Request for Letter of Authorization Under the Marine Mammal Protection Act for Incidental Harassment Of Marine Mammals Resulting From U.S. Navy Training and Research Activities In The Southern California Range Complex

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACRONYMS AND ABBREVIATIONS

AEER	Advanced Extended Echo Ranging
DoN	Department of the Navy
IEER	Improved Extended Echo Ranging
LOA	Letter of Authorization
MMPA	Marine Mammal Protection Act
NMFS	National Marine Fisheries Service
SOCAL	Southern California

1. INTRODUCTION

Under the provisions of the Marine Mammal Protection Act of 1972 (MMPA), this document is the annual renewal Application to the National Marine Fisheries Service (NMFS) for a Letter of Authorization (LOA) [1] for incidental harassment of marine mammals from U.S. Navy (Navy) training and research [2] activities in the Southern California (SOCAL) Range Complex.

This LOA renewal is being sought to cover the annual period from January 2010 to January 2011 to cover the taking of marine mammals, as described by the MMPA, incidental to training and research[2] within the SOCAL Range Complex. The LOA will not address activities designated for armed conflict or direct combat support operations, nor during periods of heightened national threat conditions, as determined by the President and Secretary of Defense or their duly designated alternatives or successors, as assisted by the Chairman of the Joint Chiefs of Staff.

The U.S. Navy has been training as well as conducting research, development, testing, and evaluation (RDT&E) in the area now defined as the SOCAL Range Complex for over 70 years. The table below shows the MMPA permit documentation applicable to the SOCAL Range Complex and NMFS's authorization (**Table 1**). Information contained in these references provide a complete description of the background for the Navy's request, overview of the SOCAL Range Complex, and description of the specified activities, description of marine mammals in the area, discussion of potential effects or lack of effects of specified activities on marine mammal, mitigation, marine mammal monitoring, and associated reporting. The descriptions contained in these references have not changed, except as where noted in this application renewal.

Table 1. Timeline of key SOCAL MMPA documents.

Timeline Date	From	Event	Reference (as cited in this application renewal)
01 April 08	Navy	Letter Of Authorization Application (request for Incidental Harassment For SOCAL Range Complex) submitted to NMFS Office of Protected Resources	DoN 2008a
20 May 08	Navy	Letter of Authorization Application Update #2 submitted to NMFS Office of Protected Resources	DoN 2008b
14 Oct 08	NMFS	Taking and Importing Marine Mammals; U.S. Navy Training In Southern California Range Complex; Proposed Rule published in Federal Register (73 FR 60836)	NMFS 2008a
15 Dec 08	Navy	SOCAL Environmental Impact Statement\Overseas Environmental Impact Statement- Final December 2008 published	DoN 2008c
21 Jan 09	NMFS	Taking and Importing Marine Mammals; U.S. Navy Training In Southern California Range Complex; Final Rule published in Federal Register (74 FR 3882)	NMFS 2009a
22 Jan 09	NMFS	Letter of Authorization take of marine mammals incidental to Navy exercises conducted in SOCAL Range Complex issued	NMFS 2009b

[1] under Section 101 (a)(5)(A) of the MMPA

The below sections discuss items that reflect changes from the Navy's April 2008 LOA application, and NMFS' Final Rule of 21 January 2009 for the SOCAL Range Complex:

There are several broad changes to the original SOCAL Range Complex LOA to reflect changes in Navy use of two systems that were not foreseen when the 2008 LOA application was originally submitted to NMFS.

These include:

a) correction of the system designation for the submarine hull mounted high-frequency sonar from AN/BQQ-15 to AN/BQS-15;

b) increased testing and training using the Improved Extended Echo Ranging (IEER) impulsive, explosive sonobuoy (AN/SSQ-110A),

c) increased testing unique to the SOCAL Range Complex of the Advance Extended Echo Ranging (AEER) tonal sonobuoy system (AN/SSQ-125), and

d) increased training need for the Torpedo Countermeasures Transmitting Set (AN/SLQ-25A), commonly referred to as NIXIE.

While details of these proposed changes are contained in subsequent pages, **Table 2** summarizes the Navy's proposed changes by systems and revised authorization being requested.

Table 2. Navy's summary of annual changes to SOCAL Range Complex authorization requested for three systems.

Annual Authorization by Year	SSQ-110A IEER Sonobuoy	SSQ-125 AEER Sonobuoy	AN/SLQ-25 NIXIE Countermeasure
Original Authorization	54	54	227
Estimated 2009 (Jan 09 to Jan 2010)	462	54	1,600
Requested 2010	1,675	1,150	1,600
Requested 2011	1,675	1,150	1,600
Requested 2012	1,675	1,150	1,600
Requested 2013	1,675	1,150	1,600

A. Change from original LOA application and Final Rule: AN/BQS-15 Nomenclature correction

The Navy's original LOA application contained a typographic error which incorrectly designated the high-frequency submarine navigational sonar system (*see* Table 1 in 74 FR 3882, NMFS 2009a). The submarine HF system listed as the "AN/BQQ-15" is incorrect. The system should be named the "AN/BQS-15" which needs to be included from this LOA application renewal forward. Other than the name change, there are no additional changes to the description, operational uses, or potential impacts estimated for this system.

B. Change from Previous: IEER Sonobuoys (Impulsive) increased testing and training use

Within the SOCAL Range Complex in 2009, the Navy experienced an increased need to test remanufactured Improved Extended Echo Ranging (IEER) sonobuoys at an accelerated rate than was known at the time of the original LOA application in April 2008. Concurrent with the increased testing in 2009, the naval aviation community expressed a need to increase training deployment of IEERs within the SOCAL Range Complex from 2010 to 2013.

The IEER system uses a paired active-and-passive sonobuoy arrangement. Of the active\passive pair comprising the IEER system, one sonobuoy (AN/SSQ-110A) uses a small (<5-lb) explosive source to generate a sound equivalent to a "ping". The IEER has two explosive line charges. The other sonobuoy in the IEER pair is passive only, and receives any return echoes from a potential underwater target. Both sonobuoys are expendable and sink when done. The AN/SSQ-110A is command activated, meaning the aircraft issues a radio-frequency command for the explosive payload to deploy from the bottom of the surface floating sonobuoy to a designated operating depth < 75 feet. A second manual command is necessary in order for the deployed charge to detonate.

2009-2013 Lot acceptance quality assurance testing- In the original application for the SOCAL Range Complex Letter of Authorization to NMFS, the Navy underestimated the amount of effort needed for sonobuoy lot acceptance quality assurance testing for the IEER. The IEER is no longer in production and the Navy is conducting re-engineering and modification to the existing inventory of IEERs to improve reliability.

The SOCAL Range Complex represents the only location for the Navy's entire quality assurance testing of IEER sonobuoys. Lot acceptance testing ensures that batches of refurbished sonobuoys actually function as designed and meet required performance specifications. The Navy randomly selects 32 to 36 sonobuoys for testing from each lot of sonobuoys (lot size varies from 500 to 2,400 buoys). Testing allows detection of defects, provides critical data on sonobuoy performance under a variety of ocean conditions, and assures reliability of refurbished sonobuoys before sending lots to the Fleet.

Lot acceptance testing is a short-term, infrequent event within the SOCAL Range Complex. For instance, from January to August 2009, there were only 8 cumulative days of sonobuoy lot acceptance tests (3 consecutive days in March 2009, 3 consecutive days in April, and 2 consecutive days in May).

Unlike training which can be conducted anywhere within the offshore waters of the SOCAL Range Complex, lot acceptance testing occurs over a relatively small time (2-3 hours per test event) within a limited geographic area 20 nm south of San Clemente Island. The actual area used for sonobuoy test drops is typically less than a quarter mile long (*see* Chapter 2 **Figure 2**). Water depth at this location is over 4,600 feet.

Sonobuoys can be deployed (i.e., dropped) from either a boat, helicopter, or fixed-wing aircraft during lot acceptance testing. The deployment platform used is variable depending on availability. While the deployment platform drops the sonobuoys within the lot acceptance test area, a surface vessel other than the deployment platform is used to visually monitor for marine mammal mitigation, and passively to act as a receiver for active sonobuoy test signals. A set of four sonobuoys are deployed approximately 225 feet apart in a line parallel to the monitoring surface vessel. All four buoys are tested before another set of buoys is deployed. Sonobuoys that work correctly sink after testing, while malfunctioning sonobuoys are retrieved (once explosive ordnance has been released) for failure analysis.

2010-2013 Training- IEER sonobuoys used in training events are typically deployed from fixed-wing maritime patrol aircraft (turboprop P-3C Orion and future 737-airframe P-8 Poseidon) to conduct large area searches for submarines as part of anti-submarine warfare training. The Navy has determined that additional at-sea use of IEER during certain training events is needed within the SOCAL Range Complex in order to meet future training requirements.

IEER AN/SSQ-110A Authorization Change Request

In January 2009, NMFS granted final authorization for AN/SSQ-110A IEER sonobuoys in the SOCAL Range Complex based on the Navy's preliminary estimate of 108 IEERs at the time of original Request for LOA submission (NMFS 2009a, 2009b). In subsequent discussions with NMFS, this original request for 108 IEER sonobuoys was amended to authorize a total of 108 sonobuoys of either the IEER or the Advanced Extended Echo Ranging (AEER) sonobuoy.

As of 1 August 2009, the number of IEER sonobuoys used exceeded the number of IEER sonobuoys authorized. The quantity of IEER sonobuoys used is contained in classified appendix to the HRC-SOCAL Range Complex Annual Exercise Report (DoN 2009b), and a discussion of the additional marine mammal exposures this increased testing may have contributed in 2009 is contained in Chapter 6 of this LOA application.

To accommodate an increased need for IEER lot acceptance quality assurance testing and changes to training needed in the SOCAL Range Complex, the Navy requests revised authorization of 6,700 IEER AN/SSQ-110A sonobuoys for the four year period from 2010 to 2013, an average of **1,675 per year (Table 2)**.

The Navy deems it prudent to over-estimate potential AN/SSQ-110A usage for 2010 to 2013 and associated potential marine mammal exposures to account for any between year variability in actual testing and training. The amount of additional potential exposures from an increase in IEER use is discussed in Chapter 6.

C. Change From Previous: AEER Sonobuoy (tonal) increased testing

2010-2013 Lot Acceptance and 2013 Training- From 2010 through 2013 lot acceptance quality assurance testing for the Advanced Extended Echo Ranging (AEER) sonobuoy will also need to be conducted for the same reasons as stated previously for the IEER. In addition, the Navy has updated its planned future deployment in SOCAL of the AEER which is intended to eventually replace the IEER. This information was not available at the time of the Navy's original April 2008 LOA application (DoN 2008a) since the final decision on distribution to the Fleet had not been determined at that time. The AEER uses the same passive sonobuoy as the IEER system in the active-passive arrangement, but replaces the impulsive source AN/SSQ-110A with a new tonal source sonobuoy, designated the AN/SSQ-125 sonobuoy. The AN/SSQ-125 has an internal battery to power generation of a tonal signal with similar waveforms as the previous AN/SSQ-110A. The exact specifications of the signal waveforms and parameters are classified. As the AEER with AN/SSQ-125 sonobuoy becomes available for training within the Fleet, the IEER will be used less frequently for testing and training in SOCAL beginning sometime after 2013. IEERs will be discontinued within SOCAL after 2013.

AEER AN/SSQ-125 Authorization Change Request

In January 2009, NMFS granted final authorization for 54 AN/SSQ-125 per year in the SOCAL Range Complex based on the preliminary estimate available at the time of original Navy submission (NMFS 2009a, 2009b). Given new information on the planned Fleet introduction of the AN/SSQ-125 sonobuoy that was not previously available including the need for lot acceptance testing, the Navy requests a revised authorization for 4,600 AEER AN/SSQ-125 sonobuoys from 2010 to 2013, an average of **1,150 per year (Table 2)**.

The Navy deems it prudent to over-estimate potential AN/SSQ-110A usage for 2010 to 2013 and associated potential marine mammal exposures to account for any between year variability in actual testing and training. The majority of AEER use will be associated with lot acceptance testing through 2013, when the first training use of AEER is slated to begin in the SOCAL Range Complex. The amount of additional potential marine mammal exposures from an increase in AEER use is discussed in Chapter 6.

