



LIVING MARINE RESOURCES PROJECT 17

Blue and Fin Whale Density Estimation in the Southern California Offshore Range Using PAM Data

THE NEED

The Navy is responsible for compliance with a suite of Federal environmental laws and regulations that apply to marine mammals and other marine protected species. As part of the compliance process associated with these regulations, the Navy is responsible for implementing a marine species monitoring program to assess potential impacts from Fleet and System Command military readiness activities involving active sonar and underwater detonations from explosives and explosive munitions.

Passive Acoustic Monitoring (PAM) is a proven means of detecting and classifying vocally active marine mammals, as well as a number of fish species. While the Navy uses PAM data for many environmental monitoring purposes, the ability to derive improved density estimates for species of concern is perhaps the most powerful and beneficial application of PAM. However, methods for using PAM for density estimates need to be developed and refined.

THE SOLUTION

This project team, led by Ana Širovic and John Calambokidis will transition previous work conducted under Office of Naval Research (ONR) sponsorship to create population density estimates of calling blue and fin whales in the Southern California Offshore Range (SCORE).

THE METHODOLOGY

This team will use point transect methodology with available PAM data. Point transect methodology is

usually used in visual surveys but this team will use PAM-captured whale calls instead of sightings to develop density estimates. To estimate density from call data, however, knowledge of call rates is needed. These call rates are currently being analyzed from available acoustic tag data for a concurrent ONR-sponsored project.



A. Allen,
NMFS Permit 14534

Brandon Southall, Ari Friedlaender and John Calambokidis dual deploy an acoustic and video tag on a blue whale as part of the SOCAL Behavioral Response Study in July 2014. Acoustic tag data from the SOCAL BRS will be used as part of this study.

To determine caller abundance; call detection range and the probability of call detection within that range will also be estimated using passive acoustic data. While average detection range estimates have been developed for the sites at SCORE for a previous ONR-sponsored project, a finer-scale analysis of local ambient noise and estimates of detection ranges will have to be evaluated to develop temporally explicit density estimates. Acoustic propagation models will be developed to estimate call densities and detection ranges to be applied to the calculation of animal density.

While the project will rely heavily on acoustic tag deployments from other past and ongoing studies such as the SOCAL Behavioral Response Study (BRS), the project team will also perform additional acoustic tag data collection, using newly available long-term tags. This will allow researchers to evaluate the impact of bias in call rate estimation from short-term tag deployments, which were the norm during the earlier data collection. The focus of tagging will be on fin whales where existing data is more limited, but will also supplement available blue whale data.

THE SCHEDULE

Under the auspices of ONR, all non-BRS acoustic tag data from blue and fin whales that has been collected from SCORE is in the process of analysis. A cooperative agreement with the BRS is underway so that data collected under that project can also be used. For the LMR portion of the research, the project plan is due to be written in fiscal year (FY) 2016, followed by two years of field work, one year of modeling dedicated to blue whales, and a year of modeling dedicated to fin whales. The collection of the long-term tag data will take place over the entire course of the project, which is scheduled to end in FY19.

NAVY BENEFITS

Population density estimates for fin and blue whales will allow a realistic, quantitative assessment of levels of impact in the future. This will enable better evaluation of potential disturbance and harassment for Navy Training and Testing Environmental Impact Statements for SCORE. Methodology will be applicable to density estimation of other baleen whale species at locations

where appropriate PAM data exist now or will be collected in the future.

TRANSITION

In addition to the density estimates for SCORE, the team will produce an implementation manual and articles in at least two peer-reviewed publications.

ABOUT THE PRINCIPAL INVESTIGATORS

Ana Širovic is a researcher at the Scripps Institution of Oceanography. Her research focus is on the use of new, non-lethal methodologies to promote a better understanding of highly exploited and endangered marine species. She has a Ph.D. in Oceanography from the University of California San Diego.



John Calambokidis is a founder and Senior Research Biologist at Cascadia Research Collective in Olympia, Washington. He has studied large baleen whales including blue and fin whales for over 30 years and is the Project Manager for the SOCAL Behavioral Response Study as well as other projects involving tag deployments on blue and fin whales.



About the LMR Program

The Living Marine Resources (LMR) program seeks to develop, demonstrate, and assess data and technology solutions to protect living marine resources by minimizing the environmental risks of Navy at-sea training and testing activities while preserving core Navy readiness capabilities. For more information, contact the LMR program manager at exwc_lmr_program@navy.mil or visit www.lmr.navy.mil.

