Movements and Diving Behavior of Risso's Dolphins in the Southern California Bight

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24th Biennial Conference on the Biology of Marine Mammals
Palm Beach, Florida • August 1-5, 2022

Marine Ecology and Telemetry Research

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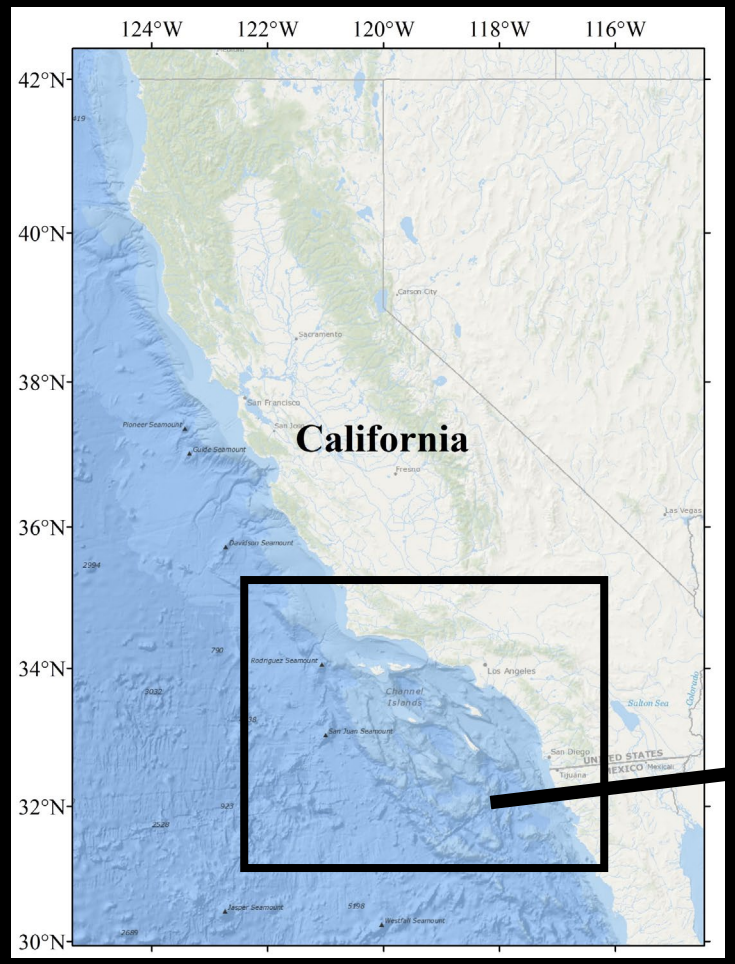
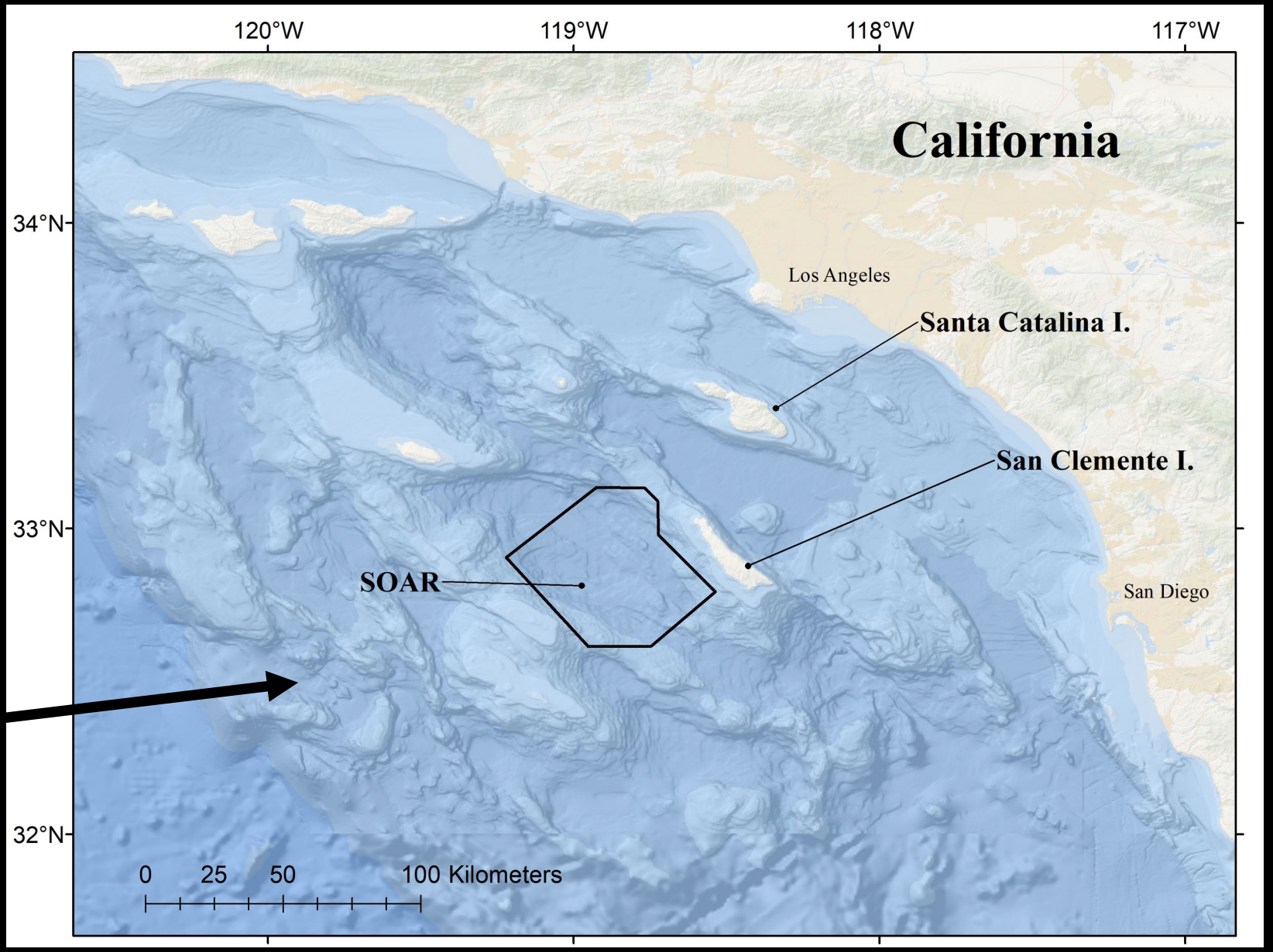
Study Area

