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National Marine Fisheries Service
Office of Protected Resources

Prepared by
Department of the Navy

In accordance with
Biological Opinion 09 February 2007
National Defense Exemption 23 January 2007

**U.S. Navy
SOUTHERN CALIFORNIA
COMPOSITE TRAINING UNIT EXERCISE 08-3
USS RONALD REAGAN CSG
After Action Report
17 March to 07 April 2008**

SUBMITTED TO
Office of Protected Resources, National Marine Fisheries Service

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Abstract

This report presents an analysis of the effectiveness of the mitigation and monitoring measures as required under the Biological Opinion on the U.S. Navy's Proposed Composite Training Unit Exercises and Joint Task Force Exercises off Southern California from February 2007 to January 2009

AND

Discussion of the nature of effects on marine mammals, if observed, under the National Defense Exemption from the Requirements of the Marine Mammal Protection Act (MMPA) for Mid-Frequency Active Sonar

EXECUTIVE SUMMARY

- As required by the 23 January 2007 National Defense Exemption (NDE) from the Requirements of the MMPA for Certain DoD Military Readiness Activities That Employ Mid-Frequency Active Sonar (MFAS) or Improved Extended Echo Ranging Sonobuoys and the 30 July 2007 *Biological Opinion (BO) on the U.S. Navy's Composite Training Unit Exercises (COMPTUEX) and Joint Task Force Exercises (JTTFEX) Off Southern California From February 2007 to January 2009*, this report summarizes marine mammal sightings and provides an assessment of mitigation effectiveness for the U.S. Navy's Composite Training Unit Exercise (COMPTUEX) 08-3 conducted by the USS RONALD REAGAN Carrier Strike Group (CSG) from 17 March to 07 April 2008 within the offshore waters of Southern California.
- Over 2,640 hours of visual sighting effort was conducted by U.S. Navy lookouts assigned to five MFAS-equipped surface ships over the entire course of the exercise (22 days x 24 hrs/day = 528 hrs x 5 MFAS ships = 2,640 hours), including MFAS and non-MFAS events. This total does not include additional visual survey results from one non-MFAS ship which represents an additional 528 hours. During these 2,604 hours, 490 hours of MFAS was reported from all sources. The 490 hours of MFAS use represent the total time conducting MFAS training or events, and do not reflect continuous and consecutive MFAS activity.
- There were a total of 133 marine mammal sightings at all ranges of an estimated 623 animals during COMPTUEX 08-3. The majority of animals sighted were "unspecified whale" and "large whale" which combined totaled 94 sightings accounting for 159 animals or approximately 71% of the total estimated number of sightings. There were 25 dolphin sightings of 426 animals total or approximately 68% of the total estimated number of animals. One non-MFAS equipped ship reported 6 sightings or 4.5% of the total sightings (6 of 133).
- Out of the total 133 sightings from all ranges, there were 96 sightings of 496 marine mammals within 2000 meters of a MFAS ship.
- There were 42 MFAS secure (i.e., MFAS was turn off) or power down events within 2,000 meters during COMPTUEX 08-3 because of marine mammal sightings.
- In context of the NMFS BO Terms and Conditions (NMFS 2007), 43 potential ESA-listed marine mammals were possibly exposed to MFAS during COMPTUEX 08-3 at Receive Levels (RL) equal to or greater than 173 dB re 1 Pa²-s. Given the time of year of this exercise, it is unknown if some these sightings might have been non-ESA whales (either gray whale, or minke whale).
- There were no obvious indications or reports that any marine mammal sighted during COMPTUEX 08-3 behaved in a manner not associated with normal movement or foraging; however, biological information available at the time of this report is limited.
- Based on visual reports of marine mammals from U.S. Navy lookouts during COMPTUEX 08-3, the U.S. Navy's Composite Training Unit Exercise/Joint Task Force Exercise Environmental Assessment/Overseas Environmental Assessment (EA/OEA) acoustic modeling appears to have over-estimated the number of potential acoustic exposures, including those to ESA-listed species. The acoustic model tends to over predict exposures due to limitations of available marine mammal density estimates, assumptions that animals are universally distributed throughout an area, and do not leave or enter the area. Additionally, exposures are calculated without accounting for any mitigation measures that are used.

INTRODUCTION

This report is presented to fulfill U.S. Navy written reporting requirements of the 23 January 2007 National Defense Exemption (NDE) from the Requirements of the MMPA for Certain DoD Military Readiness Activities That Employ Mid-Frequency Active Sonar (MFAS) or Improved Extended Echo Ranging Sonobuoys. Additionally, the 9 February 2007 *Biological Opinion (BO) on the U.S. Navy's Composite Training Unit Exercises (COMPTUEX) and Joint Task Force Exercises (JTFEX) Off Southern California From February 2007 to January 2009* requires the submittal of a written report to the Office of Protected Resources at NMFS (reporting requirements outlined in box below). This report also fulfills the BO reporting requirements. Training restrictions applicable to COMPTUEX 08-3, including those contained in court-ordered MFAS mitigation measures and National Environmental Policy Act (NEPA) alternative arrangements, are also noted in this report. Notification of this report's availability will also be provided to CEQ in support of the Alternative Arrangements agreed to on 19 January 2008.

COMPTUEX/JTFEX BO (NMFS 2007) Reporting Requirements:

5. Within 120 calendar days of completing an exercise the U.S. Navy shall provide the Chief, Endangered Species Division, Office of Protected Resources (with a copy provided to the Assistant Regional Administrator for Protected Resources in NMFS' Southwest Regional Office) with a written report that shall include the following information.

a. Summary of exercise (starting and ending date of exercise, number of ships and aircraft involved in exercise, and number of hours passive and active sonar was used during the exercise);

b. Specific mitigation measures Navy implemented during exercise;

c. Number of blue whales, fin whales, humpback whales, sei whales, sperm whales, and Guadalupe fur seals that (i) had been detected within 200 yards of a sonobuoy and 500 and 1,000 yards of a sonar dome or during an active transmission and (ii) the estimate of number of blue whales, fin whales, humpback whales, sei whales, sperm whales, and Guadalupe fur seals that had been exposed to MFAS at received levels equal to or greater than 173 dB re 1 $\mu\text{Pa}^2\cdot\text{s}$;

d. Reports of the activity or activities that blue whales, fin whales, humpback whales, sei whales, sperm whales, and Guadalupe fur seals had been observed to exhibit while they were within 200 yards of a sonobuoy and 500 and 1,000 yards of a sonar dome that was actively transmitting during exercise;

Reports of observations shall identify date, time, and visual conditions associated (if the observation is produced from a helicopter, the report should identify the speed, vector, and altitude of the airship; the sea state, and lighting conditions) with observation; and how long an observer or set of observers maintained visual contact with a marine mammal;

e. evaluation of effectiveness of those mitigation measures at avoiding exposing endangered whales to ship traffic and endangered whales and pinnipeds to MFAS. This evaluation shall identify the specific observations that support any conclusion U.S. Navy reaches about effectiveness of mitigation measures;

f. evaluation of monitoring program's ability to detect marine mammals that occur within 200 yards of a sonobuoy and 500 and 1,000 yards of a sonar dome, during an active transmission (or close enough to an exercise to be exposed to mid-frequency sonar at received levels equal to or greater than 173 dB re 1 $\mu\text{Pa}^2\cdot\text{s}$) with specific evidence that supports any conclusions U.S. Navy reaches.

REPORT ORGANIZATION

This report contains unclassified material and provides the information and analysis for Composite Training Unit Exercise (COMPTUEX) 08-3 and is submitted in fulfillment of NDE and BO written requirements. The report focuses on addressing the biological impact questions presented in the COMPTUEX/JTFEX BO (NMFS 2007) Reporting Requirements text box shown on the preceding page. Discussion on impacts of mitigation measures and the court's restrictions on U.S. Navy training is contained in separate, classified reporting.

This report is organized by section in the following order:

Background

Section A - Exercise Summary provides exercise specific information including the starting and ending dates, the number of ships and aircraft participating, and the number of hours of MFAS used by all emitters.

Section B - Mitigation Measure Summary describes specific mitigation measures implemented.

Section C/D - Biological Observations and Exposure Assessment provides an overview of marine mammal observations obtained during the exercise in terms of BO required Terms and Conditions statements 5c and 5d listed previously. The exposure assessment during COMPTUEX 08-3, estimates potential MFAS exposure for animals observed within 1,000 yards. The BO required that this analysis focus on marine mammal observations within 1,000 yards of an MFAS transmission; however, NEPA alternative arrangements granted on 15 January 2008 required analysis of marine mammal observations within 1,000 meters of an MFAS transmission. Therefore, analysis results are presented for ranges within 1,000 meters, although sighting reports are sometime still recorded in yards by exercise participants.

Section E/F - Mitigation Assessment discusses the effectiveness of the NDE and BO safety zones when marine mammals are sighted in the vicinity of ships using MFAS.

Appendix A categorizes and lists specific NDE based mitigation measures and subsequent court-ordered mitigation implemented during the exercise.

BACKGROUND

Composite Training Unit Exercises (COMPTUEX) is part of an Integrated Phase of the Fleet Readiness Training Plan (FRTP) and may involve either a Carrier Strike Group (CSG) or an Expeditionary Strike Group (ESG). A COMPTUEX is conducted as a series of scheduled training events that occur according to a given time schedule against an opposition force. COMPTUEX provides an opportunity for the Strike Group to become proficient in myriad required warfare skill sets. Additionally, it stresses the integration or coordination of the different warfare areas and provides realistic training on in-theater operations.

Prior to the exercise, NMFS-approved Marine Species Awareness Training (MSAT) was provided to exercise participants. A Letter of Instruction (LOI) which reiterated the mitigation measures to be employed during the exercise was also distributed to participants and explained procedures for reporting marine mammal sightings discussed in Section C/D. On 23 January 2007, the Deputy Secretary of Defense granted the US Navy an exemption from certain permitting requirements of the MMPA for Certain DOD Military Readiness Activities That Employ Mid-Frequency Active Sonar (MFAS) or Improved Extended Echo Ranging Sonobuoys. This exemption included a list of mitigation measures developed in coordination with NMFS to be used when operating MFAS. On January 17, 2008, a federal appeals court temporarily lifted a preliminary injunction which imposed training restrictions on COMPTUEXs and JTFEXs conducted in the Southern California Operating Area (SOCAL OPAREA). The stay was granted in part based on the Council on Environmental Quality (CEQ) granting Navy authorization for "Emergency Alternative Arrangements" under NEPA. Those emergency alternative measures required Navy to continue to adhere to the NDE mitigation measures that were developed in coordination with NMFS; ensure active public participation in the preparation of the SOCAL Environmental Impact Statement (EIS); implement measures for adaptive management; and continue long-term research commitments. The NDE mitigation measures implemented during COMPTUEX 08-3 are presented in **Appendix A**.

During COMPTUEX 08-3, the U.S. Navy adhered to the NDE mitigation measures and the measures set forth in the CEQ Alternative Arrangements as well those measures made applicable by court order.

SECTION A EXERCISE SUMMARY

EXERCISE PARTICIPANTS

COMPTUEX 08-3 was conducted from 17 March to 07 April 2008, for the USS RONALD REAGAN (CVN 76) CSG (**Table 1 and Figure 1**). Participating units included CSG assigned ships (aircraft carrier, surface combatants, submarines, and supply ships), and MFAS-equipped opposition forces (including submarines). Four AN/SQS-53 MFAS-equipped surface ships were present in COMPTUEX 08-3 (CG, DDG). One AN/SQS-56 ship was present (FFG). However, there was minimum active sonar use by some CSG and non-CSG assigned platforms due to either tactical considerations for surface ships and submarines or lack of MFAS capability (aircraft carrier, supply ships).

Total MFAS Use

During COMPTUEX 08-3, 490 hours of MFAS time was reported from all sources including hull mounted surface ship sonar (SQS-53), helicopter dipping sonar (AN/SQS-13F) and DICASS sonobuoys. Key caveats to the derivation of this total are presented in Section C/D.

Table 1. Exercise summary for COMPTUEX 08-3 conducted within the SOCAL OPAREA March 2008.

Participants	Event Name	Dates	MFAS Use Reported (hours)
USS REAGAN CSG	COMPTUEX 08-3	17 March to 07 April 2008	490 hrs
Number of MFAS equipped surface ships : 5			 1 (Ticonderoga class guided cruiser CG)
			 3 (Arleigh Burke class destroyer DDG)
			 1 (Oliver Perry class frigate FFG)
Estimated number of potential ASW helicopters available:			2-4



Figure 1. Approximate area of reported marine mammal sightings during exercise COMPTUEX 08-3.
Note: this polygon only represents the area in which marine mammal sightings were reported by exercise participants and does not imply overall operational region or areas where MFA sonar was used.

SECTION B MITIGATION MEASURES FOLLOWED

Appendix A has a list of mitigation measures used during COMPTUEX 08-3.

The NDE issued on January 23, 2007 provides for protection of marine mammals, in the absence of an MMPA Letter of Authorization, by including specific conditions to minimize potential impacts on marine mammals. These mitigation measures were developed in coordination with the NMFS, the agency with substantive responsibility for marine mammals. All NDE mitigation measures were adhered to during COMPTUEX 08-3. Those NDE measures include specific details for personnel training, lookout and watchstander responsibilities, specific operating procedures, and coordination and reporting requirements.

In addition, the Navy adhered to the Alternative Arrangements approved by the Council on Environmental Quality pursuant to 40 C.F.R. section 1506.11 (Volume 73, Federal Register, No. 16, pages 4189-4193) and any additional measures imposed by applicable court order (also included in **Appendix A**).

SECTION C/D- BIOLOGICAL OBSERVATIONS AND EXPOSURE ASSESSMENT

Section C/D provides an overview of marine mammal observations that require reporting under the Terms and Conditions of the NMFS BO (NMFS 2007).

The biological summary in this section includes the total number of marine mammals sighted, the number of marine mammals observed within 2,000 meters during MFAS transmission, and science-based analysis of species likely present in Southern California during this time of year.

