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National Marine Fisheries Service
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Department of the Navy

In accordance with the Letter of Authorization
Under the MMPA and ITS authorization under
the ESA
7 February 2011

UNCLASSIFIED

Annual Range Complex Exercise Report

2 August 2010 to 1 August 2011

For The U.S. Navy's Atlantic Fleet Active Sonar Training (AFAST) Study Area

1 October 2011

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INTRODUCTION

The U.S. Navy prepared this Annual Range Complex Exercise Report covering the period from 2 August 2010 to 1 August 2011 in compliance with the National Marine Fisheries Service (NMFS) Final Rule under the Marine Mammal Protection Act (MMPA) for the Atlantic Fleet Active Sonar Training (AFAST) Study Area (NMFS 2009).

In the AFAST Range Complex Final Rule and Letters of Authorization[1] "Requirements for monitoring and reporting" the following report subsections were specified and are present within this report:

(1) Mid-Frequency Active Sonar (MFAS)/High-Frequency Active Sonar (HFAS) Major Training Exercise for Reporting (MTER).

- (i) Exercise Information (for each MTER)
- (ii) Individual Marine Mammal Sighting Information (for each MTER).
- (iii) Evaluation (based on data gathered during all MTERs) of effectiveness of mitigation measures designed to avoid exposing marine mammals to MFAS. This evaluation shall identify the specific observations that support any conclusion the Navy reaches about the effectiveness of the mitigation.

(2) Anti-submarine Warfare (ASW) Summary

- (i) Total annual hours of each type of sonar source
- (ii) Cumulative Impact Report

(3) Improved Extended Echo Ranging (IEER) / Advanced Extended Echo Ranging (AEER) Summary

- (i) Total number of IEER and AEER events conducted in the AFAST Study Area
- (ii) Total expended/detonated rounds (buoys)
- (iii) Total number of self-scuttled IEER rounds

This Annual Report covers the period from 2 August 2010 to 1 August 2011, and the information represents the best practical data collection for this period. The data collection and reporting timeline differ from the actual LOA dates, so in an effort to provide a better representation of annual exercise data for the AFAST Study Area, the Navy has combined all exercise data from 2 August 2010 to 1 August 2011 and compared it to the annual allocations provided in the 7 February 2011 AFAST Letter of Authorization. This representation of annual exercise data shall be repeated in future Annual Reports. To provide accounting for the entire five year period of the authorization, Navy will also submit a final report at the end of the five years to provide comprehensive totals of authorized usage.

Finally, on review of accumulated reporting metrics, the Navy has determined that certain portions become classified by their summary. Information designated as classified in this report will be submitted to NMFS in a separate classified version of this report.

[1]AFAST:§216.245(f) (1) through (f) (3) of the Final Rule and 7(f) of the Letter of Authorization

(1) AFAST – MFAS/HFAS Major Training Exercise Summary

This section summarizes authorized sonar use and marine mammal observations from MTERs conducted within the AFAST Study Area during the reporting period. The AFAST MTERs include ***Southeastern ASW Integrated Training Initiative*** exercises (SEASWITI), ***Integrated ASW Course Phase II*** (IAC II), ***Composite Training Unit Exercises*** (C2X) and ***Joint Task Force Exercises*** (JTFEX).

(i) Exercise information

Table 1-i-1. MTERs conducted in the AFAST Study Area.

(A) Exercise designator	(B) Date	(C) Locations	(D) # and types of active sources used							(E) # and types of passive sources used							(F) # and types of vessels and aircraft participating								(G) Total hours of observation by watchstanders	(H) Total hours of all active sources	(I) Total hours of each active source							(J) Wave height (high, low, and average) (ft)
			SQS-53	SQS-56	BQQ-10 or 5	AQS-22 or 13	SSQ-62 Sonobuoys	SLQ-25 NIXIE	BQS-15	SQS-53	SQS-56	SQR-19	BQQ-10 or 5	AQS-22 or 13	BQS-15	SSQ-53 Sonobuoys	CG	DDG	FFG	SH-60F \MH-60R dipping helo	SH-60B non-dipping helo	Submarines	P-3C MPA	Non-ASW surface ships			SQS-53	SQS-56	BQQ-10 or 5	AQS-22 or 13	SSQ-62 Sonobuoys	SLQ-25 NIXIE	BQS-15	
C2X w/ IAC II	5-26 OCT 2010	CPOA/ JAX	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	1	6,768	*	*	*	*	*	*	*	6,2,4
JTFEX	4-11 DEC 2010	JAX	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	1	6,768	*	*	*	*	*	*	*	6,2,4
SEASWITI	6-10 DEC 2010	JAX	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	1	732	*	*	*	*	*	*	*	12,4,8
C2X w/ IAC II	19 JAN-10 FEB 2011	CPOA/ JAX	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	3	12,833	*	*	*	*	*	*	*	7,1,4
JTFEX	14-21 FEB 2011	JAX	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	3	4,083	*	*	*	*	*	*	*	7,1,4
SEASWITI	22-25 FEB 2011	JAX	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	1	1,476	*	*	*	*	*	*	*	5,4,4
IAC II	3-5 MAY 2011	CPOA	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	1	3,755	*	*	*	*	*	*	*	9,1,4

JAX=Jacksonville Operating Area; CPOA=Cherry Point Operating Area

*Information is presented in the classified version of this report.

(ii) Individual marine mammal sighting information by exercise

Table 1-ii-1. AFAST MTER – Individual Marine Mammal Sighting Information: C2X w/ IAC II 5-26 Oct 2010.

