

Quarterly Report

Latest Reports and Study Profiles Posted to the
Environmental Studies Program Information System (ESPIS)



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The Environmental Studies Program (ESP) Quarterly Reports include summaries of the Bureau of Ocean Energy Management (BOEM) environmental studies completed each quarter. These studies inform BOEM’s policy decisions on the development of energy and mineral resources on the Outer Continental Shelf (OCS).

Visit ESPIS at <https://marinecadastre.gov/espis/#/>

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Alaska Monitoring and Assessment Program (AKMAP) Survey of Estuaries Within the National Petroleum Reserve-Alaska

ALASKA REGION

ESPIS Link: <https://marinecadastre.gov/espis/#/search/study/100127>

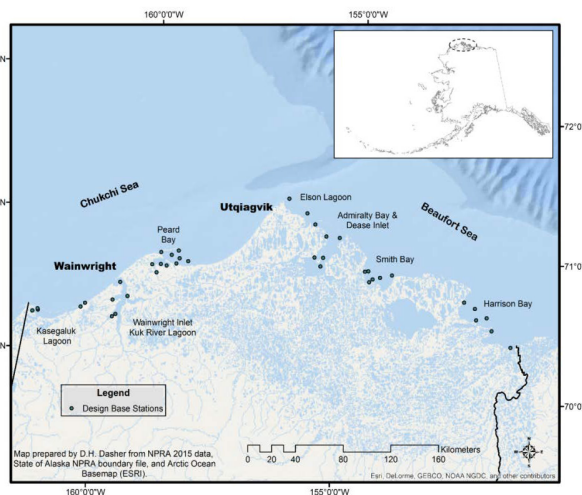
Conducted by: Alaska Department of Environmental Conservation, National Oceanic and Atmospheric Administration, National Ocean Service, University of Alaska Fairbanks

National Studies List: AK-13-03-11

Study Products (available in ESPIS): Final report, five peer-reviewed articles based on the findings, and two datasets

Purpose/Information Use:

In August 2015, the Alaska Monitoring and Assessment Program (AKMAP) surveyed the National Petroleum Reserve-Alaska (NPR-A) estuaries as part of the Environmental Protection Agency's National Coastal Condition Assessment. The goals for the survey were to assess the condition (good, fair, or poor) of estuarine aquatic resources and provide baseline data for future trend assessment. At 20 stations in the Chukchi Sea and 13 stations in the Beaufort Sea, the researchers collected sediment, water, and fish and macroinvertebrate samples for chemical, physical, and stable isotope analyses; biological assessment; and water quality benchmarking. The data collected will be used to establish a reference condition for long-term monitoring in the region.



Stations sampled in the 2015 NPR-A estuary survey

Findings/Results:

- Of the sampled region, 100% and 84% of the area ranked “good” for the water and sediment quality indexes, respectively, with 92% of the estuary area receiving a “good” rating for overall condition.
- Macroinvertebrate species (which lack a spine and can be seen by the naked eye) composition differed between estuaries, likely due to differences in habitat.
- The study analyzed seven fish for hydrocarbons and organochlorines and ten fish for trace metals. Based on the EPA benchmark criteria, contaminant levels were very low except for mercury (Hg) in one fish from Elson Lagoon. There were some site and species-specific differences but no obvious contaminant patterns.

Study Products

Dasher D, Blanchard A, Jewett A, Naidu AS, Hoberg M, Lomax T, Bethe A, Hartwell I. 2018. Alaska monitoring and assessment program 2015 National Petroleum Reserve - Alaska estuary survey. Anchorage (AK): US Department of the Interior, Bureau of Ocean Energy Management. OCS Study BOEM 2017-072. 80 p

Beaufort Sea Marine Fish Monitoring: Pilot Survey in the Central Beaufort Sea

ALASKA REGION

ESPIS Link: <https://marinecadastre.gov/espis/#/search/study/26824>

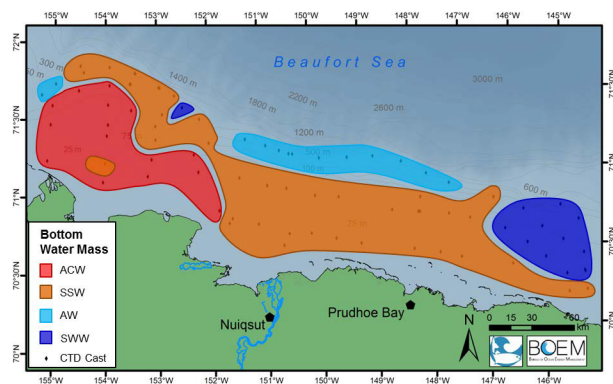
Conducted by: University of Alaska Fairbanks