COMPTUEX 08-3 BIOLOGICAL OBSERVATIONS

Figure 1 shows the approximate boundaries of all marine mammal sightings during COMPTUEX 08-3. All marine mammal sightings described in this section were made by standard Navy surface ship and aircrew lookouts using reporting procedures as detailed in the formal LOI issued prior to the exercise. Based on reports from individual U.S. Navy ships, sea states during reported marine mammal sightings ranged from 1 to 4 (**Tables 2 and 3**).

There are two metrics used in this section. One is the use of the word “sighting” to classify each unique marine mammal observation. One sighting might be of a single animal, or multiple animals such as a dolphin pod. The other metric used is the term “number of animals” to quantify the total number of marine mammals within each sighting.

There were a total of 133 live marine mammal sightings at all ranges for a minimum estimated 623 animals during COMPTUEX 08-3. There was one sighting of a pod of dolphins without a corresponding estimate of the number of animals within the pod, so this sighting can not be added to the total animal calculation above. The majority of sightings were unspecified whale and large whale which combined totaled 94 of the 133 sightings accounting for 159 whales or approximately 71% (94/133) of the total estimated number of sightings. There were 25 dolphin sightings representing 426 animals or approximately 68% (426/623) of the total estimated number of animals. In addition, there were 5 sightings of 16 small whales, 6 sightings of 17 pinnipeds (seals or sea lions), and 3 sightings of 5 animals where the marine mammal type was not reported.

(94+25+5+6 +3= 133 sightings; 159+426+16+17+5 = 623 animals)

Of note, one of the ships assigned to the CSG participating in COMPTUEX 08-3 was an aircraft carrier which does not have MFAS capability. This vessel reported 6 marine mammal sightings or approximately 4.5% of the 133 total sightings (6/133).

There was one sighting of a pinniped carcass (seal or sea lion) during COMPTUEX 08-3. A discussion of this event is provided below.

Of the total 133 live sightings, one carcass sighting, and estimated 623 animals detected during COMPTUEX 08-3, there were 96 sightings of approximately 496 animals within 2,000 meters of a reporting MFAS-equipped surface ship (**Table 2**). This represents 72% of the total sightings and 80% of the total animals. As discussed in the “MFAS EXPOSURE ASSESSMENT” assessment below, of these 96 sightings within 2,000 meters, there were 42 sightings where MFAS mitigation occurred (75 or 95% power reduction or turned off) based on either MFAS NDE mitigation or court-ordered training restrictions. In addition to the 96 sightings in **Table 2**, there were an additional 37 sightings of approximately 127 marine mammals by MFAS equipped ships at ranges greater than 2,000 meters (not shown in **Table 2**).

The CEQ Alternative Arrangement requirement #3 states that “Navy will use meters rather than yards to describe the safety zone set forth in NDE mitigation measure 20.” While surface ships sometimes continue to report initial sightings in yards, conversion to meters is done within this report. Therefore, estimated numbers of marine mammals observed within 2,000 meters of a MFAS equipped U.S. Navy ship during COMPTUEX 08-3 are presented in **Table 2** which lists each individual sighting. These sightings were taken during the exercise based on visual observations from five trained U.S. Navy lookouts per ship during ASW events, or three lookouts during non-ASW events.

Pinniped (seal or sea lion) Carcass

On 06 April 2008, a MFAS ship spotted the floating carcass of a seal or sea lion (**Figure 2**). The ship’s crew noted what may have been cuts from a propeller or screw on the pinniped which may indicate a vessel strike. It is unknown if the animal was struck before or after death. The Navy ship reported this sighting to higher headquarters and the information was relayed to NMFS. The NMFS, in their West Coast marine mammal stock assessment report cite a number of human (non-Navy) sources of mortality for pinnipeds which include accidental entanglement in active or abandoned fishing gear, ship strikes, gunshot wounds, and power plant intake entrainment (Carretta et al. 2007). Natural sources of mortality include periodic domoic acid poisoning events from algal produced neurotoxin, starvation during abnormal oceanographic conditions, and predation from sharks and killer whales (Carretta et al. 2007). From 2001 to 2004 there were between 2,000 and 4,500 pinniped strandings within California from a variety of sources (NMFS 2007). None of these strandings were associated with Navy operations.

Given the state of decay and injuries to the animal prior to observation by the Navy ship, the fact that the carcass was discovered in the general vicinity of normal commercial shipping lanes for south bound traffic, and the historic pinniped mortality in California, it is unlikely this pinniped mortality was linked to Navy operations.



Figure 2. Approximate location of pinniped carcass sighted on 06 April. Major commercial shipping lanes offshore of San Diego shown in black lines.

Base figure from Microsoft Encarta Map: <http://encarta.msn.com/encnet/features/mapcenter/map.aspx>

Table 2. Marine mammal sightings and actions by exercise participants for marine mammals sighted within 2,000 meters of a MFAS equipped U.S. Navy vessel during COMPTUEX 08-3.

nr = not reported; unk = unknown; N/A = not applicable

Date-Time local	Description of Actions Taken	Sea State	#	Animal Type	MFAS in use?	Mitigation
19 Mar	Non-MFAS surface ship sights 1 large whale at 500 yards. No MFAS equipment. No action taken.	1	1	large whale	no	N/A
19 Mar	FFG surface ship sights 1 "whale" at 600 yards. MFAS not in use. No action taken.	1	1	whale	no	N/A
19 Mar	DDG surface ship sights 2 whales at 2000. MFAS not in use. No action taken.	1	2	whale	no	N/A
19 Mar	DDG surface ship sights 1 whale at 400 yards. MFAS not in use. No action taken.	1	1	whale	no	N/A
21 Mar	FFG surface ship sights 1 large whale at 100 yards. MFAS not in use. No action taken, but ship alters course	1	1	large whale	no	N/A
20 Mar	DDG surface ship sights 3 large whales swimming at 800 yards. MFAS not in use. No action taken.	1	3	large whale	no	N/A
22 Mar	DDG surface ships sights 6 large whales breaching at 2000 yards. MFAS not in use. No action taken.	2	6	large whale	no	N/A
22 Mar	DDG surface ship sights 2 large whales fluking at 1000 yards. MFAS not in use. No action taken.	3	2	large whale	no	N/A
22 Mar	DDG sights 2 large whales fluking at 2000 yards. MFAS not in use. No action taken. Ship altered course to open range to animal.	2	2	large whale	no	N/A
22 Mar	FFG sights 10 pilot whales at 2000 yards. MFAS not in use. No action taken.	2	10	pilot whale	no	N/A
22 Mar	DDG surface ship sights 10 dolphins transiting at 2000 yards. MFAS not in use. No action taken.	1	10	dolphin	no	N/A
22 Mar	DDG surface ship sights 1 large whale breaching at 1500 yards. MFAS not in use. No action taken.	1	1	large whale	no	N/A
22 Mar	DDG surface ship sights 3 dolphins spouting at 100 yards. MFAS not in use. No action taken.	1	3	dolphin	no	N/A
23 Mar	DDG surface ship sights 50 dolphins closing to bow ride at 50 yards. MFAS not in use. No action taken.	1	50	dolphin	no	N/A
23 Mar	DDG surface ship sights 1 large whale swimming at surface at 100 yards. MFAS not in use. No action taken.	1	1	large whale	no	N/A
23 Mar	DDG surface ship sights 2 sea lions at unreported range. MFAS not in use. No action taken.	1	2	sea lions	no	N/A
23 Mar	DDG surface ship sights 2 large whales spouting and swimming at 1500 yards. MFAS not in use. No action taken.	1	2	large whale	no	N/A
23 Mar	DDG surface ship sights 1 large whale at 1000 yards. Whale swam along starboard side of vessel. MFAS not in use. No action taken.	1	1	large whale	no	N/A
23 Mar	DDG surface ship sights 1 large whale spouting at 1000 yards. MFAS not in use. No action taken.	1	1	large whale	no	N/A
24 Mar	DDG surface ship sights 3 large whales spouting at 800 yards. MFAS not in use. No action taken.	2	3	large whale	no	N/A
24 Mar	DDG surface ship sights 2 large whales at 800 yards. MFAS was in use. MFAS secured until animal no longer in sight	2	2	large whale	yes	Secured
24 Mar	DDG surface ship sights 2 large whales at 1500 yards. MFAS was in use. MFAS secured until animal no longer in sight.	1	2	large whale	yes	Secured
24 Mar	DDG surface ship sights 3 large whales at 1500 yards. MFAS was in use. MFAS secured until animals no longer in sight.	1	3	large whale	yes	Secured
24 Mar	DDG surface ship sights 1 large whale at 1500 yards. MFAS was in use. MFAS secured until animals no longer in sight.	1	1	large whale	yes	Secured
24 Mar	FFG surface ship sights 2 pilot whales at 2000 yards. MFAS not in use. No action taken.	1	2	pilot whale	no	N/A
24 Mar	DDG surface ship sights 1 unknown marine mammal at 1000 yards. MFAS was in use. MFAS secured until animal no longer in sight.	1	1	unk	yes	Secured
24 Mar	DDG surface ship sights 1 unknown marine mammal at 1500 yards. MFAS was in use. MFAS secured until animal no longer in sight.	1	1	unk	yes	Secured

Date-Time local	Description of Actions Taken	Sea State	#	Animal Type	MFAS in use?	Mitigation
24 Mar	DDG surface ship sights 1 large whale spouting at 500 yards. MFAS was in use. MFAS secured until animal no longer in sight.	1	1	large whale	yes	Secured
24 Mar	DDG surface ship sights 20 dolphins closing to ride bow wake. MFAS not in use. No action taken.	1	20	dolphin	no	N/A
24 Mar	FFG surface ship sights 2 gray whales spouting at 500 yards. MFAS was in use. MFAS secured until animals no longer in sight.	1	2	gray whale	yes	Secured
24 Mar	DDG surface ship sights 1 large whale at 1500 yards. MFAS not in use. No action taken.	1	1	large whale	no	N/A
24 Mar	DDG surface ship sights 2 large whales breaching at 2000 yards. MFAS was in use. MFAS secured until animal no longer in sight.	1	2	large whale	yes	Secured
24 Mar	DDG surface ship sights 12 dolphins spouting and on parallel course at 200 yards. MFAS was in use. MFAS secured until animals were no longer in sight.	1	12	dolphin	yes	Secured
24 Mar	DDG surface ship sights 3 gray whales breaching at 1100 yards. MFAS was in use. MFAS secured until animals no longer in sight.	2	3	gray whale	yes	Secured
24 Mar	DDG surface ship sights 1 large whale breaching at 1500 yards. MFAS was in use. MFAS secured until animal was no longer in sight.	2	1	large whale	yes	Secured
24 Mar	DDG surface ship sights group of whales and 12 dolphins at 1200 yards. MFAS was in use. MFAS secured until animals was no longer in sight.	2	unk 12	whales dolphin	yes	Secured
24 Mar	DDG surface ship sights 6 large whales swimming at 500 yards. MFAS was in use. MFAS secured until animals were no longer in sight.	2	6	large whale	yes	Secured
25 Mar	DDG surface ships sights 1 large whale spouting at 500 yards. MFAS not is use. No action taken.	2	1	large whale	no	N/A
25 Mar	DDG surface ship sights 7 dolphins at 500 yards. MFAS not in use. No action taken.	2	7	dolphin	no	N/A
25 Mar	DDG surface ship sights 2 large whales breaching and spouting at 1000 yards. MFAS not in use. No action taken.	2	2	large whale	no	N/A
25 Mar	DDG surface ship sights 1 large whale at 500 yards. MFAS was in use. MFAS secured until animal was no longer in sight.	2	1	large whale	yes	Secured
25 Mar	DDG surface ship sights 1 sea lion at 50 yards. MFAS not in use. No action taken.	2	1	sea lions	no	N/A
25 Mar	DDG surface ships sights 25 dolphins 50 yards. MFAS sonar not in use. No action taken.	2	25	dolphin	no	N/A
25 Mar	DDG surface ship sights 1 gray whale breaching at 1000 yards. MFAS not in use. No action taken.	2	1	gray whale	no	N/A
25 Mar	DDG surface ship sights 30 dolphins at 50 yards. MFAS not in use. No action taken.	2	50	dolphin	no	N/A
25 Mar	DDG surface ship sights 1 dolphin at 100 yards. MFAS was in use. MFAS secured until animal was no longer in sight.	1	1	dolphin	yes	Secured
25 Mar	DDG surface ship sights 4 dolphins at 100 yards. MFAS was in use. MFAS secured until animals were no longer in sight.	1	4	dolphin	yes	Secured
26 Mar	CG surface ship sights 8 dolphins closing to ride ship bow wake. MFAS not in use. No action taken.	2	8	dolphin	no	N/A
26 Mar	Non-MFAS surface ship sights 1 dolphin at 50 yards. No MFAS equipment. No action taken.	1	1	dolphin	no	N/A
26 Mar	CG surface ship sights 2 sea lions at 25 yards. MFAS not in use. No action taken.	2	2	sea lions	no	N/A
27 Mar	DDG surface ship sights 30 dolphins closing to ride ship bow wake at 50 yards. MFAS not in use. No action taken.	2	30	dolphin	no	N/A
28 Mar	DDG surface ship sights unknown number of dolphins at 100 yards. MFAS was in use. MFAS secured until animals no longer in sight.	nr	unk	dolphin	yes	Secured
28 Mar	DDG surface ship sights 2 large whales spouting at 1500yards. MFAS was in use. MFAS secured until animals no longer in sight. Ship also alters course to open range.	2	2	large whale	yes	Secured
28 Mar	CG surface ship sights 1 large whale at 1000 yards. MFAS was in use. MFAS secured until animal no longer in sight.	2	1	large whale	yes	Secured

