

Results of Aerial Surveys Conducted in Conjunction with US Navy Training Exercises off Southern California 2008/2010

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Section 1. Abstract

Aerial surveys were conducted to monitor marine mammals/sea turtles before, during and after US Navy (Navy) 2008-10 major training events (MTEs) involving mid-frequency active sonar (MFAS) in offshore waters of Southern California. Seven surveys were conducted in fall/summer 2008-2010 to collect baseline data and monitor potential effects, if any, from MTEs on marine mammals by conducting line-transect, focal behavioral sampling and shoreline stranding surveys. A total of ~37,000 km (~188 hr) of observation effort occurred: 8401 km in Oct/Nov 2008; 12640 km in June/July 2009; 4823 km in Nov 2009; 4891 km in May 2010; and ~4200 km in July 2010. Effort consisted of 38% systematic line transect, 38% random transect and 24% circling (focal follow/photo species verification). Beaufort 2-3 predominated. A total of 991 marine mammal sightings of ~73,211 individuals were recorded. Three pinniped, 7 dolphin and 6 whale species were identified, including Cuvier's beaked whales, killer whales and a rare Bryde's whale. Most sightings identified to species were short-beaked common dolphins (N=5321 indiv) followed by Risso's dolphins (N=2691) and long-beaked common dolphins (N=1587). Risso's dolphins were most common in June/July 09 (N=1480 indiv). Killer whales (N=67) were seen twice during the same survey in Nov 09. Four dead pinnipeds and a dead subadult male blue whale were seen in Nov 08, and a live fin whale dragging a buoy was seen in June 09, none of which were attributable to Navy activities. Focal follows of up to 60+ min occurred with 9 cetacean species and included extended video of blue, fin, humpback and killer whale as well as Risso's dolphin behavior at and below the water surface. Risso's dolphins primarily engaged in slow travel with no surface-active behaviors while common dolphins were primarily surface-active milling or traveling; both species were headed predominantly east or west. Baleen whales tended to travel north or south, with some feeding observed. MFAS transmission times were unknown to observers, but future analyses of observations vs. estimated received sound levels are planned. Marine mammals were seen in the area before, during and immediately after MTEs. Distributions were concentrated along underwater ridges and mounts, coastal waters, and other areas of bathymetric relief.



Rare sighting of Bryde's whale identified by diagnostic 3 median rostral ridges



Cow-calf fin whales



Killer whales



Risso's dolphins

Section 2. Introduction

In support of the Navy's *Marine Species Monitoring Plan* in the Southern California Range Complex (SOCAL) (DoN 2009), Smultea Environmental Sciences (SES) and Marine Mammal Research Consultants (MMRC) conducted five aerial surveys in fall/summer 08-09 to monitor MM/ST near the Navy's Southern California Anti-submarine Warfare Range (SOAR) W of San Clemente Island (SCI). Surveys addressed Navy Marine Mammal Monitoring Program requirements to monitor occurrence and behavior relative to MTEs per NMFS and Navy SOCAL Environmental Impact Statement (DoN 2008?) requirements.

Our mission was to document locations and behavior of MM/ST *before, during and after MTEs*. Since we were not informed as to the status of MFAS transmissions, we were not tasked with performing analyses concerning their effects. We attended pre-survey planning meetings with Navy personnel and other local researchers to safely conduct, coordinate, develop and assess approaches to address monitoring requirements including identification of priority species.

Section 4. Results

EFFORT & SIGHTINGS

7 aerial surveys conducted in SOCAL:

- ~37,000 km (19,978 nm) of observation effort
- 1,032 groups of marine mammals and ~ 79,896 individuals
- 16 species (13 cetaceans and 3 pinnipeds)

HIGHLIGHTS

- 10 Cuvier's beaked whales -- 5 photographed; Rare sighting of single Bryde's whale photo-documented Oct 08
- Risso's dolphins more common in June/July 08 vs. Oct/Nov, contrary to trends described by Carretta et al. (2000) for same region. Sighting rates: June/July 08 (11.1 indiv/km, n= 93 groups) & Oct/Nov (3.0 indiv/km, n= 24 groups). We saw 66% of all Risso's in summer
- 2 killer whales groups (N=67 indiv) seen Nov 09, considered rare on Navy range; photographs taken of calf apparently nursing & a juvenile male with erect penis
- Up to 4 different cetacean species seen in a ~5 km² area of SOAR W of SCI in July 09: > 5 fin whales, 1 minke whale, ~4 Cuvier's beaked whales and possible Bryde's/sei whale