National Studies List: PC-14-05-02 (2016–2018)

Study Products (available in ESPIS): Final report, related publication

Purpose/Information Use:

As offshore oil exploration interest expands in the US Arctic, more information is required about the sparsely documented fish species inhabiting the area. Fish are important food and cultural resources in the Beaufort Sea ecosystem for birds, marine mammals, and humans. It is unknown whether the data from fish surveys collected decades ago represents present conditions. Because the Beaufort Sea Planning area is under ice much of the year, knowledge of marine fish during the ice-covered seasons is essential to understanding the life history and distribution of fishes. One issue of concern to residents of the Beaufort Sea coast is the potential impact of an oil spill on the local ecosystem. Thus, it is important to understand fish distribution and abundance, especially during the under-ice and broken-ice seasons. The data generated from this study will provide BOEM with benchmark information on fish distribution and abundance in the Central Beaufort Sea.



Bottom water mass based on 74 stations having bottom temperature and salinity data in the Beaufort Sea in 2011

Findings/Results:

- The researchers conducted the Central Beaufort Sea Fish Monitoring 2011 cruise from August 15 through September 4, 2011, and sampled 81 stations in the Beaufort Sea across 200 km, capturing nearly 14,000 fishes from at least 38 species.
- Including the present study, researchers have found at least 74 marine and anadromous (migrating up rivers from the ocean to spawn) fish species in the US Beaufort Sea. Nineteen species were captured in 2011 that were not collected previously.
- This study provides a benchmark against which fish abundance, biomass, and communities can be compared in the future.
- Though sampling in open water season was successful, sampling under ice was not. Wintertime sampling is difficult due to darkness, cold, wind, high cost, and lack of available staff.

Study Products

Norcross BL, Holladay BA, Apsens SJ, Edenfield LE, Gray BP, Walker KL. 2017. Central Beaufort Sea marine fish monitoring. Anchorage (AK): US Department of the Interior, Bureau of Ocean Energy Management. OCS Study BOEM 2017-033. 502 p

Understanding Whale Presence in the Virginia Offshore Wind Energy Area

ATLANTIC REGION

ESPIS Link: <https://marinecadastre.gov/espis/#/search/study/100085>

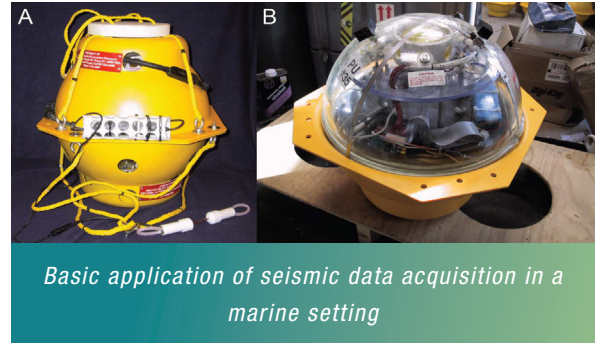
Conducted by: Cornell University

National Studies List: AT-15-03 (2015–2017)

Study Products (available in ESPIS): Final report, related publication

Purpose/Information Use:

Offshore wind energy development in coastal Virginia waters may pose risks to marine mammals that use the habitat, both through acute risks of ship-strikes or construction-related activities such as pile driving, and chronic risks from increased exposure to noise. Passive acoustic monitoring can provide insight into the distribution of whale species in the study area over time. Passive acoustic monitoring recorders were deployed off the coast of Virginia to collect two years of acoustic data from 2015–2017 and to determine the acoustic presence of four focal whale species: North Atlantic right whale, minke whale, fin whale, and humpback whale. This study compared the data with previously collected acoustic data from 2012–2015. The researchers also analyzed the baseline ambient noise measurements to help understand the potential risks to whales associated with construction and development in the offshore wind energy area. BOEM will use this information to help inform both the wind energy development process and broader assessments of how marine mammals use this geographical area.



