Environmental Assessment of Mitigation Alternatives for Issuance of Incidental Take Regulations to U.S. Navy for Atlantic Fleet Active Sonar Training (AFAST)

Office of Protected Resources
National Marine Fisheries Service
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CHAPTER 1 – PURPOSE AND NEED FOR THE ACTION

1.1 **Introduction**

The Marine Mammal Protection Act (MMPA) (16 U.S.C. 1361 et seq.) prohibits the take of marine mammals except under limited circumstances. Individuals seeking to obtain take coverage for marine mammals under the jurisdiction of the National Marine Fisheries Service (NMFS) are required to submit a request to NMFS for 5-year regulations or annual authorizations. *See* 16 U.S.C. §§ 101(a)(5)(A) & (D). In February 2008 the U.S. Navy (Navy) submitted an application to NMFS for 5-year regulations and Letters of Authorization (LOA) for military readiness activities, including training, maintenance, and research, development, testing, and evaluation (RDT&E), conducted as part of the Atlantic Fleet Active Sonar Training (AFAST) in the area referred to by the Navy as the AFAST Study Area. NMFS' promulgation of regulations, issuance of a 2009 LOA, and issuance of subsequent LOAs as appropriate are therefore required to authorize the Navy to take marine mammals incidental to military readiness activities in the AFAST Study Area. As described in more detail below and in Section 1.2, this "Environmental Assessment of Mitigation Alternatives for Issuance of Incidental Take Regulations to U.S. Navy for Atlantic Fleet Active Sonar Training (AFAST)" (Mitigation EA) provides additional analysis of mitigation measures under consideration by NMFS as part of the MMPA rulemaking process.

Sections 101(a)(5)(A) and (D) of the MMPA direct the Secretary of Commerce (Secretary) 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 during periods of not more than five consecutive years each if certain findings are made and regulations are issued or, if the taking is limited to harassment and of no more than 1 year, the Secretary shall issue a notice of proposed authorization for public review.

Authorization 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, and if the permissible methods of taking and requirements pertaining to the mitigation, monitoring and reporting of such taking are set forth. In regard to mitigation, NMFS must set forth the means of effecting the least practicable adverse impact on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.

On February 4, 2008, NMFS received an application from the Navy requesting authorization for the take of individuals of 39 species of marine mammals incidental to upcoming Navy training, maintenance, and RDT&E activities to be conducted within the AFAST Study Area, which extends east from the Atlantic Coast of the U.S. to 45^{o} W. long. and south from the Atlantic and Gulf of Mexico Coasts to approximately 23^{o} N. lat., but not encompassing the Bahamas (see Figure 1-2 in the Navy's AFAST EIS), for the period of January 2009 through January 2014. These activities are classified as military readiness activities, which have the potential to incidentally take marine mammals present within the AFAST Study Area by exposing them to sound from mid-frequency or high frequency active sonar (MFAS/HFAS) or to underwater detonations at levels that NMFS associates with the take of marine mammals. Subsequent to the initial application, Navy updated specific aspects of the request and submitted these clarifications to NMFS in March and June 2008.

The issuance of MMPA incidental take regulations and associated LOAs to the Navy is a Federal action, thereby requiring NMFS to analyze the effects of the action on the human environment pursuant to the National Environmental Policy Act (NEPA) and NMFS NEPA procedures. The Navy developed the "Atlantic Fleet Active Sonar Training Environmental Impact Statement (EIS)/Overseas Environmental Impact Statement (hereinafter, EIS or AFAST EIS) that analyzed the environmental effects of conducting military training, maintenance, and RDT&E in the AFAST Study Area. In accordance with the NEPA implementing regulations (40 CFR 1500-1508), NMFS participated as a cooperating agency in the development of the AFAST EIS (e.g., providing information in NMFS' area of expertise and assisting in the environmental effects analysis of naval activities on endangered species, marine mammals, and other marine resources). NMFS also participated as a cooperating agency in accordance with the NEPA regulations to ensure that the AFAST EIS contained adequate information and analysis to allow NMFS to adopt the AFAST EIS for the corresponding issuance of the MMPA 5-year incidental take regulations, the 2009 LOA, and future LOAs as appropriate. Notice of availability of the AFAST Final EIS was published on December 12, 2008 (73 FR 75715).

Based on NMFS' preliminary determinations reached in the development of the proposed rule associated with AFAST as well as our analysis of the comments received during the public comment period on the proposed rule, NMFS has determined that the Navy's EIS adequately analyzes the training, maintenance, and RDT&E activities in the AFAST Study Area and NMFS has adopted the AFAST EIS to support the proposed issuance of the MMPA incidental take regulations, the 2009 LOA, and future LOAs as appropriate. As mentioned above, NMFS must also prescribe regulations that set forth the means of effecting the least practicable adverse impact on affected species or stocks and their habitat (i.e., mitigation measures). The Navy's EIS includes a suite of proposed mitigation measures, a discussion of mitigation measures that were considered by the Navy, but eliminated, and an indication that additional mitigation measures (either not discussed in the EIS or measures considered but eliminated in the EIS) may be required by NMFS pursuant to the MMPA process. Additionally, three of the EIS Alternatives analyzed by the Navy considered geographical and seasonal guidelines for active sonar activities[1] related to (among other things) the density and habitat preferences of marine mammals. Note that comments received by the Navy on the Final EIS repeat a concern from the Draft EIS regarding the Navy's approach to selecting a preferred alternative, as the preference for the No Action alternative does not include consideration of seasonal and geographic guidelines for the conduct of active sonar activities. However, NMFS notes that EIS Navy-preferred alternative and the alternative preferred by NMFS in this EA analyze a requirement for "Planning Awareness Areas", which are geographically developed mitigations. As indicated in the EIS, all alternatives include implementation of mitigation measures, and the analysis of mitigation alternatives is specifically presented in Chapter 5 of the Final EIS. The consideration of mitigation measures and alternative mitigation measures in Chapter 5 provides the foundation for the alternatives analysis for this tiered EA.

1.2 **Purpose and Need for Action**

NMFS' proposed action, as analyzed in this Mitigation EA is the additional analysis of mitigation measures (i.e., consideration of benefits to affected species or stocks and their habitat and effectiveness of such measures based on a practicability standard) and a determination of whether such measures will be included in the MMPA final rule for AFAST. In making a determination of "least practicable adverse impact", NMFS considers the needs of the affected species or stocks and their habitat, as well as the personnel safety, practicality of implementation, and the impact on the effectiveness of the military readiness activity. See 16 U.S.C. 1371(a)(5)(A)(ii). Mitigation measures need only be set forth if regulations are issued authorizing incidental take – if NMFS were to deny the Navy's request for an authorization, an analysis of mitigation would not be necessary – therefore, this Mitigation EA assumes that an authorization will be issued. NMFS has not yet made a final decision regarding the issuance of an authorization, but assumes issuance here as the basis for this analysis. As mentioned previously, NMFS adopted the AFAST Final EIS in January 2009 and will rely on that document to support our decision whether or not to issue incidental take regulations, the 2009 LOA, and future LOAs as appropriate. This Mitigation EA is tiered off of the AFAST Final EIS and will serve the specific purpose of providing additional analysis of a reasonable range of mitigation alternatives that may be required if an MMPA authorization is issued. If the appropriate findings

[1] For the purposes of the AFAST EIS, training, maintenance and RDT&E activities involving active sonar and the explosive source sonobuoy (AN/SSQ-110A) are collectively described as 'active sonar activities."

under the MMPA can be made, the need for this action arises from NMFS' requirement to set forth in any associated regulations and LOAs the requirements pertaining to mitigation.

As described, mitigation is a very important component of the MMPA process and additional analysis of reasonable mitigation measures in this Mitigation EA will further support NMFS' choice of what should be required in regulations, the 2009 LOA, and subsequent LOAs as appropriate, if issued. Additionally, this Mitigation EA allows NMFS to include an analysis of any mitigation options that may have arisen during the MMPA public comment period, which ended on November 14, 2008.

Many of the mitigation measures analyzed in this document are general measures that could apply to any Navy training action involving sound in the water. NMFS may reference the analysis included in this document for consideration in other Navy actions.

1.3 Description of Action and Alternatives Analyzed in the Mitigation EA

In order to issue incidental take regulations 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." The National Defense Authorization Act of 2004 (NDAA) (Public Law 108-136) amended the MMPA (Section 3(18)(B)) as it relates to "military-readiness activities" and the incidental take authorization process by: removing the "small numbers" and "specified geographical region" limitations; amending the definition of "harassment"; and (most applicable here) indicating that "least practicable adverse impact" shall include consideration of personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity.

The Navy's identified activities in the AFAST Study Area are considered military readiness activities. It is incumbent upon NMFS to include in the incidental take regulations, adequate means to achieve the least practicable adverse effect. This means carefully considering the Navy's proposed mitigation, as well as other potential measures, and assessing the benefit of the considered measures to the affected species or stocks of marine mammals and their habitat, while also considering personnel safety, practicality of implementation, and impact on the "military-readiness activity". If NMFS determines that the activity, as proposed (and including the Navy's proposed mitigation), does not include adequate means to achieve the least practicable adverse effect, then NMFS will identify, and discuss with the Navy, additional practicable mitigation measures to further lessen adverse effects. Any mitigation measure prescribed by NMFS should be known to accomplish, have a reasonable likelihood of accomplishing (based on current science), or contribute to the accomplishment of one or more of the general goals listed below:

a) avoidance or minimization of marine mammal injury or death wherever possible (goals b, c, and d may contribute to this goal).

b) a reduction in the numbers of marine mammals (total number or number at biologically important time or location) exposed to received levels of active sonar, underwater detonations, or

other activities expected to result in the take of marine mammals (this goal may contribute to a, above, or to reducing harassment takes only).

c) a reduction in the number of times (total number or number at biologically important time or location) individuals would be exposed to received levels of active sonar, underwater detonations, or other activities expected to result in the take of marine mammals (this goal may contribute to a, above, or to reducing harassment takes only).

d) a reduction in the intensity of exposures (either total number or number at biologically important time or location) to received levels of active sonar, underwater detonations, or other activities expected to result in the take of marine mammals (this goal may contribute to a, above, or to reducing the severity of harassment takes only).

e) a reduction in adverse effects to marine mammal habitat, paying special attention to the food base, activities that block or limit passage to or from biologically important areas, permanent destruction of habitat, or temporary destruction/disturbance of habitat during a biologically important time.

f) for monitoring directly related to mitigation - an increase in the probability of detecting marine mammals, thus allowing for more effective implementation of the mitigation (shut-down zone, etc.)

This document contains an assessment of the mitigation alternatives being considered by NMFS for the issuance of incidental take regulations, the 2009 LOA, and future LOAs, as appropriate, to the Navy for its active sonar activities in the AFAST study area. Following are the three alternatives (Note these are appropriately different than the alternatives evaluated in the Navy's FEIS, so the numbering and range of alternatives are not intended to mirror those presented in that Final EIS):

- No Action Alternative: Navy Mitigation Measures – For this analysis, the no action alternative consists of NMFS issuing regulations, a 2009 LOA, and future LOAs as appropriate, for the AFAST activities that requires the mitigation measures proposed in the Navy's application for incidental take regulations and LOA with no changes or additions.

- Alternative 1 (Preferred Alternative) – NMFS and the Navy worked together to develop several additional mitigation measures, including the use of Planning Awareness Areas to raise awareness and lessen impacts in designated productive marine mammal habitat, minimization of helicopter dipping sonar and object detection exercises in southeast right whale critical habitat from November 15 – April 15, and the implementation of a Stranding Response Plan for AFAST. Alternative 1 is the issuance of regulations, a 2009 LOA, and future LOAs as appropriate to the Navy for AFAST that requires all of the mitigation measures included in the no action alternative plus these additional measures. This alternative addresses the mitigation measures presented by the Navy in their preferred alternative (EIS No Action Alternative) in the AFAST Final EIS.

- Alternative 2 – NMFS considered a variety of reasonable potential mitigation measures that have been recommended in public comments in the past or discussed internally. Alternative 2 is the issuance of regulations, a 2009 LOA, and future LOAs as appropriate, to the Navy that requires all of the mitigation measures listed in Alternative 1, but with the addition of some subset of the additional suite of mitigation measures considered in Alternative 2. These additional mitigation measures were developed internally by NMFS, provided in the comments received on the MMPA Notice of receipt or proposed rule, or considered and analyzed by the Navy in the AFAST EIS but not proposed as part of the Navy's preferred alternative.

In order to analyze the mitigation alternatives it is necessary to understand the underlying training activities for which incidental take would be authorized. As noted, the AFAST Final EIS contains a complete description of these activities. NMFS adopted the AFAST Final EIS prior to reaching a finding on this Mitigation EA, and this EA is tiered off of the AFAST Final EIS. Additionally, and more specifically, NMFS' proposed rule establishing the framework upon which incidental take authorizations may be issued to the Navy for its AFAST activities contains: a description of the Navy activities; a description of the marine mammals that will likely be taken by the Navy activities; an analysis of the permissible methods of take and their impacts to marine mammals; and a finding of negligible impact. These provisions, as appropriately updated via the MMPA process, are a required part of any final rule issued for this action. Applicable portions of the proposed rule are incorporated by reference herein and may be viewed at: http://www.nmfs.noaa.gov/pr/permits/incidental.htm#applications. A summary of the major components of NMFS' proposed authorization is included in the next section.

1.4 Background - Summary of NMFS' Proposed Authorization for AFAST

As noted above, in order to analyze the mitigation alternatives it is necessary to briefly describe the underlying training, maintenance and RDT&E activities for which incidental take would be authorized (full analysis is available in the AFAST Final EIS). The activities, thresholds, estimated take numbers and other issues addressed in this section are provided as background for context in this Mitigation EA, and are not part of the scope of action being analyzed in this EA.

1.4.1 Specified Activities Covered by the Proposed Authorization

NMFS has proposed regulations to authorize the take of marine mammals incidental to a subset of the Navy's military readiness training activities in the AFAST Study Area that include the use of mid-frequency active sonar (MFAS), high frequency active sonar (HFAS), or the improved extended echo ranging (IEER) system, which consists of a small (5 lb net explosive weight) explosive source sonobuoy (AN/SSQ-110A) and an air deployable active receiver (ADAR) passive sonobuoy (AN/SSQ-101). A complete narrative description of the Navy's specified activities may be found both in the AFAST FEIS and the Description of the Action in NMFS' proposed rule, which is incorporated herein by reference. The following tables describe the active sources utilized in AFAST Activities, the type, number, and geographic distribution by OPAREA of activities utilizing active sonar annually in the AFAST Study Area, and the specific number of sonar hours associated with each exercise type.

System	Center Frequency (kHz)	Source Level (re 1 µPa)	Associated Platform	System Description	Annual Quantity	Unit
AN/SQS-53	3.5	235	DDG and CG hull-mounted sonar (surface ship)	ASW search, detection, & localization; utilized 70% in search mode and 30% track mode	3214	Hours
AN/SQS-56	7.5	225	FFG hull-mounted sonar (surface ship)	ASW search, detection, & localization; Utilized 70% in search mode and 30% track mode	1684	Hours
AN/SQS-53 and AN/SQS-56 (Kingfisher)	MF	Classified	DDG, CG, and FFG hull-mounted sonar (object detection)	Only used when entering and leaving port	216	Hours
AN/BQQ-5 or 10****	MF	Classified	Submarine hull-mounted sonar	ASW search and attack (approximately one ping per two hours when in use)	9976	Pings
AN/AQS-13	10	215	Helicopter dipping sonar	ASW sonar lowered from hovering helicopter (approximately 10 pings/dip, 30 seconds between pings)	1476	Dips
AN/AQS-22	4.1	217	Helicopter dipping sonar	ASW sonar lowered from hovering helicopter (approximately 10 pings/dip, 30 seconds between pings)	1476	Dips
MK-48 Torpedo	HF	Classified	Submarine fired exercise torpedo	ASW sonar lowered from hovering helicopter (approximately 10 pings/dip, 30 seconds between pings)	32	Torpedoes
MK-46 or 54 Torpedo	HF	Classified	Surface ship and aircraft fired exercise torpedo	Recoverable and non-explosive exercise torpedo; sonar is active approximately 15 min per torpedo run	24	Torpedoes
Tonal sonobuoy (DICASS) (AN/SSQ-62)	8	201	Helicopter and MPA deployed	Remotely commanded expendable sonar-equipped buoy (approximately 12 pings per use, 30 secs between pings)	5853	Buoys
IEER (AN/SSQ-110A)	Impulsive - Broadband	Classified	MPA deployed	ASW system consists of explosive acoustic source buoy (contains two 4.1 lb charges) and expendable passive receiver sonobuoy	872***	Buoys
AN/SLQ-25 (NIXIE)	MF	Classified	DDG, CG, and FFG towed array (countermeasure)	Towed countermeasure to avert localization and torpedo attacks (approximately 20 mins per use)	332	Hours
AN/SQQ-32	HF	Classified	MCM over the side system (mine-hunting)	Used during MIW training events detect, classify, and localize bottom and moored mines	4474	Hours
AN/BQS-15	HF	Classified	Submarine navigational sonar	Only used when entering and leaving port	450	Hours
ADC MK-1, MK-2, MK-3, and MK-4 ADCs**	MF	Classified	Submarine deployed countermeasure	Expendable acoustic device countermeasure (approximately 20 mins per use)	225	ADCs
Noise Acoustic Emitters (NAE)	MF	Classified	Submarine deployed countermeasure	Expendable acoustic countermeasure (20 mins per use)	127	NAEs
AN/SSQ-125	MF	Classified	MPA deployed	ASW system consists of active sonobuoy and expendable passive receiver sonobuoy	872***	Buoys

Table 1. Acoustic sources used in AFAST exercises that were modeled for effects on marine mammals

*AN/AQS-22 modeling is representative of all helicopter dipping sonar

**MK-3 modeling is representative of all ADCs

ADC – Acoustic Device Countermeasure; CG – Guided Missile Cruiser; DDG – Guided Missile Destroyer; DICASS – Directional Command-Activated Sonobuoy System; DIFAR – Directional Frequency Analysis and Recording; FFG – Fast Frigate; HF – High-Frequency; IEER – Improved Extended Echo Ranging; kHz – Kilohertz; MCM – Mine Countermeasures; MF – Mid-Frequency; MIW – Mine Warfare; MPA – Maritime Patrol Aircraft

***The AN/SSQ-125 System (AEER) is replacing the AN/SSQ-110A (IEER) system, so a total of 872 buoys (IEER or AEER) will be deployed.

****The AN/BQQ-10 was used to model the AN/BQQ-5

Event Name	Training Event Scenarios	Events per Year*	Length of Overall Event	Possible Event Areas***	Typical Event Area Dimensions	Equipment or Action	Equipment Use or Action per Event	Annual Use per Event Type*
INDEPENDENT UNIT LEVEL TRAINING (INCLUDING RDT&E)								
Surface Ship ASW ULT	One or two surface ships (CG, DDG, and FFG) conducting ASW localization and tracking training.	457	2 to 6 hours	VACAPES, CHPT, JAX/CHASN, and GOMEX OPAREAs	5 NM x 10 NM to 30 NM x 40 NM	Surface ship MFA ASW sonar (AN/SQS-53 or AN/SQS-56)	1 to 2 ships (CG, DDG, or FFG) pinging 1 to 3 hours each	1071 hours AN/SQS-53 and 465 hours AN/SQS-56
						Acoustic countermeasures (AN/SLQ-25 NIXIE, MK-1, MK-2, MK-3, MK 4, or Noise Acoustic Emitter)	2 hours per NIXIE 20 minutes per MK-1, MK-2, MK-3, or MK-4 Noise Acoustic Emitter	158 NIXIE 225 MK-1, MK-2, MK-3, or MK-4 127 Noise Acoustic Emitter
						MK-46 or MK-54 Torpedo	Exercise torpedoes could be used for RDT&E	8 MK-46 or MK-54 exercise torpedoes
						MK-39 EMATT or MK-30 target	1 EMATT or MK-30 (recoverable) per exercise may be used as a target	up to 725 EMATTs expended (total annual use for all exercises)
						Vessel movement	1 to 2 ships maneuvering	Approximately 54 CG, DDG, and FFG surface ships conducting ULT throughout the year
Surface Ship Object Detection ULT	One ship (CG, DDG, and FFG) conducting object detection during transit in/out of port for training and safety during reduced visibility.	108	1 to 2 hours	Sea lanes and Entrance channels to Norfolk, Virginia and Mayport, Florida	5 NM x 10 NM	Surface ship MFA ASW sonar (AN/SQS-53 or AN/SQS-56 Kingfisher) operated in object detection mode	1 ship (CG, DDG, or FFG) pinging for 1 to 2 hours	148 hours AN/SQS-53 and 68 hours AN/SQS-56
						Vessel movement	1 ship maneuvering	Approximately 54 CG, DDG, and FFG surface ships on the East Coast conducting object avoidance twice a year
Helicopter ASW ULT	One helicopter conducting ASW training using dipping sonar or sonobuoys	165	2 to 4 hours	VACAPES, CHPT, and JAX/CHASN OPAREAs	20 NM x 30 NM	Helicopter dipping sonar (AN/AQS-13 or AN/AQS-22)	1 helicopter dipping up to two hours (10 pings per five-minute dip)	160 hours
						Tonal sonobuoy (DICASS) (AN/SSQ-62)	Up to 4 tonal sonobuoys (DICASS)	549 sonobuoys
						Passive sonobuoy (DIFAR) AN/SSQ-53D/E	Number of sonobuoys deployed can vary	up to 27,500 sonobuoys expended (total annual use for all exercises)
						MK-46 or MK-54 Torpedo	exercise torpedoes could be used for RDT&E	8 MK-46 or MK-54 exercise torpedoes
						MK-39 EMATT or MK-30 target	1 EMATT or MK-30 (recoverable) per exercise may be used as a target	up to 725 EMATTs expended (total annual use for all exercises)
Submarine ASW ULT	One submarine conducting ASW and SUW training using passive and active sonar.	100	2 to 3 days	Northeast, VACAPES, CHPT, JAX/CHASN, and GOMEX OPAREAs	30 NM x 40 NM	Submarine MFA sonar (AN/BQQ-10)	1 submarine pinging once per two hours (average 36 pings per event)	3600 pings
						MK-48 Torpedo	Number of exercise torpedoes could be used in a single RDT&E event could vary	32 MK-48 exercise torpedoes
						Vessel movement	1 submarine maneuvering	Approximately 25 submarines on the East Coast conducting ULT throughout the year
						MK-39 EMATT or MK-30 target	1 EMATT or MK-30 (recoverable) per exercise may be used as a target	up to 725 EMATTs expended (total annual use for all exercises)
Submarine ASW ULT						Tactical page buoy	1 tactical page buoy may be depoloyed	up to 60 buoys expended
Submarine Navigational	One submarine operating sonar for navigation and object detection during transit in/out of port during reduced visibility.	300	1 to 2 hours	Sea lanes and entrance channels to Norfolk, Virginia; Groton, Connecticut; and Kings Bay, Georgia	5 NM x 10 NM	Submarine MFA object detection sonar (AN/BQQ-10 or AN/BQS-15)	1 submarine pinging 1 to 2 hours	450 hours
						Vessel movement	1 submarine maneuvering	Approximately 30 submarines on the East Coast conducting ULT throughout the year

Table 2. Summary of annual AFAST activities.

Event Name	Training Event Scenarios	Events per Year*	Length of Overall Event	Possible Event Areas***	Typical Event Area Dimensions	Equipment or Action	Equipment Use or Action per Event	Annual Use per Event Type*
MPA ASW ULT (tonal sonobuoy)	One MPA conducting ASW submarine localization and tracking training using tonal sonobuoys.	791	2 to 8 hours	Northeast, VACAPES, CHPT, JAX/CHASN, and GOMEX OPAREAs	30 NM x 30 NM to 60 NM x 60 NM	Tonal sonobuoy (DICASS) (AN/SSQ-62)	Up to 10 tonal sonobuoys (DICASS)	3594 sonobuoys
						Passive sonobuoy (DIFAR) AN/SSQ-53D/E	Number of sonobuoys deployed can vary	up to 27,500 sonobuoys expended (total annual use for all exercises)
						MK-46 or MK-54 Torpedo	exercise torpedoes could be used for RDT&E	8 MK-46 or 54 exercise torpedoes
						MK-39 EMATT (repeater) and or MK-30 Target	1 EMATT or MK-30 (recoverable) per exercise may be used as a target	up to 725 EMATTs expended (total annual use for all exercises)
MPA ASW ULT (explosive source sonobuoy [AN/SSQ-110A])	One MPA conducting ASW submarine localization and tracking training using explosive source sonobuoy (AN/SSQ-110A).	169	2 to 8 hours	Northeast, VACAPES, CHPT, JAX/CHASN, and GOMEX OPAREAs	60 NM x 60 NM	explosive source sonobuoy (AN/SSQ 110A)	Up to 14 AN/SQ-110A sonobuoys	676 sonobuoys
						receiver (ADAR) sonobuoy (AN/SSQ-101)	Up to 5 AN/SSQ-101 sonobuoys	239 sonobuoys
Surface Ship MIW ULT	One ship (MCM) conducting mine localization training.	266	Less than 24 hours	GOMEX OPAREA	1 NM x 2 NM	Surface ship HFA MIW sonar (AN/SQQ-32)	1 ship (MCM) pinging for 1 to 15 hours	2074 hours of AN/SQQ-32
						Vessel movement	1 to 2 ships maneuvering	Approximately 19 MIW surface ships conducting ULT throughout the year
COORDINATED UNIT LEVEL TRAINING								
Southeastern Anti-Submarine Warfare Integrated Training Initiative (SEASWITI) and similar RDT&E	An exercise with two DDGs, one FFG with embarked helicopter, two submarines, and one MPA	4 training events and similar RDT&E	5 to 7 days	JAX/CHASN OPAREA	30 NM x 30 NM	Surface ship MFA ASW sonar (AN/SQS-53 or AN/SQS-56)	2 to 3 ships (CG, DDG, or FFG) pinging daily for several hours	440 hours AN/SQS-53 200 hours AN/SQS-56
						Helicopter ASW dipping sonar (AN/AQS-13 or AN/AQS-22)	1 helicopter dipping several times daily (10 pings per five-minute dip)	10 hours
						Submarine MFA sonar (AN/BQQ-5 or AN/BQQ-10)	1 submarine pinging up to four times daily	100 pings
						Acoustic countermeasures (AN/SLQ-25 NIXIE, MK-2, MK-3, or Noise Acoustic Emitter)	2 hours per NIXIE 20 minutes per MK-2, MK-3, and Noise Acoustic Emitter	ADCs may be used during the event; annual total ADC expenditure shown under ASW Surface ULT
						Tonal sonobuoy (DICASS) (AN/SSQ-62)	1 MPA dropping up to 8 sonobuoys in one day; 24 sonobuoys for entire	120 tonal sonobuoys (DICASS)
						Passive sonobuoy (DIFAR) AN/SSQ-53D/E	Number of sonobuoys deployed can vary	up to 27,500 sonobuoys expended (total annual use for all exercises)
						Vessel movement	3 to 4 ships maneuvering	3 to 4 ships maneuvering over 5-7 days, up to four times a year
Integrated ASW Course (IAC)	An exercise with three DDGs, one CG, one FFG, two to three helicopters, one to two submarines, and one MPA	5	2 to 5 days	VACAPES, CHPT, and JAX/CHASN OPAREAs	120NM X 60NM	Surface ship MFA ASW sonar (AN/SQS-53 or AN/SQS-56)	5 ships pinging for up to 10 hours	285 hours AN/SQS-53 100 hours AN/SQS-56
						Helicopter ASW dipping sonar (AN/AQS-13 or AN/AQS-22)	1 helicopter dipping up to one hour (10 pings per five-minute dip)	5 hours AN/AQS-13 or AN/AQS-22
						Submarine MFA sonar (AN/BQQ-5 or AN/BQQ-10)	1-2 submarines pinging up to 6 times each	60 pings
						Acoustic countermeasures (AN/SLQ-25 NIXIE, MK-2, MK-3, or Noise Acoustic Emitter)	2 hours per NIXIE 20 minutes per MK-2, MK-3, and Noise Acoustic Emitter	ADCs may be used during the event; annual total ADCs used shown under ASW Surface ULT
						Tonal sonobuoy (DICASS) (AN/SSQ-62)	Helicopters and/or MPA dropping up to 36 sonobuoys	180 sonobuoys
						Passive sonobuoy (DIFAR) AN/SSQ-53D/E	Number of sonobuoys deployed can vary	up to 27,500 sonobuoys expended (total annual use for all exercises)

Table 2. Summary of annual AFAST activities.

