Prepared for and submitted to:

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

Annual Range Complex Exercise Report

2 August 2009 to 1 August 2010

For The U.S. Navy's Southern California (SOCAL) Range Complex and Hawaii Range Complex (HRC)

1 October 2010

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INTRODUCTION

The U.S. Navy prepared this Annual Range Complex Exercise Report covering the period from 2 August 2009 to 1 August 2010 in compliance with the National Marine Fisheries Service (NMFS) Final Rule under the Marine Mammal Protection Act (MMPA) for the Southern California Range Complex (SOCAL) and the Hawaii Range Complex (HRC) (NMFS 2009).

In the SOCAL Range Complex Letter of Authorization "Requirements for monitoring and reporting", the following report subsections were specified and are present within this report for the SOCAL Range Complex:

(1) Mid-Frequency Active Sonar (MFAS)/High-Frequency Active Sonar (HFAS) Major Training Exercises (MTE).

- (i) Exercise information (for each MTE).
- (ii) Individual marine mammal sighting information (for each MTE).
- (iii) Evaluation (based on data gathered during all MTEs) 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) Sinking Exercises (SINKEX)

(4) Improved Extended Echo Ranging (IEER) Summary

(5) Explosives Summary

- (i) Total annual number of each type of explosive exercises
- (ii) Total annual expended/detonated rounds for each explosive type

This Annual Report covers the period from 2 August 2009 to 1 August 2010, and the information represents the best practical data collection for this period. Due to the data collection and reporting timeline differing from the actual LOA dates, exercise data from 2 August 2009 to 19 January 2010 falls under the 2009 SOCAL Letter of Authorization, while exercise data from 20 January 2010 to 1 August 2010 falls under the 2010 SOCAL Letter of Authorization. In an effort to provide a better representation of annual exercise data for the SOCAL Range Complex, the Navy has combined all exercise data from 2 August 2009 to 1 August 2010 and compared it to the annual allocations provided in the 2010 SOCAL 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, the 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 appendix to this report.

(1) SOCAL – MFAS/HFAS Major Training Exercises

This section summarizes authorized sonar use and marine mammal observations from the MTEs conducted within the SOCAL Range Complex between 2 August 2009 and 1 August 2010.

For SOCAL, MTEs include Ship Anti-Submarine Warfare Readiness and Evaluation Measuring (SHAREM), Sustainment Exercises (SUSTEX), Integrated Anti Submarine Warfare Course Phase II (IAC2), Composite Training Unit Exercises (COMPTUEX), and Joint Task Forces Exercises (JTFEX).

There were a total of five MTEs within the SOCAL Range Complex between 2 August 2009 and 1 August 2010.

Exercise specific details as described in the SOCAL Final Rule (DoN 2009b) §216.175(f)(1)i-iii and LOA include:

(i) Exercise Information (for each MTE)

(ii) Individual Marine Mammal Sighting Information (for each MTE)

(iii) Evaluation (based on data gathered during all MTEs) of the effectiveness of mitigation measures designed to avoid exposing marine mammals to MFAS. This evaluation shall identify the specific observations that support any conclusions the Navy reaches about the effectiveness of the mitigation.

(i) Exercise information

Table S1-i-1. MTEs conducted in the SOCAL Range Complex.

(i) Exercise	(ii) Date	(iii) Locations	(iv) # and types of active sources used							(v) # and types of passive sources used							(vi) # and types of vessels and aircraft participating								(vii) Total hours of observation by watchstanders (hrs)	(viii) Total hours of all active sonar	(ix) Total hours ea. active source							(x) Wave height (high, low, and average) (ft)
			(iv)a SQS-53	(iv)b SQS-56	(iv)c BQQ-5/10	(iv)d AQS-13F	(iv)e AQS-22	(iv)f DICASS	(iv)g SLQ-25 Nixie	(v)a SQS-53	(v)b SQS-56	(v)c SQR-19	(v)d BQQ-5/10	(v)e AQS-22	(v)d AQS-13F	(v)e DIFAR Sonobuoys	CG	DDG	FFG	SH-60F/R dipping helo	SH-60B non-dipping helo	Submarines	P-3C MPRA	Non-ASW surface ships			(ix)a SQS-53	(ix)b SQS-56	(ix)c BQQ-5/10	(ix)d AQS-13F	(ix)e AQS-22	(ix)f DICASS	(ix)g SLQ-25 Nixie	
SUSTEX	11-18 NOV 2009	S	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	1	6,643	*	*	*	*	*	*	*	11, 3, 6
IAC II	9-11 MAR 2010	S	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	0	5,103	*	*	*	*	*	*	*	13, 1, 6
C2X	17 MAR – 2 APR 2010	S	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	2	5,190	*	*	*	*	*	*	*	6,1,3
IAC II	14-16 MAY 2010	S	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	4	258.8	*	*	*	*	*	*	*	6,1,4
C2X**	23 JUL – 12 AUG 2010	S	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	4	8,640	*	*	*	*	*	*	*	6,1,3

SUSTEX=Sustainment Exercise; IAC II=Integrated ASW Course (Phase II); C2X=Composite Training Exercise

S=SOCAL Range Complex

*Information is contained in the classified appendix to this report.

**C2X ended 12 AUG 2010. Data collected from 23 July – 1 August 2010 is presented in this report. Data from 2 – 12 August 2010 will be included in the 2011 Annual Exercise Report.

(ii) Individual marine mammal sighting information by exercise

Table S1-ii-1. SOCAL MTE – Individual Marine Mammal Sighting Information: SUSTEX 11-18 Nov 2009.

(a) Location	(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 hullmounted source in use, true bearing and animal travel	(n) Observed behavior
SOCAL	whale	1	n	VIS	non-ASW ship	5	2	10	na	1000-2000	nr	na	nr
SOCAL	pinniped	20	n	VIS	DDG	5	4	10	n	500-1000	nr	na	nr
SOCAL	whale	5	n	VIS	DDG	7	4	10	n	500-1000	nr	na	nr
SOCAL	whale	1	n	VIS	DDG	8	4	10	n	500-1000	nr	na	nr
SOCAL	dolphin	1	n	VIS	DDG	1	nr	nr	n	500-1000	nr	na	nr
SOCAL	whale	1	n	VIS	nr	20	3	10	n	>2000	nr	na	nr
SOCAL	whale	1	n	VIS	FFG	15	5	10	n	>2000	nr	na	nr
SOCAL	whale	1	n	VIS	non-ASW ship	4	1	10	na	1000-2000	nr	na	nr
SOCAL	dolphin	1	nr	nr	DDG	1	nr	nr	nr	nr	nr	na	nr
SOCAL	dolphin	2	nr	VIS	DDG	2	4	10	n	500-1000	nr	na	nr
SOCAL	whale	1	n	VIS	DDG	1	4	10	n	500-1000	nr	na	nr
SOCAL	whale	1	n	VIS	CG	7	1	10	n	<200	nr	na	nr
SOCAL	dolphin	100	n	VIS	Helo	15	2	10	n	>2000	nr	na	nr

nr=not reported; VIS=visual; ACO=acoustic; y=yes; n=no; na=not applicable; crs=course

Table S1-ii-2. SOCAL MTE – Individual Marine Mammal Sighting Information: IAC II 9-11 Mar 2010.

(a) Location	(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 hullmounted source in use, true bearing and animal travel	(n) Observed behavior
SOCAL	whale	2	n	VIS	DDG	4	3	10	n	200-500	nr	na	blowing
SOCAL	whale	3	n	VIS	DDG	8	3	10	n	2000	nr	na	blowing
SOCAL	whale	2	n	VIS	DDG	8	3	10	n	200	nr	na	swimming
SOCAL	whale	2	n	VIS	DDG	9	3	10	n	1000-2000	nr	na	blowing
SOCAL	whale	4	n	VIS	DDG	4	7	9	n	200-500	nr	na	swimming
SOCAL	whale	1	n	VIS	DDG	14	4	10	n	1000-2000	ship maneuvered	na	nr
SOCAL	whale	1	n	VIS	DDG	1	4-6	10	n	1000-2000	nr	na	floating
SOCAL	whale	1	n	VIS	DDG	1	4-6	10	n	1000	nr	na	blowing
SOCAL	whale	2	n	VIS	DDG	2	1	8	n	500-1000	nr	na	blowing
SOCAL	dolphin	5	n	VIS	FFG	2	1	10	n	1000-2000	nr	na	nr
SOCAL	dolphin	100	n	VIS	FFG	10	1	10	n	1000-2000	nr	na	moving west to east
SOCAL	dolphin	12	n	VIS	CG	15	3	10	n	2000	nr	na	nr
SOCAL	whale	1	n	VIS	CG	5	3	10	n	>2000	nr	na	nr

SOCAL	whale	6	n	VIS	FFG	10	1	10	n	>2000	nr	na	nr
SOCAL	dolphin	3	n	VIS	DDG	1	4-6	10	Y	200-500	powered down sonar 10dB; ship maneuvered	dolphin 045 from ship, ship crs 239, dolphin opening ship	nr
SOCAL	whale	1	n	VIS	CG	5	3	10	Y	<200	secured sonar	whale 260 from ship, ship crs 319, whale opening ship	nr
SOCAL	whale	2	n	VIS	FFG	50	1	10	Y	>2000	nr	whale 140 from ship, ship crs 312, whale opening ship	nr
SOCAL	dolphin	5	n	VIS	DDG	1	4-6	10	Y	200-500	secured sonar; ship maneuvered	dolphin 060 from ship, ship crs 263, dolphin opening ship	tacking to open ship
SOCAL	whale	1	n	VIS	CG	2	2	10	Y	<200	secured sonar	whale 045 from ship, ship crs 266, whale direction nr	nr
SOCAL	nr	nr	nr	nr	DDG	nr	nr	nr	Y	200-500	powered down sonar 10dB	animal bearing nr, ship crs 274, animal direction nr	nr
SOCAL	whale	1	n	VIS	FFG	30	3	10	Y	>2000	nr	whale 030 from ship, ship crs 332, whale direction nr	nr
SOCAL	whale	1	n	VIS	FFG	35	3	10	n	1000-2000	nr	na	nr
SOCAL	whale	1	n	VIS	DDG	1	4-6	10	Y	1000-2000	powered down sonar 6dB	whale 040 from ship, ship crs 235, whale opening ship	nr
SOCAL	pinniped	8	n	VIS	FFG	15	3	10	Y	<200	secured sonar	pinniped 090 from ship, ship crs 076, pinniped closing ship	nr

SOCAL	dolphin	10	n	VIS	FFG	5	1	10	n	1000-2000	nr	na	nr
SOCAL	whale	6	n	VIS	FFG	10	1	10	n	1000-2000	nr	na	nr
SOCAL	dolphin	5	n	VIS	CG	2	2	10	Y	200-500	secured sonar; ship maneuvered	dolphin 330 from ship, ship crs 049, dolphin opening ship	nr
SOCAL	whale	1	n	VIS	DDG	5	1	10	n	1000-2000	nr	na	blowing
SOCAL	whale	16	n	VIS	FFG	10	1	10	n	500-1000	nr	na	nr
SOCAL	dolphin	5	n	VIS	FFG	10	2	10	n	1000-2000	nr	na	nr
SOCAL	dolphin	5	n	VIS	FFG	10	2	10	n	1000-2000	nr	na	nr
SOCAL	dolphin	20	n	VIS	DDG	2	1	10	n	<200	nr	na	swimming
SOCAL	dolphin	6	n	VIS	DDG	1	1	10	n	1000-2000	nr	na	swimming
SOCAL	dolphin	10	n	VIS	FFG	5	1	10	n	2000	nr	na	nr

nr=not reported; VIS=visual; ACO=acoustic; y=yes; n=no; na=not applicable; crs=course

Table S1-ii-3. SOCAL MTE – Individual Marine Mammal Sighting Information: C2X 17 Mar – 2 Apr 2010.