(A) Location of sighting	(B) Species	(C) # of individuals	(D) Calves observed (y/n)	(E) Initial detection sensor	(F) Platform detection from	(G) Length of time observed (min)	(H) Wave height (ft)	(I) Visibility (nm)	(J) Sonar source in use (y/n)	(K) Range (yds)	(L) Mitigation implemented	(M) If source in use (J) is hull-mounted, true bearing of animal from ship, true direction of ship's travel, and estimation of animal's motion relative to ship	(N) Observed behavior
JAX	dolphin	50	Y	VIS	FFG	25	3	10	N	<200	na	na	Bow riding
JAX	dolphin	nr	Y	VIS	FFG	25	3	10	N	500-1000	na	na	Dolphins appeared to be playing in the bowwake
JAX	dolphin	6	N	VIS	DDG	20	3	10	N	<200	na	na	Group of dolphins followed the ship for 20 minutes, repeatedly swimming underneath the ship
JAX	dolphin	20	N	VIS	DDG	5	3	10	N	200-500	na	na	Large group of dolphins surfaced off ship for brief period of time
CPOA	dolphin	nr	N	ACO	CG	28	nr	nr	N	nr	na	na	Dolphins starboard bow moving to port beam
JAX	dolphin	20	N	VIS	DDG	5	2	10	N	500-1000	na	na	Large group of dolphins surfaced near ship
JAX	dolphin	25	Y	VIS	FFG	5	3	10	N	<200	na	na	Bow riding
JAX	dolphin	nr	N	VIS	FFG	15	3	10	N	1000-2000	na	na	Dolphins appeared to be playing in the bowwake
JAX	dolphin	50	Y	VIS	FFG	1	3	10	N	<200	na	na	Bow riding

JAX	turtle	1	N	VIS	DDG	1	2	10	N	<200	na	na	Sea turtle surfaced next to the ship briefly
JAX	dolphin	nr	N	VIS	DDG	30	2	10	N	200-500	na	na	Dolphins swimming and jumping in waves
JAX	dolphin	2	N	VIS	DDG	5	2	10	N	<200	na	na	Two adult dolphins chased the ship
JAX	turtle	1	N	VIS	DDG	10	2	10	N	200-500	na	na	Swam alongside the ship
JAX	dolphin	20	N	VIS	DDG	2	2	10	N	200-500	na	na	Large group of dolphins surfaced in front of ship for brief period of time
JAX	dolphin	nr	N	VIS	FFG	1	3	10	N	500	na	na	Dolphins appeared to be playing in the bowwake
JAX	dolphin	nr	N	VIS	DDG	20	2	10	N	<200	na	na	Dolphins swimming and jumping in waves
JAX	turtle	1	N	VIS	FFG	1	3	10	N	<200	na	na	nr
JAX	turtle	nr	N	VIS	FFG	1	3	10	N	500	na	na	Nothing abnormal
JAX	turtle	1	N	VIS	FFG	1	3	10	N	200	na	na	nr
JAX	dolphin	nr	N	VIS	FFG	1	3	10	N	500	na	na	Dolphins appeared to be playing in the bowwake
JAX	dolphin	nr	N	VIS	DDG	6	2	10	N	<200	na	na	Dolphins swimming and jumping in waves
CPOA	whale	2	N	VIS	CG	10	1	10	N	2000	na	na	Starboard bow
JAX	turtle	3	N	VIS	DDG	3	2	10	N	<200	na	na	Swam past the ship
CPOA	dolphin	3	N	VIS	CG	5	1	10	Y	<200	na	dolphins bearing 285, ship course 255, paralleling ship	Bow riding
CPOA	turtle	1	N	VIS	CG	14	1	10	Y	<200	Sonar shutdown	nr, ship course 220, nr	Turtle sighted at 10 yds on starboard side. Further behavior not reported
JAX	dolphin	2	N	VIS	DDG	4	2	10	N	>2000	na	na	Dolphins surfaced next to towed target, delaying gunnery exercise until 30 minutes after last sighting

JAX	turtle	1	N	VIS	CG	nr	2	10	N	200-500	na	na	nr
JAX	dolphin	3	N	VIS	DDG	3	2	10	N	200-500	na	na	Swam past the ship
JAX	dolphin	10	N	VIS	DDG	40	2	10	N	200-500	na	na	Swam with ship for 40 minutes
JAX	turtle	nr	N	VIS	DDG	3	2	10	N	200-500	na	na	Sea turtles swimming near surface
JAX	dolphin	nr	N	VIS	DDG	5	2	10	N	<200	na	na	Dolphins swimming and jumping in waves
JAX	whale	nr	N	VIS	DDG	10	2	10	N	200-500	na	na	Whales logging and swimming
JAX	dolphin	6	N	VIS	DDG	1	2	10	N	200-500	na	na	Group of dolphins surfaced briefly
JAX	whale	nr	N	VIS	DDG	4	2	10	N	200-500	na	na	Whales logging and swimming
JAX	dolphin	1	N	VIS	DDG	5	1	10	N	1000-2000	na	na	Swam on surface for several minutes
JAX	whale	nr	N	VIS	DDG	3	2	10	N	200-500	na	na	Whales logging and swimming
JAX	dolphin	6	N	VIS	DDG	1	2	10	N	<200	na	na	Group of dolphins surfaced briefly
JAX	dolphin	4	N	VIS	DDG	1	1	10	N	<200	na	na	Small group surfaced briefly
JAX	dolphin	nr	N	VIS	DDG	5	2	10	N	<200	na	na	Dolphins swimming and jumping in waves
JAX	dolphin	6	N	VIS	CG	5	1	10	N	<200	na	na	Dolphins sighted by aft lookout, no behavior reported
JAX	turtle	1	N	VIS	CG	nr	1	10	N	>2000	na	na	Turtle sighted at 10 nm, no behavior reported. Believe seen by embarked helo
JAX	dolphin	nr	N	VIS	DDG	1	2	10	N	<200	na	na	Dolphins swimming and jumping in waves
JAX	dolphin	4	N	VIS	DDG	3	3	10	N	200-500	na	na	Group of dolphins surfaced briefly
JAX	whale	2	Y	VIS	DDG	1	3	10	N	200-500	na	na	Adult and calf whale surfaced briefly, paralleling ship's course
JAX	dolphin	nr	N	VIS	DDG	1	2	10	N	<200	na	na	Dolphins swimming and jumping in waves

