary Threshold Shift (meters) for Sonar Bin MF1 over a Representative Range of Environments within the AFTT Study Area.

Functional 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 Cetaceans	1111 (650—2775)	1111 (650—2775)	1655 (800—3775)	2160 (900—6525)
Mid-frequency Cetaceans	222 (200—310)	222 (200—310)	331 (280—525)	424 (340—800)
High-frequency Cetaceans	3001 (1275—8275)	3001 (1275—8275)	4803 (1525—13525)	6016 (1525—16775)
Phocid Seals	784 (575—1275)	784 (575—1275)	1211 (850—3025)	1505 (1025—3775)

[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 parenthesis.
Notes: Ranges for 1-sec and 30-sec periods are identical for Bin MF1 because this system nominally pings every 50 seconds, therefore these periods encompass only a single ping.
ASW: anti-submarine warfare; MF: mid-frequency; PTS: permanent threshold shift; TTS: temporary threshold shift

Table 26. Ranges to Temporary Threshold Shift (meters) for Sonar Bin MF4 over a Representative Range of Environments within the AFTT Study Area.

Functional 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 Cetaceans	89 (85—120)	175 (160—280)	262 (220—575)	429 (330—875)
Mid-frequency Cetaceans	22 (22—25)	36 (35—45)	51 (45—60)	72 (70—95)
High-frequency Cetaceans	270 (220—575)	546 (410—1025)	729 (525—1525)	1107 (600—2275)

Phocid Seals	67 (65—90)	119 (110—180)	171 (150—260)	296 (240—700)

[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 parenthesis.
Notes: ASW: anti-submarine warfare; MF: mid-frequency; PTS: permanent threshold shift; TTS: temporary threshold shift

Table 27. Ranges to Temporary Threshold Shift (meters) for Sonar Bin MF5 over a Representative Range of Environments within the AFTT Study Area.

Functional 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 Cetaceans	11 (0—14)	11 (0—14)	16 (0—20)	23 (0—25)
Mid-frequency Cetaceans	5 (0—10)	5 (0—10)	12 (0—15)	17 (0—22)
High-frequency Cetaceans	122 (110—320)	122 (110—320)	187 (150—525)	286 (210—750)
Phocid Seals	9 (8—13)	9 (8—13)	15 (14—18)	22 (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 parenthesis.
Notes: ASW: anti-submarine warfare; MF: mid-frequency; PTS: permanent threshold shift; TTS: temporary threshold shift

Table 28. Ranges to Temporary Threshold Shift (meters) for Sonar Bin HF4 over a Representative Range of Environments within the AFTT Study Area.

Functional 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 Cetaceans	1 (0—3)	3 (0—5)	5 (0—7)	7 (0—12)
Mid-frequency Cetaceans	10 (7—17)	19 (11—35)	27 (17—60)	39 (22—100)
High-frequency Cetaceans	242 (100—975)	395 (170—1775)	524 (230—2775)	655 (300—4275)
Phocid Seals	2 (0—5)	5 (0—8)	8 (5—13)	12 (8—20)

[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 parenthesis.
Notes: HF: high frequency; PTS: permanent threshold shift; TTS: temporary threshold shift

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 Navy's technical report *Criteria and Thresholds Used to Estimate Impacts to Marine Mammals from Explosives*) 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 E17 (up to 58,000 lb net explosive weight) (Tables 29 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 33 and 34, 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, 2017b).

Table 29 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 29. 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 Cetaceans[1]					
Bin	***Source Depth (m)***	***Cluster Size***	***PTS***	***TTS***	***Behavioral***
E1	0.1	1	446 (180—975)	1,512 (525—3,775)	2,591 (800—6,775)
		20	1,289 (440—3,025)	4,527 (1,275—10,775)	6,650 (1,525—16,525)
E2	0.1	1	503 (200—1,025)	1,865 (600—3,775)	3,559 (1,025—6,775)
		2	623 (250—1,275)	2,606 (750—5,275)	4,743 (1,275—8,525)
E3	18.25	1	865 (525—2,525)	3,707 (1,025—6,775)	5,879 (1,775—10,025)
		50	4,484 (1,275—7,775)	10,610 (2,275—19,775)	13,817 (2,275—27,025)
E4	15	1	1,576 (1,025—2,275)	6,588 (4,525—8,775)	9,744 (7,275—13,025)
		5	3,314 (2,275—4,525)	10,312 (7,525—14,775)	14,200 (9,775—20,025)
	19.8	2	1,262 (975—2,025)	4,708 (1,775—7,525)	6,618 (2,025—11,525)
	198	2	1,355 (875—2,775)	4,900 (2,525—8,275)	6,686 (3,025—11,275)
E5	0.1	25	3,342 (925—8,025)	8,880 (1,275—20,525)	11,832 (1,525—25,025)
E6	0.1	1	1,204 (550—3,275)	4,507 (1,275—10,775)	6,755 (1,525—16,525)
	30	1	2,442 (1,525—5,025)	7,631 (4,525—10,775)	10,503 (4,775—15,025)
E7	15	1	3,317 (2,525—4,525)	10,122 (7,775—13,275)	13,872 (9,775—17,775)

E8	0.1	1	1,883 (675—4,525)	6,404 (1,525—14,525)	9,001 (1,525—19,775)
	45.75	1	2,442 (1,025—5,525)	7,079 (2,025—12,275)	9,462 (2,275—17,025)
	305	1	3,008 (2,025—4,025)	9,008 (6,025—10,775)	12,032 (8,525—14,525)
E9	0.1	1	2,210 (800—4,775)	6,088 (1,525—13,275)	8,299 (1,525—19,025)
E10	0.1	1	2,960 (875—7,275)	8,424 (1,525—19,275)	11,380 (1,525—24,275)
E11	18.5	1	4,827 (1,525—8,775)	11,231 (2,525—20,025)	14,667 (2,525—26,775)
	45.75	1	3,893 (1,525—7,525)	9,320 (2,275—17,025)	12,118 (2,525—21,525)
E12	0.1	1	3,046 (1,275—6,775)	7,722 (1,525—18,775)	10,218 (2,025—22,525)
E16	61	1	5,190 (2,275—9,775)	7,851 (3,525—19,525)	9,643 (3,775—25,775)
E17	61	1	6,173 (2,525—12,025)	11,071 (3,775—29,275)	13,574 (4,025—37,775)

[1] Distances in meters (m). Average distance is shown with the minimum and maximum distances due to varying propagation environments in parentheses.

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

Table 30. 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 Cetaceans[1]					
Bin	***Source Depth (m)***	***Cluster Size***	***PTS***	***TTS***	***Behavioral***
E1	0.1	1	26 (25—50)	139 (95—370)	218 (120—550)
		20	113 (80—290)	539 (210—1,025)	754 (270—1,525)
E2	0.1	1	35 (30—45)	184 (100—300)	276 (130—490)
		2	51 (40—70)	251 (120—430)	365 (160—700)

E3	18.25	1	40 (35—45)	236 (190—800)	388 (280—1,275)
		50	304 (230—1,025)	1,615 (750—3,275)	2,424 (925—5,025)
E4	15	1	74 (60—100)	522 (440—750)	813 (650—1,025)
		5	192 (140—260)	1,055 (875—1,525)	1,631 (1,275—2,525)
	19.8	2	69 (65—70)	380 (330—470)	665 (550—750)
	198	2	48 (0—55)	307 (260—380)	504 (430—700)
E5	0.1	25	391 (170—850)	1,292 (470—3,275)	1,820 (575—5,025)
E6	0.1	1	116 (90—290)	536 (310—1,025)	742 (380—1,525)
	30	1	110 (85—310)	862 (600—2,275)	1,281 (975—3,275)
E7	15	1	201 (190—220)	1,067 (1,025—1,275)	1,601 (1,275—2,025)
E8	0.1	1	204 (150—500)	802 (400—1,525)	1,064 (470—2,275)
	45.75	1	133 (120—200)	828 (525—2,025)	1,273 (775—2,775)
	305	1	58 (0—110)	656 (550—750)	1,019 (900—1,025)
E9	0.1	1	241 (200—370)	946 (450—1,525)	1,279 (500—2,275)
E10	0.1	1	339 (230—750)	1,125 (490—2,525)	1,558 (550—4,775)
E11	18.5	1	361 (230—750)	1,744 (800—3,775)	2,597 (925—5,025)
	45.75	1	289 (230—825)	1,544 (800—3,275)	2,298 (925—5,025)
E12	0.1	1	382 (270—550)	1,312 (525—2,775)	1,767 (600—4,275)
E16	61	1	885 (650—1,775)	3,056 (1,275—5,025)	3,689 (1,525—6,525)
E17	61	1	1,398 (925—2,275)	3,738 (1,525—6,775)	4,835 (1,775—9,275)

[1] Distances in meters (m). Average distance is shown with the minimum and maximum distances due to varying propagation environments in parentheses.

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

Table 31. 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 Cetaceans[1]					
Bin	***Source Depth (m)***	***Cluster Size***	***PTS***	***TTS***	***Behavioral***
E1	0.1	1	54 (45—80)	259 (130—390)	137 (90—210)
		20	211 (110—320)	787 (340—1,525)	487 (210—775)
E2	0.1	1	64 (55—75)	264 (150—400)	154 (100—220)
		2	87 (70—110)	339 (190—500)	203 (120—300)
E3	18.25	1	211 (190—390)	1,182 (600—2,525)	588 (410—1,275)
		50	1,450 (675—3,275)	8,920 (1,525—24,275)	4,671 (1,025—10,775)
E4	15	1	424 (380—550)	3,308 (2,275—4,775)	1,426 (1,025—2,275)
		5	1,091 (950—1,525)	6,261 (3,775—9,525)	3,661 (2,525—5,275)
	19.8	2	375 (350—400)	1,770 (1,275—3,025)	1,003 (725—1,275)
	198	2	308 (280—380)	2,275 (1,275—3,525)	1,092 (850—2,275)
E5	0.1	25	701 (300—1,525)	4,827 (750—29,275)	1,962 (575—22,525)
E6	0.1	1	280 (150—450)	1,018 (460—7,275)	601 (300—1,525)
	30	1	824 (525—1,275)	4,431 (2,025—7,775)	2,334 (1,275—4,275)
E7	15	1	1,928 (1,775—2,275)	8,803 (6,025—14,275)	4,942 (3,525—6,525)
E8	0.1	1	486 (220—1,000)	3,059 (575—20,525)	1,087 (440—7,775)
	45.75	1	1,233 (675—3,025)	7,447 (1,275—19,025)	3,633 (1,000—9,025)

	305	1	937 (875—975)	6,540 (3,025—12,025)	3,888 (2,025—6,525)
E9	0.1	1	655 (310—1,275)	2,900 (650—31,025)	1,364 (500—8,525)
E10	0.1	1	786 (340—7,275)	7,546 (725—49,025)	3,289 (550—26,525)
E11	18.5	1	3,705 (925—8,775)	16,488 (2,275—40,275)	9,489 (1,775—22,775)
	45.75	1	3,133 (925—8,275)	16,365 (1,775—50,275)	8,701 (1,275—23,775)
E12	0.1	1	985 (400—6,025)	7,096 (800—72,775)	2,658 (625—46,525)
E16	61	1	10,155 (2,025—21,525)	35,790 (18,025—69,775)	25,946 (14,025—58,775)
E17	61	1	17,464 (8,275—39,525)	47,402 (21,025—93,275)	34,095 (16,275—86,275)

[1] Distances in meters (m). Average distance is shown with the minimum and maximum distances due to varying propagation environments in parentheses.

Table 32 shows the minimum, average, and maximum ranges to onset of auditory and likely behavioral effects that rise to the level of take for phocids based on the developed thresholds.

Table 32. SEL-Based Ranges (meters) to Onset PTS, Onset TTS, Level B Behavioral Harassment and for Phocids.

Range to Effects for Explosives: Phocids[1]					
Bin	***Source Depth (m)***	***Cluster Size***	***PTS***	***TTS***	***Behavioral***
E1	0.1	1	50 (45—85)	242 (120—470)	360 (160—650)
		20	197 (110—380)	792 (300—1,275)	1,066 (410—2,275)
E2	0.1	1	65 (55—85)	267 (140—430)	378 (190—675)
		2	85 (65—100)	345 (180—575)	476 (230—875)

E3	18.25	1	121 (110—220)	689 (500—1,525)	1,074 (725—2,525)
		50	859 (600—2,025)	4,880 (1,525—10,525)	7,064 (1,775—16,275)
E4	15	1	213 (190—260)	1,246 (1,025—1,775)	2,006 (1,525—3,025)
		5	505 (450—600)	2,933 (2,275—4,275)	4,529 (3,275—6,775)
	19.8	2	214 (210—220)	1,083 (900—2,025)	1,559 (1,025—2,525)
	198	2	156 (150—180)	1,141 (825—2,275)	2,076 (1,275—3,525)
E5	0.1	25	615 (250—1,025)	2,209 (850—9,775)	3,488 (1,025—15,275)
E6	0.1	1	210 (160—380)	796 (480—1,275)	1,040 (600—3,275)
	30	1	359 (280—625)	1,821 (1,275—2,775)	2,786 (1,775—4,275)
E7	15	1	557 (525—650)	3,435 (2,775—4,525)	5,095 (3,775—6,775)
E8	0.1	1	346 (230—600)	1,136 (625—4,025)	1,708 (850—6,025)
	45.75	1	469 (380—1,025)	2,555 (1,275—6,025)	3,804 (1,525—9,775)
	305	1	322 (310—330)	3,222 (1,775—4,525)	4,186 (2,275—5,775)
E9	0.1	1	441 (330—575)	1,466 (825—5,775)	2,142 (950—9,775)
E10	0.1	1	539 (350—900)	1,914 (875—8,525)	3,137 (1,025—15,025)
E11	18.5	1	1,026 (700—2,025)	5,796 (1,525—12,775)	8,525 (1,775—19,775)
	45.75	1	993 (675—2,275)	4,835 (1,525—13,525)	7,337 (1,775—18,775)
E12	0.1	1	651 (420—900)	2,249 (950—11,025)	3,349 (1,275—16,025)
E16	61	1	2,935 (1,775—5,025)	6,451 (2,275—16,275)	10,619 (3,275—24,025)

E17	61	1	3,583 (1,775—7,525)	12,031 (3,275—29,275)	18,396 (7,275—41,025)

[1] Distances in meters (m). Average distance is shown with the minimum and maximum distances due to varying propagation environments in parentheses.

Table 33 below 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 33. Ranges[1] to 50 Percent Non-Auditory Injury Risk for All Marine Mammal Hearing Groups.

Bin	*Range (m)*
E1	22 (22—35)
E2	25 (25—30)
E3	46 (35—75)
E4	63 (0—130)
E5	75 (55—130)
E6	97 (65—390)
E7	232 (200—270)
E8	170 (0—490)
E9	215 (100—430)

E10	251 (110—700)
E11	604 (400—2,525)
E12	436 (130—1,025)
E16	1,844 (925—3,025)
E17	3,649 (1,000—14,025)

[1] Distances in meters (m). Average distance is shown with the minimum and maximum distances due to varying propagation environments in parentheses. Modeled ranges based on peak pressure for a single explosion generally exceed the modeled ranges based on impulse (related to animal mass and depth).

Ranges to mortality, based on animal mass, are show in Table 34 below.

Table 34. Ranges[1] to 50 Percent Mortality Risk for All Marine Mammal Hearing Groups as a Function of Animal Mass.

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)	15 (15—15)	0 (0—0)	25 (25—25)	700 (250–1,025)
Low-Frequency Cetacean	13 (12—13)	2 (2—2)	72 (70—80)	4 (4—4)	685 (170–1,025)
Mid-Frequency Cetacean	0 (0—0)	0 (0—0)	0 (0—0)	0 (0—0)	680 (160–2,275)
Phocids	0 (0—0)	2 (2—2)	3 (3—3)	4 (4—4)	708 (220–1,025)

[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.

Air Guns

Table 35 and Table 36 present the approximate ranges in meters to PTS, TTS, and likely behavioral reactions that rise to the level of take for air guns for 10 and 100 pulses, respectively.

Ranges are specific to the AFTT 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 airgun activities could overlap. Small air guns (12–60 in3) would be fired pierside at the Naval Undersea Warfare Center Division, Newport Testing Range, and at off-shore locations typically in the Northeast, Virginia Capes, and GOMEX Range Complexes. 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 35. 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)	15 (15—15)	0 (0—0)	25 (25—25)	700 (250–1,025)
Low-Frequency Cetacean	13 (12—13)	2 (2—2)	72 (70—80)	4 (4—4)	685 (170–1,025)
Mid-Frequency Cetacean	0 (0—0)	0 (0—0)	0 (0—0)	0 (0—0)	680 (160–2,275)
Phocids	0 (0—0)	2 (2—2)	3 (3—3)	4 (4—4)	708 (220–1,025)

[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 36. Range to Effects from Air Guns for 100 Pulses.

Range to Effects for Air guns[1] for 100 pulses (m)					
Hearing Group	***PTS (SEL)***	***PTS (Peak SPL)***	***TTS (SEL)***	***TTS (Peak SPL)***	***Behavioral[2]***
High-Frequency Cetacean	4 (4—4)	40 (40—40)	48 (45—50)	66 (65—70)	2,546 (1,025–5,525)

Low-Frequency Cetacean	122 (120—130)	3 (3—3)	871 (600—1,275)	13 (12—13)	2,546 (1,025–5,525)
Mid-Frequency Cetacean	0 (0—0)	0 (0—0)	0 (0—0)	0 (0—0)	2,546 (1,025–5,525)
Phocids	3 (2—3)	3 (3—3)	25 (25—25)	14 (14—15)	2,546 (1,025–5,525)

[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 37 and Table 38 present the approximate ranges in meters to PTS, TTS, and likely behavioral responses that rise to the level of take for impact pile driving and vibratory pile removal, respectively. Non-auditory injury is not predicted for pile driving activities.

Table 37. 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
Phocids	19	151	870

Notes: PTS: permanent threshold shift; TTS: temporary threshold shift

Table 38. Average Ranges to Effects (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
Phocids	0	2	376

Notes: 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, habitat modeling 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 AFTT 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 AFTT Study Area. This database is described in the technical report titled *U.S. Navy Marine Species Density Database Phase III for the Atlantic Fleet Training and Testing Area* (U.S. Department of the Navy, 2017), 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 AFTT Study Area. Because this data is collected using different methods with varying amounts of accuracy and uncertainty, the Navy has developed a model 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 possible models in order of preference.

1. Spatial density models (see Roberts *et al.* (2016)) 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 *et al.*, 2016; Forney *et al.*, 2015) predict spatial variability of animal presence based on 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. In the AFTT Study Area, this model is available for certain species along the East Coast to the offshore extent of available survey data and in the GOMEX.

2. Design-based density models predict animal density based on survey data. Like spatial density models, they are applied to areas with survey data. Design-based density models may be stratified, in which a density is predicted for each sub-region of a survey area, allowing for better prediction of species distribution across the density model area. In the AFTT Study Area, stratified density models are used for certain species on both the East Coast and the GOMEX. In addition, a few species' stratified density models are applied to areas east of regions with available survey data and cover a substantial portion of the Atlantic Ocean portion of the AFTT Study Area.

3. Extrapolative models are used in areas where there is insufficient or no survey data. These models use a limited set of environmental variables to predict possible species densities based on environmental observations during actual marine mammal surveys (see Mannocci *et al.* (2017)). In the AFTT Study Area, extrapolative models are typically used east of regions with available survey data and cover a substantial portion of the Atlantic Ocean of the AFTT Study Area. Because some unsurveyed areas have oceanographic conditions that are very different from surveyed areas (*e.g.*, the Labrador Sea and North Atlantic gyre) and some species models rely on a very limited data set, the predictions of some species' extrapolative density

models and some regions of certain species' extrapolative density models are considered highly speculative. Extrapolative models are not used in the GOMEX.

4. Existing Relative Environmental Suitability models include a high degree of uncertainty, but are applied when no other model is available.

When interpreting the results of the quantitative analysis, as described in the density technical report (U.S. Department of the Navy, 2017), "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 species 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."

The Navy's estimate of abundance (based on the density estimates used) in the AFTT 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. 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 fully understood before drawing conclusions.

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 AFTT FEIS/OEIS considered all training and testing activities proposed to occur in the AFTT 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).
- 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 AFTT 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 *Quantitative Analysis for Estimating Acoustic and Explosive Impacts to Marine Mammals and Sea Turtles* (U.S. Department of the Navy, 2017a). 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 procedural 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 the conduct of 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 for 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 x Visibility x Observation Area

x 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 that the standard "detection probability" referred to as g(0) is most appropriate. Visibility = 1 – sum of individual visibility reduction factors. Observation Area = portion of impact range that can be continuously observed during an event. 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 x 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. The Navy corrects the category of predicted impact for the number of animals

sighted within the mitigation zone (*e.g.*, shifts PTS to TTS), but does not modify the total number of animals predicted to experience impacts from the scenario.

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.

The Navy coordinated with NMFS 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 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.

Authorized Take from Training Activities

For training activities, Table 39 summarizes the Navy's take request and the maximum amount and type of take by harassment that NMFS concurs is reasonably likely to occur by species or stock. Authorized mortality is addressed further down. Navy Figures 6.4-10 through 6.5-69 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 39. Species and Stock-Specific Take from All Training Activities.

Species	*Stock*	*Annual*		*5-Year Total*	
		Level B Harassment	*Level A Harassment*	*Level B Harassment*	*Level A Harassment*
Suborder Mysticeti (baleen whales)					
Family Balaenidae (right whales)					
North Atlantic right whale*	Western	245	0	1,177	0
Family Balaenopteridae (roquals)					
Blue whale*	Western North Atlantic (Gulf of St. Lawrence)	26	0	121	0
Bryde's whale	Northern Gulf of Mexico	0	0	0	0
	NSD[†]	206	0	961	0
Minke whale	Canadian East Coast	2,425	0	11,262	0
Fin whale*	Western North Atlantic	1,498	3	7,296	14
Humpback whale	Gulf of Maine	233	1	1,116	3
Sei whale*	Nova Scotia	292	0	1,400	0
Suborder Odontoceti (toothed whales)					

Family Physeteridae (sperm whale)					
Sperm whale*	Gulf of Mexico Oceanic	24	0	119	0
	North Atlantic	14,084	0	68,839	0
Family Kogiidae (sperm whales)					
Dwarf sperm whale	Gulf of Mexico Oceanic	14	0	74	0
	Western North Atlantic	8,527	10	39,913	48
Pygmy sperm whale	Northern Gulf of Mexico	14	0	74	0
	Western North Atlantic	8,527	10	39,913	48
Family Ziphiidae (beaked whales)					
Blainville's beaked whale	Northern Gulf of Mexico	35	0	173	0
	Western North Atlantic	12,533	0	61,113	0
Cuvier's beaked whale	Northern Gulf of Mexico	34	0	172	0
	Western North Atlantic	46,402	0	226,286	0
Gervais' beaked whale	Northern Gulf of Mexico	35	0	173	0
	Western North Atlantic	12,533	0	61,113	0
Northern bottlenose whale	Western North Atlantic	1,073	0	5,360	0
Sowersby's beaked whale	Western North Atlantic	12,533	0	61,113	0
True's beaked whale	Western North Atlantic	12,533	0	61,113	0
Family Delphinidae (dolphins)					
Atlantic spotted dolphin	Northern Gulf of Mexico	951	0	4,706	0
	Western North Atlantic	117,994	9	573,622	46
Atlantic white-sided dolphin	Western North Atlantic	14,502	0	71,097	0
Bottlenose dolphin	Choctawhatchee Bay	7	0	33	0
	Gulf of Mexico Eastern Coastal	42	0	125	0
	Gulf of Mexico Northern Coastal	219	0	1,089	0
	Gulf of Mexico Western Coastal	4,149	0	12,568	0
	Indian River Lagoon Estuarine System	283	0	1,414	0

	Jacksonville Estuarine System	84	0	421	0
	Mississippi Sound, Lake Borgne, Bay Boudreau	0	0	0	0
	Northern Gulf of Mexico Continental Shelf	1,560	2	7,799	9
	Northern Gulf of Mexico Oceanic	195	0	970	0
	Northern North Carolina Estuarine System	3,221	0	11,800	0
	Southern North Carolina Estuarine System	0	0	0	0
	Western North Atlantic Northern Florida Coastal	906	0	4,324	0
	Western North Atlantic Central Florida Coastal	5,341	0	25,594	0
	Western North Atlantic Northern Migratory Coastal	25,189	4	125,183	21
	Western North Atlantic Offshore	308,206	39	1,473,308	192
	Western North Atlantic South Carolina/Georgia Coastal	4,328	0	20,559	0
	Western North Atlantic Southern Migratory Coastal	12,494	2	58,061	10
Clymene dolphin	Northern Gulf of Mexico	99	0	495	0
	Western North Atlantic	69,774	3	330,027	13
False killer whale	Northern Gulf of Mexico	41	0	208	0
	Western North Atlantic	8,271	0	39,051	0
Fraser's dolphin	Northern Gulf of Mexico	59	0	298	0
	Western North Atlantic	3,929	0	18,634	0
Killer whale	Northern Gulf of Mexico	1	0	4	0
	Western North Atlantic	77	0	372	0

Long-finned pilot whale	Western North Atlantic	17,039	0	83,050	0
Melon-headed whale	Northern Gulf of Mexico	70	0	352	0
	Western North Atlantic	37,157	1	175,369	3
Pantropical spotted dolphin	Northern Gulf of Mexico	566	0	2,828	0
	Western North Atlantic	145,125	2	686,775	12
Pygmy killer whale	Northern Gulf of Mexico	16	0	84	0
	Western North Atlantic	6,483	0	30,639	0
Risso's dolphin	Northern Gulf of Mexico	39	0	197	0
	Western North Atlantic	21,034	0	100,018	0
Rough-toothed dolphin	Northern Gulf of Mexico	97	0	436	0
	Western North Atlantic	19,568	0	92,314	0
Short-beaked common dolphin	Western North Atlantic	218,144	13	1,046,193	64
Short-finned pilot whale	Northern Gulf of Mexico	36	0	179	0
	Western North Atlantic	31,357	0	150,213	0
Spinner dolphin	Northern Gulf of Mexico	228	0	1,138	0
	Western North Atlantic	73,689	1	347,347	6
Striped dolphin	Northern Gulf of Mexico	67	0	336	0
	Western North Atlantic	91,038	3	451,001	15
White-beaked dolphin	Western North Atlantic	40	0	192	0
Family Phocoenidae (porpoises)					
Harbor porpoise	Gulf of Maine/Bay of Fundy	29,789	161	147,290	802
Suborder Pinnipedia					
Family Phocidae (true seals)					
Gray seal	Western North Atlantic	1,444	0	7,173	0
Harbor seal	Western North Atlantic	2,341	0	11,632	0
Harp seal	Western North Atlantic	8,444	1	42,191	4
Hooded seal	Western North Atlantic	127	0	631	0

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

[†]NSD: No stock designated

Authorized Take from Testing Activities

For testing activities other than ship shock trials, Table 40 summarizes the Navy's take request and the maximum amount and type of take by harassment that NMFS concurs is reasonably likely to occur and has authorized by species or stock. Since the proposed rule, the Navy has removed one of their testing events in the Northeast Range Complex (Undersea Warfare Testing), which decreased the number of Level B harassment takes annually for NARW by 115 takes. This change also decreased annual Level B harassment takes by approximately 200 takes for ESA-listed fin whale and 20 takes for sei whales as well as approximately 10,000 takes annually for harbor porpoise.

Table 40. Species-Specific Take from All Testing Activities (Excluding Ship Shock Trials).

Species	*Stock*	*Annual*		*5-Year Total*	
		Level B Harassment	*Level A Harassment*	*Level B Harassment*	*Level A Harassment*
Suborder Mysticeti (baleen whales)					
Family Balaenidae (right whales)					
North Atlantic right whale*	Western	224	0	1,091	0
Family Balaenopteridae (roquals)					
Blue whale*	Western North Atlantic (Gulf of St. Lawrence)	20	0	95	0
Bryde's whale	Northern Gulf of Mexico	52	0	257	0
	NSD[†]	125	0	614	0
Minke whale	Canadian East Coast	1,616	2	7,971	7
Fin whale*	Western North Atlantic	3,655	3	17,716	16
Humpback whale	Gulf of Maine	493	0	2,412	0
Sei whale*	Nova Scotia	482	0	2,327	0
Suborder Odontoceti (toothed whales)					
Family Physeteridae (sperm whale)					

Sperm whale*	Gulf of Mexico Oceanic	1,106	0	5,240	0
	North Atlantic	11,278	0	51,657	0
Family Kogiidae (sperm whales)					
Dwarf sperm whale	Gulf of Mexico Oceanic	727	6	3,424	27
	Western North Atlantic	4,384	14	21,159	66
Pygmy sperm whale	Northern Gulf of Mexico	727	6	3,424	27
	Western North Atlantic	4,384	14	21,159	66
Family Ziphiidae (beaked whales)					
Blainville's beaked whale	Northern Gulf of Mexico	1,392	0	6,710	0
	Western North Atlantic	10,565	0	49,647	0
Cuvier's beaked whale	Northern Gulf of Mexico	1,460	0	6,988	0
	Western North Atlantic	38,780	0	182,228	0
Gervais' beaked whale	Northern Gulf of Mexico	1,392	0	6,710	0
	Western North Atlantic	10,565	0	49,647	0
Northern bottlenose whale	Western North Atlantic	971	0	4,485	0
Sowersby's beaked whale	Western North Atlantic	10,593	0	49,764	0
True's beaked whale	Western North Atlantic	10,593	0	49,764	0
Family Delphinidae (dolphins)					
Atlantic spotted dolphin	Northern Gulf of Mexico	71,882	2	333,793	13
	Western North Atlantic	109,582	11	504,538	52
Atlantic white-sided dolphin	Western North Atlantic	31,779	1	150,062	6
Bottlenose dolphin	Choctawhatchee Bay	966	0	4,421	0
	Gulf of Mexico Eastern Coastal	0	0	0	0
	Gulf of Mexico Northern Coastal	16,258	1	76,439	5
	Gulf of Mexico Western Coastal	3,677	0	18,035	0
	Indian River Lagoon Estuarine System	3	0	15	0
	Jacksonville Estuarine System	3	0	14	0

	Mississippi Sound, Lake Borgne, Bay Boudreau	1	0	4	0
	Northern Gulf of Mexico Continental Shelf	125,940	8	594,921	40
	Northern Gulf of Mexico Oceanic	14,448	1	67,244	5
	Northern North Carolina Estuarine System	106	0	533	0
	Southern North Carolina Estuarine System	0	0	0	0
	Western North Atlantic Northern Florida Coastal	329	0	1,614	0
	Western North Atlantic Central Florida Coastal	2,272	0	10,950	0
	Western North Atlantic Northern Migratory Coastal	11,855	3	56,321	15
	Western North Atlantic Offshore	119,880	23	566,572	116
	Western North Atlantic South Carolina/Georgia Coastal	1,632	0	8,017	0
	Western North Atlantic Southern Migratory Coastal	4,222	0	20,827	0
Clymene dolphin	Northern Gulf of Mexico	4,166	0	19,919	0
	Western North Atlantic	35,985	2	170,033	8
False killer whale	Northern Gulf of Mexico	1,931	0	9,118	0
	Western North Atlantic	3,766	0	17,716	0
Fraser's dolphin	Northern Gulf of Mexico	1,120	0	5,314	0
	Western North Atlantic	1,293	0	6,070	0
Killer whale	Northern Gulf of Mexico	32	0	152	0
	Western North Atlantic	42	0	188	0
Long-finned pilot whale	Western North Atlantic	20,502	2	94,694	8
Melon-headed whale	Northern Gulf of Mexico	3,059	0	14,546	0

	Western North Atlantic	16,688	1	78,545	4
Pantropical spotted dolphin	Northern Gulf of Mexico	25,929	1	121,469	4
	Western North Atlantic	77,451	4	355,889	19
Pygmy killer whale	Northern Gulf of Mexico	719	0	3,415	0
	Western North Atlantic	2,847	0	13,426	0
Risso's dolphin	Northern Gulf of Mexico	1,649	0	7,821	0
	Western North Atlantic	20,070	1	94,009	6
Rough-toothed dolphin	Northern Gulf of Mexico	3,927	0	18,493	0
	Western North Atlantic	8,765	0	41,492	0
Short-beaked common dolphin	Western North Atlantic	353,012	17	1,675,885	72
Short-finned pilot whale	Northern Gulf of Mexico	1,823	0	8,614	0
	Western North Atlantic	17,002	1	80,576	7
Spinner dolphin	Northern Gulf of Mexico	7,815	0	36,567	0
	Western North Atlantic	33,351	2	157,241	7
Striped dolphin	Northern Gulf of Mexico	2,447	0	11,703	0
	Western North Atlantic	102,047	5	465,392	23
White-beaked dolphin	Western North Atlantic	44	0	213	0
Family Phocoenidae (porpoises)					
Harbor porpoise	Gulf of Maine/Bay of Fundy	125,404	212	578,130	1,007
Suborder Pinnipedia					
Family Phocidae (true seals)					
Gray seal	Western North Atlantic	894	2	4,376	11
Harbor seal	Western North Atlantic	1,448	4	7,094	17
Harp seal	Western North Atlantic	7,850	2	38,273	12
Hooded seal	Western North Atlantic	787	0	3,805	0

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

[†]NSD: No stock designated

Authorized Take from Ship Shock

The Navy's model and quantitative analysis process used for the AFTT FEIS/OEIS and in the Navy's rulemaking/LOA application to estimate exposures of marine mammals to explosives (ship shock) 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* (U.S. Department of the Navy, 2017b). NMFS has reviewed the Navy's data and analysis of explosive impacts and concurs that the estimated take the Navy requested appropriately represents the maximum take by harassment that is reasonably expected to occur, as well as the potential for mortality. Table 41 summarizes the Navy's take request and the maximum amount and type of take that is reasonably expected to occur (harassment) or could potentially occur (serious injury/mortality) by species for ship shock trials under testing activities per small and large ship shock events and the summation over a five-year period. The table below displays maximum ship shock impacts to marine mammals by species (in bold text), as well as maximum impacts on individual stocks. The maximum is derived by selecting the highest number of potential impacts across all locations and all seasons for each species/stock. Small Ship Shock trials could take place any season within the deep offshore water of the Virginia Capes Range Complex or in the spring, summer, or fall within the Jacksonville Range Complex and could occur up to three times over a five-year period. The Large Ship Shock trial could take place in the Jacksonville Range Complex during the spring, summer, or fall and during any season within the deep offshore water of the Virginia Capes Range Complex or within the GOMEX. The Large Ship Shock Trial could occur once over five years.

