

Biological and Behavioral Response Studies of Marine Mammals in Southern California, 2011 ("SOCAL-11")



www.SOCAL-BRS.org

SOCAL-11 OVERVIEW AND OBJECTIVES

SOCAL-11 is second field season of a multi-year effort (2010-2014), more generally referred to as “SOCAL-BRS” (Behavioral Response Study). It is an interdisciplinary research collaboration, building on previous efforts in the Bahamas and Mediterranean Sea¹, designed to better understand marine mammal behavior and reactions to sound. The overall objective is to provide a better scientific basis for estimating risk and minimizing effects of active sonar for the U.S. Navy and regulatory agencies. SOCAL-BRS is also part of a larger international collaboration to measure the impacts of noise marine mammals using opportunistic and experimental approaches (including controlled exposure experiments, or “CEEs”).

SOCAL-11 follows a successful first season (SOCAL-10; see Southall *et al.*, 2011²) which demonstrated that, at least for the areas and species targeted off southern California, smaller teams and an adaptive approach that optimizes the probability of requisite good weather and of finding and tagging different focal species can be very productive. Analyses of SOCAL-10 data are progressing and some of the results have already been presented at scientific meetings (Goldbogen *et al.*, 2011³; de Ruiter *et al.*, 2011⁴). SOCAL-11 will use similar operational configuration, protocols, methodology, focal species, equipment, staff, and operational areas, with a few modifications and additions (*e.g.*, remote sensing of marine mammal prey fields before, during, and after CEEs, passive acoustic monitoring using a dedicated quiet tow vessel).

SOCAL-11 extends existing collaborations among scientists from the U.S.

¹ More information, including project reports, available at: <http://www.sea-inc.net/science/#brs>

² Southall, B. L., J. Calambokidis, P. Tyack, D. Moretti, J. Hildebrand, C. Kyburg, R. Carlson, A. Friedlaender, E. Falcone, G. Schorr, A. Douglas, S. DeRuiter, J. Goldbogen, J. Barlow. (2011). Project report: Biological and Behavioral Response Studies of Marine Mammals in Southern California, 2010 (SOCAL-10) - available at: www.SOCAL-BRS.org/SOCAL10

³ Goldbogen, J.A., Calambokidis, J., DeRuiter, S.L., Douglas, A.B., Falcone, E., Friedlaender, A.S., Schorr, G., Southall, B.L., Tyack, P.L. 2011. Dynamics of blue and fin whale maneuverability: three-dimensional kinematic analyses for assessing the effects of sound on behavior. The 4th international science symposium on Biologging (Hobart, Tasmania, 14-18 March).

⁴ DeRuiter, S. L., Calambokidis, J., Douglass, A., Falcone, E., Frielander, A., Goldbogen, J., Hildebrand, J., Moretti, D., Pusser, T., Schorr, G., Southall, B., and Tyack, P. 2011. Effects of simulated military sonar on sound production by blue whales, fin whales, sperm whales, Risso’s dolphin, and Cuvier’s beaked whale. The 4th international science symposium on Biologging (Hobart, Tasmania, 14-18 March).

National Oceanic and Atmospheric Administration (NOAA), private sector and academic scientists, and U.S. Navy researchers and operational personnel. It is jointly funded by the U. S. Navy, Chief of Naval Operations, Environmental Readiness Division (OPNAV N45) and the Office of Naval Research (ONR).

Specific objectives for SOCAL-11 include:

- (1) Obtaining baseline behavioral data;
- (2) Conducting controlled exposure experiments (CEEs) on baleen whales, beaked whales, and Risso's dolphins;
- (3) Testing optimal configuration for subsequent studies, which may include realistic/actual military sources; and
- (4) Obtaining data to support the Navy's SOCAL range monitoring efforts

SOCAL-11 OVERALL CONFIGURATION

WHAT: SOCAL-11 is a study of basic behavior and responses to controlled sound exposures in a variety of marine mammal species. It consists of a multi-disciplinary research team with specialists in marine mammal field methods, active and passive acoustics, and the use of controlled sound exposures in studying behavioral response.

WHERE: SOCAL-11 operational area includes both "inshore" areas along southern California from Morro Bay to San Diego and an offshore area that includes the U.S. Navy's SCORE range near San Clemente Island. SOCAL-11 sound transmissions will occur more than 1nm from any land mass and



more than 3nm from any land mass within the Channel Islands National Marine Sanctuary (CINMS).

WHEN: SOCAL-11 will occur in three phases during the summer and early fall 2011:

SCOUTING LEG: July 15 – 26 (12 days)

SOCAL-11 LEG I: July 29-August 11 (14 days)

SOCAL-11 LEG II: September 17 – 30 (14 days)

Specialized teams will perform different operational functions, including:

- The **source vessel** will be the logistical hub of operations, will have visual monitoring capabilities, and will conduct CEEs, monitoring/mitigation, and tag retrieval;



- **Two tagging RHIBs** may operate independently of source vessel, will locate and tag focal animals with suction cup acoustic and position- monitoring tags, will conduct behavioral focal follows during CEEs, and will assist in tag recovery;



Photo taken under NMFS permit #14534

- **Passive acoustic monitoring** will guide field operations, as possible, when operations are conducted on the SCORE range and will be conducted in other cases from a separate dedicated sailboat; dipping hydrophones may be used from the *Truth* as well as remote-deployed sonobuoys in some cases in areas other than the CINMS;



- **Fisheries acoustics** will be used to measure prey field data (e.g., krill) to quantify covariates in behavioral responses. Remotely sensed and *in situ* temperature and chlorophyll-a data will help us understand the baseline ecology of the baleen whales in the study area.

Experimental protocols involve the measurement of diving, vocal, and other behaviors before, during, and after CEEs with simulated military sonar sounds and a random noise as a control stimuli. These CEEs will be conducted under the following conditions:

- Tags must be successfully deployed for long enough to reduce attachment disturbance effects obtain sufficient baseline behavioral data
- No calves in focal/nearby group(s) may be neonates;
- No marine mammals come within 200m of source vessel during transmissions.
- No unusual and abnormal surface/subsurface behavior involving apparent disorientation and confusion or dramatic changes in group cohesion putting animals at risk of stranding or ship strike are observed; and
- No clear separation of dependent calves from mothers is observed.

Data analysis will include visual observations from dedicated marine mammal focal follows, measurements of movement and received sounds on recovered tags, and data from passive acoustic sensors.

While these safety precautions are intended to reduce the risk of any potential harm from these studies intended to better understand and manage marine mammals, a **stranding response plan** is in place in the event of any marine mammal stranding in the area (not uncommon in California during this period). This response plan has been developed in coordination with the Southwest Regional Stranding Network.

SOCAL-11, as have previous projects, is committed to an **open and transparent process** regarding the how and why these experiments are conducted, what the findings are, and what those findings mean for better understanding and managing marine mammals. A daily blog describing research activities will be available, as well as other information on the overall BRS effort <see: www.SOCAL-BRS.org>