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U.S. Navy
SOUTHERN CALIFORNIA
COMPOSITE TRAINING UNIT EXERCISE 07-7
After Action Report
September 2007

17 January 2008

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 Unit Training 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

- This reports summarizes marine mammal sightings and assessment of mitigation effectiveness for the U.S. Navy's Composite Unit Training Exercise (COMPTUEX) 07-7 conducted by the USS Tarawa Expeditionary Strike Group (ESG) from 7 to 21 September 2007 within the offshore waters of Southern California.
- During COMPTUEX 07-7, there were a total of 57 sightings of marine mammals for an estimated total of 289 animals.
- There were four cases of these 57 sightings when surface ship mid-frequency active sonar (MFAS) was in use, but turned off (secured) upon initial marine mammal sightings and until the animals left the area. One case occurred at a range of 3000 yards, which is greater than the safety zones specified within the 23 January 2007 National Defense Exemption (NDE).
- Four whales (may or may not have been Endangered Species Act (ESA)-listed) were sighted at 50 yards during MFAS transmission and could have potentially been exposed to (Sound Exposure Level) SEL greater than 173 dB re 1 $\mu\text{Pa}^2\cdot\text{s}$. The vessel immediately secured MFAS on sighting and slowed to allow the whales to clear the area. No apparent abnormal behavior from the animals was reported. Two cases involved schools of dolphins or porpoise not listed under the Endangered Species Act (ESA) sighted near and approaching MFAS- vessels, which secured sonar on first report of the sighting and kept the sonar off until the animals had departed.
- No marine mammal ship strikes occurred during COMPTUEX 07-7. There were three reports of U.S. Navy ships proactively maneuvering to avoid close encounters with marine mammals, providing evidence that these marine mammal mitigation measures are well-understood by Fleet operators and actively executed in operational practices.
- For all of COMPTUEX 07-7 marine mammal sightings, there was no obvious indication or report that any animal behaved in a manner not associated with normal movement or foraging, recognizing that the level of biological information obtained is limited at this time.
- Based on visual reports of marine mammals from U.S. Navy lookouts during COMPTUEX 07-7, the U.S. Navy's COMPTUEX/JTFEX Environmental Assessment/Overseas Environmental Assessment (EA/OEA) acoustic modeling appears to very conservatively over-estimate the amount of potential acoustic exposures, including those to ESA-listed species. The degree of variability and over predictive nature inherent within these acoustic impact models is based largely on the significant natural variability within the science of at-sea marine mammal surveys used to derive density estimates and other model limitations.
- The U.S. Navy is developing defensible and operationally feasible exercise and long-term range complex monitoring plans that will attempt to integrate multiple tools and new technologies if applicable in order to provide better assessment of marine mammal occurrence, improved detection, and lead to a more science-based determination of MFAS effects or lack of effects.

INTRODUCTION

This report is presented to fulfill U.S. Navy and U.S. Pacific Fleet written reporting requirements conditional to 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. In addition, as these NDE mitigation measures are included in the 30 July 2007 *Biological Opinion (BO) on the U.S. Navy's Composite Unit Training Exercises (COMPTUEX) and Joint Task Force Exercises (JTFEX) Off Southern California From February 2007 to January 2009*.

COMPTUEX/JTFEX BO written report requirements as specified by NMFS (2007).

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 ESA-listed marine mammals 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 ESA-listed marine mammals 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 ESA-listed marine mammals 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 only unclassified material and provides the information and analysis for Composite Unit Training Exercise (COMPTUEX) 07-7, and is submitted in fulfillment of NDE and BO written requirements.

The report is organized by section in the following order:

Section 1- 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 mid-frequency active sonar (MFAS) used from all emitters.

Section 2- Observations and Mitigation Effectiveness, provides an estimated number of marine mammals observed during COMPTUEX 07-7 potentially affected or not affected by Anti-submarine Warfare (ASW) operations, noting the nature of any observed effects where possible. In addition, Section 2 assesses the effectiveness of the NDE and BO mitigation and monitoring measures required during exercises with regard to power down and shut down zones when marine mammal are sighted within the vicinity of ships using MFAS.

Appendix A contains tables, figures, and lists the NDE mitigation measures.

BACKGROUND

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 marine species awareness training was provided to exercise participants. A Letter of Instruction (LOI), which reiterated the NDE mitigation measures as specified in **Appendix B**, was also distributed to participants and explains procedures for reporting marine mammal sightings discussed in Section 2.

MFAS-equipped platforms participating in COMPTUEX 07-7 as part of the ESG included one Ticonderoga-class guided missile cruiser (CG), and one Arleigh Burke-class guided missile destroyer (DDG) each with AN/SQS-53C mid-frequency sonar, and one Oliver Hazard Perry-class frigate (FFG) with AN/SQS-56 mid-frequency sonar, and associated SH-60B/F/R helicopters with AN/AQS-13F or AQS-22 mid-frequency dipping sonar, and AN/SSQ-62B/C/D/E Directional Command Activated Sonobuoy System (DICASS). Two additional MFAS- equipped ships were also part of the overall exercise. These included one DDG and one FFG, although they were involved more with surface rather than sub-surface operations and had minimal contributions to total MFAS use.

Active sonar use by aviation assets is captured and added to sonar totals reported in this document. MFAS on Los Angeles-class (SSN) submarines (AN/BQQ-5) is seldom used in tactical training scenarios.

SECTION 1 EXERCISE SUMMARIES

EXERCISE PARTICIPANTS

COMPTUEX 07-7 was conducted from 7 to 21 September 2007 and involved the USS Tarawa (LHA 1) ESG (**Table A-1 Appendix A**). ESG assigned ships participating in COMPTUEX 07-7 included three MFAS-equipped vessels. Other participating units included amphibious assault, support, and opposition forces. MFAS-opposition forces included submarines and two additional MFAS-equipped ships. There was minimum active sonar use by these other platforms because of either tactical considerations for submarines and non-ESG MFAS surface ships or lack of MFAS capability (amphibious assault ships, supply ships). Based on the LHA, CG, DDG, and FFG ships participating in COMPTUEX 07-7, there were two to four ASW-capable SH-60 B/F helicopters available for training during the exercise on any given day depending on maintenance availability.

MITIGATION MEASURES

All mitigation measures required by the 23 January 2007 NDE were followed as described at the end of **Appendix A**. Those 29 NDE measures include specific details for personnel training, established lookout and watchstander responsibilities, mandated specific operating procedures, and described coordination and reporting requirements. Observation data from Navy lookout sightings for COMPTUEX 07-7 is described in Section 2.

SECTION 2 OBSERVATIONS AND MITIGATION EFFECTIVENESS

MARINE MAMMALS AND OCEANOGRAPHIC CONDITIONS

Section 2 provides estimated numbers of marine mammals observed in Southern California offshore waters during COMPTUEX 07-7. This information is based on analysis of actual events and sightings of marine mammals reported by exercise participants. **Table A-2 Appendix A** lists sighting information from U.S. Navy lookouts. **Table A-3 Appendix A** lists possible marine mammal species occurring in Southern California waters based solely on estimated distribution and abundance. These tables highlight 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).

All detections described in this section were made by standard Navy surface ship and aircrew lookout reporting procedures as detailed in a formal LOI issued prior to the exercise which reiterated the NDE measures and safety zones described in **Appendix A**.