Event Name	Training Event Scenarios	Events per Year*	Length of Overall Event	Possible Event Areas***	Typical Event Area Dimensions	Equipment or Action	Equipment Use or Action per Event	Annual Use per Event Type*
Group Sail	An exercise with two DDGs with embarked helicopters, and one submarine.	20	2 to 3 days	VACAPES, CHPT, and JAX/CHASN OPAREAs	30 NM x 30 NM	Surface ship MFA ASW sonar (AN/SQS-53 or AN/SQS-56)	2-3 ships pinging for several hours	240 hours AN/SQS-53 120 hours AN/SQS-56
						Helicopter ASW dipping sonar (AN/AQS-13 or AN/AQS-22)	1 helicopter dipping up to 6 hours (10 pings per five-minute dip)	60 hours AN/AQS-13 or AN/AQS-22
						Submarine MFA sonar (AN/BQQ-5 or AN/BQQ-10)	1 submarine pinging up to two times	40 pings
						Acoustic countermeasures (AN/SLQ-25 NIXIE, MK-2, MK-3, or Noise Acoustic Emitter)	2 hours per NIXIE 20 minutes per MK-2, MK-3, and Noise Acoustic Emitter	ADCs may be used during the event; annual total ADCs used shown under ASW Surface ULT
						Tonal sonobuoy (DICASS) (AN/SSQ-62)	1 helicopter dropping up to 4 sonobuoys	80 sonobuoys
						Passive sonobuoy (DIFAR) AN/SSQ-53D/E	Number of sonobuoys deployed can vary	up to 27,500 sonobuoys expended (total annual use for all exercises)
						Vessel movement	3 ships maneuvering	3 ships maneuvering over 5-7 days, up to 20 times a year
Submarine Command Course (SCC) Operations	Two submarines operating against each other as part of the SCC for prospective submarine Commanding Officers.	2	3 to 5 days	NE and JAX/CHASN OPAREAs	30 NM x 50 NM	Submarine MFA sonar (AN/BQQ-5 or AN/BQQ-10)	2 submarines pinging up to 12 times each	48 pings
						Acoustic countermeasures (AN/SLQ-25 NIXIE, MK-2, MK-3, or Noise Acoustic Emitter)	2 hours per NIXIE 20 minutes per MK-2, MK-3, and Noise Acoustic Emitter	ADCs may be used during the event; annual total ADCs used shown under ASW Surface ULT
						Vessel movement	2 submarines maneuvering	Maneuvering twice a year for 3-5 days
RONEX and GOMEX MIW Exercises	One to five MCM ships conducting mine localization training.	8	10 to 15 days	GOMEX OPAREA	20 NM x 20 NM	Surface ship HFA MIW sonar (AN/SQQ-32 and AN/SLQ-48**)	1 to 5 ships (MCM) 60-90 hours each	2,400 hours AN/SQQ-32
						Vessel movement	1 to 5 ships (MCM) maneuvering	1 to 5 ships maneuvering up to 100 days a year
STRIKE GROUP TRAINING								
ESG COMPTUEX and CSG COMPTUEX and similar RDT&E	Intermediate level battle group exercise designed to create a cohesive CSG/ ESG prior to deployment or JTFEX. Three DDGs, one FFG, helicopters, one MPA, and two submarines.	5 training events and similar RDT&E	21 days	VACAPES, CHPT, JAX/CHASN, and GOMEX OPAREAs	60 NM x 120 NM	Surface ship MFA ASW sonar (AN/SQS-53 and AN/SQS-56)	4 ships (CG, DDG, or FFG) pinging approximately 60 hours each over 10 days	740 hours AN/SQS-53 250 hours AN/SQS-56
						Helicopter ASW dipping sonar (AN/AQS-13 or AN/AQS-22)	1 to 4 helicopters (10 pings per five-minute dip) during CSG COMPTUEX	9 hours
						Submarine MFA sonar (AN/BQQ-5 or AN/BQQ-10)	2 submarines pinging up to 16 times each	116 pings
						Acoustic countermeasures (AN/SLQ-25 NIXIE, MK-2, MK-3, or Noise Acoustic Emitter)	2 hours per NIXIE 20 minutes per MK-2, MK-3, and Noise Acoustic Emitter	ADCs may be used during the event; annual total ADCs used shown under ASW Surface ULT
						Tonal sonobuoy (DICASS) (AN/SSQ-62)	MPA and/or helicopter dropping 3 to 10 sonobuoys for a total of up to 218 sonobuoys over duration of event	982 sonobuoys
						Passive sonobuoy (DIFAR) AN/SSQ-53D/E	Number of sonobuoys deployed can vary	up to 27,500 sonobuoys expended (total annual use for all exercises)
						explosive source sonobuoy (AN/SSQ-110A)	2 MPA dropping up to 14 AN/SQ-110A sonobuoys	140 sonobuoys
						receiver (ADAR) sonobuoy (AN/SSQ-101)	Up to 5 AN/SSQ-101 sonobuoys	49 sonobuoys
						Vessel movement	6 ships (CG, DDG, FFG, or submarine) maneuvering	6 ships maneuvering up to 147 days a year

Table 2. Summary of annual AFAST activities.

Event Name	Training Event Scenarios	Events per Year*	Length of Overall Event	Possible Event Areas***	Typical Event Area Dimensions	Equipment or Action	Equipment Use or Action per Event	Annual Use per Event Type*
JTFEX	Final fleet exercise prior to deployment of the CSG and ESG. Serves as a ready-to-deploy certification for all units. Four DDGs, two FFGs, one helicopter, one MPA, and three submarines.	2	10 days	JAX/CHASN and GOMEX OPAREAs	60 NM x 80 NM up to 180 NM x 180 NM	Surface ship MFA ASW sonar (AN/SQS-53 or AN/SQS-56)	6 ships (CG, DDG, FFG) pinging up to 25 hours each	200 hours AN/SQS-53 100 hours AN/SQS-56
						Helicopter ASW dipping sonar (AN/AQS-13 or AN/AQS-22)	1 helicopters dipping for up to one hour (10 pings per five-minute dip)	2 hours
						Submarine MFA sonar (AN/BQQ-5 or AN/BQQ-10)	3 submarines pinging twice each	12 pings
						Acoustic countermeasures (AN/SLQ-25 NIXIE, MK-2, MK-3, or Noise Acoustic Emitter)	2 hours per NIXIE 20 minutes per MK-2, MK-3, and Noise Acoustic Emitter	ADCs may be used during the event; annual total ADCs used shown under ASW Surface ULT
						Tonal sonobuoy (DICASS) (AN/SSQ-62)	1 MPA and/or 1 helicopter dropping 3 to 10 sonobuoys for a total of up to 174 sonobuoys over duration of event	348 sonobuoys
						Passive sonobuoy (DIFAR) AN/SSQ-53D/E	Number of sonobuoys deployed can vary	up to 27,500 sonobuoys expended (total annual use for all exercises)
						explosive source sonobuoy (AN/SSQ-110A)	2 MPA dropping up to 14 AN/SSQ-110A sonobuoys	56 sonobuoys
						receiver (ADAR) sonobuoy (AN/SSQ-101)	Up to 5 AN/SSQ-101 sonobuoys	20 sonobuoys
						Vessel movement	9 ships (CG, DDG, FFG, or submarine) maneuvering	Up to 9 ships maneuvering for up to 40 days a year
MAINTENANCE								
Surface Ship Sonar Maintenance	Pier side and at-sea maintenance to sonar system.	410	.2 to 4 hours	Northeast, VACAPES, CHPT, and JAX/CHASN, OPAREAs		Surface ship MFA ASW sonar (AN/SQS-53 OR AN/SQS-56)	1 ship (CG, DDG, or FFG) pinging	238 hours AN/SQS-53 449 hours AN/SQS-56
Submarine Sonar Maintenance	Pier side and at-sea maintenance to sonar system.	200	1 hour	Northeast, VACAPES, CHPT, and JAX/CHASN, OPAREAs		Submarine MFA sonar (AN/BQQ-5 or AN/BQQ-10)	1 submarine pinging for up to one hour (60 pings per hour)	6000 pings (100 total hours of active sonar)

Table 2. Summary of AFAST activities

* COMPTUEX distribution reflects the typical distribtion of COMPTUEX across OPAREA boundaries.

** All events are considered equally likely to occur at any time during the year, except strike group exercises, which would not occur in the GOMEX OPAREA during hurricane season (summer and fall)

ASW - Antisubmarine warfare; CHPT - Cherry Point; COMPTUEX - Composite Training Unit Exercise; CSG - Carrier Strike Group; ESG - Expeditionary Strike Group; GOMEX - Gulf of Mexico; IAC - Integrated ASW Course; Jax/CHASN - Jacksonville/Charleston; JTFEX - Joint Task Force Exercise; MIW - Mine Warfare; MPA - Maritime Patrol Aircraft; NE - Northeast; OPAREA - Operating Area; RONEX - Squadron Exercise; SCC OPS - Submarine Command Course Operations; SEASWITI - Southeastern Antisubmarine Warfare Integrated Training Initiative; TORPEX - torpedo Exercise; ULT - Unit Level Trianing; VACAPES - Virginia Capes

	OPAREA					
	NE	VACAPES	CHPT	JAX/CHASN	GOMEX	TOTAL
Independent ULT						
Surface Ship ASW		69	91	292	5	457
Surface Ship Object Detection/Navigational Sonar		68		40		108
Helicopter ASW		25	25	115		165
Submarine ASW	30	10	14	45	1	100
Submarine Object Detection/Navigational Sonar	165	78		57		300
MPA ASW (tonal sonobuoy)	238	79	111	356	7	791
MPA ASW (explosive source sonobuoy)	34	34	34	34	34	170
Surface Ship MIW					266	266
Coordinated ULT						
SEASWITI				4		4
IAC		0.2	1.4	2.4	1	5
Group Sail		3	4	13		20
SCC Operations	0.4			1.6		2
RONEX and GOMEX Exercises					8	8
Strike Group Training						
ESG and CSG COMPTUEX*		0.2	1.4	2.4	1**	5
JTFEX		0.2	0.6	1.2	0	2
Maintenance						
Surface Ship Sonar Maintenance		61	82	263	4	410
Submarine Sonar Maintenance	30	10	14	45	1	100

Table 3. Summary of Activities by Operating Area

1.4.2 Marine Mammals for which Incidental Take Regulations are Proposed

Forty-three species of marine mammals (7 mysticetes, 29 odontocetes, 6 pinnipeds, and one sirenian (manatee)) are known to occur in theAFAST Study Area. Manatees are managed by the U.S. Fish and Wildlife Service and therefore, will not be addressed further. Based on their rare occurrence in the AFAST Study Area, the Navy and NMFS do not anticipate any takes (as that term is defined under the MMPA) of beluga whales or ringed seals. Therefore, NMFS has not proposed to authorize take of these species under the MMPA, and mitigation measures specific to these species are not addressed further in this Mitigation EA. The AFAST FEIS and NMFS' proposed rule also contain a discussion of important areas, including North Atlantic right whale (NARW) critical habitat, humpback whale feeding grounds in the northeast, and sperm whale calving and nursing grounds in the Mississippi Delta area.

The AFAST FEIS describes how marine mammal density estimates were either modeled for each region (Northeast, Southeast, and GOMEX) using available line-transect survey data or derived in order of preference: (1) Through spatial models using line-transect survey data provided by NMFS; (2) using abundance estimates from Mullin and Fulling (2003), Fulling et al. (2003), and/or Mullin and Fulling (2004); (3) or based on the cetacean abundance estimates found in the most current NOAA stock assessment report (SAR) (Waring et al., 2007). The AFAST FEIS and NMFS proposed rule also include abundance estimates for each affected stock based on NMFS' stock assessment reports.

1.4.3 Permissible Methods of Taking

In order to issue incidental take regulations, NMFS is required to set forth the permissible methods of taking. An applicant, in this case the Navy, is required to identify the type of and estimate the number of takes of marine mammals that would occur as a result of its activity. NMFS assesses the number provided by the applicant to determine whether modification is necessary, and then that number (combined with information regarding the nature of the effects) is used to inform NMFS' decisions regarding the negligible impact determination, the appropriate number of takes to authorize (and of what sort, Level A or Level B Harassment, or mortality), and the appropriate mitigation, monitoring and reporting. Based on the analysis in the AFAST Final EIS, the Navy's request for authorization, and NMFS proposed rule, this section contains a summary of the nature of the takes that are likely to result from exposure to MFAS/HFAS and explosive detonations as well as an estimate of how many marine mammal takes would occur.

1.4.3.1 *Summary of Types of Take*

With respect to military readiness activities, Section 3(18)(B) of 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]. Below is a summary of the types of

impacts that would be expected to result from the Navy's activities that would qualify as Level A or Level B Harassment under the MMPA. Also included is a brief discussion of mortality and strandings. A more detailed discussion is included in the Navy's FEIS.

1.4.3.1.1 Level B Harassment

Following are the types of anticipated effects from the Navy's action (MFAS/HFAS operation and IEER) that fall into the MMPA Level B Harassment category:

Behavioral Disturbance - Behavioral disturbance that rises to the level described in the definition above is considered Level B Harassment. Behavioral responses to sound are highly variable and context-specific. Following are some examples of the sorts of responses that could be classified as Level B harassment and that could potentially result from the Navy's activities: prolonged vocal modifications or cessation; cessation of feeding; cessation of social interaction; prolonged alteration of movement or diving behavior; habitat abandonment (temporary or permanent); brief cessation of reproductive behaviors, or, in severe cases, panic, flight, or stampede (Southall et al., 2007).

Many different variables can influence an animal's perception of and response to (nature and magnitude) an acoustic event, such as: an animal's prior experience with a sound type; the perceived nearness of the sound; the bearing of the sound (approaching vs. retreating); the similarity of a sound to biologically relevant sounds in the animal's environment (i.e., calls of predators, prey, or conspecifics); the characteristics of the individual (age, gender, reproductive status, etc.); the activity the individual is currently engaged in; or the presence of other factors, such as a nearby boat.

There are few empirical studies of avoidance responses of free-living cetaceans to mid-frequency sonar. Relatively more information is available on the avoidance responses of free-living cetaceans to other acoustic sources, like seismic airguns and low frequency sonar, than mid-frequency active sonar. Richardson et al., (1995) noted that avoidance reactions are the most obvious manifestations of disturbance from anthropogenic sounds in marine mammals.

When Level B Harassment is predicted based on estimated behavioral responses, those takes may have a stress-related (or distress) physiological component as well. When an animal does not have sufficient energy reserves to satisfy the energetic costs of a stress response, energy resources must be diverted from other biotic functions, which could impair those functions that experience the diversion and could potentially pose a risk to the animal's welfare.

From AFAST activities, behavioral disturbance can result either from exposure to MFAS/HFAS or IEER (consisting of small explosive detonations), though it is more likely to result from MFAS because the duration of sound transmission is much longer and therefore the potential for exposure of marine mammals to sound levels that may result in Level B harassment is higher (but also because there are far fewer IEER exercises than sonar).

As mentioned above, there are few empirical studies of the direct responses of cetaceans to MFAS. In addition to the studies analyzed in Chapter 4 of the FEIS, in 2008, results were

made available from a series of behavioral response studies (BRSs) conducted by NMFS and other scientists, which showed one individual beaked whale (Mesoplodon densirostris) responding to an MFAS playback. The BRS-07 Cruise Report (NMFS, 2008) indicates that the MFAS playback began when the tagged beaked whale was vocalizing at depth, following a previous controlled dive with no sound exposure. The whale appeared to stop clicking significantly earlier than usual when exposed to mid-frequency signals in the 130-140 dB (rms) range. After a few more minutes of the playback, when the received level reached a maximum of 140-150 dB, the whale ascended on the slow side of normal ascent rates with a longer than normal ascent, at which point the exposure was terminated. The BRS-07 Cruise report notes that the results are from a single experiment and that a greater sample size is needed before robust and definitive conclusions can be drawn (NMFS, 2008).

Acoustic Masking and Communication Impairment – Masking, or auditory interference, generally occurs when sounds in the environment are louder than and of a similar frequency to, auditory signals an animal is trying to receive. Masking is a phenomenon that affects animals that are trying to receive acoustic information about their environment, including sounds from other members of their species, predators, prey, and sounds that allow them to orient in their environment. Similarly, in addition to making it more difficult for animals to perceive acoustic cues in their environment, anthropogenic sound presents separate challenges for animals that are vocalizing. Acoustic masking and communication impairment are considered Level B Harassment as it can disrupt natural behavioral patterns of individuals or groups by interrupting or limiting the marine mammal's receipt or transmittal of important information or environmental cues. In the AFAST activities, masking and communication impairment could result from exposure to MFAS/HFAS.

Temporary Threshold Shift (TTS) – When animals exhibit reduced hearing sensitivity (i.e., certain sounds must be louder for an animal to recognize them) following exposure to a sufficiently intense sound, it is referred to as a noise-induced threshold shift (TS). An animal can experience temporary threshold shift (TTS) or permanent threshold shift (PTS). TTS results from fatigue of the cochlear hair cells and supporting structures and can last from minutes or hours to days. A marine mammal that experiences TTS is able to recover its hearing sensitivity. TTS occurs in specific frequency ranges (i.e., an animal might only have a temporary loss of hearing sensitivity between the frequencies of 1 and 10 kHz)) and can be of varying amounts (for example, an animals hearing sensitivity might be reduced by only 6 dB or reduced by 30 dB). The type and degree of TTS that is incurred is primarily based on the type (frequency and other characteristics) and intensity of the sound the animal is exposed to, as well as the duration of the exposure. TTS can effect how an animal behaves in response to the environment, including conspecifics, predators, and prey.

TTS can result either from exposure to MFAS/HFAS or underwater explosives. With explosives, TTS can result from exposure to the pressure wave, in addition to the acoustic energy, and will likely desensitize the animal over a broader frequency bandwidth.

1.4.3.1.2 Level A Harassment

Following are the types of potential effects that fall into the MMPA Level A Harassment category, however, the probability of these effects occurring incidental to AFAST activities is very low when the implementation of safety zone shutdowns (which are a component of the Navy's standard protective measures and included in all Alternatives of the EIS and this EA) is considered:

Permanent Threshold Shift (PTS) – A threshold shift that an animal does not recover from is called permanent threshold shift and is considered an injury. PTS results from exposure to intense sounds that cause a permanent loss of inner or outer cochlear hair cells or exceed the elastic limits of certain tissues and membranes in the middle and inner ears and result in changes in the chemical composition of the inner ear fluids. PTS can effect how an animal behaves in response to the environment, including conspecifics, predators, and prey. PTS can result either from exposure to MFAS/HFAS or underwater explosives. With explosives, PTS can result from exposure to the pressure wave, in addition to the acoustic energy, and would likely desensitize the animal over a broader frequency bandwidth, although, it is unlikely that PTS would result from the small explosives used in the AFAST IEER events.

Acoustically Mediated Bubble Growth – A few theories suggest ways in which gas bubbles become enlarged through exposure to intense sounds to the point where tissue damage results. In rectified diffusion, exposure to a sound field would cause bubbles to increase in size. Alternately, bubbles could be destabilized by high-level sound exposures such that bubble growth then occurs through static diffusion of gas out of the tissues. Tissue damage from either of these processes would be considered an injury. These effects are hypothesized to occur as a result of exposure to MFAS (not explosives).

Behaviorally Mediated Bubble Growth – Some authors suggest mechanisms in which marine mammals could behaviorally respond to exposure to MFAS/HFAS by altering their dive patterns in a manner (unusually rapid ascent, unusually long series of surface dives, etc.) that might result in unusual bubble formation or growth ultimately resulting in tissue damage (emboli, etc.). These effects are hypothesized to occur as a result of exposure to MFAS/HFAS (not explosives).

Physical Disruption of Tissues Resulting from Explosive Shock Wave – Physical damage of tissues resulting from a shock wave (from an explosive detonation, not MFAS/HFAS) is classified as an injury, although, it is highly unlikely that this type of injury could result from the small explosives used in the AFAST IEER events. Blast effects are greatest at the gas-liquid interface (Landsberg, 2000) and gas-containing organs, particularly the lungs and gastrointestinal tract, are especially susceptible (Goertner, 1982; Hill 1978; Yelverton et al., 1973). Nasal sacs, larynx, pharynx, trachea, and lungs may be damaged by compression/expansion caused by the oscillations of the blast gas bubble (Reidenberg and Laitman, 2003). Severe damage (from the shock wave) to the ears can include tympanic membrane rupture, fracture of the ossicles, damage to the cochlea, hemorrhage, and cerebrospinal fluid leakage into the middle ear.

1.4.3.1.3 Serious Injury and Mortality

Over the past 12 years, there have been five stranding events coincident with military mid-frequency active sonar use in which exposure to sonar is believed to have been a contributing factor: Greece (1996); the Bahamas (2000); Madeira (2000); Canary Islands (2002); and Spain (2006). Cuvier's beaked whales comprise approximately 80% of the animals involved in these strandings. Other beaked whale species make up the majority of the remaining species.

Several theories have been suggested to account for the potential cause of or contribution to sonar-associated strandings. To date, however, there has been limited scientific information to empirically either confirm or refute some of these theories. Though an exact causal link between the stranding events and naval exercises has not been determined, certain conditions may have existed in several of the exercises that, in their aggregate, may have contributed to the marine mammal strandings (Freitas, 2004): Exercises were conducted in areas of at least 547 fathoms (1000 m) depth near a shoreline where there is a rapid change in bathymetry on the order of 547 to 3,281 fathoms (1000 – 6000 m) occurring across a relatively short horizontal distance; multiple ships were operating MFAS in the same area over extended periods of time in close proximity; and exercises took place in an area surrounded by landmasses, or in an embayment. Exercises involving multiple ships employing MFAS near land may have produced sound directed towards a channel or embayment that may have cut off the lines of egress for the affected marine mammals (Freitas, 2004). The AFAST EIS (in particular, Appendix H) evaluates the strandings in more depth. The potential for Navy's activities in the AFAST Study Area to contribute to marine mammal strandings was considered carefully in the AFAST Final EIS, with input from NMFS, and is discussed further in section 1.4.3.2.

1.4.3.2 *Take Estimates*

1.4.3.2.1 Thresholds

NMFS utilizes various thresholds to indicate at what received levels marine mammals are likely to experience Level A and Level B Harassment incidental to exposure to different types of sound sources. These thresholds allow for estimates of the numbers of animals that may be harassed and inform NMFS' decisions regarding appropriate and practicable mitigation measures. The Navy's AFAST FEIS discussed in detail the justification for the various thresholds. The thresholds used for modeling estimated takes (as defined under MMPA) incidental to MFAS/HFAS and underwater explosive detonations are summarized below. Note that for both TTS and PTS thresholds, the species of pinnipeds present in the AFAST Study Area that are likely to be taken are more closely related to harbor seals and, therefore, only the harbor seal threshold is used. The thresholds used in other authorizations for Northern elephant seals and closely related species and California sea lions and closely related species are not applicable in the AFAST Study Area.

PTS, which is considered a conservative surrogate for the onset of all acoustic injury (Level A Harassment), is predicted to occur whenever an animal is exposed to the following levels of MFAS/HFAS or above (these metrics are called sound energy level (SEL) and incorporate duration):

- Cetaceans - 215 dB re 1 μPa^2-s

- Harbor Seals (and closely related species) – 203 dB re 1 μPa^2-s

TTS, which is a subset of Level B Harassment and, is predicted to occur whenever an animal is exposed to the following levels of MFAS/HFAS or above:

- Cetaceans - 195 dB re 1 μPa^2-s
- Harbor Seals (and closely related species) – 183 dB re 1 μPa^2-s

The following risk functions (Figure 1) are used to predict what percentage of marine mammals (all species except harbor porpoises, below) exposed to the given level of MFAS/HFAS will respond in a manner NMFS considers Level B Harassment. As received level increases, a larger percentage of the exposed animals are predicted to be harassed. For harbor porpoises, current available information suggests a lower threshold level of response for both captive and wild animals and, therefore, NMFS uses a separate 120 dB re 1 µPa step function to estimate take by behavioral harassment (more information on that threshold is provided in the Final EIS).