Date-Time local	Description of Actions Taken	Sea State	#	Animal Type	MFAS in use?	Mitigation
28 Mar	Helicopter sights 1 large whale swimming at 0 yards. MFAS not in use. No action taken.	2	1	large whale	no	N/A
28 Mar	DDG surface ship sights 1 whale at 400 yards. MFAS not in use. No action taken.	2	1	whale	no	N/A
28 Mar	DDG surface ship sights 1 whale spouting and passing along starboard side at 1500 yards. MFAS was in use. MFAS powered down until animal no longer in sight.	2	1	whale	yes	Power down
29 Mar	DDG surface ship sights 1 whale at 750 yards. MFAS not in use. No action taken.	3	1	whale	no	N/A
29 Mar	DDG surface ship sights 1 sea lion passing along port side at 1500 yards. MFAS not in use. No action taken.	3	1	sea lions	no	N/A
29 Mar	FFG surface ship sights 2 dolphins riding bow wake at 15 yards. MFAS not in use. No action taken.	2	2	dolphin	no	N/A
29 Mar	DDG surface ship sights 1 large whale spouting at 1000. MFAS not in use. No action taken.	2	1	large whale	no	N/A
30 Mar	DDG surface ship sights 1 large whale at 1500 yards. MFAS not in use. No action taken.	2	1	large whale	no	N/A
30 Mar	Non-MFAS surface ship sights 4 Pacific white-sided dolphins at 500 yards for five minutes. No MFAS equipment. No action taken.	3	4	dolphin	no	N/A
30 Mar	Non-MFAS surface ship sights 1 whale at 1000 yards for one minute. No MFAS equipment. No action taken. Altered course to open range.	3	1	whale	no	N/A
30 Mar	DDG surface ship sights 2 large whales at 1500 yards. MFAS was in use. MFAS -6dB powered down until animals no longer in sight.	4	2	large whale	yes	Power down 75%
31 Mar	DDG surface ship sights 1 large whale at 200 yards. MFAS was in use. MFAS secured until animal no longer in sight.	2	1	large whale	yes	Secured
31 Mar	DDG surface ship sights 1 large whale at 1100 yards. MFAS was in use. MFAS secured until animal no longer in sight.	3	1	large whale	yes	Secured
31 Mar	DDG surface ship sights 1 small whale at 500 yards. MFAS was in use. MFAS secured until animal no longer in sight.	3	1	small whale	yes	Secured
01 Apr	DDG surface ship sights 3 whales passing along starboard side of ship at 1100 yards. MFAS was in use. MFAS secured until animals no longer in sight.	2	3	whale	yes	Secured
01 Apr	DDG surface ship sights 1 whale 1000 yards. MFAS not in use. No action taken.	3	1	whale	no	N/A
01 Apr	DDG surface ship sights 1 whale swimming at 750 yards. MFAS was in use. MFAS powered down -6dB until animal no longer in sight.	3	1	whale	yes	Power down 75%
01 Apr	DDG surface ship sights 1 large whale at 1500 yards. MFAS was in use. MFAS secured until animal no longer in sight.	3	1	large whale	yes	Secured
01 Apr	FFG surface ship sights 1 small whale at 500 yards. MFAS was in use. MFAS powered down -10dB.	3	1	small whale	yes	Power down 90%
01 Apr	FFG sights 1 large whale at 500 yards. MFAS not in use. No action taken. Ship altered course to increase distance between ship and marine mammal.	3	1	large whale	no	N/A
02 Apr	Non-MFAS surface ship sights 1 large whale at 250 yards for one minute. No MFAS equipment. No action taken.	2	1	large whale	no	N/A
02 Apr	DDG surface ship sights 1 large whale at 1500 yards. MFAS not in use. No action taken.	1	1	large whale	no	N/A
02 Apr	Non-MFAS surface ship sights 1 humpback whale at 250 yards for one minute. No MFAS equipment. No action taken.	2	1	large whale	no	N/A
02 Apr	DDG surface ship sights 1 whale at unreported range. MFAS not in use. No action taken.	1	1	whale	no	N/A
03 Apr	DDG surface ship sights 1 large whale at 1000 yards. MFAS was in use. MFAS secured until animal no longer in sight.	2	1	whale	yes	Secured
03 Apr	DDG surface ship sights 12 dolphins at 1500 yards. MFAS was in use. MFAS secured until animals no longer in sight.	2	12	dolphin	yes	Secured
03 Apr	DDG surface ship sights 10 sea lions at 500 yards. MFAS was in use. MFAS powered down and then secured until animals no longer in sight.	2	10	sea lions	yes	Secured
03 Apr	DDG surface ship sights 1 large whale at 2000 yards. MFAS was in use. MFAS secured until animal no longer in sight.	2	1	large whale	yes	Secured

Date-Time local	Description of Actions Taken	Sea State	#	Animal Type	MFAS in use?	Mitigation
03 Apr	DDG surface ship sights 3 whales swimming at 500 yards. MFAS was in use. MFAS secured until animals no longer in sight.	2	3	whale	yes	Secured
03 Apr	DDG surface ship sights 1 large whale swimming at 500 yards. MFAS was in use. MFAS secured until animal no longer in sight.	2	1	large whale	yes	Secured
04 Apr	CG surface ship sights 30 dolphins jumping in ships wake at 50 yards. MFAS not in use. No action taken.	1	30	dolphin	no	N/A
04 Apr	DDG surface ship sights 2 large whales at 2000 yards. MFAS not in use. No action taken.	2	2	large whale	no	N/A
04 Apr	CG surface ship sights 30 dolphins at 200 yards swimming from port to starboard. MFAS was in use. MFAS secured until animals no longer in sight.	2	30	dolphin	yes	Secured
04 Apr	Helicopter sights 1 whale swimming at 100 yards. MFAS was in use. MFAS secured, and dipping sonar retrieved.	2	1	whale	yes	Secured
05 Apr	DDG surface ship sights 1 whale swimming at 1500 yards. MFAS was in use. MFAS powered down -6dB until animal no longer in sight.	3	1	whale	yes	Power down 75%
05 Apr	DDG surface ship sights 1 seal feeding at 500 yards. MFAS was in use. MFAS secured until animal no longer in sight. Animal observed to continue feeding prior to shut-down and after.	3	1	seal	yes	Secured
05 Apr	DDG surface ship sights 2 large whales swimming at 1000 yards. MFAS was in use. MFAS secured until animals no longer in sight.	3	2	large whale	yes	Secured
06 Apr	DDG surface ship sights 6 large whales swimming at 2000 yards. MFAS was in use. MFAS secured until animals no longer in sight.	2	6	large whale	yes	Secured
06 Apr	Helicopter sights 1 whale swimming at unreported range for 5 minutes. MFAS not in use. No action taken.	2	1	whale	no	N/A
06 Apr	DDG surface ship sights 1 floating seal carcass at 250 yards. Carcass showed advanced decomposition. MFAS was in use. MFAS secured.	1	x	seal	yes	Secured
07 Apr	DDG surface ship sights 50 dolphins closing to bow ride at 30 yards. MFAS not in use. No action taken.	3	50	dolphin	no	N/A
07 Apr	CG surface ship sights 1 large whale swimming at 500 yards for 5 minutes. MFAS was in use. MFAS powered down -10dB until animal no longer in sight.	2	1	large whale	yes	Power down 90%

Table 3. SOCAL sea states as reported by ship exercise participants for COMPTUEX 08-3 conducted within the SOCAL OPAREA from 20 March through 7 April 2008.

Graphic	Beaufort Wind Force Scale *	Observed Sea Surface Condition	Sailor's Term	Effects on Land	Typical Wind Speed (MPH)
	0	Mirror smooth and glassy surface	Calm	Calm; smoke rises straight up	0
Beaufort Scale 1 	1	Small ripples or capillary waves on glassy surface	Light Air	Smoke drifts with wind direction	1-3
Beaufort Scale 2 	2	Larger ripples or wavelets on glassy surface	Light Breeze	Leaves begin to rustle; wind felt on face	4 - 7
Beaufort Scale 3 	3	Wavelets of irregular direction and shape; a few crests break on glassy surface	Gentle Breeze	Small flags extend; leaves in constant motion	8 - 12
Beaufort Scale 4 	4	Small chop, defined direction; numerous whitecaps	Moderate Breeze	Dust, leaves, and loose paper move	13 - 18
<p>* One of the first scales to estimate wind speeds and the effects at sea was created by Britain's Admiral Sir Francis Beaufort (1774-1857) who developed the scale in 1805 to help sailors estimate winds via visual observations. The scale starts with 0 and goes to a force of 12. The Beaufort scale is still used today to estimate wind strengths.</p>					

Table 4 provides a summary of recent marine mammal sighting data conducted quarterly from July 2004 to November 2005 (Soldevilla et al. 2006). This paper represents data useful for predicting potential marine mammal seasonal assemblages within Southern California, and one of the few reports with winter survey results.

More detailed information on marine mammal seasonal occurrence in Southern California can be found in Forney and Barlow (1998), Carretta et al. (2000), Soldevilla et al. (2006), Barlow and Forney (2007), Hildebrand (2007), and Oleson et al. (2007). Based on the references discussed above, and given the time of year COMPTUEX 08-3 occurred (March-April), likely ESA species present in Southern California during the exercise include fin whales, humpback whales, sei whales, and sperm whales. Sperm whales have a much more variable abundance in the deep offshore waters off California (Barlow and Forney 2007, Hildebrand 2007). The

majority of sperm whale sightings reported in Barlow and Forney (2007) were from waters west of the Patton Escarpment (**Figure 3**), in areas of the SOCAL OPAREA not used for this exercise (west of the polygon in **Figure 1**).

Blue whales and humpback whales are thought to winter off Baja California, coastal Mexico (for humpback whales), in the Gulf of California, and on the Costa Rica Dome (Forney and Barlow 1998; Carretta et al. 2007). Depending on large scale oceanographic processes, the exact time when animals begin their northward migration to feeding areas off Southern California, Central California, the Pacific Northwest, and Gulf of Alaska can not always be precisely determined. In April, for instance, Soldevilla et al. (2006) and Hildebrand (2007) did report humpback sightings within Southern California during April. Fin and sei whales inhabit southern California waters in all seasons or with unknown seasonal patterns (Hildebrand 2007). Blue whales are not expected given the March to early April time frame of COMPTUEX 08-3.

At-sea distributions of Guadalupe sea lions are poorly documented so no determination of presence or absence can be inferred. For non-ESA-listed animals, the most abundant winter-spring dolphins species expected are common dolphins (short-beaked and long-beaked), Pacific white-side dolphins, Risso's dolphins, Dall's porpoise, Northern right-whale dolphins, and bottlenose dolphins (**Table 4**).

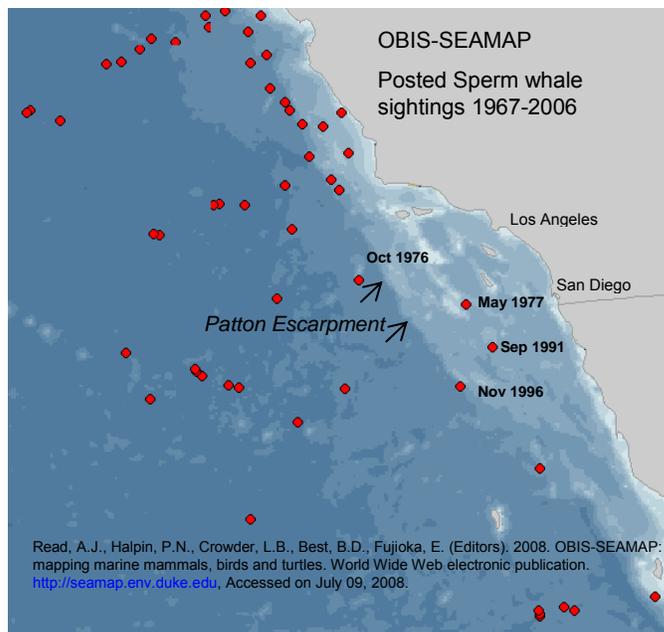


Figure 3. Sperm whale sightings from 1967 to 2006 within the offshore waters of Central California, Southern California, and Baja Mexico. Date from OBIS-SEAMAP.

Table 4. Visual detections of cetaceans over CalCOFI cruises from July 2006 – April 2007. Total number of schools sighted and total number of animals sighted per species for each trip. (Table from: Hildebrand 2007). Red box indicates sightings from same seasonal time period but not year as COMPTUEX 08-3 (Mar-Apr).

Species	July 2006		November 2006		January 2007		April 2007		July 2006 – April 2007	
	# sight	# animals	# sight	# animals	# sight	# animals	# sight	# animals	# sight	# animals
Blue whale	11	16	3	4					14	20
Fin whale	7	7	8	11	1	2	1	2	17	22
Humpback whale	3	5	1	1			3	5	7	11
Sei whale							1	1	1	1
Minke whale	2	2			1	1	1	1	4	4
Gray whale					40	73	2	4	42	77
Sperm whale	4	12	1	4	2	3	3	6	10	25
Short-beaked common dolphin	36	1802	10	678	23	1488	2	193	71	4161
Long-beaked common dolphin	3	137	2	68			1	1800	6	2005
Common dolphin species	15	717	3	395	9	2638	5	1297	32	5047
Pacific white-sided dolphin			3	60	1	30	5	100	9	190
Risso's dolphin					2	292	4	73	6	365
Northern right-whale dolphin			1	45			2	35	3	80
Bottlenose dolphin			6	45	1	30	2	16	9	91
Dall's porpoise			1	1	10	53	15	78	26	132
Short-finned pilot whale	1	30							1	30
Killer whale	1	3							1	3
Cuvier's Beaked whale					1	1			1	1
Unidentified large whale	8	20	15	20	11	15	3	4	37	59
Unidentified small whale	1	4					2	2	3	6
Unidentified odontocete					1	2	1	1	2	3
Unidentified dolphin	7	172	5	162	7	480	2	4	21	818
Unidentified beaked whale					1	5			1	5
Total	99	2927	59	1494	111	5113	55	3622	324	13156

MFAS EXPOSURE ASSESSMENT

As in any review of the operational aspects of U.S. Navy ASW operations using MFAS, specific source levels, numbers of sources, and frequencies of sonar used during COMPTUEX 08-3 are classified because release of this information may provide potential adversaries with critical tactical data. The following discussion is focused on the 1) amount of time spent visually searching the ocean, 2) the amount of time conducting MFAS training, and 3) a discussion of individual events when MFAS was active and marine mammals were spotted within 2,000 meters.

This report presents marine mammal sighting information out to 2,000 meters. Mitigation discussions reference the 200, 500, and 1,000 meter NDE safety zones applicable to this exercise. But due to court restrictions, MFAS equipped ships were required to adhere to a larger shutdown zone at times out to 2,000 meters when not at a critical point in the exercise.

