Quarterly Reports

FY 2020 Third Quarter

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

BOEM
Bureau of Ocean Energy Management

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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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Satellite Tracking of Bowhead Whales: Habitat Use, Passive Acoustic and Environmental Monitoring

ESPIS Link: *https://marinecadastre.gov/espis/#/search/study/26866*
Conducted by: Alaska Department of Fish and Game
National Studies List: AT-12-02
Study Products (available in ESPIS): Final report, technical summary, related publications

A tail-slapping bowhead whale

Purpose/Information Use:

From 2012–2019, researchers worked with Native whalers from Alaska and marine mammal hunters from Canada to attach 28 satellite transmitters to bowhead whales. A total of 89 bowhead whales were tagged since the project began in 2006: 16 bowhead whales near Utqiaġvik (formerly Barrow), Alaska; 9 near the Tuktoyaktuk Peninsula, Canada; and 3 near St. Lawrence Island, Alaska. Researchers combined information from all whales tagged to document movements and behavior. The western Arctic (or Bering-Chukchi-Beaufort) stock of bowhead whales is of high importance due to their nutritional and cultural value to coastal Alaska Natives of the Bering, Chukchi, and Beaufort Seas; their role in the marine ecosystem; and because their range overlaps with areas identified for potential oil and gas development and shipping. Increased understanding of bowhead whale movements, habitat use, and behavior will aid in resource planning and bowhead conservation.

Findings/Results:

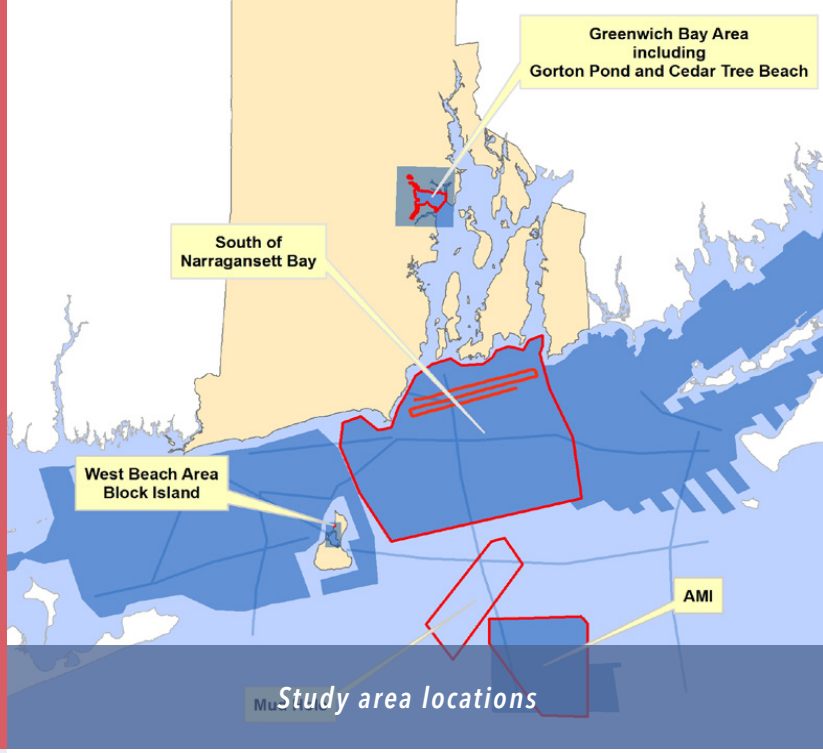
- After documenting the extensive summer movements and timing of western Arctic bowhead whales, researchers quantified six areas where whales spend time and likely feed in summer: two in Canada; one in Alaska; and three in Russia.
- During the spring migration, most bowheads travel directly from the Bering Sea to the Canadian Beaufort, with only one migrating up Russia's Chukotka coast.
- The summer distribution of bowheads is much more dispersed, with more complicated movements than originally thought. Some tagged bowheads use the entire Beaufort in summer by "looping" between the Amundsen Gulf and Chukchi Sea.
- The fall migratory corridor in the Chukchi Sea between Point Barrow and the Bering Strait varied over the years, with increased use of the north-central Chukchi Sea and decreased use of coastal Chukotka, Russia, during the study's later years. This shift appears related to factors that concentrate krill in certain regions.

Study Products

Quakenbush, LT, Citta JJ. 2019. Satellite tracking of bowhead whales: habitat use, passive acoustic, and environmental monitoring. Anchorage (AK): U.S. Dept. of the Interior, Bureau of Ocean Energy Management, Alaska Outer Continental Shelf Region. 60 p. plus appendices. Report No.: OCS Study BOEM 2019-076.

Developing Protocols for Reconstructing Submerged Paleocultural Landscapes and Identifying Ancient Native American Archaeological Sites in Submerged Environments

ESPIS Link: *https://marinecadastre.gov/espis/#/search/study/100059*
Conducted by: University of Rhode Island
National Studies List: AT-12-01
Study Products (available in ESPIS): Final report, technical report, related publication



Study area locations

Purpose/Information Use:

The Outer Continental Shelf (OCS) of the United States is increasingly becoming the focus of conventional and renewable energy development to meet the nation's energy needs. Consideration of the effects this development may have on submerged Native American (Tribal) historic properties is a legislatively mandated responsibility for Federal agencies, including the U.S. Department of the Interior's Bureau of Ocean Energy Management, which reviews and permits these undertakings. It is also a significant concern for individual states, Tribes, other regulatory agencies, stakeholders, and researchers that participate in the environmental review process for offshore development projects.