D. Change from Previous: **NIXIE torpedo counter measure increased training**

The Torpedo Countermeasures Transmitting Set, called the AN/SLQ-25A NIXIE, is a passive, electro-acoustic decoy system used to provide deceptive countermeasures against acoustic homing torpedoes. The AN/SLQ-25A employs an underwater acoustic projector housed in a streamlined body which is towed astern on a combination tow/signal-transfer coaxial cable (**Figure 1**). An onboard generated signal is used by the towed body to produce an acoustic signal to decoy the hostile torpedo away from the ship. Electronic or electromechanical means are used to produce the required signals. The system provides an alternate target diversion for an enemy acoustic homing torpedo by stringing on cable a "noise maker", aft of the ship, which has the capability of producing a greater noise than the ship; thereby diverting the incoming torpedo from the ship to the "fish". The towed device receives the torpedoes ping frequency, amplifies it and sends it back to lure the torpedo away from the ship. It should be noted that the NIXIE is not a continuous noise source and is only activated on detecting an approaching active or passive torpedo, or for training purposes a torpedo training device such as the MK39 Expendable Mobile Anti-submarine warfare Training Target (EMATT).

Figure 1. NIXIE torpedo countermeasure source (tow body) being deployed from the back of a U.S. Navy ship.

AN/SLQ-25A NIXIEEER AN/SSQ-125 Authorization Change Request

In January 2009, NMFS authorized 277 hours per year for AN/SLQ-25 NIXIE in the SOCAL Range Complex based on the preliminary estimate available at the time of original Navy submission. As of 1 August 2009, the number of NIXIE hours actually used exceeded the number of hours authorized. The quantity of hours used is contained in classified appendix to the HRC-SOCAL Range Complex Annual Exercise Report (DoN 2009b).

A discussion of the additional marine mammal exposures this increased training may have contributed in 2009 is contained in Chapter 6. Given new information on the planned Fleet utilization of NIXIE that was not previously available, the Navy requests a revised authorization for 6,400 hours of AN/SQL25A NIXIE from 2010 to 2013, an average of **1,600 hours per year (Table 2)**.

Given the modifications sought in items 1A through 1D above, **Tables 3** and **4** highlight summary changes to NMFS's authorization tables from the Final Rule (NMFS 2009).

Table 3. Navy's recommended revision to Table 2 "Estimated Annual use of each sonar source" from NMFS' 21 January 2009 SOCAL Final Rule.

Changes indicated in red underline

Event	SQS-53C Sonar Hours	SQS-56C Sonar Hours	BQQ-10 Sonar Hours	BQS-15 Sonar Hours	Total Sonar Hours	AQS-22 # of Dips	SSQ-62 # of Sono-buoys	SSQ-125 AEER # of Sono-buoys	MK-48 # of Torpedo Events	MK-46 # of Torpedo Events	AN/SLQ-25A NIXIE # of Hours
Major Exercise (8/yr)	1,045	261	98	41	1,445	337	2,255	0	11	28	700
Integrated Exercises (7/yr)	403	101	138	41	683	690	845	0	15	28	700
ULT & Main-tenance	529	132	579	41	1,281	1,692	1,156	1,150	61	28	200
Annual Total	1,977	494	815	122	3,408	2,719	4,256	1,150	87	84	1,600

Table 4. Navy's recommended revision to Table 3 "Summary of Exercise Types with sonar or explosive use anticipate in take of marine mammals" from NMFS' 21 January 2009 SOCAL Final Rule.

Changes indicated in red underline

	Independent Unit-Level Exercises							Integrated / Coordinated / Major Exercises				
Exercise Type	S-S GUNEX / NSFS	A-S MISSILEX	A-S BOMBEX	SINKEX	ASW TRACKEX including IAC	ASW TORPEX Including IAC	EER/ IEER/ AEER	IAC	Sustain-ment	SHAREM	JTFEX	COMP-TUEX
Sources/ Weapons/ Rounds	5" rounds	LGTR HELL-FIRE Har-poon	MK82, MK83, MK84 bombs	Bombs, MK48, 5" rounds	53C AQS-22 sonobuoys	53C, MK48, AQS22, sonobuoy	SSQ-110A	All sources possible	All sources possible	All sources possible	All sources possible	All sources possible
Length of Exercise	2.5 - 9 hrs	3 hrs	1 hr	16 hrs	2 hrs	2	6 hrs	2 days	>21 days	7 days	10 days	21 days
Detonations/ Rounds per exercise	6 to 11	3	MK82 – 9 MK83-5 MK84-2	5" – 120 MK82-2 MK83-1 MK48-1	N/A	N/A	36 to 50	N/A	N/A	N/A	N/A	N/A
Number Exercises per Year	402	50	40	2	53C – 1,600 buoys – 3,864 AQS22-2,453	53C – 28 buoys – 150 MK48 – 84 AQS22 - 112	30	2	1	2	4	4
Possible Areas Conduct-ed	SOAR SHOBA W-291	LTR-1/2	W-291	W-291	SOAR W-291	SOAR	W-291	SOCAL	SOCAL	SOCAL	SOCAL	SOCAL
Months of Year conducted	Year Round	Year Round	Year Round	Year Round	Year Round	Year Round	Year Round	Year Round	Year Round	Year Round	Year Round	Year Round

2. DURATION AND LOCATION OF ACTIVITIES

There are no changes to Chapter 2 as described under the Navy's original April 2008 Request for Letter of Authorization, and subsequent NMFS' October 2008 Proposed Rule (NMFS 2008a) and January 2009 Final Rule (NMFS 2009a), except as where noted .

Training using IEER and AEER would occur at locations within the SOCAL Range Complex where other sonobuoys would typically be used, predominantly within the W-291 area. These locations are the same anti-submarine warfare training areas described in the Navy's April 2008 Request, and subsequent NMFS October 2008 Proposed Rule, and January 2009 Final Rule (DoN 2008a, NMFS 2008, NMFS 2009a).

The below section reflect change from the Navy's April 2008 LOA application, and NMFS' Final Rule of 21 January 2009 for the SOCAL Range Complex:

A. IEER\AEER

Lot acceptance testing of sonobuoys describe in Chapter 1 occurs in a relatively small area 20 nm south of San Clemente Island (**Figure 2**). This area was not previously plotted in figure form.

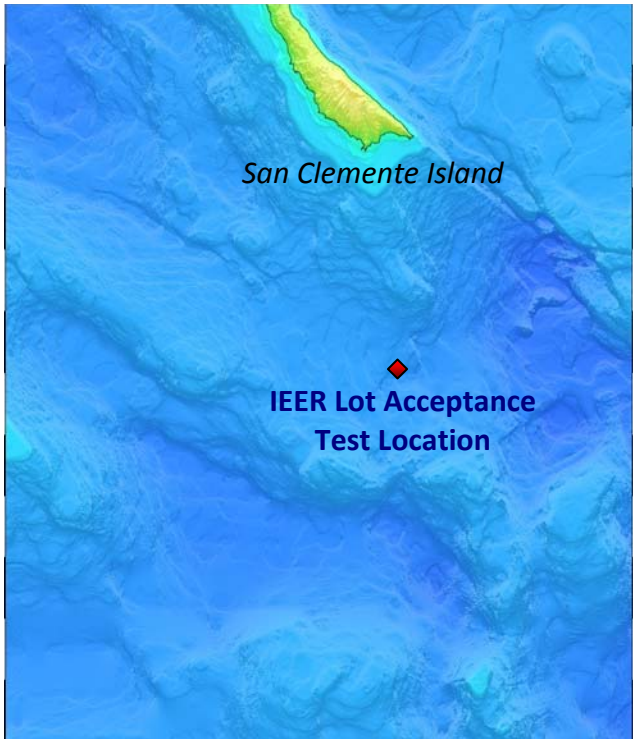


Figure 2. Approximate location of sonobuoy lot acceptance testing south of San Clemente Island.

3. MARINE MAMMAL SPECIES AND NUMBERS

There are no changes to Chapter 3 as described under the Navy's original April 2008 Request for Letter of Authorization, and subsequent NMFS' October 2008 Proposed Rule (NMFS 2008a) and January 2009 Final Rule (NMFS 2009a).

The below section provides informational update only. For permit authorization purposes, Chapter 3, therefore, remains as described in the Final Rule (NMFS 2009).

A. SOCAL Marine Mammal Density

The NMFS's Southwest Fisheries Science Center in La Jolla, California completed another comprehensive ship-based visual and acoustic marine mammal survey along the US West Coast during the summer and fall of 2008. The survey was called the Oregon, California, and Washington Marine Mammal Survey (ORCAWALE 2008)

http://swfsc.noaa.gov/textblock.aspx?Division=PRD&ParentMenuId=562&id=12718

ORCAWALE 2008 was being completed as the SOCAL Environmental Impact Statement\Overseas Environmental Impact Statement and associated Request for Letter of Authorization were being finalized. As of this submission renewal submission date (October 2009), ORCAWALE 2008 data analysis for 2008 marine mammal densities within various strata for this region is still ongoing by NMFS, and is not yet currently published. To avoid, complications in analysis that single season variability may have in determining regional marine mammal densities, NMFS' recommendation of a composite multi-year synthesis of survey data to determine density is still the most scientifically viable approach. This kind of synthesis was performed on behalf of the Navy by NMFS Southwest Fisheries Science Center using data through 2005, the year of the last full West Coast survey prior to ORCAWALE 2008. The NMFS information was used as the basis for the marine mammal densities reported in the Navy's original April 2008 Request for Letter of Authorization (DoN 2008). As such, it still represents the best available science and estimate for marine mammal densities within the SOCAL Range Complex.

4. AFFECTED SPECIES STATUS AND DISTRIBUTION

There are no changes to Chapter 4 as described under the Navy's original April 2008 Request for Letter of Authorization, and subsequent NMFS' October 2008 Proposed Rule (NMFS 2008a) and January 2009 Final Rule (NMFS 2009a).

This section, therefore, remains as described in the Final Rule (NMFS 2009).

5. HARASSMENT AUTHORIZATION REQUESTED

There are no changes to Chapter 5 as described under the Navy's original April 2008 Request for Letter of Authorization, and subsequent NMFS' October 2008 Proposed Rule (NMFS 2008a) and January 2009 Final Rule (NMFS 2009a).

This section, therefore, remains as described in the Final Rule (NMFS 2009).

6. NUMBERS AND SPECIES TAKEN

There are no changes to Chapter 6 as described under the Navy's original April 2008 Request for Letter of Authorization, and subsequent NMFS' October 2008 Proposed Rule (NMFS 2008a) and January 2009 Final Rule (NMFS 2009a), except as where noted below.

A. Additional Exposures From IEER

2009 Use

The use of additional IEER sonobuoys within the SOCAL Range Complex results in small changes to the Navy's explosive exposure estimates as presented in the NMFS's Final Rule (NMFS 2009a).

Based on IEER-specific impact modeling, which was rolled into the total marine mammal exposure estimates from explosive sources provided in the Navy's original LOA application of Apr 08, an estimate of potential exposure can be made for the 2009 use of IEERs in lot acceptance testing within the SOCAL Range Complex (**Table 5**). The Navy's predicted potential exposures include:

- 87 total exposures (76 Level B, 9 Level A, and 2 Mortality) to six common SOCAL species above those presented in the Final Rule for the SOCAL Range Complex might have occurred as a result of using IEERs through 01 August 09 (classified appendix to HRC-SOCAL Range Complex Report contains actual 2009 IEER usage to date). [as opposed to 38 total exposures (33 Level B, 4 Level A, and 1 Mortality) from IEER originally predicted for the 2009 SOCAL Range Complex Final Rule and LOA]
- 124 total exposures (108 Level B, 13 Level A, and 3 Mortality) to six common SOCAL species above those presented in the Final Rule are predicted using a final total of 462 IEERs through 20 Jan 2010 (**Table 5**). [as opposed to 38 total exposures (33 Level B, 4 Level A, and 1 Mortality) from IEER originally predicted for the 2009 SOCAL Range Complex Final Rule and LOA]

Table 5. Potential exposures from 2009 increased IEER use through 01 Aug 09 and estimated through 20 Jan 2010.