JAX	dolphin	nr	N	VIS	DDG	1	2	10	N	<200	na	na	Dolphins swimming and jumping in waves
JAX	dolphin	4	Y	VIS	DDG	5	3	10	N	<200	na	na	Two adult and two calf dolphins surfaced near the ship. One calf extremely small, suspected newborn or young infant
JAX	dolphin	nr	N	VIS	DDG	1	2	10	N	200-500	na	na	Dolphins swimming and jumping in waves
JAX	turtle	1	N	VIS	DDG	2	1	10	N	500-1000	na	na	Turtle sighted at surface, raised head out of water, closed ship and dove under at 300 yds
JAX	dolphin	nr	N	VIS	DDG	1	2	10	N	<200	na	na	Dolphins swimming and jumping in waves
JAX	dolphin	nr	N	VIS	DDG	2	2	10	N	200-500	na	na	Dolphins swimming and jumping in waves

nr=not reported; VIS=visual; ACO=acoustic; Y=yes; N=no; na=not applicable

JAX=Jacksonville Operating Area; CPOA=Cherry Point Operating Area

Table 1-ii-2. AFAST MTER – Individual Marine Mammal Sighting Information: JTFEX 4-11 Dec 2010.

(A) Location of sighting	(B) Species	(C) # of individuals	(D) Calves observed (y/n)	(E) Initial detection sensor	(F) Platform detection from	(G) Length of time observed (min)	(H) Wave height (ft)	(I) Visibility (nm)	(J) Sonar source in use (y/n)	(K) Range (yds)	(L) Mitigation implemented	(M) If source in use (J) is hull-mounted, true bearing of animal from ship, true direction of ship's travel, and estimation of animal's motion relative to ship	(N) Observed behavior
No sightings reported during this exercise.													

Table 1-ii-3. AFAST MTER – Individual Marine Mammal Sighting Information: SEASWITI 6-10 Dec 2010.

(A) Location of sighting	(B) Species	(C) # of individuals	(D) Calves observed (y/n)	(E) Initial detection sensor	(F) Platform detection from	(G) Length of time observed (min)	(H) Wave height (ft)	(I) Visibility (nm)	(J) Sonar source in use (y/n)	(K) Range (yds)	(L) Mitigation implemented	(M) If source in use (J) is hull-mounted, true bearing of animal from ship, true direction of ship's travel, and estimation of animal's motion relative to ship	(N) Observed behavior
JAX	dolphin	1	N	VIS	DDG	10	2	10	N	200-500	na	na	nr
JAX	dolphin	4	N	VIS	DDG	10	2	10	N	500-1000	na	na	nr

nr=not reported; VIS=visual; ACO=acoustic; Y=yes; N=no; na=not applicable

JAX=Jacksonville Operating Area

Table 1-ii-4. AFAST MTER – Individual Marine Mammal Sighting Information: C2X w/ IAC II 19 Jan – 10 Feb 2011.

(A) Location of sighting	(B) Species	(C) # of individuals	(D) Calves observed (y/n)	(E) Initial detection sensor	(F) Platform detection from	(G) Length of time observed (min)	(H) Wave height (ft)	(I) Visibility (nm)	(J) Sonar source in use (y/n)	(K) Range (yds)	(L) Mitigation implemented	(M) If source in use (J) is hull-mounted, true bearing of animal from ship, true direction of ship's travel, and estimation of animal's motion relative to ship	(N) Observed behavior
JAX	dolphin	8	N	VIS	FFG	7	4	10	N	1000-2000	na	na	Bow riding
JAX	dolphin	8	N	VIS	FFG	10	5	10	N	1000-2000	na	na	Bow riding
JAX	dolphin	8	N	VIS	FFG	2	6	10	N	1000-2000	na	na	Bow riding
JAX	dolphin	8	N	VIS	FFG	1	5	10	N	>2000	na	na	Bow riding
JAX	dolphin	8	N	VIS	FFG	1	4	10	N	1000-2000	na	na	Bow riding
JAX	dolphin	3	N	VIS	FFG	2	5	10	N	200-500	na	na	Bow riding
CPOA	whale	1	N	VIS	non-ASW ship	nr	nr	10	na	nr	na	na	Sighted dead floating whale carcass
JAX	dolphin	2	N	VIS	FFG	20	3	10	N	<200	na	na	Bow riding
JAX	nr	1	N	ACO	DDG	15	3	10	N	nr	na	na	nr
JAX	nr	1	N	ACO	DDG	114	3	10	N	nr	na	na	nr
JAX	dolphin	1	N	ACO	DDG	24	3	10	N	nr	na	na	nr
JAX	dolphin	1	N	ACO	DDG	39	3	10	N	nr	na	na	nr
JAX	dolphin	8	N	ACO	DDG	16	3	10	N	nr	na	na	Bow riding
JAX	turtle	1	N	VIS	DDG	6	2	10	N	nr	na	na	nr
JAX	dolphin	3	N	VIS	FFG	12	5	10	N	<200	na	na	Bow riding
JAX	dolphin	1	N	ACO	DDG	15	4	10	N	nr	na	na	nr

