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National Marine Fisheries Service
Office of Protected Resources

Prepared by:

Department of the Navy

In accordance with the Letter of Authorization
Under the MMPA and ITS authorization under
the ESA
1 February 2012

UNCLASSIFIED
Annual Range Complex Exercise Report

2 August 2012 to 25 November 2013

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

1 MARCH 2014
UNCLASSIFIED

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INTRODUCTION

The U.S. Navy prepared this Annual Range Complex Exercise Report covering the period from 2 August 2012 to 25 November 2013 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 2012 to 25 November 2013, and the information represents the best practical data collection for this period. 25 November marks the final day of data collection and reporting under the AFAST EIS/OEIS. To provide accounting for the entire five-year period of the authorization, Navy will also submit a Comprehensive National Report with final totals of authorized usage.

[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

(C) 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	Towed Array	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	MPRA	Non-ASW surface ships			SQS-53	SQS-56	BQQ-10 or 5	AQS-22 or 13	SSQ-62 Sonobuoys	SLQ-25 NIXIE	BQS-15	
IAC II	27 Nov-18 Dec 2012	VCOA/ CPOA/ JAX	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	2	11,762	*	*	*	*	*	*	*	2,1,1
C2X w/ IAC II	14 Jan-5 Feb 2013	VCOA/ CPOA/ JAX	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	3	17,058	*	*	*	*	*	*	*	9,2,6
C2X	28 Jan-18 Feb 2013	CPOA/ JAX	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	3	11,952	*	*	*	*	*	*	*	5,1,2
IAC II	20 Mar-13 Apr 2013	VCOA/ CPOA/ JAX	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	1	33,917	*	*	*	*	*	*	*	5,2,3
C2X w/ IAC II	31 May-19 Jun 2013	VCOA/ CPOA/ JAX	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	3	19,197	*	*	*	*	*	*	*	13,2,6
IAC II	17 Jul-1 Aug 2013	CPOA	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	1	11,015	*	*	*	*	*	*	*	4,2,3
IAC II	22 Oct-15 Nov 2013	VCOA/ CPOA/ JAX	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	4	22,047	*	*	*	*	*	*	*	13, 1, 5
C2X	20 Nov-19 Dec 2013*	VCOA/ CPOA/ JAX	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	7	12,367	*	*	*	*	*	*	*	10,1,3

VCOA=Virginia Capes Operating Area; CPOA=Cherry Point Operating Area; JAX=Jacksonville 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: IAC II 27 Nov-18 Dec 2012.

(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
VCOA	whale	2	N	VIS	DDG	10	1	10	N	>2000	none	na	Blowing repeatedly
CPOA	whale	2	N	VIS	DDG	1	2	10	N	>2000	none	na	nr
CPOA	dolphin	1	N	VIS	FFG	3	2	10	N	>2000	none	na	Swimming on surface
CPOA	whale	1	N	VIS	DDG	15	2	10	N	500-1000	none	na	Blowing repeatedly
CPOA	whale	1	N	VIS	FFG	1	2	10	N	200-500	none	na	nr
CPOA	dolphin	3	N	VIS	DDG	1	1	10	N	<200	none	na	nr
CPOA	dolphin	12	N	VIS	DDG	3	1	10	N	<200	none	na	Closing to bow ride
CPOA	dolphin	2	N	VIS	DDG	1	1	10	N	<200	none	na	nr
JAX	dolphin	1	N	VIS	DDG	5	2	10	N	>2000	none	na	nr
JAX	dolphin	1	N	VIS	DDG	5	2	10	N	500-1000	none	na	Closing to bow ride
JAX	whale	1	N	VIS	DDG	1	1	10	N	>2000	none	na	nr
JAX	dolphin	3	N	VIS	DDG	1	1	10	N	200-500	none	na	nr
JAX	dolphin	6	N	VIS	DDG	2	1	10	N	<200	none	na	nr
JAX	dolphin	6	N	VIS	DDG	10	1	10	N	<200	none	na	nr
JAX	dolphin	3	N	VIS	DDG	5	2	10	N	<200	none	na	nr
CPOA	whale	4	N	VIS	FFG	45	1	10	N	1000-2000	none	na	nr

nr=not reported; VIS=visual; ACO=acoustic; Y=yes; N=no; na=not applicable
VCOA=Virginia Capes Operating Area; CPOA=Cherry Point Operating Area; JAX=Jacksonville Operating Area

Table 1-ii-2. AFAST MTER – Individual Marine Mammal Sighting Information: C2X w/ IAC II 14 Jan-5 Feb 2013.