Navy's model and quantitative analysis process estimated serious injury/mortality of four dolphin species from ship shock trials including: Atlantic white-sided dolphin (Western North Atlantic), Pantropical spotted dolphin (Northern GOMEX), short-beaked common dolphin

(Western North Atlantic), and Spinner dolphin (Northern GOMEX) (Table 41 below). For serious injury/mortality takes over the five-year period, based on the exposure estimates generated by the model and the quantitative post-modeling mitigation and avoidance adjustments, an annual average of 0.2 dolphins from each dolphin species/stock listed above (*i.e.*, for those species or stocks where 1 take could potentially occur divided by 5 years to get the annual number of mortalities/serious injuries) or 1.2 dolphins in the case of short-beaked common dolphin (*i.e.*, where 6 takes could potentially occur divided by 5 years to get the annual number of mortalities/serious injuries) is used in further analysis in the *Analysis and Negligible Impact Determination* section.

Table 41. Species Specific Take from Ship Shock Trials.

Species / Stock	*Small Ship Shock*			*Large Ship Shock*			*5-Year Total*		
	Level B Harassment	*Level A Harassment*	*Mortality*	*Level B Harassment*	*Level A Harassment*	*Mortality*	*Level B Harassment*	*Level A Harassment*	*Mortality*
Suborder Mysticeti (baleen whales)									
Family Balaenidae (right whales)									
North Atlantic right whale	**1**	**0**	**0**	**2**	**0**	**0**	**5**	**0**	**0**
Western *	1	0	0	2	0	0	5	0	0
Family Balaenopteridae (roquals)									
Blue whale	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**
Western North Atlantic (Gulf of St. Lawrence)*	0	0	0	1	0	0	1	0	0
Bryde's whale	**3**	**0**	**0**	**6**	**1**	**0**	**15**	**1**	**0**
Northern Gulf of Mexico*	0	0	0	3	1	0	3	1	0
NSD†	3	0	0	6	0	0	15	0	0
Minke whale	**19**	**1**	**0**	**39**	**3**	**0**	**96**	**6**	**0**
Canadian East Coast	19	1	0	39	3	0	96	6	0
Fin whale	**131**	**3**	**0**	**234**	**27**	**0**	**627**	**36**	**0**
Western North Atlantic*	131	3	0	234	27	0	627	36	0
Humpback whale	**8**	**0**	**0**	**20**	**2**	**0**	**44**	**2**	**0**

Gulf of Maine	8	0	0	20	2	0	44	2	0
Sei whale	**12**	**1**	**0**	**27**	**4**	**0**	**63**	**7**	**0**
Nova Scotia*	12	1	0	27	4	0	63	7	0
Suborder Odontoceti (toothed whales)									
Family Physeteridae (sperm whale)									
Sperm whale*	**1**	**1**	**0**	**3**	**4**	**0**	**6**	**7**	**0**
Gulf of Mexico Oceanic	0	0	0	2	0	0	2	0	0
North Atlantic	1	1	0	3	4	0	6	7	0
Family Kogiidae (sperm whales)									
Dwarf sperm whale	**46**	**28**	**0**	**91**	**70**	**0**	**229**	**154**	**0**
Gulf of Mexico Oceanic	0	0	0	51	64	0	51	64	0
Western North Atlantic	46	28	0	91	70	0	229	154	0
Pygmy sperm whale	**46**	**28**	**0**	**91**	**70**	**0**	**229**	**154**	**0**
Northern Gulf of Mexico	0	0	0	51	64	0	51	64	0
Western North Atlantic	46	28	0	91	70	0	229	154	0
Family Ziphiidae (beaked whales)									
Blainville's beaked whale	**1**	**0**	**0**	**1**	**1**	**0**	**4**	**1**	**0**
Northern Gulf of Mexico	0	0	0	1	0	0	1	0	0
Western North Atlantic	1	0	0	1	1	0	4	1	0
Cuvier's beaked whale	**2**	**1**	**0**	**2**	**3**	**0**	**8**	**6**	**0**
Northern Gulf of Mexico	0	0	0	1	0	0	1	0	0
Western North Atlantic	2	1	0	2	3	0	8	6	0
Gervais' beaked whale	**1**	**0**	**0**	**1**	**1**	**0**	**4**	**1**	**0**
Northern Gulf of Mexico	0	0	0	1	0	0	1	0	0
Western North Atlantic	1	0	0	1	1	0	4	1	0
Northern bottlenose whale	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Western North Atlantic	0	0	0	0	0	0	0	0	0

Sowerby's beaked whale	**1**	**0**	**0**	**1**	**1**	**0**	**4**	**1**	**0**
Western North Atlantic	1	0	0	1	1	0	4	1	0
True's beaked whale	**1**	**0**	**0**	**1**	**1**	**0**	**4**	**1**	**0**
Western North Atlantic	1	0	0	1	1	0	4	1	0
Family Delphinidae (dolphins)									
Atlantic spotted dolphin	**6**	**4**	**0**	**8**	**12**	**0**	**26**	**24**	**0**
Northern Gulf of Mexico	0	0	0	2	1	0	2	1	0
Western North Atlantic	6	4	0	8	12	0	26	24	0
Atlantic white-sided dolphin	**1**	**1**	**0**	**3**	**9**	**1**	**6**	**12**	**1**
Western North Atlantic	1	1	0	3	9	1	6	12	1
Bottlenose dolphin	**13**	**10**	**0**	**16**	**24**	**0**	**55**	**54**	**0**
Choctawhatchee Bay	0	0	0	0	0	0	0	0	0
Gulf of Mexico Eastern Coastal	0	0	0	0	0	0	0	0	0
Gulf of Mexico Northern Coastal	0	0	0	1	1	0	1	1	0
Gulf of Mexico Western Coastal	0	0	0	0	0	0	0	0	0
Indian River Lagoon Estuarine System	0	0	0	0	0	0	0	0	0
Jacksonville Estuarine System	0	0	0	0	0	0	0	0	0
Mississippi Sound, Lake Borgne, Bay Boudreau	0	0	0	0	0	0	0	0	0
Northern Gulf of Mexico Continental Shelf	0	0	0	10	6	0	10	6	0
Northern Gulf of Mexico Oceanic	0	0	0	10	9	0	10	9	0

Northern North Carolina Estuarine System	0	0	0	0	0	0	0	0	0
Southern North Carolina Estuarine System	0	0	0	0	0	0	0	0	0
Western North Atlantic Northern Florida Coastal	0	0	0	0	0	0	0	0	0
Western North Atlantic Central Florida Coastal	0	0	0	0	0	0	0	0	0
Western North Atlantic Northern Migratory Coastal	0	0	0	0	0	0	0	0	0
Western North Atlantic Offshore	13	10	0	16	24	0	55	54	0
Western North Atlantic South Carolina/ Georgia Coastal	0	0	0	0	0	0	0	0	0
Western North Atlantic Southern Migratory Coastal	0	0	0	0	0	0	0	0	0
Clymene dolphin	**2**	**5**	**0**	**9**	**8**	**0**	**15**	**23**	**0**
Northern Gulf of Mexico	0	0	0	8	6	0	8	6	0
Western North Atlantic	2	5	0	9	8	0	15	23	0
False killer whale	**0**	**0**	**0**	**2**	**1**	**0**	**2**	**1**	**0**
Northern Gulf of Mexico	0	0	0	2	1	0	2	1	0
Western North Atlantic	0	0	0	2	0	0	2	0	0
Fraser's dolphin	**0**	**0**	**0**	**2**	**3**	**0**	**2**	**3**	**0**
Northern Gulf of Mexico	0	0	0	2	3	0	2	3	0
Western North Atlantic	0	0	0	0	0	0	0	0	0
Killer whale	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Northern Gulf of Mexico	0	0	0	0	0	0	0	0	0
Western North Atlantic	0	0	0	0	0	0	0	0	0
Long-finned pilot whale	**2**	**2**	**0**	**5**	**6**	**0**	**11**	**12**	**0**
Western North Atlantic	2	2	0	5	6	0	11	12	0
Melon-headed whale	**1**	**1**	**0**	**5**	**4**	**0**	**8**	**7**	**0**
Northern Gulf of Mexico	0	0	0	4	4	0	4	4	0
Western North Atlantic	1	1	0	5	1	0	8	4	0
Pantropical spotted dolphin	**2**	**3**	**0**	**25**	**20**	**1**	**31**	**29**	**1**
Northern Gulf of Mexico	0	0	0	25	20	1	25	20	1
Western North Atlantic	2	3	0	7	3	0	13	12	0
Pygmy killer whale	**0**	**0**	**0**	**1**	**1**	**0**	**1**	**1**	**0**
Northern Gulf of Mexico	0	0	0	1	1	0	1	1	0
Western North Atlantic	0	0	0	1	0	0	1	0	0
Risso's dolphin	**1**	**1**	**0**	**3**	**1**	**0**	**6**	**4**	**0**
Northern Gulf of Mexico	0	0	0	2	1	0	2	1	0
Western North Atlantic	1	1	0	3	1	0	6	4	0
Rough-toothed dolphin	**1**	**0**	**0**	**3**	**2**	**0**	**6**	**2**	**0**
Northern Gulf of Mexico	0	0	0	2	2	0	2	2	0
Western North Atlantic	0	0	0	0	0	0	0	0	0
Short-beaked common dolphin	**40**	**51**	**1**	**67**	**107**	**3**	**187**	**260**	**6**
Western North Atlantic	40	51	1	67	107	3	187	260	6
Short-finned pilot whale	**2**	**2**	**0**	**4**	**5**	**0**	**10**	**11**	**0**
Northern Gulf of Mexico	0	0	0	2	3	0	2	3	0

Western North Atlantic	2	2	0	4	5	0	10	11	0
Spinner dolphin	**3**	**1**	**0**	**37**	**45**	**1**	**46**	**48**	**1**
Northern Gulf of Mexico	0	0	0	37	45	1	37	45	1
Western North Atlantic	3	1	0	7	3	0	16	6	0
Striped dolphin	**4**	**8**	**0**	**10**	**12**	**0**	**22**	**36**	**0**
Northern Gulf of Mexico	0	0	0	4	3	0	4	3	0
Western North Atlantic	4	8	0	10	12	0	22	36	0
White-beaked dolphin	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Western North Atlantic	0	0	0	0	0	0	0	0	0
Family Phocoenidae (porpoises)									
Harbor porpoise	**43**	**41**	**0**	**120**	**81**	**0**	**249**	**204**	**0**
Gulf of Maine/Bay of Fundy	43	41	0	120	81	0	249	204	0
Suborder Pinnipedia									
Family Phocidae (true seals)									
Gray seal	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Western North Atlantic	0	0	0	0	0	0	0	0	0
Harbor seal	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Western North Atlantic	0	0	0	0	0	0	0	0	0
Harp seal	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Western North Atlantic	0	0	0	0	0	0	0	0	0
Hooded seal	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Western North Atlantic	0	0	0	0	0	0	0	0	0

Note: The table displays maximum ship shock impacts to marine mammals by species (in bold text), as well as maximum impacts on individual stocks.
* ESA-listed species' stocks within the AFTT Study Area
†NSD: No stock designated

Take from Vessel Strikes

The marine mammals most vulnerable to vessel strikes 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.*, the sperm whale). In addition, some baleen whales, such as the NARW, seem generally unresponsive to vessel sound, making them more susceptible to vessel collisions (Nowacek *et al.*, 2004). These species are primarily large, slower 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 personnel, 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 AFTT Study Area or while in transit.

There have been three recorded Navy vessel strikes of large whales in the AFTT Study Area from 2009 through 2017 (nine years), the period in which Navy began implementing effective mitigation measures to reduce the likelihood of vessel strikes. 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 AFTT Study Area within the five-year period, the Navy requested incidental takes based on probabilities derived from a Poisson distribution using ship strike data between 2009-2016 in the AFTT Study Area (the time period from when current mitigations

were instituted until the Navy conducted the analysis for the EIS and application), and no new strikes have occurred since), as well as historical at-sea days in AFTT 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 Navy vessel strike is comparatively unlikely, it is highly unlikely that a Navy vessel would strike a whale or dolphin without detecting it and, accordingly, NMFS is confident that the Navy's reported strikes are accurate and appropriate for use in the analysis. The Navy used those three 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 15 percent chance that zero whales would be struck by Navy vessels over the next five years, indicating an 85 percent chance that at least one whale would be struck over the next five years and a 17 percent chance of striking three whales over the five-year period. In addition, small delphinids are neither expected nor authorized to be struck by Navy vessels since: they have not been struck historically as a result

of Navy AFTT activities, their smaller size and maneuverability makes a strike from a larger vessel much less likely as illustrated in worldwide ship-strike records, and the majority of the Navy's faster-moving activities are located in offshore areas where smaller delphinid densities are less. Accordingly, NMFS anticipates and authorizes takes by vessel strike of large whales only (i.e., no dolphins or smaller whales) over the course of the five-year regulations from training and testing activities as discussed below.

Based on the above analysis, 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 AFTT regulations. Because of the number of incidents in which the struck animal has remained unidentified to species (although due to the Navy's particular measures to avoid NARW, it is unlikely that any of the three vessel strikes were of NARW), it is challenging to predict the number of the potential takes that will be of any particular species. The Navy requested incidental take authorization for up to two of any the following species in the five-year period: humpback whale (Gulf of Maine stock), fin whale (Western North Atlantic stock), minke (Canadian East Coast stock), and sperm whale (North Atlantic stock) and one of any of the following: sei whale (Nova Scotia stock), blue whale (Western North Atlantic stock), sperm whale (GOMEX Oceanic stock). NMFS independently reviewed this analysis and agrees that three ship strikes have at least the potential to occur and therefore 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 (three strikes by Navy over nine years) and the Navy's probability analysis. NMFS does not agree, however, that two mortal takes of any one species is likely, or that strike of either blue whales or the GOMEX stock of sperm whales is remotely likely.

In order to predict the likelihood of striking any particular species, NMFS compiled information from the latest NMFS 2018 SARs on detected annual rates of large whale serious injury and mortality from vessel collisions (Table 42 below), which represent the best available science. The annual rates of large whale serious injury and mortality from vessel collisions indicate the relative susceptibility of large whale species to vessel strike in the Atlantic Ocean and GOMEX. To calculate the relative likelihood of striking each species, we summed the annual rates of mortality and serious injury from vessel collisions, then divided each species' annual rate by this number. 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.*, 85 percent, as described by the Navy's probability analysis). To calculate the percent likelihood of striking a particular species of large whale twice, we squared the value estimated for the probability of striking a particular species of whale (*i.e.*, to calculate the probability of an event occurring twice, multiply the probability of the first event by the second). The analysis indicates that there is a very low percent chance of striking any particular species or stock more than once *(i.e.*, less than 7 percent chance for all species) as shown in Table 42 below and, accordingly, in the proposed rule NMFS proposed that any of the mysticete and sperm whale stocks might incur one serious injury or mortality take by vessel strike over the five-year period of the rule, except the NARW which would have zero mortality/serious injury takes because of the enhanced mitigation and the Bryde's whale, which would also have zero mortality/serious injury takes because of their low numbers and lack of previous strikes

However, based on the quantitative method above, blue whales and GOMEX sperm whales also have a zero percent chance of being struck. Following additional discussion with the Navy (after the proposed rule was published) about this quantitative analysis, the Navy's

activities, and other factors - and NMFS' independent review - NMFS and the Navy agreed that vessel strike of these two stocks was highly unlikely. Accordingly, the Navy revised their request for take by serious injury or mortality to include up to one of any the following species in the five-year period: humpback whale (Gulf of Maine stock), fin whale (Western North Atlantic stock), minke whale (Canadian East Coast stock), sperm whale (North Atlantic stock), and sei whale (Nova Scotia stock) - removing the request for GOMEX sperm whales and North Atlantic blue whales. We note that the quantitative method outlined above indicates only a very small likelihood that the Navy will strike a North Atlantic sperm whale (< 3 percent), however, the Navy has struck a sperm whale previously in the Atlantic, which points to a higher likelihood that it could occur and that an authorized mortality is appropriate. Additional discussion relevant to our determinations for North Atlantic blue whales, GOMEX sperm whale, NARW, and Bryde's whale is included below.

In addition to the zero probability predicted by the quantitative model, there are no recent confirmed records of vessel collision mortality or serious injury to blue whales in the U.S. Atlantic EEZ, although there is one older historical record pointing to a ship strike that likely occurred outside of the U.S. Atlantic EEZ (outside of where most Navy activities occur, so less relevant) and one 1998 record of a dead 20 m (66 ft) male blue whale brought into Rhode Island waters on the bow of a tanker. The cause of death was determined to be ship strike; however, some of the injuries were difficult to explain from the necropsy. As noted previously, the Navy has been conducting Marine Species Awareness Training and implementing additional mitigation measures to protect against strikes since 2009. Therefore, given the absence of any strikes in the recent past since the Navy has implemented its current mitigation measures, the very low abundance of North Atlantic blue whales throughout the AFTT Study Area, and the

very low number of two blue whales ever known to be struck in the area by any type of vessel (and not struck by Navy vessels), we believe the likelihood of the Navy hitting a blue whale is discountable.

In addition to the zero probability of hitting a sperm whale in the GOMEX predicted by the quantitative model, there have been no vessel strikes of any large whales since 2009 per the SAR and no Navy strikes of any large whales since 1995 (based on our records) in the GOMEX. Further, the Navy has comparatively fewer steaming days in the GOMEX and there is a fairly low abundance of sperm whales occurring there. As noted previously, the Navy has been conducting Marine Species Awareness Training and implementing additional mitigation measures to protect against strikes since 2009. Therefore, NMFS believes that the likelihood of the Navy hitting a GOMEX sperm whale is discountable.

Although the quantitative analysis predicts that NARWs do have a low probability of being struck one time within the five-year period when vessel strikes across all activity types (including non-Navy) are considered (10.11 percent, lower than all other stocks except North Atlantic sperm whales), when the enhanced mitigation measures (discussed below) the Navy will implement for NARWs are considered in combination with this low probability, the Navy and NMFS find that a vessel strike is highly unlikely and therefore, lethal take of NARWs was not requested and is not authorized. We further note that while there have been three strikes of unidentified whales, it is unlikely they were NARW, as one occurred in the Chesapeake Bay and observed features suggested it was most probably a humpback whale, while the other two occurred 75 and 45 nmi offshore from Cape Hatteras, beyond where NARW are expected to occur. Regarding the Bryde's whale, due to the fact that the Navy has not struck a Bryde's whale, the very low abundance numbers, and the limited Navy ship traffic that overlaps with

Bryde's whale habitat, neither the Navy nor NMFS anticipate any vessel-strike takes, and none were requested or proposed for authorization. The Navy is now also limiting activities (*i.e.*, 200 hr cap on hull-mounted MFAS) and will not use explosives (except during mine warfare activities) in the Bryde's Whale Mitigation Area.

Table 42: Annual rates of mortality and serious injury from vessel collisions compiled from NMFS 2018 SARs and estimated percent chance of striking each large whale species in the AFTT Study Area over a five-year period.

Species	Annual rate of M/SI* from vessel collision	Percent chance of ONE strike	Percent chance of TWO strike
Fin whale – Western North Atlantic stock	1.6	22.67	5.14
Sei whale – Nova Scotia stock	0.8	11.33	1.28
Minke whale – Canadian East Coast stock	1.4	19.83	3.93
Blue whale – Western North Atlantic stock	0	0	0
Humpback whale – Gulf of Maine stock	1.8	25.50	6.50
Sperm whale – North Atlantic stock	0.2	2.83	0.08
Sperm whale – Gulf of Mexico stock	0	0	0

In conclusion, although it is generally unlikely that any whales will be struck in a year, based on the information and analysis above (as well as the additional information regarding NARW mitigation below), 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 one of any of the five following stocks (though no more than three total): humpback whale (Gulf of Maine stock), fin whale (Western North Atlantic stock), minke (Canadian East Coast stock), sperm whale (North Atlantic stock), and sei whale (Nova Scotia stock). Accordingly, NMFS has authorized the serious injury or mortality of 0.2 whales annually from each of these species or stocks (*i.e.*, 1 take divided by 5 years to get the annual number).

Below we include additional information regarding the mitigation measures that help avoid ship strike of NARW.

In addition to procedural mitigation, the Navy will implement measures in mitigation areas used by NARW for foraging, calving, and migration (see the *Mitigation Measures* section in this rule and a full analysis in Chapter 5 (Mitigation) of the AFTT FEIS/OEIS). These measures, which go above and beyond those focused on other species (*e.g.*, funding of and communication with sightings systems, implementation of speed reductions during applicable circumstances in certain areas) have helped the Navy avoid striking a NARW during training and testing activities in the past; and essentially eliminate the potential for strikes to occur during the five-year period of the rule. In particular, the mitigation pertaining to vessels, including the continued participation in and sponsoring of the Early Warning System, will help Navy vessels avoid NARW during transits and training and testing activities. The Early Warning System is a comprehensive information exchange network dedicated to reducing the risk of vessel strikes to NARW off the southeast United States from all mariners (*i.e.*, Navy and non-Navy vessels). Navy participants include the Fleet Area Control and Surveillance Facility, Jacksonville; Commander, Naval Submarine Forces, Norfolk, Virginia; and Naval Submarine Support Command. The Navy, U.S. Coast Guard, U.S. Army Corps of Engineers, and NMFS collaboratively sponsor daily aerial surveys from December 1 through March 31 (weather permitting) to observe for NARW from the shoreline out to approximately 30–35 nmi offshore. Aerial surveyors relay sightings information to all mariners transiting within the NARW calving habitat (*e.g.*, commercial vessels, recreational boaters, and Navy ships).

In the NE NARW Mitigation Area, before all vessel transits, the Navy conducts a web query or email inquiry of NOAA's NARW Sighting Advisory System to obtain the latest NARW

sightings information. Navy vessels will use the obtained sightings information to reduce potential interactions with NARW during transits and prevent ship strikes. In this mitigation area, vessels will implement speed reductions after they observe a NARW; if they are within 5 nmi of the location of a sighting reported to the NARW Sighting Advisory System within the past week; and when operating at night or during periods of reduced visibility. During transits and normal firing involving non-explosive torpedos activities, the Navy ships will maintain a speed of no more than 10 kn. During submarine target firing, ships will maintain speeds of no more than 18 kn. During vessel target firing, vessel speeds may exceed 18 kn for only brief periods of time *(e.g.*, 10–15 min). In the SE NARW Mitigation Area, before transiting or conducting training or testing activities within the mitigation area, the Navy will initiate communication with the Fleet Area Control and Surveillance Facility, Jacksonville to obtain Early Warning System NARW whale sightings data. The Fleet Area Control and Surveillance Facility, Jacksonville will advise vessels of all reported whale sightings in the vicinity to help vessels and aircraft reduce potential interactions with NARWs and prevent ship strikes. Commander Submarine Force U.S. Atlantic Fleet will coordinate any submarine activities that may require approval from the Fleet Area Control and Surveillance Facility, Jacksonville. Vessels will use the sightings information to reduce potential interactions with NARW during transits and prevent ship strikes. Vessels will also implement speed reductions after they observe a NARW, if they are within 5 nmi of a sighting reported within the past 12 hrs, or when operating in the mitigation area at night or during periods of poor visibility. To the maximum extent practicable, vessels will minimize north-south transits in the mitigation area. Finally, the Navy will broadcast awareness notification messages with NARW Dynamic Management Area information (*e.g.*, location and dates) to applicable Navy vessels operating in the vicinity of the

Dynamic Management Area. The information will alert assets to the possible presence of a NARW to maintain safety of navigation and further reduce the potential for a vessel strike. Navy platforms will use the information to assist their visual observation of applicable mitigation zones during training and testing activities and to aid in the implementation of procedural mitigation, including but not limited to, mitigation for vessel movement.

Implementation of these measures is expected to significantly reduce the probability of striking this particular species during the five-year period of the rule. Ship strikes are a fluke encounter for which the probability will never be zero for any vessel. The probability for any particular ship to strike a marine mammal is primarily a product of the ability of the ship to detect a marine mammal and the ability to effectively act to avoid it. Navy combat ships are inherently among the best at both of these because compared to large commercial vessels, they have trained Lookouts which have received specialized MMO training, and the most maneuverable ships, which means that they are more likely to sight a marine mammal and more likely to be able to maneuver to avoid it in the available time - both of which decrease the probability of striking a marine mammal below what it would have been in the absence of those abilities. In the case of the NARW, the extensive communication/detection network described above, which is in use in the areas of highest NARW occurrence and where they may be more susceptible to strike, further increases the likelihood of detecting a NARW and thereby avoiding it, which further reduces the probability of NARW strike. Further, detection of NARW in some areas/times is associated with reduced speed requirements, which in some cases may reduce the strike probability further by slightly increasing the time within which an operator has to maneuver away from a whale. Because of these additional mitigation measures combined with the already low probability that a NARW will be struck, it is extremely unlikely the Navy will

strike a NARW and mortality/serious injury of a NARW from vessel strike is neither anticipated nor authorized.

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] satisf[ies] 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 Operations of 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)).

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[1] 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).

1 A growth rate can be positive, negative, or flat.

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.[2]

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.

2 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.

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. 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.[3]

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

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,

3 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).

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, 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*.[4] 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

4 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.

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 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)).

NMFS reviewed the Specified Activities and the mitigation measures as described in the Navy's rulemaking/LOA application and the AFTT 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 informed by input from NMFS, can be found in Chapter 5 (Mitigation) of the AFTT FEIS/OEIS and is summarized below in this section. The process described in Chapter 5 (Mitigation) of the AFTT 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.

In summary (and 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 previous AFTT 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 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 mammal 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 the mitigation tables below.

1. Pre-event in-water explosive event observations - The Navy will implement pre-event observation as part of all in-water explosive event mitigations. Additionally, if there are other platforms participating in these events (beyond the vessel or aircraft in which required Lookout(s) are located) and in the vicinity of the detonation area, they 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, and line charge testing) in advance of explosive events increases the likelihood that

marine mammals will be detected if they are in the mitigation area 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 as part of all in-water explosive event mitigations. Additionally, if there are other platforms participating in these events (beyond the vessel or aircraft in which required Lookout(s) are located) and in the vicinity of the detonation area, they 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, and line charge testing) 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. NE NARW Mitigation Area - The Navy will expand the NE NARW Mitigation Area to match the updated NE NARW ESA-designated critical habitat. All of the mitigation required in the NE NARW Mitigation Area and discussed in the proposed rule (see Table 63 in the proposed rule) will apply to the expanded NE NARW Mitigation Area. The reduction of activities in, and increase of protective measures in (discussed elsewhere), areas with higher concentrations of NARWs engaged in important feeding activities (such as they are in this area), is expected to reduce the probability and/or severity of impacts on NARWs that would be more likely to adversely affect the fitness of any individual, which in turn reduces the likelihood that any impacts would translate to adverse impacts on the stock.

4. NARW Dynamic Management Area notification - The Navy has agreed to broadcast awareness notification messages with NARW Dynamic Management Area information (*e.g.*, location and dates) to applicable Navy vessels operating in the vicinity of NARW Dynamic Management Areas. The information will alert vessels to the possible presence of a NARW to maintain safety of navigation and further reduce the potential for a vessel strike. Any expanded mechanisms for detecting NARW, 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.

5. Gulf of Maine Planning Awareness Mitigation Area - The Navy will not conduct MTEs in this area. If the Navy identifies a National Security requirement to conduct an MTE, Navy will confer with NMFS to determine/verify that potential effects are addressed under the NEPA/MMPA/ESA analyses. The Navy will implement a 200 hr/year hull-mounted MFAS cap and include all sonar and explosives usage in the Gulf of Maine Planning Awareness Mitigation Area in the annual training and testing activity reports. Any limitation of activities in, and/or increase of protective measures in, areas with higher concentrations of NARW, fin whales, sei whales, humpback whales and minke whales engaged in important feeding activities (such as this area), is expected to reduce the probability and/or severity of impacts on NARW and other mysticetes that would be more likely to adversely affect the fitness of any individual, which in turn reduces the likelihood that any impacts would translate to adverse impacts on the stock. Reduction of MTEs in this area will also reduce the severity of impacts to the small resident population of harbor porpoises (Gulf of Maine stock).

6. Bryde's Whale Mitigation Area - The Navy (1) has agreed to the addition of a year-round, Bryde's Whale Mitigation Area, which will cover the BIA as described in NMFS' 2016 Status Review and include the area between 100 to 400 m isobaths between 87.5 degrees W to

27.5 degrees N; (2) has agreed to move the northern GOMEX ship shock trial box west, out of the Bryde's whale BIA/Bryde's Whale Mitigation Area, including a five nmi buffer; (3) will also implement a 200 hr/year hull-mounted MFAS cap and restrict all explosives except for mine warfare activities events in the Bryde's Whale Mitigation Area; and (4) will report the total hours and counts of active sonar and in-water explosives used in the mitigation area in its annual training and testing activity reports submitted to NMFS. Any limitation of activities in the Bryde's whale mitigation area is expected to reduce the probability and/or severity of impacts on Bryde's whales that would be more likely to adversely affect the fitness of any individual, which in turn reduces the likelihood that any impacts would translate to adverse impacts on the stock.

7. GOMEX Planning Awareness Mitigation Area - This area has been expanded to cover the BIA as described in NMFS' 2016 Status Review and include the area between 100 to 400 m isobaths between 87.5° W to 27.5° N. The Navy will not conduct MTEs in this area. If the Navy identifies a National Security requirement to conduct an MTE, Navy will confer with NMFS to determine/verify potential effects are addressed under the NEPA/MMPA/ESA analyses. Any limitation of activities in the area in which Bryde's whales are limited to is expected to reduce the probability and/or severity of impacts on NARWs that would be more likely to adversely affect the fitness of any individual, which in turn reduces the likelihood that any impacts would translate to adverse impacts on the stock.