Visual sighting effort: Visual sighting effort for COMPTUEX 08-3 is calculated using the length of the exercise (22 days), the number of hours per day (24), the standard operating procedure for all vessels to conduct visual searches 24/7 with three lookouts on watch and scanning the ocean at all times, and an additional two lookouts during ASW events, and the presence of 5 MFAS-equipped vessels.

Over 2,640 hours of visual survey effort was conducted by U.S. Navy lookouts assigned to 5 MFAS-equipped surface ships over the entire course of the exercise (22 days x 24 hrs/day = 528 hrs x 5 MFAS ships = 2,640 hours), including MFAS and non-MFAS events. This total does not include additional visual sighting results from one non-MFAS ship which represents an additional 528 hours (2,640 + 528 = 3,168 hours).

MFAS use: During COMPTUEX 08-3, 490 hours of MFAS time was reported from all sources including hull-mounted surface ship AN/SQS-53 sonar, helicopter dipping sonar, and DICASS sonobuoys (**Table 1**).

Note, however, that the 490 hours of MFAS time is not indicative of continuous and consecutive use. MFAS is only used for a relatively small portion of any given exercise time frame. Total active sonar hours represent the sum of the total time of a number of individual training events during COMPTUEX 08-3. In other words, an individual unit using MFAS records when the sonar was turned on at the beginning of a training event and reports MFAS time until the event is finished. These sonar hours are reported into the U.S. Navy's Sonar Positional Reporting System (SPORTS) as a conservative estimate of total sonar hours based on a unit reporting it had sonar "on" for a training event, and then sonar "off". The sonar "on period" may not always be directly equivalent to all actual active sonar transmission (i.e., sound in the water) since there may be tactical and maintenance reasons why MFAS may not be in transmit mode for the portions of a training event reported in SPORTS. Therefore, MFAS hours derived from SPORTS and presented in this after action report are a conservative over estimate of total MFAS hours.

Furthermore, during periods when there is an active transmission, MFAS puts sound into the water at discrete intervals. Sonar signals are not a continuous source of acoustic energy. A surface ship sonar signal consists of a pulse (i.e., ping) approximately one second long with a period of time between successive pings based on the classified tactical considerations. Navy's modeling of time between pings is 30 seconds which results in an overstatement of the energy in the water because time between pings is, in many instances, greater than 30 seconds. Accordingly, during typical active sonar use, MFAS is silent for the vast majority of the time. This was the case for COMPTUEX 08-3. Therefore, for the 490 hours of total sonar period reported,

the actual amount of time sonar put energy into the water was less than two and a half hours. The calculation for this determination is presented below:

$$2 \text{ seconds of pings} * 1 \text{ minute} \times 60 \text{ min/1 hr} \times 490 \text{ hrs} = 980 \text{ min or } 16.3 \text{ hrs}$$

*one ping approximately every 30 seconds

Ten nautical miles distance at sea is almost the same equivalent distance as from the shore line at the Ocean Beach pier to La Mesa in San Diego County, or from the shoreline at Santa Monica to Beverly Hills in Los Angeles (**Figure 4**). Over a one hour time, only 120 seconds of acoustic energy would be released during this period. MFAS propagation loss results in significant loss of any biologically relevant energy over distances greater than 200 meters from the source. Animals at one location would not be expected to be continuously exposed to repeated sonar signals, and quite possibly would be exposed to from zero to two or three pings (0-3 seconds) depending on animal movement or diving patterns. Marine mammals observed within MFAS mitigation zones would have even less exposure when MFAS is either powered down up to 75% or turned off.

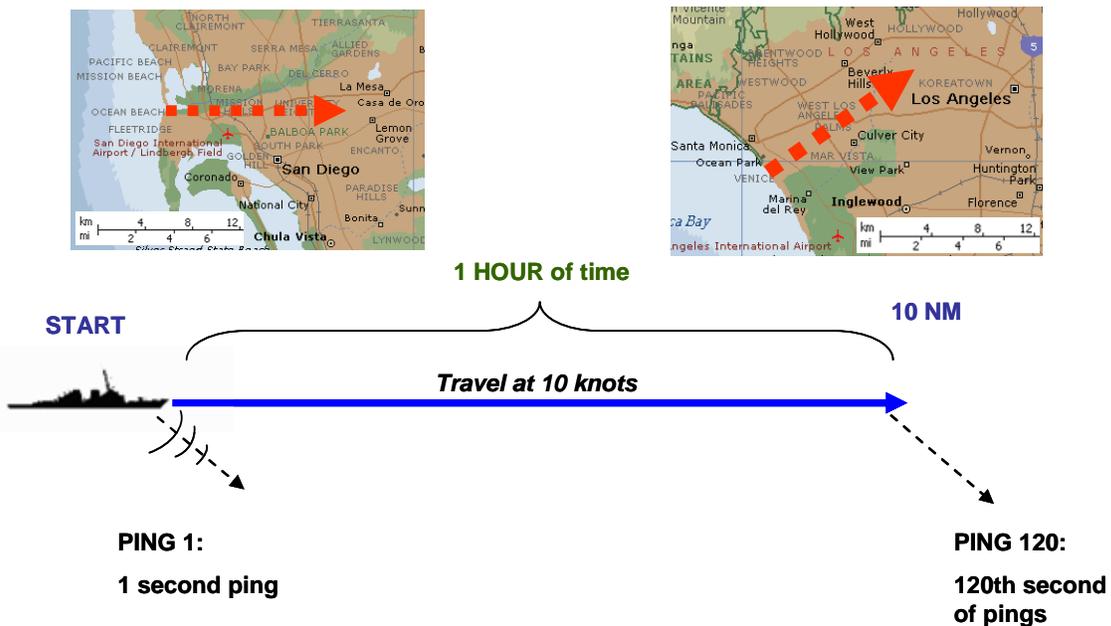


Figure 4. Example showing relative movement of MFAS surface ship over one hour and the limited amount of actual sonar energy used during this time period base on duty cycle of hull mounted sonar. This represents a generalized, typical scenario. The 120th ping represents the time at which the 120th ping will occur after an hour of travel given notional MFAS duty cycle of 1 ping every 30 seconds (2 pings per minute x 60 minutes per hour = 120 pings per hour).

NDE Safety And Litigation Training Restriction Zone Assessment for COMPTUEX 08-3

To address NMFS requirements to assess potential exposure levels of marine mammals to sonar, general transmission loss formulas derived from Urick (1982) were used and results are presented in **Table 5**. Estimated exposures can be determined based on standard generic formulas of how sound propagates in water [defined as spherical spreading where propagation loss from a source = $20 \log [R]$ with “R” being range from the source (Urick 1982)]. However, spherical spreading is only an appropriate sound propagation formula to a range of 1,000 yards from a source in open ocean, after which sound propagation is determined by cylindrical spreading [defined as spherical spreading where propagation loss from a source = $10 \log [R]+30$ with “R” being range from the source >1000 yards and 30 being the spherical loss from 0 to 1000 yards]. Depending on the range of the sighting reported in **Table 5**, either Urick’s spherical or cylindrical formula was used.

This estimate of potential exposure makes a very conservative assumption. It uses the horizontal range from a visual sighting to account for an animal across all depths at which an animal travels and predicts the maximum, worst case potential exposure. In other words, this estimated worst case exposure is presented independent of the animal’s actual depth level, since a) time and depth of current and previous dives cannot be deduced from a limited surface sighting, and b) oceanographic and tactical conditions influence actual sound propagation at different depths. Given relative motion of ships and animals at sea, the time spent with any given exposure from surface ships is likely to be limited.

Table 5 shows COMPTUEX 08-3 marine mammal sightings in relation to applicable safety zones. There were **42 MFAS secure (i.e., turn off) or power down events within 2,000 meters** during COMPTUEX 08-3. The 42 events represent 32% of the total sightings (42/133). Of the 42, there were 36 securing events and 6 power down events. In addition, 18 of the 42 MFAS securing or power down events (approximately 40%) were in response to litigation restrictions between 1,000 and 2,000 meters vice NDE mitigation measures at the 200, 500, and 1,000 meter safety ranges.

The following assessment addresses potential exposure to possible ESA-species as described in the NMFS BO Terms and Conditions (NMFS 2007). Of note, given the March to early April time frame of this exercise, it is possible that several of the whale and large whale sightings reported by exercise participants were in fact migrating gray whales. Given the uncertainty in species identification, however, all whale and large whale sightings are considered as potential ESA cetacean species for the purposes of this exposure assessment (fin, humpback, sei, sperm whales which could be seasonally expected within the area). This same approach applies also to unidentified seals.

200 meter NDE safety zone: There were six surface ship sightings that caused MFAS to be secured due to marine mammal presence within 200 meters. There was one helicopter sighting where dipping MFAS was secured due to marine mammal presence within 200 meters. For the six surface ship events, five of the six were for non-ESA listed dolphin sightings, and one was for a large whale (one sighting of one animal). During the large whale event, MFAS was secured upon initial animal sighting at 200 yards (183 meters) and remained off until the animal was no longer in sight. Assuming a maximum potential receive level (RL), sonar exposure at this range would have been 190 dB re 1 Pa²·s prior to MFAS being secured. After turning off the sonar, the animal would not have been exposed to any further sonar energy.

For the helicopter MFAS securing event, the dipping sonar was secured upon initial sighting of one whale at 100 yards (91 meters). Note, dipping sonar operates at a lower power than the hull-mounted surface ship sonars, around 216 dB. Given this source level, and assuming a maximum potential receive level (RL), sonar exposure at this range would have been 178 dB re 1 Pa²·s prior to MFAS being secured. Helicopter sonars typically only use a few pings per search since their tactical employment is to localize a suspected submarine contact vice broad area search. Overall accumulated energy before the whale sighting would have been minimal prior to the sonar being secured.

Based on the above sightings, it is estimated that a total of 2 potential ESA marine mammals (large whale) might have been exposed to RL equal to or greater than 173 dB. Given the time of year, it is unknown if these sightings might have been non-ESA whales (either gray whale, or minke whale).

201-500 meter NDE safety zone: There were 11 surface ship sightings that resulted in MFAS mitigation between 201-500 meters. Of these 11 events, there were seven MFAS mitigation events for potential ESA species (6 sightings involving 13 cetaceans and 1 seal sighting) (**Table 5**). The six cetacean MFAS mitigations events all involved an initial sighting at 500 yards. MFAS was secured in five of these cases, and powered down in one. MFAS was secured for the seal sighting. For the six securing events, MFAS was secured upon initial animal sighting at 500 yards (457 meters) and remained off until the animal was no longer in sight. Assuming a maximum potential receive level (RL), sonar exposure at this range would have been 182 dB re 1 Pa²·s prior to MFAS being secured. After turning off the sonar, the animals would not have been exposed to any further sonar energy. For the one power down event, the ship reduced power by 10 dB, a 90% power reduction. Assuming a maximum potential receive level (RL), sonar exposure at this range would have been gone from 182 dB re 1 Pa²·s to 172 dB after MFAS was powered down.

Based on the above sightings, it is estimated that a total of 14 potential ESA marine mammals (13 cetaceans and 1 seal) might have been exposed to RL equal to or greater than 173 dB. Given the time of year, it is unknown if any of these sightings might have been other non-ESA whales (gray whale, minke whale). It is also unknown if the seal sightings was an ESA-listed Guadalupe fur seal, or more common non-ESA listed California sea lion, harbor seal, or elephant seal.

501-1,000 meter NDE safety zone: There were six surface ship sightings that resulted in MFAS mitigation between 501 to 1000 meters. All six of these sightings for a total of eight animals could have been ESA species and occurred at ranges of 750, 800, and 1000 yards (686, 732, 914 meters). MFAS was secured five times and powered down once. Assuming a maximum potential receive level (RL), sonar exposure at these ranges would have been 178 dB re 1 Pa²·s at 800 yards (732 meters), and 176 dB re 1 Pa²·s at 1,000 yards (914 meters) prior to

MFAS being secured. After turning off the sonar, the animals would not have been exposed to any further sonar energy. For the one power down event at 750 yards (686 meters), the ship reduced power by 6 dB, a 75% power reduction. Assuming a maximum potential receive level (RL), sonar exposure at this range would have been gone from 178 dB re 1 Pa²·s to 172 dB after MFAS was powered down.

Based on the above sightings within this range, it is estimated that a total of 8 potential ESA marine mammals (all whales) might have been exposed to RL equal to or greater than 173 dB. Given the time of year, it is unknown if these sightings might have been non-ESA whales (either gray whale, or minke whale).

1,001-2,000 meter litigation imposed Training Restriction zone: There is no NDE required MFAS mitigation for ranges equal to or greater than 1,000 meters. Due to ongoing litigation training restrictions (**Appendix A**), ships complied by using MFAS mitigation out to ranges of 2,000 meters.

There were 18 surface ship sightings that resulted in MFAS mitigation for marine mammals between 1,001 to 2000 meters. Of these 18 sightings, 16 could have been potential ESA species. Of the 16 potential ESA sightings, MFAS was secured 13 times and powered down three times. Assuming a maximum potential receive level (RL), sonar exposure at these ranges would have been 175 dB re 1 Pa²·s for two sightings at 1,100 yards (1,005 meters), 175 db re 1 Pa²·s for one sighting at 1,200 yards (1,097 meters), 174 dB re 1 Pa²·s for seven sightings at 1,500 yards (1,372 meters), and 172 dB re 1 Pa²·s for three sightings at 2,000 yards (1,829 meters) prior to MFAS being secured. After turning off the sonar, the animals would not have been exposed to any further sonar energy. For the three power down events at 1,500 yards (1,372 meters), the ships reduced power by 6 dB, a 75% power reduction. Assuming a maximum potential receive level (RL), sonar exposure at this range would have been gone from 174 dB re 1 Pa²·s to 168 dB after MFAS was powered down.

Based on the above sightings, it is estimated that a total of 19 potential ESA marine mammals (all large cetaceans plus another group of whales not counted) might have been exposed to RL equal to or greater than 173 dB. This total excludes the 9 cetaceans sighted at 2,000 yards since RL was less than 173 dB. Given the time of year, it is unknown if these sightings might have been non-ESA whales (either gray whale, or minke whale).