(a) Location	(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 hullmounted source in use, true bearing and animal travel	(n) Observed behavior
SOCAL	whale	1	n	VIS	non-ASW ship	2	nr	4	na	200-500	nr	na	nr
SOCAL	dolphin	20	n	VIS	non-ASW ship	15	4	7	na	1000-2000	nr	na	nr
SOCAL	dolphin	3	n	VIS	non-ASW ship	5	4	7	na	1000-2000	nr	na	nr
SOCAL	whale	1	n	VIS	non-ASW ship	5	3	8	na	1000-2000	nr	na	nr
SOCAL	whale	1	n	VIS	non-ASW ship	1	2-4	10	na	>2000	nr	na	spouting and blowing
SOCAL	dolphin	6	n	VIS	DDG	20	2	10	n	500-1000	nr	na	paralleling
SOCAL	whale	1	n	VIS	CG	1	3	10	Y	500-1000	powered down sonar 6dB	whale 080 from ship, ship crs 093, whale paralleling ship	paralleling, CPA at 800yds off port beam
SOCAL	dolphin	8	n	VIS	non-ASW ship	5	4	10	na	1000-2000	nr	na	nr
SOCAL	whale	2	n	VIS	non-ASW ship	3	3	10	na	>2000	nr	na	closing and blowing

SOCAL	whale	1	n	VIS	non-ASW ship	4	4	10	na	200-500	nr	na	nr
SOCAL	dolphin	5	n	VIS	non-ASW ship	5	3	8	na	200-500	nr	na	nr
SOCAL	dolphin	20	n	VIS	non-ASW ship	4	4	8	na	<200	nr	na	nr
SOCAL	whale	2	n	VIS	non-ASW ship	3	1	10	na	500-1000	nr	na	nr
SOCAL	dolphin	5	Y	VIS	non-ASW ship	1	2	10	na	<200	nr	na	nr
SOCAL	dolphin	6	n	VIS	non-ASW ship	nr	4	8	na	200-500	nr	na	nr
SOCAL	dolphin	8	n	VIS	non-ASW ship	3	4	8	na	<200	nr	na	nr
SOCAL	dolphin	15	Y	VIS	non-ASW ship	5	4	8	na	500-1000	nr	na	nr
SOCAL	dolphin	8	n	VIS	non-ASW ship	5	4	8	na	500-1000	nr	na	nr
SOCAL	whale	1	nr	VIS	non-ASW ship	5	4	10	na	500-1000	nr	na	nr
SOCAL	dolphin	10	n	VIS	non-ASW ship	3	4	10	na	500-1000	nr	na	nr
SOCAL	dolphin	8	Y	VIS	non-ASW ship	5	4	10	na	200-500	nr	na	nr
SOCAL	dolphin	30	n	VIS	non-ASW ship	1	4	10	na	<200	nr	na	nr
SOCAL	whale	3	n	VIS	non-ASW ship	1	4	10	na	200-500	nr	na	nr
SOCAL	dolphin	5	n	VIS	non-ASW ship	1	4	10	na	<200	nr	na	nr
SOCAL	dolphin	30	n	VIS	FFG	15	5	10	Y	>2000	secured sonar	dolphin 345 from ship, ship crs 015, dolphin opening ship	nr

nr=not reported; VIS=visual; ACO=acoustic; y=yes; n=no; na=not applicable; crs=course

Table S1-ii-4. SOCAL MTE – Individual Marine Mammal Sighting Information: IAC II 14 – 16 May 2010.

(a) Location	(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 hullmounted source in use, true bearing and animal travel	(n) Observed behavior
SOCAL	dolphin	10	n	VIS	DDG	6	1	10	Y	500-1000	powered down sonar 6dB	dolphin 070 from ship, ship crs 109, dolphin closing ship	nr
SOCAL	whale	1	n	VIS	DDG	3	nr	nr	Y	500-1000	powered down sonar 6dB	whale 290 from ship, ship crs 121, whale direction unk	nr
SOCAL	dolphin	10	n	VIS	CG	3	1	8	n	200-500	nr	na	nr
SOCAL	dolphin	10	n	VIS	DDG	6	1	10	Y	500-1000	secured sonar	dolphin 320 from ship, ship crs 210, dolphin closing ship	nr
SOCAL	dolphin	20	n	VIS	CG	3	1	8	n	200-500	nr	na	nr
SOCAL	whale	1	n	VIS	DDG	2	2	10	Y	>2000	nr	whale 245 from ship, ship crs 276, whale paralleling ship	nr

SOCAL	whale	2	n	VIS	DDG	1	1	8	n	500-1000	nr	na	nr
SOCAL	dolphin	5	n	VIS	DDG	2	2	10	Y	200-500	secured sonar	dolphin 245 from ship, ship crs 269, dolphin closing ship	nr
SOCAL	whale	1	n	VIS	DDG	8	nr	nr	Y	>2000	powered down sonar 6dB	whale 290 from ship, ship crs 279, whale closing ship	nr
SOCAL	whale	1	n	VIS	CG	5	1	10	n	200-500	nr	na	nr
SOCAL	whale	2	n	VIS	DDG	6	1	5	Y	200-500	secured sonar	whale 300 from ship, ship crs 040, whale closing ship	nr
SOCAL	pinniped	1	n	VIS	DDG	10	1	10	Y	500-1000	powered down sonar 6dB	pinniped 110 from ship, ship crs 089, pinniped paralleling ship	nr
SOCAL	pinniped	1	n	VIS	DDG	2	1	10	Y	<200	nr	pinniped 050 from ship, ship crs 144, pinniped paralleling ship	nr
SOCAL	dolphin	2	n	VIS	DDG	2	1	10	Y	500-1000	nr	dolphin 050 from ship, ship crs 144, dolphin opening ship	nr
SOCAL	dolphin	2	n	VIS	DDG	63	1	10	Y	nr	secured sonar	dolphin bearing nr, ship crs 145, dolphin direction nr	nr
SOCAL	whale	1	n	VIS	DDG	1	0	10	n	<200	delayed MFAS	na	nr

SOCAL	whale	1	n	VIS	DDG	1	0	10	n	<200	nr	na	nr
SOCAL	pinniped	2	n	VIS	DDG	63	1	10	Y	nr	secured sonar	pinniped bearing nr, ship crs 145, pinniped direction nr	nr
SOCAL	whale	1	n	VIS	DDG	1	0	10	n	1000-2000	nr	na	nr
SOCAL	dolphin	5	n	VIS	DDG	29	1	10	Y	<200	secured sonar	dolphin 045 from ship, ship crs 181, dolphin direction nr	nr
SOCAL	whale	1	n	VIS	CG	15	3	10	Y	1000-2000	nr	whale 175 from ship, ship crs 116, whale direction nr	nr
SOCAL	whale	1	n	VIS	DDG	3	3	10	Y	200-500	secured sonar	whale 290 from ship, ship crs 303, whale direction nr	nr
SOCAL	whale	2	n	VIS	CG	10	3	10	Y	1000-2000	nr	whale 356 from ship, ship crs 055, whale direction nr	nr
SOCAL	whale	1	n	VIS	DDG	7	2	unk	Y	200-500	secured sonar	whale 275 from ship, ship crs 231, whale direction nr	nr
SOCAL	whale	1	n	VIS	CG	15	3	10	Y	500-1000	powered down sonar 6dB	whale 293 from ship, ship crs 266, whale direction nr	nr
SOCAL	whale	1	n	VIS	DDG	10	1	10	n	500-1000	nr	na	nr
SOCAL	dolphin	3	n	VIS	CG	5	1	9	n	<200	nr	na	nr

SOCAL	pinniped	1	n	VIS	CG	3	2	8	n	200-500	nr	na	nr
SOCAL	dolphin	2	n	VIS	DDG	2	1	12	Y	200-500	powered down sonar 10dB	dolphin 230 from ship, ship crs 338, dolphin direction nr	nr
SOCAL	dolphin	100	n	ACO	DDG	10	1	6	n	1000-2000	nr	na	nr
SOCAL	dolphin	5	n	VIS	CG	5	2	9	n	500-1000	nr	na	nr
SOCAL	dolphin	20	n	ACO	DDG	3	1	4	n	1000-2000	nr	na	nr
SOCAL	whale	1	n	VIS	DDG	2	6	7	Y	200-500	powered down sonar 10dB	whale 080 from ship, ship crs 201, whale direction nr	nr
SOCAL	pinniped	8	n	VIS	DDG	2	6	7	Y	200-500	powered down sonar 10dB	pinniped 080 from ship, ship crs 201, pinniped direction nr	nr
SOCAL	dolphin	10	n	VIS	CG	5	2	9	n	500-1000	nr	na	nr
SOCAL	dolphin	10	n	VIS	DDG	6	1	10	Y	<200	secured sonar	dolphin 235 from ship, ship crs 211, dolphin paralleling ship	nr
SOCAL	dolphin	5	n	VIS	DDG	15	2	5	Y	1000-2000	nr	dolphin 190 from ship, ship crs nr, dolphin direction nr	nr
SOCAL	dolphin	50	n	VIS	DDG	10	3	6	Y	500-1000	powered down sonar 6dB	dolphin 290 from ship, ship crs 160, dolphin direction nr	nr

SOCAL	pinniped	1	n	VIS	CG	2	6	7	n	200-500	nr	na	nr
SOCAL	generic	nr	nr	ACO	DDG	7	nr	nr	Y	unk	nr	animal 154 from ship, ship crs 256, animal direction nr	nr
SOCAL	pinniped	1	n	VIS	CG	2	2	8	n	200-500	nr	na	nr
SOCAL	dolphin	3	n	VIS	CG	2	4	10	n	<200	nr	na	nr
SOCAL	generic	nr	nr	ACO	DDG	3	nr	nr	Y	nr	nr	animal 344 from ship, ship crs 255, animal direction nr	nr
SOCAL	generic	nr	nr	ACO	DDG	2	nr	nr	Y	nr	nr	animal 212 from ship, ship crs 255, animal direction nr	nr
SOCAL	generic	nr	nr	ACO	DDG	7	nr	nr	Y	nr	nr	animal 255 from ship, ship crs 256, animal direction nr	nr
SOCAL	generic	nr	nr	ACO	DDG	7	nr	nr	Y	nr	nr	animal 199 from ship, ship crs 256, animal direction nr	nr
SOCAL	dolphin	1	n	VIS	DDG	3	5	7	Y	200-500	nr	dolphin 070 from ship, ship crs 175, dolphin paralleling ship	bowriding
SOCAL	generic	nr	nr	ACO	DDG	nr	nr	nr	Y	nr	nr	animal 109 from ship, ship crs 178, animal direction nr	nr

SOCAL	generic	nr	nr	ACO	DDG	nr	nr	nr	Y	nr	nr	animal 277 from ship, ship crs 270, animal direction nr	nr
SOCAL	dolphin	4	n	VIS	DDG	6	6	10	Y	500-1000	secured sonar	dolphin 190 from ship, ship crs 258, dolphin direction nr	nr
SOCAL	whale	1	n	VIS	DDG	10	2	10	Y	500-1000	secured sonar	whale 040 from ship, ship crs 310, whale paralleling ship	nr
SOCAL	whale	1	n	VIS	CG	15	3	7	Y	500-1000	powered down sonar 10dB, then secured sonar	whale 020 from ship, ship crs 006, whale direction nr	nr
SOCAL	whale	1	n	VIS	DDG	5	2	10	Y	500-1000	powered down sonar 6dB	whale 220 from ship, ship crs 269, whale closing ship	nr
SOCAL	dolphin	3	n	VIS	DDG	3	5	10	n	1000-2000	nr	na	nr
SOCAL	whale	1	n	VIS	DDG	3	3-5	10	n	1000-2000	nr	na	nr
SOCAL	whale	1	n	VIS	DDG	4	3	10	Y	1000-2000	powered down sonar 6dB	whale 235 from ship, ship crs 266, whale closing ship	nr

nr=not reported; VIS=visual; ACO=acoustic; y=yes; n=no; na=not applicable; crs=course

Table S1-ii-5. SOCAL MTE – Individual Marine Mammal Sighting Information C2X 23 Jul – 14 Aug 2010.

(a) Location	(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 hullmounted source in use, true bearing and animal travel	(n) Observed behavior
SOCAL	dolphin	5	n	VIS	DDG	5	2	10	Y	200-500	nr	dolphin 260 from ship, ship crs 040, dolphin paralleling ship	bowriding
SOCAL	whale	1	n	VIS	DDG	2	2	10	n	200-500	nr	na	nr
SOCAL	whale	1	n	VIS	DDG	3	3	nr	n	>2000	nr	na	nr
SOCAL	dolphin	1	n	VIS	DDG	5	nr	nr	n	200-500	nr	na	nr
SOCAL	whale	6	n	VIS	DDG	20	3	10	n	1000-2000	nr	na	nr
SOCAL	whale	2	n	VIS	DDG	3	2	10	Y	500-1000	powered down sonar 6db	whale 085 from ship, ship crs 037, whale closing ship	nr
SOCAL	whale	9	n	VIS	DDG	5	2	10	Y	1000-2000	powered down sonar 6db	whale 290 from ship, ship crs 197, whale direction nr	nr
SOCAL	whale	1	n	VIS	DDG	6	2	10	n	500-1000	nr	na	nr
SOCAL	whale	1	n	VIS	CG	1	nr	10	n	>2000	nr	na	nr
SOCAL	whale	3	n	VIS	DDG	5	1	10	n	500-1000	nr	na	nr