8. Testing Event Removal - The Navy has removed one of their testing activities in the Northeast Range Complex (four events - USWT), which decreased the number of Level B harassment takes annually for NARW by 115 takes. This change also decreased annual Level B harassment takes by approximately 200 takes for ESA-listed fin whale and 20 takes for sei whales, as well as approximately 10,000 takes annually for harbor porpoise.

9. Jacksonville Operating Area Mitigation Area (November 15 through April 15) - The Navy will implement additional coordination and obtain Early Warning System NARW sightings data to aid in the implementation of procedural mitigation to minimize potential interactions with NARW in the Jacksonville Operating Area. This additional coordination will increase the likelihood that a NARW is detected and action taken to avoid vessel strike, thus further reducing the probability of a NARW strike.

10. SE NARW Critical Habitat Special Reporting Area (November 15 through April 15) - The Navy will report the total hours and counts of active sonar and in-water explosives used in a SE NARW Critical Habitat Special Reporting Area in its annual training and testing activity reports submitted to NMFS.

11. Navy Cherry Point Range Complex Nearshore Mitigation Area (March through September) - The Navy will minimize use of explosives in the Navy Cherry Point Range Complex Nearshore Mitigation Area to the extent practicable. This area overlaps with the NARW migratory BIA and is expected to reduce impacts to NARW that may be present in March and April.

12. Mid-Atlantic Planning Awareness Areas - The Navy has assessed and agreed to move the ship shock trial box east of the including a 5 nmi buffer. The reduction of activities in, and increase of protective measures in areas with higher concentrations of NARW (such as they are in this area) is expected to reduce the probability and/or severity of impacts on NARWthat would be more likely to adversely affect the fitness of any individual, which in turn reduces the likelihood that any impacts would translate to adverse impacts on the stock.

The Navy assessed the measures it has agreed to 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 its AFTT FEIS/OEIS that were not included in the Navy's rulemaking/LOA application for the Specified Activities, 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 AFTT 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 non-governmental organizations (NGOs) or the public, through scoping or public comment on environmental compliance documents. As described in Chapter 5 of the AFTT FEIS/OEIS, commenters sometimes recommend that the Navy reduce their overall amount of training, reduce explosive use, modify their sound sources, completely replace live training with computer simulation, or include time of day restrictions. All 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 AFTT 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 the 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 AFTT FEIS/OEIS, the Navy evaluated additional potential procedural mitigation measures, including increased mitigation zones, 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 AFTT FEIS/OEIS). NMFS independently reviewed and concurred with 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.

NMFS has independently reviewed the Navy's mitigation analysis (Chapter 5 *Mitigation* of the AFTT FEIS/OEIS as referenced above), which considers the same factors that NMFS

would consider to satisfy the least practical adverse impact standard, and concurs with the conclusions. Therefore, NMFS is not proposing to include any additional measures in these regulations, other than the new measures that were agreed upon after the proposed rule. Below are the mitigation measures that NMFS 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. The following sections summarize the mitigation measures that will be implemented in association with the training and testing activities analyzed in this document. The Navy's mitigation measures are organized into two categories: procedural mitigation and mitigation areas.

Procedural Mitigation

Procedural mitigation is mitigation that the Navy will implement whenever and wherever an applicable training or testing activity takes place within the AFTT 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 43) 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 44 through Tables 63) 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, anti-swimmer grenades, line charge testing and ship shock trials), 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 43. Procedural Mitigation for Environmental Awareness and Education.

Procedural Mitigation Description
Stressor or Activity • All training and testing activities, as applicable
Mitigation Requirements • Appropriate personnel (including civilian personnel) involved in mitigation and training or testing activity reporting under the Proposed Action 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.** 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 44 through 47.

Procedural Mitigation for Active Sonar

Procedural mitigation for active sonar is described in Table 44 below.

Table 44. 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) – 4 Lookouts: Pierside sonar testing activities at Port Canaveral, Florida and Kings Bay, Georgia • 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 power down 6 dB, at 500 yd power down an additional 4 dB (for a total of 10 dB), and at 200 yd 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 observed, relocate or delay the start until the mitigation zone is clear. – Observe the mitigation zone for marine mammals; if 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: Observe the mitigation zone for marine mammals; power down active sonar transmission by 6 dB if observed within 1,000 yd. of the sonar source; power down an additional 4 dB (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 observed within 200 yd. of the sonar source. • 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 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 45 below.

Table 45. Procedural Mitigation for Air Guns.

Procedural Mitigation Description
Stressor or Activity • Air guns
Number of Lookouts and Observation Platform

• 1 Lookout 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 observed, relocate or delay the start until the mitigation zone is clear. – Observe the mitigation zone for marine mammals; if observed, relocate or delay the start of air gun use. • During the activity: – Observe the mitigation zone for marine mammals; if observed, cease air gun use. • 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 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 46 below.

Table 46. 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 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 observed, delay the start until the mitigation zone is clear. – Observe the mitigation zone for marine mammals; if observed, delay the start of pile driving or vibratory pile extraction. • During the activity: – Observe the mitigation zone for marine mammals; if observed, cease impact pile driving or vibratory pile extraction. • 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 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 47 below.

Table 47. 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 positioned on the ship conducting the firing • Depending on the activity, the Lookout could be the same one described for Explosive Medium-Caliber and Large-Caliber Projectiles or 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 observed, relocate or delay the start until the mitigation zone is clear. – Observe the mitigation zone for marine mammals; if observed, relocate or delay the start of weapons firing. • During the activity: – Observe the mitigation zone for marine mammals; if observed, cease weapons 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 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 48 through 58.

Procedural Mitigation for Explosive Sonobuoys

Procedural mitigation for explosive sonobuoys is described in Table 48 below.

Table 48. Procedural Mitigation for Explosive Sonobuoys.

Procedural Mitigation Description
Stressor or Activity • Explosive sonobuoys
Number of Lookouts and Observation Platform • 1 Lookout 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 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 observed, relocate or delay the start of sonobuoy or source/receiver pair detonations.
- During the activity:
  - Observe the mitigation zone for marine mammals; if observed, cease sonobuoy or source/receiver pair detonations.
- 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 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 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 Torpedoes

Procedural mitigation for explosive torpedoes is described in Table 49 below.

Table 49. Procedural Mitigation for Explosive Torpedoes.

Procedural Mitigation Description
Stressor or Activity • Explosive torpedoes
Number of Lookouts and Observation Platform • 1 Lookout 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 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 observed, relocate or delay the start of firing. • During the activity: – Observe the mitigation zone for marine mammals and jellyfish aggregations; if observed, cease 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 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 Medium- and Large-Caliber Projectiles

Procedural mitigation for medium- and large-caliber projectiles is described in Table 50 below.

Table 50. 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 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, 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 observed, relocate or delay the start until the mitigation zone is clear. – Observe the mitigation zone for marine mammals; if observed, relocate or delay the start of firing. • During the activity: – Observe the mitigation zone for marine mammals; if observed, cease 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 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): – 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 Missiles and Rockets

Procedural mitigation for explosive missiles and rockets is described in Table 51 below.

Table 51. 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 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 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 observed, relocate or delay the start until the mitigation zone is clear. – Observe the mitigation zone for marine mammals; if observed, relocate or delay the start of firing. • During the activity: – Observe the mitigation zone for marine mammals; if observed, cease 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 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 52 below.

Table 52. Procedural Mitigation for Explosive Bombs.

Procedural Mitigation Description
Stressor or Activity • Explosive bombs
Number of Lookouts and Observation Platform • 1 Lookout positioned in the aircraft conducting the activity • 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:

- 2,500 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 observed, relocate or delay the start until the mitigation zone is clear.
  - Observe the mitigation zone for marine mammals; if 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 observed, cease bomb deployment.
- 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 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 53 below.

Table 53. Procedural Mitigation for Sinking Exercises.

Procedural Mitigation Description
Stressor or Activity • Sinking exercises
Number of Lookouts and Observation Platform • 2 Lookouts (one positioned in an aircraft and one on a vessel) • 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:
  – 2.5 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 until the mitigation zone is clear.
  – Conduct aerial observations of the mitigation zone for marine mammals and jellyfish aggregations; if 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 observed, cease firing.
  – Immediately after any planned or unplanned breaks in weapons firing of longer than 2 hrs, observe the mitigation zone for marine mammals from the aircraft and vessel; if observed, 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 hrs 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, 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 54 below.

Table 54. Procedural Mitigation for Explosive Mine Countermeasure and Neutralization Activities.

Procedural Mitigation Description
Stressor or Activity • Explosive mine countermeasure and neutralization activities
Number of Lookouts and Observation Platform • 1 Lookout positioned on a vessel or in an aircraft when implementing the smaller mitigation zone • 2 Lookouts (one positioned in an aircraft and one on a small boat) when implementing the larger mitigation zone • 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 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 observed, relocate or delay the start until the mitigation zone is clear. – Observe the mitigation zone for marine mammals; if observed, relocate or delay the start of detonations. • During the activity: – Observe the mitigation zone for marine mammals; if observed, cease detonations. • 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 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 55 below.

Table 55. 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 on a small boat and one 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, 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 (0.1–20 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 observed, relocate or delay the start until the mitigation zone is clear. – Observe the mitigation zone for marine mammals; if observed, relocate or delay the start of detonations or fuse initiation. • During the activity: – Observe the mitigation zone for marine mammals; if observed, cease detonations or fuse initiation. – To the maximum extent practicable depending on mission requirements, safety, and environmental conditions, boats must position themselves 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, aircraft must travel in a circular pattern around the detonation location to the maximum extent practicable. – The Navy must not set time-delay firing devices (0.1–20 lb net explosive weight) to exceed 10 min • 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 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 Maritime Security Operations – Anti-Swimmer Grenades

Procedural mitigation for maritime security operations – anti-swimmer grenades is described in Table 56 below.

Table 56. 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 positioned on the small boat conducting the activity • 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: – 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 observed, relocate or delay the start until the mitigation zone is clear. – Observe the mitigation zone for marine mammals; if observed, relocate or delay the start of detonations. • During the activity: – Observe the mitigation zone for marine mammals; if observed, cease detonations. • 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 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 Line Charge Testing

Procedural mitigation for line charge testing is described in Table 57 below.

Table 57. Procedural Mitigation for Line Charge Testing.

Procedural Mitigation Description

Stressor or Activity • Line charge testing
Number of Lookouts and Observation Platform • 1 Lookout positioned on a vessel • 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: – 900 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 observed, delay the start until the mitigation zone is clear. – Observe the mitigation zone for marine mammals; if observed, delay the start of detonations. • During the activity: – Observe the mitigation zone for marine mammals; if observed, cease detonations. • 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 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; or (3) the mitigation zone has been clear from any additional sightings for 30 min • 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 Ship Shock Trials

Procedural mitigation for ship shock trials is described in Table 58 below.

Table 58. Procedural Mitigation for Ship Shock Trials.

Procedural Mitigation Description
Stressor or Activity • Ship shock trials
Number of Lookouts and Observation Platform • At least 10 Lookouts or trained marine species observers (or a combination thereof) positioned either in an aircraft or on multiple vessels (i.e., a Marine Animal Response Team boat and the test ship) – If aircraft are used, Lookouts or trained marine species observers must be in an aircraft and on multiple vessels – If aircraft are not used, a sufficient number of additional Lookouts or trained marine species observers must be used to provide vessel-based visual observation comparable to that achieved by aerial surveys • 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: – 3.5 nmi around the ship hull • During event planning: – The Navy must not conduct ship shock trials in the Jacksonville Operating Area during North Atlantic right whale calving season from November 15 through April 15. – The Navy develops detailed ship shock trial monitoring and mitigation plans approximately 1-year prior to an event and must continue to provide these to NMFS for review and approval.

- Pre-activity planning must include selection of one primary and two secondary areas where marine mammal populations are expected to be the lowest during the event, with the primary and secondary locations located more than 2 nmi from the western boundary of the Gulf Stream for events in the Virginia Capes Range Complex or Jacksonville Range Complex.
- If it is determined during pre-activity surveys that the primary area is environmentally unsuitable (e.g., observations of marine mammals or presence of concentrations of floating vegetation), the shock trial could be moved to a secondary site in accordance with the detailed mitigation and monitoring plan provided to NMFS.

- Prior to the initial start of the activity at the primary shock trial location (in intervals of 5 hrs, 3 hrs, 40 min, and immediately before the detonation):
  - Observe the mitigation zone for floating vegetation; if observed, delay the start until the mitigation zone is clear.
  - Observe the mitigation zone for marine mammals; if observed, delay triggering the detonation.
- During the activity:
  - Observe the mitigation zone for marine mammals, large schools of fish, jellyfish aggregations, and flocks of seabirds; if observed, cease triggering the detonation.
  - After completion of each detonation, observe the mitigation zone for marine mammals; if any injured or dead marine mammals are observed, follow established incident reporting procedures and halt any remaining detonations until the Navy can consult with NMFS and review or adapt the mitigation, if necessary.
- 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 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 ship hull; or (3) the mitigation zone has been clear from any additional sightings for 30 min
- After completion of the activity (during the following 2 days at a minimum, and up to 7 days at a maximum):
  - 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 59 through Table 63.

Procedural Mitigation for Vessel Movement

Procedural mitigation for vessel movement used during the Planned Activities is described in Table 59 below.

Table 59. 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, etc.), or (3) the vessel is operated autonomously.
Number of Lookouts and Observation Platform • 1 Lookout 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 observed, maneuver to maintain distance. • Additional requirements: – The Navy must broadcast awareness notification messages with North Atlantic right whale Dynamic Management Area information (e.g., location and dates) to applicable Navy assets operating in the vicinity of the Dynamic Management Area. The information must alert assets to the possible presence of a North Atlantic right whale to maintain safety of navigation and further reduce the potential for a vessel strike. Platforms must use the information to assist their visual observation of applicable mitigation zones during training and testing activities and to aid in the implementation of procedural mitigation, including but not limited to mitigation for vessel movement. – If a marine mammal vessel strike occurs, the Navy 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 60 below.

Table 60. 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 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 observed, 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 61 below.

Table 61. 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 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 observed, relocate or delay the start until the mitigation zone is clear. – Observe the mitigation zone for marine mammals; if observed, relocate or delay the start of firing. • During the activity: – Observe the mitigation zone for marine mammals; if observed, cease 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 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 62 below.

Table 62. 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 positioned in an aircraft
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 observed, relocate or delay the start until the mitigation zone is clear. – Observe the mitigation zone for marine mammals; if observed, relocate or delay the start of firing. • During the activity: – Observe the mitigation zone for marine mammals; if observed, cease firing. • Commencement/recommencement conditions after a marine mammal sighting prior to 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 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 63 below.

Table 63. 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 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 observed, relocate or delay the start until the mitigation zone is clear. – Observe the mitigation zone for marine mammals; if 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; if observed, cease bomb deployment or mine laying. • Commencement/recommencement conditions after a marine mammal sighting prior to 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 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.

Mitigation Areas

In addition to procedural mitigation, the Navy will implement mitigation measures within mitigation areas and/or at times to avoid or minimize potential impacts on marine mammals (see the revised maps and tables, with expanded areas as described above, provided in Chapter 5 (Mitigation), Section 5.4 of the AFTT FEIS/OEIS). The Navy has taken into account public comments received on the AFTT DEIS/OEIS, best available science, and the practicability of implementing additional mitigation measures and has expanded and improved their mitigation areas and mitigation measures to further reduce impacts to marine mammals. As such, the Navy

revised their mitigation areas since their application and the proposed rule (see above). The Navy re-analyzed existing mitigation areas and considered new habitat areas suggested by the public, NMFS, and other non-Navy organizations, including NARW ESA-designated critical habitat, important habitat for sperm whales and Bryde's whales, 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 AFTT FEIS/OEIS (*Affected Environment and Environmental Consequences*), published literature, predicted activity impact footprints, marine species monitoring and density data, and the practicability of implementing additional mitigation measures. Following are the mitigation areas that the Navy has committed to implement and that are included in the final regulations (including a description of expanded areas and/or protections).

Mitigation Areas off the Northeastern United States

Mitigation areas for the Northeastern United States are described in Table 64. The Navy has expanded the NE NARW Area and added the Gulf of Maine Planning Awareness Mitigation Area since the proposed rule and the location and boundaries of each mitigation area are included in the Navy's AFTT FEIS/OEIS.

Table 64. Mitigation Areas off the Northeastern United States.

Mitigation Area Description
Stressor or Activity • Sonar • Explosives • Physical disturbance and strikes
Mitigation Area Requirements (year-round) • **Northeast North Atlantic Right Whale Mitigation Area:** – The Navy must report the total hrs and counts of active sonar and in-water explosives used in the mitigation area (i.e., the northeast North Atlantic right whale critical habitat) in its annual training and testing activity reports submitted to NMFS. – The Navy must minimize the use of low-frequency active sonar, mid-frequency active sonar, and high-frequency active sonar to the maximum extent practicable within the mitigation area. – The Navy must not use Improved Extended Echo Ranging sonobuoys (in or within 3 nmi of the mitigation area) or use, explosive and non-explosive bombs, in-water detonations, and explosive torpedoes within the mitigation area. – For activities using non-explosive torpedoes within the mitigation area, the Navy must conduct activities during

daylight hrs in Beaufort sea state 3 or less. The Navy must use three Lookouts (one positioned on a vessel and two in an aircraft during dedicated aerial surveys) to observe the vicinity of the activity. An additional Lookout must be positioned on the submarine, when surfaced. Immediately prior to the start of the activity, Navy personnel must observe for floating vegetation and marine mammals; if observed, the activity must not commence until the vicinity is clear or the activity is relocated to an area where the vicinity is clear. During the activity, Navy personnel must observe for marine mammals; if observed, the activity must cease. To allow a sighted marine mammal to leave the area, the Navy must not recommence the activity until one of the following conditions has been met: (1) the animal is observed exiting the vicinity of the activity; (2) the animal is thought to have exited the vicinity of the activity based on a determination of its course, speed, and movement relative to the activity location; or (3) the area has been clear from any additional sightings for 30 min During transits and normal firing, ships must maintain a speed of no more than 10 knots. During submarine target firing, ships must maintain speeds of no more than 18 knots. During vessel target firing, vessel speeds may exceed 18 knots for brief periods of time (e.g., 10–15 min).

– Before vessel transits within the mitigation area, the Navy must conduct a web query or email inquiry to the National Oceanographic and Atmospheric Administration Northeast Fisheries Science Center's North Atlantic Right Whale Sighting Advisory System to obtain the latest North Atlantic right whale sightings information. Vessels must use the sightings information to reduce potential interactions with North Atlantic right whales during transits. Vessels must implement speed reductions within the mitigation area after observing a North Atlantic right whale, if transiting within 5 nmi of a sighting reported to the North Atlantic Right Whale Sighting Advisory System within the past week, and if transiting at night or during periods of reduced visibility.

- **Gulf of Maine Planning Awareness Mitigation Area:**
  - The Navy must report the total hrs and counts of active sonar and in-water explosives used in the mitigation area in its annual training and testing activity reports submitted to NMFS.
  - The Navy must not conduct >200 hrs of hull-mounted mid-frequency active sonar per year within the mitigation area.
  - The Navy must not conduct major training exercises (Composite Training Unit Exercises or Fleet Exercises/Sustainment Exercises) within the mitigation area. If the Navy needs to conduct a major training exercise within the mitigation area in support of training requirements driven by national security concerns, it must confer with NMFS to verify that potential impacts are adequately addressed in the Navy's Final EIS/OEIS and associated consultation documents.
- **Northeast Planning Awareness Mitigation Areas:**
  - The Navy will avoid conducting major training exercises (Composite Training Unit Exercises or Fleet Exercises/Sustainment Exercises) within the mitigation area to the maximum extent practicable.
  - The Navy must not conduct more than four major training exercises per year within the mitigation area (all or a portion of the exercise). If the Navy needs to conduct additional major training exercises in the mitigation area in support of training requirements driven by national security concerns, it must provide NMFS with advance notification and include the information in its annual training and testing activity reports submitted to NMFS.

Mitigation Areas off the Mid-Atlantic and Southeastern United States

Mitigation areas off the Mid-Atlantic and Southeastern United States are described in Table 65 below. The location and boundaries of each mitigation area are included in the Navy's AFTT FEIS/OEIS.

Table 65. Mitigation Areas off the Mid-Atlantic and Southeastern United States.

Mitigation Area Description
Stressor or Activity • Sonar • Explosives • Physical disturbance and strikes
Mitigation Area Requirements • **Southeast North Atlantic Right Whale Mitigation Area (November 15 through April 15):** – The Navy must report the total hrs and counts of active sonar and in-water explosives used in the mitigation area in its annual training and testing activity reports submitted to NMFS.

- The Navy must not conduct: (1) low-frequency active sonar (except as noted below), (2) mid-frequency active sonar (except as noted below), (3) high-frequency active sonar, (4) missile and rocket activities (explosive and non-explosive), (5) small-, medium-, and large-caliber gunnery activities, (6) Improved Extended Echo Ranging sonobuoy activities, (7) explosive and non-explosive bombing activities, (8) in-water detonations, and (9) explosive torpedo activities within the mitigation area.
- To the maximum extent practicable, the Navy must minimize the use of: (1) helicopter dipping sonar, (2) low-frequency active sonar and hull-mounted mid-frequency active sonar used for navigation training, and (3) low-frequency active sonar and hull-mounted mid-frequency active sonar used for object detection exercises within the mitigation area.
- Before transiting or conducting training or testing activities within the mitigation area, the Navy must initiate communication with the Fleet Area Control and Surveillance Facility, Jacksonville to obtain Early Warning System North Atlantic right whale sightings data. The Fleet Area Control and Surveillance Facility, Jacksonville must advise vessels of all reported whale sightings in the vicinity to help vessels and aircraft reduce potential interactions with North Atlantic right whales. Commander Submarine Force U.S. Atlantic Fleet must coordinate any submarine activities that may require approval from the Fleet Area Control and Surveillance Facility, Jacksonville. Vessels must use the sightings information to reduce potential interactions with North Atlantic right whales during transits.
- Vessels must implement speed reductions if they are within 5 nmi of a sighting reported within the past 12 hrs, or when operating at night or during periods of poor visibility.
- To the maximum extent practicable, vessels must minimize north-south transits in the mitigation area.

- **Jacksonville Operating Area (November 15 through April 15):**
  - Navy units conducting training or testing activities in the Jacksonville Operating Area must initiate communication with the Fleet Area Control and Surveillance Facility, Jacksonville to obtain Early Warning System North Atlantic right whale sightings data. The Fleet Area Control and Surveillance Facility, Jacksonville must advise vessels of all reported whale sightings in the vicinity to help vessels and aircraft reduce potential interactions with North Atlantic right whales. Commander Submarine Force U.S. Atlantic Fleet must coordinate any submarine activities that may require approval from the Fleet Area Control and Surveillance Facility, Jacksonville. The Navy must use the reported sightings information as it plans specific details of events (e.g., timing, location, duration) to minimize potential interactions with North Atlantic right whales to the maximum extent practicable. The Navy must use the reported sightings information to assist visual observations of applicable mitigation zones and to aid in the implementation of procedural mitigation.
- **Southeast North Atlantic Right Whale Critical Habitat Special Reporting Area (November 15 through April 15):**
  - The Navy must report the total hrs and counts of active sonar and in-water explosives used in the Special Reporting Area (i.e., the southeast North Atlantic right whale critical habitat) in its annual training and testing activity reports submitted to NMFS.
- **Mid-Atlantic Planning Awareness Mitigation Areas (year-round):**
  - The Navy will avoid conducting major training exercises within the mitigation area (Composite Training Unit Exercises or Fleet Exercises/Sustainment Exercises) to the maximum extent practicable.
  - The Navy must not conduct the Ship Shock trial in the Mid-Atlantic Planning Awareness Areas including a 5-nmi buffer.
  - The Navy must not conduct more than four major training exercises per year (all or a portion of the exercise) within the mitigation area. If the Navy needs to conduct additional major training exercises in the mitigation area in support of training requirements driven by national security concerns, it must provide NMFS with advance notification and include the information in its annual training and testing activity reports submitted to NMFS.
- **Navy Cherry Point Range Complex Nearshore Mitigation Area (March through September):**
  - The Navy must not conduct explosive mine neutralization activities involving Navy divers in the mitigation area.
  - To the maximum extent practicable, the Navy must not use explosive sonobuoys, explosive torpedoes, explosive medium-caliber and large-caliber projectiles, explosive missiles and rockets, explosive bombs, explosive mines during mine countermeasure and neutralization activities, and anti-swimmer grenades in the mitigation area.

Mitigation Areas in the GOMEX

Mitigation areas in the GOMEX are described in Table 66 below. The Navy has expanded the GOMEX Planning Awareness Mitigation area and added the Bryde's Whale

Mitigation area since the proposed rule and the location and boundaries of each mitigation area are included in the AFTT FEIS/OEIS.

Table 66. Mitigation Areas in the GOMEX.

Mitigation Area Description
Stressor or Activity • Sonar • Explosives
Mitigation Area Requirements (year-round) • **Bryde's Whale Mitigation Area:** – The Navy must report the total hrs and counts of active sonar and in-water explosives used in the mitigation area in its annual training and testing activity reports submitted to NMFS. – The Navy must not conduct >200 hrs of hull-mounted mid-frequency active sonar per year within the mitigation area. – The Navy must not use explosives (except during mine warfare activities) within the mitigation area. • **Gulf of Mexico Planning Awareness Mitigation Areas:** – The Navy must not conduct any major training exercises within the mitigation areas (all or a portion of the exercise). If the Navy needs to conduct a major training exercise within the mitigation areas in support of training requirements driven by national security concerns, it must confer with NMFS to verify that potential impacts are adequately addressed in the Navy's Final EIS/OEIS and associated consultation documents.

The Navy's analysis 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 and stocks or their habitat in the manner described in the Navy's analysis. After extensive coordination and independent consideration of the measures considered and eliminated by the Navy and the Navy's determinations as to how the measures would affect personnel safety, practicality to implement, and effectiveness to the Navy mission, NMFS finds the information persuasive to inform NMFS' LPAI finding and NMFS' independent analysis of these mitigation areas.

Summary of Mitigation Areas

Table 67 below includes a description of the mitigation implemented in each of the areas and immediately below we include a summary of the manner in which the mitigation areas are expected to reduce impacts to marine mammals and the likelihood or severity of impacts to species or stock:

Northeast North Atlantic Right Whale Mitigation Areas (year-round)

The Navy has enlarged the mitigation area to cover the full extent of the northeast NARW ESA-designated critical habitat. The expanded area also encompasses all of the important feeding areas for humpback whales and fin whales, significant portions of the feeding areas for sei and minke whales (73 percent and 44 percent, respectively), as well as 82 percent of the portion in the U.S. EEZ of a small and resident population of harbor porpoises. Mitigation to limit the use of active sonar to the maximum extent practicable and not use certain explosive and non-explosive munitions will help the Navy further avoid or reduce potential impacts on NARWs year-round in their most important feeding areas, a mating area, and the northern portion of their migration habitat. These mitigations will also reduce the severity and scale of impacts on the other mysticetes and harbor porpoises. Conducting non-explosive torpedo activities during daylight hours in Beaufort sea state 3 or less will help increase Lookout effectiveness during these activities. Mitigation to obtain the latest sighting information from the NARW Sighting Advisory System will help vessels avoid NARWs during training and testing activities. The NARW Sighting Advisory System is a National Oceanographic and Atmospheric Administration program that collects sightings information off the northeastern United States from aerial surveys, shipboard surveys, whale watching vessels, and opportunistic sources, such as the U.S. Coast Guard, commercial ships, fishing vessels, and the public. The Navy will also implement new special reporting procedures to report the total hours and counts of active sonar and in-water explosives used in the mitigation area in its annual training and testing activity reports submitted to NMFS. The special reporting requirements will aid the Navy and NMFS in continuing to analyze potential impacts of training and testing in this area. The reduction of activities in, and increase of protective measures in, areas with higher concentrations of NARWs

or other mysticetes engaged in important feeding activities (such as they are in this area), or NARWs engaged in mating activities, is expected to reduce the probability and/or severity of impacts to these species and stocks that would be more likely to adversely affect the fitness of any individual, which in turn reduces the likelihood that any impacts would translate to adverse impacts on the stock. Similarly, reduction in the scale or level of impacts in the vicinity of this small resident population of harbor porpoises is expected to reduce the probability that impacts would adversely impact the fitness of any individual and thereby translate to adverse impacts on the stock.

Gulf of Maine Planning Awareness Mitigation Area (year-round)

Newly developed for Phase III and since the proposed rule was published, the Gulf of Maine Planning Awareness Mitigation Area extends throughout the Gulf of Maine and southward over Georges Bank. The area covers the full extent of the northeast NARW ESA-designated critical habitat, including both a mating area and important feeding area. The expanded area also fully encompasses important feeding areas for humpback whales, minke whales, sei whales, and fin whales as well as all of the portion in the U.S. EEZ of a small and resident population of harbor porpoises. The Navy will not conduct MTEs in this area, which will further help the Navy avoid or reduce potential impacts on marine mammals from active sonar during major training exercises (which are associated with more severe effects because of the use of multiple platforms and higher-level sound sources, as well as longer-duration activities). The reduction of activities in, and increase of protective measures in, areas with higher concentrations of NARWs or other mysticetes engaged in important feeding activities (such as they are in this area), or NARWs engaged in mating activities, is expected to reduce the probability and/or severity of impacts to these species and stocks that would be more likely to

adversely affect the fitness of any individual, which in turn reduces the likelihood that any impacts would translate to adverse impacts on the stock. Similarly, and reduction in the scale or level of impacts in the vicinity of this small resident population of harbor porpoises is expected to reduce the probability that impacts would adversely impact the fitness of any individual and thereby translate to adverse impacts on the stock. The Navy will also implement special reporting procedures to report the total hours and counts of active sonar and in-water explosives used in the mitigation area in its annual training and testing activity reports submitted to NMFS. The special reporting requirements will aid the Navy and NMFS in continuing to analyze potential impacts of training and testing in this area.

Northeast Planning Awareness Mitigation Areas (year-round)

The Northeast Planning Awareness Mitigation Areas extend across the shelf break and contain underwater canyons that have been associated with marine mammal feeding and abundance, including within a portion of the Northeast Canyons and Seamounts National Marine Monument. They are situated among highly productive environments, such as persistent oceanographic features associated with upwellings and steep bathymetric contours. The mitigation included within the Northeast Planning Awareness Mitigation Areas (Table 64) will help the Navy further avoid or reduce potential impacts from active sonar during major training exercises on marine mammals that inhabit, feed in, mate in, or migrate through the northeast region. For example, the mitigation areas overlap a portion of the NARW northern migration habitat. Fin whales are known to follow prey off the continental shelf in this region (Azzellino *et al.*, 2008; Panigada *et al.*, 2008). Sei whales have high abundance in two of the mitigation areas along the shelf break of Georges Bank and near Hydrographer Canyon (Waring *et al.*, 2014). The reduction of activities in, and increase of protective measures in, areas with higher

concentrations of NARWs or other mysticetes is expected to reduce the probability of impacts to these species and stocks that would be more likely to adversely affect the fitness of any individual, which in turn reduces the likelihood that any impacts would translate to adverse impacts on the stock.

Mid-Atlantic Planning Awareness Mitigation Areas (year-round)

The Mid-Atlantic Planning Awareness Mitigation Areas extend across large swaths of shelf break and contain underwater canyons associated with high marine mammal diversity (*e.g.*, Norfolk Canyon). The mitigation areas are situated among highly productive environments, such as persistent oceanographic features associated with upwellings and steep bathymetric contours. Numerous species of marine mammals occur in the area, including beaked, fin, humpback, minke, and sperm whales; and pilot whales, bottlenose, short-beaked common, Atlantic spotted, striped, Clymene, and Risso's dolphins. The area is thought to be important for short-finned pilot whale feeding (as well as other odontocetes) and is associated with high species abundance (Thorne *et al.*, 2017). The area is also used seasonally during migrations by numerous species and overlaps the NARW migration habitat identified by LaBrecque *et al.* (2015b). The Navy will avoid planning major training exercises to the maximum extent practicable and will not conduct more than four per year. The Navy has also agreed to move the ship shock trial box east of the Mid-Atlantic Planning Awareness Mitigation Areas including a 5-nmi buffer. Because of the diversity of marine mammals and other fauna, as well as the general increased use of the area for odontocete feeding, any reduction of the more impactful MTEs (more platforms, higher-level sources, and longer duration) would be expected to have a reduction in the probability of impacts to these species and stocks that would be more likely to adversely affect the fitness of any individual, which in turn reduces the likelihood that any impacts would translate to adverse

impacts on the stock. Because of the high diversity of marine fauna, reduced training in this area would also be considered a direct reduction of impacts on marine mammal habitat.