SUMMARY

Based on reporting requirements from the NMFS BO, for COMPTUEX 08-3 the total number of potential ESA marine mammals exposed to MFAS at RL equal to or greater than 173 dB was 43 animals from 28 sightings. Given the time of year, it is unknown if some of these sightings might have been non-ESA whales (either gray whale, or minke whale).

Range	Estimated # of potential ESA-listed marine mammals exposed to RL >173 dB re 1 Pa ² ·s
<200 m	2
201-500 m	14
501-1,000 m	8
1,001-1,500 m	19
<i>total</i>	43

Table 5. Sightings during COMPTUEX 08-3 where MFAS was on and mitigation occurred (listed by range).

Assessment by Range for Surface Ship MFA sonar		
NDE Range	Marine Mammal Type	Comments <i>Estimated exposure based on 20 Log [R] spherical spreading propagation loss for ranges less than 1000 meters and where nominal MFAS source level (SL) assumed to be 235 dB (Urick 1982); for ranges > 1000 m, then propagation loss is better approximated as 10 Log(R) + 30 dB</i> [Pictograms represent ship movement (blue circle and arrow) and sighting location of marine mammal (green square) relative to ship's movement]
< 200 meters Sonar secured (turned off)	1 dolphin	25 Mar: DDG surface ship sights 1 dolphin at 100 yards. MFAS was in use. MFAS secured until animal was no longer in sight. 
	4 dolphin	25 Mar: DDG surface ship sights 4 dolphins at 100 yards. MFAS was in use. MFAS secured until animals were no longer in sight. 
	unk # dolphins	28 Mar: DDG surface ship sights unknown number of dolphins at 100 yards. MFAS was in use. MFAS secured until animals no longer in sight. 
	12 dolphin	24 Mar: DDG surface ship sights 12 dolphins spouting and on parallel course at 200 yards. MFAS was in use. MFAS secured until animals were no longer in sight. 
	1 large whale	31 Mar: DDG surface ship sights 1 large whale at 200 yards. MFAS was in use. MFAS secured until animal no longer in sight. MAX. est. MFAS exposure: 190 dB re 1 Pa ² ·s 
	30 dolphin	04 Apr: CG surface ship sights 30 dolphins at 200 yards swimming from port to starboard. MFAS was is use. MFAS secured until animals no longer in sight. 

Assessment by Range for Surface Ship MFA sonar		
NDE Range	Marine Mammal Type	Comments <i>Estimated exposure based on 20 Log [R] spherical spreading propagation loss for ranges less than 1000 meters and where nominal MFAS source level (SL) assumed to be 235 dB (Urlick 1982); for ranges > 1000 m, then propagation loss is better approximated as 10 Log(R) + 30 dB</i> [Pictograms represent ship movement (blue circle and arrow) and sighting location of marine mammal (green square) relative to ship's movement]
200-500 meters Sonar reduced -10 dB (surface ship only)	1 large whale	24 Mar: DDG surface ship sights 1 large whale spouting at 500 yards. MFAS was in use. MFAS secured until animal no longer in sight. MAX. est. MFAS exposure: 182 dB re 1 Pa ² ·s 
	2 gray whales	24 Mar: FFG surface ship sights 2 gray whales spouting at 500 yards. MFAS was in use. MFAS secured until animal no longer in sight. 
	6 large whales	24 Mar: DDG surface ship sights 6 large whales swimming at 500 yards. MFAS was in use. MFAS secured until animals was no longer in sight. MAX. est. MFAS exposure: 182 dB re 1 Pa ² ·s 
	1 large whale	25 Mar: DDG surface ship sights 1 large whale at 500 yards. MFAS was in use. MFAS secured until animals was no longer in sight. MAX. est. MFAS exposure: 182 dB re 1 Pa ² ·s 
	1 small whale	31 Mar: DDG surface ship sights 1 small whale at 500 yards. MFAS was in use. MFAS secured until animal no longer in sight. 
	1 small whale	01 Apr: FFG surface ship sights 1 small whale at 500 yards. MFAS was in use. MFAS powered down -10 dB. 
	10 sea lions	03 Apr: DDG surface ship sights 10 sea lions at 500 yards. MFAS was in use. MFAS powered down and then secured until animals no longer in sight. 
	3 whales	03 Apr: DDG surface ship sights 3 whales swimming at 500 yards. MFAS was in use. MFAS secured until animals no longer in sight. MAX. est. MFAS exposure: 182 dB re 1 Pa ² ·s 
	1 large whale	03 Apr: DDG surface ship sights 1 large whale swimming at 500 yards. MFAS was in use. MFAS secured until animal no longer in sight. MAX. est. MFAS exposure: 182 dB re 1 Pa ² ·s 
	1 seal	05 Apr: DDG surface ship sights 1 seal feeding at 500 yards. MFAS was in use. MFAS secured until animal no longer in sight. Animal observed to continue feeding prior to shut-down and after. MAX. est. MFAS exposure: 182 dB re 1 Pa ² ·s 
	1 large whale	07 Apr: CG surface ship sights 1 large whale swimming at 500 yards for 5 minutes. MFAS was in use. MFAS powered down -10 dB until animal no longer in sight. MAX. est. MFAS exposure: 182 dB re 1 Pa ² ·s to 172 dB <u>AFTER</u> power down 

Assessment by Range for Surface Ship MFA sonar		
NDE Range	Marine Mammal Type	Comments <i>Estimated exposure based on 20 Log [R] spherical spreading propagation loss for ranges less than 1000 meters and where nominal MFAS source level (SL) assumed to be 235 dB (Urlick 1982); for ranges > 1000 m, then propagation loss is better approximated as 10 Log(R) + 30 dB</i> [Pictograms represent ship movement (blue circle and arrow) and sighting location of marine mammal (green square) relative to ship's movement]
500- 1000 meters Sonar reduced -6 dB (surface ship only)	1 whale	01 Apr: DDG surface ship sights 1 whale swimming at 750 yards. MFAS was in use. MFAS powered down -6 dB until animal no longer in sight. MAX. est. MFAS exposure: 178 dB re 1 Pa ² -s to 172 dB AFTER power down 
	2 large whales	24 Mar: DDG surface ship sights 2 large whales at 800 yards. MFAS was in use. MFAS secured until animal no longer in sight. MAX. est. MFAS exposure: 178 dB re 1 Pa ² -s 
	1 unknown marine mammal	24 Mar: DDG surface ship sights 1 unknown marine mammal at 1000 yards. MFAS was in use. MFAS secured until animal no longer in sight. MAX. est. MFAS exposure: 176 dB re 1 Pa ² -s 
	1 large whale	28 Mar: CG surface ship sights 1 large whale at 1000 yards. MFAS was in use. MFAS secured until animal no longer in sight. MAX. est. MFAS exposure: 176 dB re 1 Pa ² -s 
	1 large whale	03 Apr: DDG surface ship sights 1 large whale at 1000 yards. MFAS was in use. MFAS secured until animal no longer in sight. MAX. est. MFAS exposure: 176 dB re 1 Pa ² -s 
	2 large whales	05 Apr: DDG surface ship sights 2 large whales swimming at 1000 yards. MFAS was in use. MFAS secured until animals no longer in sight. MAX. est. MFAS exposure: 176 dB re 1 Pa ² -s 

Assessment by Range for Surface Ship MFA sonar		
NDE Range	Marine Mammal Type	Comments <i>Estimated exposure based on 20 Log [R] spherical spreading propagation loss for ranges less than 1000 meters and where nominal MFAS source level (SL) assumed to be 235 dB (Urlick 1982); for ranges > 1000 m, then propagation loss is better approximated as 10 Log(R) + 30 dB</i> [Pictograms represent ship movement (blue circle and arrow) and sighting location of marine mammal (green square) relative to ship's movement]
<2000 meters	3 gray whales	24 Mar: DDG surface ship sights 3 gray whales breaching at 1100 yards. MFAS was in use. MFAS secured until animals no longer in sight. 
	1 large whale	31 Mar: DDG surface ship sights 1 large whale at 1100 yards. MFAS was in use. MFAS secured until animal no longer in sight. MAX. est. MFAS exposure: 175 dB re 1 Pa ² -s 
	3 whales	31 Mar: DDG surface ship sights 3 whales passing along starboard side of ship at 1100 yards. MFAS was in use. MFAS secured until animal no longer in sight. MAX. est. MFAS exposure: 175 dB re 1 Pa ² -s 
	unk # whales 12 dolphins	24 Mar: DDG surface ship sights group of whales and 12 dolphins at 1200 yards. MFAS was in use. MFAS secured until animals was no longer in sight. MAX. est. MFAS exposure: 175 dB re 1 Pa ² -s 
	2 large whales	24 Mar: DDG surface ship sights 2 large whales at 1500 yards. MFAS was in use. MFAS secured until animal no longer in sight. MAX. est. MFAS exposure: 174 dB re 1 Pa ² -s 
	3 large whales	24 Mar: DDG surface ship sights 3 large whales at 1500 yards. MFAS was in use. MFAS secured until animals no longer in sight. MAX. est. MFAS exposure: 174 dB re 1 Pa ² -s 
	1 large whale	24 Mar: DDG surface ship sights 1 large whale at 1500 yards. MFAS was in use. MFAS secured until animals no longer in sight. MAX. est. MFAS exposure: 174 dB re 1 Pa ² -s 
	1 unknown marine mammal	24 Mar: DDG surface ship sights 1 unknown marine mammal at 1500 yards. MFAS was in use. MFAS secured until animal no longer in sight. MAX. est. MFAS exposure: 174 dB re 1 Pa ² -s 
	1 large whale	24 Mar: DDG surface ship sights 1 large whale breaching at 1500 yards. MFAS was in use. MFAS secured until animal was no longer in sight. MAX. est. MFAS exposure: 174 dB re 1 Pa ² -s 
	2 large whales	28 Mar: DDG surface ship sights 2 large whales spouting at 1500 yards. MFAS was in use. MFAS secured until animals no longer in sight. Ship also alters course to open range. MAX. est. MFAS exposure: 174 dB re 1 Pa ² -s 
	1 whale	28 Mar: DDG surface ship sights 1 whale spouting and passing along starboard side at 1500 yards. MFAS was in use. MFAS -6 dB powered down until animals no longer in sight. MAX. est. MFAS exposure: 174 dB re 1 Pa ² -s to 168 dB AFTER power down 
	2 large whales	30 Mar: DDG surface ship sights 2 large whales at 1500 yards. MFAS was in use. MFAS -6dB powered down until animals no longer in sight. MAX. est. MFAS exposure: 174 dB re 1 Pa ² -s to 168 dB AFTER power down 
	1 large whale	01 Apr: DDG surface ship sights 1 large whale at 1500 yards. MFAS was in use. MFAS secured until animal no longer in sight. MAX. est. MFAS exposure: 174 dB re 1 Pa ² -s 

Assessment by Range for Surface Ship MFA sonar		
NDE Range	Marine Mammal Type	Comments <i>Estimated exposure based on 20 Log [R] spherical spreading propagation loss for ranges less than 1000 meters and where nominal MFAS source level (SL) assumed to be 235 dB (Urlick 1982); for ranges > 1000 m, then propagation loss is better approximated as 10 Log(R) + 30 dB</i> [Pictograms represent ship movement (blue circle and arrow) and sighting location of marine mammal (green square) relative to ship's movement]
	12 dolphins	03 Apr: DDG surface ship sights 12 dolphins at 1500 yards. MFAS was in use. MFAS secured until animal no longer in sight. 
	1 whale	05 Apr: DDG surface ship sights 1 whale swimming at 1500 yards. MFAS was in use. MFAS powered down -6 dB until animal no longer in sight. MAX. est. MFAS exposure: 174 dB re 1 Pa ² -s to 168 dB AFTER power down 
	2 large whales	24 Mar: DDG surface ship sights 2 large whales breaching at 2000 yards. MFAS was in use. MFAS secured until animal no longer in sight. MAX. est. MFAS exposure: 172 dB re 1 Pa ² -s 
	1 large whale	03 Apr: DDG surface ship sights 1 large whale at 2000 yards. MFAS was in use. MFAS secured until animal no longer in sight. MAX. est. MFAS exposure: 172 dB re 1 Pa ² -s 
	6 large whales	06 Apr: DDG surface ship sights 6 large whales swimming at 2000 yards. MFAS was in use. MFAS secured until animal no longer in sight. MAX. est. MFAS exposure: 172 dB re 1 Pa ² -s 
Assessment by Range for Helicopter MFA dipping sonar		
Range	Marine Mammal Type	Comments <i>Nominal MFAS source level (SL) assumed to be 217 dB</i>
< 200 meters- Sonar secured (turned off)	1 whale	04 Apr: Helicopter sights 1 whale swimming at 100 yards. MFAS was in use. MFAS secured, and dipping sonar retrieved. MAX. est. MFAS exposure: 178 dB re 1 Pa ² -s

PASSIVE SONAR

Passive sonar is an acoustic device used for listening to underwater sound and does not involve transmitting active sound into the water column. Passive sonar use is driven by the tactical nature of an ASW or training event, and is employed whenever possible. Given the nature of passive sonar technology and underwater sound propagation, determining range and absolute position of a marine mammal is exceedingly difficult and generally not possible with any single ship-based passive sonar. Skilled operators or unique circumstances may sometimes allow real-time or near-real time determinations of marine mammal range at the expense of interrupting the ship's ASW training at the time. Active sonar, on the other hand, is critical in providing range and bearing to potential underwater submarines and mines.

In addition, passive sonar can only detect marine mammals that are vocalizing (i.e., making underwater sound as part of communication and echolocation). Marine mammal vocalization is based on individual needs at a particular moment, species-level foraging, and mating strategies, and other oceanographic or biological factors. For instance, for some species, only males typically vocalize (ex. humpback whales, blue whales, fin whales, and minke whales). Depending on oceanographic conditions and animal source levels, when marine mammals do vocalize, sounds can easily travel one to several tens of kilometers (km) (0.5 nautical mile (nm) to tens of nm) for some mid-to-low frequency animals, and tens to hundreds of km for very low frequency baleen whales (i.e., blue and fin whales). These ranges demonstrate that even if the marine mammal vocalization can be detected, it does not mean the mammal is necessarily close to the passive sonar sensor. Determining when or if a marine mammal is within an NDE mitigation zone or court required training restriction zone by passive acoustic detection is not always possible.