EXERCISE MARINE MAMMAL SIGHTINGS

COMPTUEX 07-7 Biological Observations

Table A-2 Appendix A contains a complete list of COMPTUEX 07-7 marine mammal visual sightings made by U.S. Navy lookouts and watch teams based on standardized reporting protocols. There were a total of 57 marine mammal sightings for an estimated 289 animals during COMPTUEX 07-7. The majority of animals sighted were dolphins and porpoises. For COMPTUEX 07-7, there were 13 dolphin sightings accounting for 223 animals or 77.2% of the total estimated number of animals (223 of 289).

There were 3 sightings of animals classified as “small whales”, 10 sightings of animals classified as “large whales”, 27 sightings of animals classified as “whale” (not designated small whale or large whale), 1 sighting of a pinniped (seal or sea lion), and 1 sighting of a marine mammal not classified into any particular species.

There were two sightings of a whale carcass during COMPTUEX 07-7, one on 17 September and again on 18 September. No MFAS had been used within 24 hours of these sightings and as discussed in the *MFAS Events* section below. NOAA and NMFS suspects that ship strikes involving commercial shipping at some undetermined time and location may have caused these mortalities. Prevailing currents within Southern California are normally north-to-south and may have caused the carcasses to drift into the COMPTUEX exercise area.

Oceanographic conditions were typical for Southern California in September with sea surface temperatures ranging between 16-22°C (60.8-71.6°F) (**Figures A-2 and A-3 Appendix A**). Based on reports from individual U.S. Navy ships, sea states were relatively mild with the majority of sea states between 1 and 2, and only a few sea state 3s (**Table A-2 Appendix A**). Sea states are relatively important because visual observations of marine mammals at sea become increasingly difficult at higher sea states above 3 for smaller, more cryptic species such as beaked whales that do not travel in large schools (**Table A-4 Appendix A**).

MITIGATION AND MONITORING ASSESSMENT

OVERVIEW

The NDE calls for the U.S. Navy to submit a report to NMFS that includes a discussion of the nature of any effects or lack of effects based on modeling results and marine mammal sightings. In addition, the BO Terms and Conditions require a report that evaluates the mitigation measures and details results from the U.S. Navy’s exercise monitoring program. In this case, the mitigation measure under the BO are the NDE measures, therefore the discussion is presented together in this section.

This section of the report provides an assessment of the effectiveness of the mitigation and monitoring measures. 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. Lost MFAS time not only equates to lost exercise time; rather it 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.

COMPTUEX 07-7 Assessment

Mitigation measures were designed to minimize interactions between Navy assets and marine mammals involving MFAS levels that have been extrapolated to result in Permanent Threshold Shift (PTS) and determined to result in Temporary Threshold Shift (TTS). During COMPTUEX 07-7, Navy assets observed marine mammals only infrequently and encounters were brief in duration. 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 result in concerns with whether Navy ships were intentionally harassing marine mammals. While the majority of encounters reported occurred when MFAS was not in use, no conclusions or inferences can be drawn with whether MFAS was a factor. Many other factors exist including, but not limited to, the number of hours of underway time easily exceeding the number of hours during which MFAS was operating and the sea conditions in the extremely large area over which the exercise occurred.

There were no marine mammal ship strikes by a U.S. Navy vessel during COMPTUEX 07-7. Three vessels not using MFAS reported changing course to avoid crossing the path of traveling marine mammals and to ensure safe distances between the ship and animal.

Passive Sonar

Passive sonar involves acoustic listening to underwater sounds 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 should be assumed to be employed whenever possible. Given the nature of passive sonar technology and underwater sound propagation, localizing or determining range and absolute position of a marine mammal is generally not possible with any single ship-based passive sonar.

For COMPTUEX 07-7, there were no reports of passive acoustic detection of marine mammals by an exercise participant.

Active Sonar

Specific source levels, numbers of sources, and frequencies of active sonars used during COMPTUEX 07-7 are classified since this information provides potential adversaries with important tactical data.

During COMPTUEX 07-7, 134 hours of MFAS time was reported from all sources including hull-mounted 53C, helicopter dipping sonar, and DICASS sonobuoys (**Table A-1 Appendix A**). It should be noted that MFAS is only used for a small subset of any given exercise time frame. Total active sonar hours, as presented in this report, represent a sum of the total MFAS time from a number of individual training events during COMPTUEX 07-7. In other words, the unit using sonar records when the sonar was turned on at the beginning of a training event, and reports time until the event is finished. The sonar “on period” is not equivalent to active sonar transmission since there may be tactical and maintenance reasons why MFAS may not be in transmit mode for the entire training event. Therefore, based on how the U.S. Navy MFAS reporting system operates and standardized reporting protocols, number of MFAS hours value does not represent actual total sonar ping hours. Furthermore, during period when there is an active transmission, MFAS only puts active sound into the water at discrete intervals. Sonar signals are not a continuous source of acoustic energy. For example, surface ship sonar signal consists of a pulse (i.e. ping) significantly less than one-two seconds long with time between successive pings as much as 30 seconds (NMFS 2007). During typical active sonar use, the MFAS active sonar is silent for the vast majority of the time. This was the case for COMPTUEX 07-7.

MFAS Events

Table A-5 Appendix A shows COMPTUEX 07-7 marine mammal sightings in relation to NDE mandated safety zones. There were a total of four occurrences of MFAS being turned off (i.e. secured) by surface ships based on marine mammal sightings. One of these four events was an instance when MFAS was secured by a ship at ranges beyond those required under NDE (3000 yards). Given MFAS propagation loss at ranges from 2000 to 6500 yards, this animal would not have been exposed to MFAS transmission with SEL greater than 173 dB re 1 $\mu\text{Pa}^2\text{-s}$. In addition, MFAS was secured for 10 minutes after the initial sighting until animals were no longer in view of the lookouts.

The second event involved four whales which may or may not have been ESA-listed species (blue, fin, humpback, sei, or sperm whales) that were sighted within 50 yards of a MFAS transmission on 14 September 2007. **Table A-5 Appendix A** has a relative position diagram for this event with the closest of the four animals reported at 50 yards. Given the reported sighting distance it is possible that some or all of these whales may have been exposed to SEL greater than 173 dB re 1 $\mu\text{Pa}^2\text{-s}$ prior to the sonar being secured. The vessel ceased sonar transmission and stopped to allow the animals to clear the area.

The remaining two events in which MFAS was secured involved dolphin or porpoise pods traveling in close proximity to the ship, along the starboard side for one report on 19 September, and at 200 yards on 20 September (the animals approaching the bow of the ship from ahead while on a reciprocal course). MFAS was secured upon sighting these marine mammals and remained secured until sufficient distance had been opened between the vessel and the animals.

There are combinations of factors that reduce the acoustic energy received by dolphins approaching MFAS- transmitting ships. Dolphins parallel or astern of the bow are outside of the main beam of the MFAS vertical beam pattern. Source levels drop quickly outside of the main beam. Sidelobes of the radiated beam pattern that point to the surface are significantly lower in power. Together with spherical spreading losses, received levels in the ship's bow wave and sides can be more than 42 dB below the actual power output. It is unlikely that the dolphins sighted on 19 September were exposed to SEL greater than 173 dB re 1 $\mu\text{Pa}^2\cdot\text{s}$. On 20 September, per NDE safety ranges, MFAS was secured at 200 yards as porpoises approached the ship from ahead. From some point between 500 to 1000 yards, it was possible that these animals may have been exposed to SEL greater than 173 dB, yet no adverse reactions were noted, MFAS was secured, and the animals passed the ship without incident.