Species Occurring in SOCAL Range Complex AND Subject to Potential IEER Exposure	IEER Exposures For Use Of 108 IEER Per Navy's Original LOA Application April 2008			Revised Additional IEER Exposures For Use Of IEER Sonobuoys Through 01 Aug 09			Revised Additional IEER Exposures For Use Of 462 IEER Sonobuoys Through 20 Jan 2010		
	Level B	Level A	Mortality	Level B	Level A	Mortality	Level B	Level A	Mortality
Risso's dolphin	1	0	0	2	0	0	3	0	0
Lb common dolphin	1	0	0	2	0	0	3	0	0
Sb common dolphin	7	0	0	16	0	0	23	0	0
Northern fur seal	2	0	0	5	0	0	7	0	0
California sea lion	21	4	1	48	9	2	69	13	3
Harbor seal	1	0	0	2	0	0	3	0	0
total	33	4	1	76	9	2	108	13	3

Sb = short-beaked
Lb= long-beaked

2010-2013 Use

In terms of this 2010 reauthorization, the Navy seeks changes in authorization from 54-108 IEER sonobuoys annually to 1,675 annually. This would result in additional predicted exposures to six common SOCAL marine mammal species. Total annual predicted explosive exposures within the SOCAL Range Complex (as shown in Table 7 in NMFS 21 January 2009 Final Rule[2]) would change by the annual explosive exposure numbers indicated below and in **Table 6**:

- 514 Level B exposures (64% of which are California sea lions and 24% common dolphin species);
- 62 Level A exposures applicable to California sea lions only, and
- 16 Mortality applicable to California sea lions only.

[as opposed to 38 total exposures (33 Level B, 4 Level A, and 1 Mortality) from IEER originally predicted for the 2009 SOCAL Range Complex Final Rule and LOA]

Table 6. Change in potential marine mammal exposures from increased IEER authorization from 2010-2013.

Species Occurring in SOCAL Range Complex AND Subject to Potential IEER Exposure [1]	Original IEER Annual Exposure Estimate For 108 IEER sonobuoys			Revised IEER Exposure Estimate For Change In Authorization To 1,675 Annual sonobuoys		
	Level B	Level A	Mortality	Level B	Level A	Mortality
Risso's dolphin	1	0	0	16	0	0
Long beaked common dolphin	1	0	0	16	0	0
Short beaked common dolphin	7	0	0	109	0	0
Northern fur seal	2	0	0	31	0	0
California sea lion	21	4	1	326	62	16
Harbor seal	1	0	0	16	0	0
Total	33	4	1	514	62	16

[1] as indicated by acoustic impact modeling

B. Additional Exposures From AEER

In terms of this 2010 reauthorization, the Navy seeks for the AEER an increase in authorization from 54 buoys to 1,150 sonobuoys authorized annually. Total annual predicted explosive exposures within the SOCAL Range Complex (as shown in Table 7 in NMFS 21 January 2009 Final Rule[3]) would change by the numbers indicated below and in **Table 7**:

- 1,014 additional annual Level B behavioral exposures only for increased AEER annual authorization to 1,075 sonobuoys (as opposed to 52 Level B behavioral exposures from 54 IEER sonobuoys originally predicted for the 2009 SOCAL Range Complex Final Rule and LOA)

These behavioral exposures are evenly spread between all SOCAL marine mammal species modeled previously.

[2] See 74 FR 3882 page 3907 (NMFS 2009a)

[3] See 74 FR 3882 page 3907 (NMFS 2009a)

Table 7. Change in potential marine mammal exposures from increased AEER authorization from 2010-2013.

	Original Estimate Of Exposure From 54 Authorized AEER Sonobuoys	Revised AEER Potential Exposure Estimates For Change In Authorization To 1,150 Annual Sonobuoys
Species	**Level B Take- Behavioral**	**Level B Take- Behavioral**
Mysticetes		
Blue whale	2	39
Fin whale	2	39
Humpback whale	2	39
Sei whale	0	0
Bryde's whale	0	0
Gray whale	2	39
Minke whale	2	39
Odontocetes		
Sperm whale	2	39
Bottlenose dolphin	2	39
Long beaked common dolphin	2	39
Northern right whale dolphin	2	39
Pacific white-sided dolphin	2	39
Pantropical spotted dolphin	N/A	N/A
Risso's dolphin	2	39
Rough-toothed dolphin	N/A	N/A
Short beaked common dolphin	2	39
Spinner dolphin	N/A	N/A
Striped dolphin	2	39
Dall's porpoise	2	39
False killer whale	N/A	N/A
Killer whale	2	39
Melon-headed whale	N/A	N/A
Pygmy killer whale	N/A	N/A
Short-finned pilot whale	2	39
Dwarf sperm whale	N/A	N/A
Pygmy sperm whale	2	39
Baird's beaked whale	2	39
Cuvier's beaked whale	2	39
Mesoplodon spp.	2	39
Ziphiid whales	2	39
Pinnipeds		
Guadalupe fur seal	2	39
Northern elephant seal	2	39
Pacific harbor seal	2	39
California sea lion	2	39
Northern fur seal	2	39
Total	52	1,014

C. Additional Exposures from NIXIE

2009 Use

The use of additional NIXIE within the SOCAL Range Complex results in only small changes to the Navy's overall sonar exposure estimates as presented in the NMFS's Final Rule (NMFS 2009a).

Based on NIXIE-specific impact modeling, which was rolled into the total marine mammal exposure estimates from sonar sources provided in the Navy's original LOA application of Apr 08 and NMFS Final Rule, an estimate of potential exposure can be made for the 2009 increase in NIXIE use through 01 August 09, and estimated for the period through 20 Jan 2010 (**Table 8**). In general, the Navy estimated:

- 459 total Level B behavioral exposures to 11 common SOCAL species as a result of increased NIXIE use through 01 August 09 (as opposed to 167 Level B behavioral exposures from NIXIE original predicted for the SOCAL Range Complex Final Rule and LOA)
- 992 total Level B behavioral exposures to 11 common SOCAL species through 20 Jan 2010 (as opposed to 167 Level B behavioral exposures from NIXIE original predicted for the SOCAL Range Complex Final Rule and LOA)

2010-2013 Use

In terms of this 2010 reauthorization, the Navy seeks changes in authorization from 277 to 1,600 hours of annual NIXIE use that would result in additional predicted Level B behavioral exposures to 11 common SOCAL marine mammal species (**Table 8**). In general, the Navy predicts:

- 992 annual Level B behavioral exposures to 11 common SOCAL species from 2010-2013

Table 8. Potential exposures from 2009 increased NIXIE use through 01 Aug 09 and estimated through 20 Jan 2010.

	Original NIXIE Exposure Estimate Based On Final Rule Authorization (277 hrs)	Revised NIXIE Exposures For Increased Training Use Through 01 Aug 09	Revised NIXIE Exposures For Increased Training Use Through 20 Jan 2010 (1,600 hrs)	Revised NIXIE Annual Exposures For Increased Training Use 2010-2013 (1,600 hrs)
Species	**Level B Take-Behavioral**	**Level B Take-Behavioral**	**Level B Take-Behavioral**	**Level B Take-Behavioral**
Mysticetes				
Blue whale	0	0	0	0
Fin whale	0	0	0	0
Humpback whale	0	0	0	0
Sei whale	0	0	0	0
Bryde's whale	0	0	0	0
Gray whale	0	0	0	0
Minke whale	0	0	0	0
Odontocetes				
Sperm whale	8	16	28	28
Bottlenose dolphin	16	43	86	86
Long beaked common dolphin	8	26	52	52
Northern right whale dolphin	16	45	90	90
Pacific white-sided dolphin	16	33	82	82
Pantropical spotted dolphin	N/A	N/A	N/A	N/A
Risso's dolphin	16	45	96	96
Rough-toothed dolphin	N/A	N/A	N/A	N/A
Short beaked common dolphin	32	87	186	186
Spinner dolphin	N/A	N/A	N/A	N/A
Striped dolphin	0	0	0	0
Dall's porpoise	8	29	71	71
False killer whale	N/A	N/A	N/A	N/A
Killer whale	0	0	0	0
Melon-headed whale	N/A	N/A	N/A	N/A
Pygmy killer whale	N/A	N/A	N/A	N/A
Short-finned pilot whale	0	0	0	0
Dwarf sperm whale	N/A	N/A	N/A	N/A
Pygmy sperm whale	0	0	0	0
Baird's beaked whale	0	0	0	0
Cuvier's beaked whale	4	16	39	39
Mesoplodon spp.	0	0	0	0
Ziphiid whales	0	0	0	0
Pinnipeds				
Guadalupe fur seal	0	0	0	0
Northern elephant seal	0	0	0	0
Pacific harbor seal	8	24	52	52
California sea lion	35	95	210	210
Northern fur seal	0	0	0	0
Total	167	459	992	992

Offset Discussion

NIXIE- Potential exposures associated with increased NIXIE use in 2009 can be off-set by overall sonar exposures not incurred because of less use of other authorized SOCAL Range Complex sources of exposure (**Table 9**). As reported in the HRC-SOCAL Range Complex Annual Exercise Report and associated classified appendix, during 2009 less sonar from other sources was used than authorized. Through 20 Jan 09, it is estimated that total increase of exposures to SOCAL marine mammals from NIXIE will be approximately 993 Level B behavioral harassments, however, there will be 43,106 less Level B behavioral harassments from other sonar sources. Thus, the increased NIXIE exposures are off-set by the decreased exposures from other sources by more than 43 to 1. This assessment is applicable to 2009 only given the variability inherent to inter-annual Navy exercise and training completion.

Table 9. SOCAL Range Complex exposures from increased 2009 training using NIXIE and exposures not incurred in 2009 by other authorized sonar sources.

Category	NIXIE	SQS-53	SQS-56	BQQ-10	BQS-15	AQS-13/22	SSQ-62	MK48
exposures used to Aug09:	+459	-36,389	-6,203	-31,873	-166	-201	-4,106	-207
total "new" exposures to Aug09:	+546			***total unused exposures to Aug09:***		-79,139		
exposures predicted to 20 Jan 09:	+992 for 1,600 hrs	-14,984	-1,772	-23,558	-107	-158	-2,507	-20
total "new" exposures to 20 Jan 2010:	+1,125			***total unused exposures to 20 Jan 09:***		-43,106		

"+" means extra exposures
"-" means exposures not incurred

IEER- Potential exposures associated with increased IEER use in 2009 can also be off-set by overall explosive exposures not incurred because of less use of other authorized SOCAL Range Complex sources of exposure. Estimating total 2009 IEER exposures for Jan 09 to Jan 10, then a total of 133 addition explosive exposures would be predicted to only six of the 35 species NMFS authorized takes (*see* Table 7 of SOCAL Final Rule (NMFS 2009). These 133 additional exposures are 5% of all predicted explosive exposures (2,672 sum of all explosives exposures from Table 7 of NMFS 2009 and **Table 10** below). The HRC-SOCAL Range Complex Exercise Report (DoN 2009b) shows that for SOCAL authorized explosive events through 01 Aug 09 are: GUNNEX at 59% of authorization, MISSILEX at 30% of authorization, BOMBEX at 3% of authorization, and SINKEX 0% of authorization. For the Jan 09 to Jan10 time, while GUNNEX and MISSILEX may approach their total authorization numbers, BOMBEXs will not, and SINKEXs will definitely not since there are no SINKEXs planned for 2009 in SOCAL. Both BOMBEXs and SINKEXs use significantly larger ordnance types (76-mm to MK-84 series bombs) and explosive weight (2-945 lbs) than those found in the IEER (<5 lb).

Through 20 Jan 09, it is estimated that total increase of exposures to SOCAL marine mammals from IEER will be approximately 133 Level B behavioral harassments. However, using a very large over estimate of 80% for annual exercise complete there will be 534 less Level B behavioral harassments from other explosive sources (2,672 x 80%= 2,138 with 2,672-2,138 = 534). In reality, with no plans for any SOCAL SINKEXs in 2009, there would be even less explosive exposures likely during this period. Thus, the increased IEER exposures are off-set by the decreased exposures from other sources by more than 4 to 1.

SUMMARY

Table 10 updates NMFS' table from the Final Rule (NMFS 2009) to reflect modification to predicted marine mammal exposures in the SOCAL Range Complex based on training and testing changes requested in this LOA renewal application.

Similar to what was stated in the Navy's original LOA application of April 2008, these estimated marine mammal exposures do not reflect application of associated training mitigations, and are likely over estimation of potential exposures.

Table 10. LOA renewal recalculation of estimated exposures from all sources in the SOCAL Range Complex as modification of NMFS Final Rule (Table 9 21 Jan 2009).
changes shown in red underline.