JAX	dolphin	1	N	ACO	DDG	20	4	10	N	nr	na	na	nr
JAX	dolphin	1	N	ACO	DDG	45	3	10	N	nr	na	na	nr
JAX	dolphin	4	N	VIS	FFG	4	6	10	N	>2000	na	na	Bow riding
JAX	dolphin	1	N	ACO	DDG	30	3	10	N	nr	na	na	nr
JAX	dolphin	8	N	VIS	FFG	3	5	10	N	<200	na	na	Bow riding
JAX	dolphin	1	N	ACO	DDG	20	3	10	N	nr	na	na	nr
JAX	dolphin	8	N	VIS	FFG	3	3	10	N	1000-2000	na	na	Bow riding
JAX	dolphin	1	N	ACO	DDG	5	4	10	N	nr	na	na	nr
JAX	dolphin	8	N	VIS	FFG	1	3	10	N	<200	na	na	Bow riding
JAX	dolphin	1	N	ACO	DDG	5	7	10	N	nr	na	na	nr
JAX	dolphin	8	N	VIS	FFG	1	4	10	N	200-500	na	na	Bow riding
JAX	dolphin	7	N	VIS	DDG	5	5	10	N	500-1000	na	na	nr
JAX	turtle	2	N	VIS	FFG	5	1	7	N	500-1000	na	na	Paralleling
JAX	dolphin	5	N	VIS	FFG	5	1	7	N	500-1000	na	na	Paralleling
JAX	turtle	1	N	VIS	FFG	2	0	10	N	<200	na	na	Floating
JAX	dolphin	5	N	VIS	FFG	1	6	10	N	<200	na	na	Bow riding
JAX	turtle	2	N	VIS	FFG	1	1	7	N	500-1000	na	na	Paralleling
JAX	whale	1	N	VIS	FFG	15	2	7	N	>2000	na	na	Paralleling
JAX	dolphin	2	N	VIS	FFG	1	3	7	N	1000-2000	na	na	Paralleling
JAX	dolphin	1	N	ACO	DDG	10	2	10	N	nr	na	na	nr
JAX	dolphin	6	N	VIS	DDG	5	4	10	N	<200	na	na	Bow riding
JAX	dolphin	1	N	ACO	DDG	10	2	10	N	nr	na	na	nr
JAX	dolphin	24	Y	VIS	FFG	30	6	10	N	<200	na	na	Bow riding
JAX	turtle	1	N	VIS	DDG	1	4	10	N	<200	na	na	Paralleling
JAX	dolphin	2	N	VIS	DDG	1	4	10	N	200-500	na	na	Bow riding
JAX	dolphin	5	N	VIS	FFG	3	5	7	N	1000-2000	na	na	Paralleling

JAX	dolphin	2	N	VIS	CG	20	5	10	N	<200	na	na	nr
JAX	whale	3	N	VIS	DDG	5	2	10	N	>2000	na	na	Paralleling
JAX	dolphin	1	N	ACO	DDG	20	2	10	N	nr	na	na	nr
JAX	dolphin	nr	N	ACO	CG	20	nr	nr	N	nr	na	na	nr
JAX	dolphin	25	N	VIS	FFG	2	1	10	N	200-500	na	na	Bow riding
JAX	dolphin	1	N	ACO	DDG	10	2	7	N	nr	na	na	nr
JAX	dolphin	1	N	ACO	DDG	10	2	7	N	nr	na	na	nr
JAX	dolphin	30	N	VIS	CG	1	4	8	N	<200	na	na	nr
CPOA	dolphin	12	N	VIS	CG	10	3	10	N	500-1000	na	na	Bow riding
CPOA	dolphin	8	N	VIS	CG	1	4	8	N	<200	na	na	nr
CPOA	dolphin	nr	N	VIS	CG	5	4	8	N	1000-2000	na	na	nr
JAX	dolphin	10	N	VIS	CG	13	3	10	N	1000-2000	na	na	nr
JAX	dolphin	nr	N	VIS	CG	5	3	10	N	200-500	na	na	nr
JAX	dolphin	8	N	VIS	FFG	6	4	10	N	<200	na	na	Bow riding
JAX	dolphin	1	N	ACO	DDG	10	5	10	N	nr	na	na	nr
JAX	dolphin	3	N	VIS	FFG	15	3	7	Y	<200	Sonar shutdown	dolphins bearing 270, ship course 335, nr	Observed dolphins on port quarter, 39 yds
JAX	dolphin	12	N	VIS	DDG	3	3	7	Y	200-500	na	dolphins bearing 190, ship course 265, opening ship	Dolphins cross bow, heading aft on port side, opening ship
JAX	dolphin	nr	N	ACO	DDG	20	5	10	N	nr	na	na	nr
JAX	dolphin	nr	N	ACO	DDG	10	5	10	N	nr	na	na	nr
JAX	dolphin	nr	N	ACO	DDG	30	5	10	N	nr	na	na	nr
JAX	dolphin	4	Y	VIS	DDG	5	5	10	N	200-500	na	na	Crossed bow starboard to port
JAX	dolphin	2	N	VIS	HELO	25	3	10	N	>2000	na	na	Sighting came from embarked helo. Dolphins eventually were bowriding prior to lost sighting