(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
VCOA	whale	1	N	VIS	DDG	1	3	10	N	200-500	none	na	Parallel
VCOA	whale	1	N	VIS	DDG	2	1	10	N	<200	none	na	Fin slapping
VCOA	dolphin	1	N	VIS	DDG	1	1	10	N	200-500	none	na	Parallel
CPOA	dolphin	2	N	VIS	FFG	1	2	10	N	<200	none	na	Closing to bow ride
CPOA	dolphin	10	N	VIS	FFG	5	2	10	N	<200	none	na	Closing to bow ride
CPOA	dolphin	5	N	VIS	FFG	5	2	10	N	<200	none	na	Closing to bow ride
CPOA	dolphin	4	N	VIS	FFG	5	2	10	N	<200	none	na	Closing to bow ride
CPOA	turtle	1	N	VIS	FFG	5	2	10	N	<200	none	na	Paralleling
CPOA	dolphin	5	N	VIS	FFG	5	2	10	N	<200	none	na	Closing
CPOA	dolphin	20	N	VIS	FFG	4	2	10	N	<200	none	na	Closing
CPOA	turtle	3	Y	VIS	CG	4	2	10	N	200-500	none	na	nr
CPOA	dolphin	3	N	VIS	CG	5	2	10	N	200-500	none	na	Closing to bow ride
CPOA	dolphin	10	N	VIS	FFG	4	2	10	N	200-500	none	na	Bowriding, playing
CPOA	dolphin	20	N	VIS	FFG	4	2	10	N	200-500	none	na	Bowriding, playing
CPOA	dolphin	6	N	VIS	CG	3	4	10	N	200-500	none	na	Parallel
CPOA	dolphin	6	N	VIS	FFG	4	2	10	N	<200	Maneuvered away	na	Closing to bow ride
CPOA	dolphin	15	Y	VIS	CG	5	4	10	N	<200	none	na	Closing to bow ride
VCOA	whale	1	N	VIS	DDG	2	3	10	N	200-500	none	na	Parallel

VCOA	whale	1	N	VIS	DDG	1	3	10	N	200-500	none	na	Parallel
CPOA	whale	1	N	VIS	CG	1	3	10	N	500-1000	none	na	Fin slap
CPOA	dolphin	3	N	VIS	FFG	5	2	10	N	>2000	none	na	Dolphins sighted off port quarter parallel course with ownship
CPOA	dolphin	2	N	VIS	DDG	5	3	10	Y	200-500	Shut down sonar	Dolphins bearing 221, ship course 180, opening ship	Opening ship
CPOA	dolphin	4	N	VIS	DDG	2	2	10	N	<200	none	na	Bow riding
JAX	dolphin	4	N	VIS	CG	5	1	10	Y	200-500	Shut down sonar	Dolphins bearing 330, ship course nr, opening ship	Pod of dolphins heard on WQC-2 and sighted visually at 400 yards traveling outbound
JAX	whale	9	N	VIS	CG	10	1	10	N	500-1000	none	na	Pod of whales seen by lookouts on port and starboard beam, slowly moving aft outbound
JAX	whale	1	N	ACO	DDG	3	2	10	Y	1000-2000	Shut down sonar	Whale bearing 087, ship course 085, opening ship	Crossing
JAX	whale	1	N	ACO	DDG	20	2	10	N	na	Delayed MFAS	na	Delayed active transmissions until no longer heard
JAX	whale	7	N	VIS	FFG	10	2	10	N	>2000	none	na	Whales passed down port side of ship on opposing course
JAX	dolphin	4	N	VIS	CG	5	4	10	Y	200-500	none	Dolphins bearing 040, ship course 104, paralleling	Paralleling ship
JAX	dolphin	3	N	VIS	FFG	12	6	10	Y	>2000	none	Dolphins bearing 130, ship course 115, paralleling ship	Feeding
JAX	dolphin	6	N	VIS	DDG	20	2	10	N	200-500	none	na	Paralleling ship
CPOA	dolphin	8	N	VIS	DDG	15	6	10	N	200-500	none	na	Paralleling ship
JAX	dolphin	3	N	VIS	CG	2	2	10	N	200-500	none	na	nr
JAX	dolphin	10	N	VIS	Non-ASW ship	2	4	10	na	200-500	none	na	Paralleling Ship
JAX	dolphin	6	N	VIS	DDG	2	2	10	N	200-500	none	na	Bow riding
CPOA	dolphin	10	N	ACO	CG	20	6	10	N	na	none	na	nr