Basic application of seismic data acquisition in a marine setting

Findings/Results:

- This study found ample evidence of vocally active whales in the Virginia coastal waters, and the abundance of detected calls showed patterns of seasonality and inter-annual variation.
- Right, minke, humpback, and fin whales showed an average monthly presence across the entire study area at 9.95%, 1.30%, 38.96%, and 7.91%, respectively.
- Minke whales were not detected as often as the other species, but their presence was confirmed in the study area, especially in waters further offshore.
- Peak presence occurred in the winter months, in contrast with low periods of presence in the summer months.
- The addition of turbine construction and operation would not represent a large increase in ambient noise levels considering the very high levels of low frequency background noise recorded in the study area.
- Because modest increases in ambient noise levels within the WEA may elicit behavioral responses from whales, further studies may be needed to understand the potential impacts from these risks.

Study Products

Salisbury DP, Estabrook BJ, Klinck H, Rice AN. 2018. Understanding marine mammal presence in the Virginia Offshore Wind Energy Area. Sterling (VA): US Department of the Interior, Bureau of Ocean Energy Management. OCS Study BOEM 2019-007. 116 p.

Tracking Offshore Occurrence of Common Terns with VHF Arrays

ATLANTIC REGION

ESPIS Link: <https://marinecadastre.gov/espis/#/search/study/100063>

Conducted by: US Fish and Wildlife Service

National Studies List: AT-13-01 (2013–2018)

Study Products (available in ESPIS): Final report

Purpose/Information Use:

Information on the movements and flight altitudes of high-priority avian species is essential for estimating exposure to offshore wind energy areas. In this study, the researchers used digital very high frequency (VHF) transmitters and an array of shore-based automated radio telemetry stations to track the movements of common terns, roseate terns (federally listed as endangered species), and piping plovers (federally listed as a threatened species). A series of models to predict their flight altitudes and migration over the Atlantic outer continental shelf. Information on flight altitudes is needed to assess exposure to the Rotor Swept Zone (RSZ), generally 25 to 250 m above sea level. To obtain the necessary data, the researchers fitted 150 roseate terns, 266 common terns, and 150 piping plovers with digital VHF transmitters at select nesting areas on the U.S. Atlantic Coast from 2014 to 2017. The results of the study will be used by BOEM to better understand the potential exposure of migratory birds to offshore wind energy development.



Roseate tern with nanotag (on back), metal USGS band (left leg) and plastic field readable band (right leg).

Photos: Peter Paton.

Findings/Results:

- Common and roseate terns' offshore movements peaked during mid-July and August, primarily during morning hours and fair-weather conditions (high atmospheric pressure).
- When crossing Federal waters, terns predominantly flew below the RSZ (< 25 m). An estimated 4.3% of Common tern flights and 6.4% of Roseate tern flights occurred within the RSZ.
- Piping plovers' migratory departures peaked in early August, during evenings with favorable atmospheric conditions for crossing the mid-Atlantic Bight (i.e., tailwinds blowing to the southwest, high visibility, little to no precipitation, and high atmospheric pressure).
- When crossing Federal waters, plovers flew mostly above the RSZ (> 250 m). An estimated 21.3% of Piping Plover flights in Federal waters occurred within the RSZ.

Study Products

Loring PH, Paton PWC, McLaren JD, Bai H, Janaswamy R, Goyert HF, Griffin CR, Sievert PR. 2019. Tracking offshore occurrence of common terns, endangered roseate terns, and threatened piping plovers with VHF arrays. Sterling (VA): US Department of the Interior, Bureau of Ocean Energy Management. OCS Study BOEM 2019-017. 158 p.

Analyzing the Effects of Block Island Wind Farm (BIWF) on Rhode Island Recreation and Tourism Activities

ATLANTIC REGION

ESPIS Link: <https://marinecadastre.gov/espis/#/search/study/100146>

Conducted by: University of Rhode Island

National Studies List: AT-16-x23 (2016–2019)

Study Products (available in ESPIS): Final report

Purpose/Information Use:

Impacts to tourism from offshore wind energy development are widely cited as a concern by communities and policy makers, and research is needed to define what constitutes tourism and recreation impacts and to provide empirical evidence of impacts from operating projects. This study was designed to collect and review data from the Block Island Wind Farm (BIWF)—the first U.S. offshore wind farm—consisting of five turbines located three miles off the coast of Block Island, Rhode Island. The BIWF provided an invaluable opportunity to study social perceptions of, interactions with, and impacts of offshore wind infrastructure in a dynamic coastal environment as events unfold in the public record and in real time. The data will be used by BOEM to better understand socio-economic impacts of offshore wind.