SOCAL	whale	1	n	VIS	DDG	1	1	10	n	500-1000	nr	na	nr
SOCAL	whale	6	n	VIS	DDG	5	3	10	n	1000-2000	nr	na	nr
SOCAL	pinniped	9	n	VIS	CG	2	nr	10	Y	<200	nr	pinniped 300 from ship, ship crs 211, pinniped direction nr	nr
SOCAL	whale	2	n	VIS	CG	2	nr	10	Y	1000-2000	secured sonar	whale 205 from ship, ship crs 210, whale direction nr	nr
SOCAL	pinniped	2	n	VIS	CG	1	nr	10	Y	200-500	nr	pinniped 220 from ship, ship crs 210, pinniped direction nr	nr
SOCAL	whale	2	n	VIS	DDG	2	3	10	Y	<200	powered down sonar 10db	whale 010 from ship, ship crs 032, whale direction nr	nr
SOCAL	whale	1	n	VIS	DDG	3	1	10	Y	>2000	nr	whale 085 from ship, ship crs nr, whale direction nr	nr
SOCAL	dolphin	4	n	VIS	DDG	2	1	10	Y	<200	secured sonar	dolphin 080 from ship, ship crs 057, dolphin direction nr	nr
SOCAL	dolphin	14	n	VIS	DDG	2	1	10	Y	<200	secured sonar	dolphin 080 from ship, ship crs 058, dolphin direction nr	nr
SOCAL	whale	1	n	VIS	DDG	1	1	10	Y	<200	secured sonar	whale 090 from ship, ship crs 180, whale direction nr	nr
SOCAL	whale	1	n	VIS	DDG	1	2	10	Y	200-500	secured sonar	whale 120 from ship, ship crs 180, whale direction nr	nr
SOCAL	whale	1	n	VIS	DDG	2	1	10	Y	>2000	nr	whale 210 from ship, ship crs 211, whale direction nr	nr
SOCAL	whale	4	n	VIS	DDG	12	2	10	n	500-1000	nr	na	nr
SOCAL	whale	2	n	VIS	DDG	2	1	10	Y	200-500	secured sonar	whale 240 from ship,	nr

												ship crs 234, whale direction nr	
SOCAL	whale	1	n	VIS	DDG	1	1	10	Y	200-500	powered down sonar 10db	whale 350 from ship, ship crs 225, whale direction nr	nr
SOCAL	dolphin	16	n	VIS	DDG	2	2	10	Y	200-500	secured sonar	dolphin 125 from ship, ship crs 129, dolphin direction nr	nr
SOCAL	whale	4	n	VIS	DDG	12	2	10	n	1000-2000	nr	na	nr
SOCAL	dolphin	5	n	VIS	DDG	5	1	10	n	1000-2000	nr	na	nr
SOCAL	dolphin	4	n	VIS	DDG	3	1	10	Y	200-500	secured sonar	dolphin 210 from ship, ship crs 243, dolphin direction nr	bowriding
SOCAL	whale	3	n	VIS	DDG	10	1	10	Y	1000-2000	powered down sonar 6db	whale 310 from ship, ship crs 301, whale direction nr	nr
SOCAL	dolphin	25	n	VIS	DDG	3	3	10	Y	200-500	secured sonar	dolphin 180 from ship, ship crs 220, dolphin direction nr	nr
SOCAL	dolphin	12	n	VIS	DDG	3	3	10	Y	500-1000	secured sonar	dolphin 050 from ship, ship crs 098, dolphin direction nr	nr
SOCAL	whale	2	n	VIS	DDG	3	3	10	n	1000-2000	nr	na	nr
SOCAL	whale	3	n	VIS	DDG	5	nr	10	Y	>2000	nr	whale 030 from ship, ship crs 270, whale direction nr	blowing
SOCAL	whale	3	n	VIS	DDG	nr	2	10	Y	>2000	secured sonar	whale 180 from ship, ship crs 177, whale direction nr	nr
SOCAL	whale	1	n	VIS	DDG	nr	nr	10	n	>2000	nr	na	nr
SOCAL	whale	1	n	VIS	DDG	nr	nr	10	Y	>2000	nr	whale 320 from ship, ship crs 270, whale direction nr	nr

SOCAL	whale	5	n	VIS	DDG	5	2	10	n	>2000	nr	na	nr
SOCAL	whale	4	n	VIS	DDG	nr	nr	nr	Y	>2000	nr	whale 060 from ship, ship crs 125, whale direction nr	nr
SOCAL	whale	4	n	VIS	DDG	nr	1	10	Y	>2000	nr	whale 250 from ship, ship crs 270, whale direction nr	nr
SOCAL	whale	2	n	VIS	DDG	nr	nr	nr	Y	>2000	nr	whale 248 from ship, ship crs 270, whale direction nr	nr
SOCAL	whale	2	n	VIS	DDG	2	nr	10	Y	>2000	secured sonar	whale 358 from ship, ship crs nr, whale direction nr	nr
SOCAL	whale	1	n	VIS	DDG	nr	1	10	Y	500-1000	powered down sonar 6db	whale 020 from ship, ship crs nr, whale direction nr	nr
SOCAL	dolphin	2	n	VIS	DDG	nr	nr	nr	Y	200-500	powered down sonar 10db	dolphin bearing nr, ship crs 304, dolphin direction nr	nr
SOCAL	dolphin	5	n	VIS	DDG	10	2	10	Y	500-1000	powered down sonar 6db	dolphin 000 from ship, ship crs 001, dolphin direction nr	nr
SOCAL	pinniped	2	n	VIS	DDG	10	2	10	Y	200-500	powered down sonar 10db	pinniped 040 from ship, ship crs 120, pinniped direction nr	nr
SOCAL	whale	5	n	VIS	DDG	5	2	10	Y	>2000	nr	whale 315 from ship, ship crs 001, whale direction nr	nr
SOCAL	whale	7	n	VIS	DDG	5	2	10	Y	>2000	nr	whale 050 from ship, ship crs 315, whale direction nr	nr
SOCAL	whale	3	n	VIS	DDG	10	2	10	n	<200	nr	na	nr
SOCAL	whale	3	n	VIS	DDG	5	2	10	Y	>2000	nr	whale 050 from ship, ship crs 070, whale direction nr	nr

SOCAL	whale	5	n	VIS	DDG	5	2	10	n	<200	nr	na	nr
SOCAL	whale	12	n	VIS	DDG	20	2	10	Y	<200	secured sonar	whale bearing nr, ship crs 090, whale direction nr	nr
SOCAL	whale	5	n	VIS	DDG	11	2	10	Y	500-1000	powered down sonar 6db	whale bearing nr, ship crs 315, whale direction nr	nr
SOCAL	whale	3	n	VIS	DDG	5	2	10	Y	1000-2000	nr	whale 259 from ship, ship crs 357, whale direction nr	nr
SOCAL	whale	2	n	VIS	DDG	5	2	10	Y	<200	secured sonar	whale 340 from ship, ship crs 284, whale direction nr	nr
SOCAL	whale	2	n	VIS	DDG	3	2	10	n	>2000	nr	na	nr
SOCAL	whale	3	n	VIS	DDG	nr	2	10	Y	1000-2000	nr	whale bearing nr, ship crs 282, whale direction nr	nr
SOCAL	whale	1	n	VIS	DDG	nr	2	10	Y	500-1000	powered down sonar 6db	whale bearing nr, ship crs 284, whale direction nr	nr
SOCAL	whale	2	n	VIS	DDG	nr	2	10	Y	200-500	powered down sonar 10db	whale bearing nr, ship crs 286, whale direction nr	nr
SOCAL	whale	2	n	VIS	DDG	nr	2	10	Y	1000-2000	nr	whale bearing nr, ship crs 096, whale direction nr	nr
SOCAL	whale	2	n	VIS	DDG	nr	2	10	Y	<200	secured sonar	whale bearing nr, ship crs 145, whale direction nr	nr
SOCAL	whale	4	n	VIS	DDG	nr	2	10	n	unk	nr	na	nr
SOCAL	whale	3	n	VIS	DDG	nr	2	10	n	unk	nr	na	nr
SOCAL	whale	2	n	VIS	DDG	nr	2	10	n	unk	nr	na	nr
SOCAL	whale	2	n	VIS	DDG	nr	2	10	n	unk	nr	na	nr

SOCAL	whale	1	n	VIS	DDG	nr	2	nr	n	500-1000	nr	na	nr
SOCAL	pinniped	3	n	VIS	DDG	nr	2	nr	Y	<200	secured sonar	pinniped 210 from ship, ship crs 210, pinniped direction nr	nr
SOCAL	whale	1	n	VIS	DDG	nr	2	nr	Y	500-1000	powered down sonar 6db	whale 220 from ship, ship crs 210, whale direction nr	nr
SOCAL	whale	3	n	VIS	DDG	nr	2	nr	Y	>2000	nr	whale 011 from ship, ship crs 120, whale direction nr	nr
SOCAL	whale	3	n	VIS	DDG	nr	2	nr	Y	1000-2000	powered down sonar 6db	whale 020 from ship, ship crs 344, whale direction nr	nr
SOCAL	whale	1	n	VIS	DDG	nr	2	nr	Y	>2000	nr	whale 220 from ship, ship crs 222, whale direction nr	nr
SOCAL	pinniped	4	n	VIS	DDG	nr	2	nr	Y	200-500	powered down sonar 10db	pinniped 130 from ship, ship crs 060, pinniped direction nr	nr
SOCAL	dolphin	7	n	VIS	DDG	nr	2	nr	Y	200-500	powered down sonar 10db	dolphin 160 from ship, ship crs 121, dolphin direction nr	nr
SOCAL	dolphin	12	n	VIS	DDG	nr	2	nr	Y	200-500	secured sonar	dolphin 010 from ship, ship crs 053, dolphin direction nr	nr
SOCAL	dolphin	12	n	VIS	DDG	nr	2	nr	n	200-500	nr	na	nr
SOCAL	whale	2	n	VIS	DDG	nr	2	nr	n	>2000	nr	na	nr
SOCAL	whale	1	n	VIS	DDG	nr	2	nr	Y	200-500	powered down sonar 10db	whale bearing nr, ship crs 172, whale direction nr	nr
SOCAL	whale	2	n	VIS	DDG	nr	2	nr	Y	>2000	nr	whale 340 from ship, ship crs 250, whale direction nr	nr

SOCAL	whale	2	n	VIS	DDG	nr	2	nr	Y	>2000	nr	whale 330 from ship, ship crs 340, whale direction nr	nr
SOCAL	whale	1	n	VIS	DDG	nr	2	nr	Y	1000-2000	nr	whale 035 from ship, ship crs 343, whale direction nr	nr
SOCAL	whale	2	n	VIS	DDG	nr	2	nr	Y	1000-2000	nr	whale 330 from ship, ship crs 342, whale direction nr	nr
SOCAL	whale	1	n	VIS	DDG	nr	2	nr	Y	500-1000	powered down sonar 6db	whale 350 from ship, ship crs 121, whale direction nr	nr

nr=not reported; VIS=visual; ACO=acoustic; y=yes; n=no; na=not applicable; crs=course

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

SUMMARY: The three categories of mitigation measures (Personnel Training, Lookout and Watchstander Responsibility, and Operating Procedures) outlined in the SOCAL Final Environmental Impact Statement/Overseas Environmental Impact Statement of December 2008 and approved by NMFS in subsequent Letters of Authorization in 2009 and 2010 were effective in appropriately mitigating exposure of marine mammals to mid-frequency sonar. During this year's major exercise events, to the maximum extent possible the proscribed NMFS safety zones were adhered to, and vessels and aircraft applied mitigation measures when marine mammals were visually observed within the requisite zone.

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 (MSAT), adherence to required MFAS mitigation zones, and application of lesson learned in marine mammal sighting and reporting.

For the five major training events conducted in SOCAL this reporting period (02 Aug 2009 to 01 Aug 2010), the Navy conducted over 4,127 hours of Marine Species Awareness Training for 2,795 Navy personnel prior to getting underway. In addition, over the 40 non-consecutive major training event days in this same period (**Table S1-iii-1**), the Navy performed over 25,835 hours of visual observation (when counting the number of individual watchstanders engaged in lookout or navigation duties times the number of ships involved times the number of days at-sea).

SOCAL Major Training Event Marine Mammal Observations

There were approximately 210 sightings of an estimated 1,217 marine mammals over the course of five major training events in the SOCAL Range Complex (**Table S1-iii-2**, **Figure S1-iii-1**). Breakdown of sightings by species type were:
-Dolphins: 67 sightings of 881 animals (32% of total sightings, 72% of total animals)
-Whales: 121 sightings of 273 animals (58% of total sightings, 22% of total animals)
-Pinniped: 14 sightings of 63 animals (7% of total sightings, 5% of total animals)

Dolphin species in Southern California typically occur in larger pods than whales, hence the higher number of dolphins and larger percentage of total numbers seen in these counts.

SOCAL Major Training Event Mitigations

Of the 210 Navy marine mammal sightings during major training events, there were 62 sightings within 1,000 yards that qualified as a mitigation event (**Table S1-iii-3**, **Figure S1-iii-2).** In other, words MFAS surface ships had their sonar on, and followed the appropriate mitigation (secure or power down) depending on the range to the marine mammal.

These 62 mitigation events represented 29.5% of all marine mammal sightings for an estimated total of 306 marine mammals during this annual reporting period. As stated previously, with dolphins occurring either more frequently or in larger numbers within Southern California, of the 306 marine mammals observed during mitigation events, 218 were dolphins, 50 whales, and 38 pinnipeds (**Table S1-iii-3**).