Southeast North Atlantic Right Whale Mitigation Area (November 15 through April 15)

The Navy has expanded the existing SE NARW Mitigation Area northward approximately 50 nmi along the coast of northern Georgia from the shoreline out to 10–12 nmi. The Navy expanded the mitigation area to correlate with the occurrence of NARWs to the maximum extent practicable based on readiness requirements. The mitigation area encompasses a portion of the NARW migration and calving areas identified by LaBrecque *et al.* (2015b) and a portion of the southeast NARW ESA-designated critical habitat. Mitigation to not conduct, or to limit the use of, active sonar to the maximum extent practicable (depending on the source) and to not conduct in-water detonations and certain activities using explosives and non-explosive practice munitions, will help the Navy further avoid or reduce potential impacts on NARWs in these key habitat areas seasonally. The Navy will implement special reporting procedures to report the total hours and counts of active sonar and in-water explosives used in the mitigation area in its annual training and testing activity reports submitted to NMFS. The special reporting requirements will aid the Navy and NMFS in continuing to analyze potential impacts of training and testing in the mitigation area. Mitigation for vessel movements includes minimizing north-south transits; implementing speed reductions after vessels observe a NARW, if they are within 5 nmi of a sighting reported within the past 12 hrs, or when operating in the mitigation area at night or during periods of poor visibility; and continuing to participate in and sponsor the Early Warning System. The Early Warning System is a comprehensive information exchange network dedicated to reducing the risk of vessel strikes to NARW off the southeast United States from all mariners (*i.e.*, Navy and non-Navy vessels). Navy participants include the Fleet Area Control

and Surveillance Facility, Jacksonville; Commander, Naval Submarine Forces, Norfolk, Virginia; and Naval Submarine Support Command. The Navy, U.S. Coast Guard, U.S. Army Corps of Engineers, and NMFS collaboratively sponsor daily aerial surveys from December 1 through March 31 (weather permitting) to observe for NARWs from the shoreline out to approximately 30–35 nmi offshore. Aerial surveyors relay sightings information to all mariners transiting within the NARW calving habitat (*e.g.*, commercial vessels, recreational boaters, Navy ships). The reduction of activities in, and increase of protective measures in, areas with higher concentrations of NARWs engaged in calving activities and migration (such as they are in this area), is expected to reduce the probability and/or severity of impacts on NARWs that would be more likely to adversely affect the fitness of any individual, which in turn reduces the likelihood that any impacts would translate to adverse impacts on the stock. Additionally, these measures are expected to significantly increase the likelihood of detection of NARWs, which in turn significantly decreases the likelihood of a ship strike. Last, this area coincides with the ranges of two small resident stocks of bottlenose dolphins (Southern Georgia Estuarine and Jacksonville Estuarine) and is generally expect to reduce the scale and severity of impacts on these stocks, reducing the likelihood of population-level impacts.

Southeast North Atlantic Right Whale Critical Habitat Special Reporting Area

Newly developed for Phase III, the SE NARW Critical Habitat Special Reporting Area covers the entire southeast NARW ESA-designated critical habitat, as well as the ranges of three small resident populations of bottlenose dolphins (Southern Georgia Estuarine, Jacksonville Estuarine, and Charleston Estuarine). The Navy will implement special reporting procedures to report the total hours and counts of active sonar and in-water explosives used in the mitigation area (*i.e.*, the southeast NARW ESA-designated critical habitat) in its annual training and testing

activity reports submitted to NMFS. The special reporting requirements will aid the Navy and NMFS in continuing to analyze potential impacts of training and testing in this area.

Jacksonville Operating Area

The Navy has developed new mitigation measures for units conducting training or testing activities in the Jacksonville Operating Area, which overlaps the majority of the southeast NARW ESA-designated critical habitat and extends far out to the edge of the continental shelf. The mitigation measures to obtain and use Early Warning System NARW sightings data will help vessels and aircraft reduce potential interactions (*i.e.*, reducing the likelihood of a strike) with NARWs in portions of the southeast NARW ESA-designated critical habitat and NARW migration and calving areas identified by LaBrecque *et al.* (2015b).

Navy Cherry Point Range Complex Nearshore Mitigation Area

The Navy is continuing an existing mitigation measure to not conduct explosive mine neutralization activities involving Navy divers from March through September within the mitigation area, which is defined as within 3.2 nmi of an estuarine inlet and within 1.6 nmi of the shoreline in the Navy Cherry Point Range Complex. For Phase III, the Navy is expanding the mitigation requirements in this mitigation area to include additional in-water explosives to the maximum extent practicable. Although the measure was primarily designed to reduce potential impacts on sea turtles near nesting beaches during the nesting season and on sandbar sharks in Habitat Areas of Particular Concern, the mitigation area also overlaps a portion of the NARW migration area identified by LaBrecque *et al.* (2015b). Any reduction of impacts where NARW may be concentrated contributes to a reduction in the probability that impacts will accrue to fitness impacts on individuals or, further, to impacts on the stock.

Bryde's Whale Mitigation Area (year-round)

Newly developed for Phase III, the Bryde's Whale Mitigation Area covers the extent of the Bryde's whale small and resident population area identified by LaBrecque *et al.* (2015a), including the extended area identified by NMFS in its 2016 Bryde's whale status review (Rosel *et al.*, 2016). Mitigation to limit annual hours of mid-frequency active sonar use and to not use in-water explosives (except during mine warfare activities) will help the Navy avoid or reduce potential impacts on the small and resident population of Bryde's whales. To accomplish the mitigation for explosives, the Navy has adjusted the boundaries of the northern GOMEX ship shock trial area. The ship shock trial area is being relocated 5 nm from the western boundary of the Bryde's Whale Mitigation Area. This will help the Navy avoid the potential for Bryde's whales to be exposed to explosives during ship shock trials within the mitigation area. The Navy will implement special reporting procedures to report the total hours and counts of active sonar and in-water explosives used in the mitigation area in its annual training and testing activity reports submitted to NMFS. The special reporting requirements will aid the Navy and NMFS in continuing to analyze potential impacts of training and testing in this area. This overall reduction in activity and increase in protective measures across the majority of the Bryde's whale range minimizes the probability and/or severity of impacts on Bryde's whales that are likely to adversely affect the fitness of any individual, which in turn reduces the likelihood that any impacts would translate to adverse impacts on the stock.

GOMEX Planning Awareness Mitigation Areas (year-round)

The Navy is enlarging the more eastern GOMEX Planning Awareness Mitigation Area to fully encompass the Bryde's whale small and resident population area identified by LaBrecque *et al.* (2015a) and the extended area identified by NMFS in its 2016 Bryde's whale status review (Rosel *et al.*, 2016). The GOMEX Planning Awareness Mitigation Areas also

overlap most of the Mississippi Canyon sperm whale habitat area and a portion of sperm whale habitat area west of the Dry Tortugas. They extend across large swaths of shelf break and contain underwater canyons associated with marine mammal abundance (e.g., Mississippi Canyon, DeSoto Canyon). The mitigation areas are situated among highly productive environments, such as persistent oceanographic features associated with upwellings and steep bathymetric contours. The Navy will not conduct MTEs in these areas. Mitigation within the GOMEX Planning Awareness Mitigation Areas will help the Navy further avoid or reduce potential impacts from active sonar during MTEs (which have more platforms, higher source levels, and longer durations more likely to have more severe impacts) on marine mammals that inhabit, feed in, reproduce in, or migrate through these areas. Specifically, these mitigation areas would be expected to result in a reduction in the probability of impacts to the GOMEX stocks of Bryde's whales and sperm whale that would be more likely to adversely affect the fitness of any individual, which in turn reduces the likelihood that any impacts would translate to adverse impacts on the stock.

A summary of mitigation areas for marine mammals is described in Table 67 below.

Table 67. Summary of Mitigation Areas for Marine Mammals.

Summary of Mitigation Area Requirements
Northeast North Atlantic Right Whale Mitigation Area
• The Navy must report the total hrs and counts of active sonar and in-water explosives used in the mitigation area in its annual training and testing activity reports. • The Navy must minimize use of active sonar to the maximum extent practicable and must not use explosives that detonate in the water. • The Navy must conduct non-explosive torpedo testing during daylight hrs in Beaufort sea state 3 or less using three Lookouts (one on a vessel, two in an aircraft during aerial surveys) and an additional Lookout on the submarine when surfaced; during transits, ships must maintain a speed of no more than 10 knots; during firing, ships must maintain a speed of no more than 18 knots except brief periods of time during vessel target firing. • Vessels must obtain the latest North Atlantic right whale sightings data and implement speed reductions after they observe a North Atlantic right whale, if within 5 nmi of a sighting reported within the past week, and when operating at night or during periods of reduced visibility.
Gulf of Maine Planning Awareness Mitigation Area
• The Navy must report the total hrs and counts of active sonar and in-water explosives used in the mitigation area in its annual training and testing activity reports. • The Navy must not conduct major training exercises and must not conduct >200 hrs of hull-mounted mid-frequency active sonar per year.

Summary of Mitigation Area Requirements
Northeast Planning Awareness Mitigation Areas and Mid-Atlantic Planning Awareness Mitigation Areas
• The Navy must avoid conducting major training exercises to the maximum extent practicable. • The Navy must not conduct more than four major training exercises per year.
Southeast North Atlantic Right Whale Mitigation Area (November 15 – April 15)
• The Navy must report the total hrs and counts of active sonar and in-water explosives used in the mitigation area in its annual training and testing activity reports. • The Navy must not use active sonar except as necessary for navigation training, object detection training, and dipping sonar. • The Navy must not expend explosive or non-explosive ordnance. • Vessels must obtain the latest North Atlantic right whale sightings data; must implement speed reductions after they observe a North Atlantic right whale, if within 5 nmi of a sighting reported within the past 12 hrs, and when operating at night or during periods of reduced visibility; and must minimize north-south transits to the maximum extent practicable.
Jacksonville Operating Area (November 15 – April 15)
• Navy units conducting training or testing activities in the Jacksonville Operating Area must obtain and use Early Warning System North Atlantic right whale sightings data as they plan specific details of events to minimize potential interactions with North Atlantic right whales to the maximum extent practicable. The Navy must use the reported sightings information to assist visual observations of applicable mitigation zones and to aid in the implementation of procedural mitigation.
Southeast North Atlantic Right Whale Critical Habitat Special Reporting Area (November 15 – April 15)
• The Navy must report the total hrs and counts of active sonar and in-water explosives used in the mitigation area in its annual training and testing activity reports.
Navy Cherry Point Range Complex Nearshore Mitigation Area (March – September)
• The Navy must not conduct explosive mine neutralization activities involving Navy divers in the mitigation area. • To the maximum extent practicable, the Navy must not use explosive sonobuoys, explosive torpedoes, explosive medium-caliber and large-caliber projectiles, explosive missiles and rockets, explosive bombs, explosive mines during mine countermeasure and neutralization activities, and anti-swimmer grenades in the mitigation area.
Bryde's Whale Mitigation Area
• The Navy must report the total hrs and counts of active sonar and in-water explosives used in the mitigation area in its annual training and testing activity reports. • The Navy must not conduct >200 hrs of hull-mounted mid-frequency active sonar per year and must not use explosives (except during explosive mine warfare activities).
Gulf of Mexico Planning Awareness Mitigation Areas
• The Navy must not conduct any major training exercises under the Proposed Action.

Notes: min.: minutes; nmi: nautical miles

Summary of Procedural Mitigation

A summary of procedural mitigation is described in Table 68 below.

Table 68. Summary of Procedural Mitigation.

Stressor or Activity	*Mitigation Zones 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 degrees on either side of the firing line out to 70 yd
Explosive Sonobuoys	• 600 yd
Explosive Torpedoes	• 2,100 yd
Explosive Medium-Caliber and Large-Caliber Projectiles	• 1,000 yd (large-caliber projectiles) • 600 yd (medium-caliber projectiles during surface-to-surface activities)

Stressor or Activity	*Mitigation Zones Sizes and Other Requirements*
	• 200 yd (medium-caliber projectiles during air-to-surface activities)
Explosive Missiles and Rockets	• 2,000 yd (21–500 lb net explosive weight) • 900 y. (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)
Maritime Security Operations – Anti-Swimmer Grenades	• 200 yd
Line Charge Testing	• 900 yd
Ship Shock Trials	• 3.5 nmi
Vessel Movement	• 500 yd (whales) • 200 yd (other marine mammals) • North Atlantic right whale Dynamic Management Area notification messages
Towed In-Water Devices	• 250 yd
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

Notes: lb: pounds; nmi: nautical miles; yd: yards

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 – and considered a broad range of other measures (*i.e.*, the measures considered but eliminated in the AFTT FEIS/OEIS, which reflect many of the comments that have arisen via NMFS or public input in past years) in the context of ensuring that NMFS prescribes the means of effecting the least practicable adverse impact on the affected marine mammal species and stocks and their habitat. 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.

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.

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 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 AFTT Study Area

NMFS has received multiple years' worth of annual exercise and monitoring reports addressing active sonar use and explosive detonations within the AFTT 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 AFTT Study Area. The Navy's annual exercise and monitoring reports may be viewed at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-military-readiness-activities* and *http://www.navymarinespeciesmonitoring.us*.

The Navy's marine species monitoring program typically supports 10-15 projects in the Atlantic at any given time with an annual budget of approximately $3.5M. 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/*.

Following is a summary of the work currently planned for 2019, some of which is wrapping up and some of which will continue for multiple years, based on the planning and review process outlined above, which includes input from NMFS and the Marine Mammal Commission. Additional details are available on the Navy's website (*https://www.navymarinespeciesmonitoring.us/regions/atlantic/current-projects/*):

- Atlantic Behavioral Response Study (Hatteras study area) - Assessing behavioral response of beaked whales and pilot whales to tactical military sonar and simulated scaled sonar with controlled exposure experiments.
- Pinniped Tagging and Tracking in Southeast Virginia (lower Chesapeake Bay) – Documenting habitat use, movements, and haul-out patterns of seals in the Hampton Roads region of the Chesapeake Bay and coastal Atlantic.

- Pinniped Haul-out Counts and Photo-Identification (lower Chesapeake Bay and Virginia eastern shore) – Documenting occurrence and seasonal site fidelity of seals at select haul-out locations in the lower Chesapeake Bay.
- Mid-Atlantic Humpback Whale Monitoring (coastal SE Virginia) – Photo identification and deployment of satellite-linked tracking tags to document occurrence, baseline behavior, and habitat use of humpback whales in the coastal mid-Atlantic waters of Virginia.
- Behavioral Reactions of Juvenile Humpback Whales to Approaching Ships (Chesapeake Bay shipping channels) – Assessing response of humpback whales to vessel approaches using DTags and visual focal follow methods.
- NARW Monitoring – Assess the behavior and distribution of NARWs using multiple methods including deployment of DTags in coastal waters of the Southeast calving grounds, and passive acoustic monitoring using autonomous underwater gliders in the mid-Atlantic region.
- Occurrence, Ecology, and Behavior of Deep-diving Odontocetes (Hatteras study area) – Deployment of satellite-linked tags to document and assess habitat use and diving behavior of beaked whales and pilot whales.
- Vessel baseline surveys and tagging of cetaceans (USWTR study area of Jacksonville OPAREA) – continuation of vessel-based visual surveys for cetaceans in the USWTR region, as well as satellite-linked tagging of priority species to document habitat use and movement patterns.

- Passive Acoustic baseline monitoring - Continue deployment of High-frequency Acoustic Recording packages (or similar) at multiple locations along the mid-Atlantic and SE coast to document seasonal patterns of species occurrence.
- Occurrence and Ecology of North Atlantic Shelf Break Species and Effects of Anthropogenic Noise Impacts – Assessment of acoustic niche and spatial/seasonal occurrence of beaked whales and Kogia, occurrence and acoustic behavior of baleen whales, and anthropogenic drivers of cetacean distribution using passive acoustics.
- Bryde's whale monitoring in GOMEX – collaboration with SEFSC to assess occurrence and distribution of Bryde's whales in GOMEX.
- Mid-Atlantic Continental Shelf Break Cetacean Study (VACAPES OPAREA) - Assess occurrence, habitat use, movement patterns, and baseline behavior of cetaceans (primarily medium to large whales) in continental shelf break region of the VACAPES OPAREA with visual surveys, photo ID, biopsy sampling, and satellite-linked tagging.
- Mid-Atlantic & Southeast Humpback Catalog – Establish a centralized collaborative humpback whale photo-id catalog for the mid-Atlantic and southeast regions to support management and environmental planning.

Adaptive Management

The final regulations governing the take of marine mammals incidental to Navy training and testing activities in the AFTT 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. NMFS and the Navy would meet to discuss the monitoring reports, Navy research and development studies, and current science and whether mitigation or monitoring modifications 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 reducing adverse effects to marine mammals and if the measures are practicable.

The following are some of the possible sources of applicable data to be considered through the adaptive management process: (1) results from monitoring 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 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 will 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 AFTT Monitoring Report

The Navy will submit an annual report to NMFS of the AFTT monitoring describing the implementation and results from the previous calendar year. Data collection methods will be standardized across range complexes and AFTT Study Area to allow for comparison in different geographic locations. The report will be submitted either 90 days after the calendar year, or 90 days 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 AFTT Study Area associated with the Integrated Comprehensive Monitoring Program. Similar study questions shall be treated together so that summaries can be provided for each topic area. The report need not include analyses and content that does not provide direct assessment of cumulative progress on the monitoring plan study questions.

Annual AFTT Exercise Report

Each year, the Navy will submit a preliminary report 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 shall submit a detailed report to NMFS within 3 months after the

anniversary of the date of issuance of the LOA. The annual report shall contain information on Major Training Exercises (MTEs) and Shock Trials, Sinking Exercise (SINKEX) events, and a summary of all sound sources used, including within specified mitigation areas (total hours or quantity (per the LOA) of each bin of sonar or other non-impulsive source and total annual expended/detonated ordnance (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 report will be based on the accumulation of data from the current year's report and data presented in the previous report. Information included in the classified annual reports may be used to inform future adaptive management of activities within the AFTT Study Area.

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.

Five-year Close-out Exercise Report

This report will be included as part of the 2023 annual exercise report. This report will provide the annual totals for each sound source bin with a comparison to the annual allowance and the five-year total for each sound source bin with a comparison to the five-year allowance. The draft report will be submitted to NMFS three months after the expiration of the rule. NMFS will provide comments, if any, to the Navy on the draft close-out report 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 report if NMFS does not provide comments.

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 39 and 41), 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 reflects 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 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 39 through 41. 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 39 through 41, 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, although likely somewhat conservatively, predicts the maximum amount of Level B harassment that is reasonably expected 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 Chapter 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 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. 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, some 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, 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 repeated takes of individuals are likely to occur, they are more likely to result from non-sequential exposures from different activities and marine mammals are not predicted to be taken for more than a few 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 mysticetes from sonar and other active sound sources during testing and training activities would be primarily from ASW events. It is important to note 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 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, and 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 AFTT 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 of the AFTT 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 AFTT 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 AFTT 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.

Last, 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 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 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. At a minimum, it provides a relative picture of the scale of impacts to each stock.

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), it is important to choose an appropriate population estimate to make the comparison. In this case, we appropriately compared the predicted takes to abundance estimates generated from the same underlying density estimate used to calculate the predicted take (described earlier and below), versus abundance estimates from the SARs, which are not based on the same data (and are more limited) and would not be appropriate for this

purpose. 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, but they are not the only information used to estimate takes. Instead here modeled density layers are used, which incorporate the SAR surveys and other survey data. 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 would misrepresent the percent of the population affected because of different population baselines. Note that to further refine NMFS' comparison of take to the population (which may be found in the *Group and Species-Specific Analyses* section below), comparisons are made both within the U.S. EEZ only (where density estimates have lesser uncertainty and takes are notably greater) and across the whole AFTT Study Area, which offers a more comprehensive comparison for many stocks.

The Navy uses, and NMFS concurs with, the use of spatially and temporally explicit density models (based on the best available science) that vary in space and time to estimate their potential impacts to species. See the *U.S. Navy Marine Species Density Database Phase III for the Atlantic Fleet 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 must be fully understood before drawing conclusions.

The AFTT Study Area covers a broad area in the western North Atlantic Ocean and the GOMEX. The Navy has tried to find density estimates for this entire area, where appropriate given species distributions. However, only a small number of Navy training and testing activities occur outside of the U.S. EEZ. As such, NMFS believes that the average population predicted by Navy models across seasons in the U.S. EEZ is the best baseline to use when analyzing takes as a proportion of population. This is a close approximation of the actual population used in Navy take analysis as occasionally sound can propagate outside of the U.S. EEZ and a small number of exercises do occur in international waters. This approximation will be less accurate for species with major changes in density close to the U.S. EEZ or far offshore. Models of individual species or stocks were not available for all species and takes had to be proportioned to the species or stock level from takes predicted on models at higher taxonomic levels. See the various Navy technical reports mentioned previously in this rule that detail take estimation and density model selection proposed by Navy and adopted by NMFS for details.

TTS

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. No TTS is estimated from air guns or pile driving activities because it is unlikely to occur. 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. 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; Schlundt *et al.*, 2000; Finneran *et al.*, 2002).

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 AFTT 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 animals 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) and from continuous sources 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 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; 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 marine mammal's 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 of 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 454 (454 for harbor porpoise), but is more typically a few up to 31 (with the exception of a few species). The number of individuals to potentially incur tissue damage from explosives for the predicted species ranges from 0 to 36 (36 for short-beaked common dolphin), but is typically zero in most cases.

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 are the most appropriate estimates of what is likely to occur, and we have analyzed them.

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 and 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).

Observing for marine mammals during ship shock (which includes Lookouts in aircraft or on multiple vessels) begins 5 hrs before the detonation and extends 3.5 nmi from the ship's hull (see Table 58). The required mitigation is expected to reduce the likelihood that all of the takes will occur. Some, though likely not all, of that reduction was quantified in the Navy's quantitative assessment of mitigation; however, 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.

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 AFTT 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.

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 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 (typically the 20th percentile of a log-normal distribution of the population estimate) reasonable assurance that the stock size is equal to or greater than the estimate (Barlow *et al.*, 1995). 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) and the use of PBR under section 118. The standard for authorizing incidental take under section 101(a)(5) continues to be, among other things, whether the total taking will have a negligible impact on the species or stock. 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 requirement for a negligible impact finding under section 101(a)(5)(A), 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, NMFS has used the concept almost entirely within the context of implementing sections 117 and 118 and other commercial fisheries management-related provisions of the MMPA. Although there are a few examples where PBR has informed agency deliberations under other sections of the MMPA, where PBR has been raised it has been a consideration and not dispositive to the issue at hand. Further, the agency's thoughts regarding the potential role of PBR in relation to other programs of the MMPA have evolved since the agency's earlier applications to section 101(a)(5) decisions. 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 USFWS 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 into the PBR value (*i.e.*, PBR minus the total annual anthropogenic mortality/serious injury estimate), which is called "residual PBR." (Wood *et al.*, 2012). We focus our analysis on residual PBR because it incorporates anthropogenic mortality occurring from other sources. We then consider how the anticipated or potential incidental M/SI from the activities being evaluated compares to residual PBR using the following framework.

Where a specified activity could cause (and NMFS is contemplating authorizing) incidental M/SI that is less than 10 percent of residual PBR (the "insignificance threshold, see below), 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 considerations such as information that illustrates the uncertainty involved in the calculation of PBR for some stocks. In a prior incidental take rulemaking, this threshold was identified as the "significance threshold," but it is more accurately labeled an insignificance threshold, and so we use that terminology here. 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 overestimated of residual PBR. 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*, 97 F. Supp.3d 1210, 1225 (D. Haw. 2015), which concerned a challenge to NMFS' issuance of letters of authorization to the Navy for activities in an area of the Pacific Ocean known as 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 the stock to reach or maintain OSP," with the formula for PBR designed to ensure that growth towards OSP is not reduced by more than 10 percent (or equilibrate to OSP 95 percent of the time). Separately, and without reference to PBR, NMFS' long-standing MMPA implementing regulations state that take will have a negligible impact when it does not "adversely affect the species or stock through effects on annual rates of recruitment or survival." OSP (to which PBR is linked) is defined in the statute as a population which 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. OSP is an aspirational goal of the overall statute and PBR is designed to ensure minimal deviation from this overarching goal. The "negligible impact" determination and finding protects against "adverse impacts on the affected species and stocks" when evaluating specific activities.

For all these reasons, even where M/SI exceeds residual PBR, it is still possible for the take to have a negligible impact on the species or stock. While "allowing a stock to reach or maintain OSP" would ensure that NMFS approached the negligible impact standard in a conservative and precautionary manner so that there were not "adverse effects on affected species or stocks," it is equally clear that in some cases the time to reach this aspirational OSP 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. Another difference between the two standards is the temporal scales upon which the terms focus. That is, OSP contemplates the incremental, 10 percent reduction in the rate to approach a goal that is tens or hundreds of years away. The negligible impact analysis, on the other hand, necessitates an evaluation of annual rates of recruitment or survival to support the decision of whether to issue five-year regulations.

Accordingly, while PBR is useful for evaluating 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 should not be considered determinative. The accuracy and certainty around the data that feed any PBR calculation (*e.g.*, the abundance estimates) must be carefully considered. This approach of using PBR as a trigger for concern while also considering other relevant factors provides a reasonable and appropriate means of evaluating the effects of potential mortality on

rates of recruitment and survival, while demonstrating that it is possible to exceed PBR 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 could occur follows. No mortalities or serious injuries are anticipated from 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' NEFSC has been incorporated into the residual PBR.

We first consider maximum potential incidental M/SI from Navy's ship strike analysis for the affected mysticetes and sperm whales (see Table 69) and from the Navy's explosive detonations for the affected dolphin species (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 over the course of the five-year rule could occur, but that no more than one over the five years of any species of humpback whale, fin whale, sei whale, minke whale, or sperm whale (North Atlantic stock) would occur. This means an annual average of 0.2 whales from each species or stock as described in Table 69 (*i.e.*, 1 take over 5 years divided by 5 to get the annual number) is planned for authorization.

Table 69. Summary Information Related to AFTT Ship Strike, 2018-2023.

Species (Stock)	Stock Abundance (Nbest)*	Annual Planned 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*	NEFSC authorized take (annual)	Residual PBR-PBR minus annual M/SI and NEFSC authorized take[3]	Stock trend*[4]	UME (Y/N); Number and Year
Fin whale (Western North Atlantic)	1,618	0.2	2.5	Y; 1.1	Y;1.4	2.5	0	0	?	N
Sei whale (Nova Scotia)	357	0.2	0.6	N; 0	Y; 0.6	0.5	0	-0.1	?	N
Minke Whale (Canadian East Coast)	2,591	0.2	7.5	Y; 6.5	Y; 1.1	14	1	5.5	?	Y/43; total in 2018 (27 in 2017 and 60 in 2018)
Humpback whale (Gulf of Maine)	896[5]	0.2	9.8	Y; 7.1	Y; 2.7	14.6	0	4.8	↑	Y/81; total in 2018 (26 in 2016, 33 in 2017 and 22 in 2018)
Sperm whale (North Atlantic)	2,288	0.2	0.8	Y; 0.6	Y; 0.2	3.6	0	2.8	?	?

*Presented in the draft 2018 SARS.
[1]This column represents the annual take by serious injury or mortality by vessel collision 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 strikes or NEFSC takes as noted in the SARs to ensure not double-counted against PBR. However, for these species, there were no takes from either Navy or NEFSC as noted 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 draft 2018 SARs) and authorized take for NEFSC.
[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 number of takes divided by five years to get the annual number.

The following species takes by serious injury or mortality from explosions (ship shock trials) are being authorized by NMFS. A total of nine mortalities (one Atlantic white-sided

dolphin, one pantropical spotted dolphin, one spinner dolphin, and six short-beaked common dolphins) are possible over the 5-year period and therefore the 0.2 mortalities annually for Atlantic white-sided dolphin, pantropical spotted dolphin, and spinner dolphin and 1.2 mortalities annually for short-beaked common dolphin are described in Table 70.

Table 70. Summary Information Related to AFTT Serious Injury or Mortality from Explosives (Ship Shock Trials), 2018-2023.

Species (Stock)	Stock Abundance (Nbest)*	Annual Planned 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*	NEFSC authorized take (annual)	Residual PBR - PBR minus annual M/SI and NEFSC authorized take[3]	Stock trend*[4]	UME (Y/N); Number and Year
Atlantic white-sided dolphin (Western N. Atlantic)	48,819	0.2	30	30	304	0.6	273.4	?	N
Pantropical spotted dolphin (Northern GOMEX)	50,880	0.2	4.4	4.4	407	0	402.6	?	Y/3; in 2010-2014
Short-beaked common dolphin (Western N. Atlantic)	70,184	1.2	406	406	557	2	149	?	N
Spinner dolphin (Northern GOMEX)	11,411	0.2	0	0	62	0	62	?	Y/7; in 2010-2014

*Presented in the draft 2018 SARS.
[1] This column represents the annual take by serious injury or mortality during ship shock trials 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 or NEFSC takes as noted in the SARs to ensure not double-counted against PBR. However, for these species, there were no were no takes from either Navy or NEFSC as noted 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 draft 2018 SARs) and authorized take for NEFSC.
[4]See relevant SARs for more information regarding stock status and trends.

Species or 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 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, and authorized, M/SI below their insignificance threshold: humpback whales (Gulf of Maine), sperm whale (North Atlantic), Atlantic white-sided dolphins (Western Atlantic stock), Pantropical spotted dolphins (Northern GOMEX stock), short-beaked common dolphins (Western North Atlantic stock), spinner dolphins (Northern GOMEX stock), and minke whales (Canadian East Coast). While the authorized mortality of humpback whales and minke whales is below the insignificance threshold, because of the ongoing UMEs for these species, we address how other factors in the evaluation of how the authorized serious injury or mortality 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 stocks with anticipated potential M/SI above the insignificance threshold, how that M/SI compares to residual PBR and discussion of additional factors are discussed in the section that follows.

Humpback Whale

Authorized mortality of humpback whales is below the insignificance threshold. Additionally, when evaluating the mortality authorization in the context of the PBR designated

for the Gulf of Maine stock, a primary consideration is that, although the Gulf of Maine stock is the only stock designated under the MMPA, it is but one of several North Atlantic feeding groups associated with the West Indies breeding population DPS (which is not considered at risk and thereby not ESA-listed) found within the AFTT Study Area. Humpbacks encountered along the East Coast within the AFTT Study Area may be from the Gulf of Maine stock, the Newfoundland feeding group, the Gulf of St. Lawrence feeding group, or one of the other three feeding groups associated with the West Indies DPS. The Gulf of Maine stock likely dominates the northern portion of the AFTT Study Area, where there is far less Navy activity and ship traffic, but the southeastern and mid-Atlantic tissue sampling and photo ID work (of relatively small sample size) suggests that Gulf of Maine stock individuals might comprise approximately of 30 percent of the individuals in the rest of the of the AFTT study area, *i.e.*, the mid- and south Atlantic portion (Hayes *et al.*, 2017). In other words, if there were a mortality, it would not necessarily come from the Gulf of Maine stock. It is more appropriate to consider the mortality in the context of the much larger West Indies DPS, which has an increasing growth trend of 3.1 percent (Bettridge *et al.*, 2015) and would have a much higher PBR if it were calculated for the whole DPS or any of the other feeding groups (none of which are designated as stocks). Similarly, the humpback UME is of concern, but the number of recorded deaths along the Atlantic Coast could come from a number of feeding groups (at least four of which definitely have individuals that move through the AFTT Study Area) and should be considered in that context. In other words, the addition of the single Navy authorized mortality means that the total human-caused mortality to all humpbacks recorded from the Atlantic (which actually occurs from multiple feeding groups, most of which are not considered stocks) is still less than the insignificance threshold of the Gulf of Maine stock alone, meaning that if the human-caused

mortality in the Atlantic were compared against the abundance (and associated PBR) of the much larger (and increasing) DPS (or multiple feeding groups) to which the deaths actually accrue, the single Navy mortality would be even more clearly unlikely to have any effects on annual rates of recruitment or survival.