No stranded marine mammals were sighted at sea or on land during or after COMPTUEX 07-7. One possible blue whale carcass was sighted northwest of San Clemente Island during COMPTUEX 07-7 and may represent the southwest bound drifting of a previously reported carcass as determined by NOAA and NMFS. From the text box below, the 17 and 18 September Navy observation northwest of San Clemente Island was likely the deceased animal from the preceding 8 September Long Beach stranding. This carcass was towed back to sea by authorities and offshore surface currents were favorable for southwest drift to the northeast of San Clemente Island where it was sighted by a U.S. Navy surface ship (**Figure A-5 Appendix A**). The carcass sighting on 18 September by the same U.S. Navy vessel was a re-sighting of the carcass described in 17 September report. In this instance, the U.S. Navy flew a NMFS biologist via helicopter out to this ship specifically to assist in identification during the 18 September re-sighting event.

"..on Sept. 8 NMFS got a call from the USCG about a male blue whale carcass 72 feet long, in the Long Beach Harbor. The animal had been long dead, so it was difficult to determine cause of death – but they presume it had been brought in on the bow of a ship. However, it was difficult to tell if the cause of death was the ship strike. Several days later they had another report of a carcass near San Clemente Island, but they presume it is likely the same whale that had been in Long Beach. On September 11th, there was a report of a dead floating female blue whale approximately 70 feet long was sighted offshore from Santa Barbara, and the necropsy revealed that it was clearly a fresh ship strike. Another animal was observed the day before yesterday (September 19th), and scientists believe it was also a ship strike and that it will land in Ventura. NMFS is taking tissue samples of all of the stranded whales. This is unprecedented and NMFS does not know what is happening, as they have never seen three blue whales wash up within ten days. It was noted that it is common to see high numbers of blue whales in the channel, as the waters around the Channel Islands and near San Pedro are part of the feeding area for the whale."

From: NOAA 2007 (Channel Islands National Marine Sanctuary, Sanctuary Advisory Council, Draft Meeting Notes September 21, 2007

Modeling Estimates Applicable to COMPTUEX 07-7

For the COMPTUEX/JTFEX EA/OEA (DoN 2007) an estimate of potential acoustic and explosive exposures to marine mammals was generated in support of the NEPA process. **Table A-3** in **Appendix A** 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).

The exercise specific model estimated total potential exposures over two years of Southern California COMPTUEX and JTFEX exercises. Extrapolating for a single exercise as in Table A-3 estimates 12,198 potential exposures (11,564 sub-TTS Level B, 590 TTS Level B, and 44 Level A). Clearly, as seen from the numbers of animals reported from COMPTUEX 07-7 (289 marine mammals), the level of animal density encountered within Southern California, even considering animals not detected visually, appears to have been significantly less than modeling assumptions. COMPTUEX 07-7 only encountered approximately 2.4% of the number of animals the acoustic model predicted. This is reflective of the conservative data used to populate acoustic effects models, and the broad assumptions that are typically used in the models concerning animal distribution and biology.

NDE AND BO ASSESSMENT

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) section were implemented before and during COMPTUEX 07-7.

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. As described previously, the three categories of measures (Personnel Training, Lookout and Watchstander Responsibilities, and Operating Procedures) as outline in the NDE, appear effective in detecting and responding appropriately to the presence of marine mammals, when visually observed.

NMFS (2007) COMPTUEX/JTFEX 07-7 BO Terms and Condition 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 dB re 1 $\mu\text{Pa}^2\cdot\text{s}$.

During COMPTUEX 07-7, only one FFG surface ship equipped with AN/SQS-56 MFAS sighted potential ESA-listed marine mammals within a range that may have led to SEL exposure greater than 173 dB re 1 $\mu\text{Pa}^2\cdot\text{s}$. As described previously, this was for four whales sighted at 50-yards on 14 September 2007. The AN/SQS-56 on a FFG is not as powerful as the AN/SQS-53C on DDG and CG ships. Given the lower source level of the AN/SQS-56 as compared to the AN/SQS-56 in this instance, potential exposure based on source level and propagation loss would have been less than 190 dB re 1 $\mu\text{Pa}^2\cdot\text{s}$.

From **Table A-4 Appendix A**, a single COMPTUEX/JTFEX would be expected to potentially expose 101 ESA-listed marine mammals from all MFAS source, yet only four potential ESA-listed marine mammals were observed during COMPTUEX 07-7 at ranges that may have exposed them to SEL greater than 173 dB but less than 190 dB re 1 $\mu\text{Pa}^2\cdot\text{s}$. In addition, for all of COMPTUEX 07-7 marine mammal sightings, there was no obvious indication or report that any animal behaved in a manner not associated with normal movement, or foraging, recognizing that the level of biological information obtained is limited at this time.

The U.S. Navy acknowledges that this discussion does not account for potential marine mammal species not visually observed, which is a difficult determination even within the marine mammal scientific survey community.

In regards to impacts not associated with MFAS such as ship strikes, the U.S. Navy has a robust required ship strike reporting program. No marine mammal ship strikes from U.S. Navy vessels occurred during COMPTUEX 07-7. **Table A-2, Appendix A**, summarizes three instances where U.S. Navy ships proactively maneuvered to avoid close encounters with marine mammals, providing evidence that these marine mammal mitigation measures are well-understood by Fleet operators and actively executed in operational practices. For COMPTUEX 07-7, these procedures are assessed to have been effective.

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 greater than 173 dB re 1 $\mu\text{Pa}^2\cdot\text{s}$. Data collection needed to address this question will be reviewed as they become 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.

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 such as surveys 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 potential for alternative detection technologies may be incorporated into future exercises as the U.S. Navy's exercise monitoring program evolves.

REFERENCES

- DoN. 2007. Final Environmental Assessment/Overseas Environmental Assessment for Joint Task Force Exercises and Composite Training Unit Exercises- February 2007. Department of the Navy.
- NMFS. 2007. 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. Office of Protected Resources, National Marine Fisheries Service, Silver Springs, MD. 182 pp.
- NOAA. 2007. Channel Islands National Marine Sanctuary, Sanctuary Advisory Council, Draft Meeting Notes September 21, 2007, Santa Barbara, CA.

APPENDIX A- TABLE AND FIGURES

INTRODUCTION

This Appendix contains material supporting the discussion in the U.S. Navy’s COMPTUEX 07-7 After Action Report. It is divided into two parts. Appendix A Part 1 contains tables and figures referred to in the main Report. Part 2 contains the 2007 NDE mitigation measures.

EXERCISE PARTICULARS

Table A-1. Exercise summary for COMPTUEX 07-7 conducted within SOCAL 7-21 September 2007.

Participants	Event Name	Dates	MFAS Use Reported (hours)
USS Tarawa ESG	COMPTUEX 07-7	07-21 Sep 2007	134 hrs
Number of MFAS- equipped surface ships in ESG:			3 (1 CG 1 DDG 1 FFG)
Number of other MFAS- equipped surface ships:			2 (1 DDG, 1 FFG)
Estimated number of potential ASW helicopters:			2-4 ESG assigned units 4-6 others Upper estimate assumes no helicopters down for maintenance



Figure A-1. Approximate area of reported marine mammal sightings during exercise COMPTUEX 07-7.
Note: this area only represents the area in which marine mammal sightings were reported by exercise participants and does not imply operational area.