Species	Sonar Exposures			Explosive Exposures				Revised Sonar Exposures			Revised Explosive Exposures			
	Level B Take		Level A Take	Level B Take		Level A Take	Mortality	Level B Take		Level A Take	Level B Take		Level A Take	Mortality
	be-havioral	TTS	PTS	sub-TTS	TTS			be-havioral	TTS	PTS	sub-TTS	TTS		
Mysticetes														
Blue whale	545	67	1	2	2	0	0	582	67	1	2	2	0	0
Fin whale	159	12	0	2	1	0	0	196	12	0	2	1	0	0
Humpback whale	20	2	0	0	0	0	0	57	2	0	0	0	0	0
Sei whale	0	0	0	0	0	0	0	37	0	0	0	0	0	0
Bryde's whale	0	0	0	0	0	0	0	37	0	0	0	0	0	0
Gray whale	4,910	544	1	6	7	0	0	4,947	544	1	6	7	0	0
Minke whale	117	16	0	0	0	0	0	154	16	0	0	0	0	0
Odontocetes														
Sperm whale	144	8	0	2	1	0	0	209	8	0	2	1	0	0
Bottlenose dolphin	1,298	194	0	14	10	0	0	1,421	194	0	14	10	0	0
Lb common dolphin	4,090	435	1	61	41	1	0	4,179	435	1	61	19	1	0
N. right whale dolphin	1,347	169	0	19	12	0	0	1,474	169	0	19	12	0	0
Pacific white-sided dolphin	1,191	192	0	12	9	0	0	1,310	192	0	12	9	0	0
Pantropical spotted dolphin	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Risso's dolphin	3,164	343	0	57	34	1	0	3,297	343	0	57	49	1	0
Rough-toothed dolphin	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sb common dolphin	34,836	3,730	6	528	354	12	4	35,059	3,730	6	528	456	12	4
Spinner dolphin	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Striped dolphin	1,576	249	1	6	6	0	0	1,613	249	1	6	6	0	0
Dall's porpoise	537	88	0	2	2	0	0	645	88	0	2	2	0	0
False killer whale	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Killer whale	13	1	0	0	0	0	0	50	1	0	0	0	0	0
Melon-headed whale	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pygmy killer whale	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Short-finned pilot whale	46	6	0	0	0	0	0	83	6	0	0	0	0	0
Dwarf sperm whale	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pygmy sperm whale	148	16	0	1	1	0	0	185	16	0	1	1	0	0
Baird's beaked whale	19	1	0	0	0	0	0	56	1	0	0	0	0	0
Cuvier's beaked whale	390	37	0	5	3	0	0	466	37	0	5	3	0	0
Mesoplodon spp.	122	13	0	2	1	0	0	159	13	0	2	1	0	0
Ziphiid whales	93	8	0	2	1	0	0	130	8	0	2	1	0	0
Pinnipeds														
Guadalupe fur seal	874	190	0	2	2	0	0	911	190	0	2	2	0	0
Northern elephant seal	837	5	0	76	41	0	0	874	5	0	76	41	0	0
Pacific harbor seal	1,052	4,562	9	26	26	1	0	1,141	4,562	9	26	41	1	0
California sea lion	54,384	6	0	584	510	16	6	54,631	6	0	584	815	74	21
Northern fur seal	1,076	3	0	90	64	3	1	1,113	3	0	90	93	3	1
Total	112,988	10,897	19	1,499	1,128	34	11	115,016	10,897	19	1,499	1,572	92	26

7. IMPACTS TO MARINE MAMMAL SPECIES OR STOCKS

There are no changes to Chapter 7 as described under the Navy's original April 2008 Request for Letter of Authorization, and subsequent NMFS' October 2008 Proposed Rule (NMFS 2008a) and January 2009 Final Rule (NMFS 2009a), except as where noted below.

A. IEER\AEER negligible significant potential impacts from increase sonobuoy use

IEER in lot acceptance testing: It should be noted that exposure to marine mammals from lot acceptance testing of the AN/SSQ-110A IEER and AN/SSQ-125 AEER is anticipated to have negligible impact to individuals or populations. As discussed in **Chapters 1** and **2**, lot acceptance testing of the IEER and AEER is a limited duration (several hours) event conducted infrequently within a vary small area east of San Clemente Island (**Chapter 2 Figure 3**). Contrasting the lot acceptance test box of approximately several square nautical miles (nm^2) to the 120,000 nm^2 associated with the full SOCAL Range Complex, the magnitude of how limited an area affected can be seen. Additionally, given the linear deployment of only four sequential sonobuoys at a time for testing, the IEER lot acceptance test site is actually even smaller.

In summary, given the:

- Very small physical test location and testing protocol,
- Limited test events over a given year,
- Short duration of individual test events,
- Small number of active sonobuoys deployed in a linear pattern,
- Monitoring conducted from aerial survey by deploying platform,
- Monitoring conducted by test support vessel adjacent and parallel to deployment line,
- Wide-ranging foraging areas and significant daily movements associated with SOCAL whales, dolphins, and pinnipeds (discussed in **Chapter 13**)
- Lack of known breeding, foraging, or other significant marine mammal habitat within and unique to the small spatial scale of the lot acceptance test area;

Then there is:

- Decreased likelihood of significant marine mammals present concurrently with lot acceptance testing, and
- Increased likelihood of being able to adequately delay testing if marine mammals are sighted in the vicinity and within 1,000 yards of the active sonobuoys;

Therefore:

- potential exposures of marine mammals to IEER and AEER from lot acceptance testing will be significantly reduced beyond that indicated by numeric modeling discussed in **Chapter 6** which does not factor in biological distributions and limited small-scale presence or absence, as well as monitoring and mitigation measures.

IEER in training events: In addition, the Navy anticipates insignificant impacts to marine mammal species from IEER and eventually AEER sonobuoys used for training in open ocean areas within the SOCAL Range Complex. Explosive IEERs used in training events are typically deployed at ranges between 10-20 nm apart based on tactical needs, so the probability of successive impacts to marine mammal from closely spaced IEERs is minimized. As outlined in **Chapter 11**, the Navy with NMFS approval already has an extensive IEER/AEER mitigation plan in effect that would likely limit exposure to marine mammals from these sonobuoys.

B. NIXIE negligible significant potential impacts from increase use

Although use of NIXIE within training events is forecast to increase during the 2010-2013 authorization period, the relative contribution of NIXIE sound to potential Level B behavioral harassment is relatively minor as compared to other authorized sources (**Chapter 6**). In addition, as discussed in **Chapter 1** NIXIE is not a continuous underwater sound source and is only active in response to received signals from active torpedoes. The hours used to predict annual NIXIE use within the SOCAL Range Complex are likely an over estimation of the actual amount of sound that will be introduced during NIXIE training events.

Therefore, increased NIXIE training within the SOCAL Range Complex is predicted to have negligible impact to individual marine mammals or populations within the offshore waters of Southern California.

C. Ship Strikes To Large Whales In SOCAL

From January 2008 through June 30, 2009, the NMFS Southwest Region Stranding Network reported nine large whale strikes in the general Southern California area (**Table 11**). These were four gray whales, four fin whales, and one unidentified whale. Two of the fin whales were struck by Navy vessels within the SOCAL Range Complex, one on February 2, 2009, and another on May 6, 2009.

Ship strikes in general are an acknowledged source of mortality and injury to marine mammals. The science and literature of ship strikes worldwide are summarized in Appendix F of the SOCAL EIS/OEIS (see page F-12-13 in DoN 2008). The number of whale strikes involving commercial vessel traffic along the U.S. West Coast is likely under-reported, given limited visibility from commercial ships and minimum manning, high relative speed of commercial ship transit (more than 16 knots), and lack of clear enforcement policy for international commercial shippers to report ship strikes (Jensen and Silber 2003, Douglas et al. 2008, Huggins and Lambourn 2009). For instance, at least four blue whales died in the fall of 2007 because of suspected commercial ship strikes in the Santa Barbara Channel near Ventura and Los Angeles County California. More than seven fin whales have been struck and killed by commercial ships in Washington state since 2002, most recently on August 9, 2009 (Douglas et al. 2008, Huggins and Lambourn 2009). In a literature review derived from stranding records collected by the Northwestern Region Marine Mammal Stranding Network, Douglas et al 2008 concluded that fin whales had the most confirmed ship strikes. That was similar to the finding of a worldwide assessment by Jensen and Silber (2003). As Table 8 indicates, most ship strikes in Southern California involve gray and fin whales. In addition, ship strikes were implicated in the deaths of seven fin whales and the injury of another from 2002 to 2006 based on unpublished NMFS data (Carretta et al. 2009).

The current NMFS stock assessment for fin whales in the California, Oregon, and Washington waters out to 300 nautical miles is 2,636 whales (coefficient of variation = 0.15), although this probably underestimates abundance because it almost certainly excludes some fin whales which could not be identified in the field and which were recorded as “unidentified rorqual” or “unidentified large whale” (Carretta et al. 2009). With the cessation of commercial whaling of fin whales in the North Pacific since 1987, it is generally thought that Pacific populations of fin whales might be growing. However, there is no clear trend in abundance (increase or decrease) within California coastal waters (Carretta et al. 2009). Based on analysis of 2002-2006 data, Carretta et al. 2009 reported an observed annual mortality of 1.6 fin whales per year with the expectation that this is likely an underestimate due to unreported commercial ship strikes. From a stock management perspective, NMFS uses the term “potential biological removal” as an estimate of the number of individuals that, if accidentally killed by human interaction (ship strike, fishing gear entanglement), would not result in significant population impact to the managed stock, in this case the California, Oregon, and Washington fin whale stock. The 2008 potential biological removal estimate for the California, Oregon, and Washington stock of fin whales, the latest available, is 14 whales (Carretta et al. 2009).

The Navy requires mandatory reporting of all naval ship strikes on marine mammals, and within Southern California only three collisions with whales have been reported over the five year period from 2005 to 2009: one in 2006 and the two in 2009. Navy ships maintain a constant, 24/7 navigation watch with dedicated forward and side lookouts on the deck of all surface ships while underway. In addition, there are other navigation watchstanders such as ship officers and supervisory personnel, as well as lookouts responsible for safe navigation and avoidance of in-water objects (marine mammals, other vessels, flotsam, marine debris, etc.). Within context of Navy reporting marine mammal sightings during major exercises in the SOCAL Range Complex since 2008, there have been numerous reports of Navy ships proactively and successfully maneuvering to avoid marine mammals.

Additional mitigation measures above those already presented in the SOCAL 2009 LOA and Environmental Impact Statement\Overseas Environmental Impact Statement are not warranted nor would they provide significant additional protections beyond current navigation diligence performed by all ships underway at sea. Navy ships seek to avoid potential collisions with any large object at sea, including marine mammals. For instance, during the February 2nd ship strike, the Navy vessel was in the process of maneuvering to avoid one whale that surfaced within close proximity of the ship's bow when it struck and killed another whale coming to the surface in the area the ship had turned. During the May 6th ship strike, the ship was slowing down to launch a small boat and struck a submerged whale. The fate of the animal following the strike is unknown. However, in keeping with the intent to avoid potential ship strikes to whales in the SOCAL Range Complex, naval vessels will maneuver to keep at least 1,500 ft (500 yds) away from any observed whale in the vessel's path and avoid approaching whales head-on. These requirements do not apply if a vessel's safety is threatened, such as when change of course will create an imminent and serious threat to a person, vessel, or aircraft, and to the extent vessels are restricted in their ability to maneuver. Restricted maneuverability includes, but is not limited to, situations when vessels are engaged in dredging, submerged activities, launching and recovering aircraft or landing craft, minesweeping activities, replenishment while underway and towing activities that severely restrict a vessel's ability to deviate course. Vessels will take reasonable steps to alert other vessels in the vicinity of the whale. Given rapid swimming speeds and maneuverability of many dolphin species, naval vessels would maintain normal course and speed on sighting dolphins unless some condition indicated a need for the vessel to maneuver.

While the 2009 Navy ship strikes in SOCAL are regrettable, collisions between Navy ships and large whales, including fin whales, are relatively infrequent and rare within the context of the total time Navy vessels spend at sea within the region. More importantly, while impacts to individual whales are obviously detrimental, overall population impact relative to the stock of fin whales within Southern California may not be significant. There are numerous reports from Navy exercises of Navy vessels proactively maneuvering to avoid crossing the path of marine mammals, and the Navy continues to take an active role in trying to avoid ship strikes to the best practical extent possible.

Due to the relatively infrequent nature of ship strikes from naval ships, the Navy, therefore, predicts that ship strikes from naval vessels would have negligible impact on species or population effects within the SOCAL Range Complex over the duration of this authorization.

Table 11. Whale ship strikes in the general Southern California regions January 1, 2008 through June 30, 2009 as reported by the NMFS Southwest Region Stranding Coordinator.