Of additional note, specifically, there are over 10,000 humpback whales in the West Indies DPS. If one were to calculate a PBR for that group, using a recovery factor of 0.5 (which is appropriate for stocks when the OSP is not known), an rmax of 0.4, and assuming very conservatively that nmin would be 5,000 or more (for U.S. stocks nmin is typically 80% or more of the abundance estimate in the SAR), PBR would be around 50. Eighty-four mortalities have been recorded during the UME (since 2016), averaging 28 per year. However, average mortalities from 2011-2015 averaged about 13, which means that there are about 15 more mortalities annually during the UME than typically recorded when there is no UME. If these UME mortalities were combined with other annual human-caused mortalities and were viewed through the PBR lens (for human-caused mortalities), total human-caused mortality (inclusive of additional UME deaths, which are not necessarily human-caused, as a portion have been attributed to vessel strike, while others are inconclusive) would be well under the residual PBR for the West Indies DPS.

Also of note, the Atlantic Large Whale Take Reduction Plan (ALWTRP) is a program to reduce the risk of serious injury and death of large whales caused by accidental entanglement in U.S. commercial trap/pot and gillnet fishing gear. Since its implementation in 1997, it aims to reduce the number of whales taken by gear entanglements focusing on fin whales, humpback whales, and NARW. In 2003, the Atlantic Large Whale Take Reduction Team (Team) agreed to manage entanglement risk by first reducing the risk associated with groundlines and then

reducing the risk associated with vertical lines in commercial trap/pot and gillnet gear. In 2014, the Plan was amended (79 FR 36586, June 27, 2014) to address large whale entanglement risks associated with vertical line (or buoy lines) from commercial trap/pot fisheries. This amendment included gear modifications, gear setting requirements, an expanded seasonal trap/pot closure (Massachusetts Restricted Area), and gear marking for both trap/pot and gillnet fisheries. The original Massachusetts Restricted Area was a seasonal closure from January 1 through April 30 for all trap/pot fisheries. In a subsequent Plan amendment, the boundary for the Massachusetts Restricted Area was expanded by 900 mi^2 (2.59 km^2), and the start date changed to February 1 (79 FR 73848, December 12, 2014).

Currently the Atlantic Large Whale Take Reduction Plan has two seasonal trap/pot closures: the Massachusetts Restricted Area (50 CFR 229.32(c)(3)) and the Great South Channel Trap/Pot Closure (50 CFR 229.32(c)(4)). The Massachusetts Restricted Area prohibits fishing with, setting, or possessing trap/pot gear in this area unless stowed in accordance with § 229.2 from February 1 to April 30. The Great South Channel Trap/Pot Closure prohibits fishing with, setting, or possessing trap/pot gear in this area unless stowed in accordance with § 229.2 from April 1 through June 30. Effective September 1, 2015, the ALWTRP included new gear marking areas for gillnets and trap/pots for Jeffrey's Ledge and Jordan Basin (Gulf of Maine), two important high-use areas for humpback whales and NARWs. The only study available that examined the effectiveness of the ALWTRP reviewed the regulations up to 2009 (Pace *et al.*, 2014) and the results called for additional mitigation measures needed to reduce entanglements. Since that time, NMFS put two major regulatory actions in place -- the 2007 sinking groundline rule that went into effect in 2009 (73 FR 51228) and the 2014 vertical line rule that went into effect in 2015 (79 FR 36586). The Office of Law Enforcement (OLE) reports that of gear

checked by OLE under the ALWTRP, they found a compliance rate of 94.49 percent in FY-2015 and 84.42 percent in FY-2016. In addition, NMFS Fisheries Science Centers held a working group in May 2018 to make recommendations on the best analytical approach to measure how effective these regulations have been, however, the results of the meeting are not yet available. For more information on this program please refer to *https://www.greateratlantic.fisheries.noaa.gov/protected/whaletrp/.*

Minke Whale

Authorized mortality of minke whales is below the insignificance threshold. The abundance and PBR of minke whales is significantly greater than what is reflected in the current SAR because the most recent population estimate is based only on surveys in U.S. waters and slightly into Canada, and did not cover the habitat of the entire Canadian East Coast stock. The 2015 SAR abundance included data from the 2007 Canadian Trans-North Atlantic Sighting Surveys (TNASS), which appropriately included surveys of Nova Scotian and Newfoundland Canadian waters and estimated an abundance of 20,741 minkes with a PBR of 162, as opposed to the current estimates of 2,591 and 14, respectively. However, as recommended in the guidelines for preparing SARs (NMFS 2016), estimates older than eight years are deemed unreliable, so the 2018 SAR population estimate does not include data from the 2007 TNASS. While it is certainly possible that the numbers in Canadian waters have changed since the last TNASS survey, there is no reason to think that the majority of the individuals in the stock would not still occupy the Canadian portion of the range. Additionally, the current abundance estimate does not account for availability bias due to submerged animals (*i.e.*, estimates are not corrected to account for the fact that given X number of animals seen at the surface, we can appropriately assume that Y number were submerged and not counted). Without a correction for this bias, the

abundance estimate is likely further biased low. Last, while the UME is a concern, we note that the deaths should be considered in the context of the whole stock, which most certainly has a significantly higher abundance and PBR than those reflected in the SAR.

Of additional note, specifically, the PBR was previously estimated at 162 when the full abundance was considered. Fifty-two mortalities have been recorded during the UME (since 2017), averaging 26 per year. However, average mortalities from 2011-2016 averaged about 13, which means that there are about 13 more mortalities annually during the UME than typically recorded when there is no UME. If these UME mortalities were combined with other annual human-caused mortalities and were viewed through the PBR lens (for human-caused mortalities), and we assumed that PBR was in the vicinity of the PBR previously reported (162), total human-caused mortality (inclusive of additional UME deaths) would still be well under residual PBR for the full stock of minke whales.

Species or stocks with M/SI above the Insignificance Threshold

Fin Whale

For fin whales (Western North Atlantic stock) PBR is currently set at 2.5 and the total annual M/SI is 2.5, yielding a residual PBR of 0. The M/SI value includes the records of 1.0 annual fishery interaction and 1.5 annual vessel collisions. For the reasons discussed above, those collisions are unlikely to be from Navy vessels. NMFS is authorizing one 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 0.2 (although of note, Navy take alone does not exceed PBR itself). However as explained earlier, this does not mean that the stock is not at or increasing toward OSP or that one lethal take by the Navy in the five years covered by this rule would adversely affect the stock through annual reproduction or survival rates. To the

contrary, consideration of the information outlined below indicates that the Navy's authorized mortality is not expected to result in more than a negligible impact on this stock.

The abundance of fin whales is likely significantly greater than what is reflected in the current SAR because the most recent population estimate is based only on surveys in U.S. waters and slightly into Canada, and did not cover the habitat of the entire stock, which extends over a very large additional area into Nova Scotian and Newfoundland waters. Accordingly, if a PBR were calculated based on an appropriately enlarged abundance, it would be notably higher. Additionally, the current abundance estimate does not account for availability bias due to submerged animals (*i.e.*, estimates are not corrected to account for the fact that given X number of animals seen at the surface, we can appropriately assume that Y number were submerged and not counted). Without a correction for this bias, the abundance estimate is likely further biased low. Because of these limitations, the current calculated PBR is not a reliable indicator of how removal of animals will affect the stock's ability to reach or maintain OSP. We note that, generally speaking, while the abundance may be underestimated in this manner for some stocks due to the lack of surveys in areas outside of the U.S. EEZ, it is also possible that the human-caused mortality could be underestimated in the un-surveyed area. However, in the case of fin whales, most mortality is caused by entanglement in gear that is deployed relatively close to shore and, therefore, unrecorded mortality offshore would realistically be proportionally less as compared to the unsurveyed abundance and therefore the premise that PBR is likely underestimated still holds. Given the small amount by which residual PBR is exceeded and more significant degree (proportionally) to which abundance is likely underestimated, it is reasonable to think that if a more realistic PBR were used, the anticipated total human-caused mortality would be notably under it.

Additionally, the ALWTRP (as described above) is a program to reduce the risk of serious injury and death of large whales caused by accidental entanglement in U.S. commercial trap/pot and gillnet fishing gear. It aims to reduce the number of whales taken by gear entanglements focusing on fin whales, humpback whales, and NARW. ALWTRP measures have equal effectiveness in reducing entanglement of fin whales.

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, residual PBR would not be exceeded in 80 percent of the years covered by this rule. In these particular situations where authorized M/SI is fractional, consideration must be given to the lessened impacts anticipated due to the absence of mortality in four of the five years. Last, we reiterate the fact that PBR is a conservative metric and also is not sufficiently precise to serve as an absolute predictor of population effects upon which mortality caps would appropriately be based, which is especially important given the subtle difference between zero and one across the five-year period, which is the smallest possible distinction one can have if there is any consideration of mortality.

Nonetheless, the exceedance of residual PBR necessitates close attention to the remainder of the impacts on fin whales from this activity to ensure that the total authorized impacts are negligible. This information will be considered in combination with our assessment of the impacts of harassment takes later in the section.

Sei Whale

For sei whales (Nova Scotia stock) PBR is currently set at 0.5 and the total annual M/SI is 0.6, yielding a residual PBR of -0.1. The fact that residual PBR is negative means that the total anticipated human-caused mortality is expected to exceed PBR even in the absence of additional take by the Navy. The M/SI value includes no records of annual fishery interactions, but 0.6

annual vessel collisions. For the reasons discussed above, those collisions are unlikely to be from Navy vessels. NMFS is authorizing one 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 0.3. However as explained earlier, this does not necessarily mean that the stock is not at or increasing toward OSP or that one lethal take by the Navy in the five years would adversely affect reproduction or survival rates. In fact, consideration of the additional information below supports our determination that the Navy's authorized mortality is not expected to result in more than a negligible impact on this stock.

The abundance of sei whales is likely significantly greater than what is reflected in the current SAR because the population estimate is based only on surveys in U.S. waters and slightly into Canada, and did not cover the habitat of the entire stock, which extends over a large additional area around to the south of Newfoundland. Accordingly, if a PBR were calculated based on an appropriately enlarged abundance, it would be higher. Additionally, the current abundance estimate does not account for availability bias due to submerged animals (*i.e.*, estimates are not corrected to account for the fact that given X number of animals seen at the surface, we can appropriate assume that Y number were submerged and not counted). Without a correction for this bias, the abundance estimate is likely biased low. Because of these limitations, the current calculated PBR is not a reliable indicator of how removal of animals will affect the stock's ability to reach or maintain OSP. We note that, generally speaking, while the abundance may be underestimated in this manner for some stocks due to the lack of surveys in areas outside of the U.S. EEZ, it is also possible that the human-caused mortality could be underestimated in the un-surveyed area. However, in the case of sei whales, most mortality is caused by ship strike and the density of ship traffic is higher the closer you are to shore (making strikes more likely

closer to shore) and, therefore, unrecorded mortality offshore would realistically be proportionally less as compared to the unsurveyed abundance and therefore the premise that PBR is likely underestimated still holds. Given the small amount by which residual PBR is exceeded, and more significant degree (proportionally) to which abundance is likely underestimated, it is reasonable to think that if a more realistic PBR were used, the anticipated total human mortality would be notably under it.

We also note that in this case, 0.2 M/SI means one mortality in one of five years and zero mortalities in four of those five years. Residual PBR is not being exceeded in 80 percent of the years. In these particular situations where authorized M/SI is fractional, consideration must be given to the lessened impacts anticipated due to the absence of mortality in four of the five years. Last, we reiterate the fact that PBR is a conservative metric and also is not sufficiently precise to serve as an absolute predictor of population effects upon which mortality caps would appropriately be based, which is especially important given the subtle difference between zero and one across the five-year period, which is the smallest possible distinction one can have if there is any consideration of mortality.

Nonetheless, the exceedance of residual PBR necessitates close attention to the remainder of the impacts on sei whales from this activity to ensure that the total authorized impacts are negligible. This information will be considered in combination with our assessment of the impacts of harassment takes later in the section.

Group and Species-Specific Analyses

Overview

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 39 and 40 as well as ship shock trials shown in Table 41. 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 take numbers 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 16 times.

Those comparisons are included in the sections below. For some stocks these numbers have been adjusted slightly (single digits) since the proposed rule to more consistently apply this approach, but these minor changes did not change the analysis or findings.

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 the less severe end, exposure to comparatively lower levels of a 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 feed 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 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.

Deepwater Horizon (DWH) Oil Spill

As discussed in the proposed rule, tens of thousands of marine mammals were exposed to the DWH surface slick, where they inhaled, aspirated, ingested, and came into contact with oil

components (Dias *et al.*, 2017). The oil's physical and toxic effects damaged tissues and organs, leading to a constellation of adverse health effects, including reproductive failure, adrenal disease, lung disease, and poor body condition, as observed in bottlenose dolphins (De Guise *et al.*, 2017; Kellar *et al.*, 2017). Coastal and estuarine bottlenose dolphin populations were some of the most severely injured (Hohn *et al.*, 2017; Rosel *et al.*, 2017; Thomas *et al.*, 2017), as described previously in relation to the UME, but oceanic species were also exposed and experienced increased mortality, increased reproductive failure, and a higher likelihood of other adverse health effects.

Due to the scope of the spill, the magnitude of potentially injured populations, and the difficulties and limitations of working with marine mammals, it is impossible to quantify injury without uncertainty. Wherever possible, the quantification results represent ranges of values that encapsulate the uncertainty inherent in the underlying datasets. The population model outputs shown in Table 71 best represent the temporal magnitude of the injury and the potential recovery time from the injury (DWH NRDA Trustees (Deepwater Horizon Natural Resource Damage Assessment Trustees), 2016). The values in the table inform the baseline levels of both individual health and susceptibility to additional stressors, as well as stock status, with which the effects of the Navy takes are considered in the negligible impact analysis.

Table 71. Summary of Modeled Effects of DWH Oil Spill.

Common name	% Population exposed to oil (95% CI)	% Population killed (95% CI)	% Females with reproductive failure (95% CI)	% Population with adverse health effects (95% CI)	% Maximum population reduction (95% CI)	Years to recovery (95% CI)[b]
Bryde's whale	48 (23–100)	17 (7–24)	22 (10–31)	18 (7–28)	−22	69
Sperm whale	16 (11–23)	6 (2–8)	7 (3–10)	6 (2–9)	−7	21
Kogia spp.	15 (8–29)	5 (2–7)	7 (3–10)	6 (2–9)	−6	11
Beaked whales	12 (7–22)	4 (2–6)	5 (3–8)	4 (2–7)	−6	10
Rough-toothed dolphin	41 (16–100)	14 (6–20)	19 (9–26)	15 (6–23)	−17	54
Bottlenose dolphin, oceanic	10 (5–10)	3 (1–5)	5 (2–6)	4 (1–6)	−4	n/a
Bottlenose dolphin, northern coastal	82 (55–100)	38 (26–58)	37 (17–53)	30 (11–47)	−50 (32–73)	39 (23–76)
Bottlenose dolphin, western coastal	23 (16–32)	1 (1–2)	10 (5–15)	8 (3–13)	−5 (3–9)	n/a
Shelf dolphins[a]	13 (9–19)	4 (2–6)	6 (3–8)	5 (2–7)	−3	n/a
Clymene dolphin	7 (3–15)	2 (1–4)	3 (2–5)	3 (1–4)	−3	n/a
Pantropical spotted dolphin	20 (15–26)	7 (3–10)	9 (4–13)	7 (3–11)	−9	39
Spinner dolphin	47 (24–91)	16 (7–23)	21 (10–30)	17 (6–27)	−23	105
Striped dolphin	13 (8–22)	5 (2–7)	6 (3–9)	5 (2–8)	−6	14
Risso's dolphin	8 (5–13)	3 (1–4)	3 (2–5)	3 (1–4)	−3	n/a
Melon-headed whale	15 (6–36)	5 (2–7)	7 (3–10)	6 (2–9)	−7	29
Pygmy killer whale	15 (7–33)	5 (2–8)	7 (3–10)	6 (2–9)	−7	29
False killer whale	18 (7–48)	6 (3–9)	8 (4–12)	7 (3–11)	−9	42
Short-finned pilot whale	6 (4–9)	2 (1–3)	3 (1–4)	2 (1–3)	−3	n/a

Modified from DWH NRDA Trustees (2016).
CI = confidence interval. No CI was calculated for population reduction or years to recovery for shelf or oceanic stocks.
[a] "Shelf dolphins" includes Atlantic spotted dolphins and the shelf stock of bottlenose dolphins (20–200 m water depth). These two species were combined because the abundance estimate used in population modeling was derived from aerial surveys and the species could not generally be distinguished from the air.
[b] It is not possible to calculate YTR for stocks with maximum population reductions of less than or equal to 5 percent.

Group and Species-Specific Analyses

The analysis below in some cases (*e.g.*, porpoises, pinnipeds) addresses species collectively if they occupy the same functional hearing group (*i.e.*, low, mid, and high-frequency cetaceans and pinnipeds in water), have similar hearing capabilities, and/or are known to behaviorally respond similarly to acoustic stressors. Because some of these species have similar hearing capabilities and respond similarly to received sound, it would be duplicative to repeat the same analysis for each species. In addition, animals belonging to each stock within a species 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.

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 the unlikelihood of any masking or habitat impacts to any groups that would rise to the level of affecting individual fitness. 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 (UMEs) as well as mortality take for multiple stocks, we break out stock-specific findings at the end of the section.

In 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. Since the proposed rule, the Navy has removed one of their testing events in the Northeast Range Complex (four events - USWT), which decreased the number of Level B harassment takes annually for NARW by 115 takes. This change also decreased annual Level B harassment takes by approximately 200 takes for ESA-listed fin whales and 20 takes for sei whales.

Table 72: Annual takes of Level B and Level A harassment, mortality for mysticetes in the AFTT 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)					Total takes		Abundance		Instances of total take as percentage of abundance	
		Level B Harassment		Level A Harassment								
Species	Stock	Behavioral Disturbance	TTS (may also include disturbance)	PTS	Tissue Damage	Mortality	In EEZ	Inside and Outside EEZ	In EEZ	Inside and Outside EEZ	In EEZ	Inside and Outside EEZ
Suborder Mysticeti (baleen whales)												
Family Balaenidae (right whales)												
North Atlantic right whale*	Western North Atlantic	203	268	0	0	0	471	471	343	343	137	137
Family Balaenopteridae (roquals)												
Blue whale*	Western North Atlantic (Gulf of St. Lawrence)	12	35	0	0	0	44	47	9	104	489	45
Bryde's whale	Northern Gulf of Mexico	24	31	1	0	0	56	56	50	50	112	112
	NSD	77	260	0	0	0	313	337	50	563	626	60
Minke whale	Canadian East Coast	796	3,284	5	0	0.2	3913	4085	730	7686	536	53
Fin whale*	Western North Atlantic	1,716	3,671	33	0	0.2	5368	5420	1,660	14769	323	37
Humpback whale	Gulf of Maine	248	498	3	0	0.2	698	749	496	4580	141	16
Sei whale*	Nova Scotia	245	556	4	0	0.2	779	805	246	11737	317	7

Note: Above we compare predicted takes to abundance estimates generated from the same underlying density estimate (as described in the *Estimated Take of Marine Mammals* section), versus abundance estimates directly from NMFS' SARs, which are not based on the same data and would not be appropriate for this purpose. Note that comparisons are made both within the U.S. EEZ only (where density estimates have lesser uncertainty and takes are notably greater) and across the whole Study Area (which offers a more comprehensive comparison for many stocks).

Total takes inside and outside U.S. EEZ represent the sum of annual Level A and Level B harassment from training and testing plus take from one large ship shock trial.

The annual mortality of 0.2 is because we expect no more than one mortality over the course of five years from vessel strikes as previously described above.

The majority of takes by harassment of mysticetes in the AFTT Study Area are caused by sources from the MF1 active sonar bin (which includes hull-mounted sonar) because they are high level sources in the 1-10 kHz range, which overlaps the most sensitive area of hearing for mysticetes, and of the sources expected to result in take, they also are used in a large portion of exercises (see Table 1.5-5 in the Navy's application). Most of the takes (64 percent) from the MF1 bin in the AFTT Study Area would result from received levels between 160 and 172 dB SPL, while another 32 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 154, MF4 = 98 percent between 136 and 145, MF5 = 97 percent between 118 and 142, 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 or PTS, and the TTS takes are in the single digits and comprise a fraction (approximately 1-10 percent) of those caused by exposure to active sonar. There are no takes of mysticetes by pile driving or airguns. 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 grounds (*i.e.*, breeding or feeding). Behavioral reactions may include alerting, breaking off feeding dives and surfacing, diving or swimming away, or no response at all (Richardson, 1995; Nowacek, 2007; Southall *et al.*, 2007; DOD, 2017). 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. Although they may pause temporarily, they will resume migration shortly after. 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. 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 generally do not use the same training locations day-after-day during multi-day activities. Therefore, displaced animals could return quickly after the MTE finishes. Due to the limited number and broad geographic scope of MTEs, it is unlikely that most mysticetes would encounter a major training exercise more than once per year and no MTEs will occur in the GOMEX or the Gulf of

Maine area where the BIA feeding areas for NARW, fin whales, humpback whales, minke whales, and sei whales are located. 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 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 shift caused by Navy sonar sources will typically occur in the range of 2-20 kHz (from the 1-10 kHz MF1 bin), and if resulting from hull-mounted sonar, will be in the range of 3.5-7 kHz. The majority of mysticete vocalizations, including for NARW, occurs 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 implement mitigation areas that will avoid or reduce impacts from harassment to mysticetes and these areas contain some of the BIAs for large whales and ESA-designated critical habitat for NARW. The NARW is an at-risk species with an ongoing UME.

In order to mitigate the number and potential severity of any NARW harassment takes, from November 15 through April 15, the Navy will not conduct LFAS/MFAS/HFAS, except for sources that will be minimized to the maximum extent practicable during helicopter dipping, navigation training, and object detection exercises within the SE NARW Mitigation Area. As discussed previously, the majority of takes result from exposure to the higher power hull-mounted sonar during major training exercises, which will not occur here. The activities that are allowed to occur such as those used for navigation training or object detection exercises use lower level sources that operate in a manner less likely to result in more concerning affects (*i.e.*, single sources for shorter overall amounts of time – *e.g.*, activity is less than 30 min). Animals in these protected areas are engaged in important behaviors, either feeding or interacting with calves, during which if they were disturbed the effects could be more impactful (*e.g.*, if whales were displaced from preferred feeding habitat for long periods, there could be energetic consequences more likely to lead to an adverse effect on fitness, or if exposure to activities caused a severe disturbance to a cow-calf pair that resulted in the pair becoming separated, it could increase the risk of predation for the calf). By limiting activities, the number of takes that would occur in these areas is decreased and the probability of a more severe impact is reduced. The SE NARW Mitigation Area encompasses a portion of the NARW migration and calving areas identified by LaBrecque *et al.* (2015a) and a portion of the southeastern NARW ESA-designated critical habitat. Outside of the SE NARW Mitigation Area, active sonar would be used for ASW activities and for pierside sonar testing at Kings Bay, Georgia. The best available density data for the AFTT Study Area shows that the areas of highest density are off the southeastern United States in areas that coincide with the SE NARW Mitigation Area. Therefore, the majority of active sonar use would occur outside of the areas of highest seasonal NARW

density and important use areas off the southeastern United States. In addition, before transiting or conducting testing and training activities, the Navy will coordinate to obtain Early Warning System NARW sighting data to help vessels and aircraft reduce potential interactions with NARWs.

The Navy will also minimize the use of active sonar in the NE NARW Mitigation Area. Refer to the *Mitigation Measures* section of this rule for a description of the area. Torpedo (non-explosive) activities can occur throughout the year, however, based on typical testing schedules only a limited number would likely be conducted in August and September. Many NARW will have migrated south out of the area by that time. Torpedo training or testing activities would not occur in or within 2.7 nmi of the Stellwagen Bank National Marine Sanctuary, which is critical habitat for NARW foraging. Stellwagen Bank National Marine Sanctuary also provides feeding and nursery grounds for NARW, humpback, sei, and fin whales. Since the proposed rule, the Navy has agreed to expand the NE NARW Mitigation Area to cover the full extent of the northeast NARW ESA-designated critical habitat designated under the ESA and has agreed not to conduct MTEs in the Gulf of Maine Planning Awareness Mitigation Area. One hundred percent of the NARW feeding area on Jeffreys Ledge and the NARW mating area in the central Gulf of Maine are included in the expanded NE NARW Mitigation Area (as well as in the Gulf of Maine Planning Awareness Area). The expanded NE NARW Mitigation Area covers Cape Cod Bay, Jeffreys Ledge, the western edge of Georges Bank, and the northern portion of the Great South Channel; 100 percent of the NARW feeding area on Cape Cod Bay and Massachusetts Bay and 95.08 percent of the NARW feeding area in the Great South Channel and the northern edge of George's Bank is included in the expanded NE NARW Mitigation Area, The mitigation measures required in the previous NE NARW Mitigation Area will carry over to

the expanded mitigation area and be implemented year-round. These same important feeding and mating areas for NARW in the northeast are 100 percent included in the Gulf of Maine Planning Awareness Mitigation Area.

The humpback whale (1 BIA), minke whale (2 BIAs), fin whale (2 BIAs), and sei whale (1 BIA) feeding BIAs (6 total) are also located within the NE NARW Mitigation Area or Gulf of Maine Planning Awareness Mitigation Area (or both). Ninety-seven percent of the humpback whale feeding area in the Gulf of Maine, Stellwagen Bank, and the Great South Channel are included in the NE NARW Mitigation Area (100 percent in the Gulf of Maine Planning Awareness Mitigation Area). One hundred percent of the minke whale feeding BIA (central Gulf of Maine - Parker Ridge and Cashes Ledge) is included in the NE NARW Mitigation Area and the Gulf of Maine Planning Awareness Mitigation Area. One hundred percent of the fin whale feeding area BIA in the southern and the northern Gulf of Maine are included in the NE NARW Mitigation Area and the Gulf of Maine Planning Awareness Mitigation Area. Seventy-three percent of the sei whale feeding area in the Gulf of Maine is included in the NE NARW Mitigation Area (100 percent in the Gulf of Maine Planning Awareness Mitigation Area). Approximately half of the minke whale feeding area in the southwestern Gulf of Maine and Georges Bank is included in the NE NARW Mitigation Area (100 percent in the Gulf of Maine Planning Awareness Mitigation Area). The Navy will limit the use of active sonar to the maximum extent practicable and not use certain explosive and non-explosive munitions year-round within the NE NARW Mitigation Area to further reduce potential impacts on large whales feeding and NARW in their most important feeding areas, a mating area, and the northern portion of their migration habitat. Newly developed for this regulatory period, the Gulf of Maine Planning Awareness Mitigation Area extends throughout the Gulf of Maine and southward over

Georges Bank. The mitigation will further reduce potential impacts on marine mammals from active sonar during MTEs within key areas of biological importance, including NARW critical habitat; a portion of the northern NARW migration area; NARW, humpback whale, minke whale, sei whale, and fin whale feeding areas; and a NARW mating area.

The Bryde's whale BIA is inclusive of the GOMEX Planning Awareness Mitigation Areas and the Navy will not conduct MTEs in the GOMEX. Since the proposed rule, the Navy agreed upon the addition of a mitigation area for Bryde's whale. The Bryde's Whale Mitigation Area covers the extent of the Bryde's whale small and resident population area identified by LaBrecque *et al.* (2015b), including the extended area identified by NMFS in its 2016 Bryde's whale status review (Rosel *et al.*, 2016). In this mitigation area, the Navy will limit annual hours of MFAS use and will not use in-water explosives (except during mine warfare activities) to avoid or reduce potential impacts on the small and resident population of Bryde's whales.

As described previously there are three ongoing UMEs for NARW, humpback whales, and minke whales. There is significant concern regarding the status of the NARW, both because of the ongoing UME and because of the overall status of the stock. However, the Navy's mitigation measures make NARW mortality unlikely— and we are not authorizing such take— and the newly expanded mitigation areas further reduce the extent of potential Level B harassment by behavioral disruption in areas that are important for NARW, hence reducing the significance of such disruption. NMFS also has concern regarding the UMEs for humpback and minke whales. NMFS, in coordination with our stranding network partners, continues to investigate the recent mortalities, environmental conditions, and population monitoring to better understand how the recent humpback and minke whale mortalities occurred. Also, these unexplained mortalities have been evaluated in the context of other human-caused mortality and

the single authorized mortalities for these species in the sections above. Ship speed reduction rules are in effect for commercial and large vessels during times of high concentrations of NARW, and require vessels greater than or equal to 65 feet in length to reduce speeds to 10 kn or less while entering or departing ports. While this rule was put into place primarily for the NARW presence in New England and Mid-Atlantic waters, it does benefit other whale species, such as humpback whales that are in those areas from November through July. NOAA is reviewing ship-tracking data to ensure compliance with the ship speed reduction rule around Cape Cod, New York, and the Chesapeake Bay areas. The UME for minke whales was recently declared. Preliminary findings in several of the whales have shown evidence of human interactions or infectious disease. These findings are not consistent across all of the whales examined, so more research is needed. As part of the UME investigation process, NOAA is assembling an independent team of scientists to coordinate with the Working Group on Marine Mammal Unusual Mortality Events to review the data collected, sample stranded whales, and determine the next steps for the investigation.

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:

NARW (Western stock) – As described previously, the status of NARW is precarious and they are listed as endangered under the ESA. There is a UME associated with the recent unusually high number of deaths (some of which have been attributed to entanglement), the number of births in recent years has been unusually low, and recent studies have reported individuals showing poor health or high stress levels. Accordingly and as described above, the Navy is implementing a comprehensive suite of mitigation measures that not only avoid the

likelihood of ship strikes, but also minimize the severity of behavioral disruption by minimizing impacts in areas that are important for feeding and calving, thus ensuring that the relatively small number of Level B harassment takes that do occur are not expected to affect reproductive success or survivorship via detrimental impacts to energy intake or cow/calf interactions. Specifically, 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 instances compared to the abundance (137 percent) combined with the fact that the AFTT Study Area overlaps most if not all of the range, suggests that many to most of the individuals in the stock will likely be taken, but only on one or two days per year, with no reason to think the days would likely be sequential. 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), the received sound levels are largely below 172 dB with some lesser portion up to 178 dB (*i.e.*, of a moderate or lower level, less likely to evoke a severe response), and that because of the mitigation the exposures will not occur in areas or at times where impacts would be likely to affect feeding and energetics or important cow/calf interactions that could lead to reduced reproductive success or survival. Regarding the severity of TTS takes, we have explained that they are expected to be low-level and of short duration and the associated lost opportunities and capabilities are not at a level that would impact reproduction or survival.

Altogether, any individual NARW is likely to be disturbed at a low-moderate level on no more than a couple of likely non-sequential days per year (and not in biologically important areas). Even given the fact that some of the affected individuals may have compromised health, there is nothing to suggest that such a low magnitude and severity of effects would result in

impacts on reproduction or survival of any individual, much less impacts on annual rates of recruitment or survival for the stock. 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 NARW.

