

## Environmental Studies Program: Ongoing Study

Field	Study Information
Title	Environmental Resource Areas: Developing Products to Support Oil-Spill Risk Analysis (OSRA) and National Environmental Policy Act (NEPA) (AK-18-01)
Administered by	Alaska Regional Office
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Procurement Type(s)	Interagency Agreement
Conducting Organization(s)	USGS
Total BOEM Cost	\$400,000
Performance Period	FY 2018-2024
Final Report Due	January 14, 2024
Date Revised	February 23, 2023
Problem	Tools or methods for analyses are needed to identify environmental resource areas (ERAs) for consideration in the assessment of potential impacts to marine mammals, cetaceans, seabirds, and other resources from Outer Continental Shelf (OCS) oil- and gas-related activities.
Intervention	Synthesis of available information about individual species or other resources to facilitate development of methods for identifying ERAs.
Comparison	This study will provide improved efficiency defining ERAs over existing approaches that are individualized for various resources. This will also allow for better continuity to update the information when staffing changes.
Outcome	A consistent approach that can be applied to multiple resources and planning areas to produce a collection of ERAs in support of OSRA.
Context	All Alaska Planning Areas

**BOEM Information Need(s):** Refined information of the density distribution and temporal timing of resources susceptible to effects from potential oil spills will inform better decisions when developing inputs to BOEM's OSRA. Results from this project will help refine ERAs used in OSRA and will assist BOEM in National Environmental Policy Act (NEPA) analyses for potential future lease sales, for Exploration Plans (EPs), Development and Production Plans (DPPs), Endangered Species Act (ESA) Section 7 consultations, and decision-making on the Outer Continental Shelf (OCS) in Alaska by helping to identify the resources and geographic areas most susceptible to potential impacts from OCS activities.

**Background:** Having a good understanding of the seasonal distribution, relative abundance, and habitat use of birds, fish, marine mammals, and other species on the OCS is fundamentally important to evaluating the potential environmental impacts associated with oil and gas exploration and development, as well as cumulative impacts related to other activities. Different species have differing temporal and spatial distributions, which complicates the analyses, and many of the species are also used for subsistence and form an important part of the diet and cultural base for people in communities along the Alaska coast.

BOEM and others have amassed extensive datasets documenting spatial presence and other information for a wide range of species. The distributions of many species are temporally and spatially structured, showing seasonal or interannual changes in response to various mechanisms. These factors affect the vulnerability of a species to contact from a potential oil spill that BOEM considers as part of its OSRA through identification of ERAs, which are areas of concern relating to social, environmental, or economic resources, including critical habitat or use areas for different species of concern. Each ERA has a spatial and temporal attribute and its vulnerability may vary according to the time of year. Numerous methods are used to define the location and geographical extent of ERAs, depending on the availability of data.

Using various analysis and modeling techniques (e.g., Quakenbush and Citta 2013, and Citta et al. 2015, Roberts et al. 2016, etc.), researchers have evaluated a range of species and simulated seasonal movement patterns that resemble those suggested in the literature. Results from these efforts were then used to produce monthly mean density maps for the species considered.

**Objectives:** The overall goal of this study is to establish a consistent foundation for developing and refining ERAs used for OSRA. This project will focus on evaluating the distribution and abundance of seabirds and forage fish in marine areas off Alaska. The specific objectives include:

- Assess the utility of different modeling techniques or other analyses to evaluate distribution, abundance and temporal timing of marine birds and forage fish
- Evaluate patterns of movement and aggregation (i.e., herding, flocking, etc.), as well as spatial variations in seasonal density of identified species in marine areas off Alaska
- Provide density information or other dataset that is appropriate for identifying ERAs for the species or populations evaluated to support OSRA
- Estimate the absolute size of seasonal populations for the most common breeding and transient seabird species within each of Alaska's four Large Marine Ecosystems (Gulf of Alaska, East Bering Sea, Chukchi Sea, Beaufort Sea)
- Compile an Alaska Forage Fish Database (AFFD)
- Map forage fish abundance in the marine areas off Alaska

**Methods:** This study will update the North Pacific Pelagic Seabird Database (NPPSD) by consolidating approximately 200,000 km of new survey information conducted in the Gulf of Alaska, Aleutian Islands, and the Bering, Chukchi and Beaufort seas since the last NPPSD update in 2012. Researchers will evaluate different modeling techniques that can be applied to NPPSD data to develop gridded seabird density estimates offshore of Alaska. The data will be analyzed to estimate seasonal populations for the most common breeding and transient seabird species and to produce maps of the relative distribution and abundance of common breeding and transient (non-breeding) seabirds that utilize U.S. territorial waters off Alaska, including both continental shelf and oceanic habitats. Where sufficient data exist, seasonal patterns of distribution will be mapped as well.

Researchers will also compile an Alaska Forage Fish Database (AFFD), by combining all available data from research groundfish trawls, predatory fish stomach samples, and beach seines. Algorithms to convert raw data from forage fish samplers into indices of abundance will be used to combine data from the various sources into a single dataset to facilitate mapping of forage fish abundance in all marine areas of Alaska.

**Specific Research Question(s):**

1. What consistent method or methods can be identified to define a set of ERAs to facilitate the OSRA process in an efficient manner?
2. How can existing data for seabirds and forage fish be best utilized for defining ERAs to support OSRA?

**Current Status:** Ongoing, data analysis underway.

**Publications Completed:** None

**Affiliated WWW Sites:**

<http://www.boem.gov/akstudies/>

**References:**

- Citta, J. J., Quakenbush, L. T., Okkonen, S. R., Druckenmiller, M. L., Maslowski, W. Clement-Kinney, J., George, J. C., Brower, H., Small, R. J., Ashjian, C. J., Harwood, L. A., Heide-Jørgensen, M. P., 2015. Ecological characteristics of core-use areas used by Bering–Chukchi–Beaufort (BCB) bowhead whales, 2006–2012. *Progress in Oceanography*, 136:201-222. <http://dx.doi.org/10.1016/j.pocean.2014.08.012>.
- Quakenbush, L.T., and Citta, J.J., 2013. Kernel densities from satellite-tracked bowhead whales, 2006-2012, for use in determining environmental resource areas for oil spill response analysis. Special Technical Report, submitted to BOEM, August 2013. 11pp + GIS shapefiles.
- Roberts, J. J.; Best, B. Mannocci, D., Fujioka, L., E., E.; Halpin, P. N., Palka, D. L., Garrison, L. P., Mullin, K. D., Cole, T. V. N., Khan, C. B., McLellan, W. M., Pabst, D. A., Lockhart, G. G., 2016. Habitat-based cetacean density models for the U.S. Atlantic and Gulf of Mexico. *Scientific Reports* 6: 22615. doi: 10.1038/srep22615.