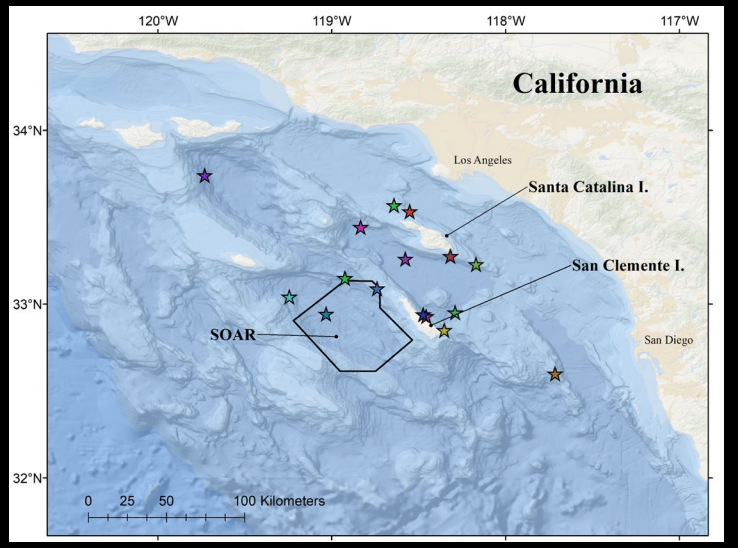


124°W
122°W
120°W
118°W
116°W
42°N
40°N
38°N
36°N
34°N
32°N
30°N
California



120°W
119°W
118°W
117°W
34°N
33°N
32°N
California
Los Angeles
Santa Catalina I.
San Clemente I.
SOAR
San Diego
0
25
50
100 Kilometers