Findings/Results:

- Overall, the researchers found little evidence that BIWF has adversely affected tourism and recreation. It appears that, instead, the wind farm has enhanced some experiences on the water and on Block Island.
- The wind farm had little impact on tourism and recreation on the Rhode Island mainland, which is 16 nautical miles from the project.
- The researchers developed a suite of 40 social indicators for use in understanding, measuring, and monitoring the effects of the BIWF and other future offshore wind farms.

Study Products

Smythe T, Smith H, Moore A, Bidwell D, McCann J. 2018. Analyzing the effects of Block Island Wind Farm on tourism and recreation. Sterling (VA): US Department of the Interior, Bureau of Ocean Energy Management. OCS Study BOEM 2018-068. 300 p.

Seismic Survey Mitigation Measures and Protected Species Observer Reports: Synthesis Report

GULF OF MEXICO REGION

ESPIS Link: <https://marinecadastre.gov/espis/#/search/study/100158>

Conducted by: CSA Ocean Sciences, Inc.

National Studies List: GM-16-01 (2017–2018)

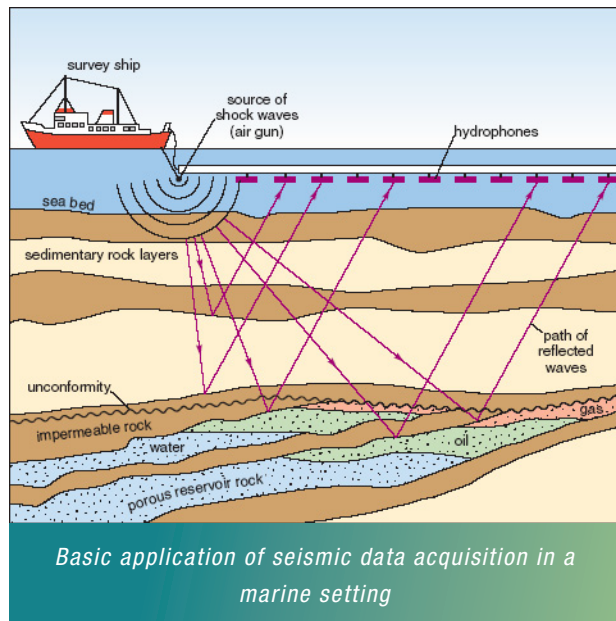
Study Products (available in ESPIS): Final report

Purpose/Information Use:

This report provides the compilation and analysis of visual and acoustic observation data collected by protected species observers (PSOs) as part of Notice to Lessees (NTL) and permit condition requirements issued to seismic operators in the Gulf of Mexico (GOM) between January 1, 2009 and December 31, 2015. Where applicable, similar data from NTL reporting between 2002 and 2008, and summarized in OCS Study BOEM 2012-015, are incorporated into the analyses. The data will help BOEM achieve its goal of creating a more comprehensive and systemic review of mitigation effectiveness that considers the best available science related to marine protected species (marine mammals and sea turtles), sound types, and sound exposure and effects.

Findings/Results:

- The study compiled and analyzed a total of 2,446 PSO reports during the 2009 to 2015 time period. PSOs recorded 404,046 hours of visual surveying and 214,887 hours of acoustic surveying in 11,166 visual detections and 8,807 acoustic detections.
- Mitigation implementation resulted in 763 ramp-up delays and 215 shutdowns from 2009 through 2015, which were attributed to both acoustic and visual monitoring.
- The proportion of acoustic detections increased annually, and the researchers found a greater number of acoustic detections than visual detections in 2013, 2014, and 2015.
- Observations of whales and dolphins were significantly farther away during full power operations of airgun arrays than during silence, which may signify an avoidance response.



Study Products

Barkaszi MJ, Kelly CJ. 2019. Seismic survey mitigation measures and protected species observer reports: synthesis report. New Orleans (LA): U.S. Department of the Interior, Bureau of Ocean Energy Management. OCS Study BOEM 2019-012. 220 p.