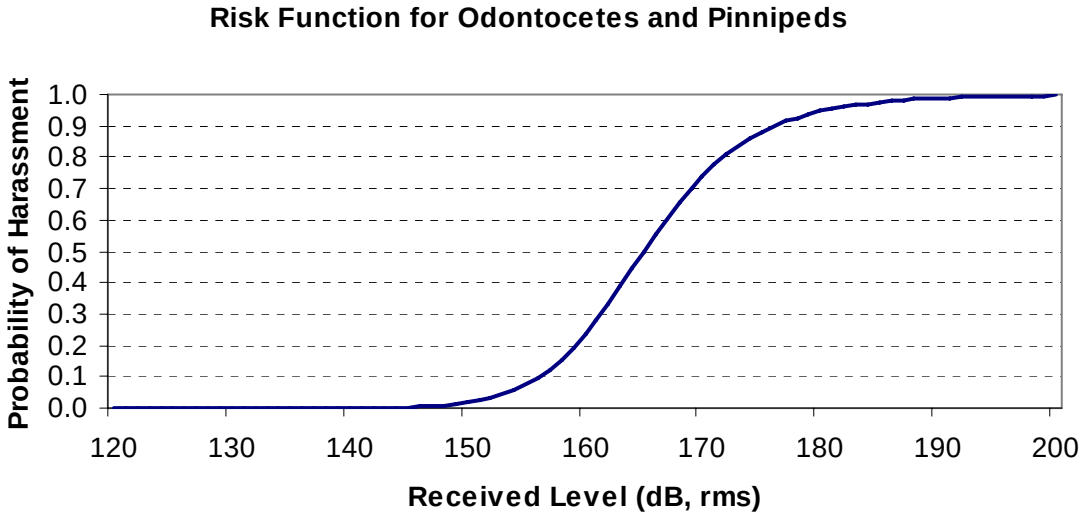

Figure 1a. Risk function for odontocetes and pinnipeds. B=120 dB, K=45 dB, A=10

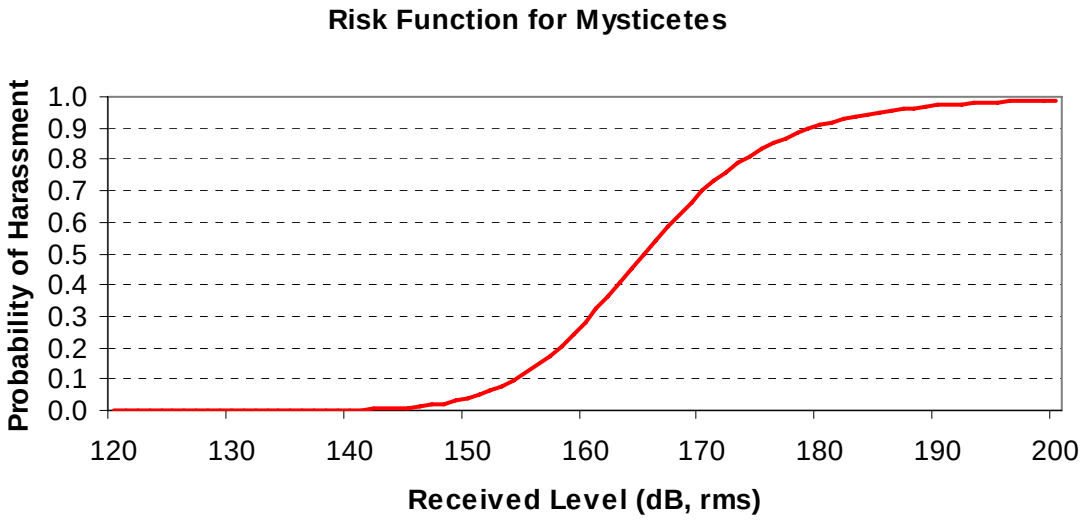

Figure 1b. Risk function for mysticetes. B=120 dB, K=45 dB, A=8.

Table 4, below, summarizes the thresholds for underwater detonations.

Criterion	Criterion Definition	Threshold
Mortality	onset of severe lung injury (1% probability of mortality)	31 psi-ms (positive impulse)
Level A Harassment (Injury)	Slight lung injury; or	13 psi-ms (positive impulse)
	50% of animals exposed would experience ear drum rupture; and 30% exposed sustain PTS	205 dB re 1 microPa^2-s (full spectrum energy)
Level B Harassment	TTS (dual criteria); or	23 psi (peak pressure) (explosives < 2,000 lbs.); or
		182 dB re 1 microPa^2-s (peak 1/3 octve band)

Table 4. Summary of Criteria for Explosive Detonations applicable to IEER

1.4.3.2.2 Navy Modeling

As described in Chapter 4.4 and Appendix H of the AFAST EIS and in the proposed rule, the Navy uses several different models to perform the calculations necessary to estimate take, and NMFS may make modifications to the Navy's estimates if appropriate. Following is a summary outline of the steps followed in the AFAST EIS to estimate take:

(1) A sound propagation model predicts the volume of water that will be ensonified to a range of levels of pressure and energy (of the metrics used in the criteria) from MFAS/HFAS and

explosive detonations based on the characteristics of the sound sources and the transmission loss in 36 representative environmental provinces across 8 sonar modeling areas in two seasons.

(2) Accumulated energy and maximum received sound pressure level within the waters in which the sonar is operating is sampled over a two dimensional grid. The zone of influence (ZOI) for a given threshold is estimated by summing the areas represented by each grid point for which the threshold is exceeded. For behavioral response, the percentage of animals likely to respond corresponding to the maximum received level is found, and the area of the grid point is multiplied by that percentage to find the adjusted area. Those adjusted area are summed across all grid points to find the overall ZOI for a particular source.

(3) Marine mammal densities of each species (specific to certain geographic areas and seasons if data are available), are applied to the summed ZOIs for a particular training event to determine how many times individuals of each species are exposed to levels that exceed the applicable criteria for injury or harassment.

(4) Criteria discussed in the previous section are applied to the estimated exposures to predict the number of exposures that exceed the criteria, i.e., the number of takes by Level B Harassment, Level A Harassment, and mortality.

(5) Mitigation measures are considered and model-calculated estimates may be adjusted based on a post-model assessment (as described in proposed rule). Table 5 contains the Navy's estimated take estimates and the take NMFS plans to authorize. The "takes" reported in the take table and proposed to be authorized are based on estimates of marine mammal exposures to levels above those indicated in the criteria. Every separate take does not necessarily represent a different individual because some individual marine mammals may be exposed more than once, either within one day and one exercise, or on different days from different exercise types.

(6) Last, the Navy's specified activities have been described based on best estimates of the number of MFAS/HFAS hours and underwater ordnance detonations that the Navy will conduct. The exact number of hours may vary from year to year, but will not exceed the 5-year total indicated in Table 2 (by multiplying the yearly estimate by 5) by more than 10 percent. NMFS estimates that a 10-percent increase in active sonar hours would result in approximately a 10-percent increase in the number of takes, and we have considered this possibility in our MMPA analyses.

Table 5 below indicates the Level B and Level A Harassment takes that NMFS proposes to authorize. Neither NMFS, nor the Navy anticipates that marine mammal strandings or mortality will result from the operation of mid-frequency sonar during AFAST activities. However, to allow for scientific uncertainty regarding the contributing causes of beaked whale strandings and the exact behavioral or physiological mechanisms that have lead to the stranding and/or death of marine mammals coincident with sonar in other geographic areas and in different circumstances, NMFS has, through its MMPA authority, proposed to authorize take, by serious injury or mortality, of 10 individual beaked whales over the course of the five-year rule.

Of note, NMFS (the Endangered Species Division) will also issue Biological Opinions and, as appropriate, associated incidental take statements (ITSs) to NMFS (the Permits, Conservation, and Recreation Division) to exempt the take (under the ESA) that NMFS authorizes in the LOAs under the MMPA. Because of the difference between the statutes, it is possible that ESA analysis of the applicant's action could produce a take estimate that is different than the takes requested by the applicant (and analyzed for authorization by NMFS under the MMPA process), despite the fact that the same proposed action (i.e. number of sonar hours and explosive detonations) is being analyzed under each statute. When this occurs, NMFS staff coordinate to ensure that that the most conservative (lowest) number of takes are authorized. For the Navy's proposed AFAST training,, coordination with the Endangered Species Division indicates that they will likely allow fewer takes of individuals of most ESA-listed marine mammal species than were requested by the applicant (because their analysis indicates that fewer will be taken than estimated by the applicant). Therefore, the number of authorized takes in NMFS' LOA(s) would reflect the lower take numbers from the ESA consultation, though the specified activities (i.e., number of sonar hours, etc.) will remain the same. Alternately, Table 5 reflects the regulations, which indicate the maximum number of takes considered for authorization under the MMPA.

	NAVY MODELED EXPOSURE ESTIMATES																		NMFS' Proposed Annual Take Authorization		
	Atlantic Ocean, Offshore of the Southeastern United States									Northeast			Gulf of Mexico			TOTAL					
	VACAPES OPAREA			Cherry Pt OPAREA			Jax/CHASN OPAR			Northeast OPAREA			GOMEX			TOTAL					
Species	PTS	TTS	Dose-Function	PTS	TTS	Dose-Function	PTS	TTS	Dose-Function	PTS	TTS	Dose-Function	PTS	TTS	Dose-Function	PTS	TTS	Dose-Function	Mortality	Level A Harassment	Level B Harassment
North Atlantic right whale*	0	1	45	0	0	30	0	3	363	0	0	224	X	X	X	0	4	662	**0**	**0**	**666 (0)**
Humpback whale*	0	4	403	0	6	686	0	19	2371	0	0	702	0†	1†	10†	0	30	4172	**0**	**0**	**4202 (0)**
Minke whale	0	0	21	0	0	36	0	1	129	0	0	228	X	X	X	0	1	414	**0**	**0**	**415 (1)**
Bryde's whale	X	X	X	X	X	X	0†	1†	10†	X	X	X	0	0	25	0	1	35	**0**	**0**	**36 (0)**
Sei whale*	0†	1†	10†	0†	1†	10†	X	X	X	0	0	1035	X	X	X	0	2	1055	**0**	**0**	**1057 (0)**
Fin whale*	0	1	68	0†	1†	10†	X	X	X	0	0	802	X	X	X	0	2	880	**0**	**0**	**882 (0)**
Blue whale*	X	X	X	X	X	X	X	X	X	0	0	801	X	X	X	0	0	801	**0**	**0**	**801 (0)**
Sperm whale*	0	36	3087	0	4	317	0	17	1517	0	1	4404	0	5	370	0	63	9695	**0**	**0**	**9758 (0-32)**
Kogia spp.	0	5	408	0	8	703	0	26	2476	0	0	423	0	5	330	0	44	4340	**0**	**0**	**4384 (22 to 44)**
Beaked whale	0	8	771	0	5	423	0	19	1731	0	0	1787	0	2	161	0	34	4873	**10 over 5 yrs**		**4907 (17 to 34)**
Rough-toothed dolphin	0	2	194	0	4	334	0	13	1177	X	X	X	0	10	974	0	29	2679	**0**	**0**	**2708 (0-15)**
Bottlenose dolphin	3	405	32657	7	738	66340	35	4722	461586	0	2	16113	2	225	24014	47	6092	600710	**0**	**0**	**606802 (0-3039)**
Pantropical spotted dolp.	1	108	8998	2	183	15491	5	580	54555	0	1	9250	5	695	49445	13	1567	137739	**0**	**0**	**139306 (0-778)**
Atlantic spotted dolphin	10	1287	97900	3	551	41887	11	2176	202708	0	4	15141	3	124	14583	27	4142	372219	**0**	**0**	**376361 (0-2071)**
Spinner dolphin	0†	1†	10†	0†	10†	100†	0†	1 0†	100†	0†	1†	10†	2	289	20624	2	311	20844	**0**	**0**	**21155 (0-156)**
Clymene dolphin	0	51	4299	1	87	7401	2	277	26064	0	0	0	1	114	8145	4	529	45909	**0**	**0**	**46438 (0-261)**
Striped dolphin	8	839	75409	0	1	61	X	X	X	2	10	94213	0	58	4133	10	908	173816	**0**	**0**	**174724 (0-454)**
Common dolphin	4	850	47499	0	1	111	X	X	X	1	10	47989	X	X	X	5	861	95599	**0**	**0**	**96460 (0-431)**
Fraser's dolphin	X	X	X	X	X	X	X	X	X	X	X	X	0	5	341	0	5	341	**0**	**0**	**346 (0-2)**
Risso's dolphin	1	92	7276	1	100	8639	5	585	57169	0	2	18726	0	21	1465	7	800	93275	**0**	**0**	**94075 (0-400)**
Atlantic white-sided dolp.	0†	1†	10†	X	X	X	X	X	X	0	1	20639	X	X	X	0	2	20649	**0**	**0**	**20651 (0-1)**
White-beaked dolphin	X	X	X	X	X	X	X	X	X	0	1	3449	X	X	X	0	1	3449	**0**	**0**	**3450 (1)**
Melon-headed whale	X	X	X	X	X	X	0†	1†	10†	X	X	X	0	23	1620	0	24	1630	**0**	**0**	**1654 (0)**
Pygmy killer whale	0†	1†	10†	0†	1†	10†	0†	1†	10†	0†	1†	10†	0	3	233	0	7	273	**0**	**0**	**280 (0)**
False killer whale	0†	1†	10†	0†	1†	10†	0†	1†	10†	0†	1†	10†	0	7	487	0	11	527	**0**	**0**	**538 (0)**
Killer whale	0†	10†	100†	0†	10†	100†	0†	10†	100†	0†	0†	100†	0	1	62	0	41	462	**0**	**0**	**503 (0)**
Pilot whales	1	159	13220	1	134	12249	7	796	77082	0	12	22604	0	16	1121	9	1117	126276	**0**	**0**	**127393 (0)**
Harbor porpoise	0†	10†	1000†	0†	1†	100†	X	X	X	0	0	152370	X	X	X	0	11	153470	**0**	**0**	**153481 (0)**
Gray Seal	X	X	X	X	X	X	X	X	X	0	31	7828	X	X	X	0	31	7828	**0**	**0**	**7859 (16-31)**
Harbor Seal	X	X	X	X	X	X	X	X	X	0	29	12630	X	X	X	0	29	12630	**0**	**0**	**12659 (15-29)**
Hooded Seal	X	X	X	X	X	X	X	X	X	0	62	15656	X	X	X	0	62	15656	**0**	**0**	**15718 (31-62)**
Harp Seal	X	X	X	X	X	X	X	X	X	0	43	10959	X	X	X	0	43	10959	**0**	**0**	**11002 (22-43)**

Table 5. Navy's estimated exposures to indicated criteria and NMFS proposed take authorization. Though exposures are predicted by the model, NMFS does not anticipate any injury/PTS to occur because of the mitigation measures (as related to certain characteristics of animals, such as size, gregariousness, or group size) and likely avoidance behavior of marine mammals. As discussed in the Estimated Take of Marine Mammals Section, NMFS also anticipates fewer takes by TTS will actually occur than were modeled.

Anticipated TTS occurences are indicated in parentheses in the last column (and are already counted within the broad Level B harassment number that NMFS proposes to authorize)

X - Species is not present or extremely rare in this region, therefore Navy is not requesting takes of this species in this region.

† - Species may be present in small numbers but insufficient data exists to generate density and therefore exposures could not be modeled. In this case the Navy estimated a number of takes to request based on qualitative assessment.

‡ - In the Atlantic pilot whales are often grouped in sighting records due to difficulty of distinguishing between the species. Therefore, in the Atlantic long-finned and short-finned pilot whale takes are combined. There are no confirmed sightings of long-finned pilot whales in the Gulf of Mexico, therefore take numbers are only for short finned pilot whales.

Blue whale: Used fin whale densities to predict exposures in the Northeast.

White-beaked dolphin: Used fall bottlenose estimates in the Northeast as a year-round white-beaked dolphin estimate.

1.4.4 Negligible Impact Finding

As mentioned above, NMFS may only issue incidental take regulations if it determines that the total taking over the 5-year period will have a negligible impact on the species or stock(s). NMFS has made this determination for the AFAST proposed rule (for the preferred alternative). The Analysis and Negligible Impact Determination section of NMFS' proposed rule for AFAST is incorporated herein by reference.

1.4.5 Monitoring and Reporting

When issuing incidental take regulations pursuant to section 101(a)(5)(A) of the MMPA, NMFS is required to prescribe regulations setting forth requirements pertaining to the monitoring and reporting of the authorized take.

1.4.5.1 *Monitoring Requirements*

The Navy's Monitoring Plan for AFAST may be viewed at NMFS' website: http://www.nmfs.noaa.gov/pr/permits/incidental.htm. The Monitoring Plan for AFAST has been designed as a collection of focused "studies" (described fully in the AFAST Monitoring Plan) to gather data that will support assessment of the following questions:

(a) Are marine mammals exposed to MFAS, especially at levels associated with adverse effects (i.e., based on NMFS'criteria for behavioral harassment, TTS, or PTS)? If so, at what levels are they exposed?

(b) If marine mammals are exposed to MFAS in the AFAST Study Area, do they redistribute geographically as a result of continued exposure? If so, how long does the redistribution last?

(c) If marine mammals are exposed to MFAS, what are their behavioral responses to various received levels?

(d) Is the Navy's suite of mitigation measures for MFAS (e.g., measures agreed to by the Navy through permitting) effective at avoiding TTS, injury, and mortality of marine mammals?

Data gathered in these studies will be collected by qualified, professional marine mammal biologists that are experts in their field. They will use a combination of the following methods to collect data:

- Visual Surveys – Vessel and aerial
- Passive Acoustic Monitoring (PAM).
- Marine Mammal Observers (MMOs) on Navy Vessels

In the four proposed study designs (all of which cover multiple years), the above methods will be used separately or in combination to monitor marine mammals in different combinations before, during, and after training activities utilizing MFAS/HFAS or IEER.

Included in the Navy's Monitoring Plan is an Integrated Comprehensive Monitoring Plan (ICMP), which will provide the overarching coordination that will support compilation of data from specific monitoring plans (e.g., AFAST, Southern California Range Complex, or Hawaii Range Complex Plan) as well as Navy funded research and development (R&D) studies. The ICMP will be used both as: 1) a planning tool to focus Navy monitoring priorities (pursuant to ESA/MMPA requirements) across Navy Range Complexes and Exercises; and 2) an adaptive management tool, through the consolidation and analysis of the Navy's monitoring and watchstander data, as well as new information from other Navy programs (e.g., R&D), and other appropriate newly published information.

1.4.5.2 *Reporting Requirements*

NMFS also worked with the Navy to establish new, more specific (since those included in the proposed rule for the AFAST), reporting requirements that will allow for consistent data collection across different Navy actions and also for the comparison of Navy data with the marine mammal data collected by others. These reporting requirements are designed to verify the extent of the Navy's specified activity and the implementation of the mitigation measures, as well as document any observations of marine mammal occurrence or responses made during the required monitoring period. These reporting requirements include specifications of data gathering for both Navy lookouts involved in training, as well as MMOs implementing the Monitoring Plan. Both annual and 5-yr comprehensive reports from AFAST are required and the Navy is also required to compare the MFAS data collected in other Range Complexes and exercises.

1.4.6 Adaptive Management

As presented in the MMPA proposed rule for AFAST, any final regulations governing the take of marine mammals incidental to Navy AFAST activities will contain an adaptive management component. NMFS' understanding of the effects of MFAS/HFAS and explosives on marine mammals is still in its relative infancy, and the science in this field continues to improve. These circumstances make the inclusion of an adaptive management component both valuable and necessary within the context of 5-year regulations for activities that have been associated with marine mammal mortality in certain circumstances and locations (though not the AFAST Study Area). The use of adaptive management will give NMFS the ability to consider new data from different sources to determine (in coordination with the Navy) on an annual basis if mitigation or monitoring measures should be modified or added (or deleted) if new data suggest that such modifications are appropriate (or are not appropriate) for subsequent annual LOAs. Following are some of the possible sources of applicable data:

- Results from the Navy's monitoring from the previous year (either from AFAST or other locations)
- Findings of the Workshop that the Navy will convene in 2011 to analyze monitoring results to date, review current science, and recommend modifications, as appropriate to the monitoring protocols to increase monitoring effectiveness
- Compiled results of Navy funded research and development (R&D) studies (presented pursuant to the ICMP, which is discussed elsewhere in this document)

- Results from specific stranding investigations (either from the AFAST Study Area or other locations, and involving coincident MFAS/HFAS of explosives training or not involving coincident use)
- Results from the Long Term Prospective Study described in the Proposed Rule.
- Results from general marine mammal and sound research (funded by the Navy (described below) or otherwise)

Mitigation measures could be modified or added (or deleted) if new data suggests that such modifications would have (or do not have) a reasonable likelihood of accomplishing the goals of any mitigation laid out in the AFAST final rule and if the measures are practicable. NMFS would also coordinate with the Navy to modify or add to (or delete) the existing monitoring requirements if the new data suggest that the addition or deletion of a particular measure would more effectively accomplish the goals of monitoring laid out in the final rule. The reporting requirements associated with the final rule would be designed to provide NMFS with monitoring data from the previous year to allow NMFS to consider the data and issue annual LOAs. NMFS and the Navy propose to meet annually to discuss the monitoring reports, Navy R&D developments, and current science and whether mitigation or monitoring modifications are appropriate.

CHAPTER 2 – ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 **No Action Alternative: Navy Mitigation Measures**

The No Action Alternative consists of NMFS issuing regulations, a 2009 LOA, and future LOAs as appropriate, that require the Navy to implement the mitigation measures proposed in the Navy's application for incidental take regulations and an LOA with no changes or additions. Note that the No Action alternative for purposes of this EA is distinct from the NMFS' No Action alternative and the Navy No Action alternative considered by NMFS in adopting the AFAST Final EIS. Under that NMFS No Action alternative, should NMFS be unable to reach required findings under the MMPA, regulations and an LOA would not be issued. As described earlier, this Mitigation EA assumes the MMPA findings can be made and that regulations and an LOA will be issued, requiring that NMFS set forth the means of effecting the least practicable adverse impact (i.e., mitigation measures).

The Navy's standard protective measures associated with each of the specified activities described earlier in this Mitigation EA are listed below.

2.1.1 Mitigation Measures for ASW and MIW training:

(i) All lookouts onboard platforms involved in ASW training events shall review the NMFS-approved Marine Species Awareness Training (MSAT) material prior to use of mid-frequency active sonar.

(ii) All Commanding Officers, Executive Officers, and officers standing watch on the Bridge shall review the MSAT material prior to a training event employing the use of mid- or high-frequency active sonar.

(iii) Navy lookouts shall undertake extensive training in order to qualify as a watchstander in accordance with the Lookout Training Handbook (NAVEDTRA, 12968-D).

(iv) Lookout training shall include on-the-job instruction under the supervision of a qualified, experienced watchstander. Following successful completion of this supervised training period, Lookouts shall complete the Personal Qualification Standard program, certifying that they have demonstrated the necessary skills (such as detection and reporting of partially submerged objects).

(v) Lookouts shall be trained in the most effective means to ensure quick and effective communication within the command structure in order to facilitate implementation of mitigation measures if marine mammals are spotted.

(vi) On the bridge of surface ships, there shall always be at least three people on watch whose duties include observing the water surface around the vessel.

(vii) All surface ships participating in ASW exercises shall, in addition to the three personnel on watch noted previously, have at all times during the exercise at least two additional personnel on watch as lookouts.

(viii) Personnel on lookout and officers on watch on the bridge shall have at least one set of binoculars available for each person to aid in the detection of marine mammals.

(ix) On surface vessels equipped with MFAS, pedestal mounted “Big Eye” (20x110) binoculars shall be present and in good working order.

(x) Personnel on lookout shall employ visual search procedures employing a scanning methodology in accordance with the Lookout Training Handbook (NAVEDTRA 12968-D). Surface lookouts should scan the water from the ship to the horizon and be responsible for all contacts in their sector. In searching the assigned sector, the lookout should always start at the forward part of the sector and search aft (toward the back). To search and scan, the lookout should hold the binoculars steady so the horizon is in the top third of the field of vision and direct the eyes just below the horizon. The lookout should scan for approximately five seconds in as many small steps as possible across the field seen through the binoculars. They should search the entire sector in approximately five-degree steps, pausing between steps for approximately five seconds to scan the field of view. At the end of the sector search, the glasses should be lowered to allow the eyes to rest for a few seconds, and then the lookout should search back across the sector with the naked eye.

(xi) After sunset and prior to sunrise, lookouts shall employ Night Lookouts Techniques in accordance with the Lookout Training Handbook. At night, lookouts should not sweep the horizon with their eyes because this method is not effective when the vessel is moving. Lookouts should scan the horizon in a series of movements that should allow their eyes to come to periodic rests as they scan the sector. When visually searching at night, they should look a little to one side and out of the corners of their eyes, paying attention to the things on the outer edges of their field of vision.

(xii) Personnel on lookout shall be responsible for informing the Officer of the Deck all objects or anomalies sighted in the water (regardless of the distance from the vessel) to the Officer of the Deck, since any object or disturbance (e.g., trash, periscope, surface disturbance, discoloration) in the water may be indicative of a threat to the vessel and its crew or indicative of a marine species that may need to be avoided as warranted.

(xii) Commanding Officers shall make use of marine mammal detection cues and information to limit interaction with marine mammals to the maximum extent possible consistent with safety of the ship.

(xiv) All personnel engaged in passive acoustic sonar operation (including aircraft, surface ships, or submarines) shall monitor for marine mammal vocalizations and report the detection of any marine mammal to the appropriate watch station for dissemination and appropriate action.

(xv) Units shall use trained lookouts to survey for marine mammals prior to commencement and during the use of active sonar.

(xvi) During operations involving sonar, personnel shall utilize all available sensor and optical systems (such as Night Vision Goggles) to aid in the detection of marine mammals.

(xvii) Navy aircraft participating in exercises at sea shall conduct and maintain, when operationally feasible and safe, surveillance for marine mammals as long as it does not violate safety constraints or interfere with the accomplishment of primary operational duties.

(xviii) Aircraft with deployed sonobuoys shall use only the passive capability of sonobuoys when marine mammals are detected within 200 yards (182 m) of the sonobuoy.

(xix) Marine mammal detections shall be reported immediately to assigned Aircraft Control Unit (if participating) for further dissemination to ships in the vicinity of the marine mammals. This action shall occur when it is reasonable to conclude that the course of the ship will likely close the distance between the ship and the detected marine mammal.

(xx) Safety Zones - When marine mammals are detected by any means (aircraft, shipboard lookout, or acoustically) the Navy shall ensure that sonar transmission levels are limited to at least 6 dB below normal operating levels if any detected marine mammals are within 1000 yards (914 m) of the sonar dome (the bow).

(A) Ships and submarines shall continue to limit maximum transmission levels by this 6-dB factor until the marine mammal has been seen to leave the area, has not been detected for 30 minutes, or the vessel has transited more than 2,000 yards (1828 m) beyond the location of the last detection.

(B) Should a marine mammal be detected within or closing to inside 457 m (500 yd) of the sonar dome, active sonar transmissions shall be limited to at least 10 dB below the

equipment's normal operating level. Ships and submarines shall continue to limit maximum ping levels by this 10-dB factor until the marine mammal has been seen to leave the area, has not been detected for 30 minutes, or the vessel has transited more than 2000 yards (1828 m) beyond the location of the last detection.

(C) Should the marine mammal be detected within or closing to inside 183 m (200 yd) of the sonar dome, active sonar transmissions shall cease. Sonar shall not resume until the marine mammal has been seen to leave the area, has not been detected for 30 minutes, or the vessel has transited more than 2,000 yards (1828 m) beyond the location of the last detection.