nr=not reported; VIS=visual; ACO=acoustic; Y=yes; N=no; na=not applicable
VCOA=Virginia Capes Operating Area; CPOA=Cherry Point Operating Area; JAX=Jacksonville Operating Area

Table 1-ii-3. AFAST MTER – Individual Marine Mammal Sighting Information: C2X 28 Jan-18 Feb 2013.

(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	5	N	VIS	Non-ASW ship	10	1	10	na	200-500	none	na	Swimming on surface
CPOA	dolphin	4	N	VIS	CG	5	4	10	N	<200	none	na	Spotted off the stbd bow and swimming away from the ship
CPOA	dolphin	3	N	VIS	CG	2	4	10	N	200-500	none	na	Sighted off the stbd bow. Continued to swim down the stbd side

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

CPOA=Cherry Point Operating Area

Table 1-ii-4. AFAST MTER – Individual Marine Mammal Sighting Information: IAC II 20 Mar-13 Apr 2013.

(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
VCOA	dolphin	6	N	VIS	DDG	10	2	10	N	>2000	none	na	Jumping
CPOA	dolphin	25	N	VIS	DDG	3	2	10	N	500-1000	none	na	Closing to bow ride
CPOA	dolphin	7	N	VIS	FFG	2	2	10	N	<200	none	na	Closing to bow ride
CPOA	dolphin	4	N	VIS	DDG	10	2	10	N	<200	none	na	Closing to bow ride
CPOA	dolphin	25	N	VIS	DDG	2	1	10	N	<200	none	na	Closing to bow ride
CPOA	dolphin	6	N	VIS	FFG	1	4	5	N	<200	none	na	Closing to bow ride
CPOA	dolphin	2	N	VIS	DDG	1	5	4	N	<200	none	na	Bow riding
CPOA	dolphin	5	N	VIS	DDG	10	3	10	N	<200	none	na	Bow riding
CPOA	dolphin	5	N	VIS	DDG	10	3	10	N	<200	none	na	Bow riding
CPOA	dolphin	2	N	VIS	DDG	1	1	10	N	<200	none	na	Bow riding
CPOA	dolphin	1	N	VIS	DDG	1	1	10	N	<200	none	na	Bow riding
CPOA	whale	1	N	VIS	DDG	1	2	7	Y	200-500	Powered down sonar	Whale bearing 352, ship course 232, opening ship	Blowing
CPOA	dolphin	6	N	VIS	DDG	15	0	10	N	>2000	none	na	Bow riding
CPOA	dolphin	20	N	VIS	DDG	2	1	10	N	<200	none	na	Bow riding
CPOA	dolphin	1	N	VIS	DDG	1	0	10	N	>2000	none	na	Bow riding
CPOA	dolphin	4	N	VIS	DDG	4	3	10	N	200-500	none	na	Bow riding
CPOA	whale	2	N	VIS	FFG	1	3	10	N	>2000	none	na	Two spouts sighted