Methods



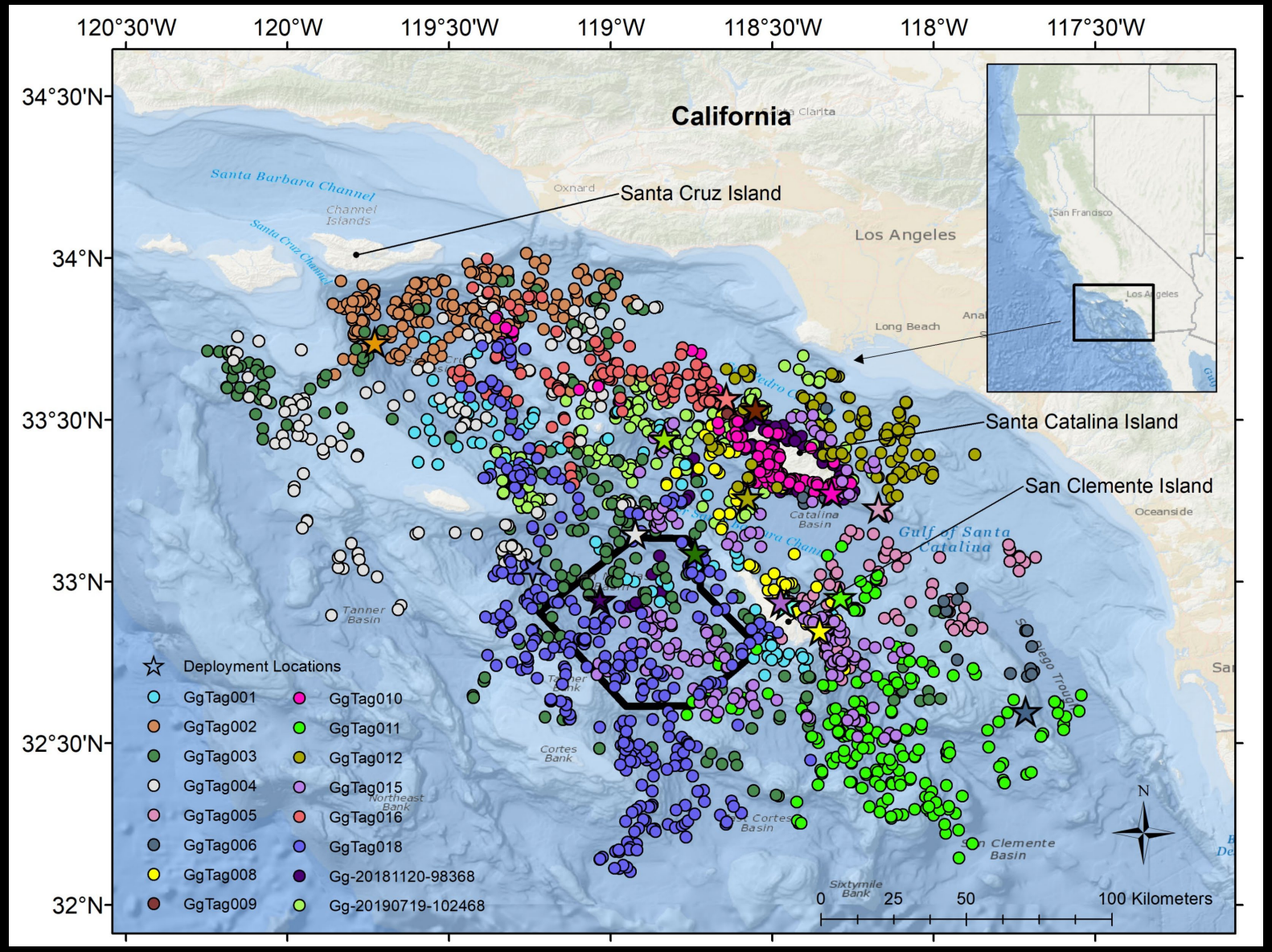
- *Years of Research*: 2009-2019
- *Tag Data*: 16 Argos-linked satellite tags (8 location only, 8 location and dive)
- *Deployment Locations*: outer surrounding waters of the Channel Islands
- *Tag Data Processing*:

Argos Locations → Kalman and Douglas Filters → Movement Locations

Kalman and Douglas Filters → Continuous-time correlated random walk model - *CRAWL* → Dive Locations

- *Environmental Data:* bathymetric, remote sensing, solar elevation, lunar phase
- *Analyses*: Kernel Density, Generalized linear and additive mixed models