(D) If the need for power-down should arise as detailed in "Safety Zones" in paragraph (a)(1)(xx) of this section, Navy shall follow the requirements as though they were operating at 235 dB – the normal operating level (i.e., the first power-down shall be to 229 dB, regardless of at what level above 235 sonar was being operated).

(xxi) Prior to start up or restart of active sonar, operators shall check that the Safety Zone radius around the sound source is clear of marine mammals.

(xxii) Sonar levels (generally) – The Navy shall operate sonar at the lowest practicable level, not to exceed 235 dB, except as required to meet tactical training objectives.

(xxiii) Helicopters shall observe/survey the vicinity of an ASW Operation for 10 minutes before the first deployment of active (dipping) sonar in the water.

(xxiv) Helicopters shall not dip their sonar within 200 yards (183 m) of a marine mammal and shall cease pinging if a marine mammal closes within 200 yards of the helicopter dipping sonar (183 m) after pinging has begun.

(xxv) Submarine sonar operators shall review detection indicators of close-aboard marine mammals prior to the commencement of ASW training activities involving active sonar.

(xxvi) Night vision devices shall be available to all ships and air crews, for use as appropriate.

(xxvii) Dolphin bowriding - if, after conducting an initial maneuver to avoid close quarters with dolphins, the ship concludes that dolphins are deliberately closing in on the ship to ride the vessel's bow wave, no further mitigation actions would be necessary because dolphins are out of the main transmission axis of the active sonar while in the shallow-wave area of the vessel bow.

(xxviii) TORPEXs conducted in the northeast North Atlantic right whale critical habitat (as designated in 50 CFR Part 226) shall implement the following measures.

(A) All torpedo-firing operations shall take place during daylight hours.

(B) During the conduct of each test, visual surveys of the test area shall be conducted by all vessels and aircraft involved in the exercise to detect the presence of marine mammals. Additionally, trained observers shall be placed on the submarine, spotter aircraft, and the surface support vessel. All participants shall report sightings of any marine mammals, including negative reports, prior to torpedo firings. Reporting requirements shall be outlined in the test plans and procedures written for each individual exercise, and shall be emphasized as part of pre-exercise briefings conducted with all participants.

(C) Observers shall receive NMFS-approved training in field identification, distribution, and relevant behaviors of marine mammals of the western north Atlantic. Observers shall fill out Standard Sighting Forms and the data shall be housed at the Naval Undersea Warfare Center Division Newport (NUWCDIVNPT). Any sightings of North Atlantic right whales shall be immediately communicated to the Sighting Advisory System (SAS). All platforms shall have onboard a copy of:

(1) The Guide to Marine Mammals and Turtles of the US Atlantic and Gulf of Mexico (Wynne and Schwartz 1999)
(2) The NMFS Critical Sightings Program placard
(3) Right Whales, Guidelines to Mariners placard

(D) In addition to the visual surveillance discussed above, dedicated aerial surveys shall be conducted utilizing a fixed-wing aircraft. An aircraft with an overhead wing (i.e., Cessna Skymaster or similar) shall be used to facilitate a clear view of the test area. Two trained observers, in addition to the pilot, shall be embarked on the aircraft. Surveys shall be conducted at an approximate altitude of 1000 ft (305 m) flying parallel track lines at a separation of 1 nmi (1.85 km), or as necessary to facilitate good visual coverage of the sea surface. While conducting surveillance, the aircraft shall maintain an approximate speed of 100 knots (185 km/hr). Since factors that affect visibility are highly dependent on the specific time of day of the survey, the flight operator will have the flexibility to adjust the flight pattern to reduce glare and improve visibility. The entire test site shall be surveyed initially, but once preparations are being made for an actual test launch, survey effort shall be concentrated over the vicinity of the individual test location. Further, for approximately ten minutes immediately prior to launch, the aircraft shall racetrack back and forth between the launch vessel and the target vessel.

(E) Commencement of an individual torpedo test scenario shall not occur until observers from all vessels and aircraft involved in the exercise have reported to the Officer in Tactical Command (OTC) and the OTC has declared that the range is clear of marine mammals. Should marine mammals be present within or seen moving toward the test area, the test shall be either delayed or moved as required to avoid interference with the animals.

(F) The TORPEX shall be suspended if the Beaufort Sea State exceeds 3 or if visibility precludes safe operations.

(G) Vessel speeds:

(1) During transit through the northeastern North Atlantic right whale critical habitat, surface vessels and submarines shall maintain a speed of no more than 10 knots (19 km/hr) while not actively engaged in the exercise procedures.

(2) During TORPEX operations, a firing vessel should, where feasible, not exceed 10 knots. When a submarine is used as a target, vessel speeds should, where feasible, not exceed 18 knots. However, on occasion, when surface vessels are used as targets, the vessel may exceed 18 kts in order to fully test the functionality of the torpedoes. This increased speed would occur for a short period of time (e.g., 10-15 minutes) to evade the torpedo when fired upon.

(H) In the event of an animal strike, or if an animal is discovered that appears to be in distress, the Navy shall immediately report the discovery through the appropriate Navy chain of Command.

2.1.2 Mitigation for IEER/AEER

The following are mitigation measures for use with Extended Echo Ranging/Improved Extended Echo Ranging (EER/IEER) and Advanced Extended Echo Ranging given an explosive source generates the acoustic wave used in this sonobuoy.

(i) Navy crews shall conduct visual reconnaissance of the drop area prior to laying their intended sonobuoy pattern. This search should be conducted below 500 yards (457 m) at a slow speed, if operationally feasible and weather conditions permit. In dual aircraft training activities, crews are allowed to conduct coordinated area clearances.

(ii) For IEER (AN/SSQ-110A), Navy crews shall conduct a minimum of 30 minutes of visual and acoustic monitoring of the search area prior to commanding the first post (source/receiver sonobuoy pair) detonation. This 30-minute observation period may include pattern deployment time.

(iii) For any part of the briefed pattern where a post (source/receiver sonobuoy pair) will be deployed within 1,000 yards (914 m) of observed marine mammal activity, deploy the receiver ONLY and monitor while conducting a visual search. When marine mammals are no longer detected within 1,000 yards (914 m) of the intended post position, co-locate the explosive source sonobuoy (AN/SSQ-110A) (source) with the receiver.

(iv) When operationally feasible, Navy crews shall conduct continuous visual and aural monitoring of marine mammal activity. This is to include monitoring of own-aircraft sensors from first sensor placement to checking off station and out of communication range of these sensors.

(v) Aural Detection: If the presence of marine mammals is detected aurally, then that should cue the aircrew to increase the diligence of their visual surveillance. Subsequently, if no marine mammals are visually detected, then the Navy crew may continue multi-static active search.

(vi) Visual Detection:

(A) If marine mammals are visually detected within 1,000 yards (914 m) of the explosive source sonobuoy (AN/SSQ-110A) intended for use, then that payload shall not be detonated.

(B) Navy Aircrews may utilize this post once the marine mammals have not been re-sighted for 30 minutes, or are observed to have moved outside the 1,000 yards (914 m) safety buffer.

(C) Navy Aircrews may shift their multi-static active search to another post, where marine mammals are outside the 1,000 yards (914 m) safety buffer.

(vii) For IEER (AN/SSQ-110A), Navy Aircrews shall make every attempt to manually detonate the unexploded charges at each post in the pattern prior to departing the operations area by using the "Payload 1 Release" command followed by the "Payload 2 Release" command. Aircrews shall refrain from using the "Scuttle" command when two payloads remain at a given post. Aircrews shall ensure that a 1,000 yard (914 m) safety buffer, visually clear of marine mammals, is maintained around each post as is done during active search operations.

(viii) Navy Aircrews shall only leave posts with unexploded charges in the event of a sonobuoy malfunction, an aircraft system malfunction, or when an aircraft must immediately depart the area due to issues such as fuel constraints, inclement weather, and in-flight emergencies. In these cases, the sonobuoy will self-scuttle using the secondary or tertiary method.

(ix) The Navy shall ensure all payloads are accounted for. Explosive source sonobuoys (AN/SSQ-110A) that cannot be scuttled shall be reported as unexploded ordnance via voice communications while airborne, then upon landing via naval message.

(x) Marine mammal monitoring shall continue until out of own-aircraft sensor range.

2.1.3 Mitigation Measures related to Vessel Transit and North Atlantic Right Whales

2.1.3.1 Mid-Atlantic, Offshore of the Eastern United States

(A) All Navy vessels are required to use extreme caution and operate at a slow, safe speed consistent with mission and safety during the months indicated below and within a 37 km (20 nm) arc (except as noted) of the specified associated reference points:

(1) South and East of Block Island (37 km (20 NM) seaward of line between 41-4.49 N. lat. 071-51.15° W. long. and 41-18.58° N. lat. 070-50.23° W. long): Sept-Oct and Mar-Apr

(2) New York / New Jersey (40-30.64° N. lat. 073-57.76° W. long.): Sep–Oct and Feb-Apr.

(3) Delaware Bay (Philadelphia) (38-52.13 º N. lat. 075-1.93 º W. long.): Oct–Dec and Feb–Mar.

(4) Chesapeake Bay (Hampton Roads and Baltimore) (37-1.11 º lat. 075-57.56 º W. long.): Nov-Dec and Feb–Apr.

(5) North Carolina (34-41.54 º N. lat. 076-40.20 º W. long.): Dec-Apr

(6) South Carolina (33-11.84 º N. lat. 079-8.99 º W. long. and 32-43.39 º N. lat. 079-48.72 º W. long.): Oct-Apr

(B) During the months indicated directly above, Navy vessels shall practice increased vigilance with respect to avoidance of vessel-whale interactions along the mid-Atlantic coast, including transits to and from any mid-Atlantic ports not specifically identified in paragraph (a)(3)(i)(A) of this section.

(C) All surface units transiting within 56 km (30 NM) of the coast in the mid-Atlantic shall ensure at least two watchstanders are posted, including at least one lookout who has completed required MSAT training.

(D) Navy vessels shall not knowingly approach any whale head on and shall maneuver to keep at least 457 m (1,500 ft) away from any observed whale, consistent with vessel safety.

2.1.3.2 Southeast Atlantic, Offshore of the Eastern United States

For the purposes of the measures below, the "southeast" encompasses sea space from Charleston, South Carolina, southward to Sebastian Inlet, Florida, and from the coast seaward to 148 km (80 NM) from shore. North Atlantic right whale critical habitat is the area from 31-15 º N. lat. to 30-15 º N. lat. extending from the coast out to 28 km (15 NM), and the area from 28-00 º N. lat. to 30-15 º N. lat. from the coast out to 9 km (5 NM). All mitigation measures described here that apply to the critical habitat apply from November 15 – April 15 and also apply to an associated area of concern which extends 9 km (5 NM) seaward of the designated critical habitat boundaries.

(A) Prior to transiting or training in the critical habitat or associated area of concern, ships shall contact Fleet Area Control and Surveillance Facility, Jacksonville, to obtain latest whale sighting and other information needed to make informed decisions regarding safe speed and path of intended movement. Subs shall contact Commander, Submarine Group Ten for similar information.

(B) The following specific mitigation measures apply to activities occurring within the critical habitat and an associated area of concern which extends 9 km (5 NM) seaward of the designated critical habitat boundaries:

(1) When transiting within the critical habitat or associated area of concern, vessels shall exercise extreme caution and proceed at a slow safe speed. The speed shall be the slowest safe speed that is consistent with mission, training and operations.

(2) Speed reductions (adjustments) are required when a whale is sighted by a vessel or when the vessel is within 9 km (5 NM) of a reported new sighting less then 12 hours old. Circumstances could arise where, in order to avoid North Atlantic right whale(s), speed reductions could mean vessel must reduce speed to a minimum at which it can safely keep on course or vessels could come to an all stop.

(3) Vessels shall avoid head-on approaches to North Atlantic right whale(s) and shall maneuver to maintain at least 457 m (500 yd) of separation from any observed whale if deemed safe to do so. These requirements do not apply if a vessel's safety is threatened, such as when a change of course would create an imminent and serious threat to a person, vessel, or aircraft, and to the extent vessels are restricted in the ability to maneuver.

(4) Ships shall not transit through the critical habitat or associated area of concern in a North-South direction.

(5) Ships, surfaced subs, and aircraft shall report any whale sightings to Fleet Area Control and Surveillance Facility, Jacksonville, by the quickest and most practicable means. The sighting report shall include the time, latitude/longitude, direction of movement and number and description of whale (i.e., adult/calf).

2.1.3.3 Northeast Atlantic, Offshore of the Eastern United States

(A) Prior to transiting the Great South Channel or Cape Cod Bay critical habitat areas, ships shall obtain the latest North Atlantic right whale sightings and other information needed to make informed decisions regarding safe speed. The Great South Channel critical habitat is defined by the following coordinates: 41-00 ^{o} N. lat., 69-05 ^{o} W. long.; 41-45 ^{o} N. lat, 69-45 ^{o} W. long; 42-10 ^{o} N. lat., 68-31 ^{o} W. long.; 41-38 ^{o} N. lat., 68-13 ^{o} W. long.. The Cape Cod Bay critical habitat is defined by the following coordinates: 42-04.8 ^{o} N. lat., 70-10 ^{o} W. long.; 42-12 ^{o} N. lat., 70-15 ^{o} W. long.; 42-12 ^{o} N. lat., 70-30 ^{o} W. long.; 41-46.8 ^{o} N. lat., 70-30 ^{o} W. long.

(B) Ships, surfaced subs, and aircraft shall report any North Atlantic right whale sightings (if the whale is identifiable as a right whale) off the northeastern U.S. to Patrol and Reconnaissance Wing (COMPATRECONWING). The report shall include the time of sighting, lat/long, direction of movement (if apparent) and number and description of the whale(s).

(C) Vessels or aircraft that observe whale carcasses shall record the location and time of the sighting and report this information as soon as possible to the cognizant regional environmental coordinator. All whale strikes must be reported. This report shall include the date, time, and location of the strike; vessel course and speed; operations being conducted by the vessel; weather conditions, visibility, and sea state; description of the whale; narrative of incident; and indication of whether photos/videos were taken. Navy personnel are encouraged to take photos whenever possible.

(D) Specific mitigation measures related to activities occurring within the critical habitat include the following:

(1) Vessels shall avoid head-on approaches to North Atlantic right whale(s) and shall maneuver to maintain at least 457 m (500 yd) of separation from any observed whale if deemed safe to do so. These requirements do not apply if a vessel's safety is threatened, such as when change of course would create an imminent and serious threat to person, vessel, or aircraft, and to the extent vessels are restricted in the ability to maneuver.

(2) When transiting within the critical habitat or associated area of concern, vessels shall use extreme caution and operate at a safe speed so as to be able to avoid collisions with North Atlantic right whales and other marine mammals, and stop within a distance appropriate to the circumstances and conditions.

(3) Speed reductions (adjustments) are required when a whale is sighted by a vessel or when the vessel is within 9 km (5 NM) of a reported new sighting less than one week old.

(4) Ships transiting in the Cape Cod Bay and Great South Channel critical habitats shall obtain information on recent whale sightings in the vicinity of the critical habitat. Any vessel operating in the vicinity of a North Atlantic right whale shall consider additional speed reductions per Rule 6 of International Navigational Rules.

2.2 **Alternative 1 (Preferred Alternative)**

Alternative 1 is the issuance of regulations, a 2009 LOA, and subsequent LOAs as appropriate, to the Navy requiring the Navy to implement all of the mitigation measures included in Section 2.1 - No Action Alternative plus several additional mitigation measures, including the use of Planning Awareness Areas to raise awareness and lessen impacts in designated productive marine mammal habitat, minimization of helicopter dipping sonar and object detection exercises in southeast right whale critical habitat from November 15 – April 15, and the implementation of a Stranding Response Plan for AFAST. This is NMFS' preferred alternative. The additional measures that would be specified in a final rule under this alternative are presented in the subsections below.

Note that the AFAST Stranding Response Plan, which is discussed below, is a stand-alone document that is currently available on the NMFS website: http://www.nmfs.noaa.gov/pr/permits/incidental.htm#applications, and is incorporated herein by reference. Under this alternative, NMFS' final rule, 2009 LOA, and associated LOAs as appropriate, would indicate that the Navy is required to abide by the AFAST Stranding Response Plan. Additionally, the primary requirements of the AFAST Stranding Response Plan would be summarized in the final rule and subsequent LOA(s), as indicated below. The measures described below also are included in the Final EIS and are considered part of the action included

in the preferred alternative (EIS No Action Alternative) identified by Navy in the December 2008 Final EIS.

2.2.1 Planning Awareness Areas (PAAs)

(A) The Navy shall avoid planning major exercises in the specified planning awareness areas (PAAs - attached) where feasible. Should national security require the conduct of more than four major exercises (COMPTUEX, JTFEX, SEASWITI, or similar scale event) in these areas (meaning all or a portion of the exercise) per year the Navy shall provide NMFS with prior notification and include the information in any associated after-action or monitoring reports.

(B) The Navy shall conduct no more than one of the four above-mentioned major exercises (COMPTUEX, JTFEX, SEASWITI or similar scale event) per year in the Gulf of Mexico to the extent operationally feasible. If national security needs require more than one major exercise to be conducted in the Gulf of Mexico PAAs, the Navy shall provide NMFS with prior notification and include the information in any associated after-action or monitoring reports.

(C) The Navy shall include the PAAs in the Navy's Protective Measures Assessment Protocol (PMAP) (implemented by the Navy for use in the protection of the marine environment) for unit level situational awareness (i.e., exercises other than COMPTUEX, JTFEX, SEASWITI) and planning purposes.

2.2.2 Helicopter Dipping Sonar

Unless otherwise dictated by national security needs, the Navy shall minimize helicopter dipping sonar activities within the southeastern areas of North Atlantic right whale critical habitat (as designated in 50 CFR Part 226) from November 15 – April 15.

2.2.3 Object Detection Exercises

The Navy shall implement the following measures regarding object detection activities in the southeastern areas of the North Atlantic right whale critical habitat:

(A) The Navy shall reduce the time spent conducting object detection exercises in the NARW critical habitat;

(B) Prior to conducting surface ship object detection exercises in the southeastern areas of the North Atlantic right whale critical habitat during the time of November 15 – April 15, ships shall contact FACSFACJAX to obtain the latest North Atlantic right whale sighting information. FACSFACJAX shall advise ships of all reported whale sightings in the vicinity of the critical habitat and associated areas of concern (which extend 9 km (5 NM) seaward of the designated critical habitat boundaries). To the extent operationally feasible, ships shall avoid conducting training in the vicinity of recently sighted North Atlantic right whales. Ships shall maneuver to maintain at least 500 yards separation from any observed whale, consistent with the safety of the ship.

2.2.4 AFAST Stranding Response Plan

The Navy shall abide by the letter of the "Stranding Response Plan for Major Navy Training Exercises in the AFAST Study Area", to include the following measures:

(A) Shutdown Procedures – When an Uncommon Stranding Event (USE – defined in the AFAST Stranding Response Plan) occurs during a Major Training Exercise, as defined for the purposes of the plan (MTE, including SEASWITI, IAC, Group Sails, JTFEX, or COMPTUEX), in the AFAST Study Area, the Navy shall implement the procedures described below.

(1) The Navy shall implement a Shutdown (as defined in the AFAST Stranding Response Plan) when advised by a NMFS Office of Protected Resources Headquarters Senior Official designated in the AFAST Stranding Communication Protocol that a USE involving live animals has been identified and that at least one live animal is located in the water. NMFS and Navy shall communicate, as needed, regarding the identification of the USE and the potential need to implement shutdown procedures.

(2) Any shutdown in a given area shall remain in effect in that area until NMFS advises the Navy that the subject(s) of the USE at that area die or are euthanized, or that all live animals involved in the USE at that area have left the area (either of their own volition or herded).

(3) If the Navy finds an injured or dead animal of any species other than North Atlantic right whale floating at sea during an MTE, the Navy shall notify NMFS immediately or as soon as operational security considerations allow. The Navy shall provide NMFS with species or description of the animal (s), the condition of the animal (s) including carcass condition if the animal(s) is/are dead), location, time of first discovery, observed behaviors (if alive), and photo or video (if available). Based on the information provided, NMFS shall determine if, and advise the Navy whether a modified shutdown is appropriate on a case-by-case basis.

(4) If the Navy finds an injured (or entangled) North Atlantic right whale floating at sea during an MTE, the Navy shall implement shutdown procedures (14 or 17 nm, as defined below) around the animal immediately (without waiting for notification from NMFS). The Navy shall then notify NMFS (pursuant to the AFAST Communication Protocol) immediately or as soon as operational security considerations allow. The Navy shall provide NMFS with species or description of the animal (s), the condition of the animal (s) including carcass condition if the animal(s) is/are dead), location, time of first discovery, observed behaviors (if alive), and photo or video (if available). Subsequent to the discovery of the injured whale, any Navy platforms in the area shall report any North Atlantic right whale sightings to NMFS (or to a contact that can alert NMFS as soon as possible). Based on the information provided, NMFS may initiate/organize an aerial survey (by requesting the Navy's assistance pursuant to the memorandum of agreement (MOA, see below) or by other available means) to see if other North Atlantic right whales are in the vicinity. Based on the information provided by the Navy and, if necessary, the outcome of the aerial surveys, NMFS shall determine whether a continued

shutdown is appropriate on a case-by-case basis. Though it will be determined on a case-by-case basis after Navy/NMFS discussion of the situation, NMFS anticipates that the shutdown will continue within 14 or 17 nm of a live, injured/entangled North Atlantic right whale until the animal dies or has not been seen for at least 3 hours (either by NMFS staff attending the injured animal or Navy personnel monitoring the area around where the animal was last sighted).

(5) If the Navy finds a dead North Atlantic right whale floating at sea during an MTE, the Navy shall notify NMFS (pursuant to AFAST Stranding Communication Protocol) immediately or as soon as operational security considerations allow. The Navy shall provide NMFS with species or description of the animal (s), the condition of the animal (s) including carcass condition if the animal(s) is/are dead), location, time of first discovery, observed behaviors (if alive), and photo or video (if available). Subsequent to the discovery of the dead whale, if the Navy is operating sonar in the area they shall use increased vigilance (in looking for North Atlantic right whales) and all platforms in the area shall report sightings of North Atlantic right whales to NMFS as soon as possible. Based on the information provided, NMFS may initiate/organize an aerial survey (by requesting the Navy's assistance pursuant to the MOA (see below) or by other available means) to see if other North Atlantic right whales are in the vicinity. Based on the information provided by the Navy and, if necessary, the outcome of the aerial surveys, NMFS will determine whether any additional mitigation measures are necessary on a case-by-case basis.

(6) In the event, following a USE, that: a) qualified individuals are attempting to herd animals back out to the open ocean and animals are not willing to leave, or b) animals are seen repeatedly heading for the open ocean but turning back to shore, NMFS and the Navy should coordinate (including an investigation of other potential anthropogenic stressors in the area) to determine if the proximity of MFAS/HFAS training activities or explosive detonations, though farther than 14 or 17 nm from the distressed animal(s), is likely decreasing the likelihood that the animals return to the open water. If so, NMFS and the Navy shall further coordinate to determine what measures are necessary to further minimize that likelihood and implement those measures as appropriate.

(B) Within 72 hours of the notification of the USE the Navy will inform NMFS where and when they were operating MFAS or conducting explosive detonations (within 80 nm and 72 hours prior to event). Within 7 days of the completion of any exercises that were being conducted within 80 nm or 72 hours prior to the event, the Navy will further provide information to NMFS (per the AFAST Stranding Communication Protocol), *as available*, regarding the number and types of acoustic/explosive sources, direction and speed of units using MFAS, and marine mammal sightings information associated with those training activities. Information not initially available regarding the 80 nm, 72 hours, period prior to the event will be provided as soon as it becomes available. The Navy will provide NMFS investigative teams with additional relevant unclassified information as requested (or classified information to designated NMFS staff), if available.

(C) Memorandum of Agreement (MOA) – The Navy and NMFS shall develop a MOA, or other mechanism consistent with federal fiscal law requirements (and all other applicable

laws), that will establish a framework whereby the Navy can (and provide the Navy examples of how they can best) assist NMFS with stranding investigations in certain circumstances.

2.3 **Alternative 2**

NMFS considered a variety of reasonable potential mitigation measures that have been recommended in past public comments on activities involving sound in the water, submitted during the comment period on the AFAST proposed rule, discussed within NMFS as part of the proposed rulemaking for AFAST, or considered by the Navy in the AFAST EIS but not included as preferred measures in the Navy's proposed action. Alternative 2 is the issuance of regulations, a 2009 LOA, and subsequent LOAs as appropriate to the Navy that requires all of the mitigation measures identified in Alternative 1, but with the addition of a subset of the additional suite of mitigation measures considered herein. Below is a description of the reasonable mitigation measures that NMFS considered in Alternative 2. These measures are broadly grouped into general mitigation measures, with lists of more specific measures that have been recommended by the public. Note that the term 'public comment' as used here includes comments received from other federal and state agencies during public comment periods.

Many of the mitigation measures considered by NMFS for AFAST are measures that could apply broadly to other Navy actions and the material included in this document may be used to assist in the analysis of mitigation options for other Navy actions. Also note that several of the measures are specific to MFAS (versus HFAS), as MFAS sources are responsible for the majority of the estimated takes presented in Table 5.

2.3.1 Seasonal and/or Geographic Limitations

A seasonal or geographic limitation is a requirement that an authorized entity limit or avoid conducting the specified activity in specific areas where marine mammals are *known* to be concentrated, either regularly or to perform a specifically important biological function (such as breeding, calving, or feeding), either all of the time or during specific times of the year (or day). Another way of effecting a similar result is to require that an activity specifically occur in areas where marine mammals are *not* concentrated, etc. Following are the general types of seasonal and geographic limitations analyzed by NMFS in this Mitigation EA.

- Disallow any use of MFAS in all areas where specific marine mammal species are known to be conducting specifically important behaviors during all of the time period that the marine mammals are conducting the behavior. Or, the following sub-categories of mitigation could be utilized:
    - Disallow use of MFAS in a subset of the areas described above
    - Disallow use of MFAS for a subset of the time described above
    - Disallow use of MFAS in a subset of the areas and times described above

- Limit use (i.e., require reduced use, either in the planning stages or at the scene) of MFAS in all areas where specific marine mammal species are known to be conducting

specifically important behaviors during all of the time period that the marine mammals are conducting the behavior. Or, the following sub-categories of mitigation could be used:

- Limit use of MFAS in a subset of the areas described above
- Limit use of MFAS for a subset of the time described above
- Limit use of MFAS in a subset of the areas and times described above

Following are some specific examples of seasonal or geographic restrictions that NMFS considers for AFAST activities:

- Disallowing or limiting MFAS use in coastal areas (25 nm from 200-m isobath, inside of shelf break)

- Disallowing or limiting MFAS use in North Atlantic right whale critical habitat

- Disallowing or limiting MFAS use when the factors that have been associated with marine mammal strandings and sonar (such as the presence of more than 3 ships operating in the same area for an extended amount of time, constricted channels or embayments, steep bathymetry, and the presence of significant surface ducts) or other scenarios potentially associated with potential danger to marine mammals (embayments) are present in their aggregate or separately.

