

Environmental Studies Program: Ongoing Study

Study Area(s): Northern California, Washington-Oregon

Administered By: Pacific OCS Region

Title: Seabird and Marine Mammal Surveys off the Northern California, Oregon and Washington Coasts (NSL #PC-10-05)

BOEM Information Need(s) to be Addressed: BOEM is considering renewable energy proposals offshore northern California, Oregon, and southern Washington. This study will provide up-to-date information on species composition, distribution, abundance, seasonal variation, and habitat utilization of marine mammals and seabirds along this section of coast. Data generated will be used for overall evaluation of proposed renewable energy sites and environmental review of specific project proposals received by BOEM.

Total BOEM Cost: \$2,247,000

Period of Performance: FY 2010–2018

Conducting Organization(s): U.S. Geological Survey and U.S. Fish & Wildlife Service

Principal Investigator(s): [John Takekawa](#), [Dr. Josh Adams](#), and [John Mason](#)

BOEM Contact(s): [David Pereksta](#)

Description:

Background: BOEM (formerly MMS) funded seabird surveys offshore central and northern California in 1980-1983 (MMS 84-0043) and marine mammal/seabird surveys offshore Oregon and Washington in 1989-1990 (MMS 91-0093). While these surveys provide a good foundation of information for the area, they may be limited by potential shifts of species' distribution and abundance that may have occurred over the past two decades. The proposed study would review and refine the methodology used in earlier studies to provide up-to-date information and establish a more robust longitudinal data set from which to draw on for environmental analyses.

The Pacific Region updated its "Summary of Knowledge" (SOK) for northern California, Oregon, and southern Washington in 2009. The SOK identified data gaps and researchers active in this area. Data collected by other survey efforts will be evaluated to ensure that new surveys complement earlier studies and avoid duplication of effort. In many cases, past studies have focused fine-scale data collection on areas not being considered for renewable energy development (e.g., Marine Sanctuaries and other marine protected areas). This survey effort will focus on offshore areas suitable for renewable energy development.

Objectives: Objectives of this study include:

1. Review and refinement of methodologies used for previous marine mammal/seabird surveys;

2. Monthly field surveys (aerial) offshore northern California, Oregon, and southern Washington over a 24-month period;
3. Assessment, analysis, and comparison of data collected with other sources of survey data;
4. Characterization of the current marine mammal/seabird composition, distribution, abundance, seasonal variation, and habitat use within the survey area; and,
5. Publication of report(s) on the findings of the surveys and data analysis.

Methods: Survey methodologies used in previous BOEM studies and other survey efforts have been reviewed and modified, as necessary, to account for new technologies and equipment availability. Available funding limited the field effort to six aerial surveys along prescribed transect lines.

Current Status: All 12 aerial surveys have been completed, the final report is finished, and researchers are now working on the following products that were identified in the 2012 modification to the intra-agency agreement:

- *Atlas of the Pacific Outer Continental Shelf:* USGS has compiled a large number of telemetry datasets working with partners relative to the at-sea distribution, movements, and behavior of seabirds in the California Current and North Pacific Basin. Existing datasets will be consolidated in to a single, GIS-based atlas that will allow comparison with distributional data from vessel-based, at-sea surveys.
 - Website created: www.werc.usgs.gov/ccesta
 - Work-flow, data processing, and GIS integration protocol established
 - Final map format established (3 data representations: time in polygon, individuals in polygon, stacked Brownian bridge utilization distribution)
 - 13 species data sets acquired to date: Sooty Shearwater, Pink-footed Shearwater, Red-throated Loon, Black-footed Albatross, Laysan Albatross, Short-tailed Albatross, Surf Scoter, Ashy Storm-Petrel, Cassin's Auklet, Western Gull, Common Murre, Xantus's (Scripps's) Murrelet, Marbled Murrelet
 - Incorporated USGS-related VHF datasets for Marbled Murrelet, Scripps's Murrelet, Cassin's Auklet, and Ashy Storm-Petrel
 - Finalized methods for ARGOS utilization distribution mapping
 - Created .pdf hard copy of CCESTA Atlas (report format TBD; April 30, 2016)
- *Pacific Seabird Shelf Monograph:* Seabirds of the northern California Current and a 20-year comparison to earlier surveys.
 - USGS contracted with Environment International, Portland, OR (John Mason)
 - Linear mixed modeling analyses and GIS mapping complete for numerically abundant species
 - Draft manuscript to be completed according to revised date June 30, 2016
 - Revised geo-corrected database to be delivered to BOEM and NOAA collaborators for species prediction modeling (PC-15-01b) revised date May 31, 2016

- *Seabird Community Paper*: Oceanographic affiliations and community patterns among seabirds of the northern California Current. The product will examine the spatial distribution of seabirds from the aerial surveys in relation to conditions in the California Current from remote sensing products. Paper in preparation, finalized watermass classification, Broughton PhD (September 30, 2016).
- *Shearwater Movements Paper*: Comparison of at-sea distribution of Sooty and Pink-footed Shearwaters determined from satellite telemetry and vessel-based surveys off Oregon and Washington. Existing USGS satellite telemetry datasets on shearwaters will be integrated with vessel-based survey results to examine interpretation differences from temporally varying datasets of continuous telemetry records versus snapshot survey records. Paper In preparation, CCESTA raster product for Pink-footed Shearwater finalized (2015 tracking data; September 30, 2016).
- *Hyperspectral Imagery Technique Paper*: Use of airborne hyperspectral imagery to classify unique water masses and frontal structures: a new technique to inform aerial surveys of seabirds and marine mammals.

Final Report Due: September 30, 2016 (expected June 2018)

Publications Completed:

Adams, J., J. Felis, J.W. Mason, and J.Y. Takekawa. 2014. Pacific Continental Shelf Environmental Assessment (PaCSEA): Aerial Seabird and Marine Mammal Surveys off Northern California, Oregon, and Washington, 2011–2012. U.S. Dept. of the Interior, Bureau of Ocean Energy Management, Pacific OCS Region, Camarillo, CA. OCS Study BOEM 2014-003, 266 p. <http://www.boem.gov/Study-2014-003/>

Affiliated WWW Sites: <https://marinecadastre.gov/espis/#/search/study/14536>

Revised Date: February 1, 2018