Of the 62 mitigation events, there were 29 periods when sonar was turned off (i.e., secured) at ranges <200 yards from the ship, 27 periods when sonar power was turned down (i.e., powered down), and six periods when mitigation did not occur but with the explanations detailed below. There were also three reports of a Navy ship changing course in addition to applying sonar mitigation in order to open the range between the marine mammal and ship. The Navy lost a minimum of 20 hours of training time due to subsequent shut downs and power downs as a result of applying marine mammal mitigation during these sighting events at ranges less than 1,000 yards. There were no reports of any marine mammal behaving in any unusual manner while observing marine mammals for 4.5 hours during mitigation events.

Table S1-iii-1. SOCAL Range Complex major training events from 2 August 2009 to 1 August 2010.

MTE Type	Dates	# Of Days	# of Ships Involved	# Of Marine Mammal Sightings	# Of Marine Mammals
SUSTEX	11-18 November 2009	8	8	13	136
IAC II	8-10 March 2010	3	5	34	249
COMPTUEX	17 March - 2 April 2010	17	7	25	190
IAC II	14-16 May 2010	3	8	56	319
COMPTUEX	23 Jul-14 Aug 2010 *	9 *	11	82	313
Totals:		40 days	39 ships	210 sightings	1,207 marine mammals

Note: * A COMPTUEX occurred from 23 July 2010 until 14 August 2010. Given this exercise occurred between monitoring report periods which run from Aug to Aug, details from this event are summarized for the period 23 July – 1 Aug. Data from 2 – 14 August will be included in the 2011 Monitoring Report (Aug 2010 to Aug 2011).

SUSTEX = Sustainment Exercise
COMPTUEX = Composite Training Unit Exercise
IAC II = Integrated Anti-submarine Warfare Course Phase II

Table S1-iii-2. Total number of marine mammal sightings observed from Navy platforms during SOCAL Range Complex major training events from 2 August 2009 to 1 August 2010.

Species Type	# of sightings	% of total sightings	# of marine mammals	% of total number of marine mammals
Dolphins	67	32%	881	72%
Whales	121	57%	273	23%
Pinniped	14	7%	63	5%
Unidentified marine mammals	8	4%	not reported	not applicable
Totals:	210	1,207		

Note: Totals represent sum of observations during both MFAS\explosive events, and during non-MFAS\ non-explosives training periods.

Table S1-iii-3. Number of marine mammal sightings at ranges less than 1,000 yards observed from Navy platforms during major training events concurrent with MFAS mitigation from 2 August 2009 to 1 August 2010 in the SOCAL range Complex.

mitigation range	# of sightings	total # of marine mammals	Breakdown by species type		
			# of dolphins	# of whales	# of pinnipeds
< 200 yards	15	75	33	21	21
200-500 yards	27	120	92	12	16
500-1000 yards	20	111	93	17	1
Totals:	62 *	306 *	218	50	38

* 62 sightings of 306 marine mammals is 29% of the total sightings and 25% of the total individuals observed during all major training events periods (MFAS\explosive and non-MFAS\non-explosive periods) (*see* ***Table S1-iii-2***).

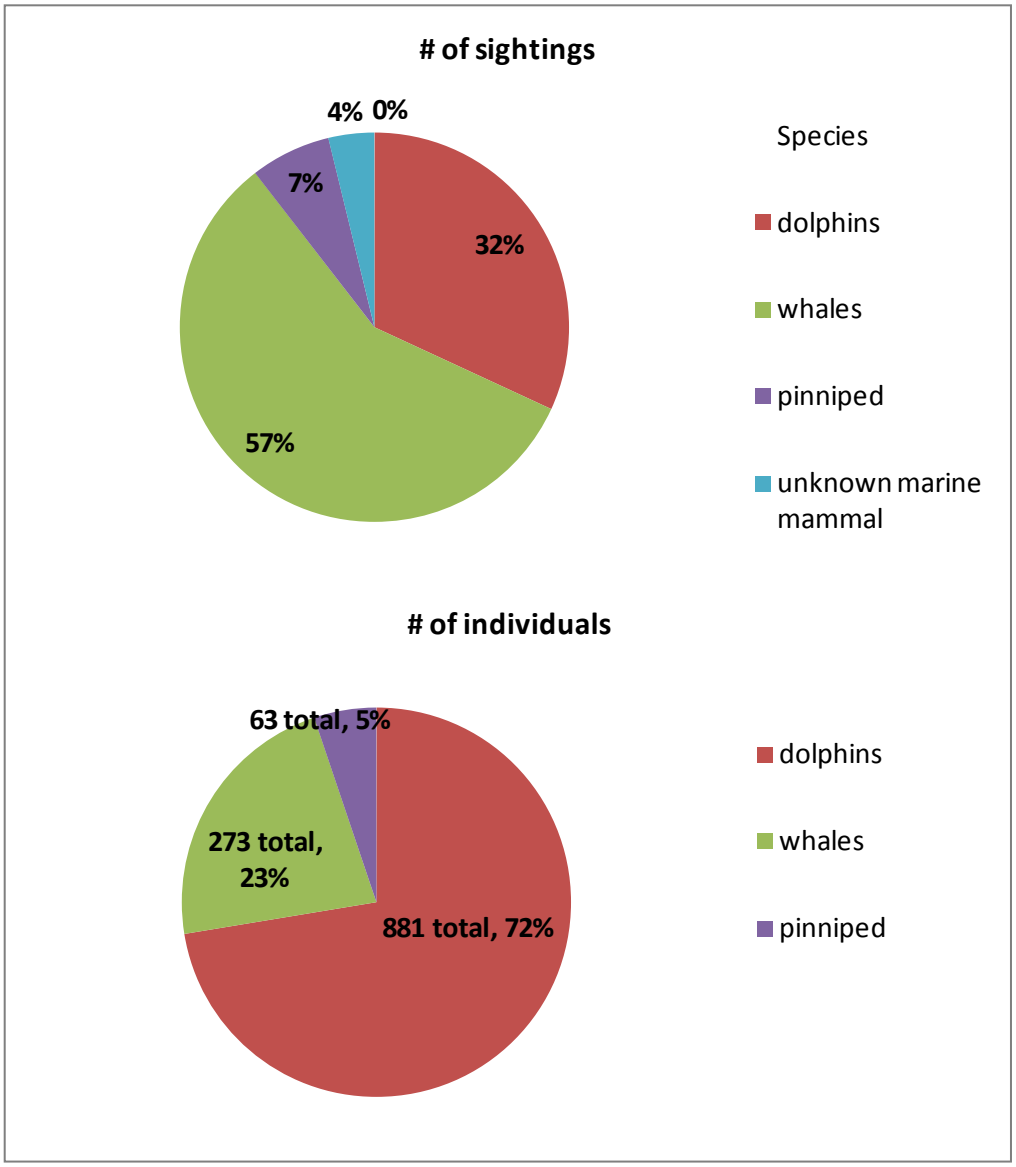


Figure S1-iii-1. Chart of marine mammal sightings (top panel) and sightings by species type (bottom panel) during SOCAL Range Complex major training events from 2 August 2010 to 1 August 2010.

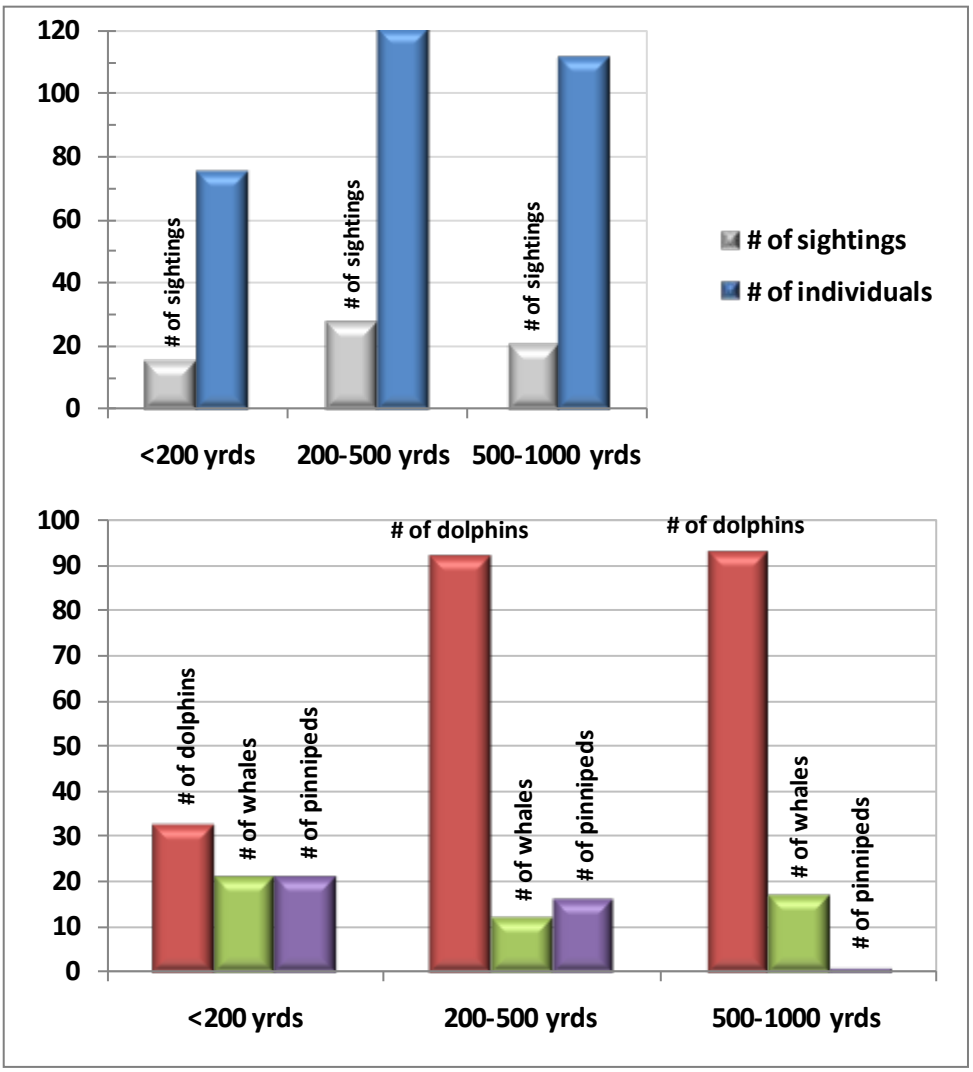


Figure S1-iii-2. Bar chart showing marine mammal sightings concurrent with MFAS mitigation (top panel) and breakdown of sightings by species type (bottom panel) from 2 August 2009 to 1 August 2010 in the SOCAL range Complex.

Navy Safety Zone Adherence

During this year's major exercise events, to the maximum extent possible the proscribed NMFS safety zones were adhered to (see table **Table S1-iii-5**) with the exceptions noted below. These six cases ranked by range between the marine mammal(s) and ship represent times when mitigation was not performed, although under the agreed to mitigation procedures with NMFS no mitigation is required in the case of bowriding dolphins, or if a marine mammal is leaving a mitigation zone.

Table S1-iii-4. Safety zone exceptions.

Range	Ship Action	Analysis	Relative ship (circle-blue arrow) and marine mammal position (square-green arrow)
< 200 yards			
1 pinniped	Ship did not shut down sonar	Ship was heading 144T @ 8 knots, and spotted seal at 050T, or slightly abaft the beam. By the time the seal sighting was received and understood by the bridge, it was already passed and opening (i.e., behind the ship), due in part to the confusion with 2 dolphins spotted at the same time at the same bearing, but beyond the mitigation zones (>1,000 yards). The ship's Officer of the Deck (OOD) realized the dolphins were not an issue, and disregarded other reports coming from the same bearing. By the time it was made clear to the OOD, the seal was outside of the safety zones. By happenstance, a Navy exercise representative was aboard this ship during the event. He conducted training with the ship's bridge team after the incident to explain what happened and provide guidance. **Assessment: erroneous initial reporting, then ship soon passed beyond mitigation range. Maximum exposure estimated to be << 189 dB given the orientation of the ship**	
9 pinnipeds	Ship did not shut down sonar	Ship was heading 211T when sea lions were spotted at 200T, or slighting abaft the starboard beam. **Assessment: Ship soon passed beyond mitigation range to the pinnipeds. Maximum exposure estimated to be <<189 dB given the orientation of the ship**	
2 whales	Ship powered down vice shut down sonar	Ship was heading 032T when whales were spotted 010T, or slightly to the left of the ship's bow. The ship powered down sonar for over an hour until the whales were well clear (>>1,000 yards) behind. **Assessment: Maximum exposure estimated to be <179 dB.**	
200-500 yards			
1 dolphin	Ship did not power down sonar	Ship was heading 175T when dolphin spotted at 070T approaching the ship from the left rear. Dolphin continued to close and eventually ride the bow wave (bowride). **Assessment: dolphins were bowriding, no mitigation required**	
5 dolphins	Ship did not power down sonar	Ship was heading 175T when dolphins spotted at 070T approaching the ship from the rear. Dolphins continued to close and eventually ride the bow wave (bowride). **Assessment: dolphins were bowriding, no mitigation required**	
2 pinnipeds	Ship did not power down sonar	Ship was heading 210T when pinnipeds spotted at 220T, or slightly off the right bow. **Assessment: none. Maximum exposure estimated to be <189 dB**	
500-1000 yards			
50 dolphins		Ship was heading 160T when dolphins spotted at 290T, or behind and to the right of the ship closer to the 1000 yard edge of the mitigation zone. Ship relative motion quickly put dolphins outside of mitigation range >1000 yards. **Assessment: minimum exposure, prior to no mitigation required**	

Table S1-iii-5. SOCAL MTEs where sonar was on during detection of marine mammals at ranges less than 1,000 yards, and mitigation conducted.