EXERCISE RESULTS

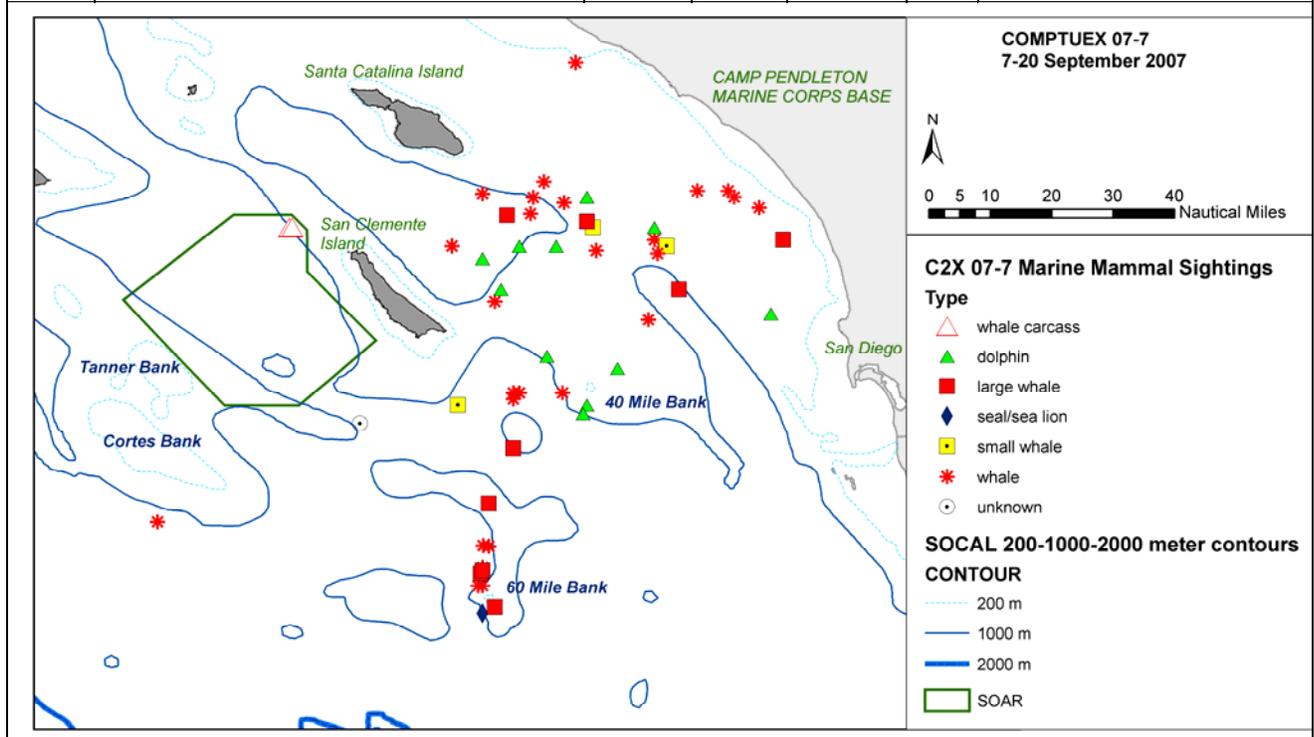
Table A-2. Marine mammal sightings and actions by exercise participants during COMPTUEX 07-7. Text in red **bold** indicate events when MFAS was in use and secured due to marine mammal mitigation. "NR" indicates "Not Reported".

Date-Time local	Description of Actions Taken	MFAS Lost Train Time (min)	Type of detect	Sea State and Weather	#	Animal Type	MFAS in use ?	MFAS Secured ?
9/08-0730	Surface ship sights 1 "whale" breaching at 4000 yards. MFAS not in use. No action taken.		visual	1-NR	1	whale		
9/08-1300	Surface ship sights 20 "porpoises" moving at 25000. MFAS not in use. No action taken.		visual	3-NR	20	porpoise		
9/10-0840	Surface ship sights 3 "large whales" at 500 yards on the surface for two minutes. MFAS not in use. No action taken.		visual	2-NR	3	large whale		
9/10-0909	Surface ship sights 3 "dolphins" at 200 yards on surface for 30 seconds. MFAS not in use. No action taken.		visual	1-NR	3	dolphin		
9/10-0957	Surface ship sights 2 "small whales" at 4000 yards by spout blows. MFAS not in use. No action taken.		visual	1-NR	2	small whale		
9/10-1051	Surface ship sights 3 "dolphins" at 500 yards on surface playing		visual	1-NR	3	dolphin		
9/10-1330	Surface ship sights 6 "dolphins" at 20 yards crossing ships bow. MFAS not in use. Ship maneuvers to avoid.		visual	2-SKC	6	dolphin		
9/10-1620	Surface ship sights 1 "whale". Non-MFAS ship. Ship stops for 5 minutes to allow animal to clear area.		visual	2-NR	1	whale		
9/10-1644	Surface ships sights 1 "whale" at 1000 yards blowing off bow. Non-MFAS ship. Ship alters course to avoid for 5 minutes.		visual	2-clear	1	whale		
9/10-1644	Surface ships sights 1 "whale" at 1000 yards blowing off port bow for 5 minutes. Non-MFAS ship. No action taken		visual	2-clear	1	whale		
9/11-0710	Surface ship sights 1 "large whale (dark gray, black back, no flukes up on dive) at non-reported range. Non-MFAS ship. No action taken.		visual	2-clear	1	large whale		
9/11-0747	Surface ships sights 1 "whale" at unspecified range port bow for 5 minutes. Non-MFAS ship. No action taken		visual	2-clear	1	whale		
9/11-1505	Surface ship sights 1 "unknown marine mammal" at 500 yards.		visual	2-NR	1	unknown		
9/12-1846	Surface ships sights 1 "whale" at unspecified range off bow for 5 minutes. Non-MFAS ship. No action taken		visual	2-clear	1	whale		
9/13-1806	Surface ships sights "whale corpse". Navy reporting message sent. MFAS not in use. No action taken.		visual	NR	1	whale		
9/14-1737	Surface ship sights 4 "whales" at 50 yards diving and surfacing several time. MFAS in use. MFAS secured during middle of ASW exercise. Ship alters course and stops to avoid animals.	NR	visual	3-NR	4	whale	yes	yes
9/14-0807	Surface ship sights 2 "whales" at 3500 yards spouting and fluking up. Non-MFAS-ship. No action taken.		visual	1-clear	2	whale		
9/14-0820	Surface ship sights 2 "whales" at 4000 yards with multiple long spouts. Non-MFAS ship. No action taken		visual	1-clear	2	whale		