OTHER EVENTS

No marine mammal ship strikes occurred during COMPTUEX 08-3. During COMPTUEX 08-3, there were six instances where U.S. Navy ships not using MFAS at the time proactively maneuvered to avoid close encounters with marine mammals. There were no additional reports of stranded or injured marine mammals during or after COMPTUEX 08-3, with the exception of the one seal carcass described previously.

SECTION E/F- MITIGATION ASSESSMENT

COMPTUEX 08-3 ASSESSMENT

OVERVIEW

This section of the report provides an assessment of the effectiveness of the mitigation and monitoring measures used in COMPTUEX 08-3. The NDE requires the U.S. Navy to submit a report to NMFS that includes a discussion of the nature of any effects or lack of effects of mitigation measures based on modeling results and marine mammal sightings. In addition, the BO Terms and Conditions require a report that evaluates the mitigation measures and provides results of the U.S. Navy's exercise monitoring and reporting program. In this case, the mitigation measures under the BO are the same as the NDE measures; therefore, the discussion is presented together in this section.

ASW proceeds slowly and requires careful development of a tactical frame of reference over time. Data is integrated from a number of sources and sensors. Once MFAS is turned off for a period of time, turning it back on later does not usually allow a commander to simply continue from the last frame of reference. From an individual operator perspective, securing sonar essentially clears the screen of all information, which then has to be rebuilt over time when the system power is restored. Lost MFAS time not only equates to lost exercise time, but has a broader, overall impact on the tempo and development of a "tactical picture" shared among exercise participants as they train toward the goal of improving ASW skills in general.

Mitigation measures were designed to minimize interactions between marine mammals and Navy vessels employing MFAS at levels with the potential to result in a Temporary Threshold Shift (TTS) or Permanent Threshold Shift (PTS) (DoN 2007). Navy ships were not tasked nor expected to maintain contact with marine mammals sighted for purposes of monitoring requirements. To do so would have unnecessarily interfered with military readiness activities and may have resulted in concerns with whether Navy ships were intentionally harassing marine mammals.

MODELING ESTIMATES APPLICABLE TO COMPTUEX 08-3

For the COMPTUEX/JTFEX EA/OEA (DoN 2007) an estimate of potential acoustic exposure to marine mammals was generated in support of the NEPA process. **Table 6** shows estimated marine mammal acoustic exposures from model derived calculations based on estimated marine mammal densities, operational parameters, sound transmission loss, and potential energy accumulated based strictly on pre-exercise acoustic impact modeling (DoN 2007). **Table 6** lists possible marine mammal species generally occurring in Southern California waters based solely on *estimated* distribution and abundance, but does not take into account potential seasonal distribution. The table also highlights the ESA-listed species described in the COMPTUEX/JTFEX BO (NMFS 2007), and shows estimated potential acoustic exposures derived from acoustic impact modeling (DoN 2007 COMPTUEX-JTFEX EA/OEA).

Table 6 shows the annual species-specific model estimated potential exposures for Southern California COMPTUEX and JTFEX exercises. Extrapolating for a single exercise (i.e., dividing the total annual species exposures by 7 exercises per year) results in an estimated 12,198 potential exposures to all marine mammals per exercise (11,564 behavioral sub-TTS Level B harassments, 590 TTS Level B harassments, and 44 Level A harassments). The total number of all marine mammal species visually observed and potentially exposed to MFAS equal to or

greater than 173 dB during COMPTUEX 08-3 was significantly lower than pre-exercise modeling assumptions. While a total of 623 marine mammals were observed by exercise participants (Section C/D), this total is for both MFAS and non-MFAS sightings (**Table 2**). Only approximately 131 marine mammals (dolphins, whales, pinnipeds) were potentially exposed to MFAS at RL greater than 173 dB during COMPTUEX 08-3 as compared to pre-exercise model predictions of 12,198 animals.

In context of the NMFS BO Terms and Conditions (NMFS 2007), 101 potential exposures per exercise are predicted for ESA species based on the pre-exercise acoustic impact model results (DoN 2007). However, in Section C/D the presence of blue whales in SOCAL during the time frame of this exercise is less likely given their normal seasonal distribution to the south. Therefore, the predicted model exposures can be adjusted from 101 to 53 animals (101-48 blue whale exposures = 53). From **Table 5** and Section C/D, 43 potential ESA-listed marine mammals were possibly exposed to MFAS during COMPTUEX 08-3 at RL equal to or greater than 173 dB.

COMPTUEX 08-3 Minimum Total Marine Mammals Sighted During MFAS Operations at RL ≥173 dB (Table 5)	131
Total Pre-exercise Estimated Exposures at RL ≥173 dB For ALL Marine Mammals (Table 5)	12,198
Total Pre-exercise Estimated Exposures at RL ≥173 dB For ESA-listed species only AND excluding blue whales (Table 5)	53
COMPTUEX 08-3 # of Potential ESA Species Exposed at RL ≥173 dB (at ranges < 1,000 m)	43 *

** (43 whale, large whale, and pinniped which could be potential ESA-species. Note given time of year for this exercise, March-April, there is high probability that several of these sightings may have been non-ESA-listed gray whales on their northbound migration)*

The discrepancy between pre-exercise modeling, actual sightings, and actual potential exposures for all species is due to the conservative nature of the acoustic effects model process combined with lack of specific scientific information on regional occurrence and distribution for many species. Over-estimation of exposures in acoustic effects models can be partially attributed to the following factors: 1) acoustic exposures do not account for mitigation measures, 2) marine mammal density estimates are based on NMFS survey data that may be limited in duration and time of year (e.g., many surveys only occur in spring-summer, or summer-fall); and 3) marine mammal densities are averaged across active sonar activity areas and, therefore, are evenly distributed without consideration for real-world animal grouping or variation.

It is important to understand that there are limitations to the ecological data (diving behavior, migration or movement patterns and population dynamics) used in acoustic exposure modeling. The model results must be interpreted within the context of a given species' ecology. The large SOCAL OPAREA makes individual mammals' repeated or prolonged exposures to sonar signals unlikely. Similarly, due to the time delay between MFAS pings, platform speed, and animal movement, exposure of any animal to sonar that would lead to harassment would be minimized.

Table 6. Total estimated annual exposures based on pre-exercise modeling for MFAS sonar from DoN 2007 based on seven exercises per year (COMPTUEX/COMPTUEX EA/OEA Tables 4.3-6 and 4.3-7) (*left three columns*), and estimated exposures per exercise (estimated total exposures divided by seven) (*right three columns*).

Species	DoN 2007 annual estimated exposures			Estimated single exercise exposures		
	Level B Sub TTS	Level B	Level A	Level B Sub TTS	Level B	Level A
ESA-listed						
Blue whale	325	14	0	46	2.0	0
Fin whale	263	10	0	38	1	0
Humpback whale	33	0	0	5	0	0
Sei whale	2	0	0	>1	0	0
Sperm whale	59	4	0	8	>1	0
Non-ESA listed						
Baird's beaked whale	4	0	(4)*	>1	0	>1
Bottlenose dolphin	516	30	0	74	4	0
Bryde's whale	2	0	0	>1	0	0
Common dolphin	69,258	3,464	8	9894	495	1
Cuvier's beaked whale	208	10	(218)*	23	1	31
Dall's porpoise	142	3	0	20	>1	0
Dwarf sperm whale	0	0	0	0	0	0
False killer whale	16	0	0	2	0	0
Gray whale	64	0	0	9	0	0
Killer whale	12	1	0	2	>1	0
<i>Mesoplodon</i> spp.	0	0	0	0	0	0
Minke whale	24	2	0	3	>1	0
Northern right whale dolphin	3,003	227	0	429	32	0
Pacific white-sided dolphin	1,949	101	0	278	14	0
Pantropical spotted dolphin	547	0	0	78	0	0
Pygmy sperm whale	859	56	0	123	8	0
Risso's dolphin	2,050	96	0	293	14	0
Rough-toothed dolphin	0	0	0	0	0	0
Short-finned pilot whale	0	0	0	0	0	0
Striped dolphin	1,554	72	0	222	10	0
Ziphiid beaked whale	49	3	(52)*	7	>1	7
California sea lion	0	0	0	0	0	0
Northern elephant seal	0	0	0	0	0	0
Pacific harbor seal	6	0	0	1	0	0
Approximate Total accounting for rounding=				11,564	590	44

* ALL predicted beaked whale Level B exposures (sub-TTS and TTS) counted as Level A exposures as an overly conservative metric

NDE AND BO EXPOSURE MITIGATION ASSESSMENT

1) All measures promulgated in the 23 January 2007 *Mid-Frequency Active Sonar Mitigation Measures during Major Training Exercises or within Established DOD Maritime Ranges and Established Operating Areas* (NDE) and those agreed to in the NEPA Emergency Alternative Arrangements were implemented before and during COMPTUEX 08-3.

2) In addition to the above assessment of the NDE, the BO calls for a report that evaluates the effectiveness of the U.S. Navy's exercise mitigation measures. The three categories of measures (Personnel Training, Lookout and Watchstander Responsibilities, and Operating Procedures) outlined in the NDE are effective in detecting and responding appropriately to the presence of marine mammals, when visually observed. Fleet commanders and ship watch teams continue to improve individual awareness and enhance reporting through various pre-exercise conferences, lessons learned, and these after action reports. The NDE safety zones are adhered to and vessels apply mitigation when marine mammals are first visually observed within a zone. The U.S. Navy acknowledges that the mitigation measures do not account for potential marine mammals not visually observed, which is even difficult to determine within the civilian marine mammal scientific survey community. Deep diving animals if exposed may not be exposed to significant levels for long periods, given the moving nature of ship MFAS use, and even less frequent pings from lower power aviation deployed MFAS systems (dipping sonar, sonobuoys). For instance, during a one hour dive by a beaked whale or sperm whale, a MFAS ship moving at a nominal 10 knot speed could cover about 10 nm from its original location, well beyond ranges predicted to have significant exposures.

3) NMFS (2007) COMPTUEX-JTFEX BO Terms and Conditions require the U.S. Navy to estimate the number of ESA-listed marine mammals that may have been exposed to received energy level equal to or greater than $173 \text{ dB re } 1 \mu\text{Pa}^2 \cdot \text{s}$. A total of at least 24 marine mammals some of which may have been ESA-listed whales were potentially exposed during COMPTUEX 08-3 with no apparent or reported detrimental results from this exposure. Given the March to early April time frame of this exercise, it is possible that some of the sighted whales in this total were actually non-ESA listed gray whales on their northward migration.

4) For all marine mammal sightings occurring during COMPTUEX 08-3, there was no obvious indication or report that any animal behaved in a manner not associated with normal movement, or foraging, however, the biological information available at the time of this report is limited. In addition, not all species or even all individuals within a given species will react to external sound in the same manner. Some species, as acknowledged in recent NMFS Biological Opinions for other Navy exercises, are specialized for extremely low frequency sounds, as determined by scientific-based vocalization recordings. Blue whales, fin whales, and sei whales are typically open-ocean, low frequency specialist, with complex vocalizations less than 300-800 Hz (**Figure 5**). As NMFS acknowledges, these species likely cannot perceive (e.g., hear) mid-frequency sounds such as Navy MFAS. These species are only included within Navy acoustic impact analysis under NEPA as a very over conservative approach. In reality, the likelihood of these species biologically perceiving and potentially reacting to MFAS is remote. There has been no association between baleen whale behavioral impacts or strandings related to MFAS (ICES 2005).

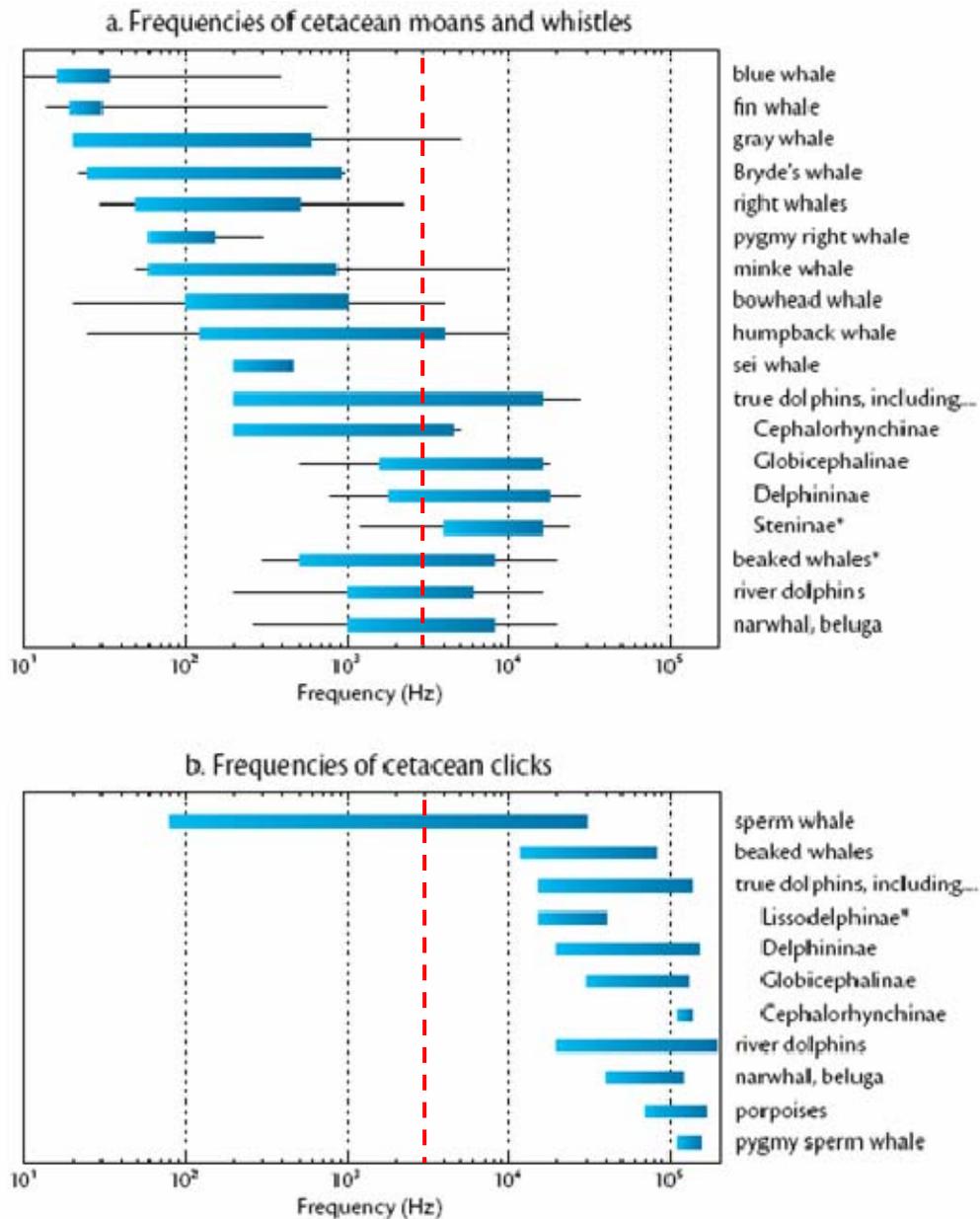


Figure 1. Known frequency ranges of cetacean sounds. Large whales are listed by species, while toothed whales are grouped into families. The thick bar shows the range of the most common types of vocalizations, while the thinner line shows recorded extremes of frequency. An asterisk (*) indicates that the upper frequency is unknown because of recording equipment limitations. (a) Tonal sounds—moans and whistles—with most baleen whale species shown separately. (b) Echolocation clicks. Baleen whales do not produce high-frequency echolocation clicks, while some toothed whales, dolphins, and porpoises do not produce tonal sounds.