1) Range [SOCAL (S)]	2) MTE	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 hullmounted source in use, true bearing, animal travel	15) Observed behavior
S	IAC II	Mar 2010	dolphin	3	DDG	1	200-500	PD, MAN	<189-181	3	<179-171 for 3 min	1,000	dolphin 045 from ship, ship crs 239, dolphin opening ship	none reported
S	IAC II	Mar 2010	whale	1	CG	5	<200	SD	<189	15	none for 15 min	5,000	whale 260 from ship, ship crs 319, whale opening ship	none reported
S	IAC II	Mar 2010	dolphin	5	DDG	1	200-500	SD, MAN	<189-181	3	none for 3 min	1,000	dolphin 060 from ship, ship crs 263, dolphin opening ship	tacking to open ship
S	IAC II	Mar 2010	whale	1	CG	2	<200	SD	<189	23	none for 23 min	7,667	whale 045 from ship, ship crs 266, whale direction nr	none reported
S	IAC II	Mar 2010	nr	nr	DDG	nr	200-500	PD	<189-181	7	<179-171 for 7 min	2,333	animal bearing nr, ship crs 274, animal direction nr	none reported
S	IAC II	Mar 2010	pinniped	8	FFG	15	<200	SD	<179	56	none for 56 min	18,666	pinniped 090 from ship, ship crs 076, pinniped closing ship	none reported
S	IAC II	Mar 2010	dolphin	5	CG	2	200-500	SD, MAN	<189-181	42	none for 42 min	14,000	dolphin 330 from ship, ship crs 049, dolphin opening ship	none reported
S	C2X	Mar 2010	whale	1	CG	1	500-1000	PD	<181-175	1	<175-169 for 1 min	333	whale 080 from ship, ship crs 093, whale paralleling ship	paralleling, CPA 800 yds off port beam

S	IAC II	May 2010	dolphin	10	DDG	6	500-1000	PD	<181-175	15	<175-169 for 15 min	5,000	dolphin 070 from ship, ship crs 109, dolphin closing ship	none reported
S	IAC II	May 2010	whale	1	DDG	3	500-1000	PD	<181-175	25	<175-169 for 25 min	8,333	whale 290 from ship, ship crs 121, whale direction unk	none reported
S	IAC II	May 2010	dolphin	10	DDG	6	500-1000	SD	<181-175	8	none for 8 min	2,667	dolphin 320 from ship, ship crs 210, dolphin closing ship	none reported
S	IAC II	May 2010	dolphin	5	DDG	2	200-500	SD	<189-181	5	none for 5 min	1,667	dolphin 245 from ship, ship crs 269, dolphin closing ship	none reported
S	IAC II	May 2010	whale	2	DDG	6	200-500	SD	<189-181	6	none for 6 min	2,000	whale 300 from ship, ship crs 040, whale closing ship	none reported
S	IAC II	May 2010	pinniped	1	DDG	10	500-1000	PD	<181-175	10	<175-169 for 10 min	3,333	pinniped 110 from ship, ship crs 089, pinniped paralleling ship	none reported
S	IAC II	May 2010	pinniped	1	DDG	2	<200	none	<189	na	<189	na	pinniped 050 from ship, ship crs 144, pinniped paralleling ship	none reported
S	IAC II	May 2010	dolphin	2	DDG	2	500-1000	none	<181-175	na	<181-175	na	dolphin 050 from ship, ship crs 144, dolphin opening ship	none reported
S	IAC II	May 2010	dolphin	5	DDG	29	<200	SD	<189	29	none for 29 min	9,667	dolphin 045 from ship, ship crs 181, dolphin direction nr	none reported
S	IAC II	May 2010	whale	1	DDG	3	200-500	SD	<189-181	5	none for 5 min	1,667	whale 290 from ship, ship crs 303, whale direction nr	none reported
S	IAC II	May 2010	whale	1	DDG	7	200-500	SD	<189-181	7	none for 5 min	2,333	whale 275 from ship, ship crs 231, whale direction nr	none reported
S	IAC II	May 2010	whale	1	CG	15	500-1000	PD	<181-175	10	<175-169 for 10 min	3,333	whale 293 from ship, ship crs 266, whale direction nr	none reported
S	IAC II	May 2010	dolphin	2	DDG	2	200-500	PD	<189-181	18	<179-171 for 18 min	6,000	dolphin 230 from ship, ship crs 338, dolphin direction nr	none reported

S	IAC II	May 2010	whale	1	DDG	2	200-500	PD	<189-181	2	<179-171 for 2 min	667	whale 080 from ship, ship crs 201, whale direction nr	none reported
S	IAC II	May 2010	pinniped	8	DDG	2	200-500	PD	<189-181	2	<179-171 for 2 min	667	pinniped 080 from ship, ship crs 201, pinniped direction nr	none reported
S	IAC II	May 2010	dolphin	10	DDG	6	<200	SD	<189	6	none for 6 min	2,000	dolphin 235 from ship, ship crs 211, dolphin paralleling ship	none reported
S	IAC II	May 2010	dolphin	50	DDG	10	500-1000	PD	<181-175	142	<175-169 for 142 min	47,333	dolphin 290 from ship, ship crs 160, dolphin direction nr	none reported
S	IAC II	May 2010	dolphin	1	DDG	3	200-500	none	<189-181	na	<189-181	na	dolphin 070 from ship, ship crs 175, dolphin paralleling ship	bowriding
S	IAC II	May 2010	dolphin	4	DDG	6	500-1000	SD	<181-175	10	<175-169 for	3,333	dolphin 190 from ship, ship crs 258, dolphin direction nr	none reported
S	IAC II	May 2010	whale	1	DDG	10	500-1000	SD	<181-175	10	none for 10 min	3,333	whale 040 from ship, ship crs 310, whale paralleling ship	none reported
S	IAC II	May 2010	whale	1	CG	15	500-1000	PD, SD	<181-175	17	none for 17 min	5,667	whale 020 from ship, ship crs 006, whale direction nr	none reported
S	IAC II	May 2010	whale	1	DDG	5	500-1000	PD	<181-175	6	<175-169 for 6 min	2,000	whale 220 from ship, ship crs 269, whale closing ship	none reported
S	C2X	July 2010	dolphin	5	DDG	5	200-500	none	<189-181	na	<189-181	na	dolphin 260 from ship, ship crs 040, dolphin paralleling ship	bowriding
S	C2X	July 2010	whale	2	DDG	3	500-1000	PD	<181-175	36	<175-169 for 36 min	12,000	whale 085 from ship, ship crs 037, whale closing ship	none reported
S	C2X	July 2010	pinniped	9	CG	2	<200	none	<189	na	<189	na	pinniped 300 from ship, ship crs 211, pinniped direction nr	none reported
S	C2X	July 2010	pinniped	2	CG	1	200-500	none	<189-181	na	<189-181	na	pinniped 220 from ship, ship crs 210, pinniped direction nr	none reported

S	C2X	July 2010	whale	2	DDG	2	<200	PD	<189	60	<179 for 60 min	20,000	whale 010 from ship, ship crs 032, whale direction nr	none reported
S	C2X	July 2010	dolphin	4	DDG	2	<200	SD	<189	6	none for 6 min	2,000	dolphin 080 from ship, ship crs 057, dolphin direction nr	none reported
S	C2X	July 2010	dolphin	14	DDG	2	<200	SD	<189	6	none for 6 min	2,000	dolphin 080 from ship, ship crs 058, dolphin direction nr	none reported
S	C2X	July 2010	whale	1	DDG	1	<200	SD	<189	63	none for 63 min	21,000	whale 090 from ship, ship crs 180, whale direction nr	none reported
S	C2X	July 2010	whale	1	DDG	1	200-500	SD	<189-181	21	none for 21 min	7,000	whale 120 from ship, ship crs 180, whale direction nr	none reported
S	C2X	July 2010	whale	1	DDG	1	200-500	PD	<189-181	40	<179-171 for 40 min	13,333	whale 350 from ship, ship crs 225, whale direction nr	none reported
S	C2X	July 2010	whale	2	DDG	2	200-500	SD	<189-181	12	none for 12 min	4,000	whale 240 from ship, ship crs 234, whale direction nr	none reported
S	C2X	July 2010	dolphin	16	DDG	2	200-500	SD	<189-181	10	none for 10 min	3,333	dolphin 125 from ship, ship crs 129, dolphin direction nr	none reported
S	C2X	July 2010	dolphin	4	DDG	3	200-500	SD	<189-181	10	none for 10 min	3,333	dolphin 210 from ship, ship crs 243, dolphin direction nr	bowriding
S	C2X	July 2010	dolphin	25	DDG	3	200-500	SD	<189-181	35	none for 35 min	11,667	dolphin 180 from ship, ship crs 220, dolphin direction nr	none reported
S	C2X	July 2010	dolphin	12	DDG	3	500-1000	SD	<181-175	30	none for 30 min	10,000	dolphin 050 from ship, ship crs 098, dolphin direction nr	none reported
S	C2X	July 2010	whale	1	DDG	nr	500-1000	PD	<181-175	12	<175-169 for 12 min	4,000	whale 020 from ship, ship crs nr, whale direction nr	none reported
S	C2X	July 2010	dolphin	2	DDG	nr	200-500	PD	<189-181	30	<179-171 for 30 min	10,000	dolphin bearing nr, ship crs 304, dolphin direction nr	none reported

S	C2X	July 2010	dolphin	5	DDG	10	500-1000	PD	<181-175	16	<175-169 for 16 min	5,333	dolphin 000 from ship, ship crs 001, dolphin direction nr	none reported
S	C2X	July 2010	pinniped	2	DDG	10	200-500	PD	<189-181	47	<179-171 for 47 min	15,667	pinniped 040 from ship, ship crs 120, pinniped direction nr	none reported
S	C2X	July 2010	whale	5	DDG	11	500-1000	PD	<181-175	11	<175-169 for 11 min	3,667	whale bearing nr, ship crs 315, whale direction nr	none reported
S	C2X	July 2010	whale	12	DDG	20	<200	SD	<189	20	none for 20 min	6,667	whale bearing nr, ship crs 090, whale direction nr	none reported
S	C2X	July 2010	whale	2	DDG	5	<200	SD	<189	5	none for 5 min	1,667	whale 340 from ship, ship crs 284, whale direction nr	none reported
S	C2X	July 2010	whale	1	DDG	nr	500-1000	PD	<181-175	15	<175-169 for 15 min	5,000	whale bearing nr, ship crs 284, whale direction nr	none reported
S	C2X	July 2010	whale	2	DDG	nr	200-500	PD	<189-181	30	<179-171 for 30 min	10,000	whale bearing nr, ship crs 286, whale direction nr	none reported
S	C2X	July 2010	whale	2	DDG	nr	<200	SD	<189	19	none for 19 min	6,333	whale bearing nr, ship crs 145, whale direction nr	none reported
S	C2X	July 2010	pinniped	3	DDG	nr	<200	SD	<189	4	none for 4 min	1,333	pinniped 210 from ship, ship crs 210, pinniped direction nr	none reported
S	C2X	July 2010	whale	1	DDG	nr	500-1000	PD	<181-175	30	<175-169 for 30 min	10,000	whale 220 from ship, ship crs 210, whale direction nr	none reported
S	C2X	July 2010	pinniped	4	DDG	nr	200-500	PD	<189-181	13	<179-171 for 13 min	4,333	pinniped 130 from ship, ship crs 060, pinniped direction nr	none reported
S	C2X	July 2010	dolphin	7	DDG	nr	200-500	PD	<189-181	3	<179-171 for 3 min	1,000	dolphin 160 from ship, ship crs 121, dolphin direction nr	none reported
S	C2X	July 2010	dolphin	12	DDG	nr	200-500	SD	<189-181	77	none for 77 min	25,667	dolphin 010 from ship, ship crs 053, dolphin direction nr	none reported

S	C2X	July 2010	whale	1	DDG	nr	200-500	PD	<189-181	30	<179-171 for 30 min	10,000	whale bearing nr, ship crs 172, whale direction nr	none reported
S	C2X	July 2010	whale	1	DDG	nr	500-1000	PD	<181-175	24	<175-169 for 24 min	8,000	whale 350 from ship, ship crs 121, whale direction nr	none reported

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 DDG's and 225 for FFG's (Urick 1982). Actual operating parameters and oceanographic conditions likely result in 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 can become trapped by the sea surface and bottom (depending on water depth and other sound propagation factors) and not 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 $(10\log R_2/R_1)$. Cylindrical spreading loss between 1000 and 2000 yards equates to an additional 3 dB of loss. By the time the sound wave has propagated to 2000 yards, the sonar signal strength has decreased by a total of at least 63 dB. Using the AN/SQS-53 sonar as an example transmitting at 235 dB 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 relative motion of ships and animals at sea, the time spent with any given exposure from surface ships is likely to be limited.