Date-Time local	Description of Actions Taken	MFAS Lost Train Time (min)	Type of detect	Sea State and Weather	#	Animal Type	MFAS in use ?	MFAS Secured ?
9/14-0907	Surface ship sights 1 "large whale" at 1800 yards. Non-MFAS ship. No action taken		visual	NR	1	large whale		
9/14-1534	Surface ships sights 2 "whales" at unspecified range off bow with blows seen for 5 minutes. Non-MFAS ship. No action taken		visual	2-clear	2	whale		
9/15-1707	Surface ships sights 1 "whale" at unspecified range off bow with blows seen for 5 minutes. Non-MFAS ship. No action taken		visual	1-clear	1	whale		
9/15-1456	Surface ship sights 1 "seal at 100 yards swimming. MFAS not in use. No action taken.		visual	1-NR	1	seal		
9/16-0755	Surface ship sights 4 "whales from between 30-1500 yards along multiple bearings. First sighting was at 1300 yards. Whales were transiting and observed for 8 minutes until lost from view. Non-MFAS ship. No action taken.		visual	2-NR	4	whale		
9/16-0640	Surface ship sights 1 "large whale" at 1000 yards swimming for 4 minutes until lost from sight. MFAS not in use. No action taken.		visual	2-NR	1	whale		
9/16-0736	Surface ships sights 2 "large whales" at 2000 yards swimming for 6 minutes until lost from view. MFAS not in use. No action taken.		visual	2-clear	2	large whale		
9/16-0808	Surface ship sights 3 "whales" at 2000 yards blowing off starboard bow for 15 minutes. Non-MFAS ship. No action taken.		visual	2-clear	3	whale		
9/16-0823	Surface ship sights 2 "whales" at 4000 yards blowing off starboard bow for 15 minutes. Non-MFAS ship. <i>Ship maneuvers to allow larger passing range to animals.</i>		visual	2-clear	2	whale		
9/16-0831	Surface ship sights 2 "whales" at 3000 yards blowing off starboard beam. Non-MFAS ship. No action taken.		visual	2-clear	2	whale		
9/16-0835	Surface ship sights 2 "large whales" at 2000 yards swimming for 3 minutes until lost from view. MFAS not in use. No action taken.		visual	2-clear	2	large whale		
9/16-0844	Surface ship sights 1 "large whale" at 600 yards swimming for 5 minutes until lost from view. MFAS not in use. <i>Ship maneuvers to increase distance between ship and animal.</i>		visual	2-clear	1	large whale		
9/16-0851	Surface ship sights 1 "whale" at non-reported range blowing off bow. Non-MFAS ship. No action taken.		visual	2-clear	1	whale		
9/16-0900	Surface ships sights 1 "large whale" at 100 yards swimming for 5 minutes. MFAS not in use. Ship maneuvers and stops to allow animal to cross ship's bow.		visual	3-clear	1	large whale		
9/16-1056	Surface ship sights 1 "whale" at 200 yards. Broaching and moving port to starboard. MFAS not in use. No action taken.		visual	2-NR	1	whale		
9/16-1457	Surface ship sights 40+ "dolphins" at 2000 yards swimming for 7 minutes until lost from view. MFAS not in use. No action taken.		visual	2-clear	40	dolphin		
9/17-0800	Surface ship sights "whale carcass" floating. Navy reporting message sent. MFAS not in use for the 24 hours preceding the sighting. No action taken.		visual	NR	1	carcass		
9/17-0913	Surface ships sights 24 "porpoises" at 300 yards. MFAS not in use. No action taken.		visual	1-NR	24	porpoise		

Date-Time local	Description of Actions Taken	MFAS Lost Train Time (min)	Type of detect	Sea State and Weather	#	Animal Type	MFAS in use ?	MFAS Secured ?
9/17-1545	Surface ship sights 20 "dolphins" at 1500 yards moving from port to starboard. MFAS not in use. No action taken.		visual	NR	20	dolphin		
9/17-1611	Surface ship sights 1 "pilot whale" at 200 yards. MFAS not in use. Ship maneuvers to open range between ship and animal.		visual	NR	1	small whale		
9/18-1801	Surface ship sights 1 "whale" 2000 yards off bow for 1 minutes until lost from view. Non-MFAS ship. No action taken.		visual	1-clear	1	whale		
9/18-1429	Surface ship sights "whale carcass" floating. Navy reporting message sent. No action taken.		visual	NR	1	carcass		
9/19-0656	Surface ship sights 1 "whale" at non-reported range blowing off bow for 1 minute. Non-MFAS ship. No action taken.		visual	2-clear	1	whale		
9/19-0849	Surface ship sights 1 "whale" at non-reported range off bow for 5 minutes. Non-MFAS ship. No action taken.		visual	1-clear	1	whale		
9/19-0955	Surface ship sights 1 "whale" at non-reported range blowing off bow for 5 minutes. Non-MFAS ship. No action taken.		visual	2-clear	1	whale		
9/19-0957	Surface ship sights 1 "small whale" at 3000 yards. MFAS in use. MFAS secured for 10 minutes.	10	visual	2-NR	1	small whale	yes	yes
9/19-0957	Surface ship sights 1 "whale" at non-reported range off bow for 5 minutes. Non-MFAS ship. No action taken.		visual	2-clear	1	whale		
9/19-1006	Surface ship sights 1 "whale" at non-reported range blowing off port bow for 5 minutes. Non-MFAS ship. Ship maneuvers to open range between ship and animal.		visual	1-clear	1	whale		
9/19-1018	Surface ship sights 1 "whale" at non-reported range blowing off starboard quarter for 5 minutes. Non-MFAS ship. No action taken.		visual	1-clear	1	whale		
9/19-1049	Surface ship sights unknown number of dolphins along starboard side of ship. MFAS is use. MFAS secured for 18 minutes.	18	visual	1-clear		dolphin	yes	yes
9/19-1130	Surface ship sights 2 "fin whales" at 4000 yards swimming south and crossing bow ahead of ship. Non-MFAS ship. No action taken.		visual	1-clear	2	large whale		
9/19-1139	Surface ship sights 20 "dolphins" at 1000 yards swimming for 5 minutes until lost from view due to ship's movement. MFAS not in use. No action taken.		visual	2-part cloudy	20	dolphin		
9/19-1305	Surface ship sights 2 "large whales" at 1000 yards swimming for 5 minutes until lost from view. MFAS not in use. Ship maneuvers to open range between ship and animals.		visual	3-NR	2	large whale		
9/20-1756	Surface ship sights 63 "porpoises" at 200 yards swimming toward ship. MFAS not in use. No action taken.		visual	NR-clear	63	porpoise		
9/20-0300	Surface ship sights 2 "large whales" at 6000 yards swimming north before lost from view. Non-MFAS ship. No action taken		visual-night	1-clear	2	large whale		
9/20-1200	Surface ship sights 1 "large whale" at non reported range. Non-MFAS ship. No action taken.		visual	NR	1	large whale		

Date-Time local	Description of Actions Taken	MFAS Lost Train Time (min)	Type of detect	Sea State and Weather	#	Animal Type	MFAS in use ?	MFAS Secured ?
9/20-1205	Surface ships 1 "whale" 4000 yards off bow blowing for 5 minutes. Non-MFAS ship. No action taken.		visual	NR	1	whale		
9/20-1450	Surface ship sights 4 "porpoises" at 200 yards swimming on a reverse parallel course as the ship. MFAS in use. MFAS secured for 20 minutes.	20	visual	1-NR	4	porpoise	yes	yes
9/21-0840	Surface ship sights 20 "dolphins" at 1000 yards swimming for 5 minutes until lost from view due to ship's movement. MFAS not in use. No action taken.		visual	2-clear	20	dolphin		
57	= total number of sightings	48 min	= known lost MFAS training time in minutes		289	= # of marine mammals		