Results



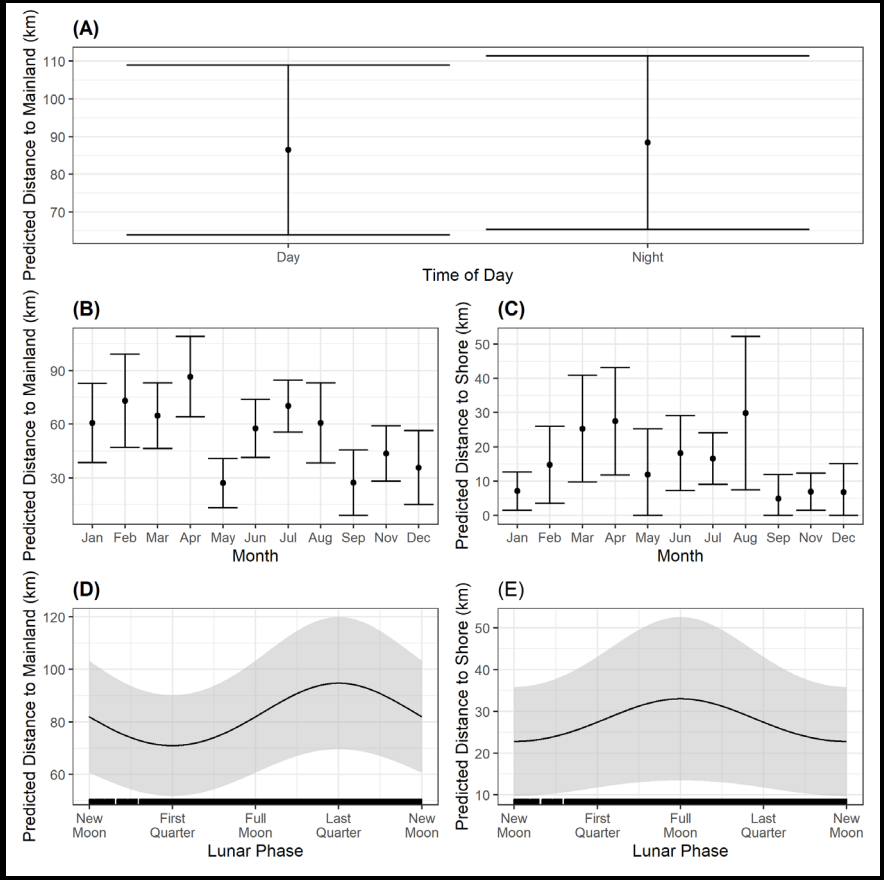
- Location data: 9 years across 11 months
- Dive data: 5 years across 7 months
- Tag duration: median 10.7 days (0.8-19.7)