JAX	turtle	1	N	VIS	HELO	10	3	10	N	>2000	na	na	Sighting came from embarked helo
JAX	dolphin	8	N	VIS	DDG	90	2	10	N	<200	na	na	Bow riding
JAX	dolphin	30	N	VIS	DDG	60	2	10	N	<200	na	na	Bow riding
JAX	dolphin	5	N	VIS	DDG	4	3	10	N	200-500	na	na	Paralleling
JAX	dolphin	8	N	VIS	FFG	20	5	10	N	1000-2000	na	na	nr
JAX	dolphin	8	N	VIS	FFG	11	3	10	N	1000-2000	na	na	Bow riding
JAX	dolphin	20	N	VIS	FFG	20	6	10	N	500-1000	na	na	Dolphins on bow paralleling course and speed
JAX	dolphin	1	N	VIS	DDG	4	3	10	N	200-500	na	na	Paralleling
CPOA	whale	2	N	VIS	HELO	5	2	10	N	>2000	na	na	nr
JAX	turtle	1	N	VIS	FFG	2	1	10	N	<200	na	na	Floating
JAX	whale	3	N	VIS	DDG	5	2	10	N	>2000	na	na	Blowing
JAX	whale	4	N	VIS	DDG	nr	nr	nr	Y	>2000	na	nr, ship course 285, nr	nr
JAX	dolphin	1	N	VIS	CG	6	2	10	N	nr	na	na	nr
JAX	dolphin	nr	N	ACO	DDG	nr	nr	nr	N	nr	na	na	nr
JAX	dolphin	nr	N	ACO	CG	12	2	10	N	nr	na	na	nr

nr=not reported; VIS=visual; ACO=acoustic; Y=yes; N=no; na=not applicable

JAX=Jacksonville Operating Area; CPOA=Cherry Point Operating Area

Table 1-ii-5. AFAST MTER – Individual Marine Mammal Sighting Information: JTFEX 14-21 Feb 2011.

(A) Location of sighting	(B) Species	(C) # of individuals	(D) Calves observed (y/n)	(E) Initial detection sensor	(F) Platform detection from	(G) Length of time observed (min)	(H) Wave height (ft)	(I) Visibility (nm)	(J) Sonar source in use (y/n)	(K) Range (yds)	(L) Mitigation implemented	(M) If source in use (J) is hull-mounted, true bearing of animal from ship, true direction of ship's travel, and estimation of animal's motion relative to ship	(N) Observed behavior
JAX	dolphin	3	N	VIS	CG	2	1	10	N	<200	na	na	Crossed bow starboard to port
CPOA	whale	3	N	VIS	CG	5	2	10	N	1000-2000	Maneuvered away	na	Closed to ship's beam
JAX	turtle	1	N	VIS	CG	2	3	10	N	<200	na	na	Swimming forward to aft
JAX	dolphin	4	N	VIS	CG	1	3	10	N	<200	na	na	Swam toward ship then disappeared
JAX	dolphin	nr	N	VIS	CG	19	5	10	N	<200	na	na	Bow riding
JAX	dolphin	2	N	ACO	CG	360	3	10	N	nr	na	na	Remained in vicinity of ship for 6 hours

nr=not reported; VIS=visual; ACO=acoustic; Y=yes; N=no; na=not applicable

JAX=Jacksonville Operating Area; CPOA=Cherry Point Operating Area

Table 1-ii-6. AFAST MTER – Individual Marine Mammal Sighting Information: SEASWITI 22-25 Feb 2011.

(A) Location of sighting	(B) Species	(C) # of individuals	(D) Calves observed (y/n)	(E) Initial detection sensor	(F) Platform detection from	(G) Length of time observed (min)	(H) Wave height (ft)	(I) Visibility (nm)	(J) Sonar source in use (y/n)	(K) Range (yds)	(L) Mitigation implemented	(M) If source in use (J) is hull-mounted, true bearing of animal from ship, true direction of ship's travel, and estimation of animal's motion relative to ship	(N) Observed behavior
JAX	dolphin	3	N	VIS	CG	10	1	10	N	<200	na	na	Dolphin pod spotted riding bow waves
JAX	dolphin	5	Y	ACO	DDG	nr	nr	nr	Y	<200	Sonar shutdown	dolphins bearing 000, ship course 046, paralleling ship	Mammals exhibited bow riding behavior when sighted
JAX	nr	nr	N	ACO	DDG	nr	nr	nr	N	nr	na	na	nr
JAX	nr	nr	N	ACO	DDG	10	nr	nr	N	nr	na	na	nr
JAX	nr	nr	N	ACO	DDG	65	nr	nr	Y	nr	na	Acoustic detection only	nr
JAX	nr	nr	N	ACO	DDG	8	nr	nr	Y	nr	na	Acoustic detection only	nr

nr=not reported; VIS=visual; ACO=acoustic; Y=yes; N=no; na=not applicable

JAX=Jacksonville Operating Area

Table 1-ii-7. AFAST MTER – Individual Marine Mammal Sighting Information: IAC II 3-5 May 2011.

(A) Location of sighting	(B) Species	(C) # of individuals	(D) Calves observed (y/n)	(E) Initial detection sensor	(F) Platform detection from	(G) Length of time observed (min)	(H) Wave height (ft)	(I) Visibility (nm)	(J) Sonar source in use (y/n)	(K) Range (yds)	(L) Mitigation implemented	(M) If source in use (J) is hull-mounted, true bearing of animal from ship, true direction of ship's travel, and estimation of animal's motion relative to ship	(N) Observed behavior
CPOA	dolphin	nr	nr	ACO	DDG	11	1	10	N	nr	na	na	nr
CPOA	dolphin	nr	nr	ACO	DDG	1	2	10	N	nr	na	na	nr
CPOA	dolphin	nr	nr	ACO	DDG	1	2	10	N	nr	na	na	nr
CPOA	dolphin	nr	nr	ACO	DDG	1	2	10	N	nr	na	na	nr
CPOA	dolphin	nr	nr	ACO	DDG	1	2	10	N	nr	na	na	nr
CPOA	dolphin	nr	nr	ACO	DDG	1	2	10	N	nr	na	na	nr
CPOA	dolphin	nr	nr	ACO	DDG	15	3	10	N	nr	na	na	nr
CPOA	dolphin	nr	nr	ACO	DDG	7	1	10	N	nr	na	na	nr
CPOA	whale	1	N	VIS	DDG	15	3	10	Y	1000-2000	Sonar shutdown	whale bearing 045, ship course 105, opening ship	Opening ship upon sighting