Enhancement of the Environmental Studies Program Information System and the MMC to Provide Environmental Studies Program Data

NATIONAL/MULTI-REGION REGION

ESPIS Link: <https://marinecadastre.gov/espis/#/search/study/27022>

Conducted by: National Oceanic and Atmospheric Administration, National Ocean Service, Quantum Spatial, Inc.

National Studies List: NT-12-01 (2012–2017)

Study Products (available in ESPIS): Final report, data products

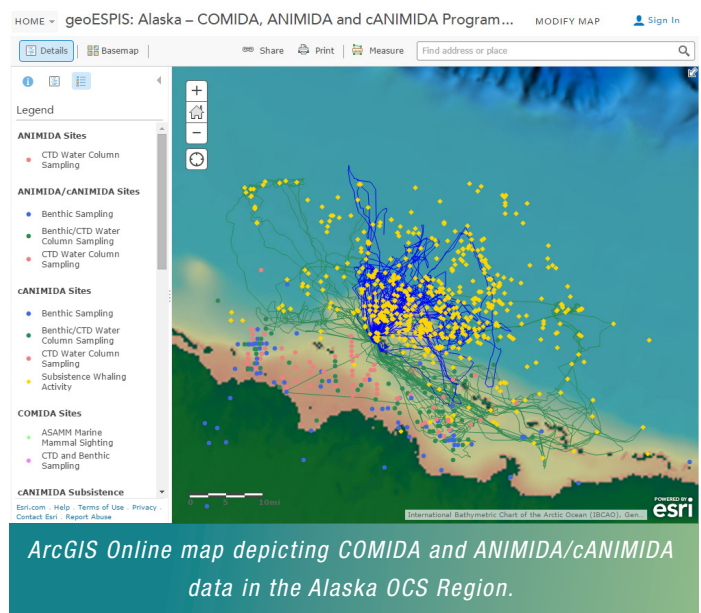
Purpose/Information Use:

This project created an improved Environmental Studies Program Information System (ESPIS) with geospatial search capabilities to streamline the search, discovery, and retrieval of 40+ years of Bureau of Ocean Energy Management (BOEM) Environmental Studies Program (ESP) environmental and social research. The new ESPIS reaches a larger audience, from the scientific community to the general public, who increasingly need access to environmental studies research findings to address their day-to-day ocean uses and regional governance activities, such as marine planning. The project aligns BOEM with future needs and the vision of a digital Federal Government presence that is transparent and accessible to the public.

Findings/Results:

To accomplish its goals, this project completed several tasks:

- Improved the organization of 4,734 original ESPIS documents
- Searched for, prioritized, and collected supporting literature and data product locations
- Developed, retrieved, or manually digitized the footprints for each study
- Created a web portal that allows the system to be searched



Study Products

Ramirez A, Foster E, Krejci K, Stein D. 2019. Enhancement of the Environmental Studies Program Information System and marinecadastre.gov. Sterling (VA): US Department of the Interior, Bureau of Ocean Energy Management. OCS Study BOEM 2019-002.61 p.

Sediment Sorting During Coastal Restoration Projects: Implications for Resource Management, Environmental Impacts, and Multiple Use Conflicts

NATIONAL/MULTI-REGION REGION

ESPIS Link: <https://marinecadastre.gov/espis/#/search/study/100165>

Conducted by: U.S. Army Corps of Engineers

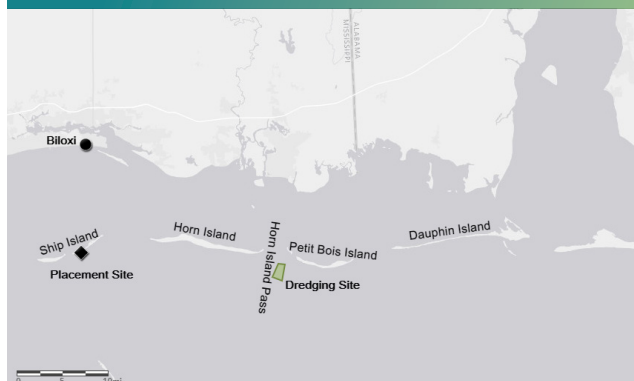
National Studies List: NT-15-05 (2016–2019)