Figure 5. Known frequency range of cetacean vocalizations and echolocation. Frequency of U.S. Navy MFAS (AN/SQS-53) shown in dashed line (From: Mellinger et al. 2007).

Data Limitations and Improvements

There is no information from which to assess how many, if any, animals not observed by Navy lookouts may or may not have been exposed to MFAS received levels equal to or greater than 173 dB re 1 $\mu\text{Pa}^2\cdot\text{s}$. However, many of the ESA-listed species in SOCAL with the exception perhaps the sperm whale, are easier to spot on the surface due to shorter dive times and larger animal size.

Data needed to address this question will be reviewed as it becomes available for potential incorporation into future exercises, although this remains a problematic science issue for even non-Navy marine mammal surveys. Real-time passive sonar systems used by the U.S. Navy, and to some degree by most of the marine mammal science community, lack the ability to automatically classify detected species, although there is substantial academic research into improving this capability. Most current passive data sets rely on extensive post-collection analysis by skilled subject matter experts to conclusively establish species identification. In addition to species classification, range detection using moving passive acoustic systems on U.S. Navy ships is limited in real time at the typical 8-10 knot speeds at which many ASW training events occur. Indeed, if passive range detection of any submerged contacts (submarines, marine mammals) was more advanced and easier, then there would be less tactical reliance on active sonar systems. Also, non-vocalizing marine mammals cannot currently be detected using passive systems. For instance, in minke whales, it is often only the male of the species that frequently vocalizes.

The U.S. Navy continues conducting robust and realistic exercises, and development of long-term range complex monitoring plans. The goal of these plans is to integrate multiple tools in an effort to generate better assessments of marine mammal occurrence and possible MFAS effects, or lack thereof. In accordance with the COMPTUEX-JTFEX BO, data collection needs to address unresolved questions regarding likely area-specific species composition and the potential for alternative detection technologies may be incorporated into future exercises as the U.S. Navy's exercise monitoring program evolves.

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APPENDIX A – MITIGATION MEASURES EMPLOYED

This appendix contains a list of applicable mitigation measures employed at the time COMPTUEX 08-3 occurred.

Table A-1. List of applicable mitigation measures for Southern California exercises.

	NDE II (01/07 Exemption)	2008 CTX/JTFX (with Court restrictions as of May 2008)
PERSONNEL TRAINING	<p>All Lookouts onboard platforms involved in ASW training events will review the NMFS-approved Marine Species Awareness Training (MSAT) material prior to use of mid-frequency active sonar.</p> <p>All Commanding Officers, Executive Officers, and officers standing watch on the bridge will have reviewed the MSAT material prior to training event employing MFA sonar.</p> <p>Navy lookouts will undertake extensive training in order to qualify as a watchstander in accordance with Lookout Training Handbook (NAVEDTRA 129869-B).</p> <p>Lookout training will include on-the-job instruction under the supervision of a qualified, experienced watchstander. Following successful completion of this supervised training period, lookouts will complete Personal Qualification Standard program, certifying that they have demonstrated the necessary skills (such as detection and reporting of partially submerged objects). This does not preclude personnel being trained as lookouts from being counted as those listed in previous measures so long as supervisors monitor their progress and performance.</p> <p>Lookouts will be trained in the most effective means to ensure quick and effective communication within the command structure in order to facilitate implementation of protective measures if marine species are spotted.</p>	<p>All surface ship lookouts and topside watchstanders (i.e., OODS, JOODS) as well as maritime patrol aircraft (MPA) aircrews and ASW/MIW helicopter aircrews must complete Marine Species Awareness Training (MSAT) by viewing the U.S. Navy MSAT DVD.</p> <p>All units that employee MFAS shall ensure they fully understand and implement the marine mammal mitigation measures and reporting requirements promulgated in this message.</p> <p>Foreign participants are encouraged to follow mitigation measures to the extent they will not impair operations or operational capabilities.</p> <p>Commanding officers shall thoroughly review this guidance with key personnel and watchstanders to ensure full situational awareness and compliance.</p>
AREA OF OPERATION		<p>MFA sonar OPAREA. Use of MFAS in the SOCAL Operating Area for CTX 08-3 will occur in W-291 and SOAR only. Subject to additional restrictions as set forth in subsequent paragraphs.</p> <p>MFA Sonar Exclusion Zones. MFAS shall not be employed within 12 nm of the California coastline.</p> <p>Catalina Basin Exclusion. MFAS shall not be employed in the Catalina Basin (located between Santa Catalina Island and San Clemente Island).</p> <p>San Clemente Island Exclusion. MFAS shall not be employed within 5 nm of the western shore of San Clemente Island.</p>
PRE-USE MONITORING	<p>Prior to start-up or restart of active sonar, operators will check that the Safety Zone radius around the sound source is clear of marine mammals.</p> <p>Helicopters shall observe/survey the vicinity of an</p>	<p>Pre-Exercise Monitoring – Dedicated Aircraft. Dedicated aerial monitoring shall be conducted by either military or contract aircraft to monitor for the presence of marine mammals for 60 minutes prior to the first employment of MFAS and</p>

	NDE II (01/07 Exemption)	2008 CTX/JTFX (with Court restrictions as of May 2008)
	<p>ASW exercise for 10 minutes before the first deployment of active (dipping) sonar in the water.</p> <p>Submarine sonar operators will review detection indicators of close-aboard marine mammals prior to the commencement of ASW operations involving active mid-frequency sonar.</p> <p><i>(See pre-exercise monitoring requirements under Environmental Factors Measure, below.)</i></p>	<p>commencement of the ASW portion of the exercise. A gap between completion of aerial monitoring and the first use of MFAS shall be avoided (and shall not exceed 60 minutes). If marine mammals are detected, report sightings to assigned aircraft control unit (ACU) or Tactical Support Center (TSC) for submission to CIC. CIC will disseminate the sighting information to all platforms in the area with a recommendation for appropriate action.</p> <p>Subject to para. 6.E.6. exception, if marine mammals are detected within 2200 yards (2000 meters), MFAS shall not be employed until (1) the marine mammals are seen to leave the vicinity, or (2) the MFAS sonar employing unit has transited at least 2200 yards (2000 meters) away from the marine mammals.</p> <p>Exercise monitoring – individual units. Individual units are required to monitor for the presence of marine mammals for 60 minutes prior to the first use of MFAS each day. Dedicated aerial monitoring in the previous paragraph satisfies this requirement for the first day’s use of MFAS. or subsequent days of the exercise, units shall continuously monitor for and report the presence of marine mammals throughout the exercise, as a matter of course, units will already be in compliance with this daily 60 minute monitoring requirement.</p> <p>Prior to start-up or restart of active sonar, operators will ensure that the 2200 yard (2000 meter) MFAS shutdown zone is clear of marine mammals.</p> <p>Sub sonar operators will check for passive indication of marine mammals close aboard prior to use of MFAS. Close aboard is defined as visible bearing rate on DIMUS display. Ship sonar operators will check for passive indication of marine mammals on the underwater telephone in order to alert lookouts prior to use of MFAS.</p>
DURING USE MONITORING	<p><u>Surface Vessels:</u></p> <p>On the bridge of surface ships, there will always be at least three people on watch whose duties include observing the water surface around the vessel.</p> <p>In addition to the three personnel on watch noted previously, all surface ships participating in ASW exercises will have at all times during the exercise at least two additional personnel on watch as lookouts.</p> <p>Personnel on lookout and officers on watch on the bridge will have at least one set of binoculars available for each person to aid in the detection of marine mammals.</p> <p>On surface vessels equipped with MFA, pedestal-</p>	<p>During Exercise Monitoring – Military and contract aircraft participating in the exercise shall monitor for marine mammals during their assigned missions and report sightings to assigned Aircraft Control Unit (ACU) or Tactical Support Center (TCS) for submission to CIC. CIC will disseminate the sighting information to all platforms in the area with a recommendation for appropriate action (e.g., MFAS shut down; MFAS power down; surface or subsurface vessels to avoid area or increase distance from mammals; aerial platforms to increase vigilance). Any spotting of marine mammals shall be communicated to units employing MFAS with all possible speed to allow for timely compliance with 2200 yard (2000 meter) MFAS shutdown zone (subject to para. 6.E.6. exception).</p>

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	<p>mounted “Big Eye” (20x110) binoculars will be present and in good working order to assist in the detection of marine mammals in the vicinity of the vessel.</p> <p>Personnel on lookout will employ visual search procedures employing a scanning methodology in accordance with the Lookout Training Handbook (NAVEDTRA 12968-B).</p> <p>After sunset and prior to sunrise, lookouts will employ Night Lookout Techniques in accordance with the Lookout Training Handbook.</p> <p>Personnel on lookout will be responsible for reporting 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 (i.e., 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.</p> <p><u>Aircraft:</u></p> <p>Navy aircraft participating in exercises at sea will conduct and maintain, when operationally feasible and safe, surveillance for marine species of concern as long as it does not violate safety constraints or interfere with the accomplishment of primary operational duties.</p> <p><u>Passive Acoustic:</u></p> <p>All personnel engaged in passive acoustic sonar operation (including aircraft, surface ships, or submarines) will monitor for marine mammal vocalizations and report the detection of any marine mammals to the appropriate watch station for dissemination and appropriate action.</p> <p>During MFA operations, personnel will utilize all available sensor and optical systems (such as Night Vision Goggles) to aid in the detection of marine mammals.</p> <p><i>(See additional exercise monitoring measures under Environmental Factors Measure, below.)</i></p>	<p>During Exercise Monitoring – Lookouts. On the bridge of surface ships, there will always be at least three non-dedicated watchstanders required to look out for marine mammals whose duties include observing the water surface around the vessel.</p> <p>In addition to the three personnel on watch, all surface ships participating in ASW exercises will have at least two dedicated lookouts at all times when MFAS is being used during the exercise, required to look out for marine mammals.</p> <p>Each person on watch will have a set of binoculars to aid in detection of marine mammals. On surface vessels equipped with MFAS, pedestal-mounted (Big Eye/ 20 x 110) binoculars will be used as feasible to assist in detection of marine mammals in the vicinity of the vessel.</p> <p>All sightings of marine mammals by all watchstanders and all lookouts will be reported directly to the Combat Information Center (CIC) or via the appropriate watch stations for submission to CIC. CIC will disseminate the sighting information to all platforms in the area with a recommendation for appropriate action (e.g., MFAS shut down; MFAS power down; surface or subsurface vessels to avoid area or increase distance from mammals; aerial platforms to increase vigilance).</p> <p>During MFAS operations, personnel will utilize all available sensor and optical systems (such as night vision goggles) to aid in detection of marine mammals.</p> <p>Personnel on lookout will employ visual search procedures employing a scanning methodology IAW lookout training handbook (NAVEDTRA 12968-D).</p>
MFAS OPERATIONS	<p>Sonar levels (generally) – The ship or submarine will operate sonar at the lowest practicable level, not to exceed 235 dB, except as required to meet tactical training objectives.</p>	<p>MFAS Operations. Operate MFAS at the lowest practicable level, not to exceed 235 dB, except to meet tactical training objectives.</p>
SAFETY ZONE SHIPS	<p>20. Safety Zones – When marine mammals are detected by any means (aircraft, shipboard lookout, or acoustically) within 1,000 yards of the sonar dome (the bow), the ship or submarine will limit active transmission levels to at least 6 dB below normal operating levels.</p> <p>(i) Ships and submarines will continue to limit maximum transmission levels by this 6-dB factor until the animal has been seen to leave the area,</p>	<p>6.E.4. MFAS Shutdown Zone. Cease use of MFAS (either hull mounted or aircraft based sonobuoys or active dipping sonar) when marine mammals are spotted within 2200 yards (2000 meters) until unit has transited at least 2200 yards (2000 meters) away from the marine mammals or the mammals are seen to exit the safety zone. If sonar is shut down due to presence of marine mammals, then reporting requirements described in para. 7 apply.</p>