nr=not reported; VIS=visual; ACO=acoustic; Y=yes; N=no; na=not applicable

CPOA=Cherry Point Operating Area

(iii) Evaluation (based on data gathered during all MTERs) of effectiveness

Between 2 August 2010 and 1 August 2011, there were a total of nine major training exercises, including three IAC II, two C2X, two JTFEX, and two SEASWITI.

Table 1-iii-1. AFAST MTERs and associated marine mammal sightings.

MTER Type	Month	# of Exercise Days	# of Ships Involved (MFAS and non-MFAS)	# of Marine Mammal Sightings	# of Marine Mammals
C2X w/ IAC II	OCT 2010	22	14	51	260
JTFEX	DEC 2010	8	11	0	0
SEASWITI	DEC 2010	5	5	2	5
C2X w/ IAC II	JAN-FEB 2011	23	22	79	393
JTFEX	FEB 2011	8	22	6	14
SEASWITI	FEB 2011	4	7	6	12
IAC II	MAY 2011	3	5	9	9
	Total	73	86	153	693

Mitigation Effectiveness Discussion

The three categories of mitigation measures (Personnel Training, Lookout and Watchstander Responsibility, and Operating Procedures) outlined in the AFAST EIS/OEIS and approved by NMFS (DoN 2008a, NMFS 2010, 2011, 2011a) were effective in detecting and appropriately mitigating exposure of marine mammal to mid-frequency active sonar. Fleet commanders and ship watch teams continue to improve individual awareness and enhance reporting practices. This improvement can be attributed to the various pre-exercise conferences, mandatory marine species awareness training, and making adjustments based upon the lessons learned. The safety zones were adhered to, and vessels and aircraft applied mitigation measures when marine mammals were visually observed within the requisite zones.

There were a total of 5 sightings of at least 24 marine mammals for all AFAST MTER sightings at ranges less than 1,000 yards during which MFAS was in use. Of these 5 MTER MFAS sightings, there were 4 sightings of 23 dolphins, 0 sightings of whales, 0 sightings of pinnipeds, and 1 sighting of 1 turtle. (**Table 1-iii-2**).

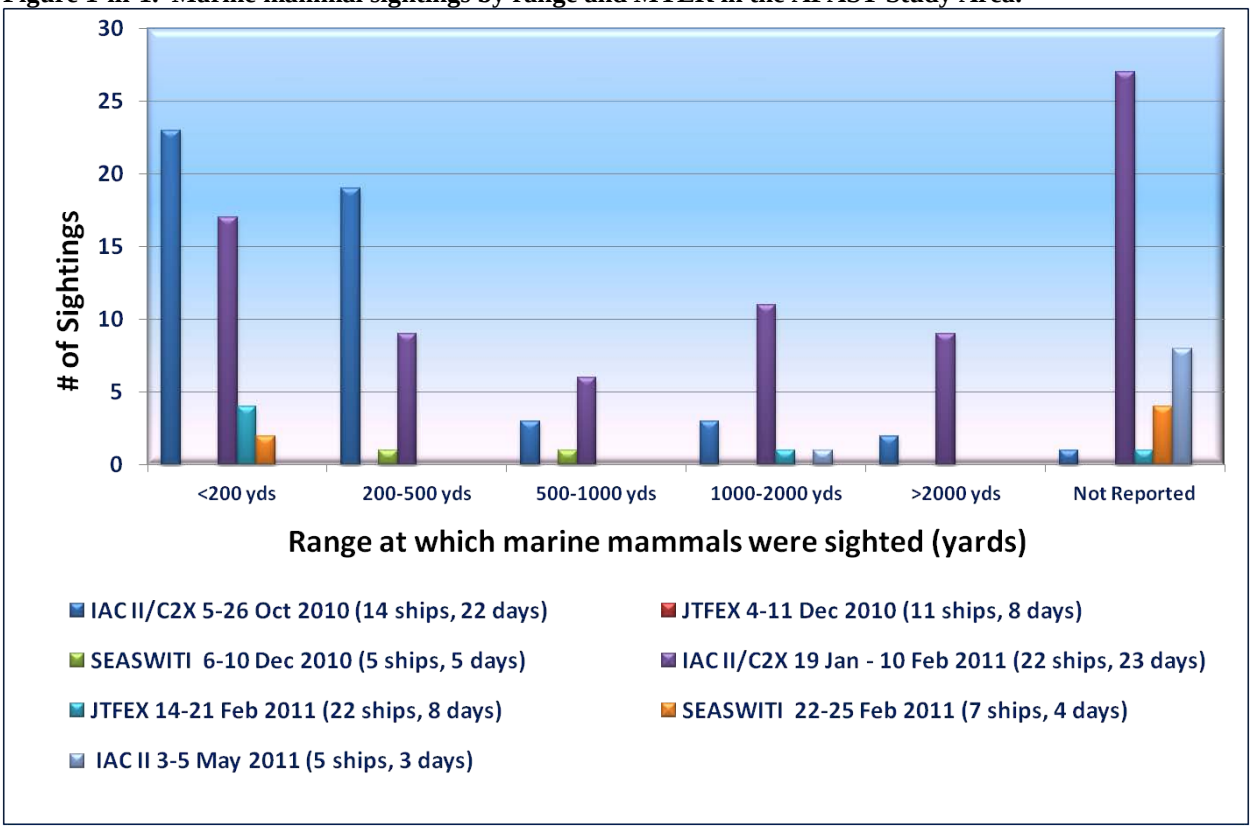
Table 1-iii-2. Breakdown of marine mammals sighted in the AFAST study area during MTERs at ranges less than 1000 yards concurrent with MFAS use.