Study Products (available in ESPIS): Final report

Purpose/Information Use:

Beach nourishment projects using sand mined from offshore borrow sites must often meet sediment compatibility requirements, including sediment size, sediment sorting, mineral content, sediment color, and fine sediment content. In many instances, the application of these regulations does not account for changes in these sediment characteristics from borrow areas to beach placement sites. Hopper dredging operations for beach and nearshore placement typically include periods of overflow at the borrow site and outwash at the beach, which changes the fine sediment content and color of sand ultimately placed on the beach compared to that of the borrow area. This study measured and compared sediment characteristics at the borrow area, in the dredge hopper, and on the beach to determine changes in sediment composition and characteristics associated with specific dredging operations. The results of this study will help BOEM better match borrow sites with beach nourishment projects.

Horn Island Pass is located between Horn Island on the west and Petit Bois Island on the east. The Pascagoula Bar Channel provides navigation access through Horn Island Pass.



Findings/Results:

- The study found that 87% of the fine sediment content of the borrow site sediments was removed in the process of dredging and beach placement.
- The dredging process reduced the fine sediment content and lightened the color of the sediment placed on the beach, two important factors for determining sediment compatibility with the native beach.
- This report recommends the application of simple, data-based estimates of fine-sediment removal to ensure compatibility of offshore sands with the receiving beaches.

Study Products

Smith SJ, Priestas AM, Bryant DB, Brutsché KE, Fall KA. 2019. Sediment sorting during hopper dredging and pumpout operations. Sterling (VA): US Department of the Interior, Bureau of Ocean Energy Management. OCS Study BOEM 2019-010. 156 p.

Support for JIP Controlled Exposure Experiments with Humpback Whales and Seismic Air Gun Arrays and Testing of Effectiveness of Ramp-Up

NATIONAL/MULTI-REGION REGION

ESPIS Link: <https://marinecadastre.gov/espis/#/search/study/27001>

Conducted by: University of Sydney, School of Geosciences

National Studies List: NT-10-08 (2011–2017)

Study Products (available in ESPIS): Final report

Purpose/Information Use:

BRAHSS (Behavioural Response of Australian Humpback Whales to Seismic Surveys) aims to understand how humpback whales respond to seismic air gun surveys and to provide the information that will allow these surveys to be conducted efficiently with minimal impact on whales. The product also studied how whales react to ramp-up or soft start used at the start of surveys, and how effective this is as a mitigation measure. The researchers conducted four experiments in September and October of 2010, 2011, 2013, and 2014 (with additional work in 2015) during the southbound migration of humpback whales along the Australian coastlines from their breeding grounds farther north. The study conducted experiments off Peregian Beach north of Brisbane on the east coast, except for the experiment in 2013, which was conducted off Dongara, north of Perth on the west coast. The data from this study will help inform BOEM's analyses of the impacts of seismic air gun surveys.



The small air gun array on the stern of MV Adrianus without the supporting floats. The 20 cu in air gun on the center port side is obscured.

Findings/Results:

- Whale groups consistently showed avoidance behavior of the seismic air gun surveys either by increasing their distance from the source vessel (i.e., moving away) or keeping their distance from the vessel, relative to their predicted paths.
- The dose response for movement behavior showed that groups were most likely to respond to the sounds of air guns if they were within about 3 km of the source and received sound levels were greater than about 140 dB re 1 $\mu\text{Pa}^2\cdot\text{s}$.
- There was no significant difference in movement responses to ramp-up compared to those for a constant sound level. This suggests that the operational use of ramp-up may not be important, and it may be no more effective than starting with a source at constant level. The value of starting at a low sound level is that it limits the exposure at those whales that are close enough to the source at the start.

Study Products

Cato DH, Noad MJ, Dunlop RA, McCauley RD. 2019. Project BRAHSS: Behavioral response of Australian humpback whales to seismic surveys; final report. Sterling (VA): US Department of the Interior, Bureau of Ocean Energy Management. OCS Study BOEM 2019-020. 90 p.