(2) SOCAL – ASW Summary

This section summarizes information from MTEs 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 SOCAL Range Complex between 2 August 2009 and 1 August 2010 are presented in the classified appendix to this report. System use for the reporting period was less than and sometimes significantly less than the amount authorized.

Table S2-i-1. Sonar allocation within the SOCAL Range Complex by source.

Authorized MFAS sources §216.170 (c)(1) of NMFS SOCAL Final Rule and LOA	Annually Authorized
(i) AN/SQS-53 surface ship hull-mounted active sonar (hours)	1,977
(ii) AN/SQS-56 surface ship hull-mounted active sonar (hours)	494
(iii) AN/BQQ-10 submarine active sonar (hours)	815
(iv) AN/BQS-15 submarine navigational sonar (hours)	122
(v) AN/AQS-22 helicopter active dipping sonar (# of dips)	2,719
(vi) AN/SSQ-62 DICASS acoustic sonobuoy (# of buoys)	4,256
(vii) SSQ-125 AEER sonobuoy (# of buoys)	1,150
(viii) Mk-48 heavyweight torpedoes (# of torpedoes)	87
(ix) Mk-46 lightweight torpedoes (# of torpedoes)	84
(x) AN/SLQ-25 NIXIE acoustic countermeasure (hours)	1,600

(ii) Cumulative impact report

From NMFS Final Rule: "*To the extent practical, the Navy shall develop and implement a method of annually reporting non-major training exercises utilizing hull-mounted sonar. This section shall present an annual (and seasonal, where practicable), depiction of non-major training exercises geographically across the range complex.*"

The annual quantity in hours and breakdown by system of hull-mounted sonar use in the SOCAL Range Complex during non-major training events between 2 August 2009 and 1 August 2010 is presented in the classified version of this report. The majority of this MFAS occurred during short-duration unit-level training (ULT). ULT is typically a single-ship event that normally only lasts for several hours at a time.

The geographic extent of non-major training exercise sonar use is depicted in the following figure.

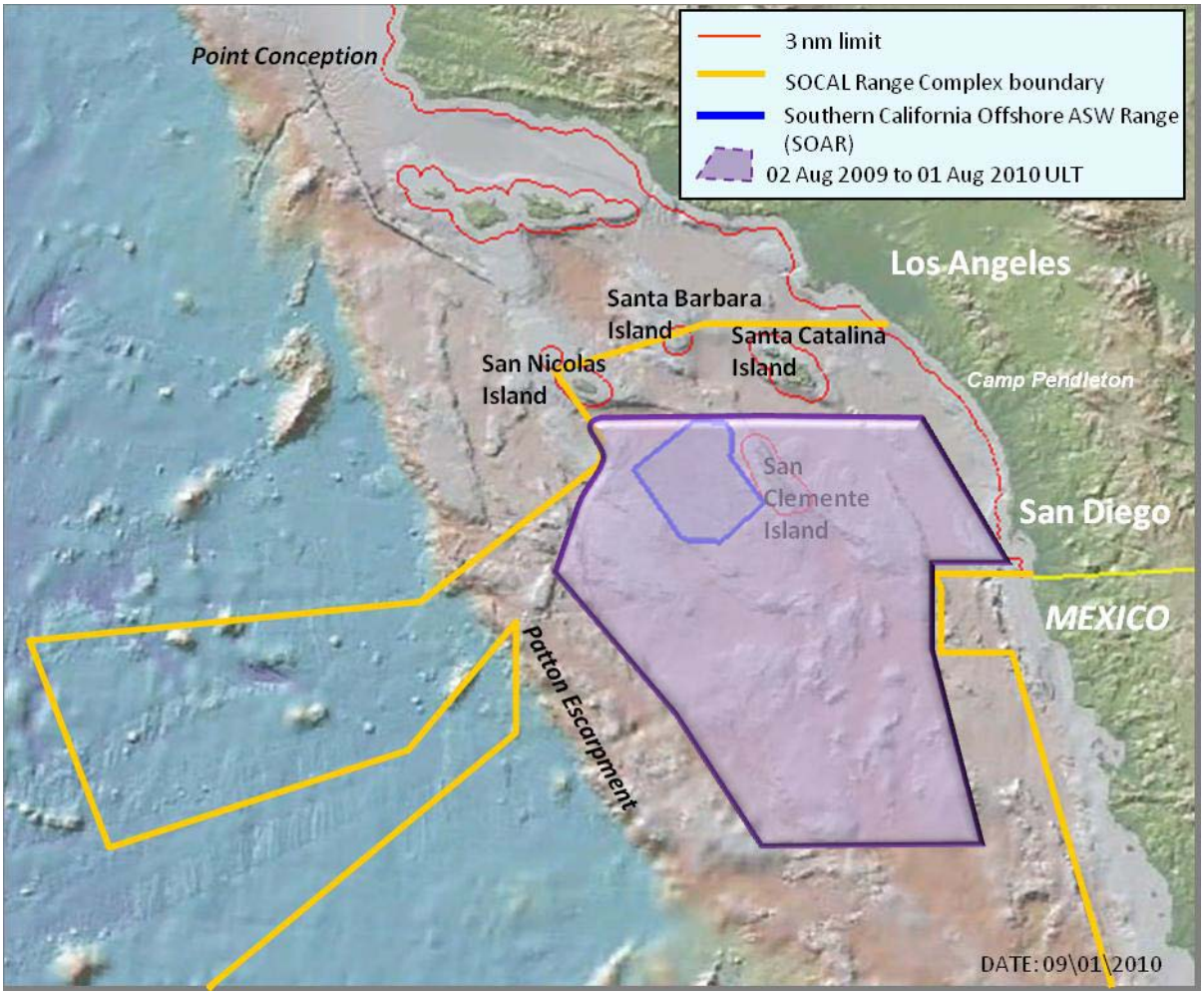


Figure S2-ii-1. ULT MFAS use in the SOCAL Range Complex.

(3) SOCAL – SINKEXs

No SINKEXs were conducted in the SOCAL Range Complex during the reporting period.

(4) SOCAL – IEER Summary

The annual summary of use within the SOCAL Range Complex for Improved Extended Echo-Ranging System (IEER) sonobuoys is deemed classified. Data requested from the Navy is presented in the classified version of this report.

(5) SOCAL – Explosives Summary

The Navy is in the process of improving the methods used to track explosives use within each range complex. Therefore, NMFS requested that the Navy report to the maximum extent practicable as defined in the SOCAL Range Complex Final Rule (NMFS 2009b). The summary for maritime explosives use within the SOCAL Range Complex is presented below.

Table S5-1. Explosives usage in the SOCAL Range Complex.

(i) Total annual number of each type of explosive exercise			
Authorized Exercise	**Total Annual**	**Amount Annually Authorized**	**% Total Used To Total Authorized**
(A) Surface-to-Gunnery Exercise (S-S GUNNEX)	4	402	1%
(B) Air-to-surface Missile Exercise (A-S MISSILEX)	1	50	2%
(C) Bombing Exercise (BOMBEX)	0	40	0%
(D) Sinking Exercise (SINKEX)	0	2	0%
(E) EER/IEER/AEER Exercise	8	30	27%
(ii) Total annual expended/detonated rounds for each explosive type			
Category		**Quantity**	
(A) 5” naval gunfire rounds		66	
(B) 76 mm naval gunfire rounds		0	
(C) Maverick missiles		1	
(D) Harpoon missiles		0	
(E) Mk-82 aerial bombs		0	
(F) Mk-83 aerial bombs		0	
(G) Mk-84 aerial bombs		0	
(H) Mk-48 torpedoes (detonations)		0	
(I) Demolition charges		5	
(J) EER/IEER explosive sonobuoys		120	

These explosive numbers were collected manually from several different databases that are maintained by separate entities. It is currently estimated that an automated database query tool will be operational in time to be used for next year’s explosives data collection. This system will reduce the manpower needed to collect this data and improve reporting accuracy within the SOCAL range complex.

HAWAII RANGE COMPLEX

INTRODUCTION

The U.S. Navy prepared this Annual Range Complex Exercise Report covering the period from 2 August 2009 to 1 August 2010 in compliance with the National Marine Fisheries Service (NMFS) Final Rule under the Marine Mammal Protection Act (MMPA) for the Hawaii Range Complex (HRC) (NMFS 2009).

In the Hawaii Range Complex Letter of Authorization "Requirements for monitoring and reporting", the following report subsections were specified and are present within this report for the Hawaii Range Complex:

(1) Mid-Frequency Active Sonar (MFAS)/High-Frequency Active Sonar (HFAS) Major Training Exercises (MTE).

- (i) Exercise Information (for each MTE).
- (ii) Individual Marine Mammal Sighting Information (for each MTE).
- (iii) Evaluation (based on data gathered during all MTEs) 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) Total sonar hours (dense humpback areas)
- (iii) Total sonar hours (humpback whale cautionary area)
- (iv) Cumulative Impact Report

(3) Sinking Exercises (SINKEX)

- (i) Exercise information
- (ii) Individual marine mammal observation information

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

(5) Explosives Summary

- (i) Total annual number of each type of explosive exercises
- (ii) Total annual expended/detonated rounds for each explosive type

This Annual Report covers the period from 2 August 2009 to 1 August 2010, and the information represents the best practical data collection for this period. Due to the data collection and reporting timeline differing from the actual LOA dates, exercise data from 2 August 2009 to 13 January 2010 falls under the 2009 HRC Letter of Authorization, while exercise data from 14 January 2010 to 1 August 2010 falls under the 2010 HRC Letter of Authorization. In an effort to provide a better representation of annual exercise data for the HRC, the Navy has combined all exercise data from 2 August 2009 to 1 August 2010 and compared it to the annual allocations provided in the 2010 HRC 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, the 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 appendix to this report.

(1) HRC – MFAS/HFAS Major Training Exercises

This section summarizes authorized sonar use and marine mammal observations from MTEs conducted within the HRC between 2 August 2009 and 1 August 2010. For the HRC, MTEs include Rim of the Pacific exercises (RIMPAC), Undersea Warfare Exercises (USWEX), and Multi Strike Group Exercises.

Between 2 August 2009 and 1 August 2010, there were two MTEs conducted within the HRC.

Exercise specific details as described in the HRC Final Rule (DoN 2009a) §216.175(f)(1)i to iii and LOA include:

(i) Exercise Information (for each MTE)

(ii) Individual Marine Mammal Sighting Information (for each MTE)

(iii) Evaluation (based on data gathered during all MTEs) of the effectiveness of mitigation measures designed to avoid exposing marine mammals to MFAS. This evaluation shall identify the specific observations that support any conclusions the Navy reaches about the effectiveness of the mitigation.

(i) Exercise information

Table H1-i-1. MTEs conducted in the HRC.

(i) Exercise	(ii) Date	(iii) Locations	(iv) # and types of active sources used							(v) # and types of passive sources used							(vi) # and types of vessels and aircraft participating								(vii) Total hours of observation by watchstanders (hrs)	(viii) Total hours of all active sonar	(ix) Total hours ea. active source							(x) Wave height (high, low, and average) (ft)
			(iv)a SQS-53	(iv)b SQS-56	(iv)c BQQ-5/10	(iv)d AQS-13F	(iv)e AQS-22	(iv)f DICASS	(iv)g SLQ-25 Nixie	(v)a SQS-53	(v)b SQS-56	(v)c SQR-19	(v)d BQQ-5/10	(iv)e AQS-22	(iv)d AQS-13F	(v)e DIFAR Sonobuoys	CG	DDG	FFG	SH-60F \SH-60R dipping helo	SH-60B non-dipping helo	Submarines	P-3C MPRA	Non-ASW surface ships			(ix)a SQS-53	(ix)b SQS-56	(ix)c BQQ-5/10	(ix)d AQS-13F	(ix)e AQS-22	(ix)f DICASS	(ix)g SLQ-25 Nixie	
USWEX	7-10 AUG 2009	H	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	1	3,478	*	*	*	*	*	*	*	*	6, 2, 4
RIMPAC	6-31 JUL 2010	H	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	8	50,098	*	*	*	*	*	*	*	*	8, 2, 4

RIMPAC=Rim of the Pacific Exercise; USWEX=Undersea Warfare Exercise

H=Hawaii Range Complex

*This information is included in the classified appendix to this report.