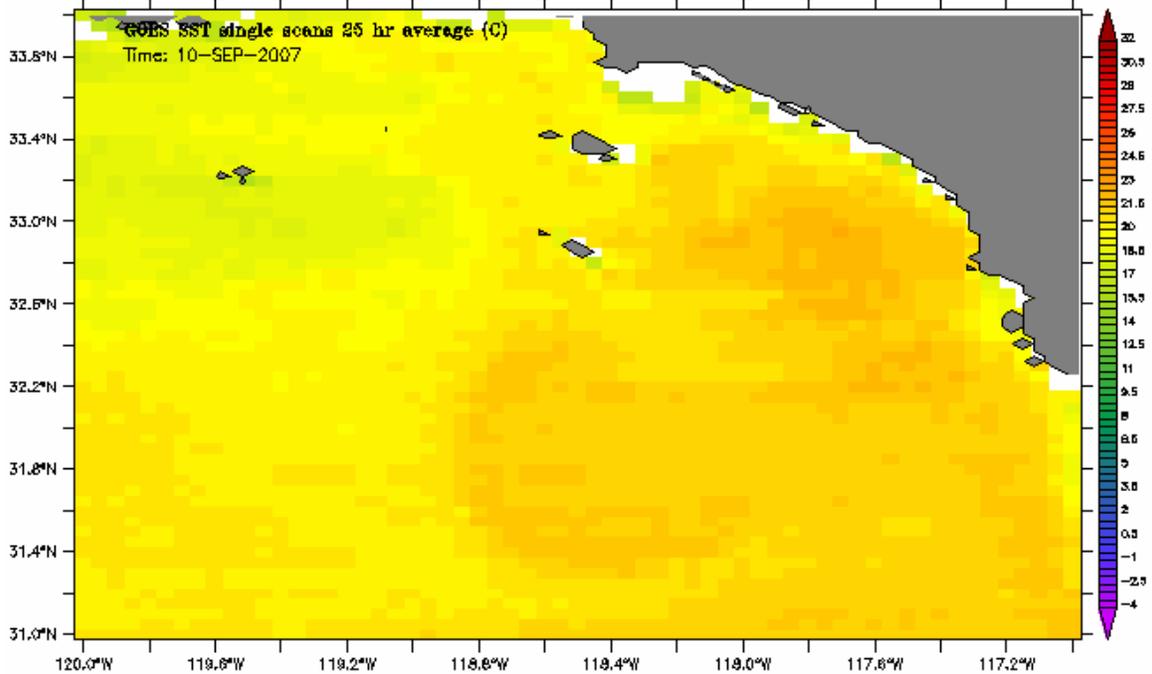


Figure A-2. Sea surface temperature (SST) for Southern California on 10 September 2007. (GOES SST 25 hour average from North Pacific Demonstration Project Ocean Watch provided online by Coastwatch and Southwest Fisheries Science Center, NMFS <http://las.pfeg.noaa.gov>)

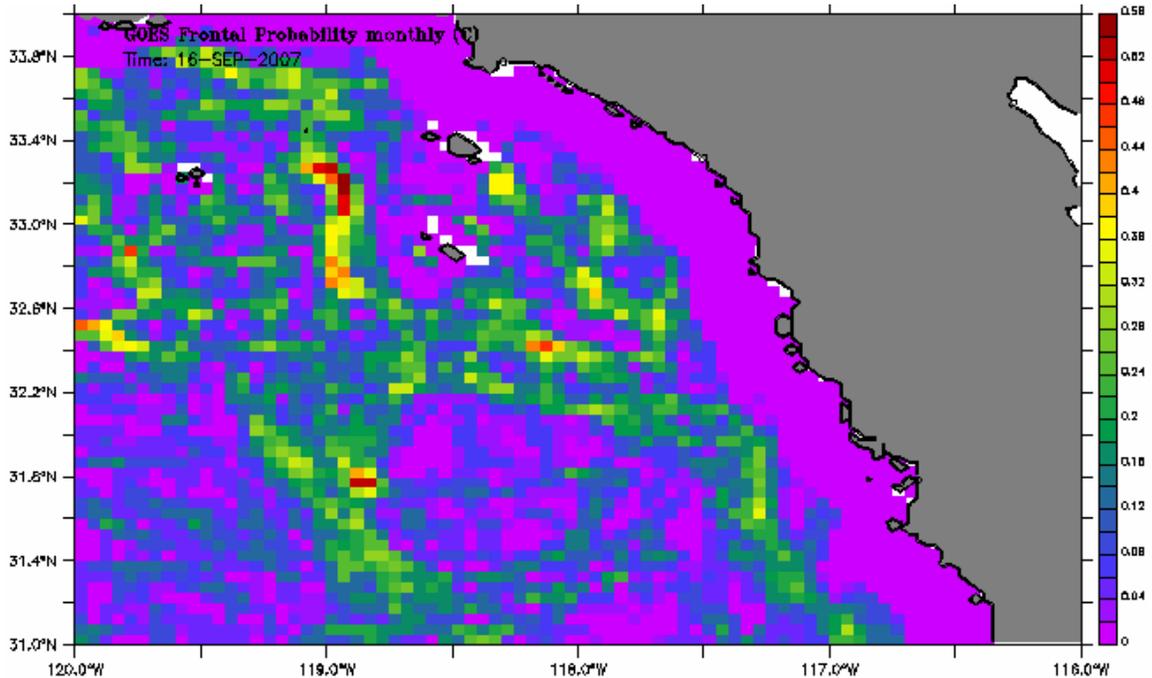


Figure A-3. Southern California monthly frontal probability index for September 2007 (16 Sep 2007); medium and long term frontal activity is often associated with potentially increased biological activity as oceanographic conditions concentrate nutrients within a defined area. (from North Pacific Demonstration Project Ocean Watch provided online by Coastwatch and Southwest Fisheries Science Center, NMFS <http://las.pfeg.noaa.gov>)