CPOA	dolphin	2	N	VIS	FFG	1	5	3	N	<200	none	na	Playing in wake
JAX	dolphin	6	N	VIS	FFG	1	5	5	N	<200	none	na	Playing in wake
JAX	dolphin	15	N	VIS	DDG	5	2	10	N	<200	none	na	Bow riding
JAX	dolphin	5	N	VIS	DDG	5	4	10	N	500-1000	none	na	Hopping
JAX	dolphin	4	N	VIS	DDG	3	2	10	N	<200	none	na	Bow riding
JAX	dolphin	3	N	VIS	DDG	2	4	10	N	200-500	none	na	Bow riding
VCOA	dolphin	7	N	VIS	DDG	3	2	10	N	200-500	none	na	Bow ride
JAX	dolphin	3	N	VIS	DDG	5	4	10	N	500-1000	none	na	Bow riding
JAX	dolphin	5	N	VIS	DDG	1	0	10	N	<200	none	na	Bow riding
JAX	dolphin	4	N	VIS	DDG	2	1	10	N	<200	none	na	Bow riding

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

VCOA=Virginia Capes Operating Area; CPOA=Cherry Point Operating Area; JAX=Jacksonville Operating Area

Table 1-ii-5. AFAST MTER – Individual Marine Mammal Sighting Information: C2X w/ IAC II 31 May-19 Jun 2013.

(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	4	N	VIS	DDG	3	1	10	N	200-500	none	na	Passing stbd to port
CPOA	dolphin	3	N	VIS	DDG	4	1	10	N	<200	none	na	Port bow to stbd bow
CPOA	dolphin	1	N	VIS	DDG	1	1	10	N	200-500	none	na	Bow to stern
CPOA	dolphin	2	N	VIS	DDG	1	1	10	N	<200	none	na	Port to stbd
CPOA	dolphin	20	N	VIS	CG	1	0	10	N	<200	none	na	nr
CPOA	dolphin	4	N	VIS	DDG	2	1	10	N	<200	none	na	Stbd to port
CPOA	dolphin	6	N	VIS	DDG	2	1	10	N	<200	none	na	Fwd to aft
CPOA	dolphin	10	N	VIS	CG	30	1	10	N	nr	none	na	nr
CPOA	dolphin	5	N	VIS	CG	1	4	10	N	<200	none	na	nr
CPOA	dolphin	3	N	VIS	CG	5	3	4	N	<200	none	na	nr
CPOA	dolphin	4	N	VIS	CG	4	3	4	N	<200	none	na	nr
CPOA	dolphin	1	Y	VIS	CG	1	5	2	N	<200	none	na	nr
CPOA	dolphin	3	N	VIS	DDG	3	2	10	N	<200	none	na	Fwd to aft
VCOA	whale	2	N	VIS	Non-ASW ship	3	2	10	na	500-1000	none	na	Surfaced
CPOA	dolphin	11	N	VIS	FFG	1	8	5	N	<200	none	na	Opening
CPOA	dolphin	10	Y	VIS	CG	3	12	9	N	<200	none	na	nr
CPOA	dolphin	10	N	VIS	DDG	1	2	10	N	<200	none	na	Bow to stern