- Disallowing or limiting MFAS use in the vicinity of physical or environmental features likely to (or that could potentially) be associated with higher concentrations of marine mammals (or specific marine mammal occurrences themselves), such as:
  - Large seamounts or submarine canyons for beaked whales
  - Fronts and other major oceanographic features (Gulf Stream, warm core rings)
  - Aggregations of beaked whales or mysticetes

- Disallowing or limiting MFAS use in areas of known higher marine mammal density (some commenters recommended Stellwagen Bank or other northeast mysticete feeding areas) or where models estimate higher marine mammal takes.

More specifically, in the AFAST EIS, the Navy's proposed action is to designate areas where mid- and high-frequency active sonar and IEER system training, maintenance, and RDT&E activities will occur within and adjacent to existing OPAREAs and to conduct these activities. There is no difference in the amount or type of activities conducted between the Navy's alternatives – rather, there are differences in where and when the activities will be conducted. Essentially, other than the No Action alternative, the Navy's alternative analysis in the EIS was developed utilizing a balance of operational requirements with some combination of geographic and seasonal limitations based on areas of high marine mammal density, bathymetric features, oceanographic features, NARW critical habitat, river and bay mouths, and National Marine Sanctuary locations. In NMFS' analysis of potential mitigation alternatives for the MMPA rule (and as part of Alternative 2 of this mitigation EA), NMFS considered the alternatives presented in the EIS, which are listed below:

- Designated Active Sonar Areas (Alternative 1 and Figure ES-2 in the EIS) - fixed active sonar areas would be designated using an environmental analysis to determine locations

that would minimize environmental effects to biological resources while still meeting operational requirements. These areas would be available for use year-round.

- Designated Seasonal Active Sonar Areas (Alternative 2 and Figures ES-3 through ES-6 in the EIS) - active sonar training areas would be designated using the same environmental analysis conducted under Alternative 1, above. The areas would be adjusted seasonally to minimize effects to marine resources while still meeting minimum operational requirements.
- Designated Areas of Increased Awareness (Alternative 3 and Figure ES-7), the results of the environmental analysis conducted for Alternative 1 and 2 were utilized in conjunction with a qualitative environmental analysis of sensitive habitats to identify areas of increased awareness. Active sonar would not be conducted within these areas of increased awareness.

2.3.2 Additional Detection Methods to Implement Mitigation (Shutdown Zones)

Visual observations of marine mammals by Navy lookouts stationed on the decks of surface vessels are currently the primary means of marine mammal detection for use in mitigation implementation. Aircraft and passive acoustic tools involved in training exercises also provide additional detection capabilities, when operationally feasible. A suite of other possible marine mammal detection tools are considered here by NMFS for regular use in the implementation of mitigation (shutdowns):

- Active Sonar (HFM3 or other)
- Additional Passive Sonar (sonobuoys, SQQ89, nodes, instrumented ranges, bottom-mounted sensors, or other)
- Radar
- Infrared technologies
- Additional platforms specifically for detection (aircraft, UAVs, Gliders)

These methods could be used either as dedicated equipment for the detection of marine mammals, or in conjunction with other uses as part of the ongoing Navy training.

In addition to being used all of the time for the detection of marine mammals for mitigation implementation, these additional types of detection methods could be used in different ways or for more specific circumstances, such as at night or in low visibility.

2.3.3 Use of Dedicated or Independent Marine Mammal Observers (MMOs) to Implement Mitigation

These measures include the use of dedicated or independent marine mammal observers that are not participating in the Navy exercises to detect marine mammals for the purpose of implementing the mitigation measures (including powerdowns and shutdowns). Considerations include the use of these MMOs either all of the time or during particular times of heightened concern. Related measures would require that the Navy conduct a study to compare the effectiveness of Navy lookouts to experienced MMOs and requiring that the Navy use

standardized datasheets during Navy exercises to ensure consistency of data collection and comparability across observations.

2.3.4 Enlargement or Modification of Powerdown/Shutdown Zones of Hull-mounted Sonar

Currently, the Navy implements the following powerdowns and shutdowns: powerdown 6 dB (marine mammal closing to or within 1000 yds of source); powerdown additional 4 dB to 10 dB total (marine mammal closing to or within 500 yds of source); shutdown (marine mammal closing to or within 200 yds). There are multiple ways that powerdown or shutdown zones could be modified and following are some examples that NMFS has specifically considered under this alternative for potential use in AFAST:

- Enlarged shutdown and powerdown zones for use at all times with MFAS (for example, 2 km or 4 km)

- Enlarged shutdown and powerdown zones for use when specific marine mammals are detected, such as:
    - Beaked whales
    - Feeding aggregations of large whales
    - Right whales with calves

- Use of a prolonged powerdown (i.e., MFAS operated at lower power) in certain circumstances, such as:
    - The presence of a strong surface duct
    - Nighttime or low visibility

2.3.5 Ramp Up of Sonar Source Prior to Full Power Operation

One method of potentially reducing impacts to marine mammals is requiring the Navy to "ramp up" the sonar source, which means that the source is turned on at a lower level and then slowly turned up until it is operating at the level needed to conduct the training exercise. This measure is based on the supposition that many marine mammals avoid sonar sources and that they will gradually move farther away from the source as it is gradually turned up and thereby be exposed to lower levels than if it were turned immediately on to the full level required during a particular activity.

2.3.6 Halting of MFAS Use in the Event of a Marine Mammal Stranding until Cause is Determined

This measure would require the Navy to cease all MFAS use in the event of a stranding until the definitive cause of the stranding was determined.

2.3.7 Suspension of MFAS Training at Night, or During Low Visibility or Surface Duct

This measure would require the suspension of MFAS use at night, during periods of low visibility (including fog, high Beaufort Sea State, or dusk and dawn), or when a strong surface duct is present.

2.3.8 Avoidance of Federal and State Marine Protected Areas, including Stellwagen Bank, Monitor, Gray's Reef, Flower Garden Banks, and Florida Keys National Marine Sanctuaries

This measure would disallow or restrict Navy active sonar or underwater detonations in federal and/or state marine protected areas, including Stellwagen Bank, Monitor, Gray's Reef, Flower Garden Banks, and Florida Keys National Marine Sanctuaries. Although specific additional state marine protected areas are not analyzed in this EA, this EA does include the approach to analysis that is followed in considering site-specific avoidance.

2.3.8 Delayed Restart of MFAS after Shutdown or Powerdown

Under this measures, NMFS would require the Navy to delay resumption of full operational sonar use following a power-down or shutdown for 30 minutes if the sighted animal can be identified to the species level and the species is not deep diving and 60 minutes if it cannot be identified or is known to be a member of a deep-diving species such as sperm and beaked whales.

2.3.9 Implementing a Set Speed Limit for Navy Vessels (10 knots) for NARWs

This measure would require that the Navy implement a speed limit of 10 knots in a designated area, to include the southern NARW critical habitat plus an area east 30 nm from the Atlantic coast, from November 15 – April 15.

2.4 **Alternatives Considered by NMFS but Eliminated**

Several additional potential "mitigation measures" were identified by NMFS or raised during the public comment period on the proposed AFAST rule. These measures were addressed in the AFAST Final EIS. However, for the reasons described below, these alternative measures were not appropriate for consideration as mitigation, and therefore were not included in NMFS' Alternatives 1 or 2 of this mitigation EA. The rationale for eliminating them is presented below.

2.4.1 Scaling Back of Activities or Use of Simulated Exercises in Lieu of Real-time Exercises

NMFS considered the recommendations of some members of the public that the Navy scale back the amount of training they will conduct or use simulated electronic exercises instead of the real exercises described in the Navy's specified activities pursuant to their request for incidental take regulations and an LOA.

However, NMFS did not carry analysis of these recommendations further because the MMPA requires that NMFS make its findings based on the "specified activity" identified in an applicant's request, and reducing the overall amount of the activity specified by the applicant or replacing part of the specified activity with a completely different activity (training simulations) inherently changes the applicant's specified activity.

The Navy's AFAST Final EIS addresses but eliminates from more detailed consideration reduced training effort or use of simulated electronic exercises (see Chapter 5 of the AFAST FEIS). Given NMFS duties under MMPA regarding the specified activity, NMFS does not consider scaled back training or enforced simulation training within the appropriate range of alternatives for NMFS action of analyzing mitigation measures for the specified activity.

Additionally, while the Navy continues to research new ways to provide realistic training through simulation, simulated training does not fully develop the skills and capabilities necessary to attain appropriate military readiness; thus, such an alternative would also fail to meet the purpose and need of the proposed action for AFAST. Simulators may assist in developing an understanding of certain basic skills and equipment operation, but cannot sufficiently capture the complexity and uncertainty of real-world training conditions, nor can they offer a complete picture of the detailed and instantaneous interaction within each command and among many commands and warfare communities that actual training at sea provides. AFAST provides realistic training in the most relevant environments replicating the operational stresses of warfare. Current simulation technology cannot adequately replicate the multi-dimensional training (e.g., training for simultaneous air, surface and subsurface threats) necessary to adequately prepare the nation's Naval forces for combat. Furthermore, it does not provide for adequate anti-submarine warfare (ASW) training, which involves the use of MFAS and HFAS, with the degree of fidelity necessary to develop and maintain proficiency. An alternative that would cause ASW skills to atrophy is not reasonable because it would put Naval forces at risk during combat.

2.4.2 Requirement that Foreign Navies Abide by U.S. Mitigation Measures during AFAST

As described in the AFAST Final EIS, pursuant to the Navy's 2000 Policy for Environmental Compliance at Sea, the commander or officer in charge of a major exercise provides participating foreign units with a description of the measures to protect the environment required of similar U.S. units as early as reasonable in the exercise planning process and encourages them to comply. It is not within the power of the U.S. Navy to compel foreign sovereign immune vessels to adopt the U.S. mitigation measures and, therefore, NMFS did not consider this measure further. However, the Navy has indicated to NMFS that they strongly encourage foreign navies to abide by the same measures employed by the U.S. Navy.

2.4.3 Required Research and Development of Technology to Reduce MFAS Impacts

NMFS considered requiring the Navy to research and develop new technologies to better detect marine mammals and reduce impacts to marine mammals during MFAS use. However, the MMPA does not require that individuals who have applied for an incidental take regulations conduct research and develop new technologies prior to receiving an authorization and, therefore NMFS has not carried this proposed measure forward for analysis as part of an action alternative in this Mitigation EA.

However, NMFS has incorporated an adaptive management component into the AFAST rule which would allow for yearly review of Navy monitoring and current science that could

influence (allow for the potential modification of) monitoring and mitigation measures in subsequent LOAs, if appropriate.

NMFS recognizes the importance of research, and notes that the Navy specifically addressed research in the AFAST Final EIS. NMFS encourages research on new or improved methods of marine mammal detection and on understanding the effects of Navy activities on marine mammals. The Navy continues to commit resources to marine mammal and related research efforts. A summary of the Navy's research plans is included in the FEIS, in NMFS' proposed rule, and in the Navy's Marine Mammal Monitoring Program for AFAST, but these robust programs are not detailed here as the MMPA does not specifically require the conduct of research by applicants.

CHAPTER 3 – AFFECTED ENVIRONMENT

The affected environment for NMFS' decision consists of the marine mammals potentially taken by the Navy's specified activity and their habitats in the AFAST Study Area. This Mitigation EA tiers from the analysis presented in the AFAST Final EIS; Section 3.6 of that EIS specifically presents the "Marine Mammals" affected environment that is relevant to NMFS' proposed action.

CHAPTER 4 – ENVIRONMENTAL CONSEQUENCES

This chapter includes an analysis of the environmental consequences associated with each of the three alternatives presented in Chapter 2. The environmental consequences of the underlying Navy action for the marine resources relevant to NMFS' authorization are presented in Chapter 4 of the AFAST Final EIS, and those consequences (e.g., number of estimated takes) are not reassessed here. Chapter 5 of the AFAST Final EIS presents an analysis of the majority of the mitigation alternatives assessed in this Mitigation EA. Therefore, this tiered Mitigation EA provides additional analyses that build upon the information presented in Chapter 5 of the FEIS (and the EIS alternatives themselves, which consist of different geographical and seasonal limitations),.

In this EA, NMFS expands the analysis of the potential benefit or lack of benefit of potential marine mammal mitigation measures. The approach to this assessment is founded on the purposes of mitigation described in items a) through f) of Section 1.3 above. Where a benefit to marine mammals is identified in the assessment, NMFS has evaluated the practicability of the measure in greater detail. Note that practicability is not described in additional detail herein if the benefit of a measure to marine mammals is not clear, as NMFS would not seek to require measures with no identified benefit to the affected marine mammal species or their habitats; in these cases the practicability of the measure is as presented in Chapter 5 of the Final EIS.

4.1 **No Action Alternative: Navy Mitigation Measures**

As described in Chapter 2 of this Mitigation EA, personnel training and monitoring for the presence of marine mammals for the implementation of the powerdown and shutdown zones

are a large part of the Navy's standard protective measures. Section 2.1 presents the suite of specific mitigation measures that would be required by NMFS as part of the MMPA rulemaking under the No Action alternative. This section does not analyze each specific mitigation measure described in Section 2.1. Rather, NMFS considers the mitigation measures as they act together to effect the least practicable adverse impact. For example, the series of personnel training mitigations are analyzed below, followed by NMFS assessment of the effectiveness of this training operating in concert with the various requirements to survey areas for marine mammal presence and the subsequent requirement to implement appropriate mitigation (e.g., shut down) when marine mammals are sighted with certain distances from sound sources. NMFS' resulting analyses of the suite of measures considered under the No Action alternative are provided below.

Marine mammal mitigation training for specific participants in the active sonar activities is a key element of implementing the mitigation measures summarized above. The goal of this training is twofold: (1) that active sonar operators understand the details of the mitigation measures and be competent to carry out the mitigation measures, and (2) that key personnel onboard Navy platforms exercising in and adjacent to the various OPAREAS understand the mitigation measures and be competent to carry them out.

Navy personnel (i.e., lookouts/watchstanders, bridge personnel, active sonar operators, aviation units) on ships, submarines, and aircraft involved in ASW exercises receive a variety of professional training, including the marine species awareness training (MSAT) and the NAVEDTRA 12968-D (as applicable to their workstation) to increase their understanding of the visual cues, physical and behavioral characteristics of marine mammals. Lookout training includes precise scanning procedures for marine species (i.e., detect visual cues indicating the presence of marine mammals and their behavior). Other tools such as a Navy-developed whale identification wheel are provided to aid Navy crews in their identification of marine mammal species. Sonar operators are taught to distinguish biological contacts from other acoustic contacts and to notify lookouts of potential marine mammal detections so that lookouts can confirm the object sited.

Navy shipboard lookout(s) are highly qualified and experienced observers. The information presented here is a summary of input provided by Navy in response to inquiries from NMFS requesting more detail on the lookouts' qualifications and experience:

- Effective visual searching does not come naturally; Navy lookouts learn specialized scanning procedures, undergo extensive training and certification, and have more hours practicing these skills than many non-Navy marine mammal observers. For example, in the daytime, the average person must stop on an object in order to see it but Navy lookouts are skilled at scanning while moving their eyes across the water rapidly from point to point.
- At all times, the shipboard lookouts are required to sight and report all objects (e.g., trash, periscope) or disturbances (e.g., surface disturbance, discoloration) found in the water. Because the safety of the ship is dependent on the eyes of these lookouts, the chances are greater that a lookout will spot something: a faint wisp of smoke on the horizon may be the first indication of an approaching enemy surface unit or a single flash of sunlight on a wingtip may be the only notice of approaching enemy aircraft that can attack at a speed of 500 yards per second. Failure to see and report a

mere pinpoint of light on the horizon jeopardizes the safety of the crew and means disciplinary action if they do not report everything they see or hear.

- Lookouts operate at stations, scan for, and report all marine sightings prior to activating MFAS. Lookout watches established on ships survey the waters surface to the horizon. Their assigned areas have a 10-degree overlap, so no area will go unsearched. (Figure 2 Lookout/Watchstander Sectors Assigned). A special watch, called the low visibility lookout, is stationed as far forward in the ship as possible during fog or other conditions of poor visibility. The low visibility lookout watch consists of two people. One person wears sound powered (S/P) phones for communication with the bridge and the other looks and listens. Sounds at night are often heard without seeing their source and it might be possible to determine the bearing of the sound and, sometimes, an estimate of its distance. Conversely, when in a fog, sound sources are difficult to determine because the sound may seem to come from several different directions.

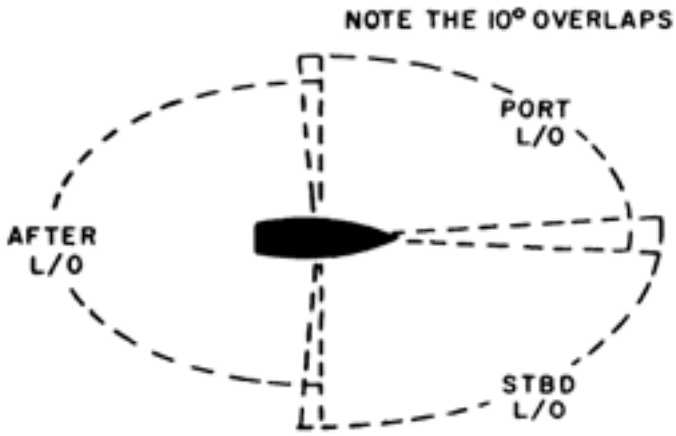

Figure 2 Lookout/Watchstander Sectors Assigned

The normal peacetime watch organization has three people in each watch section whose duties include observing the water surface around the vessel, with two specifically dedicated during ASW training observing the water for marine mammals. Personnel located on the bridge or atop the pilothouse whose duties include observing water also aid in marine mammal detection. In addition to surface ship lookouts, a majority of training exercises involve at least one aerial asset with crews specifically training to hone their detection of objects in the water. Surface and aerial platforms provide good survey capabilities using the Navy's existing exercise assets/personnel because they are faster and more efficient at scanning for and detecting objects in the water than inexperienced non-navy individuals. Sonar operators, lookouts, and the bridge team ensure quick and effective communication within the command structure resulting in facilitated implementation of mitigation measures if marine mammals are spotted.

The Navy also uses the above-described training and monitoring capabilities in conjunction with their "Mitigation Measures related to Vessel Transit and North Atlantic Right Whales". Protective Measures have been in place in the southeast since 1997. In 2002, NARW protective measures were promulgated for all United States Fleet Forces (USFF) activities occurring in the northeast region. In December 2004, the Navy issued further guidance for all USFF ships to increase awareness of North Atlantic right whale migratory patterns and implement additional protective measures along the mid-Atlantic coast. The Navy coordinated with NMFS for identification of seasonal right whale occurrence patterns in six major sections of the mid-Atlantic coast, with particular attention to port and coastal areas of key interest for vessel traffic management. The Navy's resulting guidance is included in the protective measures that the Navy put forth as part of their proposed action here and is designed to avoid vessel strikes of NARWs and other marine mammals.

The Navy also includes a suite of measures specifically applicable to TORPEX exercises conducted in the northern NARW critical habitat.

4.1.1 Benefit to Marine Mammals / Effectiveness of Measure

The shutdown/safety zone/exclusion zone measures, as well as the mitigation measures related to vessel transit and TORPEXs, that the Navy has proposed will enable the Navy to avoid injuring or killing any marine mammals and will enable them to minimize the numbers of marine mammals exposed to received sound levels associated with TTS. As described in Section 1.3, this would accomplish purpose (a) and, also, purposes (b), (c), and (d) as they relate to TTS takes. The following subsections provide the rationale for NMFS assessment that these measures will benefit marine mammals and be practicable for the Navy to implement.

MFAS/HFAS

The Navy's standard protective measures indicate that they will ensure powerdown of MFAS/HFAS by 6 dB when a marine mammal is detected within 1000 yd (914 m), powerdown of 4 more dB (or 10 dB total) when a marine mammal is detected within 500 yd (457 m), and will cease MFAS/HFAS transmissions when a marine mammal is detected within 200 yd (183 m).

PTS/Injury – NMFS' assessment indicates that the proposed mitigation measures will allow the Navy to avoid exposing marine mammals to received levels of MFAS/HFAS sound that would result in injury for the following reasons:

- The estimated distance from the most powerful source at which cetaceans and all pinnipeds except harbor seals would receive a level of 215 dB SEL (threshold for PTS/injury/Level A Harassment) is approximately 10 m (10.9 yd). The PTS threshold for harbor seals is 203 dB SEL, which has an associated distance of approximately 40 m.
- NMFS believes that the probability that a marine mammal would approach within the above distances of the sonar dome (to the sides or below) without being seen by the watchstanders (who would then activate a shutdown if the animal was within 200 yd

(183 m) is very low, especially considering that animals would likely avoid approaching a source transmitting at that level at that distance.

- The model predicted that some animals (124 instances annually) would be exposed to levels associated with injury, however, the model does not take into account the potential reduction of take associated with the mitigation measures or the likely avoidance behaviors and NMFS has determined that injury is unlikely when those factors are considered.

TTS – NMFS' assessment indicates that the proposed mitigation measures will allow the Navy to minimize exposure of marine mammals to received levels of MFAS/HFAS sound associated with TTS for the following reasons:

- The estimated range of maximum distances from the most powerful source at which an animal would receive 195 dB SEL (the TTS threshold) is approximately 275-500 m from the source in most operating environments (except for harbor seals for which the distance is approximately 830 m
- Based on the size of the animals, average group size, behavior, and average dive time, NMFS believes that the probability that Navy watchstanders will visually detect mysticetes or sperm whales, dolphins, social pelagic species (pilot whales, melon-headed whales, etc.) at some point within the 1000 yd (914 km) safety zone before they are exposed to the TTS threshold levels is high, which means that the Navy would be able to shutdown or powerdown to avoid exposing these species to sound levels associated with TTS.
- However, seals and more cryptic (animals that are difficult to detect and observe), deep-diving cetaceans (beaked whales and Kogia spp.) are less likely to be visually detected and could potentially be exposed to levels of MFAS/HFAS expected to cause TTS (see the Threshold Shift section of the AFAST proposed rule - TTS can have effects on marine mammals ranging from discountable to serious, however, serious effects would be expected in conjunction with TTS of a longer duration and larger amount, which is not expected to occur because of the 2 sets of bullets above). Animals at depth in one location would not be expected to be continuously exposed to repeated sonar signals, though, given the typical 5-10+ knot speed of Navy surface ships during ASW events. During a typical one-hour subsurface dive by a beaked whale, the ship while have moved over 5 to 10 nm from the original location.
- Additionally, the Navy's bow-riding mitigation exception for dolphins may sometimes allow dolphins to be exposed to levels of MFAS/HFAS likely to result in TTS. However, there are combinations of factors that reduce the acoustic energy received by dolphins approaching ships to ride in bow waves. Dolphins riding ship's bow wave are outside of the main beam of the MFAS vertical beam pattern. Source levels drop quickly outside of the main beam. Sidelobes of the radiate beam pattern that point to the surface are significantly lower in power. Together with spherical spreading losses, received levels in the ship's bow wave can be more than 42 dB less than typical source level (i.e., 235 dB- 42 dB = 193 dB). Finally, bow wave riding dolphins are frequently in and out of a bubble layer generated by the breaking bow waves. This bubble layer is an excellent scatterer of acoustic energy and can further reduce received energy.

IEER

The Navy utilizes a 1000-yd exclusion zone (wherein explosive detonation will not occur if animals are within the zone) for the IEER and they begin observations at least 30 minutes before any detonations. Based on the explosive criteria, a marine mammal would need to be within 24-78 m of the explosive sonobuoy detonation to be exposed to levels that could cause death, within 79-179 m to be exposed to levels that could cause injury, and within 209 – 348 m to be exposed to levels that could result in TTS (the maximum range varies with acoustic propagation environment).

Mortality and Injury – Though the model predicted that 3 animals annually could be exposed to levels that would result in PTS (0 for mortality), NMFS believes that the mitigation measures will allow the Navy to avoid exposing marine mammals to underwater detonations from IEER that would result in injury or mortality for the following reasons:

- Surveillance begins 30 minutes before the exercise and extends 1000 yd from the charges.
- Animals would need to approach within less than approximately 24-78 m of the source unnoticed to be exposed to the mortality threshold (we note here that this threshold is conservatively based on the exposure of a dolphin calf – most marine mammals are much larger and effects to these larger animals would likely be less severe). Additionally, the model predicted no exposures to levels associated with mortality.
- Animals would need to approach within less than 79 - 179 m of the sonobuoy to be injured
- Unlike for sonar, an animal would need to be present at the exact moment of the explosion(s).

TTS - NMFS believes that the proposed mitigation measures will allow the Navy to minimize the exposure of marine mammals to underwater detonations that would result in TTS for the following reasons:

- 31 animals were predicted to be exposed to explosive levels that would result in TTS, however, for the same reasons as above (i.e., surveillance and close approach to source), NMFS believes that most modeled TTS takes can be avoided, especially dolphins, mysticetes and sperm whales, and social pelagic species.
- However, more cryptic, deep-diving species (beaked whales and Kogia sp.) are less likely to be visually detected and could potentially be exposed to explosive levels expected to cause TTS

Vessel Transit Measures

As described in Chapter 2, in addition to the standard operating procedures to reduce the likelihood of collisions, which include: (1) use of lookouts trained to detect all objects on the

surface of the water (including marine mammals); (2) reasonable and prudent actions to avoid the close interactions of Navy assets and marine mammals; and (3) maneuvering to keep away from any observed marine mammal, the Navy has issued extensive North Atlantic right whale protective measures for all Fleet Forces training activities. These measures, which were developed with input from NMFS, include additional training requirements, designated areas of caution (where caution includes speed or direction adjustments and avoidance of known groups of right whales when feasible) and additional reporting requirements and systems. NMFS and the Navy believe that, when considered in combination with the low density of NARWs in the area, the relatively low density of Navy ships in the area, and the small number of activities planned for the NARW critical habitat, the required measures will allow the Navy to avoid colliding with large whales during their specified activities. The Navy neither requested, nor did NMFS grant, authorization for take of right whales from ship strikes incidental to the specified activities.

TORPEX Measures

The Navy included protective measures for TORPEX that are virtually identical to measures developed during prior section 7 consultations that resulted in a "not likely to adversely affect" finding for right whales, which suggests that these measures are notably reducing the adverse effects to right whales in the associated time and place.