Species	Date	County	Locality	Remarks
Gray Whale	7-Feb-08	Orange	Huntington City Beach	Dead Stranding; Propeller Wounds To Left Dorsum From Mid-Body To Caudal Peduncle; Deep External Bruising On Right Side Of Head; Field Necropsy Revealed Multiple Cranial Fractures
Gray Whale	1-Mar-08	Mexico	Port Of Cabo San Lucas	Carcass Brought Into Port On Bow Of Cruise Ship; Collision Occurred Between Ports Of San Diego & Cabo San Lucas Between 5:00 P.M. On 2/28 & 7:20 A.M. On 3/1
Fin Whale	19-Oct-08	Los Angeles	Long Beach Harbor	Carcass Brought Into Harbor On Bow Of Freighter
Unidentified Whale	7-Dec-08	Los Angeles	6 Miles Offshore Santa Catalina Island	Catalina Express Vessel Collided With Free-Swimming Whale; No Blood Observed In Water; Final Status Unknown
Fin Whale	2-Feb-09	San Diego	29 Miles Offshore San Clemente Island	U.S. Navy Destroyer Collided With Free-Swimming Whale; Blood Observed In Water; Mortality; Carcass Resighted On 2/14 Floating Offshore La Jolla
Gray Whale	5-Apr-09	Orange	Sunset Beach	Dead Stranding; 3 Deep Propeller Wounds To Right Side Of Body, Just Anterior To Genital Opening
Fin Whale	10-Apr-09	Los Angeles	Los Angeles Harbor	Carcass Brought Into Harbor On Bow Of Freighter; Field Necropsy Revealed Significant Bruising & Blood Loss In Area Dorsal Of Left Pectoral Flipper & Small Bone Fragments From Shattered Scapula
Gray Whale	1-May-09	Los Angeles	2 Miles Offshore El Segundo	Catalina-Marina Del Rey Flyer Catamaran Vessel Collided With Free-Swimming Whale; Blood & Pieces Of Flesh Observed In Water; Final Status Unknown
Fin Whale	6-May-09	San Diego	9.5 Miles Offshore San Clemente Island	U.S. Navy Cruiser Collided With Free-Swimming Whale; Blood Observed In Water; Final Status Unknown

8. IMPACT ON SUBSISTENCE USE

There are no changes to Chapter 8 as described under the Navy's original April 2008 Request for Letter of Authorization, and subsequent NMFS' October 2008 Proposed Rule (NMFS 2008a) and January 2009 Final Rule (NMFS 2009a).

This section, therefore, remains as described in the Final Rule (NMFS 2009).

9. IMPACTS TO THE MARINE MAMMAL HABITAT AND THE LIKELIHOOD OF RESTORATION

There are no changes to Chapter 9 as described under the Navy's original April 2008 Request for Letter of Authorization, and subsequent NMFS' October 2008 Proposed Rule (NMFS 2008a) and January 2009 Final Rule (NMFS 2009a).

This section, therefore, remains as described in the Final Rule (NMFS 2009).

10. IMPACTS TO MARINE MAMMALS FROM LOSS OR MODIFICATION OF HABITAT

There are no changes to Chapter 10 as described under the Navy's original April 2008 Request for Letter of Authorization, and subsequent NMFS' October 2008 Proposed Rule (NMFS 2008a) and January 2009 Final Rule (NMFS 2009a).

This section, therefore, remains as described in the Final Rule (NMFS 2009).

11. MEANS OF EFFECTING THE LEAST PRACTICABLE ADVERSE IMPACTS – MITIGATION MEASURES

There are no changes to Chapter 11 as described under the Navy's original April 2008 Request for Letter of Authorization, and subsequent NMFS' October 2008 Proposed Rule (NMFS 2008a) and January 2009 Final Rule (NMFS 2009a) except as noted below.

A. Change requested to Safety Zone mitigation language:

1) In §216.274 of NMFS's SOCAL Final Rule (NMFS 2009a) the following statement is presented on page 3912:

"(H) Safety Zones- When marine mammals are detected by any means (aircraft, shipboard lookout, or acoustically) within or closing to inside 1,000 yds (914 m) of the sonar dome (the bow), the ship or submarine shall limit active transmission level to at least 6 decibels (dB) below normal operating levels."

For clarity, the Navy requests in this LOA application that the phrase "*within or closing to inside 1,000 yds*" in the above paragraph be amended so that the revised paragraph reads:

> "(H) Safety Zones- When marine mammals are detected by any means (aircraft, shipboard lookout, or acoustically) the Navy shall ensure that sonar transmission levels are limited to at least 6 dB below normal operating levels if any detected marine mammals are within 1000 yards of the sonar dome (the bow)."

2) In §216.274 of NMFS's SOCAL Final Rule (NMFS 2009a) the following statement is presented on page 3912:

"(2) Should a marine mammal be detected within or closing to inside of 500 yds (457 m) of the sonar done, active sonar transmission shall be limited to at least 10 dB below the equipment's normal operating level."

For clarity, the Navy requests in this LOA application that the phrase "*within or closing to inside 500 yds*" in the above paragraph be amended so that the revised paragraph reads:

> "(2) When marine mammals are detected by any means (aircraft, shipboard lookout, or acoustically) the Navy shall ensure that sonar transmission levels are limited to at least 10 dB below normal operating levels if any detected marine mammals are within 500 yards of the sonar dome (the bow).

3) In §216.274 of NMFS's SOCAL Final Rule (NMFS 2009a) the following statement is presented on page 3912:

"(3) Should the marine mammal be detected within or closing to inside 200 yds (183 m) of the sonar dome, active sonar transmissions shall cease."

For clarity, the Navy requests in this LOA application that the phrase "*within or closing to inside 200 yds*" in the above paragraph be amended so that the revised paragraph reads:

> "(3) When marine mammals are detected by any means (aircraft, shipboard lookout, or acoustically) the Navy shall ensure that active sonar transmissions cease if any detected marine mammals are within 200 yards of the sonar dome (the bow)."

B. IEER\AEER Mitigation

There are no changes proposed to IEER\AEER mitigation.

Marine mammal mitigation measures for use of IEER during Navy training events in SOCAL are described in NMFS' October 2008 Proposed Rule[4] (NMFS 2008a) and repeated below. Mitigation measures associated with lot acceptance testing are similar to those associated with training, with the addition of a separate vessel in the vicinity of sonobuoy drops for monitoring as described in **Chapter 1** previously.

Mitigation Measures Previously Promulgated in NMFS Final Rule (NMFS 2009)

A discussion of mitigation in terms of the IEER sonobuoy is repeated below to recap the Navy's current mitigation for these training and testing events. Below is the current SOCAL Range Complex IEER and AEER mitigation from the NMFS's 21 January Final Rule[5] (NMFS 2009a) and adhered to by the Navy in SOCAL:

(xi) Extended Echo Ranging/Improved Extended Echo Ranging (IEER/AEER):

Crews shall conduct visual reconnaissance of the drop area prior to laying their intended sonobuoy pattern. This search shall be conducted at an altitude below 457 m (500 yd) at a slow speed, if operationally feasible and weather conditions permit. In dual aircraft operations, crews are allowed to conduct coordinated area clearances.

(B) For IEER (AN/SSQ–110A), crews shall conduct a minimum of 30 minutes of visual and aural monitoring of the search area prior to commanding the first post detonation. This 30-minute observation period may include pattern deployment time.

(C) For any part of the briefed pattern where a post (source/receiver sonobuoy pair) will be deployed within 914 m (1,000 yd) of observed marine mammal activity, the Navy shall deploy the receiver ONLY and monitor while conducting a visual search. When marine mammals are no longer detected within 914 m (1,000 yd) of the intended post position, the Navy shall co-locate the explosive source sonobuoy (AN/SSQ–110A) (source) with the receiver.

(D) When able, Navy crews shall conduct continuous visual and aural monitoring of marine mammal activity. This is to include monitoring of own-aircraft sensors from first sensor placement to checking off station and out of RF range of these sensors.

(E) Aural Detection—If the presence of marine mammals is detected aurally, then that shall cue the Navy aircrew to increase the diligence of their visual surveillance. Subsequently, if no marine mammals are visually detected, then the crew may continue multi-static active search.

(F) Visual Detection—If marine mammals are visually detected within 914 m (1,000 yd) of the explosive source sonobuoy (AN/SSQ–110A) intended for use, then that payload shall not be detonated. Aircrews may utilize this post once the marine mammals have not been re-sighted for 30 minutes, or are observed to have moved outside the 914 m (1,000 yd) safety buffer. Aircrews may shift their multi-static active search to another post, where marine mammals are outside the 914 m (1,000 yd) safety buffer.

(G) For IEER (AN/SSQ–110A), aircrews shall make every attempt to manually detonate the unexploded charges at each post in the pattern prior to departing the operations area by using the ''Payload 1 Release'' command followed by the ''Payload 2 Release'' command. Aircrews shall refrain from using the ''Scuttle'' command when two payloads remain at a given post. Aircrews will ensure that a 914 m

[4] §216.274(b)(3)(xi) page 60905 of 73 FR 60836 (NMFS 2008a)

[5] See §216.274 in 74 FR 3882, page 3914 (NMFS 2009a)

(1,000 yd) safety buffer, visually clear of marine mammals, is maintained around each post as is done during active search operations.

(H) Aircrews shall only leave posts with unexploded charges in the event of a sonobuoy malfunction, an aircraft system malfunction, or when an aircraft must immediately depart the area due to issues such as fuel constraints, inclement weather, and in-flight emergencies. In these cases, the sonobuoy will self-scuttle using the secondary or tertiary method.

(I) The Navy shall ensure all payloads are accounted for. Explosive source sonobuoys (AN/SSQ–110A) that can not be scuttled shall be reported as unexploded ordnance via voice communications while airborne, then upon landing via naval message.

(J) Marine mammal monitoring shall continue until out of own-aircraft sensor range.

12. SUBSISTENCE EFFECTS AND PLAN OF COOPERATION

There are no changes to Chapter 12 as described under the Navy's original April 2008 Request for Letter of Authorization, and subsequent NMFS' October 2008 Proposed Rule (NMFS 2008a) and January 2009 Final Rule (NMFS 2009a).

This section, therefore, remains as described in the Final Rule (NMFS 2009).

13. MONITORING AND REPORTING MEASURES

There are no changes to Chapter 13 as described under the Navy's original April 2008 Request for Letter of Authorization, and subsequent NMFS' October 2008 Proposed Rule (NMFS 2008a) and January 2009 Final Rule (NMFS 2009a), except as where noted below.

A. August 2008 to 01 August 2009 Navy-funded SOCAL Range Complex Marine Mammal Monitoring.

The Navy met, exceeded, or supplemented its monitoring goals as stated in the range complex specific Monitoring Plan for marine mammals in the SOCAL Range Complex (DoN 2009a,c). The monitoring report for 2009 was submitted to NMFS on 01 October 2009.

As discussed in the Navy's SOCAL Monitoring Plan (DoN 2009a), there are two Navy organizations funding marine mammal monitoring within the SOCAL Range Complex. One effort ongoing since 1998 is sponsored by the Environmental Readiness Division of the Chief of Naval Operations (CNO N45). The other effort begun in 2009 in support of MMPA compliance monitoring is funded by U.S Pacific Fleet. In addition, there are also various projects either funded by or conducted by the Office of Naval Research, and the Naval Postgraduate School in Monterey, CA. Detailed results and major milestones from the Navy's Compliance Monitoring (U.S. Pacific Fleet), and Research and Development (R&D) monitoring (CNO N45) are presented in the Navy's SOCAL monitoring report (DoN 2009c).

A summary of 2009 SOCAL Range Complex monitoring accomplishments is presented below and in **Table 12**. These results highlight the Navy's contribution to marine mammal science, and present the obtainment of agreed upon compliance metrics for the SOCAL Range Complex in 2009. Furthermore, lessons learned and results from the 2009 monitoring help set priorities and initiatives applicable to 2010 monitoring proposed in the Navy's SOCAL Range Complex 2010 LOA renewal application discussed in the Adaptive Management section below. A more complete synopsis of monitoring successes is available in DoN 2009b. Some survey data is still being analyzed and total cumulative values reported in **Table 12** will increase when final summaries are completed.