CPOA	dolphin	5	N	VIS	DDG	1	2	10	N	<200	none	na	Port to stbd
CPOA	dolphin	7	Y	VIS	CG	1	2	8	N	<200	none	na	nr
CPOA	dolphin	3	N	VIS	DDG	2	2	8	N	<200	none	na	Bow to stern
CPOA	dolphin	3	N	VIS	CG	1	2	8	N	<200	none	na	Nr
CPOA	dolphin	2	N	VIS	Non-ASW ship	3	2	10	na	500-1000	none	na	Paralleling
CPOA	dolphin	10	N	VIS	DDG	10	0	9	N	<200	none	na	Closed and then loitered around the stern of the ship, slowly diving and surfacing in a pod
JAX	dolphin	2	N	VIS	DDG	1	1	9	N	<200	none	na	Bow to stern
JAX	dolphin	7	N	VIS	DDG	1	1	8	N	<200	none	na	Stern to bow
JAX	dolphin	10	N	VIS	CG	3	2	10	N	200-500	none	na	Floating on surface
JAX	whale	3	N	VIS	CG	4	2	10	N	>2000	none	na	Floating on surface
JAX	turtle	1	N	VIS	CG	2	2	10	N	200-500	none	na	Surfaced
JAX	dolphin	20	Y	VIS	DDG	10	0	10	N	<200	none	na	Closed and then loitered around the ship, slowly diving and surfacing in a pod. Some appeared to be logging
JAX	dolphin	1	N	VIS	CG	nr	2	10	N	<200	none	na	Off bow
JAX	dolphin	10	N	VIS	DDG	5	0	10	N	<200	none	na	A pod moving swiftly through the water initially closed the ship and then dove around it before opening and disappearing again
CPOA	dolphin	10	N	VIS	DDG	10	0	10	N	<200	none	na	Pod closed the ship and played in the bow wake for approximately 5 mins before moving away
CPOA	dolphin	10	N	VIS	DDG	10	0	10	N	<200	none	na	Pod closed the ship and played in the bow wake for approximately 5 mins before moving away
CPOA	dolphin	5	N	VIS	DDG	5	0	10	N	<200	none	na	Pod closed the ship and played in the bow wake for approximately 5 mins

													before moving away
CPOA	dolphin	15	Y	VIS	DDG	10	0	10	N	<200	none	na	Pod closed the ship and played in the bow wake for approximately 5 mins before moving away
CPOA	dolphin	5	0	VIS	FFG	2	3	10	N	<200	none	na	Opening
CPOA	dolphin	2	0	VIS	FFG	2	2	10	N	<200	none	na	Opening
CPOA	dolphin	20	N	VIS	DDG	2	1	8	Y	<200	none	Dolphins bearing 270, ship course 000, paralleling ship	Bow to stern

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

VCOA=Virginia Capes Operating Area; CPOA=Cherry Point Operating Area; JAX=Jacksonville Operating Area

Table 1-ii-6. AFAST MTER – Individual Marine Mammal Sighting Information: IAC II 17 Jul-1 Aug 2013.

(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	2	N	VIS	DDG	1	4	10	N	200-500	Maneuvered away	na	Two dolphins off port bow CPA 200 yds after maneuver
CPOA	Dolphin	2	N	VIS	DDG	3	1	10	N	<200	none	na	Two dolphins off stbd beam CPA 5 yds and moved away
CPOA	Turtle	1	N	VIS	DDG	2	8	10	N	<200	none	na	One sea turtle spotted passing down port side
CPOA	Whale	1	N	VIS	DDG	1	4	10	Y	>2000	Shut down sonar	Whale bearing 218, ship course 289, paralleling ship	Whale observed in optical sight in CIC
CPOA	Dolphin	7	N	VIS	FFG	5	2	10	N	<200	none	na	Closing to bow ride
CPOA	Dolphin	5	N	VIS	DDG	5	2	10	N	<200	none	na	5 dolphins riding bow
CPOA	Dolphin	2	N	VIS	DDG	5	2	10	N	<200	none	na	Two dolphins off port bow riding along with ship
CPOA	Dolphin	3	N	VIS	DDG	5	3	10	N	<200	none	na	Three dolphins swimming away from ship
CPOA	Dolphin	3	N	VIS	DDG	3	3	10	N	<200	none	na	Three dolphins following bow
CPOA	Dolphin	8	N	VIS	FFG	60	2	10	N	<200	none	na	Closing to bow ride
CPOA	Dolphin	3	N	VIS	DDG	1	2	10	N	<200	none	na	Three dolphins surfaced and dove below water

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

CPOA=Cherry Point Operating Area

Table 1-ii-7. AFAST MTER – Individual Marine Mammal Sighting Information: IAC II 22 Oct-15 Nov 2013.