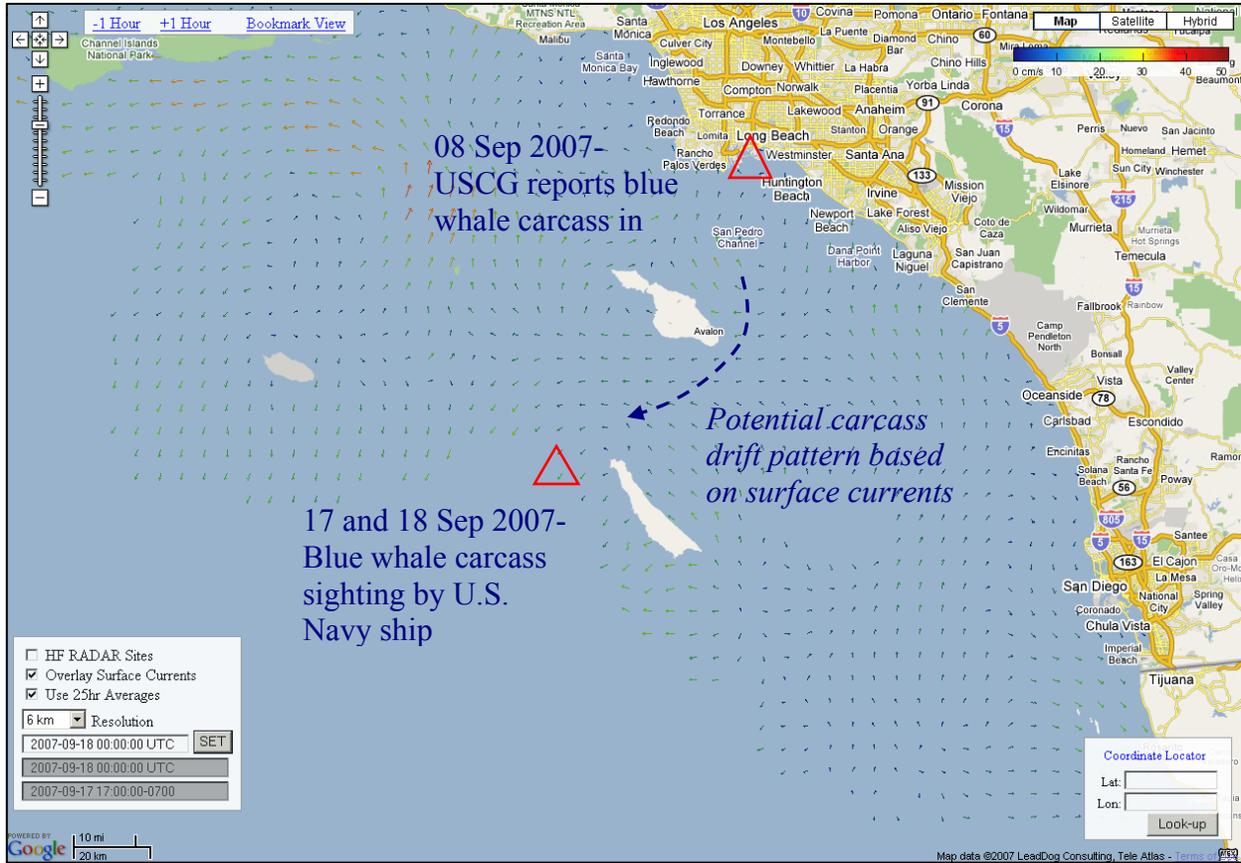


Figure A-4. RADAR derived Southern California ocean surface currents at 5:00 PM local time on 18 September.

(6 km, 25-hour averaged provided by the Coastal Ocean Currents Monitoring Program obtained online via the Southern California Coastal Observation System <http://www.sccoos.org/index.html>).

Table A-3. Total estimated annual exposures based on pre-exercise modeling for MFAS sonar from DoN 2007 based on seven exercise per year (COMPTUEX/JTFEX 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	46.4	2.0	0
Fin whale	263	10	0	37.6	1.4	0
Humpback whale	33	0	0	4.7	0	0
Sei whale	2	0	0	0.3	0	0
Sperm whale	59	4	0	8.4	0.6	0
Non-ESA listed						
Baird's beaked whale	4	0	(4)*	0.6	0	0.6
Bottlenose dolphin	516	30	0	73.7	4.3	0
Bryde's whale	2	0	0	0.3	0.0	0
Common dolphin	69,258	3,464	8	9894.0	494.9	1.14
Cuvier's beaked whale	208	10	(218)*	29.7	1.4	31.1
Dall's porpoise	142	3	0	20.3	0.4	0
Dwarf sperm whale	0	0	0	0.0	0.0	0
False killer whale	16	0	0	2.3	0.0	0
Gray whale	64	0	0	9.1	0.0	0
Killer whale	12	1	0	1.7	0.1	0
<i>Mesoplodon</i> spp.	0	0	0	0.0	0.0	0
Minke whale	24	2	0	3.4	0.3	0
Northern right whale dolphin	3,003	227	0	429.0	32.4	0
Pacific white-sided dolphin	1,949	101	0	278.4	14.4	0
Pantropical spotted dolphin	547	0	0	78.1	0	0
Pygmy sperm whale	859	56	0	122.7	8.0	0
Risso's dolphin	2,050	96	0	292.9	13.7	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	222.0	10.3	0
Ziphiid beaked whale	49	3	(52)*	7.0	0.4	7.4
California sea lion	0	0	0	0	0	0
Northern elephant seal	0	0	0	0	0	0
Pacific harbor seal	6	0	0	0.9	0	0
Total=				11,564	590	44

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

Table A-4. Relationship between Beaufort sea state and ocean conditions.

Graphic	Beaufort Sea State Number	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
	1	Small ripples or capillary waves on glassy surface	Light Air	Smoke drifts with wind direction	1-3
	2	Larger ripples or wavelets on glassy surface	Light Breeze	Leaves begin to rustle; wind felt on face	4 - 7
	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
	4	Small chop, defined direction; numerous whitecaps	Moderate Breeze	Dust, leaves, and loose paper move	13 - 18
	5	Heavy chop; many white foaming crests; some spray	Fresh Breeze	Small trees begin to sway	19 - 24
	6	Larger surface waves form; whitecaps everywhere; more spray	Strong Breeze	Large branches move; whistling heard in wires	25 - 31
	7	Sea heaps up; white foam starts to blow in streaks along direction of wind; spindrift forms	Near Gale	Resistance strong when walking	32 - 38
	8	Moderately high waves, crests begin to break into spindrift; well marked streaks of foam	Gale	Twigs and small branches broken off trees	39 - 46
	9	High waves, sea begins to roll; spray begins to reduce visibility; dense streaks of foam	Strong Gale	Slight structural damage occurs (chimney-pots and slates removed).	47 - 54
	10	Sea mostly covered in white foam; visibility reduced; exceptionally large waves	Storm	Trees uprooted; considerable structural damage	55 - 63
	11	Exceptionally high waves; Sea completely covered with long white patches of foam lying along direction of wind. Everywhere edges of wave crests are blown into froth. Visibility affected.	Violent Storm	Wide-spread damage	64-72
	12	The air is filled with foam and spray. Sea completely white with driving spray; visibility very seriously affected	Hurricane	Significant flooding and wind damage	73-83

Table A-5. Sightings during COMPTUEX 07-7 where MFAS was on and mitigation occurred.
(**Bold= potential** ESA species).

Assessment by Range for Surface Ship MFA sonar			
Range	ESA species (potential)	MMPA species	Comments
200 yards- Sonar secured (turned off)	4 whales		Whales sighted at 50 yards on 14 Sep. MFAS secured during middle of ASW exercise. Ship alters course and stops to avoid animals. Relative position of ship (S) movement and whale location (W) shown below: 
		unk # dolphins	Pod of dolphins sighted along starboard side of ship on 19 Sep. MFAS secured for 18 minutes.
		4 porpoises	Porpoises/dolphins sighted at 200 yards approaching ship on reciprocal heading on 20 Sep. MFAS secured for 20 minutes.
500 yards- Sonar reduced -10 dB (surface ship only)			No reports
1000 yards- Sonar reduced -6 dB (surface ship only)			No reports
>1000 yards- No NDE-mandated mitigation required			No reports
>2000 yards- No NDE-mandated mitigation required	1 sm whale		Ship secures sonar on sighting at 3000 yards on 19 Sep. MFAS secured for 10 minutes.
Assessment by Range for Helicopter MFA dipping sonar			
Range	ESA species (potential)	MMPA species	Comments
< 200 yards- Sonar secured (turned off)			No reports
>200 yards- No NDE-mandated mitigation required			No reports

NDE CONDITIONS AND LETTER OF INSTRUCTION

NDE

NDE mitigation measures include:

I. General Maritime Protective Measures: Personnel Training:

1. 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.
2. All Commanding Officers, Executive Officers, and officers standing watch on the bridge will have reviewed the MSAT material prior to a training event employing the use of MFAS.
3. Navy lookouts will undertake extensive training in order to qualify as a watchstander in accordance with the Lookout Training Handbook (NAVEDTRA 12968-B).
4. 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 the 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 counted as those listed in previous measures so long as supervisors monitor their progress and performance.
5. 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.

II. General Maritime Protective Measures: Lookout and Watchstander Responsibilities:

6. 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.
7. 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.
8. 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.
9. On surface vessels equipped with MFAS, pedestal 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.
10. Personnel on lookout will employ visual search procedures employing a scanning methodology in accordance with the Lookout Training Handbook (NAVEDTRA 12968-B).
11. After sunset and prior to sunrise, lookouts will employ Night Lookouts Techniques in accordance with the Lookout Training Handbook.