(ii) Individual marine mammal sighting information by exercise

Table H1-ii-1. HRC MTE – Individual Marine Mammal Sighting Information: USWEX 7 – 10 Aug 2009.

(a) Location	(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 hullmounted source in use, true bearing and animal travel	(n) Observed behavior
No applicable sightings*													

*Marine mammal vocalizations were detected on passive sonar for 30 minutes, but the marine mammals were not detected visually.

Table H1-ii-2. HRC MTE – Individual Marine Mammal Sighting Information: RIMPAC 6 – 31 Jul 2010.

(a) Location	(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 hullmounted source in use, true bearing and animal travel	(n) Observed behavior
HRC	turtle	1	n	VIS	non-ASW ship	2	5	10	na	<200	none	na	swimming
HRC	dolphin	1	n	VIS	DDG $	nr	nr	nr	nr	nr	nr	na	nr
HRC	dolphin	1	n	VIS	non-ASW ship	nr	nr	nr	na	nr	none	na	nr
HRC	whale	7	n	VIS	FFG	nr	nr	nr	n	200-500	nr	na	nr
HRC	dolphin	6	n	VIS	FFG	nr	nr	nr	n	nr	nr	na	nr
HRC	dolphin	2	n	VIS	CG	1	2	10	n	200-500	none	na	swimming
HRC	dolphin	7	n	VIS	non-ASW ship	nr	nr	nr	na	nr	none	na	nr
HRC	whale	1	n	VIS	CG	nr	nr	nr	n	>2000	none	na	nr
HRC	dolphin	2	n	VIS	DDG $	nr	nr	nr	nr	nr	nr	na	blowing
HRC	whale	1	n	VIS	non-ASW aircraft	nr	nr	nr	na	>2000	none	na	60 ft whale observed swimming by fighter aircraft at high speed
HRC	dolphin	1	n	VIS	DDG $	nr	nr	nr	nr	nr	nr	na	nr
HRC	dolphin	2	n	VIS	non-ASW ship	nr	nr	nr	na	nr	none	na	nr

HRC	whale	1	n	VIS	FFG	10	3	8	n	>2000	none	na	nr
HRC	dolphin	2	n	VIS	non-ASW ship	nr	nr	nr	na	nr	none	na	nr
HRC	dolphin	5	n	VIS	non-ASW ship	nr	nr	nr	na	nr	none	na	nr
HRC	whale	1	n	VIS	MPRA	12	1	10	n	nr	none	na	floating carcass
HRC	dolphin	1	n	VIS	DDG $	nr	nr	nr	nr	nr	nr	na	nr
HRC	dolphin	20	n	VIS	CG	3	6	10	n	200-500	none	na	bowriding
HRC	dolphin	3	n	VIS	FFG	13	5	10	n	200-500	none	na	bowriding
HRC	whale	1	n	VIS	non-ASW ship	1	6	10	na	1000-2000	none	na	blowing
HRC	dolphin	1	n	VIS	MPRA	nr	nr	nr	nr	nr	nr	na	nr
HRC	whale	5	n	VIS	non-ASW ship	nr	nr	nr	na	nr	none	na	nr
HRC	dolphin	2	n	VIS	FFG	nr	nr	nr	n	nr	nr	na	nr
HRC	whale	1	n	VIS	DDG	nr	nr	nr	n	nr	nr	na	nr
HRC	turtle	1	n	VIS	non-ASW ship	nr	nr	nr	na	nr	none	na	nr
HRC	turtle	1	n	VIS	non-ASW ship	nr	nr	nr	na	nr	none	na	nr
HRC	dolphin	30	n	VIS	non-ASW ship	nr	nr	nr	na	nr	none	na	nr
HRC	dolphin	15	n	VIS	DDG $	nr	nr	nr	nr	nr	nr	na	nr
HRC	whale	1	n	VIS	non-ASW ship	nr	nr	nr	na	nr	none	na	nr
HRC	dolphin	7	n	VIS	non-ASW ship	nr	nr	nr	na	nr	none	na	nr
HRC	dolphin	2	n	VIS	FFG	40	5	10	Y	>2000	secured sonar	dolphin 137 from ship, ship crs 205, dolphin direction nr	swimming
HRC	whale	1	n	VIS	FFG	10	3	7	n	500-1000	none	na	nr
HRC	dolphin	8	n	VIS	non-ASW ship	nr	nr	nr	na	nr	none	na	nr
HRC	dolphin	2	n	VIS	non-ASW ship	nr	nr	nr	na	nr	none	na	nr

HRC	turtle	1	n	VIS	non-ASW ship	nr	nr	nr	na	nr	none	na	nr
HRC	turtle	6	n	VIS	non-ASW ship	nr	nr	nr	na	nr	none	na	nr
HRC	whale	1	n	VIS	FFG $	nr	nr	nr	nr	nr	nr	na	nr
HRC	dolphin	5	n	VIS	FFG $	nr	nr	nr	nr	nr	nr	na	nr
HRC	dolphin	50	n	VIS	non-ASW ship	nr	nr	nr	na	nr	none	na	nr
HRC	dolphin	1	n	VIS	MPRA $	nr	nr	nr	nr	nr	nr	na	nr
HRC	dolphin	4	n	VIS	non-ASW ship	nr	nr	nr	na	nr	none	na	nr
HRC	dolphin	25	n	VIS	non-ASW ship	nr	nr	nr	na	<200	none	na	swimming
HRC	turtle	9	n	VIS	non-ASW ship	nr	nr	nr	na	<200	none	na	swimming
HRC	dolphin	6	n	VIS	non-ASW ship	nr	nr	nr	na	nr	none	na	nr
HRC	whale	3	n	VIS	non-ASW ship	1	5	10	na	<200	none	na	swimming
HRC	dolphin	6	n	VIS	non-ASW ship	nr	nr	nr	na	nr	none	na	nr
HRC	whale	4	n	VIS	non-ASW ship	nr	nr	nr	na	nr	none	na	nr
HRC	dolphin	12	n	VIS	non-ASW ship	nr	nr	nr	na	nr	none	na	nr
HRC	dolphin	3	n	VIS	non-ASW ship	nr	nr	nr	na	nr	none	na	nr
HRC	whale	2	n	VIS	MPRA $	nr	nr	nr	nr	nr	nr	na	nr
HRC	dolphin	2	n	VIS	MPRA	nr	nr	nr	nr	nr	nr	na	nr
HRC	dolphin	18	n	VIS	non-ASW ship	nr	nr	nr	na	nr	none	na	nr
HRC	turtle	6	n	VIS	non-ASW ship	nr	nr	nr	na	nr	none	na	nr
HRC	dolphin	3	n	VIS	non-ASW ship	nr	nr	nr	na	nr	none	na	nr

nr=not reported; VIS=visual; ACO=acoustic; y=yes; n=no; na=not applicable; crs=course
$=Foreign naval unit; additional information not provided.

Although marine mammal sighting details are consistently and thoroughly reported during SOCAL major training exercises, much of the sighting details were not reported during RIMPAC 2010. Due in large part to the scope of the exercise and its unique, coalition-based command structure, the reporting requirements were bifurcated into separate parts of an instruction. The difference in procedure was not identified by many units, and as a result, those units collected only partial data. This oversight was not discovered until the exercise was complete. In order to ensure complete sighting information is collected in future RIMPAC exercises, the required reports will have command-level visibility and all information will be collected and reviewed daily for completeness.

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

Between 2 August 2009 and 1 August 2010, there was one USWEX and one Rim of the Pacific exercise conducted within the Hawaii Range Complex. Navy lookouts reported 47 marine mammal sightings for an estimated 286 marine mammals. There were zero marine mammal sightings reported at a range less than 1000 yards concurrent with MFAS use.

Table H1-iii-1. HRC MTEs from 2 August 2009 to 1 August 2010.

MTE Type	Month	# of Exercise Days	# of Ships Involved (MFAS and non-MFAS)	# of Marine Mammal Sightings	# of Marine Mammals
USWEX	AUG 2009	4	8	0	NA
RIMPAC	JUL 2010	26	26	47	286
	Totals:	**30**	**34**	**47**	**286**

Mitigation Effectiveness Discussion

The three categories of mitigation measures (Personnel Training, Lookout and Watchstander Responsibility, and Operating Procedures) outlined in the HRC EIS/OEIS and approved by NMFS (DoN 2008, NMFS 2009a, 2009b) were effective in detection appropriately mitigating exposure of marine mammal to mid-frequency 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 zone.

Table H1-iii-2. Breakdown of marine mammals sighted in the HRC during MTEs at ranges less than 1000 yards concurrent with MFAS use.

Range of Marine Mammal Sighting		
< 200 yards	**200 – 500 yards**	**500 – 1000 yards**
No applicable sightings		

Table H1-iii-3. HRC MTEs where sonar was on during detection of marine mammals at ranges less than 1,000 yards and mitigation conducted.

1) Range [HRC (H)]	2) MTE	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 hullmounted source in use, true bearing, animal travel	15) Observed behavior
No applicable sightings														

(2) HRC – ASW Summary

This section summarizes information from MTEs 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 HRC between 2 August 2009 and 1 August 2010 are presented in the classified appendix to this report. All reporting metrics within the HRC were below the NMFS authorized amount.

Table H2-i-1. Sonar allocation within the HRC by source.

Authorized MFAS sources §216.170 (c)(1) of NMFS HRC Final Rule and LOA	Annually Authorized
(i) AN/SQS-53 surface ship hull-mounted active sonar (hours)	1,284
(ii) AN/SQS-56 surface ship hull-mounted active sonar (hours)	383
(iii) AN/AQS-22 or 13 helicopter active dipping sonar (# of dips)	1,010
(iv) AN/SSQ-62 DICASS acoustic sonobuoy (# of buoys)	2,423
(v) Mk-48/Mk-46/Mk-54 torpedoes (# of torpedoes)	313
(vi) AN/BQQ-5/10 submarine active sonar (hours)	200

(ii) Total Sonar Hours (dense humpback areas)

Hull-mounted active sonar use was not reported within the dense humpback areas plus a 5 km buffer between 15 December 2009 and 15 April 2010. The precise boundaries of these "dense humpback areas" have yet to be formalized by the U.S. Navy and NMFS (see figure H2-iv-1).

(iii) Total Sonar Hours (humpback whale cautionary area)

Hull-mounted active sonar use was not reported within the humpback whale cautionary area between 15 December 2009 and 15 April 2010 (see figure H2-iv-1).

(iv) Cumulative Impact Report

From NMFS Final Rule: "*To the extent practical, the Navy shall develop and implement a method of annually reporting non-major training exercises utilizing hull-mounted sonar. This section shall present an annual (and seasonal, where practicable), depiction of non-major training exercises geographically across the range complex.*" Specific to the HRC only, seasonality refers to reporting of total hull-mounted use within Hawaii's "dense humpback areas" and humpback cautionary area between 15 December and 15 April.

The annual quantity in hours and breakdown by system of hull-mounted sonar use in the HRC during non-major training events between 2 August 2009 and 1 August 2010 is presented in the classified appendix to this report. The majority of this MFAS occurred during short-duration unit-level training (ULT). ULT is typically a single-ship event that normally only lasts for several hours at a time.

The geographic extent of seasonal non-major training exercise sonar use is depicted in the following two figures.

Figure H2-iv-1. HRC cold season sonar use reported 15 December 2009 – 15 April 2010.