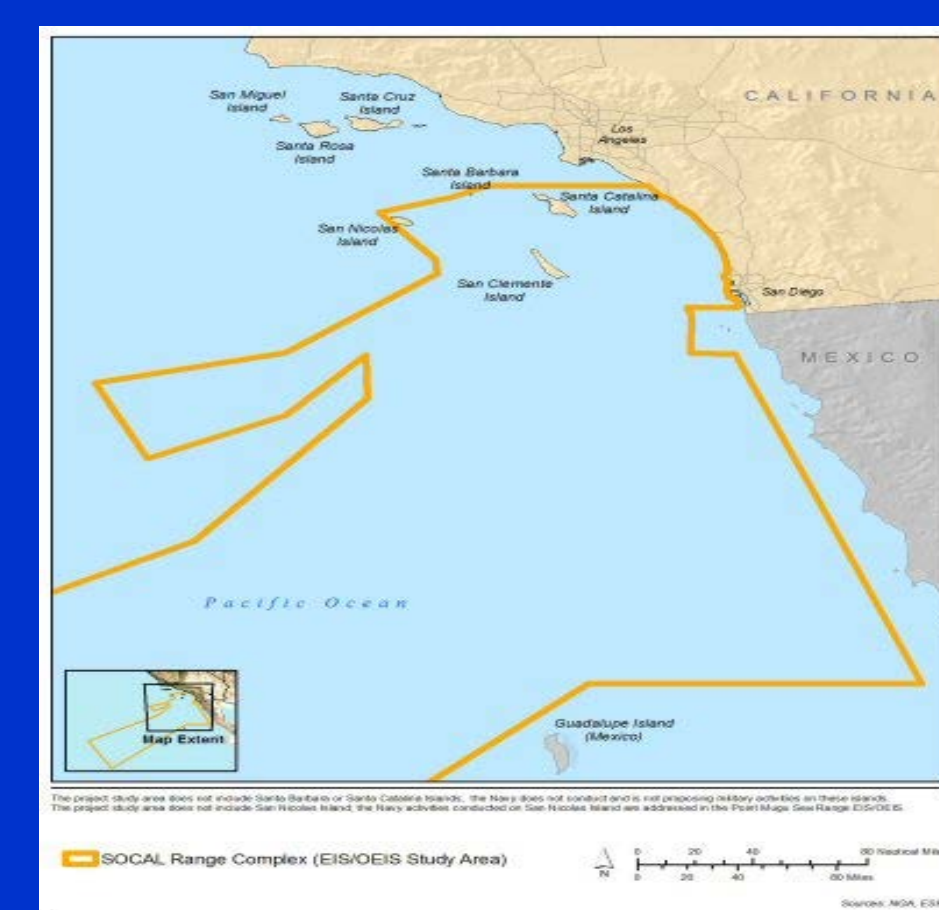
CONCLUSIONS

- Marine mammals seen before, during and after MTEs on Navy range. *Naval training has been conducted within SOCAL for > 40 years, and marine mammals are also known to (e.g., Carretta et al. 2000; DoN 2009) and continue to be abundant there.*
- Some species more suitable for focal behavioral follows (e.g., Risso's dolphins, whales) than others (e.g., large common dolphin groups)
- Focal follows of suitable/high priority species, provide behavioral data for baseline & before/during/after MFAS
- Aerial surveys useful in locating & documenting dead/stranded/entangled marine mammals: 6 occasions reported immediately to Navy, who contacted NMFS. Causes of death unknown:
 - 1 dead floating male blue whale ~50 km S of SCI: rope draped over penis / tail stock attached to 2 buoys, sharks nearby
 - 4 dead floating California sea lions seen near SCI Nov 08 & July 09
 - 1 live fin whale dragging long rope & buoy

➔ Aerial Surveys (1) offer unique overhead and sub-water surface perspectives, (2) do not interfere with behavior when flown at higher altitudes and lateral distances, and (3) allow cetacean behavior to be tracked for extended periods

➔ Aerial Survey data can be combined with vessel and passive acoustic data to provide a "3-D" perspective

Survey aircraft was a Partenavia P68-C twin engine chartered from Aspen Helicopters in Oxnard, CA. Below- Bell 206 Helicopter used 2 days in July 2010 Survey.



Fin whale lunging toward a baitball with mouth agape. Photo courtesy of Bernd Wuersig



Table 1. Summary of Surveys								
Parameter	2008		2009		2010		TOTAL	
Survey Dates	17-21 Oct 2008	15-18 Nov 2008	5-11 June 2009	20-29 July 2009	18-23 Nov 2009	13-18 May	27 July-3 Aug	7 survey s: May, June, July, Oct, Nov
No. Days Flown	5	4	6	9	6	6	7	36
Major Training Exercise (MTE) Before, During or After Survey?	Before/During	After	After	After	During/After	During	During/After	During & before or after
Total Flight Hr (Wheels up/down)	28	21	30	34	28	29	19	189
Total Observation Effort (km) (excl. poor weather, over land)	4563 km (2464 nm)	3838 km (2072 nm)	6140 km (3315 nm)	6500 km (3510 nm)	4823 km (2604 nm)	4891 km (2641 nm)	3125 km (1688 nm)	33,880 km (18,294 nm)
No. Navy-directed Survey Changes (appos)	9	7	12	10	3	1	0	42
No. Coastline Surveys for Strandings (San Clemente Isl)	0	2	1	0	1	1	0	5
No. Groups Seen	115	185	161	240	93	152	86	1,032
Estim. No. Individuals	12,587	5732	9489	22,719	12,826	5,453	11,090	79,896
Mean Group Size	109.4	31	58.9	94.7	137.9	35.9	131.3	85.6
No. Dead Sightings	0	3 (2 CA sea lions, 1 blue whale)	0	2 (2 prob. CA sea lions)	0	0	0	5
No. Species	9	9	11	10	10	9	5	16
No. Focal Groups Circled 5-9 min	22	20	24	37	14	10	6	139
No. Extended Focal Groups Circled >10 min	5	7	7	8	10	20	13	83
Longest Focal Follow Duration	29 min (Fin whale)	60 min (Fin whale)	48 min (Fin whale)	38 min (Long-beaked common dolphin)	40 min (Killer whale)	144 min (Fin whale)	59 min (Blue whale)	144 min.
No. Photos Taken	1050	1280	1099	2301	2203	1350	2900	12,183
Estimated Usable Video (min)	53	41	83	50	90	334	373	1024

Section 5. Acknowledgements

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Section 6. References

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