4.1.2 *Practicability of the Measures*

The Navy currently utilizes the measures described in the No Action Alternative and has indicated that they are practicable. Therefore, NMFS has determined that these measures are practicable.

4.2 **Alternative 1 (NMFS Preferred Alternative)**

Alternative 1 includes the measures described and analyzed for the No Action alternative, plus the PAAs, the Helicopter Dipping sonar and Object Detection minimization measures, and the Stranding Response Plan. The environmental consequences of Alternative 1, with the exception of the measures discussed below, were described in section 4.1 and are equally applicable to this alternative.

4.2.1 Planning Awareness Areas

Based on extensive discussions with NMFS, the Navy has designated several Planning Awareness Areas (PAAs) (attached) based on areas of high productivity that have been correlated with high concentrations of marine mammals (such as persistent oceanographic features like upwellings associated with the Gulf Stream front where it is deflected off the east coast near the Outer Banks), and areas of steep bathymetric contours that are frequented by deep diving marine mammals such as beaked whales and sperm whales. These Planning Awareness Areas are a subset of the areas that were considered for avoidance in the Navy FEIS alternatives.

4.2.1.1 *Benefit to Marine Mammals / Effectiveness of Measure*

The incorporation of the Navy's proposed PAAs into their planning process along with the plan not to conduct more than 4 major exercises within these areas should ultimately result in a reduction in the number of marine mammals exposed to MFAS/ HFAS (because these PAAs are anticipated to have higher densities of animals), a reduction in the number of animals exposed while engaged in feeding behaviors (because these areas are particularly productive and because of the known concentrations of mysticetes likely to feed in the NE in the vicinity of the PAA), a reduction in the number of sperm whales exposed while engaged in important calving and nursing behaviors off the Mississippi Delta, and an increased awareness of their potential presence when conducting activities in those important areas. This measure should accomplish mitigation goals b, c, and d.

4.2.1.2 *Practicability of the Measure*

The Navy has indicated that the PAAs are practicable, therefore, NMFS has determined that these measures are practicable.

4.2.2 Helicopter Dipping Sonar

4.2.2.1 *Benefit to Marine Mammals / Effectiveness of Measure*

The Navy's plan to minimize helicopter dipping sonar activities within the NARW critical habitat during the time when the most calves and mothers are present should result in the minimization of exposure of cow/calf pairs to MFAS/HFAS (mitigation goals b, c, and d). Additionally, the Navy has already planned only limited activities in the NARW critical habitat. The Navy anticipates conducting approximately 30 helicopter dipping sonar maintenance events (< 1 hr) annually in the NARW critical habitat (and approximately 84 helicopter training exercises in the vicinity of the critical habitat but in deeper waters at least more than 5 nm seaward of the critical habitat boundaries). This means that only a subset of those 30 activities will occur in the critical habitat between Nov 15 and April 15 (approximately 13 if one assumes they are distributed equally throughout the year, for example) and only a subset of the 84 helicopter training exercises would occur near the critical habitat between Nov 15 and April 15 (approximately 34 if one assumes they are distributed equally throughout the year, for example). Note that the source level of a helicopter dipping sonar is approximately 18 dB less than that of a surface vessel sonar source, which means that the ensonified area is on the order of 65 times less (if spherical spreading is assumed).

4.2.2.2 Practicability of the Measure

The Navy has indicated that the Helicopter Dipping sonar minimization measure is practicable, therefore, NMFS has determined that this measures is practicable.

4.2.3 Object Detection Exercises

4.2.3.1 *Benefit to Marine Mammals / Effectiveness of Measure*

The Navy's plan to minimize object detection activities within the NARW critical habitat during the time when the most calves and mothers are present should result in the minimization of exposure of cow/calf pairs to MFAS/HFAS (mitigation goals b, c, and d). Additionally, the Navy has already planned limited activities in the NARW critical habitat. The Navy would conduct approximately 40 ship object detection exercises (1-2 hours each) and 57 submarine object detection exercises (1-2 hours each) annually while entering/exiting port (within approximately 1 mile of shore). This means that only a subset of those activities will occur between Nov 15 and April 15, approximately 41 if one assumes they are distributed equally throughout the year, for example.

4.2.3.2 Practicability of the Measure

The Navy has indicated that the Object Detection minimization measures are practicable, therefore, NMFS has determined that these measures are practicable.

4.2.4 AFAST Stranding Response Plan

4.2.4.1 *Benefit to Marine Mammals / Effectiveness of Measure*

When marine mammals are in a situation that can be defined as a *stranding* (see glossary in Stranding Response Plan), they are experiencing physiological stress. When animals are stranded, and alive, exposing these compromised animals to additional known stressors would likely exacerbate the animal's distress and could potentially cause its death. Regardless of the factor(s) that may have initially contributed to the stranding, it is NMFS' goal to avoid exposing these animals to further stressors. Therefore, when live stranded cetaceans are in the water and engaged in what is classified as an *Uncommon Stranding Event* (USE) (see Stranding Response Plan glossary), the shutdown component (within 14 and 17 nm, for East Coast and Gulf of Mexico respectively, of the animal) of this plan will minimize the exposure of those animals to MFAS/HFAS and explosive detonations, regardless of whether or not these activities may have initially played a role in the event. This measure will contribute to goals (a) and (d) of the mitigation as described in Section 1.3 of this Mitigation EA.

The Stranding Response Plan includes components more relevant to monitoring measures, but which also provide information that can be used to further benefit marine mammals. The plan will enhance the understanding of how MFAS or explosive detonations (as well as other environmental conditions) may, or may not, be associated with marine mammal injury or strandings. Information gained from the investigations associated with the Stranding Response Plan may be used in the adaptive management of mitigation or monitoring measures in subsequent LOAs, if appropriate. Finally, the information gathered pursuant to this protocol will inform NMFS' decisions regarding the Navy's compliance with Sections 101(a) (5) (B and C) of the MMPA.

4.2.4.2 *Practicability of the Measure*

The Navy has indicated that the measures contained in the Stranding Response Plan are practicable, therefore, NMFS has determined that these measures are practicable.

4.3 **Alternative 2**

Alternative 2 includes the measures described and analyzed for Alternative 1, plus all or some subset of the measures analyzed below. The environmental consequences of Alternative 1, with the exception of the measures discussed below, were described in section 4.2 and are equally applicable to this alternative**.**

4.3.1 Seasonal and/or Geographic Limitations

4.3.1.1 *Benefit to Marine Mammals / Effectiveness of Measure*

Seasonal or Geographic Limitations are one of the most direct and effective means of reducing adverse impacts to marine mammals. By reducing the overlap in time and space of the known concentrations of marine mammals and the acoustic footprint associated with the thresholds for the different types of take (either at all times and places where animals are concentrated, or times and places where they are concentrated for specifically important behaviors (such as reproduction or feeding)), the amount of take can be reduced. Variations of these types of measures can meet mitigation goals (a-d).

It is important, however, that these measures are used carefully at times and places where their effects are relatively well known. For example, if there is credible evidence that concentrations of marine mammals are known to be high at a specific place or during a specific time of the year (such as the high densities of humpback whales in the main Hawaiian Islands, or North Atlantic right whale critical habitat on the east coast), then these types of blanket seasonal or geographic exclusions or limitations may be appropriate. However, if marine mammals are known to *prefer* certain *types* of areas (as opposed to specific areas) for certain functions (such as beaked whales use of seamounts or marine mammal use of productive areas like fronts), which means that they may or may not be present at any specific time, it is less effective to require avoidance or limited use of the area all of the time.

As mentioned earlier, the Navy's action and alternatives in the FEIS are based on geographical and seasonal exclusions and the FEIS clearly describes the potential benefits of utilizing (by exclusion, or inclusion) the areas that the Navy designated in their Alternatives 1-3 based on marine mammal densities, bathymetry, oceanographic features, etc.

Some members of the public recommended that NMFS require that the Navy not only avoid conducting any activities in the southern NARW critical habitat (from Nov 15 – April 15), but avoid conducting activities 30 nm offshore of Georgia and Florida, where right whales are known to occur seasonally. Avoiding activities in the NARW critical habitat would provide a benefit to right whales. However, as discussed in section 4.2 above, the Navy is already conducting limited activities in NARW critical habitat with an additional 5 nm buffer beyond the eastern edge. Total avoidance of activities in critical habitat would not meet the Navy's or NMFS' purpose and need.

4.3.1.2 *Practicability of the Measure*

Generally speaking, and specifically discussed in section 2.7 of the Final EIS, the Navy has informed NMFS that they need to have the flexibility to operate at any time or place to meet their training needs pursuant to Title 10. The Navy needs to be able to train in the largest variety of physical (bathymetry, etc.), environmental, and operational (within vicinity of different assets, such as airfields, instrumented ranges, homeports, etc.) parameters in order to be properly prepared. Additionally, Navy training, planning and implementation needs to be adaptable in order to accommodate the need of the Navy to respond to world events and the ever-changing strategic focus of the U.S. In some cases, the Navy has been able to commit to considering certain areas that are important to marine mammals in their planning process, or limiting MFAS use in certain ways in certain areas, but has always expressed a need to maintain the flexibility to train in an area if necessary for national security, and any measures imposed by NMFS need to account for this reality.

Aside from the general reasons of impracticability cited above, below are some of the specific reasons that certain specific types of seasonal and geographic restrictions or limitations are impracticable for the Navy.

Coastal restrictions (such as 25 nm from 200-m isobath) - Littoral waterspace is where potential enemies will operate. The littoral waterspace is also the most challenging area to operate due to a diverse acoustic environment. In real world situations, it is highly likely the Navy would be working in these types of areas. It is not realistic to refrain from training in the areas that are the most challenging and operationally important. Areas where AFAST events are scheduled to occur are carefully chosen to provide for the safety of events and to allow for the realistic development of the training scenario including the ability of the exercise participants to develop, maintain, and demonstrate proficiency in all areas of warfare simultaneously. Limiting the training event to a few areas would have an adverse impact on the effectiveness of the training by limiting the ability to conduct other critical warfare areas including, but not limited to, the ability of the Strike Group to defend itself from threats on the surface and in the air while carrying out air strikes and/or amphibious assaults. In those locations where amphibious landing events occur, coastal restrictions would decouple ASW training and Amphibious training, which are critically important to be conducted together due to the high risk to forces during actual Amphibious operations. Furthermore, major exercises using integrated warfare components require large areas of the littorals and open ocean for realistic and safe training.

Sea Mounts and Canyons- Submarine tracking is a long and complicated tactical procedure. Seamounts are often used by submarines to hide or mask their presence, requiring the need to train in this complex ocean environment. This is precisely the type of area needed by the Navy to train. Sea mounts and canyons impact the way sound travels in water as well as the Navy's ability to search and track submarines. If the Navy does not train near sea mounts and canyons and understand how these features affect their ability to search and track a submarine, they will be unable to do so when faced with an actual threat. Exercise locations are carefully chosen based on training requirements and the ability of ships, aircraft, and submarines to operate safely. Given the strategic training needs, restricting active sonar operation around

seamounts and canyons in the AFAST study area is not practicable. This discussion considers the impracticability of avoiding all seamounts and canyons. While it may be somewhat less impracticable to avoid a subset of specific seamounts or canyons, marine mammal use of these areas is ephemeral and varies based on many changing factors, which would make it difficult to justify requiring the avoidance of any particular features since doing so may or may not benefit marine mammals at any particular time.

Fronts and other Major Oceanographic Features – NMFS has determined that the impracticability to the Navy of avoiding these features outweighs the potential conservation gain. Though many species may congregate near fronts and other major oceanographic features, these areas may be both large and transitory, and, so restricting access to these features to avoid animals that *may* congregate in a small subset of the total areas is not practicable. Additionally, limiting sonar use in the vicinity of these types of features would disrupt training for the reasons described above for sea mounts and canyons.

Since the EIS alternatives are geographically and seasonally-based, the Navy rationale for preferring the No Action alternative warrants discussion as part of the practicability analysis of seasonal and geographic mitigation measures.. Specifically, regarding the alternatives considered in the FEIS, through careful consideration of the data developed in the EIS, and the necessity to conduct realistic ASW training today and in the future, the Navy EIS identifes the No Action Alternative as the operationally preferred alternative. As described in the EIS, the world today is a rapidly changing and extremely complex place. This is especially true in the arena of ASW and the scientific advances in submarine quieting technology. Not only is this technology rapidly improving, the availability of these quiet submarines has also significantly increased. Since these submarines typically operate in coastal regions, which are the most difficult acoustically to conduct ASW, the Navy needs to ensure it has the ability to train in areas that are environmentally similar to where these submarines currently operate, as well as areas that may arise in the future. Limiting where naval forces can train will eliminate this critical option of training flexibility to respond to future crises. Not only would EIS Alternatives 1 and 2 severely limit the ability to train in areas similar to where potential threats operate, it would require the relocation of approximately 30 percent of Navy‘s current training. Furthermore, independent of the geographic limitations that would be imposed by EIS Alternative 3; there is not a statistically significant difference in the analytical results (number of exposures) between EIS Alternative 3 and the EIS No Action Alternative. Because the difference in the acoustic effects analysis between Alternative 3 and the No Action Alternative is statistically insignificant, and the importance of the geographic flexibility required to conduct realistic training, the No Action Alternative is the Navy’s operationally preferred option. Given that, NMFS worked with Navy to address how seasonal and geographic considerations might be considered as mitigation versus a full EIS alternative, resulting in this Mitigation EA’s Alternative 1 analysis of PAAs and this Alternative 2 consideration of additional seasonal and geographic issues.

4.3.2 Use of Additional Detection Methods to Implement Mitigation (Shutdown Zones)

4.3.2.1 *Benefit to Marine Mammals / Effectiveness of Measure*

Lookouts stationed on surface vessels are currently the primary component of the Navy’s marine mammal detection capabilities, with some opportunistic assistance from aerial or passive acoustic platforms when such assets are participating in a given exercise. NMFS recognizes the

weaknesses inherent in using vessel-based visual observers to detect marine mammals (especially cryptic and deep-diving species like beaked whales, which are not at the surface often and are difficult to see when they are) (Barlow et al., 2002). The use of additional detection methods, such as those listed in chapter 2, for the implementation of mitigation would further minimize the take of marine mammals (through mitigation goal (e), Section 1.3). Specifically, passive and active acoustic methods could detect animals that were below the surface (for passive acoustic detection, the animals would have to be vocalizing to be detected, but for active acoustic detection they would not – the HFM3 system utilized by LFA sonar vessels effectively detects marine mammals to within 1 km of the sonar source). Additionally, the use of more specialized passive acoustic detection methods could increase the practicability of species-specific measures (such as powering or shutting down when beaked whale aggregations are nearby). Some benefits of specific methods are included in the section below.

In order for additional marine mammal detection methods to assist in the implementation of mitigation (shutdown and powerdown), they must be able to localize, or identify where the marine mammal is in relation to the sound source of concern (since shutdown and powerdown mitigation is triggered by the distance from the sound source), and transmit the applicable data to the commanding officer in real time (i.e., quickly so that the sonar source can be turned down or shut off right away or the explosive detonation can be delayed). Techniques based on the realtime participation of additional observers (such as additional aerial platforms) can achieve this, while many passive acoustic methods cannot. The section below contains information provided by the Navy that speaks both to the practicality of implementation of some methods as well as the effectiveness.

4.3.2.2 *Practicability of the Measure*

The assessments below are based largely on additional information provided by the Navy in response to inquiries from NMFS regarding practicability, which, under the MMPA is to be determined by NMFS after consultation with the Navy.

Radars - While Navy radars are used to detect objects at or near the water surface, radars are not specifically designed to search for and identify marine mammals. For example, when an object is detected by radar, the operators cannot definitively discern that it is a whale. During a demonstration project at Pacific Missile Range Facility (PMRF) in Hawaii, radar systems were only capable of detecting whales under very controlled circumstances and when these whales were already visually spotted by lookouts/watchstanders. Enhancing radar systems to detect marine mammals requires additional resources to schedule, plan and execute Navy limited objective experiments (LOEs) and RDT&E events. The Navy is currently reviewing opportunities to pursue enhancing radar systems and other developmental methods such as laser detection and ranging technology as potential mitigation for detecting marine mammals. Until funding resources and the data are available to develop enhanced systems, it is not known whether it will be technically feasible in the future to implement radar as an additional detection method.

Additional Platforms (aerial, UAV, Gliders, and Other) - The number of aerial and unmanned aerial vehicle (UAV) systems currently integrated into fleet training is extremely low and their

availability for use in most training events is rare; therefore, shifting their use and focus from hunting submarines to locating marine mammals would be costly and negatively impact the training objectives related to these systems. If additional platforms are civilian, scheduling civilian vessels or aircraft to coincide with training events would affect training effectiveness since exercise events or timetables are not fixed and are based on a free flow development of tactical situations. Waiting for civilian aircraft or vessels to complete surveys, refuel, or be on station would slow the required progress of the training exercise. In addition, the precise location data and exercise plans provided to non-Navy assets poses logistical challenges and classification or security issues. While the Navy is currently reviewing options for additional detection methods, these additional platforms proved to be impracticable for the following reasons:

- Additional Aerial Survey Detection: Airborne assets already monitor for the presence of marine mammals with no reported incidents where marine mammals were overlooked during an exercise or where aerial assets were unable to perform their duties while watching for marine mammals; therefore, the allocation of additional airborne assets is not well justified. In addition, the presence of additional aircraft (not involved in the exercise) near naval exercises would present safety concerns for both commercial and naval observers because ASW training exercises are dynamic, can last several hours or days, and cover large areas of ocean several miles from land.
- UAV Detection: Currently and in the foreseeable five-year period of the requested authorization, these assets are extremely limited and are rarely if ever available, therefore impractical and expensive.
- Gliders Detection: Gliders are not currently capable of providing real time data, and therefore, are not an effective detection method for use in mitigation implementation.

Active Sonar - As previously noted, the Navy is actively engaged in acoustic monitoring research involving a variety of methodologies; however, none of the methodologies have been developed to the point where they could be used as a mitigation tool for MFAS. At this time, the active sonar and adjunct systems listed in Chapter 2 proved to be impracticable for the following reasons:

- Use of multiple systems (meaning the MFAS used for the exercise plus any additional active system used for marine mammal detection) operating simultaneously increases the likelihood that a submarine may be detected under conditions where it is attempting to mask its presence before activating sonar, resulting in an impact to the effectiveness of the military readiness activity. Additionally, interference may occur when certain active sonar systems (such as HFM3) are activated concurrently with MFAS.
- HFM3 is an adjunct system used by LFA because the hulls of those platforms can be modified and travel can occur at slow speeds. Of note, LFA systems and associated HFM3 are also not currently proposed for use in the AFAST study area. MFAS combatants are not equipped with HFM3 systems and it is impractical to install such a system on MFAS combatants.

The Navy will continue to coordinate acoustic monitoring and detection research specific to the proposed use of active sonar. As technology and methodologies become available, their applicability and viability will be evaluated for potential future incorporation.

Additional Passive Acoustic Monitoring - To provide a specialized localization capability (distance, direction, etc.), most of the systems mentioned in Chapter 2 (Sonobuoys, SQQ89, Bottom-Mounted Sensors) require significant modifications. The Navy is working to develop or enhance systems with distance measuring capabilities. Until these capabilities are available, exercise participants can use these systems to aid in marine mammal detection, but not solely to implement mitigation measures. Although passive contact on marine mammals only indicates the presence, not the range (distance and direction), the information on any passive acoustic detections is disseminated real time to allow lookouts to focus their visual search for marine mammals.

The Navy is improving the capabilities to use range instrumentation to aid in the passive acoustic detection of marine mammals. There is currently no instrumented range on the east coast of the U.S.

Infrared technology – As a complement to existing methods, use of the Infrared (IR) band for marine mammal detection and location has some obvious benefits if proved viable, including the ability to operate infrared at night, as well as the ability to establish automated detections procedures which might well reduce the factor of human fatigue that affects observer-based methods. The Navy has committed to a program of research, development, and testing of IR-based technologies for detection of marine mammals in the wild.

The Navy program will have two main thrusts. Naval Air Systems Command (NAVAIR) will continue to pursue operational tests of their airborne monitoring and mitigation program for marine species using net-centric Intelligence, Surveillance, and Reconnaissance (ISR) systems. The proposed system uses a radar detect and track cueing sensor for a turreted airborne Electro-Optic/Infrared/Multi-spectral imaging sensor. If fully funded for prototyping and demonstration, this program would evaluate the efficacy for marine mammal detection of a large, high-powered system designed, tested, and deployed for other purposes, and operates beyond the domain of research Science and Technology.

At the same time, the Office of Naval Research (ONR) will take the lead in pursuing a longer-range, research S&T program to evaluate new concepts for IR detection that may ultimately lead to an operationally viable technique(s). The focus of the ONR effort will be on comparatively small, low-power systems that might be deployable on small, robot aircraft known as Unmanned Aerial Vehicles (UAVs) as well as operating in a ship-based mode. Either option might allow the inclusion of standard video for confirmation of mammal detections during the day. The UAV option might allow for multiple passages of an area of interest at low altitude to confirm mammal detections and identification.

ONR will continue to support this effort for at least several years, with the potential for sustained support, though the future breadth of this program will depend on the outcome of early efforts. The system is not considered practicable to require for implementation at this time.

4.3.3 Use of Dedicated or Independent Marine Mammal Observers (MMOs) to Implement Mitigation

4.3.3.1 *Benefit to Marine Mammals / Effectiveness of Measure*

As discussed in Section 4.2 of this Mitigation EA, Navy lookouts are specifically trained to detect anything (living or inanimate) that is in the vicinity of, visible from, or approaching the vessel. The safety of the personnel on board and of the vessel depends on their performance. While they receive training that is intended to expose them to the different species of marine mammals they might see and the behaviors they might potentially observe, they would certainly not be expected to differentiate between species or identify the significance of a behavior as effectively as an independent MMO. However, identification to species and understanding of marine mammal behavior is not necessary for mitigation implementation – for that, a lookout must simply detect a marine mammal and estimate its distance (e.g., within 1000 yds, 500 yds, or 200 yds) to the vessel. Though dedicated and independent MMOs are critical to implement a Monitoring Plan, lookouts performing their normal duties would likely be no less effective at detecting marine mammals for mitigation implementation than an MMO.

However, NMFS has recommended, and the Navy has included in their Monitoring Plan a study that compares the effectiveness of Navy lookouts, versus MMOs, at detecting marine mammals to implement mitigation measures. In the meantime, NMFS has not identified important protective value to be gained by utilizing independent MMOs instead of Navy lookouts to implement the mitigation measure.

4.3.3.2 *Practicability of the Measure*

Following are several reasons that the Navy presented for why using third-party observers from air or surface platforms, in addition to or instead of the existing Navy-trained lookouts is not practicable.

- The use of third-party observers could compromise security due to the requirement to provide advance notification of specific times/locations of Navy platforms.
- Reliance on the availability of third-party personnel would also impact training flexibility, thus adversely affecting training effectiveness. The presence of other aircraft in the vicinity of naval exercises would raise safety concerns for both the commercial observers and naval aircraft.
- Use of Navy observers is the most effective means to ensure quick and effective implementation of mitigation measures if marine species are spotted. A critical skill set of effective Navy training is communication. Navy lookouts are trained to act swiftly and decisively to ensure that appropriate actions are taken.
- Security clearance issues would have to be overcome to allow non-Navy observers onboard exercise platforms.
- Some training events will span one or more 24-hour period(s), with operations underway continuously in that timeframe. It is not feasible to maintain non-Navy

surveillance of these operations, given the number of non-Navy observers that would be required onboard.

- Surface ships with active mid-frequency sonar have limited berthing capacity. Exercise planning includes careful consideration of this limited capacity in the placement of exercise controllers, data collection personnel, and Afloat Training Group personnel on ships involved in the exercise. Inclusion of non-Navy observers onboard these ships would require that in some cases there would be no additional berthing space for essential Navy personnel required to fully evaluate and efficiently use the training opportunity to accomplish the exercise objectives.
- Aerial surveying during an event raises safety issues with multiple, slow civilian aircraft operating in the same airspace as military aircraft engaged in combat training activities. In addition, most of the training events take place far from land, limiting both the time available for civilian aircraft to be in the exercise area and presenting a concern should aircraft mechanical problems arise.
- Scheduling civilian vessels or aircraft to coincide with training events would impact training effectiveness, since exercise event timetables cannot be precisely fixed and are instead based on the free-flow development of tactical situations. Waiting for civilian aircraft or vessels to complete surveys, refuel, or be on station would slow the progress of the exercise and impact the effectiveness of the military readiness activity.
- Multiple events may occur simultaneously in areas at opposite ends of the AFAST Study Area and continue for up to multiple days at a time. There are not enough qualified third-party personnel to accomplish the monitoring task.

4.3.4 Enlargement or Modification of Powerdown/Shutdown Zones of Hull-mounted Sonar

4.3.4.1 *Benefit to Marine Mammals / Effectiveness of Measure*

As described in section 4.2 of this EA and in the FEIS, the current power down and shut down zones are based on scientific investigations specific to MFA sonar for a representative group of marine mammals. They are based on the source level, frequency, and sound propagation characteristics of MFA sonar. The zones are designed to preclude direct physiological effect from exposure to MFA sonar. Specifically, the current power-downs at 500 yards and 1,000 yards, as well as the 200 yard shut-down, were developed to minimize exposing marine mammals to sound levels that could cause TTS and PTS.. The underlying received levels of sound that were used to determine the appropriate safety zone distances are based on: for TTS - empirical information gathered on the levels at which the onset of noise-induced loss in the hearing sensitivity of captive cetaceans occurs, and; and for PTS – extrapolations from the cetacean TTS data that incorporate TTS growth data from terrestrial animals. NMFS has determined that these measures effectively accomplish this.

Enlargement of the powerdown or shutdown zones would primarily result in the further reduction of the maximum received level that the detected animal might be exposed to (Section 1.3 mitigation goal (d)), which could potentially mean that an animal expected to respond in a

manner NMFS would classify as level B harassment could potentially either respond in a less severe manner or maybe not respond at all. This could be more important at an important time or place or in the presence of species or age-classes of concern (such as beaked whales). NMFS has received varying recommendations regarding the potential size of an expanded powerdown or shutdown zone, including 2 km, 4 km, or the 154 dB isopleth. Regarding potential benefits to marine mammals, Table 9 compares the levels that animals would be exposed to at the different distances and the estimated percentage of exposed animals that would be "taken" based on the risk function used to estimate behavioral harassment.