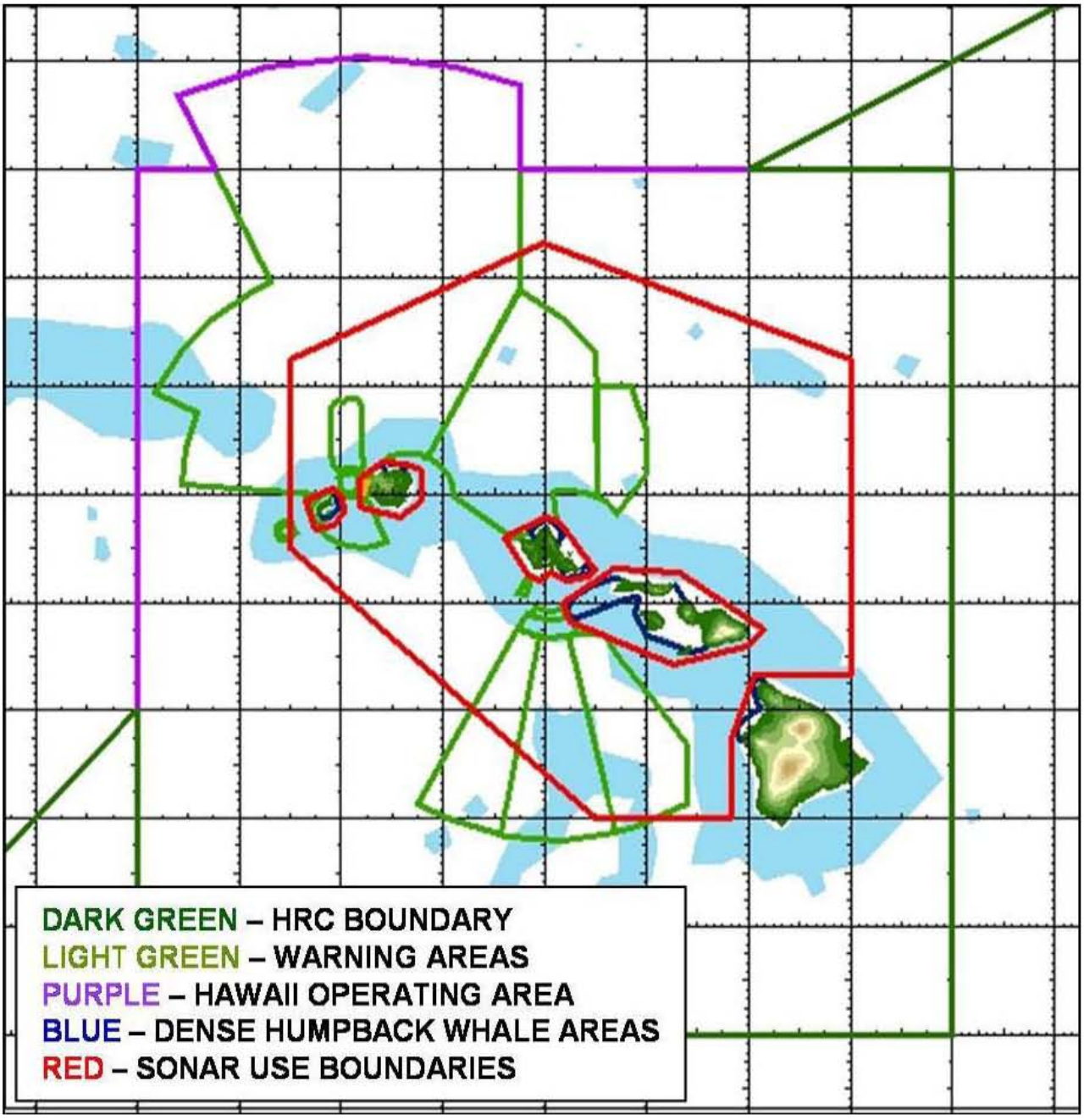
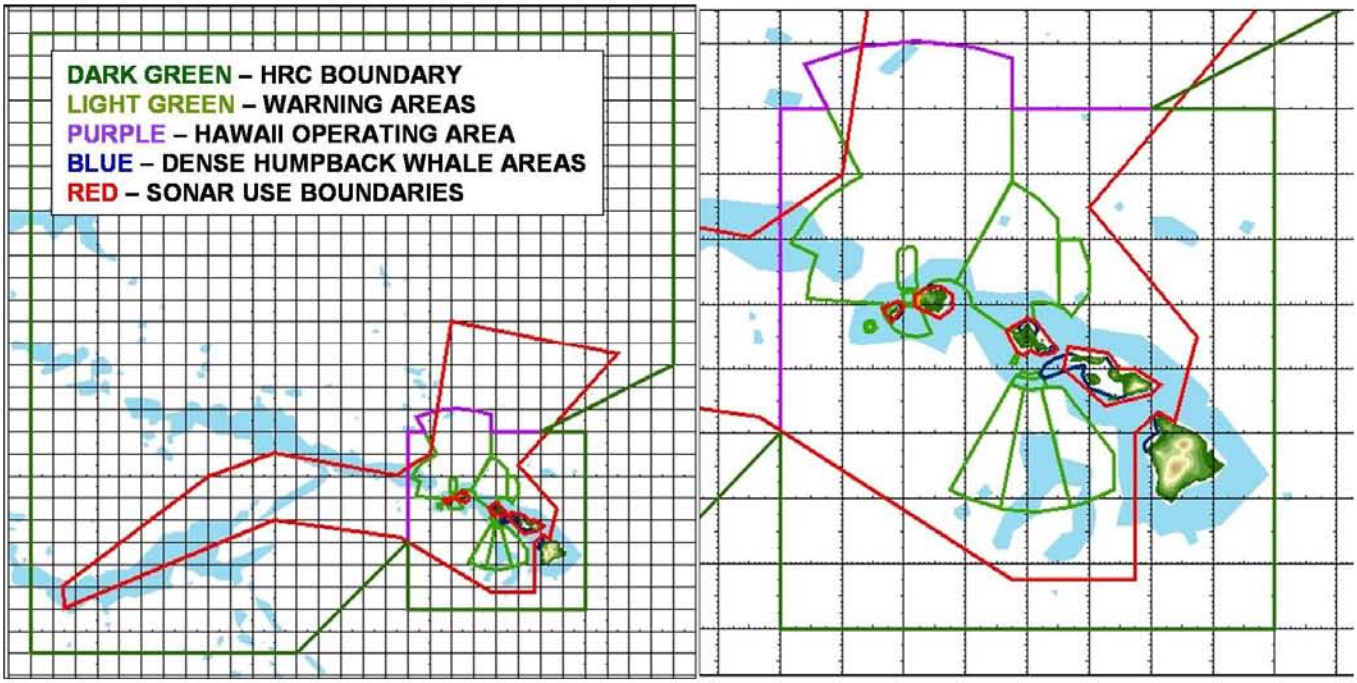


Figure H2-iv-2. HRC warm season sonar use reported 2 Aug 2009 – 14 Dec 2009, and from 16 Apr 2010 – 1 Aug 2010.



(3) HRC – SINKEX

(i) Exercise information

Based on the reporting requirements in the HRC Final Rule (NMFS 2009a) the below information on Sinking Exercises is submitted for events between 2 August 2009 and 1 August 2010. Three SINKEX were conducted in the HRC between 2 August 2009 and 1 August 2010, one each on 10 July, 14 July, and 17 July 2010.

Specific reporting requirements include:

(i) Exercise information (for each SINKEX)

(ii) Individual marine mammal observations.

HRC SINKEX data is summarized in **Table H3-i-1** below.

Table H3-i-1. Summary of SINKEXs conducted in HRC.

(a) Location	(b) Date/time exercise began/ended	(c) Total hours of observation before, during, and after exercise	(d) Total number and types of rounds expended/explosives detonated	(e) Number and types of passive acoustic sources used in exercises	(f) Total hours of passive acoustic search time	(g) Number and types of vessels and aircraft participating	(h) Wave height in feet (High, Low, Average)	(i) Narrative description of sensors and platforms used for marine mammal detection and timeline illustrating how marine mammal detection was conducted
22:59.6N 160:06.9W	101900Z JUL 10 to 110411Z JUL 10	259	(*) Harpoon (*) 5 Inch (*) 76 mm (*) Mk-84 bombs	3 SQS-53 10 SSQ-53	10 hours SQS-53 40 hours SSQ-53	1 CG 2 DDG 4 B-52 5 P-3	7, 4, 5	Marine mammal surveillance conducted for 3 hours prior to COMEX using C-26 and S-61 aircraft and range small boats. CPF had Marine Mammal Observers in the S-61 helo. In addition, two P-3 aircraft provided a total of 7 hours of range clearance, commencing two hour s prior to COMEX. Surveillance continued throughout the event and for one hour after FINEX by participants and range platforms. Sensors utilized were visual search and passive sonars, as available.
22:51.8N 160:13.7W	141800Z JUL 10 to 152016Z JUL 10	316	(*) Harpoon (*) AGM-114 Hellfire (*) AGM-65 Maverick (*) 5 Inch (*) 76 mm (*) Mk-83 bombs	3 SQS-53 3 SQS-56 10 SSQ-53	9 hours SQS-53 9 hours SQS-56 40 hours SSQ-53	1 CG 2 DDG 3 FFG 4 SH-60B 4 P-3 9 F/A-18 2 F-15	8, 5, 6	Marine mammal surveillance conducted for 2 hours prior to COMEX using C-26 and S-61 aircraft and range small boats. In addition, two P-3 aircraft provided a total of 7 hours of range clearance, commencing two hour s prior to COMEX. Surveillance continued throughout the firing events on the 14th by participants and range platforms. Sensors utilized were visual search and passive sonars, as available.
22:57.2N 160:05.6W	171900Z JUL 10 to 180458Z JUL 10	99	(*) Harpoon (*) AGM-65 Maverick (*) AGM-88 HARM (*) Mk-82 bombs (*) Mk-84 bombs (*) Mk-48 torpedo	1 BQQ-10 8 SSQ-53	2 hours BQQ-10 16 hours SSQ-53	1 SSN 6 P-3 17 F/A-18	5, 2, 3	Marine mammal surveillance conducted for 3 hours prior to COMEX using C-26 and S-61 aircraft and range small boats. In addition, two P-3 aircraft provided a total of 11 hours of range clearance, commencing two hour s prior to COMEX. Surveillance continued throughout the event and for one hour after FINEX by participants and range platforms. Sensors utilized were visual search and passive sonars, as available.

*Information is contained in the classified appendix to this report.

(ii) Individual marine mammal observation information

Table H3-ii-1. Mammal sighting information for SINKEX on 10 July 2010.

(a) Location	(b) Species	(c) Number of individuals	(d) Calves observed (y/n)	(e) Initial detection sensor	(f) Length of observation (min)	(g) Wave height	(h) Visibility	(i) Sighted before/during/after exercise, and time (min)	(j) Distance of mammal from detonation	(k) Observed behavior	(l) Mitigation implementation	(m) If observation occurs during detonation, indicate munitions type
No marine mammals sightings reported during this event												

Table H3-ii-2. Mammal sighting information for SINKEX on 14 July 2010.

(a) Location	(b) Species	(c) Number of individuals	(d) Calves observed (y/n)	(e) Initial detection sensor	(f) Length of observation (min)	(g) Wave height	(h) Visibility	(i) Sighted before/during/after exercise, and time (min)	(j) Distance of mammal from detonation	(k) Observed behavior	(l) Mitigation implementation	(m) If observation occurs during detonation, indicate munitions type
No marine mammals sightings reported during this event												

Table H3-ii-3. Mammal sighting information for SINKEX on 17 July 2010.

(a) Location	(b) Species	(c) Number of individuals	(d) Calves observed (y/n)	(e) Initial detection sensor	(f) Length of observation (min)	(g) Wave height	(h) Visibility	(i) Sighted before/during/after exercise, and time (min)	(j) Distance of mammal from detonation	(k) Observed behavior	(l) Mitigation implementation	(m) If observation occurs during detonation, indicate munitions type
No marine mammals sightings reported during this event												

(4) HRC – IEER/AEER Summary

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

(5) HRC – Explosives Summary

The Navy is in the process of improving the methods used to track explosives use within each range complex. Therefore, NMFS requested that the Navy report to the maximum extent practicable as defined in the Hawaii Range Complex Final Rule (NMFS 2009a). The summary for maritime explosives use within the HRC is presented below.

(i) Total annual number of each type of explosives exercises
(of those identified as part of the "specified activity" under NMFS 2009a)

Table H5-i-1. Explosives exercises conducted in the HRC.

Authorized Exercise §216.170(c)(2)(ii)	Total Annual	Amount Annually Authorized	% Total Used To Total Authorized
(A) Mine Neutralization	9	68	13%
(B) Air-to-surface Missile Exercise (A-S MISSILEX)	9	50	18%
(C) Surface-to-surface Missile Exercise (S-S MISSILEX)	6	12	50%
(D) Bombing Exercise (BOMBEX)	21	38	55%
(E) Sinking Exercise (SINKEX)	3	6	50%
(F) Surface-to-surface Gunnery Exercise (S-S GUNEX)	115	91	126% (Note)
(G) Naval surface fire support (NSFS)	5	28	18%

Note: The total number of S-S GUNEXs authorized in one year is 91. The total conducted during this reporting period was 115 (24 more than authorized during a single year). However, zero S-S GUNEXs were conducted during last year's reporting period. S-S GUNEXs averaged over these two years is within the authorized amount (182 GUNEXs authorized over two years, but only 115 GUNEXs conducted during this two year time frame). The number of rounds fired during this reporting period was only 28% of the 3822 rounds authorized by the final rule.

(ii) Total annual expended/detonated rounds for each explosive type
(missile, bomb, etc)

Table H5-ii-1. Explosives usage in the HRC.

Underwater Explosives §216.170 (c)(2)(ii)	Number
(A) 5" naval gunfire rounds	746
(B) 76 mm naval gunfire rounds	323
(C) Maverick missiles	5
(D) Harpoon missiles	15
(E) Mk-82 aerial bombs	22
(F) Mk-83 aerial bombs	48
(G) Mk-84 aerial bombs	6
(H) Mk-48 torpedoes (detonations)	3
(I) Demolition charges	49
(J) EER/IEER or AEER sonobuoys	459

These explosive numbers were collected manually from several different databases that are maintained by the separate entities. It is currently estimated that an automated database query tool will be operational in time to be used for next year's explosives data collection. This system will reduce the manpower needed to collect this data and improve reporting accuracy within the Hawaii Range Complex.