Blue Whale (Western North Atlantic stock) – This is a wide-ranging stock that is best considered as "an occasional visitor" to the U.S. EEZ, which may represent the southern limit of its feeding range (2017 SARS), though no specific feeding areas have been identified. For this reason, the abundances calculated by the Navy based on survey data in the U.S. EEZ are very low (9 and 104, in the U.S. EEZ and throughout the range respectively) and while NMFS' 2018 SAR does not predict an abundance, it does report an Nmin (minimum abundance) of 440. There is no currently reported trend for the population and there are no specific issues with the status of the stock that cause particular concern (*e.g.*, UMEs), although the species is listed as endangered under the ESA. No mortality or Level A harassment is anticipated or authorized for blue whales. Regarding the magnitude of Level B harassment takes (TTS and behavioral disruption), given the number of total takes (47), the large range and wide-ranging nature of blue whales, and the minimum abundance identified in the SAR, there is no reason to think that any single animal will be taken by Level B harassment more than one time (though perhaps a few could be) and less than 10 percent of the population is likely to be impacted. Regarding the severity of those individual Level B harassment behavioral takes, 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 are 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 and of short duration and the

associated lost opportunities and capabilities not at a level that would impact reproduction or survival.

Altogether, no more than 10 percent of the stock is likely to be impacted and any individual blue whale is likely to be disturbed at a low-moderate level on no more than a day or two days per year and not in any known biologically important areas. This low magnitude and severity of effects is unlikely to result in impacts on the reproduction or survival of any individual, much less impacts on annual rates of recruitment or survival for the stock. 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 blue whales.

Bryde's whale (Northern GOMEX stock) – The Bryde's whale is a small resident population. Although there is no current UME, the small size of the population and its constricted range, combined with the lingering effects of exposure to oil from the DWH oil spill (which include adverse health effects on individuals, as well as population effects) are cause for considerable caution. Accordingly, as described above, the Navy is implementing considerable time/area mitigation (including an expansion since the rule was proposed) to minimize impacts within their limited range, including not planning MTEs, which include the most powerful sound sources operating in a more concentrated area, limiting the hours of other sonar use, and not using explosives, with the exception of mine warfare activities, which has both reduced the amount of take and reduced the likely severity of impacts. No mortality or Level A harassment by tissue damage injury is anticipated or authorized, and only one Level A harassment by PTS take is estimated and authorized. Regarding the magnitude of Level B harassment takes (TTS and behavioral disruption), the number of estimated instances compared to the abundance (112 percent, Table 72) combined with the fact that the AFTT Study Area overlaps all of the small

range, suggests that most to all of the individuals in the stock will likely be taken, but only on one or two days per year, with no reason to think the days would likely be sequential. Regarding the severity of those individual Level B harassment behavioral takes, we have explained that the duration of any exposure is expected to be between minutes and hours (*i.e.*, relatively short); the received sound levels are 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); and that because of the mitigation the exposures will be of a less impactful nature. Regarding the severity of TTS takes, we have explained that they are expected to be low-level and of short duration and the associated lost opportunities and capabilities not at a level that would impact reproduction or survival. For similar reasons (described above) the one 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, any individual Bryde's whale is likely to be disturbed at a low-moderate level on no more than one or two days per year. Even given the fact that some of the affected individuals may have compromised health, there is nothing to suggest that such a low magnitude and severity of effects would result in impacts on the reproduction or survival of any individual, much less annual rates of recruitment or survival for the stock. 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 GOMEX stock of Bryde's whales.

Bryde's whale (NSD) – These Bryde's whales span the mid- and southern Atlantic and have not been designated as a stock under the MMPA. There is no currently reported trend for the population and there are no specific issues with the status of the stock that cause particular concern (*e.g.*, UMEs). 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 instances compared to the abundance within the U.S. EEZ and both in and outside of the U.S. EEZ, respectively, is 626 percent and 60 percent (Table 72), though the percentages would be far lower if compared against the abundance of the entire range of this species in the Atlantic. This information suggests that only a portion of the stock is likely impacted (significantly less than 60 percent given the large range), but that there is likely some repeat exposure (5 to 12 days within a year) of some subset of individuals within the U.S. EEZ if some animals spend extended time within the U.S. EEZ. Regarding the severity of those individual Level B harassment behavioral takes, 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 are 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 and of short duration and the associated lost opportunities and capabilities not at a level that would impact reproduction or survival.

Altogether, only a portion of the population is impacted and any individual Bryde's whale is likely to be disturbed at a low to moderate level, with likely many animals exposed only once or twice and a subset potentially disturbed across 5 to 12 likely non-sequential days not in any known biologically important areas. This low magnitude and severity of effects is not expected to result in impacts on annual rates of recruitment or survival for the stock. 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 Bryde's whales.

Minke whale (Canadian East Coast stock) – This stock of minke whales spans the East Coast and far into Northern Canada waters. Minke whales in the Atlantic are currently experiencing a UME wherein there have been unexpectedly elevated deaths along the Atlantic

Coast, some of which have been preliminarily attributed to human interaction or infectious disease. Importantly, both the abundance and PBR are considered significantly underestimated in the SAR, as discussed above. NMFS will authorize one mortality in five years, and the resulting 0.2 annual mortality fell below 10 percent of residual PBR, under the insignificance threshold, and would be considerably even lower if compared against a more appropriate PBR. Regarding the magnitude of Level B harassment takes (TTS and behavioral disruption), the number of estimated instances compared to the abundance within the U.S. EEZ and both in and outside of the U.S. EEZ, respectively, is 536 percent and 53 percent (Table 72). This information suggests that something less than half of the individuals are likely impacted, but that there is likely some repeat exposure (5 to 10 days within a year) of some subset of individuals within the U.S. EEZ if some animals spend extended time within the U.S. EEZ. 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). Also, the Navy implements time/area mitigation in the Northeast that minimizes MTEs and total sonar hours in an area that significantly overlaps an important feeding area for minke whales, which will reduce the severity of impacts to minke 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 and of short duration and the associated lost opportunities and capabilities not at a level that would impact reproduction or survival. For similar reasons (described above) the five estimated

Level A harassment takes by PTS for this stock are 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 to moderate level, with likely many animals exposed only once or twice and a subset potentially disturbed across 5 to 10 likely non-sequential days, minimized in biologically important areas. Even given the potential for compromised health of some individuals, this low magnitude and severity of effects is not expected to result in impacts on the reproduction or survival of individuals, 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 the stock. 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 minke whales.

Fin whale (Western North Atlantic stock) – This stock spans the East Coast and up into the Newfoundland waters of Canada. There is no currently reported trend for the population and there are no specific issues with the status of the stock that cause particular concern (*e.g.*, UMEs), although the species is listed as endangered under the ESA. Importantly, both the abundance and PBR are considered underestimated in the SAR, as discussed above. NMFS will authorize 1 mortality over the 5 years of the rule, or 0.2 annually. With the addition of this 0.2 annual mortality, residual PBR is exceeded, which means the total human-caused mortality would exceed PBR by 0.2. However, if the PBR in the SAR reflected the actual abundance across the entire range of the stock, residual PBR would be significantly higher, and definitely not be exceeded. Further, the Atlantic Large Whale Take Reduction Plan directs multiple efforts and requirements towards reducing mortality from commercial fishing (via gear modifications,

area closures, and other mechanisms) and NOAA Law Enforcement has reported high compliance rates. Regarding the magnitude of Level B harassment takes (TTS and behavioral disruption), the number of estimated instances compared to the abundance within the U.S. EEZ and both in and outside of the U.S. EEZ, respectively, is 323 percent and 37 percent (Table 72). This information suggests that something less than a third of the individuals are likely impacted, but that there is likely some repeat exposure (2-6 days within a year) of some subset of individuals within the U.S. EEZ if some animals spend extended time within the U.S. EEZ. 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 moderate or lower level, less likely to evoke a severe response). Also, the Navy implements time/area mitigation in the Northeast that minimizes major training exercises and total sonar hours in an area that significantly overlaps an important BIA feeding area for fin whales, which will reduce the severity of impacts to fin 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 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 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 33 estimated Level A harassment takes by PTS for fin 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, only a portion of the stock is impacted and any individual fin whale is likely to be disturbed at a low to moderate level, with likely many animals exposed only once or twice and a subset potentially disturbed across approximately 6 likely non-sequential days, minimized in biologically important areas. This low magnitude and severity of effects is not expected to result in impacts on reproduction or survival of individuals, 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 the stock. 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 fin whales.

Humpback whale (Gulf of Maine stock) – This feeding group stock of humpback whales is one of several associated with the larger, and increasing, West Indies DPS. Humpback whales in the Atlantic are currently experiencing a UME in which a portion of the whales have shown evidence of vessel strike. NMFS will authorize one mortality for the five-year period, which falls under the insignificance threshold of 10 percent of residual PBR for the Gulf of Maine stock. However, importantly, deaths of humpback whales along the Atlantic coast (whether by authorized ship strike or UME) must be considered within the context of the larger West Indies DPS, as animals along the coast could come from the Gulf of Maine stock or any of three or more other associated feeding groups. Specifically, the West Indies DPS numbers in excess of 10,000 whales and the associated PBR, if calculated, would be over 100.

Regarding the magnitude of Level B harassment takes (TTS and behavioral disruption), the number of estimated instances (of any humpbacks) compared to the abundance within the

U.S. EEZ and both in and outside of the U.S. EEZ, respectively, is 141 percent and 16 percent (Table 72). This suggests that only a small portion of the humpback whales in the area are likely impacted, with perhaps some individuals taken on a few days of the year. It would be impossible to determine exactly what portion of the takes are from the Gulf of Maine stock. However, based on the information provided earlier, which suggested about one third of the humpback whales traversing the Atlantic Coast likely come from the Gulf of Maine stock, we estimate that approximately 250 of the 749 total humpback whale takes might be from the Gulf of Maine stock. Two hundred and fiftyrepresents about 28 percent of the minimum population estimate for the Gulf of Maine humpback whale abundance in NMFS' draft 2018 SAR, equating to an expectation that few animals would be repeatedly exposed. 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 above 178 dB (*i.e.*, of a moderate or lower level, less likely to evoke a severe response). Also, the Navy implements time/area mitigation in the Northeast that minimizes MTEs and total sonar hours in an area that significantly overlaps with an important feeding area for humpbacks, which will reduce the severity of impacts to humpbacks 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 and of short duration and the associated lost opportunities and capabilities not at a level that would impact reproduction or survival. For similar reasons (described above) the three estimated Level A harassment takes by PTS for this stock are unlikely to have any effects on the reproduction or survival of any individuals.

Altogether, only a portion of the stock or DPS is impacted and any individual humpback whale is likely to be disturbed at a low-moderate level, with most animals exposed only once or twice, and minimized in biologically important areas. This low magnitude and severity of effects is not expected to result in impacts on the reproduction or survival of any individuals, 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 the stock. 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 humpback whales.

Sei whale (Nova Scotia stock) – This stock spans the northern East Coast and up to southern Newfoundland. There is no currently reported trend for the population and there are no specific issues with the status of the stock that cause particular concern (*e.g.,* UMEs), although the species is listed as endangered under the ESA. Importantly, both the abundance and PBR are considered underestimated in the SAR, as discussed above. NMFS will authorize one mortality over the 5 years covered by this rule, or 0.2 mortality annually. With the addition of this 0.2 annual mortality, residual PBR is exceeded, which means the total human-caused mortality would exceed PBR by 0.3. However, if the PBR in the SAR reflected the actual abundance across the entire range of the stock, residual PBR would be significantly higher, and PBR would not be exceeded. Further, the ALWTRP Plan directs multiple efforts and requirements towards reducing mortality from commercial fishing (via gear modifications, area closures, and other mechanisms) and NOAA Law Enforcement has reported high compliance rates. Regarding the magnitude of Level B harassment takes (TTS and behavioral disruption), the number of estimated instances compared to the abundance within the U.S. EEZ and both in and outside of the U.S. EEZ, respectively, is 317 percent and 7 percent (Table 72). This information suggests

that only a very small portion of individuals in the stock are likely impacted, but that there is likely some repeat exposure (several days within a year) of some subset of individuals within the U.S. EEZ if some animals spend extended time within the U.S. EEZ. 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). Also, the Navy implements time/area mitigation in the Northeast that minimizes major training exercises and total sonar hours in an area that significantly overlaps an important BIA feeding area for sei whales, which will reduce the severity of impacts to sei 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 and of short duration and the associated lost opportunities and capabilities not at a level that would impact reproduction or survival. For similar reasons (described above) the four estimated Level A harassment takes by PTS for this stock are unlikely to have any effects on the reproduction or survival of any individuals.

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 likely many animals exposed only once or twice and a subset potentially disturbed across a few days, minimized in biologically important areas. 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 sei whales.

Odontocetes

In this section, we include information here that applies to all of the odontocete species and stocks addressed below, which are further divided into the following subsections: Sperm whales, dwarf sperm whales, and pygmy sperm whales; Dolphins and small whales; Beaked whales; and Harbor porpoise. These sub-sections include more specific information about the group, as well as conclusions for each stock represented.

The majority of takes by harassment of odontocetes in the AFTT 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 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). For odontocetes other than beaked whales or harbor porpoises (for which these percentages are indicated separately in their sections), most of the takes (97 percent) from the MF1 bin in the AFTT Study Area would result from received levels between 160 and 172 dB SPL. For the remaining active sonar bin types, the percentages are as follows: LF3 = 98 percent between 142 and 160, MF4 = 97 percent between 136 and 160, MF5 = 98 percent between 124 and 148, and HF4 = 93 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 of those caused by exposure to active sonar. Take from exposure to air guns or pile driving is limited to small numbers of a few dolphin species (bottlenose, Atlantic spotted, and Clymene).

The range of potential behavioral effects of sound exposure on marine mammals generally, and odontocetes specifically, has been discussed in detail previously. There are a couple of 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, there are many studies demonstrating the cessation of odontocete 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). Alternately, 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 one fish or squid at a time, which means that if they are interrupted while feeding, it is often possible to find more prey relatively nearby.

Because the majority of harassment take of odontocetes results from the sources in the MF1 bin (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 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 an odontocete's 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 North Atlantic Kogia, which are explicitly discussed below), at the most, and therefore they are unlikely to incur impacts on reproduction or survival.

Sperm Whales, Dwarf Sperm Whales, and Pygmy Sperm Whales - In this section, building on the broader discussion above (for marine mammals, and odontocetes in particular),

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. We have also previously described the unlikelihood of any masking or habitat impacts to any groups that would rise to the level of affecting individual fitness. The discussion in this section fairly narrowly focuses some 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 authorized mortality, we break out specific findings into a few groups – North Atlantic sperm whales (with authorized mortality and one instance of tissue damage from explosives), Western North Atlantic dwarf and pygmy sperm whales, and GOMEX sperm, dwarf sperm and pygmy sperm whales (which have lower level magnitude of Level B harassment takes, but lingering effects from the DWH oil spill).

In Table 73 below, for sperm whale, 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.

Table 73. Annual takes of Level B and Level A harassment, mortality for sperm whales, dwarf sperm whales, and pygmy sperm whales in the AFTT 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)					Total takes		Abundance		Instances of total take as percentage of abundance	
		Level B Harassment		Level A Harassment								
Species	Stock	Behavioral Disturbance	TTS (may also include disturbance)	PTS	Tissue Damage	Mortality	In EEZ	Inside and Outside EEZ	In EEZ	Inside and Outside EEZ	In EEZ	Inside and Outside EEZ
Suborder Odontoceti (toothed whales)												
Family Physeteridae (sperm whale)												
Sperm whale*	Gulf of Mexico Oceanic	1,107	25	0	0	0	1132	1132	2,114	2,114	54	54
	North Atlantic	24,703	662	3	1	0.2	21489	25369	3,950	61,700	544	41
Family Kogiidae (sperm whales)												
Dwarf sperm whale	Gulf of Mexico Oceanic	339	453	70	0	0	862	862	1,107	1,107	78	78
	Western North Atlantic	3,900	9,102	94	0	0	12852	13096	611	3,641	2105	360
Pygmy sperm whale	Northern Gulf of Mexico	339	453	70	0	0	862	862	1,107	1,107	78	78
	Western North Atlantic	3,900	9,102	94	0	0	12852	13096	611	3,641	2105	360

Note: Above we compare predicted takes to abundance estimates generated from the same underlying density estimate (as described in the *Estimated Take of Marine Mammals* section), versus abundance estimates directly from NMFS' SARs, which are not based on the same data and would not be appropriate for this purpose. Note that comparisons are made both within the U.S. EEZ only (where density estimates have lesser uncertainty and takes are notably greater) and across the whole Study Area (which offers a more comprehensive comparison for many stocks).

Total takes inside and outside U.S. EEZ represent the sum of annual Level A and Level B harassment from training and testing plus take from one large ship shock trial.

The annual mortality of 0.2 is because we expect no more than one mortality over the course of five years from vessel strikes as previously described above.

As discussed above, the majority of Level B harassment behavioral takes of odontocetes, and thereby sperm whales, are 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 *Kogia*, as an HF-sensitive species, has a lower PTS threshold than all other groups and therefore is likely to experience larger amounts of TTS and PTS, and NMFS will 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 takes is high, all of the reasons described above for why TTS and PTS are not expected to impact reproduction or survival still apply. The Navy will implement a mitigation area that will avoid or reduce impacts to sperm whales (*Physeter microcephalus*). Nearly the entire important sperm whale habitat (Mississippi Canyon) is included in the GOMEX Planning Awareness Mitigation Areas where the Navy will not conduct MTEs, which are more likely to have more severe effects because of their multiple platforms, hull-mounted sonar, and longer-durations.

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 (North Atlantic stock) - This stock spans the East Coast out into oceanic waters well beyond the U.S. EEZ. There is no currently reported trend for the population and, although listed as endangered under the ESA, there are no specific issues with the status of the stock that cause particular concern (*e.g.*, UMEs). NMFS will authorize one mortality, which, when added to the other forward-projected mortality does not exceed the PBR insignificance threshold. One Level A harassment take by tissue damage will also be authorized 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 and the sperm whale's large size, which improves detection by Lookouts, 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 this single take that could lower one 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 one year) and one instance would not be expected to impact annual rates of recruitment or survival, even if it were a female. Regarding the magnitude of Level B harassment takes (TTS and behavioral disruption), the number of estimated instances of harassment compared to the abundance within the U.S. EEZ and both in and outside of the U.S. EEZ, respectively, is 544 percent and 41 percent (Table 73). This information, combined with the known range of the stock, suggests that something less than a quarter of the individuals in the stock are likely impacted, but that there is likely some repeat exposure (2-11 days within a year) of some subset of individuals that remain within the U.S. EEZ for an extended time. Regarding the severity of those individual takes by Level B behavioral harassment, we have explained that the duration of any exposure response is expected to be between minutes and hours (*i.e.*,

relatively short) and the received sound levels largely between 160 and 172 dB (*i.e.*, of a lower, to occasionally moderate, level). Regarding the severity of TTS takes, as described previously they are expected to be low-level and of short duration and the associated lost opportunities and capabilities not at a level that would impact reproduction or survival. For similar reasons (described above) three estimated Level A harassment takes by PTS for this stock is unlikely to have any effects on the reproduction or survival of any individuals.

Altogether, only a small portion of the stock is impacted and any individual sperm whale is likely to be disturbed at a low-moderate level, with the majority of animals likely disturbed once or not at all, and a subset potentially disturbed across 2-11 likely non-sequential days. Even for an animal disturbed at the high end of this range (11 days over a year), given the low to moderate impact from each incident, and the fact that few days with take would likely be sequential, no impacts to individual fitness are expected. This low to occasionally moderate magnitude and severity of effects is not expected to result in impacts on reproduction or or survival, and nor are these harassment takes combined with the 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 North Atlantic sperm whales.

Sperm whale, dwarf sperm whale, and pygmy sperm whale (GOMEX stocks) – These stocks suffer from lingering health issues from the DWH oil spill (6 - 7 percent of individuals of these stocks with adverse health effects), which means that some could be more susceptible to exposure to other stressors, and negative population effects (21 - 42 years until the DWH oil-injured population trajectory is projected to catch up with the baseline population trajectory (*i.e.*, in the absence of DWH)), reported as years to recovery. Neither mortality nor tissue damage

from explosives is anticipated or authorized for any of these three stocks, and sperm whales are not expected to incur PTS. Regarding the magnitude of Level B harassment takes (TTS and behavioral disruption), the number of estimated instances of harassment compared to the abundance is 54-78 percent (Table 73), which suggests that for each of the three species/stocks either this percentage of the individuals in these stocks are all taken by harassment on a single day, or a small subset may be taken on a few days. Regarding the severity of those individual takes by Level B behavioral harassment, we have explained that the duration of any exposure response is expected to be between minutes and hours (*i.e.*, relatively short) and the received sound levels are largely between 160 and 172 dB (*i.e.*, of a lower level, less likely to evoke a severe response). Additionally, the Navy is implementing mitigation areas for sperm whales that are expected to reduce impacts in important feeding areas, further lessening the severity of impacts. 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. Also, there is no reason to believe that any individual would incur these TTS takes more than a few days in a year, 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, 70 estimated Level A harassment takes by PTS for the two *Kogia* stocks in the GOMEX 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, only a portion of these stocks are impacted and any individual sperm, dwarf sperm, or pygmy sperm whale is likely to be disturbed at a low to occasionally moderate level and no more than a few days per year. Even given the fact that some of the affected individuals may have compromised health, there is nothing to suggest that such a low magnitude and severity of effects would result in impacts on the reproduction or survival of individuals, much less annual rates of recruitment or survival for any of the stocks. 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 GOMEX stocks of sperm whales, dwarf sperm whales, and pygmy sperm whales.

Pygmy and Dwarf sperm whales (Western North Atlantic stocks) – These stocks span the deeper waters of the East Coast north to Canada and out into oceanic waters beyond the U.S. EEZ. There is no currently reported trend for these populations and there are no specific issues with the status of the stocks that cause particular concern. Neither mortality nor tissue damage from explosives is anticipated or authorized for these stocks. Regarding the magnitude of Level B harassment takes (TTS and behavioral disruption), the number of estimated instances of harassment compared to the abundance within the U.S. EEZ and both in and outside of the U.S. EEZ, respectively, is 2,105 percent and 360 percent (Table 73). This information, combined with the known range of the stock, suggests that while not all of the individuals in these stocks will most likely be taken (because they span well into oceanic waters) of those that are taken, most will be taken over several repeated days (though likely not sequential) and some subset that spends extended time within the U.S. EEZ will likely be taken over a larger amount of days (likely 15-42 days during a year), some of which could be sequential. Regarding the severity of the individual takes by Level B behavioral harassment, we have explained that the duration of

any exposure response is expected to be between minutes and hours (and likely not more than 24 hours) and the received sound levels are largely between 160 and 172 dB (*i.e.*, of a lower level, less likely to evoke a severe response). 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 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. Also, there is no reason to believe that any individual would incur these TTS takes more than a few days in a year, 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, at the expected scale the 94 estimated Level A harassment takes by PTS for the two *Kogia* stocks in the North Atlantic 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, most of the 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) 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 one year) 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 impact annual rates of recruitment or survival, especially given that PBR for both of these stocks is 21. 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 West North Atlantic stocks of pygmy and dwarf sperm whales.

Dolphins and Small Whales - This section builds on the broader discussion above 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. None of these species are listed as endangered or threatened under the ESA. 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 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 four groups: the two GOMEX (GOM) stocks with authorized mortality, the two Western North Atlantic stocks with authorized mortality, the

remaining GOMEX stocks (which have a lower magnitude of Level B harassment takes, but also health issues related to the DWH oil spill), and the remaining Western North Atlantic stocks.

In Table 74 below, for dolphins and small 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.

Table 74. Annual takes of Level B and Level A harassment and mortality for dolphins and small whales in the AFTT 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)					Total takes		Abundance		Instances of total take as percentage of abundance	
		Level B Harassment		Level A Harassment								
Species	Stock	Behavioral Disturbance	TTS (may also include disturbance)	PTS	Tissue Damage	Mortality	In EEZ	Inside and Outside EEZ	In EEZ	Inside and Outside EEZ	In EEZ	Inside and Outside EEZ
Family Delphinidae (dolphins)												
Atlantic spotted dolphin	Northern Gulf of Mexico	69,225	3,610	3	0	0	72,838	72,838	47,676	47,676	153	153
	Western North Atlantic	208,201	19,383	26	6	0	209,814	227,616	52,118	250,648	403	91
Atlantic white-sided dolphin	Western North Atlantic	44,077	2,207	7	3	0.2	44,210	46,294	14,332	137,305	308	34
Bottlenose dolphin	Choctawhatchee Bay	941	32	0	0	0	973	973	99	99	984	984
	Gulf of Mexico Eastern Coastal	42	0	0	0	0	42	42	9,888	9,888	0	0
	Gulf of Mexico Northern Coastal	15,644	834	2	0	0	16,480	16,480	8,476	8,476	194	194
	Gulf of Mexico Western Coastal	7,191	635	0	0	0	7,826	7,826	33,903	33,903	23	23
	Indian River Lagoon Estuarine System	255	31	0	0	0	286	286	36	36	790	790
	Jacksonville Estuarine System	74	13	0	0	0	87	87	27	27	320	320
	Mississippi Sound, Lake Borgne, Bay Boudreau	1	0	0	0	0	1	1	198	198	1	1
	Northern Gulf of Mexico Continental Shelf	121,223	6,287	15	1	0	127,526	127,526	72,043	72,043	177	177
	Northern Gulf of Mexico Oceanic	13,947	706	8	2	0	14,663	14,663	18,364	18,364	80	80
	Northern North Carolina Estuarine System	2,844	483	0	0	0	3,327	3,327	3,622	3,622	92	92
	Southern North Carolina Estuarine System	0	0	0	0	0	0	0	0	0	0	0
	Western North Atlantic Northern Florida Coastal	1,145	90	0	0	0	1,235	1,235	906	906	136	136
	Western North Atlantic Central Florida Coastal	7,100	513	0	0	0	7,613	7,613	4,528	4,528	168	168
	Western North Atlantic Northern Migratory Coastal	33,993	3,051	7	0	0	37,051	37,051	9,962	9,962	372	372
	Western North Atlantic Offshore	393,416	34,686	77	9	0	421,295	428,188	64,298	186,260	655	230
	Western North Atlantic South Carolina/Georgia Coastal	5,544	416	0	0	0	5,960	5,960	3,622	3,622	165	165
	Western North Atlantic Southern Migratory Coastal	15,411	1,305	2	0	0	16,718	16,718	7,245	7,245	231	231
Clymene dolphin	Northern Gulf of Mexico	4,174	99	4	2	0	4,279	4,279	10,942	10,942	39	39
	Western North Atlantic	97,952	7,816	10	3	0	92,364	105,781	15,370	171,202	601	62
False killer whale	Northern Gulf of Mexico	1,902	72	1	0	0	1,975	1,975	3,136	3,136	63	63
	Western North Atlantic	11,176	863	0	0	0	11,131	12,039	1,254	16,144	888	75
Fraser's dolphin	Northern Gulf of Mexico	1,123	58	2	1	0	1,184	1,184	1,637	1,637	72	72
	Western North Atlantic	4,931	291	0	0	0	3,914	5,222	411	17,588	952	30
Killer whale	Northern Gulf of Mexico	33	0	0	0	0	33	33	176	176	19	19
	Western North Atlantic	113	6	0	0	0	112	119	15	472	747	25
Long-finned pilot whale	Western North Atlantic	35,890	1,656	7	1	0	33,769	37,554	3,863	447,431	874	8
Melon-headed whale	Northern Gulf of Mexico	3,067	66	3	1	0	3,137	3,137	6,725	6,725	47	47
	Western North Atlantic	50,058	3,792	3	0	0	49,707	53,853	5,821	69,526	854	77
Pantropical spotted dolphin	Northern Gulf of Mexico	25,924	596	15	6	0.2	26,541	26,541	82,055	82,055	32	32
	Western North Atlantic	207,279	15,304	8	1	0	196,098	222,592	30,088	275,964	652	81
Pygmy killer whale	Northern Gulf of Mexico	720	16	1	0	0	737	737	2,062	2,062	36	36
	Western North Atlantic	8,702	629	0	0	0	8,507	9,331	1,052	12,296	809	76
Risso's dolphin	Northern Gulf of Mexico	1,647	43	1	0	0	1,691	1,691	3,096	3,096	55	55
	Western North Atlantic	38,887	2,220	2	0	0	40,144	41,109	5,601	39,085	717	105
Rough-toothed dolphin	Northern Gulf of Mexico	3,849	177	1	1	0	4,028	4,028	4,824	4,824	83	83
	Western North Atlantic	25,857	2,476	0	0	0	26,450	28,333	2,793	34,768	947	81
Short-beaked common dolphin	Western North Atlantic	540,662	30,561	101	36	1.2	571,100	571,361	73,481	520,317	777	110
Short-finned pilot whale	Northern Gulf of Mexico	1,835	26	3	0	0	1,864	1,864	2,032	2,032	92	92
	Western North Atlantic	45,724	2,639	5	1	0	34,760	48,369	6,578	450,146	528	11
Spinner dolphin	Northern Gulf of Mexico	7,803	277	31	14	0.2	8,125	8,125	13,653	13,653	60	60
	Western North Atlantic	98,665	8,382	5	1	0	98,817	107,053	11,280	135,573	876	79
Striped dolphin	Northern Gulf of Mexico	2,449	69	2	1	0	2,521	2,521	4,871	4,871	52	52
	Western North Atlantic	181,103	11,992	16	4	0	167,438	193,115	52,222	322,542	321	60
White-beaked dolphin	Western North Atlantic	80	4	0	0	0	84	84	42	42	200	200

Note: Above we compare predicted takes to abundance estimates generated from the same underlying density estimate (as described in the *Estimated Take of Marine Mammals* section), versus abundance estimates directly from NMFS' SARs, which are not based on the same data and would not be appropriate for this purpose. Note that comparisons are made both within the U.S. EEZ only (where density estimates have lesser uncertainty and takes are notably greater) and across the whole Study Area (which offers a more comprehensive comparison for many stocks).

Total takes inside and outside U.S. EEZ represent the sum of annual Level A and Level B harassment from training and testing plus take from one large ship shock trial.

For mortality takes there was an annual average of 0.2 dolphins from each dolphin species/stock listed above (*i.e.*, for those species or stocks where 1 take could potentially occur divided by 5 years to get the annual number of mortalities/serious injuries) or 1.2 dolphins in the case of short-beaked common dolphin (*i.e.*, where 6 takes could potentially occur divided by 5 years to get the annual number of mortalities/serious injuries).

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 AFTT 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, except Risso's dolphin, such as bottlenose dolphins, spotted dolphins, common dolphins, spinner dolphins, rough-toothed dolphins, etc), 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.

BIAs have been identified for several small and resident populations of bottlenose dolphin in the GOMEX and on the East Coast, but these identified areas are within bays and estuaries where the Navy does not use explosives and conducts limited activities by sonar and other transducers. For example, for the small resident population of Northern North Carolina Estuarine dolphins, for which there is a BIA, one-third of the takes are from sub-navigation and ship object avoidance, which are less impactful than sonar activity and shorter in duration by about 30 min or less). The area of activity is at the northern edge of this BIA, which further reduces the possibility of modeled takes that would result in impacts that could affect reproduction or survival. The other two-thirds of the takes for the Northern North Carolina Estuarine dolphins are from Civilian Port Defense, which would occur at most only once in five years in the vicinity of that BIA. Similarly, for the small resident population of Indian River Lagoon Estuarine system bottlenose dolphins, for which there is also a BIA, all of the Level B harassment takes are also from the less impactful sonar activity of sub-navigation and ship object avoidance and are events of short duration (approximately 30 min). Two small and resident populations of bottlenose dolphin for which there are two BIAs (Northern North Carolina Estuarine System and Southern North Carolina Estuarine System) may be impacted during pile driving activities for the Elevated Causeway System at Marine Corps Base Camp Lejeune, North

Carolina; however, only one modeled take of a Northern North Carolina Estuarine System bottlenose dolphin is predicted. There are no expected takes from any activities to the small resident population of Southern North Carolina Estuarine System bottlenose dolphins (for which there is a BIA) and only one expected take to the small resident population of Mississippi Sound bottlenose dolphins (for which there is a BIA) from sonar. Therefore, for these small resident populations of bottlenose dolphins, impacts from Level B harassment are expected to be short-term and minor, and mostly all in the form of behavioral disturbance. Abandonment of the area, or any other response that could affect reproduction or survival, is not anticipated for the small and resident bottlenose dolphin populations stocks with BIAs from the Navy's training and testing activities.