Distance from source	Area that must be surveyed by lookouts (km^2)	Approximate Estimated Received Level (dB rms) (with 6dB powerdown)	Risk Function - estimated % of exposed animals "taken" given received level (i.e. at edge of indicated zone)	Risk Function - estimated % of exposed animals "taken" with 6 dB powerdown at indicated distance
914 m (1000 yd)	2.6	178 (172)	88-93 %	76-81 %
2000 m	12.6	173 (167)	79-84 %	58-60 %
4000 m	50.2	170 (164)	70-75 %	44-45 %

Table 9. Comparison of safety zones, estimated received level at edge of safety zones - where powerdown or shutdown required, and % of exposed animals taken at that received level based on risk function. Table also indicates the area necessary to survey in order to effectively implent a powerdown/shutdown zone of indicated size.
Gray shading indicates powerdown/shutdown distances recommended by public.

NMFS notes that review of the Navy's post-exercise reports shows lookouts have not reported any observed response of marine mammals at any distance.

Because sounds experience lower propagation loss in a surface duct, the purpose of enlarging the powerdown/shutdown zone during a surface duct would not be to reduce the received levels that an animal is exposed to. Rather, in the case of a surface duct, the purpose of enlarged safety zones would be to ensure that injury can still be avoided and TTS minimized in the presence of a feature that reduces propagation loss, which results in and the received level of sound at the same distance being higher. However, surface ducts have already been factored into the Navy model (through average sound speed profiles) and the estimated distances from the source in which an animal would be exposed to received levels associated with TTS and injury already take surface ducts into account.

4.3.4.2 *Practicability of the Measure*

The outer safety zone the Navy has developed (1000 yd) is also based on a lookout's ability to realistically maintain situational awareness over a large area of the ocean, including the ability to detect marine mammals at that distance during most conditions at sea. Requirements to implement procedures when marine mammals are present well beyond 1,000 yards dictate that lookouts sight marine mammals at distances that, in reality, are not always possible. These increased distances also significantly expand the area that must be monitored to implement these procedures (Column 2 of Table 9). For instance, if a power down zone increases from 1,000 to 4,000 yards, the area that must be monitored increases sixteen-fold. Increases in safety zones are not based in science, provide limited benefit to marine mammals and severely impact realistic ASW training by increasing the number of times that a ship would have to shut down active

sonar, impacting realistic training, and depriving ships of valuable submarine contact time. Commanders participating in training designed for locating, tracking, and attacking a hostile submarine could lose awareness of the tactical situation through increased stopping and starting of MFA sonar leading to significant exercise event disruption. Increased shutdowns could allow a submarine to take advantage of the lapses of active sonar, and position itself for an simulated attack, artificially changing the reality of the training activity. . Given the operational training needs, increasing the size of the safety range is generally impracticable.

4.3.5 Ramp Up of Sonar Source Prior to Full Power Operation

4.3.5.1 *Benefit to Marine Mammals / Effectiveness of Measure*

Based on the evidence that some marine mammals avoid sound sources, such as vessels, seismic sources, or MFAS (Richardson et al., 1995, Southall et al., 2008, and BRS Cruise Report, 2008), the theory behind the ramp-up is that animals would move away from a sound source that was ramped up starting at low energy, which would result in the animals not being suddenly exposed to a more alarming, or potentially injurious sound. Compton et al. (2008) noted that this response has not been empirically demonstrated, that the effectiveness of the measure would likely vary between species and circumstances, and that the effectiveness of the measure should be the focus of further research (i.e., controlled exposure experiments). With seismic surveys, which have relatively large safety zones compared to MFAS (and for which NMFS estimates that injury can occur at greater distances from the source than MFAS), NMFS utilizes ramp-up as a cautious mitigation measure to reduce Level B harassment and help ensure that Level A harassment does not occur. This measure would likely accomplish (at least for some species and in some circumstances) mitigation goals (b-d), but mostly (d) (see Section 1.3).

4.3.5.2 *Practicability of the Measure*

Ramp-up procedures are not a viable alternative for MFA sonar training events as the ramp-up would alert opponents to the participants' presence, thus undermining training realism and effectiveness of the military readiness activity. When a MFA sonar ship turns its sonar on, area submarines are alerted to its presence. A submarine can hear an active sonar transmission farther away than the surface ship can hear the echo of its sonar off the submarine. Ideally, the surface ship will detect the submarine in time to attack the submarine before the submarine can attack one of the ships of the Strike Group (noting of course, that attacks during training events are not actual attacks). If the MFA sonar ship starts out at a low power and gradually ramps up, it will give time for the submarine to take evasive action, hide, or close in for an attack before the MFA sonar is at a high enough power level to detect the submarine. Additionally, using these procedures would not allow the Navy to conduct realistic training, or "train as they fight," thus adversely impacting the effectiveness of the military readiness activity. Therefore, NMFS considers this measure to be impracticable.

4.3.6 Halting of MFAS Use in the Event of a Marine Mammal Injury or Death (and Stranding) until Cause is Determined

4.3.6.1 *Benefit to Marine Mammals / Effectiveness of Measure*

Only in a very small portion of incidents (such as when a ship strikes a whale and personnel realize it immediately) is the cause of marine mammal injury or death immediately known. NMFS almost always includes a measure in an MMPA authorization that requires the authorized entity to cease their action and immediately contact NMFS in cases where their activity is known to have caused the injury or death of a marine mammal. This measure is more responsive to ensuring compliance with the MMPA than to the reduction of effects to any marine mammal.

Halting MFAS use in the event of a marine mammal stranding may have an immediate benefit to marine mammals if animals have stranded and are still in the water and are within a certain distance of a Navy sound source(s) (not to imply that the Navy source would be assumed to have caused the event), i.e., it is physically possible for them to be exposed to received levels of sound that could potentially result in an additional adverse effects. In this case, cessation of sonar could alleviate additional stress to an animal that is already in a compromised physical state.

However, if stranded animals are dead or on the beach, the benefit of a cessation of sonar is less clear as neither dead nor beached animals can benefit from it. Additionally, when animals are dead or on the beach, the Stranding response plan proposed in NMFS' preferred alternative indicates that "NMFS will coordinate internally, with the Navy, and with other agencies and entities with the intent of obtaining aerial survey arrangements. If an aircraft is available, a survey will be conducted within 10 miles (on the shore and in the water) to look for additional animals that meet the USE criteria. NMFS will request that the Navy assist with aerial surveys, as resources are available," to ensure that continuing effects, not visible at the stranding site, are not continuing to occur.

4.3.6.2 *Practicability of the Measure*

Investigations into the causes of stranding events often take months or years and the most probable outcome is that a definitive determination of cause is not made. Despite the fact that the Navy has been conducting thousands of hours of sonar, each, in southern California, around Hawaii, and off the east coast of the U.S. for multiple years, NMFS and the Navy have concluded that only 5 strandings worldwide (and not in the areas mentioned) can be definitively associated with MFAS use. It is impracticable to halt the use of MFAS while the cause of a stranding is determined.

4.3.7 Suspension of MFAS Training at Night, or During Low Visibility or Surface Duct

4.3.7.1 *Benefit to Marine Mammals / Effectiveness of Measure*

The Navy indicates that it is capable of ***effectively monitoring*** a 1000-yd safety zone using night vision goggles and passive acoustic monitoring (infrared cameras are sometimes used as an extra tool for detection, when available, but have not been shown to show a significant enhancement of current capabilities). Night vision goggles are always available to all vessel and aircrews as needed and passive acoustic monitoring is always in use. As mentioned previously, the estimated zone in which TTS may be incurred is within about 140 m of the sound source

(830 m for harbor seals), and the estimated zone for injury is within 10 m of the sonar dome. The powerdown and shutdown zones are at 1000, 500, and 200 yds. The Navy is expected to be able to effectively implement the necessary mitigation measures during nighttime and times of lower visibility.

Because of the limited visibility beyond 1000 m, Navy personnel could potentially detect fewer animals early (outside of the 1000 yds), as they are approaching to within 1000 yd, which could result in a slightly delayed powerdown or shutdown as compared to when operations are conducted in full daylight. However, any such potential delays would be at the outer edge of the safety zone and would not result in an animal being exposed to received sound levels associated with TTS or injury. So, suspension of MFAS during times of lower visibility could slightly reduce the exposures of marine mammals to levels associated with behavioral harassment (goals b-d), but would not reduce the number of marine mammals exposed to sound levels associated with TTS or injury.

Regarding surface ducts, their presence is based on water conditions in the exercise areas, is not uniform, and can change over a period of a few hours as the effects of environmental conditions such as wind, sunlight, cloud cover, and tide changes alter surface duct conditions. Across a typical exercise area, the determination of "significant surfacing ducting" is continually changing, and Navy has determined that this mitigation measure cannot be accurately implemented. Furthermore, surface ducting alone does not necessarily increase the risk of MFA sonar impacts to marine mammals. While surface ducting causes sound to travel farther before losing intensity, simple spherical and cylindrical spreading losses result in a received level of no more than 175 dB rms at approximately 1,100 yards (assuming the nominal source of 235 dB rms), even in significant surface ducting conditions. There is no scientific evidence that this mitigation measure is effective or that it provides additional protection for marine mammals beyond that afforded by an appropriate safety zone.

4.3.7.2 *Practicability of the Measure*

ASW training using MFAS is required year round in all environments, to include nighttime and low visibility conditions or conditions that realistically portray bathymetric features where adversary submarines threats (i.e., extremely quite diesel electric or nuclear powered) can hide and present significant detection challenges. Unlike an aerial dogfight, which is over in minutes or even seconds, ASW is a cat and mouse game that requires large teams of personnel working in shifts around the clock (24-hours) typically over multiple days to complete an ASW scenario. ASW can take a significant amount of time to develop the tactical picture (i.e., understanding of the battle space such as area searched or unsearched, identifying false contacts, and water conditions). Reducing or securing power at night or in low visibility conditions would affect a Commander's ability to develop the tactical picture as well as not provide the needed training realism. If there is an artificial break in the exercise by reducing power or suspending MFAS use, the flow of the exercise is lost and several hours of training will have been wasted. Both lost time and training differently than what would be needed in combat diminish training effectiveness.

MFAS training at night is vital because differences between daytime and nighttime affect the detection capabilities of MFAS systems. Ambient noise levels are higher at night because many species use the nighttime period for foraging and movement. Temperature layers, which affect sound propagation, move up and down in the water column from day to night. Consequently, personnel must train during all hours of the day to ensure they identify and respond to changing environmental conditions. An ASW team trained solely during the day cannot be sent on deployment and be expected to fight at night because they would not identify and respond to the changing conditions.

Finally, as a matter of safety and international law, Navy vessels are required to use all means available in restricted visibility, including MFAS and positioning of additional lookouts, to provide heightened vigilance to avoid collision. The *International Navigation Rules of the Road* considers periods of fog, mist, falling snow, heavy rainstorm, sandstorms, or any similar events as "restricted visibility." In restricted visibility, all mariners, including Navy vessel crews, are required to maintain proper lookout by sight and hearing as well as "by all available means appropriate in the prevailing circumstances and conditions so as to make a full appraisal of the situation and of the risk of collision." Prohibiting or limiting vessels from using sensors like MFAS during periods of restricted visibility violates international navigational rules, increases navigational risk, and jeopardizes the safety of the vessel and crew.

Surface ducting occurs when water conditions (e.g., temperature layers, lack of wave action) result in sound energy emitted at or near the surface to be refracted back up to the surface, then reflected from the surface only to be refracted back up to the surface so that relatively little sound energy penetrates to the depths that otherwise would be expected. This increases active detection ranges in a narrow layer near the surface, but decreases active sonar detection below the thermocline, a phenomenon that submarines have long exploited. Significant surface ducts are conditions under which ASW training must occur to ensure Sailors learn to identify these conditions, how they alter the abilities of MFA sonar systems, and how to deal with the resulting effects on MFA sonar capabilities. To be effective, the complexity of ASW requires the most realistic training possible. Reducing power in significant surface ducting conditions undermines training realism, and is, therefore, impracticable.

4.3.8 Avoidance of Federal National Marine Santuaries including Stellwagen Bank, Monitor, Gray's Reef, Flower Garden Banks, and Florida Keys National Marine Sanctuaries

4.3.8.1 *Benefit to Marine Mammals / Effectiveness of Measure*

Pursuant to the MMPA, NMFS makes decisions regarding required mitigation based on biological information pertaining to the potential impacts of an activity on marine mammals and their habitat (and the practicability of the measure), not management designations intended for the broad protection of various other marine resources. However, when areas important to marine mammals are contained within National Marine Sanctuaries (such as the mysticete feeding areas within Stellwagen Banks NMS), avoidance of the areas can certainly benefit marine mammals.

The AFAST EIS considers national marine sanctuaries within and near the AFAST Study Area. All of NMFS alternatives include measures intended to limit the take of marine mammals throughout the AFAST Study Area (see 2.1, 2.2., and 2.3), which would include Federal or state designated marine protected areas or other ecologically critical areas (National Estuarine Research Reserves, etc.). Additionally, although it is not listed as a mitigation measure, the U.S. Navy does not plan to conduct active sonar activities within the Stellwagen Bank, Monitor, Gray's Reef, Flower Garden Banks, and Florida Keys National Marine Sanctuaries and will avoid these sanctuaries by observing a 5 km (2.7 NM) buffer. As described in the EIS, at all times, the Navy will conduct AFAST activities in a manner that avoids to the maximum extent practicable any adverse impacts on sanctuary resources. In the event the Navy determines AFAST activities, due to operational requirements, are likely to destroy, cause the loss of, or injure any sanctuary resource (for Stellwagen Bank National Marine Sanctuary, the threshold is ―may destroy, cause the loss of, or injure), the Navy would first consult with the Director, Office of National Marine Sanctuaries in accordance with 16 U.S.C. 1434(d).

4.3.8.2 *Practicability of the Measure*

The Navy has included plans to avoid conducting active sonar training in the Sanctuaries in their preferred alternative, which indicates that it is practicable and is part of the description of the action provided in the EIS.

4.3.9 Delayed Restart of MFAS after Shutdown or Powerdown

4.3.9.1 *Benefit to Marine Mammals / Effectiveness of Measure*

NMFS' asssement indicates that expanding the delay (until sonar can be restarted after a shutdown due to a marine mammal sighting) from 30 to 60 minutes for deep-diving species adds minimal protective value for the following reasons:

- The ability of an animal to dive longer than 30 minutes does not mean that it will always do so. Therefore, the 60 minute delay would only potentially add value in instances when animals had remained under water for more than 30 minutes.
- Navy vessels typically move at 10-12 knots (5-6 m/sec) when operating active sonar and potentially much faster when not. Fish et al. (2006) measured speeds of 7 species of odontocetes and found that they ranged from 1.4–7.30 m/sec. Even if a vessel was moving at the slower typical speed associated with active sonar use, an animal would need to be swimming near sustained maximum speed for an hour in the direction of the vessel's course to stay within the safety zone of the vessel (i.e., to be in danger of being exposed to levels of sonar associated with injury or TTS).
- Additionally, the times when marine mammals are deep-diving (i.e., the times when they are under the water for longer periods of time) are the same times that a large portion of their motion is in the vertical direction, which means that they are far less likely to keep pace with a horizontally moving vessel.
- Given that, the animal would need to have stayed in the immediate vicinity of the sound source for an hour and considering the maximum area that both the vessel and the animal could cover in an hour, it is improbable that this would randomly occur. Moreover,

considering that many animals have been shown to avoid both acoustic sources and ships without acoustic sources, it is improbable that a deep-diving cetacean (as opposed to a dolphin that might bow ride) would choose to remain in the immediate vicinity of the source. It is unlikely that a single cetacean would remain in the safety zone of a Navy sound source for more than 30 minutes.

- Last, in many cases, the lookouts are not able to differentiate species to the degree that would be necessary to implement this measure. Plus, Navy operators have indicated that increasing the number of mitigation decisions that need to be made based on biological information is more difficult for the lookouts (because it is not their area of expertise).

4.3.9.2 *Practicability of the Measure*

As described in 4.3.7.2, when there is an artificial break in the exercise (such as a shutdown) the flow of the exercise is lost and several hours of training may be wasted, depending on where the Navy was in the exercise. An increase in the delay of MFAS use that occurs during an exercise will likely further negatively affect the effectiveness of the military readiness training because it will be harder to regain the flow of the exercise the longer the equipment and personnel are on hold. Moreover, lengthening a delay in training necessitates a continuation of the expenditure of resources (operation of all of the equipment and personnel), while not making progress towards the accomplishment of the mission (training completion)

4.3.10 Implement a Set Vessel Speed for Navy Vessels (10 knots) for NARWs

4.3.10.1 *Benefit to Marine Mammals / Effectiveness of Measure*

NMFS' right whale ship strike regulations (73 FR 60173, October 10, 2008), which were developed specifically to reduce the likelihood of deaths and serious injuries to North Atlantic right whales that result from collisions with ships, applied a 10-knot speed restriction to all vessels of 65 ft. or greater in length in certain locations and at certain times of the year along the U.S. Atlantic seaboard. See that document for details (http://www.nmfs.noaa.gov/pr/shipstrike/). Additionally, section 6.3.5 of the AFAST EIS addresses impacts to right whales from military traffic and NMFS' ship strike EIS and regulations.

4.3.10.2 *Practicability of the Measure*

As discussed in EIS Section 5.3, Navy personnel are already required to use extreme caution and operate at a slow, safe speed consistent with mission and safety. Ships and submarines need to be able to react to changing tactical situations in training as they would in actual combat. Requiring speed restrictions would not allow them to properly react to these situations. Training differently than what would be needed in an actual combat scenario would decrease training effectiveness and reduce the crew's abilities.

Of note, NMFS' ship strike regulations do not apply to vessels owned or operated by, or under contract to, Federal agencies. NMFS believes that the national security, navigational, and human safety missions of some agencies may be compromised by mandatory vessel speed restrictions, and more detailed consideration of these issues is provided in the regulations and Final EIS for that action.

4.5 Cumulative Impacts

A detailed assessment of potential cumulative impacts associated with the proposed Navy AFAST activities is provided in the AFAST Final EIS (chapter 6). The environmental consequences in this tiered Mitigation EA focus on evaluating the direct and indirect effects of mitigation measures that are under consideration for inclusion in any incidental take regulations that NMFS may issue to the Navy. For this Mitigation EA, an additional assessment of cumulative impacts is not warranted beyond that presented in the AFAST Final EIS, as the goal of mitigation is specifically to reduce impacts to marine mammals and their habitats from the proposed Navy actions to the least practicable adverse level. NMFS' preference for certain mitigation is based on the practicability of the measures and the benefit the measures provide to reducing impacts to species under NMFS jurisdiction. The mitigation measures required by NMFS through a final rule and associated LOAs would be expected to reduce the potential for cumulatively significant impacts over time.

4.4 Comparison of EA Alternatives and Conclusion

No Action Alternative - As described in Section 4.1, NMFS determined that the measures included in the No Action Alternative will benefit marine mammals by being effective at avoiding the injury of marine mammals and minimizing exposure of marine mammals to received levels of sound or pressure associated with TTS (mitigation goals (a-d)). Additionally, these measures are practicable for the Navy to implement.

Alternative 1 - As described in Section 4.2, the additional measure included in Alternative 1 (the Planning Awareness Areas, helicopter dipping sonar and object detection limitations, and the Stranding Response Plan) will provide additional benefit to marine mammals (above and beyond the standard Navy measures analyzed in the No Action Alternative). The PAAs should generally reduce the Level B take of marine mammals. The helicopter dipping sonar and object detection measures should reduce impacts to right whale in the critical habitat, when they are involved in important feeding and reproductive behaviors. When live stranded cetaceans are in the water and engaged in what is classified as an *Uncommon Stranding Event*, the shutdown component of the Stranding Response Plan will minimize the exposure of those animals to MFAS/HFAS and explosive detonations (goals (a) and (d) of the mitigation). Information gained from the investigations associated with the Stranding Response Plan may be used in the adaptive management of mitigation or monitoring measures in subsequent LOAs, if appropriate. Additionally, these measures are practicable to implement.

Alternative 2 – As described in Section 4.3, NMFS determined that all of the individual measures discussed as part of this alternative either could not likely be effectively implemented or would not likely reduce adverse effects to marine mammals (could not be tied to the goals of mitigation discussed in Section 1.3 if they could be implemented, or the measures were not practicable for the Navy to implement.

For the reasons described above, Alternative 1 is NMFS' Preferred Alternative. The information and analysis contained in NMFS' proposed rule for AFAST, the Navy's AFAST

Final EIS, and this document support a conclusion that the mitigation measures identified in the preferred alternative (Alternative 1) will further the purposes of the MMPA by effecting the least practicable adverse impact on affected species or stocks and their habitat, while taking into account personnel safety, practicality of implementation and impact on the effectiveness of the military readiness activity.

CHAPTER 5 – LIST OF PREPARERS AND AGENCIES CONSULTED

This Mitigation EA was prepared by a Fisheries Biologist in the Office of Protected Resources with input from U.S. Navy personnel.

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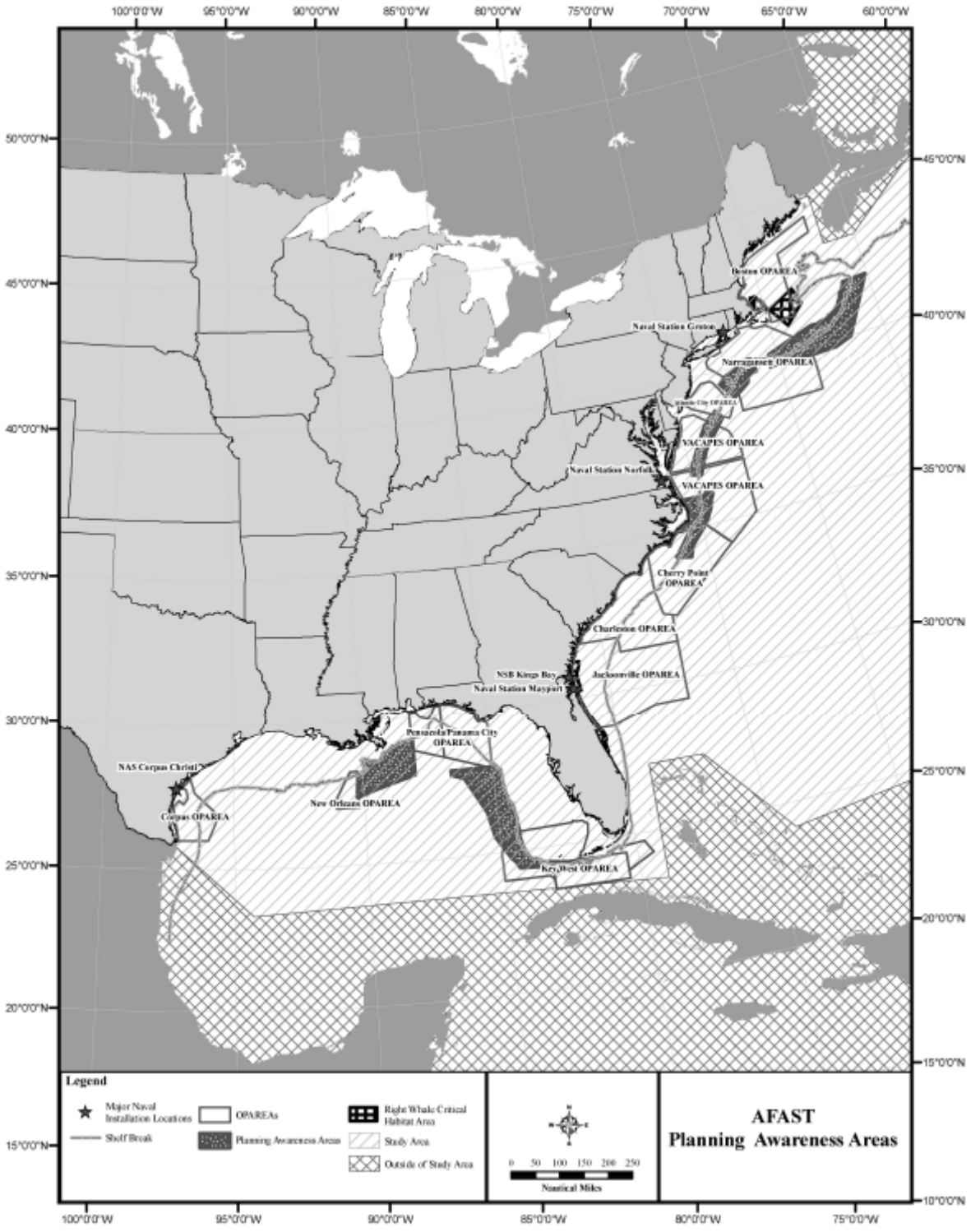
APPENDICES

AFAST Planning Awareness Areas

AFAST Stranding Response Plan



AFAST Planning Awareness Areas

Stranding Response Plan for Atlantic Fleet Active Sonar Training (AFAST)
January 2009

Strandings

Strandings, as defined by the Marine Mammal Protection Act (MMPA), have occurred throughout recorded history, although U.S. stranding programs have only been keeping consistent records in some cases as long as the last three decades, but more commonly the last decade. Strandings may result from many different causes, including, for example, infectious agents, biotoxicosis, starvation, fishery interaction, ship strike, unusual oceanographic or weather events, sound exposure, or combinations of these stressors sustained concurrently or in series. In many cases, a cause of stranding or death cannot be unequivocally determined for a number of reasons. Approximately five marine mammal strandings in the Mediterranean Sea, Caribbean Sea, and Eastern Atlantic Ocean and involving beaked whale species have been associated with mid-frequency active sonar (MFAS), however, scientific uncertainty remains regarding the exact combination of behavior and physiological responses that link MFAS exposure to strandings (though several mechanisms have been theorized). Available evidence suggests that in some cases it may be the presence of additional specific environmental or physical conditions working in confluence with the exposure of marine mammals to MFAS that can potentially result in a stranding. The National Marine Mammal Stranding Network (created under the Marine Mammal Health and Stranding Response Program Act (MMHSRPA)) consists of over 100 organizations partnered with the National Marine Fisheries Service (NMFS) to investigate marine mammal strandings in U.S. waters. NMFS is currently developing (with help anticipated from the Navy, the petroleum industry, and other agencies and entities) a series of studies to correlate long-term stranding patterns and pathologies with all known anthropogenic stressors, such as sound and including seismic surveys and active military sonar. Among other things, the plan discussed below is intended to contribute to the better understanding of why strandings occur.