(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	10	N	VIS	FFG	10	2	10	N	<200	none	na	Dolphins approached from astern and began bow riding
CPOA	Dolphin	4	N	VIS	FFG	2	2	10	N	<200	none	na	Small boat crew observed dolphins bow riding
CPOA	Dolphin	3	N	VIS	FFG	5	2	10	N	<200	none	na	Dolphins approached from starboard quarter and began bow riding
CPOA	Dolphin	1	N	VIS	FFG	1	1	10	N	<200	none	na	Forward lookout reported single dolphin
CPOA	Dolphin	12	N	VIS	FFG	2	1	10	N	200-500	none	na	XO observed pod of dolphins off port side
CPOA	Dolphin	1	N	VIS	FFG	1	1	10	N	200-500	none	na	Forward lookout reported dolphin off starboard bow
CPOA	Dolphin	15	N	VIS	FFG	3	1	10	N	200-500	none	na	Dolphins observed stdb side
CPOA	Dolphin	5	N	VIS	Non-ASW ship	5	3	10	N	500-1000	none	na	Five dolphins following bow
CPOA	Dolphin	5	Y	VIS	FFG	2	1	10	N	<200	none	na	Dolphins closed to stbd side then departed
JAX	Dolphin	1	N	VIS	FFG	1	5	10	N	<200	none	na	Dolphin observed bow-riding during alongside refueling
JAX	Dolphin	2	N	VIS	FFG	2	5	10	N	<200	none	na	Dolphins closed to bow ride
CPOA	Dolphin	4	N	VIS	Non-ASW ship	5	4	10	N	500-1000	none	na	Four dolphins following bow
JAX	Dolphin	4	N	VIS	Non-ASW ship	4	2	10	N	200-500	none	na	Four dolphins following bow
CPOA	Dolphin	2	N	VIS	Non-ASW ship	6	3	10	N	500-1000	none	na	Two dolphins following bow

CPOA	Dolphin	5	N	VIS	Non-ASW ship	7	5	8	N	200-500	none	na	Five dolphins following bow
CPOA	Dolphin	8	N	VIS	Non-ASW ship	10	3	10	N	500-1000	none	na	Eight dolphins following bow

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

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

Table 1-ii-8. AFAST MTER – Individual Marine Mammal Sighting Information: C2X 20-25 Nov 2013.

(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	1	N	ACO	FFG	25	nr	nr	N	na	none	na	nr
CPOA	Dolphin	2	N	VIS	DDG	5	3	9	N	<200	none	na	nr
CPOA	Dolphin	8	N	VIS	DDG	5	3	9	N	<200	none	na	nr
CPOA	Dolphin	10	N	VIS	DDG	5	4	8	N	<200	none	na	nr
CPOA	Dolphin	2	N	VIS	FFG	2	6	10	N	<200	none	na	nr
CPOA	Dolphin	9	N	VIS	FFG	20	6	10	N	200-500	none	na	nr

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

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

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

Between 2 August 2012 and 25 November 2013, there were a total of ten major training exercises, including six IAC II and four C2X.

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
IAC II	Nov-Dec 2012	22	11	16	49
C2X w/ IAC II	Jan-Feb 2013	21	15	36	197
C2X	Jan-Feb 2013	22	5	3	12
IAC II	Mar-Apr 2013	27	9	27	176
C2X w/ IAC II	May-Jun 2013	21	10	38	250
IAC II	Jul-Aug 2013	17	7	11	37
IAC II	Oct-Nov 2013	25	12	16	82
C2X	Nov 2013	6	23	6	32
	Total	**161**	**92**	**153**	**835**

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 2008, NMFS 2012) 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 31 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 30 dolphins, 1 sighting of 1 whale, and 0 sightings of pinnipeds or turtles. (**Table 1-iii-2**).