When combined with other Navy funded marine mammal surveys reported in **Chapter 14 Research**, key statistics include:

- 19,700 nm of visual survey effort
- 1,533 marine mammal sightings of groups or individuals
- 78,635 estimated number of marine mammals sighted
- >10,000 hours of passive acoustic echolocation and vocalization data collected
- 8,148 digital photos and 227 minutes of digital video taken
- 54 tissue biopsies collected
- 12 satellite tracking tags attached to individual marine mammals, including two Cuvier's beaked whales

The significant distance surveyed and quantity of marine mammal sightings obtained during SOCAL monitoring represents the most recent, up-to-date, and comprehensive visual surveys for marine mammals in Southern California. Use of aircraft for marine mammal monitoring has been demonstrated to have benefit in areas other than traditional presence\absence surveys. Overall, results support the utility of aerial surveys to: (1) collect quantifiable behavioral data known to be indices of stress or disturbance, (2) conduct focal follows of priority cetacean species including video-documentation of underwater behavior, (3) provide the advantage of surveying particular area in one day, providing a "snapshot" of marine mammal numbers, presence, distribution and behavior before, during and after training events; (4) provide a platform from which the behavior and potential reactions of cetaceans to Navy training may be

studied without confounding results (vs. from vessels), and (5) locate and identify dead floating carcasses and stranded animals. For instance, in SOCAL unique extended focal follows by airplane were performed for blue, fin, and humpback whales, and Risso's dolphins, and small (<~50) groups of bottlenose dolphins, common dolphins, and Pacific white-sided dolphins. In addition, there were seven systematic assessments of marine mammal reactions to aircraft at various altitudes (one blue whale, one fin whale, two common dolphin spp., and three Risso's dolphins).

Passive acoustic monitoring, although a long term challenge due to the sheer magnitude of vocalization data collected, can offer insights into vocalization and echolocation as a measure of likely foraging success of cryptic, hard to visual spot marine mammals such as beaked whales and sperm whales. Two high-frequency acoustic recording packages (HARP) funded by the U.S. Pacific Fleet were installed within the SOCAL Range Complex by Scripps Institute of Oceanography one year ahead of schedule and have been recording data since February 2009. This increases to 12 the total number of Navy-funded HARPs installed at various locations in Southern California from Point Conception south. Navy funding for a post-doctoral position at Scripps was also provided to facilitate 2010 passive data analysis.

The HARPs are currently located south of San Clemente Island at the northern edge of the San Clemente Basin, and in the southern end of the Santa Cruz Basin, west of Santa Barbara Island. Both locations represent areas that have not been covered by PAM to significant extent. The southern location south of San Clemente Island represents another area periodically used for certain portions of underwater training events. The northern location is outside of the SOCAL Range Complex. Since deployment, > 2,565 hours of passive acoustic data have been collected from these two Fleet-funded HARPs. Data analysis is ongoing by SIO with FY09 U.S. Pacific Fleet SOCAL monitoring funding provided for a post-graduate student in support of data analysis.

Since deployment, >2,565 hours of passive acoustic data have been collected from these two Fleet-funded HARPs. Data analysis is ongoing by SIO with FY09 U.S. Pacific Fleet SOCAL monitoring funding provided for a post-graduate student in support of data analysis. At one site, for a 53-day period from 17 May to 08 July 2009, over 1,265 hours of passive recordings were obtained. At the other site, for a 54-day period between 19 May and 12 July 2009, over 1,302 hours of passive recordings were obtained. Preliminary acoustic monitoring results from the of two U.S. Pacific Fleet funded HARP deployments is presented in the 2009 marine mammal monitoring report (DoN 2009b).

Detected species include blue whale, California sea lion, beaked whales (mostly Cuvier's beaked whales), fin whale, humpback whale, killer whale, minke whale, Pacific-white sided dolphin, Risso's dolphin, sperm whale, and unidentified dolphins (likely bottlenose, and long and short-beaked common dolphin. Periods of MFAS as well as commercial and Navy ship traffic were also recorded.

Marine mammal tagging and photographic identification is discussed under **Chapter 14 Research**, but the value added by these techniques is such that U.S. Pacific Fleet would like to also add them as monitoring elements under the 2010 SOCAL Range Complex Compliance monitoring.

Major accomplishments from the U.S. Pacific Fleet's FY 2009 compliance monitoring in SOCAL include:

- Aerial Visual Survey (Compliance Monitoring)
  - The significant distance surveyed and quantity of marine mammal sightings obtained during the Oct-Nov 2008 and June-July 2009 SOCAL aerial surveys represent the most up-to-date and comprehensive visual surveys for marine mammals in the SOCAL/SOAR vicinity since the SWFSC aerial surveys in 1998-99 (Carretta et al. 2000);
    - Completed 114 hours (over 24 cumulative days) out of 120 hours scheduled for aerial visual surveys;
    - 11,219 nm of ocean surveyed;
    - 701 sightings of individuals or groups for an estimated total of 50,527 marine mammals;
    - 5,730 digital photos of marine mammals were taken;
    - 227 minutes digital video of marine mammals were taken;
  - Unique extended focal follows by airplane were performed for blue, fin, and humpback whales, and Risso's dolphins, and small (<~50) groups of bottlenose dolphins, common dolphins, and Pacific white-sided dolphins (focal groups explained in aerial survey discussion).
    - 93 focal groups circled for 5-9 min;
    - 27 extended focal groups circled for >10 min (species included blue whales, bottlenose dolphins, common dolphins spp., fin whales, humpback whales, and Risso's dolphins)
    - Longest duration focal follow: fin whale group for 60 min.
  - Seven systematic assessments of marine mammal reactions to aircraft at various altitudes (one blue whale, one fin whale, two common dolphin spp., and three Risso's dolphins)
- Vessel Visual Survey (Compliance Monitoring)
  - Completed 70 hours of a ship board visual survey over eight days. This represents an additional 10 hours of effort over the FY09 planned amount of 60 hours;
  - 539 nm of ocean surveyed;
  - 153 sightings of individuals or groups for an estimated 2,321 marine mammals;
  - 36 passive acoustic detections by species made during concurrent PAM from towed array.
- Passive Acoustic Monitoring (Compliance Monitoring)
  - Deployment in January 2009 of two new high-frequency acoustic recording packages (HARP) in areas of interest within SOCAL and funding for analysis provided to Scripps Institute of Oceanography;
    - >108 days and >2,500 hours of passive acoustic date from marine mammal vocalizations before, during, after, and between Navy training events were recorded.

Table 12. Cumulative total of effort and accomplishments from Navy funded monitoring in SOCAL from August 2008 to August 2009.

N= CNO N45, P= U.S. Pacific Fleet, NPG= Naval Postgraduate School; S= Scripps Institute of Oceanography (SIO), C= Cascadia Research Collective (CRC), M= Marine Mammal Research Consultants; FLIP= FLoating Instrument Platform; RHIB = rigid hull inflatable boat, CalCOFI= California Cooperative Fisheries Investigation, Partenavia= airplane type

Navy funding	Performing Organization	Survey Dates or Window	Participating Vessels	# Days (days)	Total Survey Time (hrs)	Total Survey Distance (nm)	# Groups	# Individuals	# Species visually sighted	Digital Photo/ IDs (#)	Digital video taken (min)	Biopsies (#)	Satellite Tags (# tags)	# Passive recordings (#)	Total passive recording (hrs)	# Acoustic detection (#)	# Species acoustically detected (#)	# Passive sonobuoys (# buoys)
* = data not available as of this report date 1 Does not include effort hours for SIO RHIB; does not include survey distance for Sproul, SIO RHIB 2 Does not include survey distance for SIO RHIB 3 PhotoID # is the actual number of fin whales and beaked whales identified, IDs of bottlenose and Risso's are not processed as of 01 August 09 and not included in this total 4 Estimated number of IDs, including fin whales, Cuvier's beaked whales, bottlenose and Risso's dolphins 5 Does NOT yet include photoID of fin whale for R/V Horizon/NPG July effort																		
N	S,C	2-10 Aug 08	2 CRC RHIBs, 1 SIO RHIB, Sproul [1, 3]	31	229	734	147	5,698	10	36	-	11	2	*	*	*	*	*
N	S,C	14-30 Aug 08	CalCOFI	17	93	895	58	1,007	8	227	-	-	-	65	139	51	8	31
N	S,C	14-29 Oct 08	CalCOFI	17	86	727	36	732	6	81	-	-	-	61	126	67	8	29
N	C	17-30 Oct 08	1 CRC RHIB, 1 SIO RHIB, Sproul [2, 3]	28	267	1,073	61	4,771	13	54	-	10	2	*	*	*	*	*
N	S	13 Oct-12 Nov 08	FLIP	30	*	-	*	*	*	*	-	-	-	*	*	*	*	*
N	S,C	8-23 Jan 09	CalCOFI	16	76	694	72	984	11	381	-	-	-	59	128	42	8	30
N	S	9-14 Mar 09	R/V Sproul	6	*	*	*	*	*	*	-	-	-	*	*	*	*	-
N	S,C	7-23 Mar 09	CalCOFI	17	83	768	29	440	7	223	-	-	-	59	133	29	6	28
N	S	15-20 May 09	R/V Sproul	6	*	*	*	*	*	*	-	-	-	*	*	*	*	*
N	C	18-26 July 09	1 CRC RHIB [4]	9	81	777	76	3,282	10	228	-	8	8	-	-	-	-	-
N	S	20-28 Jul 09	1 SIO RHIB	8	70	682	42	3,250		1,175	-	25		33	*	-	-	-
N	S	14 Jul-05 Aug 09	CalCOFI	25	*	1,006	110	2,050	*	*	-		-	*	*	*	*	*
P	M	17-21 Oct 08	Partenavia P-68-C	5	27	2,380	115	12,587	10	2,330	95	-	-	-	-	-	-	-
P	M	15-18 Nov 08	Partenavia P-68-C	4	23	2,140	185	5,732	8	-	-	-	-	-	-	-	-	-
P	M	5-11 June 09	Partenavia P-68-C	6	30	3,192	161	9,489	11	1,099	83	-	-	-	-	-	-	-
P	M	20-29 July 09	Partenavia P-68-C	9	34	3,507	240	22,719	10	2,301	49	-	-	-	-	-	-	-
P,N	S,C	21-28 July 09	R/V Sproul [4]	8	70	845	153	2,321	10	13	-	-	-	*	*	36	*	-
NPG	NPG	24-28 July 09	R/V New Horizon [5]	5	56	280	48	3,573	8	*	-	-	-	*	*	*	*	-
				247	**1,224**	**19,700**	**1,533**	**78,635**		**8,148**	**227**	**54**	**12**	**277**	**526**	**225**		**118**

Adaptive Management Recommendations For 2010 Monitoring In SOCAL Range Complex

Adaptive management is an iterative process of optimal decision making in the face of uncertainty, with an aim to reducing uncertainty over time via system monitoring. Within the natural resource management community, adaptive management involves ongoing, real-time learning and knowledge creation, both in a substantive sense and in terms of the adaptive process itself. Adaptive management focuses on learning and adapting, through partnerships of managers, scientists, and other stakeholders who learn together how to create and maintain sustainable ecosystems. Adaptive management helps science managers maintain flexibility in their decisions, knowing that uncertainties exist and provides managers the latitude to change direction will improve understanding of ecological systems to achieve management objectives; and is about taking action to improve progress towards desired outcomes.

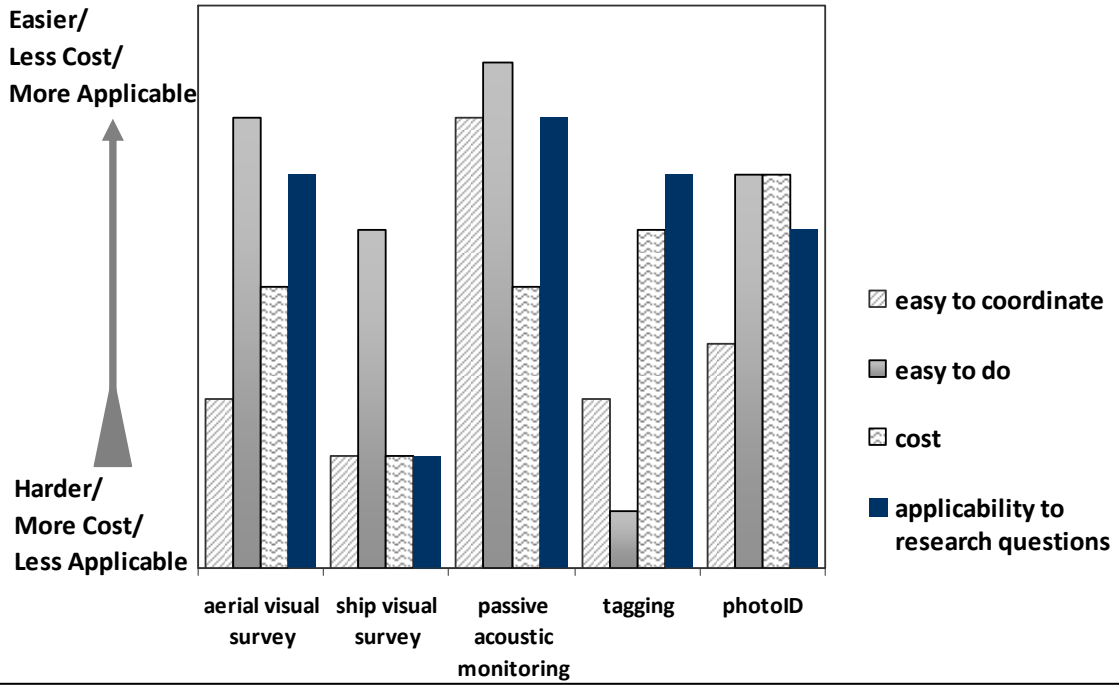
Significant progress was made during Compliance monitoring within the SOCAL Range Complex this year. This first year focus was the preliminary assessment of various monitoring techniques discussed in the 2009 SOCAL monitoring report (DoN 2009c), as well as coming to grips with the degree of within-Navy and outside-Navy coordination required in order to align monitoring resources and event availability. It should be noted that within the SOCAL Range Complex, scheduling monitoring that involves civilian aircraft and ships operating concurrently with multiple Navy aircraft and ships in the same area required extensive pre-survey coordination between multiple Navy commands. Even with approved deconfliction, emergent changes in Navy training schedules often required last minute revision of planned survey areas, sometimes while the civilian plane or boat was in transit. For instance, during the June and July aerial surveys, the plane was excluded 22 times from a planned survey route while in transit (12 times in June 2009, 10 times in July 2009).