Introduction to the Stranding Plan

Pursuant to 50 CFR Section 216.105, the plan outlined below will be included by reference and summarized in the regulations and included fully as part of (attached to) the Navy's MMPA Letter of Authorization (LOA), which indicates the conditions under which the Navy is authorized to take marine mammals pursuant to Atlantic Fleet Active Sonar Training (AFAST) activities involving MFAS off the Atlantic Coast of the U.S. or in the Gulf of Mexico. This Stranding Response plan is specifically intended to outline the applicable requirements the authorization is conditioned upon in the event that a marine mammal stranding is reported off the Atlantic Coast of the U.S. or in the Gulf of Mexico during a *major training exercise* (MTE) (see glossary below). As mentioned above, NMFS considers all plausible causes within the course of a stranding investigation and this plan in no way presumes that any strandings in the AFAST Study Area are related to, or caused by, Navy training activities, absent a determination made in a Phase 2 Investigation as outlined in Paragraph 7 of this plan, indicating that MFAS or explosive detonation in the AFAST Study Area were a cause and/or contributed to the stranding.. This plan is designed to address the following three issues:

- **Mitigation** – When marine mammals are in a situation that can be defined as a *stranding* (see glossary below), they are experiencing physiological stress. When animals are stranded, and alive, NMFS believes that exposing these compromised animals to additional known stressors would likely exacerbate the animal's distress and could potentially cause its death. Regardless of the factor(s) that may have initially contributed to the stranding, it is NMFS' goal to avoid exposing these animals to further stressors. Therefore, when live stranded cetaceans are in the water and engaged in what is classified as an *Uncommon Stranding Event* (USE) (see glossary below), the shutdown component of this plan is intended to minimize the exposure of those animals to mid-frequency active sonar (MFAS) and explosive detonations, regardless of whether or not these activities may have initially played a role in the event.

- **Monitoring** – This plan will enhance the understanding of how MFAS (as well as other environmental conditions) may, or may not, be associated with marine mammal injury or strandings. Additionally, information gained from the investigations associated with this plan may be used in the adaptive management of mitigation or monitoring measures in subsequent LOAs, if appropriate. We note that detections of stranded marine mammals off the Atlantic Coast of the U.S. or in the Gulf of Mexico are typically accomplished using passive surveillance, i.e. individuals conducting their normal activities happen to see an animal and report it to the stranding network. There are many strandings reported on the East coast annually and if surveys or expanded active detection efforts are specifically used during Navy training exercises, we expect that the number of strandings detected during training may be higher relative to other times because of the increased targeted effort.

- **Compliance** – The information gathered pursuant to this protocol will inform NMFS' decisions regarding compliance with Sections 101(a) (5) (B and C) of the MMPA.

In addition to outlining the necessary procedural steps for the Navy to undertake in the event of a USE during an MTE (as required by the LOA), this document describes NMFS' planned participation in stranding responses off the Atlantic Coast of the U.S. or in the Gulf of Mexico, as NMFS' response relates specifically to the Navy requirements described here. The NMFS Marine Mammal Health and Stranding Response Program (MMHSRP) and the participating Northeast and Southeast Regional Stranding Networks have specific responsibilities regarding unusual marine mammal mortality events (UMEs) pursuant to Title IV of the MMPA. This document does not serve to replace or preclude any of the procedures currently in place for NMFS' response to UMEs or to any normal operations of the stranding network. NMFS will pursue any activities to fulfill obligations relative to UMEs any time that a trigger is reached as determined by the Working Group on Marine Mammal Unusual Mortality Events. This document highlights (or adds to) applicable existing (and in development) protocols and procedures to be used with the specific circumstances and specific subset of strandings addressed here, namely a USE off the Atlantic Coast of the U.S. or in the Gulf of Mexico during the MTE. This document has been reviewed and approved by the NMFS staff responsible for conducting and overseeing the referenced activities and this plan will be implemented by NMFS to the degree that resources are available and logistics are feasible.

General Notification Provision

If, at any time or place, Navy personnel find a *stranded* marine mammal (see glossary below) either on the shore, near shore, or floating at sea, NMFS requests the Navy contact NMFS immediately (or as soon as clearance procedures allow) as described in the AFAST Stranding Communication Protocol (currently under development, but subject to incorporation into this plan upon mutual agency approval). NMFS requests the Navy provide NMFS with species or description of animal (s), the condition of the animal (including carcass condition if the animal is dead – see glossary for condition codes), location, time of first discovery, observed behaviors (if alive), and photo or video (if available).

In addition, NMFS requests that in the event of a ship strike by any Navy vessel, at any time or place, the Navy do the following:

- Navy immediately report to NMFS the species identification (if known), location (lat/long) of the animal (or the strike if the animal has disappeared), and whether the animal is alive or dead (or unknown)

- as soon as feasible report to NMFS, the size and length of animal, an estimate of the injury status (ex., dead, injured but alive, injured and moving, unknown, etc.), vessel class/type and operational status.

- report to NMFS the vessel length, speed, and heading as soon as feasible.

- Provide NMFS a photo or video, if possible

Operational Response Plan

This section describes the specific actions the Navy must take in order to comply with the AFAST LOA if a USE is reported to the Navy off the Atlantic Coast of the U.S. or in the Gulf of Mexico coincident to, or within 72 hours of, an MTE. This Stranding Response Plan will include an associated AFAST Stranding Communication Protocol (currently under development, but subject to incorporation into this plan upon mutual agency approval), which will indicate, among other things, the specific individuals (NMFS Office of Protected Resources - HQ senior administrators) authorized to advise the Navy that certain actions are prescribed by the Stranding Response Plan. A glossary is included at the end of this document. Words included in the glossary are italicized in this section the first time they are used.

1. Initial Stranding Response - The NMFS regional stranding network will respond to all reports of stranded marine mammals in areas where there is geographic coverage by the stranding network, when feasible. All marine mammals will receive examination appropriate to the condition code of the animal and the feasibility of the logistics. If a *qualified* individual determines that the stranding is a *USE*, NMFS staff (or qualified individual) will initiate a *Phase 1 Investigation*. NMFS will immediately contact appropriate NMFS and Navy personnel (pursuant to the AFAST Stranding Communication Protocol). NMFS and Navy will maintain a

dialogue, as needed, regarding the identification of the USE and the potential need to implement shutdown procedures.

2. ***Shutdown* Procedures** – Shutdown procedures are not related to the investigation of the cause of the stranding and their implementation is in no way intended to imply that MFAS is the cause of the stranding. Rather, as noted above, shutdown procedures are intended to protect cetaceans *exhibiting indicators of distress* and involved in a USE by minimizing their exposure to possible additional stressors (MFAS or explosive detonations), regardless of the factors that initially contributed to the USE. Only individuals specifically identified in the AFAST Stranding Communication Protocol (NMFS Protected Resources – HQ senior administrators) will be authorized to advise the Navy of the need to implement shutdown procedures (pursuant to the Stranding Response Plan/LOA).

a) If no live (*Condition Code 1*) or freshly dead (*Condition Code 2*) cetaceans are involved in the USE, NMFS will advise the Navy that shutdown procedures need not be implemented. Aerial surveys will be conducted if feasible (see second bullet under b, below).

b) If live or freshly dead cetaceans are involved in the USE, the Navy will implement the following procedures:

- If live cetaceans involved in the USE are in the water (i.e., could be exposed to sonar), NMFS will advise the Navy of the need to implement shutdown procedures defined in the glossary (pursuant to the Stranding Response Plan/LOA).

- NMFS will coordinate internally, with the Navy, and with other agencies and entities with the intent of obtaining aerial survey arrangements. If an aircraft is available, a survey will be conducted within 14 (Atlantic) or 17 (Gulf of Mexico) nm (on the shore and in the water near the coast) of the stranding to look for additional animals that meet the USE criteria. NMFS will request that the Navy assist with aerial surveys, as resources are available.

    - If no additional animals that meet the USE criteria are found (including if no aircraft were available to conduct a survey), and the originally detected animals are not in the water, and will not be put back in the water for rehabilitation or release purposes, or are dead, NMFS will advise the Navy that shutdown procedures need not be implemented at any additional locations.

    - If additional cetacean(s) meeting the USE criteria are detected by surveys, the shutdown procedures will be followed for the newly detected animal(s) beginning at 2(a) above.

- If a qualified individual determines that it is appropriate to put live animals that were initially on the beach back in the water for rehabilitation or release purposes,

NMFS will advise the Navy of the need to implement shutdown procedures pursuant to the Stranding Response Plan/LOA.

c) If the Navy finds an injured (or entangled) right whale floating at sea during an MTE, the Navy should implement shutdown procedures (14 or 17 nm, as defined below) around the animal immediately (without waiting for notification from NMFS). The Navy shall then notify NMFS (pursuant to the AFAST Communication Protocol) immediately or as soon as operational security considerations allow. The Navy should provide NMFS with the information outlined in the general notification provision above, as available. Subsequent to the discovery of the injured whale, any Navy platforms in the area will report any right whale sightings to NMFS (or to a contact that can alert NMFS as soon as possible). Based on the information provided, NMFS may initiate/organize an aerial survey (by requesting the Navy's assistance pursuant to the MOA (see # 6) or by other available means) to see if other right whales are in the vicinity. Based on the information provided by the Navy and, if necessary, the outcome of the aerial surveys, NMFS will determine whether a continued shutdown is appropriate on a case-by-case basis. Though it will be determined on a case-by-case basis after Navy/NMFS discussion of situation, NMFS anticipates that the shutdown will continue within 14 nm (or 17 nm in Gulf of Mexico) of a live, injured/entangled right whale until the animal dies or has not been seen for at least 3 hours (either by NMFS staff attending the injured animal or Navy personnel monitoring the area around where the animal was last sighted).

d) If the Navy finds a dead right whale floating at sea during an MTE, the Navy shall notify NMFS (pursuant to AFAST Stranding Communication Protocol) immediately or as soon as operational security considerations allow. The Navy should provide NMFS with the information outlined in the general notification provision above, as available. Subsequent to the discovery of the dead whale, if the Navy is operating sonar in the area they will use increased vigilance (in looking for right whales) and all platforms in the area will report sightings of right whales to NMFS as soon as possible. Based on the information provided, NMFS may initiate/organize an aerial survey (by requesting the Navy's assistance pursuant to the MOA (see # 6) or by other available means) to see if other right whales are in the vicinity. Based on the information provided by the Navy and, if necessary, the outcome of the aerial surveys, NMFS will determine whether any additional protective measures are necessary on a case-by-case basis.

e) If the Navy finds an injured (or entangled) or dead marine mammal (other than a right whale) floating at sea during an MTE, the Navy shall notify NMFS (pursuant to AFAST Stranding Communication Protocol) immediately or as soon as operational security considerations allow. The Navy should provide NMFS with the information outlined in the general notification provision above, as available. Based on the information provided, NMFS will determine if a modified shutdown is appropriate on a case-by-case basis.

f) In the event, following a USE, that: a) qualified individuals are attempting to herd animals back out to the open ocean and animals are not willing to leave, or b) animals are seen repeatedly heading for the open ocean but turning back to shore, NMFS and the

Navy will coordinate (including an investigation of other potential anthropogenic stressors in the area) to determine if the proximity of MFAS operations or explosive detonations, though farther than 14 nm (or 17 nm in Gulf of Mexico) from the distressed animal(s), is likely decreasing the likelihood that the animals return to the open water. If so, NMFS and the Navy will further coordinate to determine what measures are necessary to further minimize that likelihood and implement those measures as appropriate. Navy and NMFS will maintain a dialogue regarding the plan to return the animal(s) to the water.

3. **Restart Procedures**

- If at any time, the subject(s) of the USE die or are euthanized, NMFS will immediately advise the Navy that the shutdown around that animal(s)' location is no longer needed,

- Shutdown procedures will remain in effect until NMFS determines that, and advises the Navy that, all live animals involved in the USE have left the area (either of their own volition or herded). Leading up to restart, NMFS will coordinate internally, with the Navy, and with other federal and state agencies with the intent of securing arrangements to track the movement of the animals (via aircraft, vessel, tags, etc.) following the dispersal of the USE. If the Navy has restarted operations in the vicinity of the animals, NMFS and the Navy will further coordinate to determine (based on location and behavior of tracked animals and location/nature of Navy activities) if the proximity of MFAS operations is likely increasing the likelihood that the animals re-strand. If so, NMFS and the Navy will further coordinate to determine what measures are necessary to minimize that likelihood and implement those measures as appropriate.

4. **Information** - Within 72 hours of the notification of the USE the Navy will inform NMFS where and when they were operating MFAS or conducting explosive detonations (within 80 nm and 72 hours prior to event). Within 7 days of the completion of any exercises that were being conducted within 80 nm or 72 hours prior to the event, the Navy will further provide information to NMFS (per the AFAST Stranding Communication Protocol), *as available*, regarding the number and types of acoustic/explosive sources, direction and speed of units using MFAS, and marine mammal sightings information associated with those training activities. Information not initially available regarding the 80 nm, 72 hours, period prior to the event will be provided as soon as it becomes available. The Navy will provide NMFS investigative teams with additional relevant unclassified information as requested (or classified information to designated NMFS staff), if available.

5. **Phase 1 Investigation** – Because of the number of strandings off the Atlantic coast and in the Gulf of Mexico and the variablilty of available resources across stranding network agencies in the Northeast and Southeast regions, NMFS cannot currently commit, in advance, to the specific degree of investigation that will be conducted for any given stranding. NMFS stranding coordinators are currently assessing available resources with the goal of setting forth a plan that realistically outlines the possible responses in a given area. Meanwhile, the ideal responses (Phase 1 and 2 Investigations) area described in the Biomonitoring Protocols and are referred to

below (here and in # 7), and NMFS will respond in the indicated manner when resources are available and it is logistically feasible:

Within 4 weeks of a USE (when feasible), NMFS will conduct and complete the Phase 1 Investigation (list of procedures typically included in Phase 1 investigation are included in the Glossary of this document, description of actual procedures are contained in the Biomonitoring Protocols) for all USEs that occur along the U.S. Atlantic Coast and Gulf of Mexico coincident with MTEs. Results from the Phase 1 Investigation will be categorized in one of the two ways discussed below and trigger the indicated action:

- If the results of the Phase 1 Investigation indicate that the USE was likely caused by something (such as entanglement or ship strike) other than MFAS or explosive detonations authorized by the Navy's LOA, then the USE investigation will be considered complete as related to the MMPA authorization.

- If NMFS cannot conclude that the stranding was likely caused by something other than MFAS or explosive detonations authorized by the Navy LOA, rather, the results of the Phase 1 Investigation range from completely inconclusive to including potential early indicators that acoustic exposure could have played a role, then a Phase 2 Investigation will be conducted by qualified individuals, under the direction of NMFS staff, and an individual case report will be prepared for each animal (list of procedures typically included in Phase 2 investigation are included in the Glossary of this document, description of actual procedures are contained in the Biomonitoring Protocols).

6. **Memorandum of Agreement (MOA)** - The Navy and NMFS will develop an MOA, or other mechanism consistent with federal fiscal law requirements (and all other applicable laws), that allows the Navy to assist NMFS with the Phase 1 and 2 Investigations of USEs through the provision of in-kind services, such as (but not limited to) the use of plane/boat/truck for transport of stranding responders or animals, use of Navy property for necropsies or burial, or assistance with aerial surveys to discern the extent of a USE. The Navy may assist NMFS with the Investigations by providing one or more of the in-kind services outlined in the MOA, when available and logistically feasible and which do not negatively affect Fleet operational commitments.

7. **Phase 2 Investigation** – Please see # 5, above. Results from the Phase 2 Investigation (procedures outlined in the Biomonitoring Protocols) will be categorized in one of the three ways discussed below and trigger the indicated action:

- If the results indicate that the USE was likely caused by something (such as entanglement or blunt force trauma) other than MFAS or explosive detonations authorized by the Navy's LOA, then the *USE* investigation will be considered complete as related to the MMPA authorization.

- If the results are inconclusive which, historically, is the most likely result (i.e. NMFS can neither conclude that the USE was likely caused by something other than acoustic trauma nor conclude that there is a high likelihood that exposure to MFAS or explosive

detonations were a cause of the USE), then the USE investigation will be considered complete as related to the MMPA authorization.

- If the results of a comprehensive and detailed scientific investigation into all possible causes of the stranding event indicate that there is a high likelihood that MFAS was a cause of the USE, one of the following will occur:

    - If the total mortalities determined to be caused by MFAS or explosive detonation do not exceed the number analyzed for the 5-yr period in the regulations (10 and 0, respectively), they will be recorded (to add on to if there is another stranding) and NMFS will take no further action beyond that indicated in 8, below.

    - If the total mortalities determined to be caused by MFAS exceed the number analyzed for the 5-yr period in the regulations, NMFS will begin the process of determining whether or not suspension or withdrawal of the authorization is appropriate.

The Navy will be provided at least ten working days to review and provide comments on NMFS' summary and characterization of the factors involved in the USE. NMFS will consider the Navy's comments prior to finalizeing any conclusions and/or deciding to take any action involving any take authorization

8. **USE Response Debrief and Evaluation** – Within 2 months after a USE, NMFS and Navy staff will meet to discuss the implementation of the USE response and recommend modifications or clarifications to improve the Stranding Response Plan. These recommendations will feed into the adaptive management strategy discussed below.

9. **Adaptive Management** - The regulations under which the Navy's LOA (and this Stranding Response Plan) are issued will contain an adaptive management component. This gives NMFS the ability to consider the results of the previous years' monitoring, research, and/or the results of stranding investigations when prescribing mitigation or monitoring requirements in subsequent years. In the event that NMFS concludes that there is a high likelihood that MFAS or explosive detonations were a cause of a USE, NMFS will review the analysis of the environmental and operational circumstances surrounding the USE. In subsequent LOAs, based on this review and through the adaptive management component of the regulations, NMFS may require the mitigation measures or Stranding Response Plan be modified or supplemented if the new data suggest that modifications would either have a reasonable likelihood of reducing the chance of future USEs resulting from a similar confluence of events or would increase the effectiveness of the stranding investigations. Further based on this review and the adaptive management component of the regulations, NMFS may modify or add to the existing monitoring requirements if the data suggest that the addition of a particular measure would likely fill a specifically important data or management gap. Additionally, the USE Debrief and Evaluation discussed above (in combination with adaptive management) will allow NMFS and the Navy to further refine the Stranding Response Plan for maximum effectiveness.

Communication

Effective communication is critical to the successful implementation of this Stranding Response Plan. Very specific protocols for communication, including identification of the Navy personnel authorized to implement a shutdown and the NMFS personnel authorized to advise the Navy of the need to implement shutdown procedures (NMFS Protected Resources HQ – senior administrators) and the associated phone trees, etc. (to be included in the document entitled "AFAST Stranding Communication Protocols") are currently in development and will be refined and finalized for the AFAST Study Area by March 2009 and updated yearly (or more frequently, as appropriate).

The Stranding Response Plan is dependent upon advance notice to NMFS of the planned upcoming MTE. NMFS and the Navy will develop a mechanism (that conforms with operational security requirements) wherein the Navy can provide NMFS with necessary advance notification of MTEs.

NMFS will keep information about planned MTE's in a confidential manner and will transmit information to NMFS personnel responding to USE's to the minimum necessary to accomplish the NMFS mission under this plan.

Glossary:

Condition Code – a method for evaluating the stage of decomposition of a stranded animal or carcass. Codes range from live animals (Code 1) to skeletal remains (Code 5) (modified from Marine Mammals Ashore: A Field Guide for Strandings by J.R. Geraci and V.J. Lounsbury).

- Code 1: Live animals
- Code 2: Freshly dead. The carcass is in good condition (fresh/edible), as if it has just died.
- Code 3a: The carcass is in fair condition, with only slight decomposition or scavenger damage. There may be slight bloating and a minimal smell.
- Code 3b: The carcass is moderately decomposed with obvious bloating, some sunburn (blackening and cracking of the skin), sloughing or missing skin, and scavenger damage.
- Code 4: The carcass is in an advanced state of decomposition with a strong odor, skin may be entirely missing, and there is likely extensive scavenger damage.
- Code 5: Mummified or skeletal remains. Skin may be draped over skeletal remains and any remaining tissues are dessicated.

Major training exercise (MTE) – An MTE, within the context of this document, means

- Southeastern Integrated Training Initiative (SEASWITI) - 4 events annually, 5 to 7 days per entire event
- Integrated ASW Course (IAC) - 5 events annually, 2 to 5 days per entire event
- Group Sails - 20 events annually, 2 to 3 days per entire event
- Composite Training Unit Exercise (COMPTUEX) - 5 events annually, 21 days per entire event
- Joint Task Force Exercise (JTFEX.) - 2 events annually, 10 days per entire event

It should be noted that sonar is typically not in use throughout an entire event.

Exhibiting Indicators of Distress – Animals exhibiting an uncommon combination of behavioral and physiological indicators typically associated with distressed or stranded animals. This situation would be identified by a qualified individual and typically includes, but is not limited to, some combination of the following characteristics:

- Marine mammals continually circling or moving haphazardly in a tightly packed group – with or without a member occasionally breaking away and swimming towards the beach.
- Abnormal respirations including increased or decreased rate or volume of breathing, abnormal content or odor
- Presence of an individual or group of a species that has not historically been seen in a particular habitat, for example a pelagic species in a shallow bay when historic records indicate that it is a rare event.
- Abnormal behavior for that species, such as abnormal surfacing or swimming pattern, listing, and abnormal appearance

Phase 1 Investigation – A Phase 1 Investigation, for the purposes of this document, will typically include the following tests and procedures (which are described in NMFS' Biomonitoring Protocols):

- Demographics of the stranding
- Environmental parameters
- Behavioral assessment of group
- Live animal
    - physical examination
    - blood work
    - diagnostics such as AEP or ultrasound
    - assessment or treatment
- Dead animal
    - External examination and external human interaction evaluation
    - Morphometrics
    - Photographs
    - Diagnostic imaging including CT/MRI scans or ultrasound as appropriate and feasible
    - Necropsy with internal examination, descriptions, photographs and sample collection

Note that several factors will dictate whether all or a subset of these procedures are conducted, including:

- The condition of a carcass
- For live cetaceans - the time it would take necessary personnel and equipment to arrive at the site
- Availability (both in time and space) of resources and feasibility of implementation

Phase 2 Investigation – A Phase 2 Investigation, for the purposes of this document, will typically include the following tests and procedures (which are described in NMFS' Biomonitoring Protocols):

- Analyses and review of diagnostic imaging obtained in Phase I

- Histopathology
- Special stains
- Ancillary diagnostics (e.g., PCR for infections, gas emboli)
- CT of ears
- Additional diagnostic imaging as needed
- Histology of ears
- Case summaries
- Review

Note that several factors will dictate whether all or a subset of these procedures are conducted, including:

- The condition of a carcass
- Logistics for transport
- Available resources
- Validated diagnostic techniques

Qualified – NMFS has a rigorous set of standards and training in place to qualify stranding responders, however, since the stranding network is a largely volunteer network, there is significant variability from one area to another. Additionally, AFAST activities span a very long stretch of coastline and some areas do not have regular coverage of stranding responders. In the Biomonitoring Protocol, NMFS will identify the minimum qualifications necessary for individuals to make the determinations necessary to carry out this plan. These qualifications are currently in development and will be refined and finalized in the Biomonitoring Protocols. Not all qualified individuals (veterinarians, technicians, etc.) will be NMFS employees. However, only specific individuals (NMFS Protected Resources, HQ – senior administrators) indicated in the AFAST Stranding Communication Protocol will be empowered to advise the Navy of the need to implement shutdown procedures.

Stranding – an event in the wild in which:

(a) a marine mammal is dead and is –

(i) on the beach or shore of the United States; or

(ii) in waters under the jurisdiction of the United States (including any navigable waters); or

(b) a marine mammal is alive and is –

(i) on a beach or shore of the United States and unable to return to the water;

(ii) on a beach or shore of the United States and, although able to return to the water, is in apparent need of medical attention; or

(iii) in the waters under the jurisdiction of the United States (including navigable waters), but is unable to return to its natural habitat under its own power or without assistance.

Shutdown Procedures – The act of the Navy ceasing operation of sonar or explosive detonations within a designated area for a designated time. The time is designated by the Restart Procedures (# 3, above). The designated area, for the purposes of this document, is an area

within 14 nm (if on Atlantic Coast) or an area within 17 nm (if on Gulf of Mexico Coast) of any live, in the water animal involved in the USE. These distances (14 or 17 nm) are the distances at which sound from the sonar source is anticipated to attenuate to approximately 145 dB (SPL). The risk function predicts that less than 1% of the animals exposed to sonar at this level (mysticete or odontocete) would respond in a manner that NMFS considers Level B Harassment. As indicated above in 2(d), if this distance appears too short (i.e, the proximity of sonar use may likely be deterring the animals from returning to the open water), NMFS and the Navy will further coordinate to determine what measures are necessary to further minimize that likelihood and implement those measures as appropriate.

Uncommon Stranding Event (USE) – A stranding event that takes place during an MTE and involves any one of the following:

- Two or more individuals of any cetacean species (i.e., could be two different species, but not including mother/calf pairs, unless of species of concern listed in next bullet) found dead or live on shore within a two day period and within 30 miles of one another.
- A single individual or mother/calf pair of any of the following marine mammals of concern: beaked whale of any species, kogia sp., melon-headed whale, short-finned and long-finned pilot whales, right whales, humpback whales, sperm whales, blue whales, fin whales, or sei whales
- A group of 2 or more cetaceans of any species exhibiting indicators of distress.

Supplemental Documents in Development

AFAST Stranding Communication Protocol – This document, which is currently in development, will include all of the communication protocols (phone trees, etc.) and associated contact information required for NMFS and the Navy to carry out the actions outlined in this Stranding Response Plan. This document is currently in usable draft form and will be finalized by March 2009 and updated yearly (or more frequently, as appropriate).

Biomonitoring Protocols for AFAST – This document (which is currently in a usable draft form, but will be finalized in 2009) will contain protocols for the procedures that are necessary for NMFS staff to implement this Stranding Plan including:

- Qualifications necessary for individuals to implement certain parts of the Stranding Plan, such as: identifying a USE, identifying a Code 2 animal, or conducting a Phase 1 or 2 Investigation
- A protocol for the stranding responders that outlines the actions to take in the event of a USE during MTEs
- Protocols for the investigators that describe in detail procedures implemented for Phase 1 and Phase 2 Investigations

Memorandum of Agreement – This document (or other mechanism consistent with federal fiscal law requirements and all other applicable laws), which will be finalized in 2009, will establish a framework whereby the Navy can assist with stranding investigations when feasible. This document will include a comprehensive list of the specific ways the Navy could provide this assistance.

LOA Stranding Plans in Other Geographic Regions

The frequency and nature of strandings (naturally occurring or otherwise), the nature of military operations, and the NMFS resources and qualified staff available for stranding response, can be highly variable in different geographic regions, and sub-regions within those regions. Measures and procedures developed for and implemented in this Stranding Response Plan may not be appropriate, or even possible, in other geographic regions. As the need arises, NMFS and the Navy will work together to develop appropriate Stranding Response Plans for other geographic regions based on available information and resources. This Stranding Response Plan is not intended to serve as a template for other geographic regions, and, in fact, Stranding Plans for other areas may be significantly different.