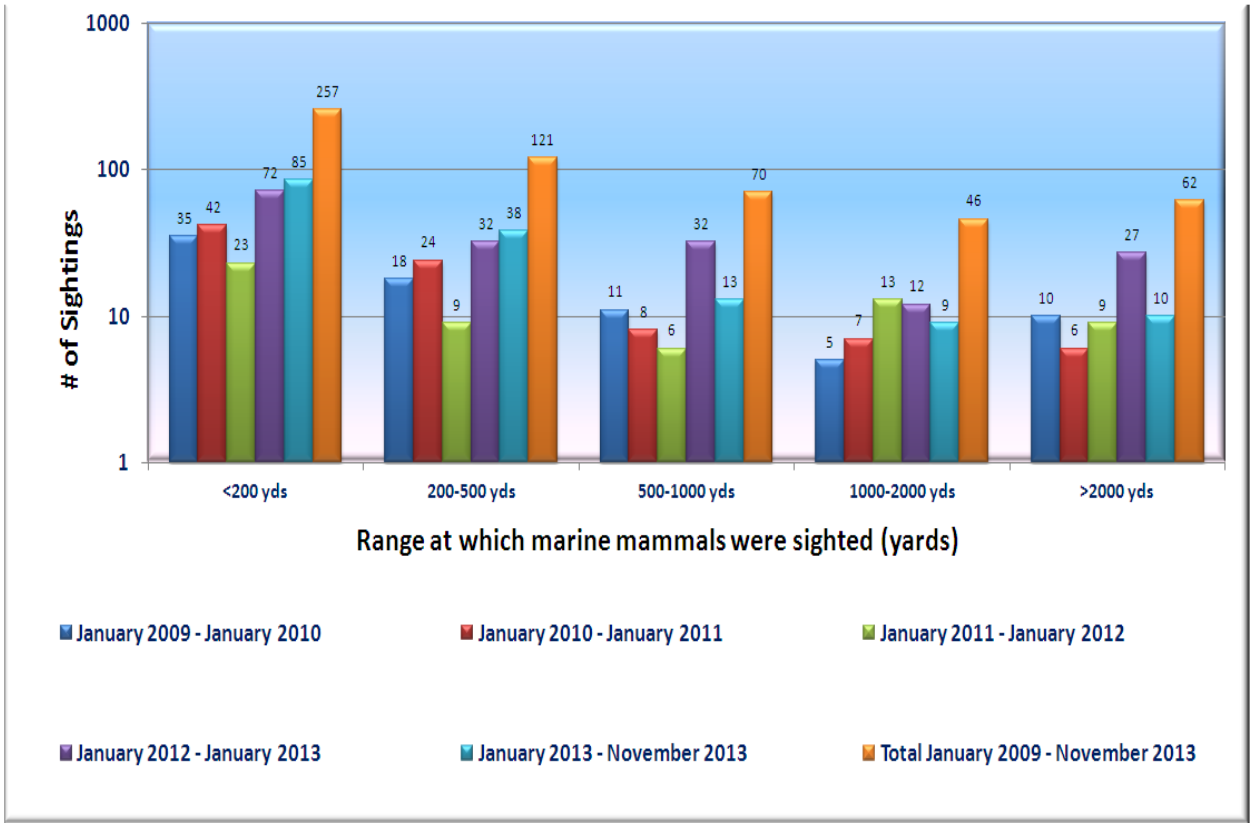
Table 1-iii-2. Breakdown of marine mammals sighted in the AFAST study area during MTERs at ranges less than 1000 yards concurrent with MFAS use.

Range	< 200 yards	200 – 500 yards	500 – 1000 yards
Dolphins	20	10	0
Whales	0	1	0
Pinnipeds	0	0	0
Turtles	0	0	0
Total marine mammals	20	10	0

For AFAST MTERs, there were a total of 5 mitigation events when sonar was shut off or powered down during ASW training. During three of these mitigations, sonar was unnecessarily shut down due to a mammal observed outside of the 200 yard shutdown safety zone, two separate times for one whale and one time for a group of four dolphins.