More disruptive were either cancellations or major date shifts in Navy training events based on logistics, fiscal, or operational needs that occurred this year. These kind of changes are difficult to predict and more importantly, more difficult to reschedule from a monitoring prospective when survey equipment has been purchased, rented or relocated; personnel availability and transport arranged; and fixed date contracts put into place. Several planned Navy training events scheduled for monitoring had to either be cancelled, or subject to expensive funding increase to cover the change in monitoring design.

The advance degree of N45's R&D funded monitoring within SOCAL was under appreciated at the time the initial Fleet-funded SOCAL Range Complex Monitoring Plan was originally finalized for submission to the NMFS in mid-2008 (DoN 2009a). Several techniques including deployment of over 10 HARPs located throughout Southern California, development of small boat cetacean tagging procedures and deploying tags on key species, continued refinement of the real-time and near-real time beaked whale detection capabilities of a system at the Southern California Offshore Anti-submarine Warfare Range west of San Clement Island, and associated visual survey efforts in conjunction with the these methods were under evaluated in how close they match the data needs to address the NMFS framed study questions. Integration of certain elements of the N45 R&D program into the Range Complex Compliance Monitoring Program is highly recommended.

Figure 3 shows a highly subject preliminary assessment of various monitoring techniques from the Compliance and R&D programs in terms of how effective they may be in the SOCAL Range Complex. By "subjective", the Navy refers to a review across a number of factors made by U.S. Pacific Fleet environmental planning staff based on lessons learned, data obtained, and associated coordination issues that arose during the monitoring described in the HRC-SOCAL Monitoring Report (DoN 2009c). This is an early preliminary assessment in that data analysis, especially of collected passive acoustic monitoring data is still ongoing. The kind of feedback obtained by this form of internal self-assessment, however, is useful in allowing the Navy to plan future range complex monitoring, as part of the Adaptive Management Process.

In view of lessons learned during implementation of the 2009 SOCAL Monitoring Plan, and as part of the Navy's adaptive management review for the SOCAL Range Complex, a proposed modification of the 2009 Plan to reflect the science needed for a revised 2010 SOCAL Monitoring Plan is shown in **Table 13**.



Definition of Subjective Categories

"**Easy to coordinate**" = ease of being able to gain SOCAL Range Complex access especially in associate with MTEs

"**Easy to do**" = ease of performing once on range; also includes standardization of technique to SOCAL Range Complex

"**Cost**"= costs associated with a particular technique; includes costs associated pre-event preparation/purchasing, field work, and post-field effort data analysis

"**Applicability to research questions**"= Will technique provide the enough scientific information to address the Navy-NMFS monitoring objectives over time; to some degree also reflective of value of a given technique given the three categories above

Figure 3. Subjective assessment of techniques for adaptive management review of 2009 SOCAL Range Complex monitoring.

Proposed 2010 Monitoring

In view of lessons learned during implementation of the 2009 SOCAL Monitoring Plan (DoN 2009a), and as part of the Navy's adaptive management review for the SOCAL Range Complex, a Navy recommended modification of the 2009 Plan to reflect the science needed for a revised 2010 SOCAL Monitoring Plan is recommended and shown in Table 13.

The main rational for restructuring the monitoring shown in Table 13 is to:

- simplify the presentation of goals,
- provide more flexibility in types of events monitored given the often rapid change in Navy exercise schedules,
- align the technique with the best promise of more accurately addressing the Monitoring Plan objectives, and
- demonstrate the value of leverage data collection efforts from the SOCAL specific on-going N45 R&D program which is already concurrently addressing some portions of the information needed in support of the monitoring goals.

Original projection of 2010 monitoring needs discussed with NMFS in summer of 2008 and finalized in the 2009 SOCAL Monitoring Plan lists 120 hours of aerial survey, 72 hours of vessel survey, 72 hours of MMOs, 2 PAMs, and opportunistic tagging. At that time, the level of effort from the N45 R&D program was not evaluated in terms of its contribution to marine mammal and impact analysis science within the SOCAL Range Complex. Given the lessons learned and data presented from 2009 monitoring (DoN 2009c), and leveraging from parallel N45 R&D program and presentation of effort and results from that program, modification of the 2010 US Pacific Fleet funded portion of the Navy's overall monitoring in the SOCAL Range Complex is sought to align monitoring with the best science technique available.

Specific points of discussion on elements of the proposed 2010 monitoring include:

Visual: Recommended 2010 monitoring reflected in Table 13 shows a shift towards combining all visual survey hours (aerial and vessel) into one overall category of "total visual survey hours" to allow for better flexibility when scheduling visual monitoring throughout the study year. While aerial surveys were more productive in terms of value and proximity to pre-, during, and post-training events, flexibility to select from future aerial or vessel survey is desired so that as future training events are identified, the best technique can be applied. While Table 13 shows the final level of effort from US Pacific Fleet Monitoring as a range of hours, the actual level of effort in 2010 will be significantly higher than the values presented in the table, and also significantly higher than the estimated hours predicted in the original January 2009 SOCAL Monitoring Plan (192 hours). It is difficult to quantify and predict what the final contribution of the R&D program will be to overall visual survey efforts through 2010. R&D survey effort is more fluid in scheduling and each survey can vary in time from cruise to cruise. Often a window of availability is established for R&D monitoring in which actual survey effort may occur in specific time segments of that window. However, ultimately a significant amount of Navy funded visual survey effort will be performed during 2010 in the SOCAL Range Complex. By way of example using results from 2009 monitoring, over 1,200 hours of total visual effort covering over 19,000 nm was conducted when tabulating the combined US Pacific Fleet and N45 R&D monitoring efforts.

MMO: Use of MMOs was more successful during 2009 in the Hawaii Range Complex (HRC) due to less major exercises impacting availability of naval vessels from which to perform the observation (DoN 2009c). For the SOCAL Range Complex, there were more major exercises (n=6) (DoN 2009b, 2009c), which restrict the availability of berthing space on each individual ship due to extra evaluators, technicians, and other support groups that often get underway with a

Strike Group. Smaller scale unit level training in the SOCAL Range Complex is highly variable as compared to HRC with short notification of pending training events which hinders aligning transportation and scheduling of civilian MMOs. However, the Navy remains committed to use of MMOs in 2010 within the SOCAL Range Complex, but like visual surveys, is proposing listing a range of hours to account for uncertainty in the scheduling process. In lieu of slightly fewer hours of MMO, the Navy is adding at least one new technique to the overall 2010 monitoring plan (PhotoID) which was not in the original plan development. In addition, the Navy is functionally (i.e., scheduling, funding, level of effort) increasing the amount of PAM and tagging in the SOCAL Range Complex when both US Pacific Fleet and N45 R&D monitoring efforts are considered.

Marine Mammal Tagging: Opportunistic tagging marine mammals within the SOCAL Range Complex is being done and will continue in 2010 under the N45 R&D program. Future results from this effort will be presented in the US Pacific Fleet's Pacific Ocean 2010 Range Complex Monitoring Report. As detailed in the previous 2009 report (DoN 2009c), between August 2008 and August 2009, 12 individual marine mammals were tagged with satellite tracking tags in the SOCAL Range Complex which provides detailed movement data not available previously. The full monitoring report (DoN 2009c) contains more specific details and results of this tagging effort, and is also briefly summarized in Chapter 14 Research.

PAM: PAM within the SOCAL Range Complex will continue in 2010 with continued data acquisition from two US Pacific Fleet funded HARPs, as well as associated data analysis. PAM typically collects very large volumes of data that often require substantial post-event analysis. In addition, the N45 R&D program has 10 additional HARPs deployed in California marine waters within and outside of the SOCAL Range Complex. And finally, the Navy's permanently instrumented underwater range west of San Clemente Island also collects near continuous marine mammal vocalization data for analysis under the N45 R&D funded Marine Mammal Monitoring on Navy Ranges (M3R) program. Finally, US Pacific Fleet will also consider, but can not commit to a definitive metric, if other PAM devices can be employed within the SOCAL Range Complex depending on availability, funding, and training event opportunity. This optional PAM use is presented, again like visual surveys and MMOs, so that future flexibility will exist in the 2010 monitoring program to account for new or emerging technology.

PhotoID: As part of N45 R&D efforts in the SOCAL Range Complex, photographic identification of individual marine mammals is ongoing. This technique offers the ability to confirm presence or absence of specific individuals over time which may be indicative of geographic variability in distribution both in relation to Navy training events and in relation to normal movement patterns. As part of the 2010 monitoring plan, this field research will continue and results will be included in the US Pacific Fleet's Pacific Ocean 2010 Range Complex Monitoring Report.

Table 13. Navy's final proposed 2010 monitoring plan goals for the SOCAL Range Complex.

Monitoring Technique	Implementation	
Visual Surveys (aerial or vessel) STUDIES 1,2,3,4, 5	Portions of major training exercises (MTE), or Unit Level Training (ULT) events using sonar (MFAS, HFAS), or offshore and inshore detonation events (100-150 combined hours)	Adaptive Management Review (AMR) for 2011
Marine Mammal Observers (MMO) STUDIES 1,2,3, 4, 5	Opportunistic; MTE, ULT, or offshore or inshore detonation events as available (50-100 total hours)	
Marine Mammal Tagging STUDIES 1,2, 3	Present results from ongoing N45 R&D Program	
Passive Acoustics Monitoring (PAM) STUDIES 1,2, 3	Continue data collection and analysis from two U.S. Pacific Fleet HARPs; add other Fleet funded PAM as available; Present results from ongoing N45 R&D Program (HARPs, M3R);	
PhotoID STUDIES 2,3	Present results from ongoing N45 R&D Program; increase Fleet funded opportunistic tagging as available	
SOCAL Exercise Summary From Navy Lookout Reports STUDY 5	Continue to collect/analyze marine mammal sightings from Navy lookouts during MTEs and present results	

Changes from 2009 SOCAL Monitoring Plan (DoN 2009a)

Original projection of 2010 monitoring needs discussed with NMFS in summer of 2008 and finalized in the 2009 SOCAL Monitoring Plan lists 120 hours of aerial survey, 72 hours of vessel survey, 72 hours of MMOs, 2 PAMs, and opportunistic tagging. At that time, the level of effort from the N45 R&D program was not evaluated in terms of its contribution to marine mammal and impact analysis science within the SOCAL Range Complex. As discussed in the text and below, given the lessons learned and data presented from 2009 monitoring (DoN 2009c), and leveraging from parallel N45 R&D program and presentation of effort and results from that program, modification of the 2010 US Pacific Fleet funded portion of the Navy's overall monitoring in the SOCAL Range Complex is sought to align monitoring with the best science technique available.

TOTAL Navy 2010 Goal:

100 to 150 hours visual survey funded by US Pacific Fleet as well as presentation of N45 R&D visual survey efforts; 50-100 hours Marine Mammal Observers; continue data collection/analysis from two (2) US Pacific Fleet-funded HARPs as well as conduct other Fleet-funded opportunistic PAM if available; present results from N45 R&D visual survey/PAM (HARPs and M3R); present results from N45 R&D tagging; present results from N45 R&D PhotoID.