Environmental Sensitivity and Associated Risk to Habitats and Species on the Pacific West Coast and Hawaii with Offshore Floating Wind Technologies

PACIFIC REGION

ESPIS Link: <https://marinecadastre.gov/espis/#/search/study/100175>

Conducted by: ICF

National Studies List: PC-14-05-02 (2016–2018)

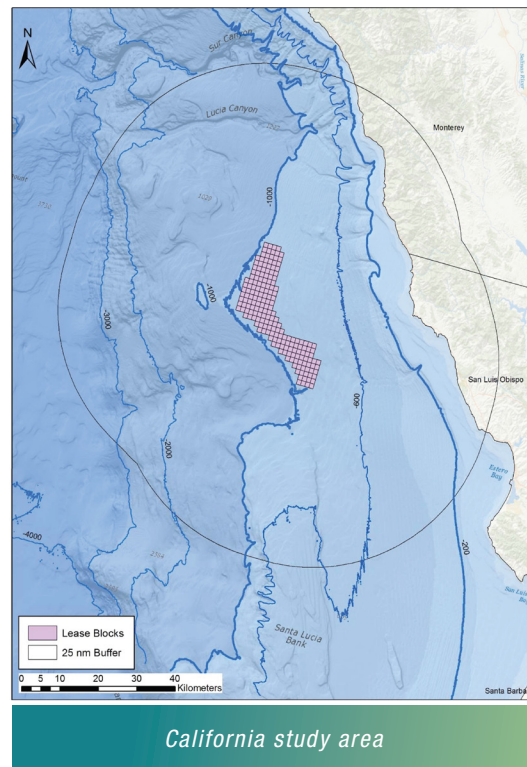
Study Products (available in ESPIS): Final report (3 volumes)

Purpose/Information Use:

As the technological viability of power generation by offshore floating wind (OSW) farms continues to grow and increase the alternative energy initiatives in Federal waters offshore the Pacific West Coast, it is important to understand environmental implications and general knowledge gaps that should be addressed prior to OFW development. This study completed a review of existing sensitivity analyses; a summary of OFW technology and a definition of its major impact-causing factors (ICF); an assessment of large-scale event impacts; a detailed geospatial analysis of various habitat characteristics; and a thorough literature review for 44 fish, invertebrate, mammal, turtle, bird, and bat species in one California and two Hawaii study areas to assess the potential sensitivity of habitats and species to large-scale OFW development. The information contained within the study will help BOEM better understand the potential environmental impacts of OFW.

Findings/Results:

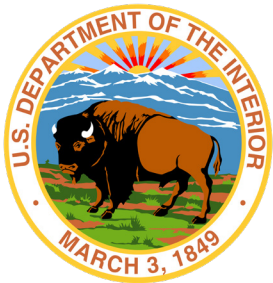
- The study identified species, habitats, seasons, and regions that are potentially most sensitive to various ICFs of OFW for further study.
- The researchers defined eight ICFs from OFW development and determined them to be potential stressors to habitats and species.
- The ICFs that occurred during operation phases had the highest impact duration due to the expected lifespan of an OFW development (e.g., artificial light, collisions, electromagnetic fields, habitat disturbance/displacement, sound/noise).
- During construction and operation, the ICF with the highest impact scale was artificial light, due to its potential spatial reach.
- During all three phases of development, vessel strikes showed the highest impact level.



Study Products

Morandi A, Berkman S, Rowe J, Balouskus R, Reich D, Etkin DS, Moulter C. 2018. Environmental sensitivity and associated risk to habitats and species offshore Central California and Hawaii from offshore floating wind technologies; Volume 1: Final Report. Camarillo (CA): US Department of the Interior, Bureau of Ocean Energy Management. OCS Study BOEM 2018-031. 100 p.

See also Volumes 2 and 3



The Department of the Interior Mission

The Department of the Interior protects and manages the Nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated island communities.



The Bureau of Ocean Energy Management

The mission of the Bureau of Ocean Energy Management is to manage development of U.S. Outer Continental Shelf energy and mineral resources in an environmentally and economically responsible way.

The BOEM Environmental Studies Program

The mission of the Environmental Studies Program (ESP) is to provide the information needed to predict, assess, and manage impacts from offshore energy and marine mineral exploration, development, and production activities on human, marine, and coastal environments. The proposal, selection, research, review, collaboration, production, and dissemination of each of BOEM's Environmental Studies follows the DOI Code of Scientific and Scholarly Conduct, in support of a culture of scientific and professional integrity, as set out in the DOI Departmental Manual (305 DM 3).

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