Figure 1-iii-1 depicts the reported ranges of all marine mammal sightings (with and without MFAS) from each of the ten 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, well beyond ranges predicted to have significant exposures (**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)]	10) Estimate MAX exposure PRIOR to mitigation (dB re 1uPa) [1]	11) Number of minutes sonar mitigation applied	12) Estimate exposure AFTER mitigation (dB re 1uPa) [1]	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	Jan	dolphin	2	DDG	5	200-500	Sonar shutdown	<181-189	30	None	1,667	Dolphins bearing 221, ship course 180, opening ship	Opening ship
JAX	IAC II	Jan	dolphin	4	CG	5	200-500	Sonar shutdown	<181-189	23	None	1,667	Dolphins bearing 330, ship course nr, opening ship	Sighted visually on port quarter traveling outbound
JAX	IAC II	Jan	dolphin	4	CG	5	200-500	none	<181-189	na	<181-189	1,667	Dolphins bearing 040, ship course 104, paralleling ship	Closing to bow-ride
CPOA	IAC II	Mar	whale	1	DDG	1	200-500	Sonar powerdown	<181-189	30	<175-183	333	Whale bearing 352, ship course 232, opening ship	Blowing
CPOA	C2X	Jun	dolphin	20	DDG	2	<200	none	<189	na	<189	667	Dolphins bearing 270, Ship course 000, paralleling ship	Closing to bow-ride, then opened astern

Notes:

[1] 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.

nr = not reported

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

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

This section summarizes total annual hours of each type of sonar source used within AFAST between 2 August 2012 to 25 November 2013 from MTERs and non-major training exercises such as unit-level training.

(C) Table 2-i-1. Sonar usage within the AFAST Study Area by source (MTER + ULT).

Authorized MFAS sources §216.170 (c)(1) of NMFS AFAST Final Rule and LOA	22 Jan 12 - 1 Aug 12	22 Jan 12 - 21 Jan 13	Annually Authorized (22Jan 12-21Jan13)	% Total Used of Total Authorized	2 Aug 12 - 21 Jan 13	22 Jan 13 - 25 Nov 13	Nominal 16-month Authorized	% Total Used of Nominal 16-month Authorized
(i) AN/SQS-53 surface ship hull-mounted active sonar (hours)	*	*	3,214	*	*	*	4,285	*
(ii) AN/SQS-56 surface ship hull-mounted active sonar (hours)	*	*	1,684	*	*	*	2,245	*
(iii) AN/SQS-56/53 hull-mounted sonar in object detection mode (hours)	*	*	216	*	*	*	288	*
(iv) AN/BQQ-10 or 5 submarine active sonar (# of pings) *	*	*	9,976	*	*	*	13,301	*
(v) AN/AQS-22 or 13 helicopter active dipping sonar (# of dips) **	*	*	2,952	*	*	*	3,936	*
(vi) AN/SSQ-62 DICASS acoustic sonobuoy (# of buoys) ***	*	*	5,853	*	*	*	7,804	*
(vii) Mk-48 heavyweight torpedoes (# of torpedoes)	*	*	32	*	*	*	43	*
(viii) Mk-46 or 54 lightweight torpedoes (# of torpedoes)	*	*	24	*	*	*	32	*
(ix) AN/SSQ-110A IEER explosive sonobuoy (# of buoys)	*	*	1,725	*	*	*	2,300	*
(x) AN/SSQ-125 AEER sonobuoy (# of buoys)	*	*	1,550	*	*	*	2,067	*
(xi) AN/SLQ-25 NIXIE towed countermeasure (hours)	*	*	2,500	*	*	*	3,333	*
(xii) AN/BQS-15 submarine navigation (hours)	*	*	450	*	*	*	600	*
(xiii) MK-1/2/3/4 Acoustic Device Countermeasures (# of ADCs)	*	*	225	*	*	*	300	*
(xiv) Noise Acoustic Emitters (# of NAEs)	*	*	127	*	*	*	169	*

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

(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. 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 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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NMFS. 2008. Taking and Importing Marine Mammals; U.S. Navy's Atlantic Fleet Active Sonar Training (AFAST); Proposed Rule. October 14 2008. 73 FR 60754

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