Range	< 200 yards	200 – 500 yards	500 – 1000 yards
Dolphins	11	12	0
Whales	0	0	0
Pinnipeds	0	0	0
Turtles	1	0	0
Total marine mammals	12	12	0

For AFAST MTERs, there were a total of 4 mitigation events when sonar was shut off during ASW training. During two of these mitigations sonar was unnecessarily shut down, once due to the observed range of a whale being in excess of 1000 yards, and once due to passively receiving mammal vocalizations where the range to the mammal could not be determined.

Figure 1-iii-1 depicts the reported ranges of all marine mammal sightings (with and without MFAS) from each of nine MTERs within the AFAST Study Area. The number of sightings is variable by strike group, exercise type, and sea state at the time of the MTER.

Figure 1-iii-1. Marine mammal sightings by range and MTER in the AFAST Study Area.



Deep diving animals were not observed during any of the MTERs. If exposure did occur, Navy assesses that these animals would not be exposed to significant levels for long periods based on the moving nature of ship MFAS use, and even less so from less frequent and 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 transit about 10 nm from its original location. This relative movement and the distance traveled away from the original location will result in lower exposure levels (**Table 1-iii-3**).

Table 1-iii-3 contains a list of all mitigation events where sonar was on and observed range was less than 1,000 yards. It should be noted that with or without mitigation, given the relative motion of ships maneuvering at-sea and the independent marine mammal movement, the time any given animal would be exposed to MFAS from surface ships is likely to be limited as shown by the distances calculated in **Table 1-iii-3** Column 13.

Table 1-iii-3. Sightings where sonar was on during detection of marine mammals at ranges less than 1,000 yards, and the mitigation conducted.

1) OpArea (JAX (J); CPOA (C); VCOA (V))	2) MTER	3) Month	4) Species sighted	5) # of marine mammals sighted	6) Platform	7) Length of time observed (min)	8) Range at which marine mammal sighted	9) Mitigation [secure (SD); power down (PD); maneuver ship (MAN)[1]]	10) Estimate MAX exposure PRIOR to mitigation (dB re 1uPa)[2]	11) Number of minutes sonar mitigation applied	12) Estimate exposure AFTER mitigation (dB re 1uPa)[2]	13) DISTANCE ship would have moved given length of mitigation and nominal 10-knot ship speed (yds)	14) If source in use (J) is hull-mounted, true bearing of animal from ship, true direction of ship's travel, and estimation of animal's motion relative to ship	15) Observed behavior
CPOA	C2X	OCT	dolphin	3	CG	5	<200	na	<189	na	<189	na	dolphins bearing 285, ship course 255, paralleling ship	Bow riding
CPOA	C2X	OCT	turtle	1	CG	14	<200	Sonar shutdown	<189	14	None	4,667	nr, ship course 220, nr	Turtle sighted at 10 yds on starboard side. Further behavior not reported
JAX	IAC II	JAN	dolphin	3	FFG	15	<200	Sonar shutdown	<179	30	None	10,000	dolphins bearing 270, ship course 335, nr	Observed dolphins on port quarter, 39 yds
JAX	IAC II	JAN	dolphin	12	DDG	3	200-500	na	<181-189	na	<181-189	na	dolphins bearing 190, ship course 265, opening ship	Dolphins cross bow, heading aft on port side, opening ship. Based on description, animals likely bowriding
JAX	SEASWITI	FEB	dolphin	5	DDG	nr	<200	Sonar shutdown	<189	5	None	1,667	dolphins bearing 000, ship course 046, paralleling ship	Mammals exhibited bow riding behavior when sighted

Notes:
[1] na = not applicable; mitigation not applicable if dolphins are determined to be bowriding.
[2] Estimated exposure based on 20Log[R] spherical spreading propagation loss for ranges less than 1000 yards and where nominal MFAS Source Level (SL) assumed to be 235 dB for DDGs and 225 for FFGs (Urick 1982). Actual operating parameters and oceanographic condition likely result is lower exposure. This calculation assumes exposure prior to mitigation. Once animal was spotted at the range indicated, applied mitigation would have resulted in much lower to no exposures.

Exposure Assessment

Estimated exposures within 2000 yards can be determined based on standard formulas of how sound propagates in water. Spherical spreading is generally valid within 1000 yards from the sound source, and can be expressed as spreading loss (in dB from a source) equals 20logR [with "R" being range from the source in yards (Urick 1982)]. Spherical spreading loss in the first 1000 yards equates to 60 dB of loss. At ranges between 1000 and 2000 yards the sound waves become trapped by the sea surface and bottom and cannot expand vertically. The spreading wave then forms an expanding cylinder. Cylindrical spreading loss in dB between two points can be calculated by using the formula (10logR2/R1), with "R2" being the longer range, and "R1" being 1000 yards. Cylindrical spreading loss between 1000 and 2000 yards equates to an additional 3 dB of loss. By the time the wave has propagated to 2000 yards, the sonar signal strength has decreased by a total of 63 dB. Using the AN/SQS-53 sonar as an example, transmitting at 235 dB and subtracting the 63 dB of spreading loss equates to an estimated sonar Receive Level (RL) of 172 dB at 2000 yards. The spreading loss formulas are used to make very conservative assumptions about potential exposure. The formula is an estimation of spreading losses only and does not take into account other factors that could increase the total propagation losses such as oceanographic conditions, attenuation losses, scattering losses, and Navy-unique MFAS operating parameters which would result in slightly lower sonar transmit levels. Use of this approach to estimate potential RL at any given animal assumes the horizontal range from a visual sighting accounts for an animal across all depths at which an animal travels to predict 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 the relative motion of ships and animals at sea, the time spent with any given exposure from surface ships is likely to be limited.