Study 1= Are marine mammals and sea turtles exposed to mid-frequency active sonar (MFAS), especially at levels associated with adverse effects (i.e., based on NMFS' criteria for behavioral harassment, TTS, or PTS)? If so, at what levels are they exposed?
Study 2= If marine mammals and sea turtles are exposed to sonar, do they redistribute geographically as a result of continued exposure? If so, how long does the redistribution last?
Study 3= If marine mammals and sea turtles are exposed to MFAS, what are their behavioral responses to various levels?
Study 4= What are the behavioral responses of marine mammals and sea turtles that are exposed to explosives at specific levels?
Study 5= Is Navy's suite of mitigation measures for sonar and explosives, and major exercise measures agreed to by Navy through permitting effective at avoiding TTS, injury, and mortality of marine mammals and sea turtles

14. RESEARCH

There are no changes to Chapter 14 as described under the Navy's original April 2008 Request for Letter of Authorization, and subsequent NMFS' October 2008 Proposed Rule (NMFS 2008a) and January 2009 Final Rule (NMFS 2009a), except as where noted below.

CNO N45 R&D Monitoring

As discussed in **Chapter 13** and the SOCAL Monitoring Plan (DoN 2009a), the Navy's CNO N45 R&D program has an extensive, multi-year marine mammal monitoring effort ongoing in SOCAL. Some of this effort was done collaboratively with U.S. Pacific Fleet 2009 monitoring and is discussed in detail in the SOCAL monitoring report (DoN 2009c). Of note is use and planned expansion of two techniques from the R&D program for inclusion in the U.S. Pacific Fleet 2010 plans (*see* **Chapter 13**). A more detailed description and data presentation of Navy funded R&D monitoring is presented in the 2009 HRC-SOCAL Monitoring Report (DoN 2009c).

Major accomplishments from the CNO N45's August 2008 to August 2009 R&D monitoring in SOCAL include:

- Vessel\Boat Visual Surveys ***** (R&D Monitoring)-
  - Completed 1,040 hours of boat and small craft (RHIB) visual survey effort;
  - 7,636 nm of ocean surveyed;
  - 30-day deployment of stationary FLoating Instrument Platform (FLIP) for visual and PAM adjacent to Navy instrumented range (SOAR)
  - 679 sightings of individuals or groups for an estimated total of 25,787 marine mammals;
  - 2,418 digital photo images of marine mammals taken;
  - 54 tissue samples (biopsies) collected

  **** not all summary statistics have been tabulated for 2009 as of this application date***

- Passive Acoustic Monitoring (R&D Monitoring)
  - Continued data collection from 10 additional HARPs, some having been deployed in SOCAL since 1999
  - Over >10,000 hours of passive acoustic marine mammal vocalization data recorded from HARPS; analysis ongoing
  - Two field validation experiments with the Navy's Marine Mammal Monitoring on Navy Ranges (M3R); continuous passive acoustic data collection in support of M3R program begun in February 2009 on the Navy's instrumented underwater range west of San Clemente Island;
  - passive sonobuoys deployed on long-term SOCAL cruises associated with the California Cooperative Oceanic Fisheries Investigation (CalCOFI) program
- Tagging (R&D Monitoring)
  - 12 satellite tracking tags were attached to four different species for varying amounts of time (eight fin whales, two Cuvier's beaked whales, one Risso's dolphin, and one bottlenose dolphin). Tagging of Cuvier's beaked whales, Risso's dolphin, and bottlenose dolphin represent the first every tagging of these species in SOCAL;

Technological advancements in recent years now provide opportunity for data collection by deploying tags on individual marine mammals for various time periods depending of both animal size and tag type. Between August 2008 and August 2009, under the Navy's CNO N45 R&D program, 12 tags were deployed on four species of marine mammals including seven fin whales, two Cuvier's beaked whales, one Risso's dolphin, and one bottlenose dolphin. Tagging of Cuvier's beaked whales, Risso's dolphin, and bottlenose dolphin represent the first ever tagging of these species in SOCAL (**Figure 4**). The Navy would like to add and continue into 2010 additional tagging as another valuable tool for SOCAL Range Complex monitoring. This tagging would be performed under both the existing CNO N45 R&D program, as well as supplemented by 2010 U.S. Pacific Fleet range complex monitoring.

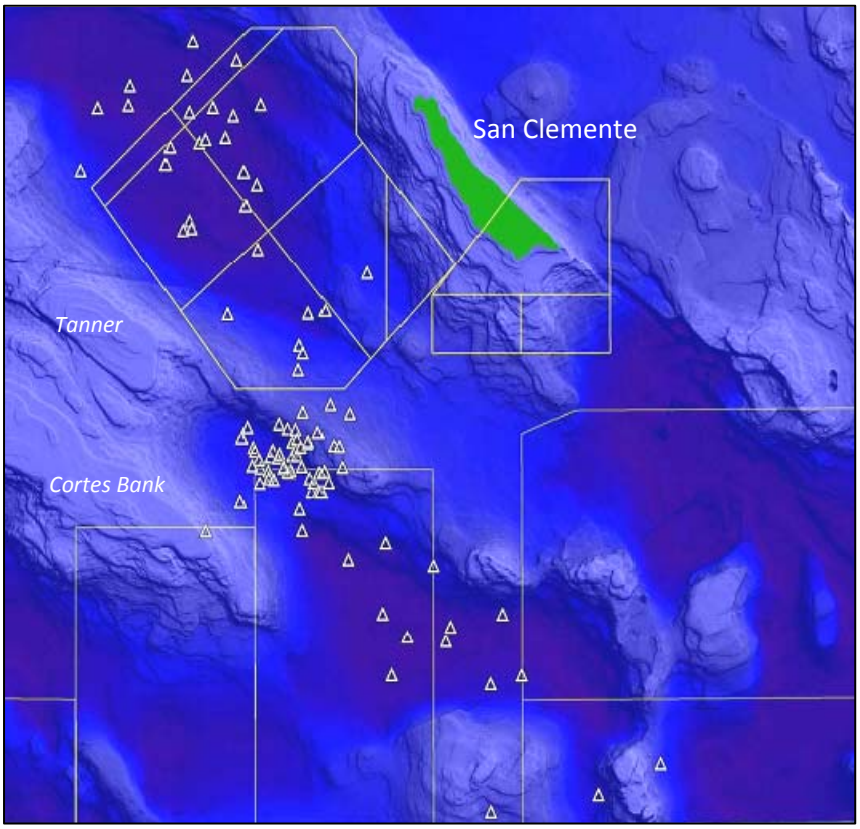


Figure 4. Map showing daily location of a satellite tagged Cuvier's beaked whale over a period of 106 days from August to November 2008.
The maximum distance moved from the original tagging location was 82 nm. Graphic courtesy of Greg Schorr, Cascadia Research Collective.

Another technique not originally described in the SOCAL Monitoring Plan involves the use of photographic identification of individual marine mammal from digital images. PhotoID provides information on sighting and re-sighting of individuals which may help to address subtle concepts such as residence time, large or small scale distribution, or geographic redistribution. In SOCAL alone, over 7,200 digital images and 227 minutes of digital video were taken from August 2008 until 01 August 2009. To date, over 50 individual Cuvier's beaked whales and 150 fin whales have been photographed (**Figure 5**)(Falcone et al. 2009). The Navy would like to add and continue into 2010 photoID as another valuable tool for SOCAL Range Complex monitoring.

Figure 5. Individual Cuvier's beaked whales photographed within the SOCAL Range Complex.
photos courtesy of Cascadia Research Collective

ORCAWALE 2008

As previously mentioned in Chapter 4, The NMFS's Southwest Fisheries Science Center completed the Oregon, California, and Washington Marine Mammal Survey (ORCAWALE 2008) visual and acoustic along the US West Coast during the summer and fall of 2008.

http://swfsc.noaa.gov/textblock.aspx?Division=PRD&ParentMenuId=562&id=12718

As of this submission renewal submission date (October 2009), ORCAWALE 2008 data analysis for 2008 marine mammal densities within various strata for this region is still ongoing by NMFS, and is not yet currently published.

SIBR Phase II Project "Marine Mammal Acoustics"

Sonalysts, Inc.[6], in partnership with Whale Acoustics, is continuing work on a Phase 2 Department of Defense Small Business Innovation Research (SBIR) project managed by Naval Air Systems Command (NAVAIR) to analyze beaked whale echolocation as a surrogate for foraging in response to sonar exposure within SOCAL. The goal of the project is to determine beaked whale response to mid-frequency sonar by analyzing potential sonar impacts on the animals' foraging behavior. Existing recordings from passive seafloor recorders include whale echolocation and sonar. The whales' own vocalizations provide an insight into their reactions. So far, through 2009, over 2,000 Cuvier's dives were picked from about 1,200 instrument days of data. This represents about 41 Terabytes of raw data. Sonar impact analysis concentrated on five particular HARP sites in SOCAL containing over 1,600 Cuvier's beaked whale dives and almost 800 hours of opportunistic sonar exposures. Data analysis is still ongoing.

[6] The Government's rights to use, modify, reproduce, release, perform, display, or disclose technical data or computer software marked with this legend are restricted as provided in paragraph (b)(4) of DFARS 252-227-7018, Rights in Noncommercial Technical Data and Computer Software - Small Business Innovative Research (SBIR) Program. Topic Number:N07-024; Contract Number:N68335-07-C-0222; Contractor Name: Sonalysts, Inc.; PO Box 280, Waterford, CT 06385; Expiration of SBIR Data Rights: 9/22/2014

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16. REFERENCES

Carretta, K.A. Forney, M.S. Lowry, J. Barlow, J. Baker, D. Johnston, B. Hanson, M.M. Muto, D. Lynch, and L. Carswell. 2009. U.S. Pacific Marine Mammal Stock Assessments: 2008. NOAA Technical Memorandum NOAA-TM-NMFS-SWFSC-434.

Carrillio, M. and F. Ritter. 2008. Increasing Numbers of Ship Strikes in the Canary Islands: Proposals for Immediate Action to Reduce Risk of Vessel-Whale Collisions. Presentation to the Scientific Committee of the International Whaling Commission SC/60/BC 6.

DoN. 2008. Southern California Range Complex: Final Environmental Impact Statement\Overseas Environmental Impact Statement-December 2008. Department of the Navy.

DoN. 2009a. Southern California Range Complex Monitoring Plan-Final 09 January 2009. Department of the Navy. 46 pp.

DoN. 2009b. Annual Range Complex Exercise Report January to 01 August 2009 For The U.S. Navy's Hawaii Range Complex And Southern California Range Complex. 01 October 2008. Department of the Navy, U.S. Pacific Fleet.

DoN. 2009c. Marine Mammal Monitoring For The U.S. Navy's Hawaiian Range Complex (HRC) And Southern California (SOCAL) Range Complex- Annual Report 2009. Authors: Chip Johnson and Julie Rivers. Department of the Navy, U.S. Pacific Fleet.

Douglas, A.B., J. Calambokidis, S. Raverty, S.J. Jeffries, D.M. Lambourn, and S.A. Norman. 2008. Incidence of ship strikes of large whales in Washington state. Journal of the Marine Biological Association of the United Kingdom 88:1121-1132.

Falcone, E.A., G.S. Schorr, A.B. Douglas, J. Calambokidis, E. Henderson, M.F. McKenna, J. Hildebrand and D. Moretti. 2009. Sighting characteristics and photo-identification of Cuvier's beaked whales (*Ziphius cavirostris*) near San Clemente Island, California: a key area for beaked whales and the military? Marine Biology 10.1007/s00227-009-1289-8. http://www.springerlink.com/content/74227g284k24u7t6/

Glass, A.H., T.V.N. Cole, M. Garron, R.L. Merrick, and R.M. Pace III. 2008. Mortality and Serious Injury Determinations for Baleen Whale Stocks along the United States Eastern Seaboard and Adjacent Canadian Maritimes, 2002-2006. US Department of Commerce, National Marine Fisheries Service. Northeast Fisheries Science Center Reference Document 08-04.

Huggins, J. and D. Lambourn. 2009. Examination of a dead fin whale found at the Port of Tacoma, August 8, 2009. Cascadia Research Collective and Washington Department of Fish and Wildlife. http://www.cascadiaresearch.org/Fin%20Whale%20Exam%20Aug%202009.htm

Jensen A.S. and G.K. Silber. 2003. Large whale ship strike database. US Department of Commerce, NOAA Technical Memorandum, NMFS-OPR-, 37 pp.

NMFS. 2009. Taking and Importing Marine Mammals; U.S. Navy Training in the Southern California Range Complex; Final Rule. January 21, 2009. 74FR3882.