Animals from one of these stocks with a BIA, the bottlenose dolphin of Barataria Bay, Louisiana, which is still showing persistent impacts from the Cetacean UME in the Northern GOMEX, were recently fitted with satellite-linked transmitters, which showed that most dolphins remained within the bay, while those that entered nearshore coastal waters remained within 1.75 km (Wells *et al.*, 2017). With the Navy's activities very limited in this type of habitat, the Navy is not conducting training or testing where Barataria Bay dolphins inhabit and therefore no takes will occur to this stock.

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:

Atlantic white-sided dolphin and short-beaked common dolphin (Western North Atlantic stocks) – There is no currently reported trend for these stocks and there are no specific issues with the status of these stocks that cause particular concern (*e.g.*, UMEs). We have authorized

one and six mortalities over the course of five years for these two stocks, respectively. Given the large residual PBR values for these stocks (248 and 148), this number of mortalities falls well under the insignificance threshold. Some Level A harassment take by tissue damage from explosives has also been authorized for these stocks (3 and 36, respectively). As noted previously, tissue damage effects could range in impact from minor to something just less than M/SI that could seriously impact fitness. However, given the Navy's mitigation, which makes exposure at the closer to the source and more severe end of the spectrum less likely, we cautiously assume some moderate impact for this category of take that could lower an individual's fitness within the year such that females (assuming a 50 percent chance that a take is 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 one year) and the number of takes anticipated for each stock would not be expected to impact annual rates of recruitment or survival, even if all of the takes were females (which would be highly unlikely), especially given the high residual PBRs of these stocks (in other words, if the stocks can absorb those numbers of mortalities without impacting ability to approach OSP, clearly they can absorb the significantly lesser effects of a one-year delay in calving).

Regarding the magnitude of Level B harassment takes (TTS and behavioral disruption), the number of estimated instances of harassment compared to the abundance within the U.S. EEZ and both in and outside of the U.S. EEZ for these four stocks, respectively, is 308-777 percent and 34-110 percent (Table 74). This information suggests that some portion of these stocks are likely not taken at all, but that there is likely some repeat exposure (2-15 days within a year) of some subset of individuals. Regarding the severity of those individual takes by Level B behavioral harassment, we have explained that the duration of any exposure response 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 level, less likely to evoke a severe response). Additionally, while we do not have a specific reason to expect that these takes would occur sequentially on more than several days in row or be more severe in nature, the probability of this occurring increases the higher the total take numbers. Given the higher number of takes and the associated abundances (especially for short-beaked common dolphin) we acknowledge the possibility that some smaller subset of individuals could experience behavioral disruption of a degree that impacts energetic budgets such that reproduction could be delayed for a year. However, as discussed above in regards to PBR and Level A harassment by tissue damage, and in consideration of the potential reproductive effects of tissue damage and these takes by Level B behavioral harassment, and in combination with the authorized mortality - this degree of effects on a small subset of individuals is still not expected to adversely affect rates of recruitment or survival. Regarding the severity of TTS takes, as described previously they are expected to be low-level, of short duration, and not in a frequency band that would be expected to significantly interfere with dolphin communication, or echolocation or other important low-frequency cues - and, 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 Level A harassment takes by PTS for the two dolphin stocks addressed here (7 and 101, respectively) 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, individual dolphins are likely to be taken at a low level, with some animals likely taken once or not at all, many potentially disturbed across 2-15 predominantly non-sequential days, and a small number potentially experiencing a level of effects that could curtail reproduction for one year. This magnitude and severity of effects (especially given the status of the stocks), including the consideration or the authorized mortality, is not expected to result in impacts on annual rates of recruitment or survival for either of the stocks. 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 two Western North Atlantic stocks of dolphins.

Pantropical spotted dolphin and spinner dolphin (GOM stocks) - As described above, the GOMEX dolphin stocks indicated in Table 71 suffer from lingering health issues resulting from the DWH oil spill (7 and 17 percent of individuals of these stocks, respectively, have adverse health effects), which means that some of them could be more susceptible to exposure to other stressors, as well as negative population effects (predicting it will take up to 39 and 105 years, respectively, for stocks to return to population growth rates predicted in the absence of DWH effects). We have authorized one mortality over the course of five years for each of these two stocks, respectively. Given the large residual PBR values for these stocks (402 and 62, respectively), this number of mortalities falls well under the insignificance threshold. Some Level A harassment take by tissue damage from explosives has also been authorized for these stocks (6 and 14, respectively). As noted previously, tissue damage effects could range in impact from minor to something just less than M/SI that could seriously impact fitness. However, given the Navy's mitigation, which makes exposure at the closer to the source and more severe end of the spectrum less likely, we cautiously assume some moderate impact for this category of take

that could lower an individual's fitness within the year such that females (assuming a 50 percent chance that a take is 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 one year) and the number of takes anticipated for each stock would not be expected to impact annual rates of recruitment or survival, even if all of the takes were females (which would be highly unlikely), especially given the high residual PBRs of these stocks (in other words, if the stocks can absorb one mortality each without impacting ability to approach OSP, they can absorb the significantly lesser effect of a one-year delay in calving).

Regarding the magnitude of Level B harassment takes (TTS and behavioral disruption), the number of estimated instances of harassment compared to the abundance is 32 percent and 60 percent, respectively, reflecting that only a subset of each stock will be taken by Level B behavioral harassment within a year. Of that subset, those taken will likely be taken one time, but if taken more than that, the 2 or 3 days would not likely be sequential (Table 74). Regarding the severity of those individual takes by Level B behavioral harassment, we have explained that the duration of any exposure response 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 severity).

Regarding the severity of TTS takes, as described previously they are expected to be low-level, of short duration, and not in a frequency band that would be expected to significantly interfere with dolphin communication, or echolocation or other important low-frequency cues. Therefore, the associated lost opportunities and capabilities are not 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 Level A harassment takes by PTS for the dolphin stocks addressed here (15 and 31, respectively) 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, any individual dolphin is likely to be taken at a low to occasionally moderate level, with most animals likely not taken at all and with a subset of animals being taken up to a few non-sequential days. Even given the fact that some of the affected individuals may have compromised health, there is nothing to suggest that such a low magnitude and severity of effects, including the potential tissue damage, would result in impacts on annual rates of recruitment or survival for either of these two stocks. 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 GOMEX stocks of pantropical spotted dolphins and spinner dolphins.

Western North Atlantic dolphin stocks (all stocks in Table 74 except Atlantic white-sided dolphin and short-beaked common dolphin) – There are no specific issues with the status of these stocks that cause particular concern (*e.g.*, UMEs). No mortality is expected nor has it been authorized for these stocks. For some of these stocks, some tissue damage has been authorized (0 for many, 1-9 for others). As noted previously, tissue damage effects could range in impact from minor to something just less than M/SI that could seriously impact fitness. However, given the Navy's mitigation, which makes exposure at the closer to the source and more severe end of the spectrum less likely, we cautiously assume some moderate impact for all these takes that could lower an individual's fitness within the year such that this small number of females (assuming a 50 percent chance of 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 one year) and a few instances would not be expected to impact annual rates of recruitment or survival, even if all of the takes were females (which would be highly unlikely), especially given the higher residual PBRs, where known (the majority of stocks). For stocks with no calculated residual PBR or where abundance is unknown, the limited information available on population size indicates that the very low number of females who might forego reproduction would have no effect on rates of recruitment or survival. Regarding the magnitude of Level B harassment takes (TTS and behavioral disruption), the number of estimated instances of harassment compared to the abundance ranges up to 984 percent inside the U.S. EEZ (though some are significantly lower) and is generally much lower across the whole range of most stocks, reflecting that for many stocks only a subset of the stock will be impacted – although alternately for a few of the smaller bay stocks all individuals are expected to be taken across multiple days (Table 74). Generally, individuals of most stocks (especially bottlenose dolphins) might be taken no more than several times each, while the other species in this group will only accrue takes to a portion of the stock, but individuals might be taken across 2-20 days within a year. Regarding the severity of those individual takes by Level B behavioral harassment, we have explained that the duration of any exposure response 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 level, less likely to evoke a severe response). While we do not have reason to expect that these takes would occur sequentially on more than several days in a row or be more severe in nature, the probability of this occurring increases the higher the total take numbers. Given higher percentages when compared to abundances, and especially where the absolute number of takes is higher *(e.g.*, spinner dolphin), we acknowledge the possibility that some smaller subset of

individuals (especially in the larger stocks with higher total take numbers) could experience behavioral disruption of a degree that impacts energetic budgets such that reproduction could be delayed for a year. However, as discussed above in regards to tissue damage, and in consideration of the potential reproductive effects of Level A harassment by tissue damage and these takes by Level B behavioral harassment, this degree of effects on a small subset of individuals is still not expected to adversely affect rates of recruitment or survival. For the smaller Estuarine stocks with the potential repeated days of disturbance, we note that as described earlier, the activities that Navy conducts in inland areas (not MTEs, etc.) are expected to generally result in lower severity responses, further decreasing the likelihood that they would accrue to effects on reproduction or survival, even if accrued over several sequential days.

Regarding the severity of TTS takes, as described previously they are expected to be low-level, of short duration, and not in a frequency band that would be expected to significantly interfere with dolphin communication, or 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 Level A harassment takes by PTS for the dolphin stocks addressed here (between 1 and 77) 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, any individual dolphin is likely taken at a low to occasionally moderate level, with some animals likely taken once or not at all, and a subset potentially disturbed across 2-20 predominantly non-sequential days, and a small number potentially experiencing a level of

effects that could curtail reproduction for one year. The magnitude and severity of effects described is not expected to result in impacts on annual rates of recruitment or survival for any of the stocks. 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 Western North Atlantic stocks of dolphins.

GOMEX dolphin stocks (all of the stocks indicated in Table 74 except Pantropical spotted dolphin and spinner dolphin) – As described above, the GOMEX stocks indicated in Table 71 suffer from lingering health issues resulting from the DWH oil spill (3-30 percent of individuals of these stocks have adverse health effects), which means that some of them could be more susceptible to exposure to other stressors, as well as negative population effects (predicting it will take up to 76 years, with number varying across stocks, for stocks to return to population growth rate e predicted in the absence of DWH effects). Of note, the Northern Coastal bottlenose dolphin adverse effect statistics are about twice as high as the others (*i.e.*, all other stocks are below 17 percent). No mortality is authorized for these stocks, however a few Level A harassment takes by tissue damage from explosives (zero for most, 1-2 for a few, and 6 for the Atlantic spotted dolphin stock) are authorized. As noted previously, tissue damage effects could range in impact from minor to something just less than M/SI that could seriously impact fitness. However, given the Navy's mitigation, which makes exposure at the closer to the source and more severe end of the spectrum less likely, we cautiously assume some moderate impact for these Level A harassment takes that could lower an individual's fitness within the year such that a female (assuming a 50 percent chance of 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 one year) and a few instances, even up to six, would not be expected to

impact annual rates of recruitment or survival, even if all of the takes were of females (which is highly unlikely).

Regarding the magnitude of Level B harassment takes (TTS and behavioral disruption), the number of estimated instances of harassment compared to the abundance ranges up to 177 percent, but is generally much lower for most stocks, reflecting that generally only a subset of each stock will be taken, with those in the subset taken only a few non-sequential days of the year (Table 74). Regarding the severity of those individual takes by Level B behavioral harassment, we have explained that the duration of any exposure response 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 severity).

Regarding the severity of TTS takes, as described previously they are expected to be low-level, of short duration, and not in a frequency band that would be expected to significantly interfere with dolphin communication, or 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 Level A harassment takes by PTS for the dolphin stocks addressed here (all 3 or below, with the exception of three stocks with much larger abundances with 4, 8, and 15 PTS takes) 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, any individual dolphin is likely to be taken at a low to occasionally moderate level, with many animals likely not taken at all and with a subset of animals being taken up to a

few times. A very small number could potentially experience tissue damage that could curtail reproduction for one year. Even given the fact that some of the affected individuals may have compromised health, there is nothing to suggest that such a low magnitude and severity of effects would result in impacts on annual rates of recruitment or survival for any of the GOMEX stocks indicated in Table 74. 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 GOMEX stocks of dolphins.

Harbor Porpoise - In this section, we build on the broader Odontocete discussion above (*i.e.*, that information applies to harbor porpoises as well), except where we offer alternative information about the received levels for harbor porpoise Level B behavioral harassment. We bring together the discussion of 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. Harbor porpoises are not listed as endangered or threatened under the ESA. The discussion below focuses on additional information that is specific to harbor porpoises (in addition to the general information on odontocetes provided above, which is relevant to this species) to support the summarized conclusion for this stock. We have also described previously the unlikelihood of any masking or habitat impacts to harbor porpoises that would affect reproduction or survival.

In Table 75, below for porpoises, 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. Since the proposed rule, the Navy has removed one of its testing activities in the Northeast Range Complex (four events - USWT), which decreased the number of Level B harassment takes by approximately 10,000 takes annually for harbor porpoise.

Table 75. Annual takes of Level B and Level A harassment and mortality for porpoises in the AFTT 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)					Total takes		Abundance		Instances of total take as percentage of abundance	
		Level B Harassment		Level A Harassment								
Species	Stock	Behavioral Disturbance	TTS (may also include disturbance)	PTS	Tissue Damage	Mortality	In EEZ	Inside and Outside EEZ	In EEZ	Inside and Outside EEZ	In EEZ	Inside and Outside EEZ
Family Phocoenidae (porpoises)												
Harbor porpoise	Gulf of Maine/Bay of Fundy	133,396	21917	454	0	0	155,767	155,767	16,552	195727	941	80

Note: Above we compare predicted takes to abundance estimates generated from the same underlying density estimate (as described in the *Estimated Take of Marine Mammals* section), versus abundance estimates directly from NMFS' SARs, which are not based on the same data and would not be appropriate for this purpose. Note that comparisons are made both within the U.S. EEZ only (where density estimates have lesser uncertainty and takes are notably greater) and across the whole Study Area (which offers a more comprehensive comparison for many stocks).

Total takes inside and outside U.S. EEZ represent the sum of annual Level A and Level B harassment from training and testing plus take from one large ship shock trial.

Note that this 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 harbor porpoises in the AFTT 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 a more sensitive portion (though not the most sensitive) of the HF 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 (88 percent) from the MF1 bin in the AFTT Study Area would result from received levels between 154 and 166 dB SPL. For the remaining active sonar bin types, the percentages are as follows: LF3 = 98 percent between 136 and 154, MF4 = 95 percent between 130 and 148, MF5 = 93 percent between 118 and 136, and HF4 = 96 percent between 118 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).

Harbor porpoises have been shown to be particularly sensitive to human activity (Tyack *et al.*, 2011; Pirotta *et al.*, 2012). The information currently available regarding harbor porpoises suggests a very low threshold level of response for both captive (Kastelein *et al.*, 2000; Kastelein *et al.*, 2005) and wild (Johnston, 2002) animals. Southall *et al.* (2007) concluded that harbor porpoises are likely sensitive to a wide range of anthropogenic sounds at low received levels (approximately 90 to 120 dB). Research and observations of harbor porpoises for other locations show that this species is wary of human activity and will display profound avoidance behavior for anthropogenic sound sources in many situations at levels down to 120 dB re 1 µPa (Southall, 2007). Harbor porpoises routinely avoid and swim away from large motorized vessels (Barlow *et al.*, 1988; Evans *et al.*, 1994; Palka and Hammond, 2001; Polacheck and Thorpe, 1990). Harbor porpoises may startle and temporarily leave the immediate area of the training or testing until after the event ends. Accordingly, harbor porpoises have been assigned a lower Level B behavioral harassment threshold, *i.e.*, a more distant distance cutoff (40 km for high source level, 20 km for moderate source level) and, as a result, the number of harbor porpoise taken by Level B behavioral harassment through exposure to LFAS/MFAS/HFAS in the AFTT Study Area is generally higher than the other species. 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 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 low to moderate behavioral reactions are unlikely to affect reproduction or survival. Some takes by Level B behavioral harassment could be in the form of a longer (several hours or a day) and more moderate response, but unless they are repeated over more than several sequential days, impacts to reproduction or survival for most animals are not anticipated. Even

where some smaller number of animals could experience effects on reproduction (which could happen to a small number), for the reasons explained below this would not affect rates of recruitment or survival, especially given the status of the stock.

A BIA was identified for this small and resident population of harbor porpoises by LaBrecque *et al.* (2015a, 2015b). The population straddles the Northern border of the U.S. EEZ and AFTT Study Area, with perhaps approximately half located inside the border (noting that BIAs were only identified within the U.S. EEZ, so the whole BIA is in the AFTT Study Area). Navy testing activities that use sonar and other transducers could occur year round within the Northeast Range Complexes in the vicinity of the BIA. However, the harbor porpoise BIA is included in the Gulf of Maine Planning Awareness Mitigation Area where the Navy will not plan MTEs (Composite Training Unit or Fleet/Sustainment Exercises) and will not conduct more than 200 hrs of hull-mounted MFAS per year, both of which reduce the likely severity of potential Level B harassment by behavioral disturbance (*e.g.*, it is less likely that harbor porpoises would be displaced from the preferred habitat in the BIA and thereby suffer effects more likely to impact reproduction or survival).

In conclusion, the Gulf of Maine/Bay of Fundy stock of harbor porpoise is found predominantly in northern U.S. coastal waters (<150 m depth) and up into Canada's Bay of Fundy. No mortality or tissue damage by explosives are anticipated or authorized for this stock and there are no specific issues with the status of the stock that cause particular concern (*e.g.*, UMEs). Regarding the magnitude of Level B harassment takes (TTS and behavioral disruption), the number of estimated instances compared to the abundance within the U.S. EEZ and both in and outside of the U.S. EEZ, respectively, is 941 percent and 80 percent (Table 75). This information, combined with the known range of the stock, suggests that only a portion of the

individuals in the stock are likely impacted (*i.e.*, notably less than 80 percent given the likely repeats; in other words more than 20 percent taken zero times), but that there would likely be some amount of repeat exposures across days (perhaps 6-19 days within a year) for some subset of individuals that spend extended times within the U.S. EEZ. Regarding the severity of those individual takes by Level B behavioral harassment, the duration of any exposure response is expected to be from minutes to hours and not likely exceeding 24 hrs, and the received sound levels of the MF1 bin are largely between 154 and 166 dB, which, for a harbor porpoise (which have a lower Level B behavioral harassment threshold) would mostly be considered a moderate level.

Regarding the severity of TTS takes, as described previously they are expected to be low-level, of short duration, and not in a frequency band that would be expected to significantly interfere with harbor porpoise communication, or 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 454 Level A harassment takes by PTS for harbor 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, 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. However, given the status of the stock, even if this occurred, it would not adversely impact rates of recruitment or survival.

Altogether, because harbor porpoises are particularly sensitive, it is likely that a fair number of the responses will be of a moderate nature. Additionally, as noted, some portion of the stock may be taken repeatedly on up to 19 days within a year, some of those may be sequential. Given this and the larger number of total takes (totally and to individuals), it is more likely (probabilistically) that some 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) has far less of an impact on population rates than mortality and a small number of instances would not be expected to adversely impact annual rates of recruitment or survival, especially given that the residual PBR of harbor porpoises is 451 (and a one year delay in calving has a far less severe impact on population rates than death, and this stock could absorb more than 400 deaths without inhibiting its ability to approach OSP). All indications are that the number of times in which reproduction would be likely to be foregone will not affect the stock's 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 harbor porpoises.

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 from explosives for any stock. Broadly, 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 summarized conclusion for this stock. Because there are differential magnitudes of effect to the GOMEX stocks of beaked whales (lower magnitude of Level B harassment, but also lingering effects from the DWH oil spill) versus the Western North Atlantic beaked whales, we break out specific findings into those two groups.

In Table 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.

Table 76. Annual takes of Level B and Level A harassment and mortality for beaked whales in the AFTT 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)					Total takes		Abundance		Instances of total take as percentage of abundance	
		Level B Harassment		Level A Harassment								
Species	Stock	Behavioral Disturbance	TTS (may also include disturbance)	PTS	Tissue Damage	Mortality	In EEZ	Inside and Outside EEZ	In EEZ	Inside and Outside EEZ	In EEZ	Inside and Outside EEZ
Suborder Odontoceti (toothed whales)												
Family Ziphiidae (beaked whales)												
Blainville's beaked whale	Northern Gulf of Mexico	1,420	8	0	0	0	1,428	1,428	966	966	148	148
	Western North Atlantic	22,902	197	1	0	0	19,959	23,100	1,274	14,277	1567	162
Cuvier's beaked whale	Northern Gulf of Mexico	1,487	8	0	0	0	1,495	1,495	966	966	155	155
	Western North Atlantic	84,460	724	3	0	0	73,799	85,187	4,704	52,716	1569	162
Gervais' beaked whale	Northern Gulf of Mexico	1,420	8	0	0	0	1,428	1,428	966	966	148	148
	Western North Atlantic	22,902	197	1	0	0	19,959	23,100	1,274	14,277	1567	162
Northern bottlenose whale	Western North Atlantic	2,040	4	0		0	1,836	2,044	100	688	1836	297
Sowersby's beaked whale	Western North Atlantic	22,930	197	1	0	0	19,987	23,128	1,274	14,277	1569	162
True's beaked whale	Western North Atlantic	22,930	197	1	0	0	19,987	23,128	1,274	14,277	1569	162

Note: Above we compare predicted takes to abundance estimates generated from the same underlying density estimate (as described in the *Estimated Take of Marine Mammals* section), versus abundance estimates directly from NMFS' SARs, which are not based on the same data and would not be appropriate for this purpose. Note that comparisons are made both within the U.S. EEZ only (where density estimates have lesser uncertainty and takes are notably greater) and across the whole Study Area (which offers a more comprehensive comparison for many stocks).

Total takes inside and outside U.S. EEZ represent the sum of annual Level A and Level B harassment from training and testing plus take from one large ship shock trial.

Note that 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 AFTT 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 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 (91 percent) from the MF1 bin in the AFTT Study Area would result from received levels between 148 and 160 dB SPL. For the remaining active sonar bin types, the percentages are as follows: LF3 = 94 percent between 136 and 148, MF4 = 96 percent between 124 and 148, MF5 = 96 percent between 100 and 142, and HF4 = 94 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 (Tyack *et al.*, 2011; Pirotta *et al.*, 2012) 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). 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.

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. 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 1µPa. 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; Moretti *et al.*, 2009, 2010; Tyack *et al.*, 2010, 2011; McCarthy *et al.*, 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. Populations of beaked whales and other odontocetes on the Bahamas and other Navy fixed ranges, where Navy activities have been operating for decades, appear to be stable. Take by Level B behavioral harassment (most likely 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 (Tyack *et al.*, 2011; De Ruiter *et al.*, 2013; Manzano-Roth *et al.*, 2013; Moretti *et al.*, 2014). 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, 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 adverse impact on rates of recruitment and survival in the areas a result of exposure to Navy's training and testing activities. Finally, results from passive acoustic monitoring estimated regional Cuvier's beaked whale densities were higher than indicated by 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, they would not be expected to adversely affect rates of recruitment or survival.

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:

Beaked whales (Western North Atlantic stocks) – These stocks span the deeper waters of the East Coast north to Canada and out into oceanic waters beyond the U.S. EEZ. There is no currently reported trend for these populations and there are no specific issues with the status of the stocks that cause particular concern. Neither mortality nor tissue damage from explosives is anticipated or authorized for these stocks. Regarding the magnitude of Level B harassment takes (TTS and behavioral disruption), the number of estimated instances of harassment compared to the abundance within the U.S. EEZ and both in and outside of the U.S. EEZ is 1567-1836 percent and 148-297 percent, respectively (Table 76). This information, combined with the known range of the stock, suggests that while not all of the individuals in these stocks will most likely be taken (because they span well into oceanic waters), of those that are, most will be taken over a few days (though likely not sequential) and some subset that spends extended time within the U.S. EEZ will likely be taken over a larger amount of days (maybe 15-37) some of which could be sequential. Regarding the severity of those individual takes by Level B behavioral harassment, we have explained that the duration of any exposure response is expected to generally be between minutes and hours and largely between 148 and 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. However, 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 in the Western North Atlantic.

Regarding the severity of TTS takes, as described previously they are expected to be low-level, of short duration, and not in a frequency band that would adversely affect communication, inhibit echolocation, or otherwise interfere with other low frequency cues. Therefore any associated lost opportunities and capabilities would not impact reproduction or survival. For the

same reasons (low level and frequency band) the one to three estimated Level A harassment takes by PTS for these stocks are unlikely to have any effects on the reproduction or survival of any individuals.

Altogether, a small portion of the stock will likely be taken (at a relatively moderate level) on a relatively moderate to high number of days across the year, some of which could be sequential. Though the majority of impacts are expected to be of a sometimes low, but more likely, moderate magnitude and severity, the sensitivity of beaked whales and larger number of takes 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 one year) has far less of an impact on population rates than mortality and a small number of instances would not be expected to adversely impact annual rates of recruitment or survival. Based on the abundance of these stocks in the area and the evidence of little, if any, known human-caused mortality, all indications here are that the small number of times in which reproduction would be likely to be foregone will not affect the stock's 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 Atlantic stocks of beaked whales.

Beaked whales (GOMEX stocks) – The animals in these stocks suffer from lingering

health issues resulting from the DWH oil spill (four percent of individuals of these stocks have adverse health effects), which means that some of them could be more susceptible to exposure to other stressors, and negative population effects (10 years for their growth rate to recover to the rate predicted for the stock if it had not incurred spill impacts). Neither mortality nor tissue damage from explosives is anticipated or authorized for these stocks. Level A harassment take from PTS is also unlikely to occur. Regarding the magnitude of Level B harassment takes (TTS and behavioral disruption), the number of estimated instances of harassment compared to the abundance is 148-155 percent (Table 76). This information indicates that either the individuals in these stocks are all taken by harassment one or two days within a year, or that a subset are not taken at all and a small subset may be taken several times. Regarding the severity of those individual takes, we have explained that the duration of any exposure response is expected to generally be between minutes and hours and largely between 148 and 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. However, 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 in the GOMEX. Regarding the severity of TTS takes, as described previously they are expected to be low-level, of short duration, and not in a frequency band that would adversely affect communication, inhibit echolocation, or otherwise interfere with other low frequency cues. Therefore any associated lost opportunities and capabilities would not impact reproduction or survival.

Altogether, likely only a portion of these stocks are impacted and any individual beaked whale is likely being disturbed moderate level no more than a few days per year. Even given the fact that some of the affected individuals may have compromised health, there is nothing to

suggest that this magnitude and severity of effects would result in impacts on annual rates of recruitment or survival for any of the stocks. 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 GOMEX stocks of beaked whales included in Table 76.

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 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 pinnipeds, there is no predicted mortality or tissue damage from explosives for any stock. Broadly, we have already described above why we believe the incremental addition of the small number of low-level PTS takes in predominantly narrow frequency bands will not have any meaningful effect towards inhibiting reproduction or survival. 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. Much of the discussion below focuses on the behavioral effects. A UME has been designated for harbor seals and gray seals, which is addressed below, but because of the small magnitude and severity of effects for all of the species, it is not necessary to break out the findings by species or stock.

In Table 77 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.

Table 77: Annual takes of Level B and Level A harassment and mortality for pinnipeds in the AFTT 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)					Total takes		Abundance		Instances of total take as percentage of abundance	
		Level B Harassment		Level A Harassment		Mortality						
Species	Stock	Behavioral Disturbance	TTS (may also include disturbance)	PTS	Tissue Damage		In EEZ	Inside and Outside EEZ	In EEZ	Inside and Outside EEZ	In EEZ	Inside and Outside EEZ
Suborder Pinnipedia												
Family Phocidae (true seals)												
Gray seal	Western North Atlantic	810	1,528	2	0	0	2,340	2,340	2,472	2,472	95	95
Harbor seal	Western North Atlantic	1,312	2,477	4	0	0	3,793	3,793	11,122	11,122	34	34
Harp seal	Western North Atlantic	6,339	9,955	3	0	0	16,297	16,297	7,242	7,242	225	225
Hooded seal	Western North Atlantic	448	466	0	0	0	914	914	880	880	104	104

Note: Above we compare predicted takes to abundance estimates generated from the same underlying density estimate (as described in the *Estimated Take of Marine Mammals* section), versus abundance estimates directly from NMFS' SARs, which are not based on the same data and would not be appropriate for this purpose. Note that comparisons are made both within the U.S. EEZ only (where density estimates have lesser uncertainty and takes are notably greater) and across the whole Study Area (which offers a more comprehensive comparison for many stocks).

Total takes inside and outside U.S. EEZ represent the sum of annual Level A and Level B harassment from training and testing plus take from one large ship shock trial.

The majority of takes by harassment of pinnipeds in the AFTT 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 (76 percent) from the MF1 bin in the AFTT Study Area would result from received levels between 166 and 172 dB SPL, while another 23 percent would result from exposure between 172 and 178 dB SPL. For the remaining active sonar bin types, the percentages are as follows: LF3 = 97 percent between 148 and 166, MF4 = 97 percent between 142 and 166, MF5 = 97 percent between 130 and 160, and HF4 = 96 percent between 118 and 166 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 take of pinnipeds is expected to result from pile driving, and take from exposure to airguns is limited to single digits of gray and harbor seals.

Because the majority of harassment take of pinnnipeds results from the sources in the MF1 bin (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, odontocete 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 an 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 shift either. The very low number of takes by threshold shifts that might be incurred by individuals exposed to explosives or airguns 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.

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 (Jacobs and Terhune, 2002; Costa *et al.*, 2003; 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 (Harris *et al.*, 2001; Blackwell *et al.*, 2004; 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 AFTT 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 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. Evidence from areas where the Navy extensively trains and tests provides some indication of the possible consequences resulting from those planned activities. Specifically, almost all of the impacts to pinnipeds estimated by the quantitative assessment are due to navigation and object avoidance (detection) activities in navigation lanes entering Groton, Connecticut. Navigation and object avoidance (detection) activities normally involve a single ship or submarine using a limited amount of sonar, therefore significant reactions are unlikely, especially in phocid seals. The use of sonar from navigation and object avoidance in Groton, Connecticut likely exposes the same sub-population of animals multiple times throughout the year. However, phocid seals are likely to have only minor and short-term behavioral reactions to these types of activities and significant behavioral reactions leading to impacts on reproduction or survival would not be expected, even if some smaller groups were repeatedly taken. 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 species and stocks addressed in this section.

In conclusion, the Western North Atlantic pinnipeds (harp seal, harbor seal, hooded seal, and gray seal) stocks are northern, but highly migratory species. While harp seals are limited to the northern portion of the U.S. EEZ, gray and harbor seals may be found as far south as the Chesapeake in late Fall and hooded seals migrate as far south as Puerto Rico. A UME has been designated for gray seals and harbor seals and the main pathogen found on the seals that have been tested is phocine distemper virus. Neither mortality nor tissue damage from explosives 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 harassment compared to the abundance that is expected within the AFTT Study area is 34-225 percent, which suggests that only a subset of the animals in the AFTT STudy area would be taken, but that a few might be taken on several days within the year (1-5), but not on sequential days. When the fact that some of these seals are residing in areas near Navy activities is considered, we can estimate that perhaps some of those individuals might be taken some higher number of days within the year (up to approximately 10), but still with no reason to think that these takes would occur on sequential days, which means that we would not expect effects on reproduction or survival. Regarding the severity of those individual Level B behavioral harassment takes, we have explained that the duration of any exposure response is expected to be between minutes and hours *(i.e.*, relatively short) and the received sound levels are largely below 172 dB, with some up to 178 dB (*i.e.*, of a lower to moderate level, less likely to evoke a severe response) and therefore there is no indication that the expected takes by Level B behavioral harassment would have any effect on annual rates of recruitment or survival.

Regarding the severity of TTS takes, they are expected to be low-level, of short duration, and not in a frequency band that would adversely affect communication, inhibit echolocation, or

otherwise interfere with other low frequency cues. Therefore any associated lost opportunities and capabilities would not impact reproduction or survival. For the same reasons (low level and frequency band) the two to four estimated Level A harassment takes by PTS for these stocks are unlikely to have any effects on the reproduction or survival of any individuals.