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 exercise 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, it is believed 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 a mitigation zone by passive acoustic detection is not always technically feasible.

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 the exposure criteria set forth by NMFS (DoN 2008, NMFS 2009). However, many of the ESA-listed species in AFAST, with the exception of perhaps the sperm whale, are easier to spot on the surface due to shorter dive times and larger animal size (blue whale, fin whale, sei whale). Dolphins, the most common cetacean seen in AFAST often occur in large, visible pods. Beaked whales are acknowledged to be difficult to observe at-sea due to deep diving profiles and short surface intervals. For all marine mammal sightings made by Navy platforms during AFAST MTERs (**Tables 1-iii-1**, **1-iii-2**, **1-iii-3** and **Figure 1-iii-1**), there was no obvious indication or report that any animal behaved in a manner not associated with normal movement, or foraging.

(2) AFAST – Annual ASW Summary

This section summarizes total annual hours of each type of sonar source used within AFAST between 2 August 2010 to 1 August 2011 from MTERs and non-major training exercises such as unit-level training.

(i) Total annual hours of each type of sonar source

Total annual hours of each type of sonar source used within the AFAST Study Area between 2 August 2010 and 1 August 2011 are presented in the classified version of this report. With the exception of SLQ-25, system usage was less and sometimes significantly less than the amount authorized.

Table 2-i-1. Sonar allocation within the AFAST Study Area by source.

Authorized MFAS sources §216.170 (c)(1) of NMFS AFAST Final Rule and LOA	Annually Authorized
(i) AN/SQS-53 surface ship hull-mounted active sonar (hours)	3,214
(ii) AN/SQS-56 surface ship hull-mounted active sonar (hours)	1,684
(iii) AN/SQS-56/53 hull-mounted sonar in object detection mode (hours)	216
(iv) AN/BQQ-10 or 5 submarine active sonar (# of pings)	9,976
(v) AN/AQS-22 or 13 helicopter active dipping sonar (# of dips)	2,952
(vi) AN/SSQ-62 DICASS acoustic sonobuoy (# of buoys)	5,853
(vii) Mk-48 heavyweight torpedoes (# of torpedoes)	32
(viii) Mk-46 or 54 lightweight torpedoes (# of torpedoes)	24
(ix) AN/SSQ-110A IEER explosive sonobuoy (# of buoys)	1,725
(x) AN/SSQ-125 AEER sonobuoy (# of buoys)	1,550
(xi) AN/SLQ-25 NIXIE towed countermeasure (hours)	2,500
(xii) AN/BQS-15 submarine navigation (hours)	450
(xiii) MK-1/2/3/4 Acoustic Device Countermeasures (# of ADCs)	225
(xiv) Noise Acoustic Emitters (# of NAEs)	127

(ii) Cumulative Impact Report

From NMFS Final Rule: "*To the extent practicable, the Navy, in coordination with NMFS, shall develop and implement a method of annually reporting non-major (i.e., other than MTERs) training exercises utilizing hull-mounted sonar. The report shall present an annual (and seasonal, where practicable) depiction of non-major training exercises geographically across the AFAST Study Area. To the extent practicable, this report will also include the total number of sonar hours (from helicopter dipping sonar and object detection exercises) conducted within the southern NARW critical habitat plus 5 nm buffer area. The Navy shall include (in the AFAST annual report) a brief annual progress update on the status of the development of an effective and unclassified method to report this information until an agreed-upon (with NMFS) method has been developed and implemented.*"

The precise locations and frequency of ASW training is classified and is presented in the classified version of this report. There is currently no method to declassify the sensitivity of this data in order to publish this type of information in an unclassified report. For this reason the only available method for this information to be disseminated for the foreseeable future is in the classified version of this Annual Exercise Report.

The total number of sonar hours (from helicopter dipping sonar or object detection exercises) that were conducted within the southern North Atlantic Right Whale (NARW) Critical Habitat plus a 5nm buffer area during this reporting period are presented in the classified version of this report.

(3) AFAST – IEER/AEER Summary

The annual summary of use within the AFAST Study Area for Improved Extended Echo-Ranging System (IEER) and Advanced Extended Echo-Ranging System (AEER) sonobuoys is deemed classified. Data requested from the Navy is presented in the classified version of this report. Reporting elements include (i) Total number of IEER and AEER events; (ii) Total expended/detonated rounds (buoys); and (iii) Total number of self-scuttled IEER rounds.

Report Summary

The Navy's mitigation measures within the AFAST Study Area are assessed to have been effective during this reporting period. No animals were known to be adversely affected by the use of mid-frequency active sonar.

Visual detection by Navy lookouts remains the most realistically achievable at-sea mitigation currently available.

Real-time passive sonar systems used by the Navy, and to some degree by most of the marine mammal science community, lack the ability to automatically classify detected species in real time. 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 Navy ships is limited in real time. Also, non-vocalizing marine mammals cannot currently be detected using passive systems.

The Navy continues conducting robust and realistic exercises, and development of long-term marine mammal 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). Data collection efforts continue to focus on addressing unresolved questions regarding likely area-specific species' composition and the potential for alternative detection technologies.

References

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