12. 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 (e.g., trash, periscope, surface disturbance, discoloration) in the water may be indicative of a threat to the vessel and its crew or indicative of a marine species that may need to be avoided as warranted.

III. Operating Procedures

13. A Letter of Instruction, Mitigation Measures Message or Environmental Annex to the Operational Order will be issued prior to the exercise to further disseminate the personnel training requirement and general marine mammal protective measures.
14. Commanding Officers will make use of marine species detection cues and information to limit interaction with marine species to the maximum extent possible consistent with safety of the ship.
15. 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 mammal to the appropriate watch station for dissemination and appropriate action.
16. During MFAS operations, personnel will utilize all available sensor and optical systems (such as Night Vision Goggles to aid in the detection of marine mammals).
17. 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.
18. Aircraft with deployed sonobuoys will use only the passive capability of sonobuoys when marine mammals are detected within 200 yards of the sonobuoy.
19. Marine mammal detections will be immediately reported to assigned Aircraft Control Unit for further dissemination to ships in the vicinity of the marine species as appropriate where it is reasonable to conclude that the course of the ship will likely result in a closing of the distance to the detected marine mammal.
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.
 - (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, has not been detected for 30 minutes, or the vessel has transited more than 2,000 yards beyond the location of the last detection.
 - (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.
 - (iii) Should the marine mammal be detected within or closing to inside 200 yards of the sonar dome, active sonar transmissions 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.

(iv) Special conditions applicable for 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 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.

(v) If the need for power-down should arise as detailed in "Safety Zones" above, Navy 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).

21. 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.
22. 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.
23. Helicopters shall observe/survey the vicinity of an ASW exercise for 10 minutes before the first deployment of active (dipping) sonar in the water.
24. 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.
25. Submarine sonar operators will review detection indicators of close-aboard marine mammals prior to the commencement of ASW operations involving active mid-frequency sonar.
26. Increased vigilance during major ASW training exercises with tactical active sonar when critical conditions are present.

Based on lessons learned from strandings in Bahamas 2000, Madeiras 2000, Canaries 2002, and Spain 2006, beaked whales are of particular concern since they have been associated with MFAS operations. Navy should avoid planning major ASW training exercises with MFAS in areas where they will encounter conditions which, in their aggregate, may contribute to a marine mammal stranding event.

The conditions to be considered during exercise planning include:

(1) Areas of at least 1000 m depth near a shoreline where there is a rapid change in bathymetry on the order of 1000-6000 meters occurring across a relatively short horizontal distance (e.g., 5 nm).

(2) Cases for which multiple ships or submarines (≥ 3) operating MFAS in the same area over extended periods of time (≥ 6 hours) in close proximity (≤ 10 NM apart).

(3) An area surrounded by land masses, separated by less than 35 nm and at least 10 nm in length, or an embayment, wherein operations involving multiple ships/subs (≥ 3) employing MFAS near land may produce sound directed toward the channel or embayment that may cut off the lines of egress for marine mammals.

(4) Although not as dominant a condition as bathymetric features, the historical presence of a significant surface duct (i.e. a mixed layer of constant water temperature extending from the sea surface to 100 or more feet).

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 additional 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 sonar 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.

All safety zone requirements described in Measure 20 apply.

The post-exercise report must include specific reference to any event conducted in areas where the above conditions exist, with exact location and time/duration of the event, and noting results of surveys conducted.

IV. Coordination and Reporting

27. Navy will coordinate with the local NMFS Stranding Coordinator for 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.
28. Navy will submit a report to the OPR, 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.
29. If a stranding occurs during an ASW exercise, NMFS and Navy will coordinate to determine if MFAS should be temporarily discontinued while the facts surrounding the stranding are collected.

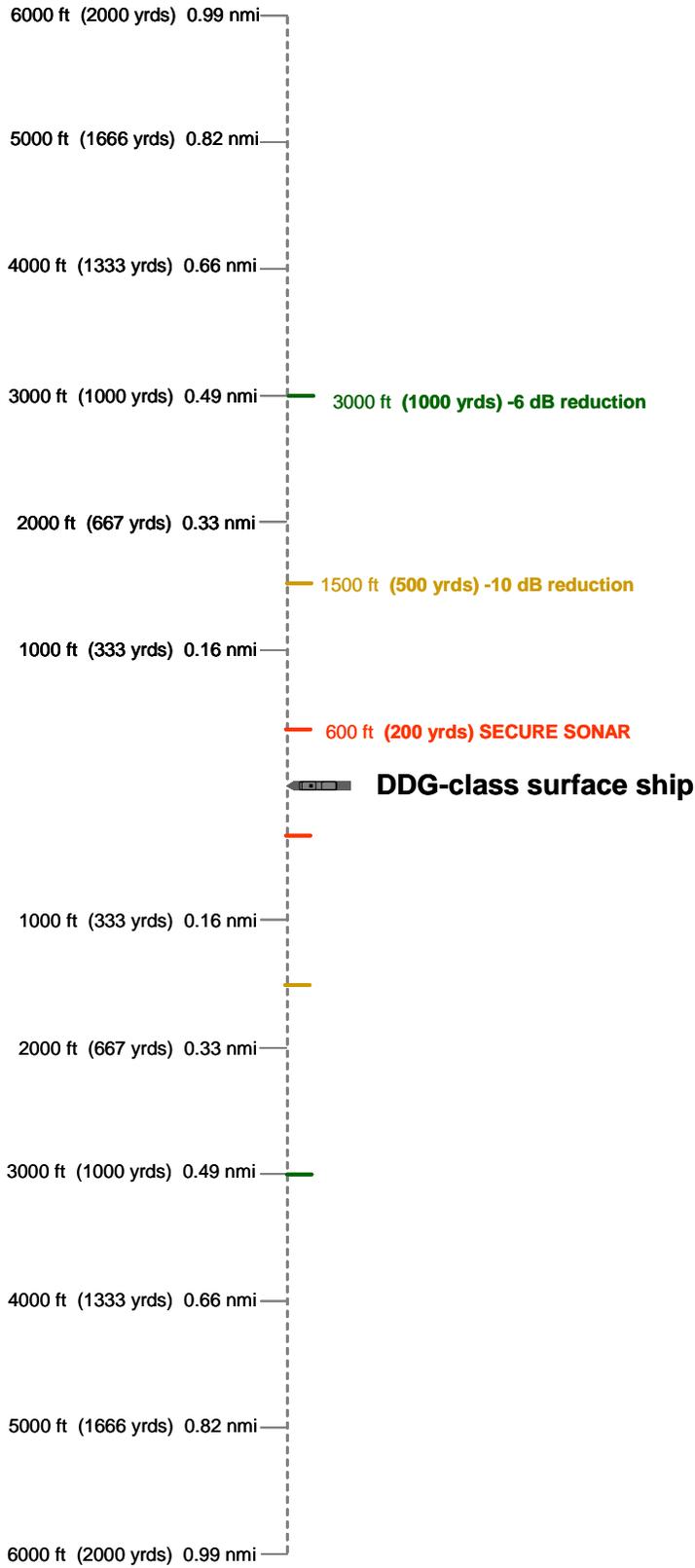


Figure A-5. Diagram of NDE sonar safety ranges. Ranges are to scale based on a DDG-class surface ship.