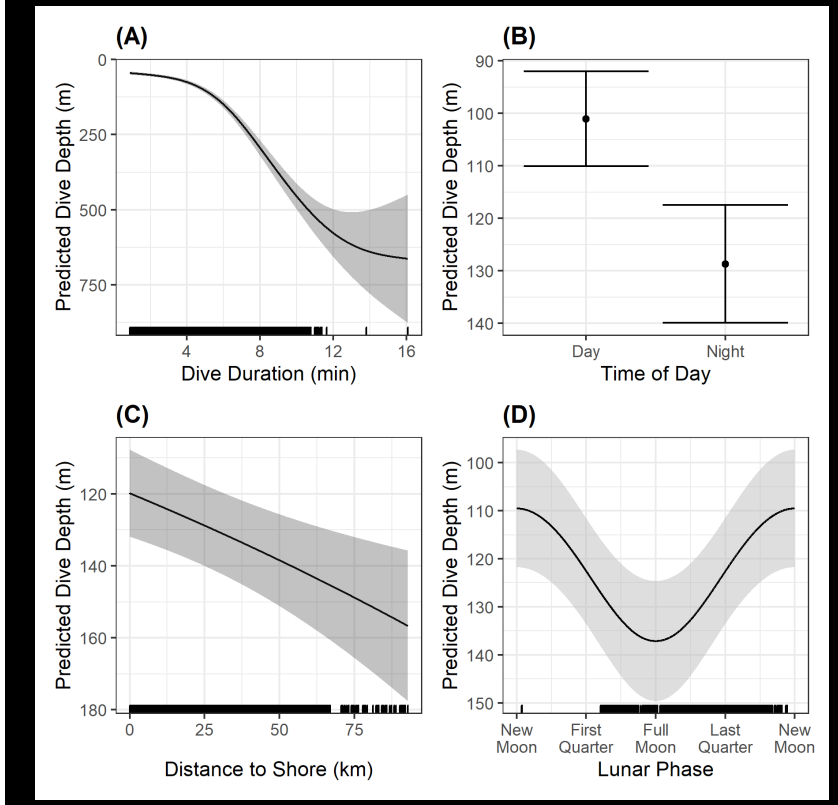
<u>Dives</u>

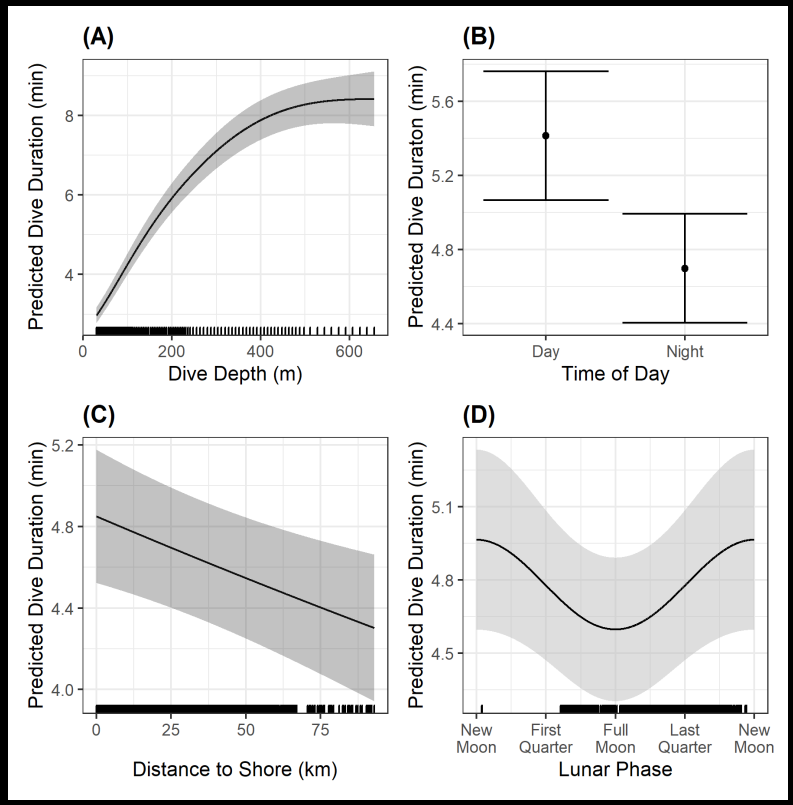
1. Median Dive Depth: 101 m (max=656)
2. Median Dive Duration: 5.6 min (max=16.1)
3. Dives beyond 500 m both day and night
4. Dives more frequent at night versus day

Results

Solid black lines and dots: predicted values
Shaded gray and error bars: 95% CI
Hatch marks along x-axis: spread of observed data







Distance to Mainland (A, B, D)
Distance to Shore (C, E)

Dive Depth

Dive Duration

Rone et al., "Movements and diving behavior of Risso's dolphins in the Southern California Bight", Frontiers in Marine Science, *in review*

Summary

- New insights into Risso's dolphin behaviors in the Southern California Bight
  - Seasonal trends, year-round presence (resident versus migratory?), lunar and diel influence

- Statistical versus Biological Significance
  - Exercise caution with interpretation (data gaps, limited sample size, weak trends)

- Value of Models
  - Fosters discussion and ideas for future work
  - Targeted data collection to increase sample sizes and fill in data gaps
  - As data become available, models will improve

Acknowledgements

Funding Agencies/Contracting

U.S. Pacific Fleet

U.S. Navy, Living Marine Resources

Office of Naval Research

Chief of Naval Operations Environmental Readiness Division

Environmental Security Technology Certification Program

Californian Cooperative Ecosystems Studies Unit

Naval Postgraduate School

Supporting Organizations/Individuals

Southern California Offshore Range

Dorothy Greenhoe

SCORE Ops Division

Wildlife Computers

Frank and Jane Falcone

Peg and Rob Roy

Key Personnel

Jeff Foster

Naval Undersea Warfare Center (M3R)

Susan Jarvis

Ron Morrissey

Nancy DiMarzio

Dave Moretti

Research conducted under NMFS Permit No. 540-1811, 16111, 15330, 20605