Even given the fact that some of the affected harbor seal individuals may have compromised health due to the UME, there is nothing to suggest that such a low magnitude and severity of effects would result in impacts on annual rates of recruitment or survival, especially given that the stock abundance in NMFS SAR is 75,839 with a residual PBR of 1,651. Similarly, given the low magnitude and severity of effects, there is no indication that these activities would affect reproduction or survival of harp or hooded seals, much less adversely affect rates of recruitment or survival, especially given that harp seal abundance is estimated at 6.9 million and hooded seal residual PBR is 13,950. Gray seals are experiencing a UME as well as an exceedance of more than 4,299 M/SI above PBR. However, given the low magnitude (take compared to abundance is 95 percent, meaning the subset of individuals taken may be taken a few times on non-sequential days) and low to occasionally moderate severity of impacts, no impacts to individual reproduction or survival are expected, and therefore no effects on annual rates of recruitment or survival will occur. 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 Western North Atlantic stocks of gray seals, harbor seals, hooded seals, and harp seals.

Determination

Based on the analysis contained herein of the potential and 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 subsistence uses or harvest of marine mammals in the geographic area affected by the specified activities. 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.

ESA

There are five marine mammal species under NMFS jurisdiction that are listed as endangered or threatened under the ESA with confirmed or possible occurrence in the AFTT Study Area: blue whale (Western North Atlantic stock), fin whale (Western North Atlantic stock), sei whale (Nova Scotia), sperm whale (GOMEX Oceanic stock and North Atlantic stock), and NARW (Western North Atlantic stock). In addition, the GOMEX Bryde's whale is proposed for listing under the ESA. 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 AFTT activities. NMFS issued a Biological and Conference Opinion concluding that the issuance of the rule and subsequent LOAs are likely to adversely affect, but are 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 AFTT Study Area. The Biological and Conference 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 agency actions that are likely to injure national marine sanctuary resources are subject to consultation with the Office of National Marine Sanctuaries (ONMS) under section 304(d) of the National Marine Sanctuaries Act (NMSA).

On December 15, 2017, the Navy initiated consultation with ONMS and submitted a Sanctuary Resource Statement (SRS) that discussed the effects of the U.S. Navy's AFTT activities in the vicinity of Stellwagen Bank, Gray's Reef, and Florida Keys National Marine Sanctuaries on sanctuary resources. NMFS worked with the Navy in the development of the SRS to ensure that it could serve jointly as an SRS for NMFS' action as well.

On December 20, 2017, NMFS OPR initiated consultation with ONMS on NMFS' proposed MMPA Incidental Take Regulations for the Navy's AFTT activities. NMFS requested that ONMS consider the description and assessment of the effects of the Navy's activities, which included an assessment of the effects on marine mammals, included in the joint SRS submitted by the Navy as satisfying NMFS' need to provide an SRS.

ONMS reviewed the SRS, as well as an addendum the Navy provided on April 3, 2018. On April 12, 2018, ONMS found the SRS addendum sufficient for the purposes of making an injury determination to develop recommended alternatives as required by the NMSA. On May 15, 2018, ONMS recommended two reasonable and prudent measures to Navy and NMFS (one of which applied to NMFS) in accordance with the NMSA to minimize injury and to protect sanctuary resources. ONMS subsequently provided a slight modification of those recommendations to the Navy and NMFS on August 1, 2018.

On August 17, 2018, the Navy agreed to implement both ONMS recommendations. On October 30, 2018, NMFS agreed to implement the recommendation that applied to NMFS, thus concluding our consultation with ONMS.

NEPA

NMFS participated as a cooperating agency on the AFTT FEIS/OEIS, which was published on September 14, 2018, and is available at *http://www.aftteis.com*. In accordance with 40 CFR 1506.3, NMFS independently reviewed and evaluated the AFTT 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 AFTT FEIS/OEIS. NMFS has prepared a separate Record of Decision. NMFS' Record of Decision for adoption of the AFTT 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 will 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, are applicable only to the Navy. NMFS does not expect the issuance of these regulations or the associated LOAs to result in any impacts to small entities pursuant to the RFA. Because this action will directly affect the Navy and not a small entity, NMFS concludes the action will not result in a significant economic impact on a substantial number of small entities.

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 by November 14, 2018, to accommodate the Navy's current Letters of Authorization expiring November 13, 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 two 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 Letters of Authorization 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: October 30, 2018.

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Samuel D. Rauch III,

Deputy Assistant Administrator for Regulatory Programs,

National Marine Fisheries Service.

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

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

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

Authority: 16 U.S.C. 1361 *et seq.*, unless otherwise noted.

2. Revise subpart I of part 218 to read as follows:

Subpart I – Taking and Importing Marine Mammals; U.S. Navy's Atlantic Fleet Training and Testing (AFTT)

Sec.

218.80 Specified activity and specified geographical region.

218.81 Effective dates.

218.82 Permissible methods of taking.

218.83 Prohibitions.

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Subpart I – Taking and Importing Marine Mammals; U.S. Navy's Atlantic Fleet Training and Testing (AFTT)

§ 218.80 Specified activity and specified 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 Atlantic Fleet Training and Testing (AFTT) Study Area, which includes areas of the western Atlantic Ocean along the East Coast of North America, portions of the Caribbean Sea, and the Gulf of Mexico. The AFTT Study Area begins at the mean high tide line along the U.S. East Coast and extends east to the 45-degree west longitude line, north to the 65-degree north latitude line, and south to approximately the 20-degree north latitude line. The AFTT Study Area also includes Navy

pierside locations, bays, harbors, and inland waterways, and civilian ports where training and testing occurs.

(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.

(vi) Surface warfare.

(2) *Testing*. (i) Naval Air Systems Command Testing Activities.

(ii) Naval Sea System Command Testing Activities.

(iii) Office of Naval Research Testing Activities.

§ 218.81 Effective dates.

Regulations in this subpart are effective November 14, 2018 through November 13, 2023.

§ 218.82 Permissible methods of taking.

(a) Under LOAs issued pursuant to §§ 216.106 of this chapter and 218.86, the Holder of the LOAs (hereinafter "Navy") may incidentally, but not intentionally, take marine mammals within the area described in § 218.80(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 ship shock trials and vessel strikes 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 § 218.82

Species	Stock
Suborder Mysticeti (baleen whales)	
Family Balaenidae (right whales)	
North Atlantic right whale*	Western
Family Balaenopteridae (roquals)	
Blue whale*	Western North Atlantic (Gulf of St. Lawrence)
Bryde's whale	Northern Gulf of Mexico
	NSD
Minke whale	Canadian East Coast
Fin whale*	Western North Atlantic
Humpback whale	Gulf of Maine
Sei whale*	Nova Scotia
Suborder Odontoceti (toothed whales)	
Family Physeteridae (sperm whale)	
Sperm whale*	Gulf of Mexico Oceanic
	North Atlantic
Family Kogiidae (sperm whales)	
Dwarf sperm whale	Gulf of Mexico Oceanic
	Western North Atlantic
Pygmy sperm whale	Northern Gulf of Mexico
	Western North Atlantic
Family Ziphiidae (beaked whales)	
Blainville's beaked whale	Northern Gulf of Mexico
	Western North Atlantic
Cuvier's beaked whale	Northern Gulf of Mexico
	Western North Atlantic
Gervais' beaked whale	Northern Gulf of Mexico
	Western North Atlantic
Northern bottlenose whale	Western North Atlantic
Sowersby's beaked whale	Western North Atlantic

True's beaked whale	Western North Atlantic
Family Delphinidae (dolphins)	
Atlantic spotted dolphin	Northern Gulf of Mexico
	Western North Atlantic
Atlantic white-sided dolphin	Western North Atlantic
Bottlenose dolphin	Choctawhatchee Bay
	Gulf of Mexico Eastern Coastal
	Gulf of Mexico Northern Coastal
	Gulf of Mexico Western Coastal
	Indian River Lagoon Estuarine System
	Jacksonville Estuarine System
	Mississippi Sound, Lake Borgne, Bay Boudreau
	Northern Gulf of Mexico Continental Shelf
	Northern Gulf of Mexico Oceanic
	Northern North Carolina Estuarine System
	Southern North Carolina Estuarine System
	Western North Atlantic Northern Florida Coastal
	Western North Atlantic Central Florida Coastal
	Western North Atlantic Northern Migratory Coastal
	Western North Atlantic Offshore
	Western North Atlantic South Carolina/Georgia Coastal
	Western North Atlantic Southern Migratory Coastal
Clymene dolphin	Northern Gulf of Mexico
	Western North Atlantic
False killer whale	Northern Gulf of Mexico

	Western North Atlantic
Fraser's dolphin	Northern Gulf of Mexico
	Western North Atlantic
Killer whale	Northern Gulf of Mexico
	Western North Atlantic
Long-finned pilot whale	Western North Atlantic
Melon-headed whale	Northern Gulf of Mexico
	Western North Atlantic
Pantropical spotted dolphin	Northern Gulf of Mexico
	Western North Atlantic
Pygmy killer whale	Northern Gulf of Mexico
	Western North Atlantic
Risso's dolphin	Northern Gulf of Mexico
	Western North Atlantic
Rough-toothed dolphin	Northern Gulf of Mexico
	Western North Atlantic
Short-beaked common dolphin	Western North Atlantic
Short-finned pilot whale	Northern Gulf of Mexico
	Western North Atlantic
Spinner dolphin	Northern Gulf of Mexico
	Western North Atlantic
Striped dolphin	Northern Gulf of Mexico
	Western North Atlantic
White-beaked dolphin	Western North Atlantic
Family Phocoenidae (porpoises)	
Harbor porpoise	Gulf of Maine/Bay of Fundy
Suborder Pinnipedia	
Family Phocidae (true seals)	
Gray seal	Western North Atlantic
Harbor seal	Western North Atlantic
Harp seal	Western North Atlantic
Hooded seal	Western North Atlantic

§ 218.83 Prohibitions.

Notwithstanding incidental takings contemplated in § 218.82(a) and authorized by LOAs issued under §§ 216.106 of this chapter and 218.86, no person in connection with the activities listed in § 218.80(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 218.86;

(b) Take any marine mammal not specified in § 218.82(b);

(c) Take any marine mammal specified § 218.82(b) in any manner other than as specified in the LOAs; or

(d) Take a marine mammal specified § 218.82(b) if NMFS determines such taking results in more than a negligible impact on the species or stocks of such marine mammal.

§ 218.84 Mitigation requirements.

When conducting the activities identified in § 218.80(c), the mitigation measures contained in any LOAs issued under §§ 216.106 of this chapter and 218.86 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 AFTT 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, line charge testing and ship shock trials), 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).

(1) *Environmental awareness and education*. Appropriate personnel (including civilian personnel) involved in mitigation and training or testing activity reporting under the specified activities will 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 active sonar 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 active sonar 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); two Lookouts for platforms without space or manning restrictions while underway (at the forward part of the ship); and four Lookouts for pierside sonar testing activities at Port Canaveral, Florida and Kings Bay, Georgia.

(B) *Non-hull mounted sources*. One Lookout on the ship or aircraft conducting the activity.

(ii) *Mitigation zones and requirements*. During the activity, at 1,000 yard (yd) the Navy must power down 6 decibels (dB), at 500 yd the Navy must power down an additional 4 dB (for a total of 10 dB), and at 200 yd the Navy must shut down for low-frequency active sonar ≥200

dB and hull-mounted mid-frequency active sonar; or at 200 yd the Navy 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 initial start of the activity (*e.g.*, when maneuvering on station), Navy personnel must observe the mitigation zone for floating vegetation; if observed, Navy personnel must relocate or delay the start until the mitigation zone is clear. Navy personnel also must observe the mitigation zone for marine mammals; if observed, Navy personnel must relocate or delay the start of active sonar transmission.

(B) During 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 observed within 1,000 yd of the sonar source; power down by an additional 4 dB (10 dB total) if observed within 500 yd of the sonar source; and cease transmission if observed within 200 yd of the sonar source.

(C) During 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 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, 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).

(3) *Air guns*--(i) *Number of Lookouts and observation platform*. One Lookout must be 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 observed, Navy personnel must relocate or delay the start until the mitigation zone is clear. Navy personnel also must observe the mitigation zone for marine mammals; if 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 observed, Navy personnel must cease use of air guns.

(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 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 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 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: 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)(19)(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 initial start of the activity, Navy personnel must observe the mitigation zone for floating vegetation; if resources observed, relocate or delay the start until the mitigation zone is clear. Navy personnel also must observe the mitigation zone for marine mammals; if 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 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, personnel positioned in those assets (e.g., safety observers, evaluators) will 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 observed, relocate or delay the start 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 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 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 observed, relocate or delay the start until the mitigation zone is clear. Navy personnel also 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 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 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) - 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.

(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 initial start of the activity (*e.g.*, when maneuvering on station), Navy personnel must observe the mitigation zone for floating vegetation; if observed, Navy personnel must relocate or delay the start until the mitigation zone is clear. Navy personnel also must observe the mitigation zone for marine mammals; if observed, Navy personnel must relocate or delay the start of firing.

(E) During the activity, Navy personnel must observe for marine mammals; if 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) - 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.

(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 resource observed,

Navy personnel must relocate or delay the start until the mitigation zone is clear. Navy personnel also must observe the mitigation zone for marine mammals; if resources observed, Navy personnel must relocate or delay the start of firing.

(D) During the activity, Navy personnel must observe for marine mammals; if 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) - 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.

(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 observed, Navy personnel must relocate or delay the start until the mitigation zone is clear. Navy personnel also must observe the mitigation zone for marine mammals; if 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 for marine mammals; if 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), 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.

(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 and delay the start until the mitigation zone is clear. Navy personnel also must conduct aerial observations of the mitigation zone for marine mammals and jellyfish aggregations; if 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 information from detections to assist visual observations. Navy personnel must visually observe the mitigation zone for marine mammals from the vessel; if 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 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 must 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 (using up to 0.1-5 lb net explosive weight charges).

(B) Two Lookouts (one must be in an aircraft and one must be on a small boat) when implementing the larger mitigation zone (using up to 6-650 lb net explosive weight charges).

(C) If additional platforms are participating in the activity, Navy personnel positioned in those assets (*e.g.*, safety observers, evaluators) will 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 observed, Navy personnel must relocate or delay the start until the mitigation zone is clear. Navy personnel also must observe the mitigation zone for marine mammals; if 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; if observed, the Navy must cease detonations.

(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 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 will 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 must support the Lookouts while performing their regular duties and must 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 weigh

(B) 1,000 yd around the detonation site during all activities using time-delay fuses (0.1–20 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 observed, Navy personnel must relocate or delay the start until the mitigation zone is clear. Navy personnel also must observe the mitigation zone for marine mammals; if resource observed, Navy personnel must relocate or delay the start of detonations or fuse initiation.

(D) During the activity, Navy personnel must observe for marine mammals; if observed, Navy personnel must cease detonations or fuse initiation. To the maximum extent practicable depending on mission requirements, safety, and environmental conditions, boats must position themselves 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, 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 (0.1–20 lb. net explosive weight) to exceed 10 min.

(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 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.

(F) After completion of an activity (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 observed, Navy personnel must relocate or delay the start until the mitigation zone is clear. Navy personnel also must observe the mitigation zone for marine mammals; if observed, Navy personnel must relocate or delay the start of detonations.

(B) During the activity, Navy personnel must observe for marine mammals; if 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), 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.

(15) *Line charge testing*--(i) *Number of Lookouts and observation platform*. One Lookout 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*. 900 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 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 observed, Navy personnel must delay the start of detonations.

(B) During the activity, Navy personnel must observe for marine mammals; if 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; or the mitigation zone has been clear from any additional sightings for 30 min.

(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 will assist in the visual observation of the area where detonations occurred.

(16) *Ship shock trials*--(i) *Number of Lookouts and observation platform*. (A) A minimum of ten Lookouts or trained marine species observers (or a combination thereof) must be positioned either in an aircraft or on multiple vessels (*i.e.*, a Marine Animal Response Team boat and the test ship).

(*1*) If aircraft are used, Lookouts or trained marine species observers must be in an aircraft and on multiple vessels.

(*2*) If aircraft are not used, a sufficient number of additional Lookouts or trained marine species observers must be used to provide vessel-based visual observation comparable to that achieved by aerial surveys.

(B) 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*. 3.5 nmi around the ship hull.

(A) The Navy must not conduct ship shock trials in the Jacksonville Operating Area during North Atlantic right whale calving season from November 15 through April 15.

(B) The Navy must develop detailed ship shock trial monitoring and mitigation plans approximately one-year prior to an event and must continue to provide these to NMFS for review and approval.

(C) Pre-activity planning must include selection of one primary and two secondary areas where marine mammal populations are expected to be the lowest during the event, with the primary and secondary locations located more than 2 nmi from the western boundary of the Gulf Stream for events in the Virginia Capes Range Complex or Jacksonville Range Complex.

(D) If it is determined during pre-activity surveys that the primary area is environmentally unsuitable (*e.g.*, observations of marine mammals or presence of concentrations of floating vegetation), the shock trial can be moved to a secondary site in accordance with the detailed mitigation and monitoring plan provided to NMFS.

(E) Prior to the initial start of the activity at the primary shock trial location (in intervals of 5 hrs, 3 hrs, 40 min, and immediately before the detonation), Navy personnel must observe the mitigation zone for floating vegetation; if 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 observed, Navy personnel must delay triggering the detonation.

(F) During the activity, Navy personnel must observe for marine mammals, large schools of fish, jellyfish aggregations, and flocks of seabirds; if observed, Navy personnel must cease triggering the detonation. After completion of each detonation, Navy personnel must observe the mitigation zone for marine mammals; if any injured or dead marine mammals are observed, Navy personnel must follow established incident reporting procedures and halt any remaining detonations until Navy personnel can consult with NMFS and review or adapt the mitigation, if necessary.

(G) 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 ship hull; or the mitigation zone has been clear from any additional sightings for 30 min.

(H) After completion of the activity (during the following two days at a minimum, and up to seven days at a maximum), 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.

(17) *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, etc.); or the vessel is operated autonomously.

(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).

(C) During the activity, when underway, Navy personnel must observe the mitigation zone for marine mammals; if observed, Navy personnel must maneuver to maintain distance.

(D) Additionally, Navy personnel must broadcast awareness notification messages with North Atlantic right whale Dynamic Management Area information (*e.g.*, location and dates) to applicable Navy assets operating in the vicinity of the Dynamic Management Area. The information will alert assets to the possible presence of a North Atlantic right whale to maintain safety of navigation and further reduce the potential for a vessel strike. Platforms will use the information to assist their visual observation of applicable mitigation zones during training and testing activities and to aid in the implementation of procedural mitigation, including but not limited to, mitigation for vessel movement. If a marine mammal vessel strike occurs, Navy personnel must follow the established incident reporting procedures.

(18) *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. During the activity, when towing an in-water device, Navy personnel must observe for marine mammals; if observed, Navy personnel must maneuver to maintain distance.

(19) *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 initial start of the activity (*e.g.*, when maneuvering on station), Navy personnel must observe the mitigation zone for floating vegetation; if observed, Navy personnel must relocate or delay the start until the mitigation zone is clear. Navy personnel also must observe the mitigation zone for marine mammals; if observed, Navy personnel must relocate or delay the start of firing.

(B) During the activity, Navy personnel must observe for marine mammals; if 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.

(20) *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 observed, Navy personnel must relocate or delay the start until the mitigation zone is clear. Navy personnel also must observe the mitigation zone for marine mammals; if observed, Navy personnel must relocate or delay the start of firing.

(B) During the activity, Navy personnel must observe for marine mammals; if 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.

(21) *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 observed, Navy personnel must relocate or delay the start until the mitigation zone is clear. Navy personnel also must observe the mitigation zone for marine mammals; if 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; if 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, the Navy must implement mitigation measures within mitigation areas to avoid potential impacts on marine mammals.

(1) *Mitigation areas off the Northeastern United States for sonar, explosives, and physical disturbance and strikes*--(i) *Mitigation area requirements*. (A) Northeast North Atlantic Right Whale Mitigation Area (year-round):

(*1*) Navy personnel must report the total hours and counts of active sonar and in-water explosives used in the mitigation area (which includes North Atlantic right whale ESA-designated critical habitat) in its annual training and testing activity reports submitted to NMFS.

(*2*) Navy personnel must minimize the use of low-frequency active sonar, mid-frequency active sonar, and high-frequency active sonar to the maximum extent practicable within the mitigation area.

(*3*) Navy personnel must not use Improved Extended Echo Ranging sonobuoys in or within 3 nmi of the mitigation area or use explosive and non-explosive bombs, in-water detonations, and explosive torpedoes within the mitigation area.

(*4*) For activities using non-explosive torpedoes within the mitigation area, Navy personnel must conduct activities during daylight hours in Beaufort sea state 3 or less. The Navy must use three Lookouts (one positioned on a vessel and two positioned in an aircraft during

dedicated aerial surveys) to observe the vicinity of the activity. An additional Lookout must be positioned on the submarine, when surfaced. Immediately prior to the start of the activity, Navy personnel will observe for floating vegetation and marine mammals; if observed, Navy personnel will not commence the activity until the vicinity is clear or the activity is relocated to an area where the vicinity is clear. During the activity, Navy personnel will observe for marine mammals; if observed, Navy personnel will cease the activity. To allow a sighted marine mammal to leave the area, Navy personnel must not recommence the activity until one of the following conditions has been met: the animal is observed exiting the vicinity of the activity; the animal is thought to have exited the vicinity of the activity based on a determination of its course, speed, and movement relative to the activity location; or the area has been clear from any additional sightings for 30 min. During transits and normal firing, ships will maintain a speed of no more than 10 knots (kn). During submarine target firing, ships must maintain speeds of no more than 18 kn. During vessel target firing, vessel speeds may exceed 18 kn for brief periods of time (*e.g.*, 10–15 min).

(5) For all activities, before vessel transits within the mitigation area, Navy personnel must conduct a web query or email inquiry to the National Oceanographic and Atmospheric Administration Northeast Fisheries Science Center's North Atlantic Right Whale Sighting Advisory System to obtain the latest North Atlantic right whale sightings information. Navy personnel on vessels must use the sightings information to reduce potential interactions with North Atlantic right whales during transits. Navy personnel on vessels must implement speed reductions within the mitigation area after observing a North Atlantic right whale, if transiting within 5 nmi of a sighting reported to the North Atlantic Right Whale Sighting Advisory System within the past week, and if transiting at night or during periods of reduced visibility.

(B) Gulf of Maine Planning Awareness Mitigation Area (year-round):

(*1*) Navy personnel must report the total hours and counts of active sonar and in-water explosives used in the mitigation area in its annual training and testing activity reports submitted to NMFS.

(*2*) Navy personnel must not conduct greater than 200 hrs of hull-mounted mid-frequency active sonar per year within the mitigation area.

(*3*) Navy personnel must not conduct major training exercises (Composite Training Unit Exercises or Fleet Exercises/Sustainment Exercises) within the mitigation area. If the Navy needs to conduct a major training exercise within the mitigation area in support of training requirements driven by national security concerns, Navy personnel must confer with NMFS to verify that potential impacts are adequately addressed.

(C) Northeast Planning Awareness Mitigation Areas (year-round):

(*1*) Navy personnel will avoid planning major training exercises (Composite Training Unit Exercises or Fleet Exercises/Sustainment Exercises) within the mitigation area to the maximum extent practicable.

(*2*) Navy personnel must not conduct more than four major training exercises per year (all or a portion of the exercise) within the mitigation area.

(*3*) If the Navy needs to conduct additional major training exercises in the mitigation area in support of training requirements driven by national security concerns, Navy personnel must provide NMFS with advance notification and include the information in its annual training and testing activity reports submitted to NMFS.

(ii) [Reserved]

(2) *Mitigation areas off the Mid-Atlantic and Southeastern United States for sonar, explosives, and physical disturbance and strikes*--(i) *Mitigation area requirements*. (A) Southeast North Atlantic Right Whale Mitigation Area (November 15 through April 15):

(*1*) Navy personnel must report the total hours and counts of active sonar and in-water explosives used in the mitigation area in its annual training and testing activity reports submitted to NMFS.

(*2*) The Navy must not conduct: low-frequency active sonar (except as noted in paragraph (b)(2)(i)(A)(*3*) of this section), mid-frequency active sonar (except as noted in paragraph (b)(2)(i)(A)(*3*) of this section), high-frequency active sonar, missile and rocket activities (explosive and non-explosive), small-, medium-, and large-caliber gunnery activities, Improved Extended Echo Ranging sonobuoy activities, explosive and non-explosive bombing activities, in-water detonations, and explosive torpedo activities within the mitigation area.

(*3*) To the maximum extent practicable, Navy personnel must minimize the use of: helicopter dipping sonar, low-frequency active sonar and hull-mounted mid-frequency active sonar used for navigation training, and low-frequency active sonar and hull-mounted mid-frequency active sonar used for object detection exercises within the mitigation area.

(*4*) Before transiting or conducting training or testing activities within the mitigation area, Navy personnel must initiate communication with the Fleet Area Control and Surveillance Facility, Jacksonville to obtain Early Warning System North Atlantic right whale sightings data. The Fleet Area Control and Surveillance Facility, Jacksonville must advise Navy personnel on vessels of all reported whale sightings in the vicinity to help Navy personnel on vessels and aircraft reduce potential interactions with North Atlantic right whales. Commander Submarine Force U.S. Atlantic Fleet must coordinate any submarine activities that may require approval

from the Fleet Area Control and Surveillance Facility, Jacksonville. Navy personnel on vessels must use the sightings information to reduce potential interactions with North Atlantic right whales during transits.

(*5*) Navy personnel on vessels must implement speed reductions after they observe a North Atlantic right whale, if they are within 5 nmi of a sighting reported within the past 12 hrs, or when operating in the mitigation area at night or during periods of poor visibility.

(*6*) To the maximum extent practicable, Navy personnel on vessels must minimize north-south transits in the mitigation area.

(B) Southeast North Atlantic Right Whale Critical Habitat Special Reporting Area (November 15 through April 15):

(*1*) Navy personnel must report the total hours and counts of active sonar and in-water explosives used in the Special Reporting Area (which includes southeast North Atlantic right whale ESA-designated critical habitat) in its annual training and testing activity reports submitted to NMFS.

(*2*) [Reserved]

(C) Jacksonville Operating Area (November 15 through April 15):

(*1*) Navy units conducting training or testing activities in the Jacksonville Operating Area must initiate communication with the Fleet Area Control and Surveillance Facility, Jacksonville to obtain Early Warning System North Atlantic right whale sightings data. The Fleet Area Control and Surveillance Facility, Jacksonville must advise Navy personnel on vessels of all reported whale sightings in the vicinity to help Navy personnel on vessels and aircraft reduce potential interactions with North Atlantic right whales. Commander Submarine Force U.S. Atlantic Fleet must coordinate any submarine activities that may require approval from the Fleet

Area Control and Surveillance Facility, Jacksonville. Navy personnel must use the reported sightings information as they plan specific details of events (*e.g.*, timing, location, duration) to minimize potential interactions with North Atlantic right whales to the maximum extent practicable. Navy personnel must use the reported sightings information to assist visual observations of applicable mitigation zones and to aid in the implementation of procedural mitigation.

(*2*) [Reserved]

(D) Navy Cherry Point Range Complex Nearshore Mitigation Area (March through September):

(*1*) Navy personnel must not conduct explosive mine neutralization activities involving Navy divers in the mitigation area.

(*2*) To the maximum extent practicable, Navy personnel must not use explosive sonobuoys, explosive torpedoes, explosive medium-caliber and large-caliber projectiles, explosive missiles and rockets, explosive bombs, explosive mines during mine countermeasure and neutralization activities, and anti-swimmer grenades in the mitigation area.

(E) Mid-Atlantic Planning Awareness Mitigation Areas (year-round):

(*1*) Navy personnel will avoid planning major training exercises (Composite Training Unit Exercises or Fleet Exercises/Sustainment Exercises) to the maximum extent practicable.

(*2*) Navy personnel must not conduct more than four major training exercises per year (all or a portion of the exercise) within the mitigation area.

(*3*) If the Navy needs to conduct additional major training exercises in the mitigation area in support of training requirements driven by national security concerns, Navy personnel

will provide NMFS with advance notification and include the information in its annual training and testing activity reports submitted to NMFS.

(ii) [Reserved]

(3) *Mitigation areas in the Gulf of Mexico for sonar*--(i) *Mitigation area requirements*. (A) Gulf of Mexico Planning Awareness Mitigation Areas (year-round):

(*1*) Navy personnel must not conduct major training exercises within the mitigation area (all or a portion of the exercise).

(*2*) If the Navy needs to conduct a major training exercise within the mitigation areas in support of training requirements driven by national security concerns, Navy personnel must confer with NMFS to verify that potential impacts are adequately addressed.

(B) Bryde's Whale Mitigation Area (year-round):

(*1*) Navy personnel must report the total hours and counts of active sonar and in-water explosives used in the mitigation area in its annual training and testing activity reports submitted to NMFS.

(*2*) Navy personnel must not conduct greater than 200 hrs of hull-mounted mid-frequency active sonar per year within the mitigation area.

(*3*) The Navy must not use explosives (except during mine warfare activities) within the mitigation area.

(ii) [Reserved]

§ 218.85 Requirements for monitoring and reporting.

(a) *Unauthorized take*. The Navy must notify NMFS immediately (or as soon as operational security considerations allow) if the specified activity identified in § 218.80 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 required reporting under the LOAs, including abiding by the AFTT 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/incidental-take-authorizations-military-readiness-activities*.

(d) *Annual AFTT Study Area marine species monitoring report*. The Navy must submit an annual report of the AFTT 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 of NMFS either 90 days after the calendar year, or 90 days 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 monitoring plan study questions across all Navy ranges associated with the Integrated Comprehensive Monitoring Program. Similar study questions must be treated together so that progress on each topic can 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.

(e) *Annual AFTT Study Area training and testing reports*. Each year, the Navy must submit a preliminary report (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 a detailed report within 3 months after the anniversary of the date of issuance of each LOA to the Director, Office of Protected Resources, NMFS. 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 specified mitigation reporting areas, as described in paragraph (e)(3) of this section. The analysis in the detailed report must be based on the accumulation of data from the current year's report and data collected from the previous report. The detailed reports must contain information identified in paragraphs (e)(1) through (5) of this section.

(1) *MTEs*. This section of the report must contain the following information for MTEs conducted in the AFTT 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 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) Mitigation implementation. Whether operation of sonar sensor was delayed, or sonar was powered or shut down, and how long the delay was.

(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) Observed behavior. 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 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.

(J) 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: 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 (or target spot if not yet detonated).

(J) Observed behavior. 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) Resulting mitigation implementation. 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 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 (pile driving and air gun activities); and

(ii) Total annual expended/detonated ordnance (missiles, bombs, sonobuoys, etc.) for each explosive bin.

(4) *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 AFTT Study Area.

(5) *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.

(f) *Five-year close-out comprehensive training and testing report*. This report must be included as part of the 2023 annual training and testing report. This report must provide the annual totals for each sound source bin with a comparison to the annual allowance and the five-year total for each sound source bin with a comparison to the five-year allowance. Additionally, if there were any changes to the sound source allowance, this report must include a discussion of why the change was made and include the analysis to support how the change did or did not result in a change in the EIS and final rule determinations. The draft report must be submitted three months after the expiration of this subpart to the Director, Office of Protected Resources, NMFS. NMFS must submit comments on the draft close-out report, if any, within three months of receipt. The report will be considered final after the Navy has addressed NMFS' comments, or 3 months after the submittal of the draft if NMFS does not provide comments.

§ 218.86 Letters of Authorization.

(a) To incidentally take marine mammals pursuant to the regulations in this subpart, the Navy must apply for and obtain Letters of Authorization (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 the expiration date of the regulations in this subpart.

(c) If an LOA expires prior to the expiration date of the regulations in this subpart, 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 § 218.87(c)(1)) as required by an LOA issued under this subpart, the Navy must apply for and obtain a modification of the LOA as described in § 218.87.

(e) Each LOA will set forth:

(1) Permissible methods of incidental taking;

(2) Specified 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) will 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) will be published in the *Federal Register* within 30 days of a determination.

§ 218.87 Renewals and modifications of Letters of Authorization.

(a) An LOA issued under §§ 216.106 of this chapter and 218.86 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) under the regulations in this subpart 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 218.86 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 218.86, 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.

§§ 218.88-218.89 [Reserved]

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