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	<p>has not been detected for 30 minutes, or the vessel has transited more than 2,000 yards beyond the location of the last detection.</p> <p>(ii) Should a marine mammal be detected within or closing to inside 500 yards of the sonar dome, active sonar transmissions will be limited to at least 10 dB below the equipment’s normal operating level. Ships and submarines will continue to limit maximum ping levels by this 10-dB factor until the animal has been seen to leave the area, has not been detected for 30 minutes, or the vessel has transited more than 2,000 yards beyond the location of the last detection.</p> <p>(iii) Should the marine mammal be detected within or closing to inside 200 yards of the sonar dome, active sonar transmission will cease. Sonar will not resume until the animal has been seen to leave the area, has not been detected for 30 minutes, or the vessel has transited more than 2,000 yards beyond the location of the last detection.</p> <p>(iv) Special conditions applicable for dolphins and porpoise only: If, after conducting an initial maneuver to avoid close quarters with dolphins or porpoises, the Officer of the Deck concludes that dolphins or porpoises are deliberately closing to ride the vessel’s bow wave, no further mitigation actions are necessary while the dolphins or porpoises continue to exhibit bow wave riding behavior.</p> <p>(v) If the need for power-down should arise as detailed in “Safety Zones” above, the ship or submarine shall follow the requirements as though they were operating at 235 dB – the normal operating level (i.e., the first power- down will be to 229 dB, regardless of at what level above 235 sonar was being operated).</p>	<p>6.E.5. Bow Riding Exception. Special conditions applicable to dolphins and porpoises only. If, after conducting an initial maneuver to avoid close quarters with dolphins or porpoises, the officer of the deck concludes that dolphins or porpoises are intentionally riding the vessel’s bow wave, MFAS shutdown is no longer required for as long as the dolphins or porpoises continue to exhibit bow wave riding behavior. Note: this provision also applies to 6.E.6 and 6.E.7.</p> <p>6.E.6. MFAS Shutdown Exception. Officer Conducting the Exercise (OCE) will determine critical point in the exercise (CPE) and promulgate to all participating units when a CPE exists. When CPE exists, the following mitigation measures will apply:</p> <p>6.E.6.A 1000 meters. When a marine mammal is detected within 1000 meters from the sonar source, power down MFAS by 6 dB below normal operating levels.</p> <p>6.E.6.B. 500 meters. When a marine mammal is detected within 500 meters from the sonar source, power down MFAS by 10 dB below normal operating level.</p> <p>6.E.6.C. 200 meters. When a marine mammal is detected within 200 meters from the sonar source, shut down MFAS.</p> <p>6.E.6.D. A critical point in the exercise is a point when, in the discretion of the Officer Conducting the Exercise (OCE), the continued use of MFAS is critical to the certification of a STRKGRU or the effective training of its personnel.</p> <p>6.E.6.E. OCE Critical Point in the Exercise (CPE) determination shall be promulgated via chat to exercise participants.</p>
SAFETY ZONE SONOBUOYS	<p>Aircraft with deployed sonobuoys will use only the passive capability of sonobuoys when marine mammals are detected within 200 yards of the sonobuoy.</p>	<p>Sonobuoys. Aircraft shall observe/survey the vicinity of each ASW event location for 10 min prior to commencement of the prosecution (i.e. before deploying DICASS sonobuoys). Subject to para. 6.E.6. Exception, if marine mammals are spotted within the 2200 yard (2000 meter) safety zone, all use of active sonar shall cease until the mammals are seen to exit the safety zone.</p> <p>Sonobuoys (CPE determination only). Aircraft deploying sonobuoys will cease active transmissions and use only passive capability of sonobuoys when marine mammals are detected within 1000 meters of the sonobuoy (no SSD) and 2000 meters (during SSD conditions).</p> <p>Sonobuoys. Whenever SSD is present, aircraft deploying sonobuoys will cease active transmissions and use only passive capability of sonobuoys when marine mammals are detected</p>

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		within 2000 meters of the sonobuoy.
HELO DIPPING	<p>Helicopters shall observe/survey the vicinity of an ASW exercise for 10 minutes before the first deployment of active (dipping) sonar in the water.</p> <p>Helicopters shall not dip their sonar within 200 yards of a marine mammal and shall cease pinging if a marine mammal closes within 200 yards after pinging has begun.</p>	<p>Helicopters. Helicopters shall observe/survey the vicinity of each ASW event location for 10 min prior to commencement of the prosecution (i.e. before deploying active dipping sonar). Subject to para. 6.E.6. Exception, if marine mammals are spotted within the 2200 yard (2000 meter) safety zone, all use of active sonar shall cease until the helicopter has transited at least 2200 yards (2000 meters) away from the marine mammals, or the mammals are seen to exit the safety zone. If sonar is shut down due to presence of marine mammals, then reporting requirements described in para. 7 apply.</p> <p>When CPE exists (No SSD), the following mitigation measures will apply for dipping sonar:</p> <p>When a marine mammal is spotted within 1000 meters of any helicopter-based sonar, power down helicopter-based sonar to 500 watts (to approximately 204 dB), to be maintained until the animal has left the area, is not sighted for 30 minutes, or the sonar-emitting helicopter transits more than 1000 meters from the location of the sighting;</p> <p>When a marine mammal is detected within or closing to within 500 meters of any helicopter-based sonar, shut down helicopter-based sonar, to be maintained until the animal has left the area, is not seen for 30 minutes, or the sonar-emitting helicopter transits more than 500 meters beyond the location of the sighting.</p> <p>When CPE exists (SSD present), the following mitigation measures will apply for dipping sonar:</p> <p>When a marine mammal is spotted within 2000 meters of any helicopter-based sonar, power down helicopter-based sonar to 500 watts (to approximately 204 dB), to be maintained until the animal has left the area, is not sighted for 30 minutes, or the sonar-emitting helicopter transits more than 2000 meters from the location of the sighting;</p> <p>When a marine mammal is detected within or closing to within 1000 meters of any helicopter-based sonar, shut down helicopter-based sonar, to be maintained until the animal has left the area, is not seen for 30 minutes, or the sonar-emitting helicopter transits more than 1000 meters beyond the location of the sighting.</p>
SURFACE DUCTING MEASURE		<p>Significant Surface Ducting Conditions. Significant surface ducting conditions is defined as a mixed layer of constant water temperature extending from the sea surface to 100 feet or more.</p> <p>When significant surface ducting conditions are detected and CPE is not designated by OCE, units</p>

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		<p>shall comply with para. 6.E.4. MFAS shutdown zone.</p> <p>When significant surface ducting conditions are detected and CPE has been designated by OCE, units will utilize the following mitigation measures:</p> <p>2000 meters (2200 yards). A 6 dB power down will occur when a marine mammal is detected within 2000 meters (2200 yards) from the sonar source.</p> <p>1000 meters (1100 yards). A 10 dB power down will occur when a marine mammal is detected within 1000 meters (1100 yards) from the sonar source.</p> <p>500 meters (550 yards). MFAS shut down will occur when a marine mammal is detected within 500 meters (550 yards) from the sonar source.</p> <p>Surface ducting conditions will be monitored by the SCC and promulgated to all ASW units.</p>
<p>ENVIRONMENTAL FACTORS MEASURE</p>	<p>26. Increased vigilance during major ASW training exercises with tactical active sonar when critical conditions are present:</p> <p>Based upon lessons learned from strandings in the Bahamas (2000), the Madeiras (2000), the Canaries (2002) and Spain (2006), beached whales are of particular concern since they have been associated with MFA operations. Navy should avoid planning major ASW training exercises with MFA in areas where they will encounter conditions that, in their aggregate, may contribute to a marine mammal stranding event.</p> <p>[note: This increased vigilance is not required in Southern California because the below conditions do not exist in the aggregate in this region.]</p> <p>The conditions to be considered during exercise planning include:</p> <p>(1) Areas of at least 1,000 m depth near a shoreline where there is a <u>rapid change in bathymetry</u> on the order of 1,000-6,000 meters occurring across a relatively short horizontal distance (e.g., 5 nm).</p> <p>(2) Cases for which <u>multiple ships or submarines</u> (≥ 3) operating MFA in the same area over extended periods of time (≥ 6 hours) in close proximity (≤ 10 nm apart).</p> <p>(3) An area surrounded by <u>land masses, separated by less than 35 nm and at least 10 nm in length</u>, or an <u>embayment</u>, wherein operations involving multiple ships/subs (≥ 3) employing MFA near land may produce sound directed toward the channel or embayment that may cut off the lines of egress for marine mammals.</p> <p>(4) Although not as dominant a condition as bathymetric features, the historical presence of a</p>	

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	<p><u>significant surface duct</u> (i.e., a mixed layer of constant water temperature extending from the sea surface to 100 or more feet).</p> <p>If the major exercise must occur in an area where the above conditions exist in their aggregate, these conditions must be fully analyzed in environmental planning documentation. Navy will increase vigilance by undertaking the following protective measure: A dedicated aircraft (Navy asset or contracted aircraft) will undertake reconnaissance of the embayment or channel ahead of the exercise participants to detect marine mammals that may be in the area exposed to active sonar. Where practical, advance survey should occur within about two hours prior to MFA use, and periodic surveillance should continue for the duration of the exercise. Any unusual conditions (e.g., presence of sensitive species, groups of species milling out of habitat, any stranded animals) shall be reported to the Officer in Tactical Command (OTC), who should give consideration to delaying, suspending or altering the exercise.</p> <p>All Safety Zone requirements described in Measure 20 apply.</p> <p>The post-exercise report must include specific reference to any event conducted in areas where the above conditions exist, with the exact location and time/duration of the event, and noting results of surveys conducted.</p>	
REPORTING REQUIREMENTS	<p>Navy will coordinate with the local NMFS Stranding Coordinator regarding any unusual marine mammal behavior and any stranding, beached live/dead, or floating marine mammals that may occur at any time during or within 24 hours after completion of mid-frequency active sonar use associated with ASW training activities.</p> <p>Navy will submit a report to the Office of Protected Resources, NMFS, within 120 days of the completion of a Major Exercise. This report must contain a discussion of the nature of the effects, if observed, based on both modeled results of real-time events and sightings of marine mammals.</p> <p>If a stranding occurs during an ASW exercise, NMFS and Navy will coordinate to determine if MFA should be temporarily discontinued while the facts surrounding the stranding are collected.</p> <p><i>(See special reporting requirements under Environmental Factors Measures.)</i></p>	<p>7. Reports and Data Collection. Data collection requirements will support marine mammal After Action Report (AAR) required to comply with MMPA and ESA post-exercise assessment products.</p> <p>Marine Mammal After Action Report. All units are required to submit an AAR input to Commander, ESG. Commander ESG shall consolidate all reports into a final AAR message within 10 days of completion of the exercise. This timeline is required due to regulatory requirements that Navy verbally report marine mammal sighting information and impacts to MFAS Ops to National Marine Fisheries Services within 15 business days from exercise completion.</p> <p>The Final Report will be comprised of two parts. Part one will report all marine mammals sighted during the exercise, and will include the data listed below:</p> <p>A. DTG of initial sighting.</p> <p>B. Unit and posit (unit name and lat/long). Note, if report is for ASW helo assigned to vessel, this must be reported separately from surface ship reports.</p> <p>C. Description of animal by species if known,</p>

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		<p>otherwise specify dolphin/porpoise, large whale, small whale, seal/sea-lion, etc.</p> <p>D. Estimated number of animals.</p> <p>E. True bearing and range from unit.</p> <p>F. Sea state-WEAX at time of obs (i.e., wave height and visibility).</p> <p>G. Animal observation at time of sighting: describe animal's motion relative to ship, how long animal was in view, and any further ampn of what was seen.</p> <p>H. MFAS status at initial sighting: MFAS on, MFAS off, NA (for non-MFAS equipped ships).</p> <p>I. Action taken (none, altered course to avoid, MFAS power down, MFAS shut down).</p> <p>Only in cases where MFAS is powered down or shut down, the following additional information is required in order to conduct post-exercise Impact assessment.</p> <p>J. Unit course and speed.</p> <p>K. Animal direction of relative motion and estimated speed.</p> <p>L. Action timeline: length of time for MFAS power down or shut down.</p> <p>M. As applicable, whether significant surface ducting conditions existed at time of marine mammal sighting.</p> <p>N. As applicable, at time of marine mammal sighting, start and stop time that unit implemented CPE measures and, as applicable, action taken (i.e., 6 dB/1000 meters, 10 dB/500 meters or MFAS shutdown at 200 meters).</p> <p>O. Action impact summary (i.e., tactical degradation assessment – none, slight, moderate, significant).</p> <p>P. Action impact analysis (i.e., demonstration of operational impact to ASW prosecution and realistic training at time of marine mammal sighting).</p> <p>Repeat paras. A-P as necessary to report additional sightings.</p> <p>Sightings shall be in the following format: A. DTG/B. Unit and Posit/C. Description/D. #Animals/E. Brng-Rng/F. Sea State-WEAX/G. Behavior/H. MFAS status.</p> <p>If MFAS mitigation measures were required, report the following additional information: I. Action taken/J. Unit CRS-SPD/K. Animal crs-spd/L. Action timeline/M. Significant surface ducting (SSD) conditions/N. Start and stop time of CPE</p>

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		<p>measure/O. Impact summary/P. Impact analysis.</p> <p>Part two of the report will provide (1) a commander's assessment of the overall effectiveness of the mitigation measures (to include discussion of circumstances affecting operating during instances that CPE designated and/or powerdown was required due to significant surface ducting conditions), (2) make recommendations to improve these measures, and (3) report any impact to training fidelity caused by these measures. It is particularly important for the commander to capture the negative impact that these measures have on realistic training.</p> <p>Ongoing Reporting:</p> <p>Sightings:</p> <p>Sightings of all marine mammals shall be passed via the chain of command to the COMTHIRDFLT Fleet Watch Officer in order to alert other units in the area to the possibility of the marine mammal's presence.</p> <p>Collision:</p> <p>A Navy report is required in the event of a whale collision. If possible, take video and/or photographs of the stricken whale. Coordinate further actions with C3F.</p> <p>Attempt to identify distinguishing characteristics of the whale involved. The 'whale wheel,' a device that lists various species of whales and their identifying features, can assist in this regard.</p> <p>Stranding/Floating:</p> <p>In addition, a Navy report is required in the event sighting of a stranded or floating marine mammal. If possible, take video and/or photographs of the marine mammal carcass. Coordinate further actions with C3F.</p> <p>Report of Training:</p> <p>All units that employ MFAS shall ensure they fully understand and implement the marine mammal mitigation measures and reporting requirements promulgated in this message.</p> <p>Foreign participants are encouraged to follow mitigation measures to the extent they will not impair operations or operational capabilities.</p> <p>Commanding officers shall thoroughly review this guidance with key personnel and watchstanders to ensure full situational awareness and compliance.</p>