Findings/Results:

- This project developed best practices to improve the effectiveness of Tribal engagement and geoarchaeological site characterization associated with the permitting process for offshore energy development on the OCS.
- The study helped to establish a methodology to better locate, identify, and understand ancient sites where indigenous people may have been present on the OCS.
- It is an example of how collaborative projects can foster meaningful interaction between different parties and develop best practices to address cultural, scientific, and archaeological aspects of offshore energy development.

Report, related publications, and a video:

Report: King JW, Robinson DS, Gibson CL, Caccioppoli BJ. 2020. Developing protocols for reconstructing submerged paleocultural landscapes and identifying ancient Native American archaeological sites in submerged environments. Sterling (VA): U.S. Department of the Interior, Bureau of Ocean Energy Management. 24 p. Report No.: OCS Study BOEM 2020-023.

Video: *Submerged Paleocultural Landscapes Project*

Atlantic Fish Telemetry: Movement and Habitat Selection by Migratory Fishes Within the Maryland Wind Energy Area and Adjacent Sites

ESPIS Link: *https://marinecadastre.gov/espis/#/search/study/100109*

Conducted by: University of Maryland Center for Environmental Science

National Studies List: AT-16-01b

Study Products (available in ESPIS): Final report, technical summary, related publications

Acoustic release mooring design

Purpose/Information Use:

Prior to offshore wind development, baseline information is needed on endangered species such as the Atlantic sturgeon. Between 2017–2019, an extensive acoustic telemetry project monitored the timing and location of Atlantic sturgeon, winter skate, and other acoustically telemetered species in the Delaware Wind Energy Area. This study was conducted to better understand the potential of encountering these species during future development in the area, as well as address potential impacts to commercial fisheries (e.g., winter skate) and develop environmentally driven models of Atlantic sturgeon and winter skate. Between Feb 2017 and Feb 2019, receivers recorded 43,620 detections of 360 individual Atlantic sturgeon. Acoustic detections from all receivers in the array documented the presence of 26 different marine fish and mammals, which creates a baseline to inform future monitoring efforts. BOEM will use this baseline information for environmental assessments of offshore wind development. It will also improve future post-construction telemetry studies of fish

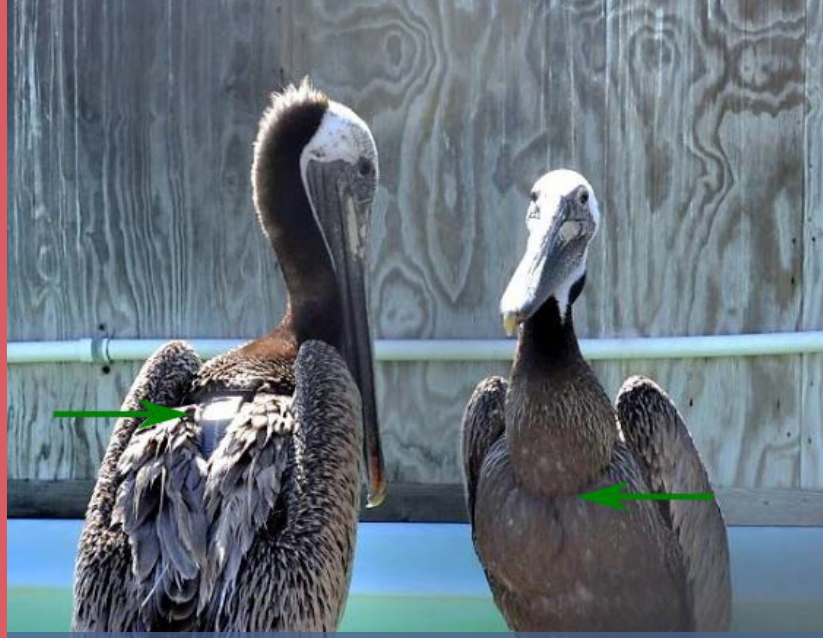
Findings/Results:

- Atlantic sturgeon were observed during all months of the period but occurred most frequently in the late fall/early winter.
- Atlantic sturgeon were most concentrated in the northern portion of the study region, except in the late fall/early winter, when they were detected throughout the entire array.
- Winter skate occurred less commonly and were concentrated in the shallowest portion of the study region.
- Both species appear to be related to bottom type and topography, which is most distinctive in the northern portion of the Delaware Wind Energy Area.

Final Report: Secor D, O'Brien M, Rothermel E, Wiernicki C, Bailey H. 2020. Movement and habitat selection by migratory fishes within the Maryland Wind Energy Area and adjacent reference sites. Sterling (VA): U.S. Department of the Interior, Bureau of Ocean Energy Management, Office of Renewable Energy Programs. 109 p. Report No.: OCS Study BOEM 2020-030.

Eastern Brown Pelicans: Dispersal, Seasonal Movements, and Monitoring of PAHs and Other Contaminants in the Northern Gulf of Mexico

ESPIS Link: *https://marinecadastre.gov/espis/#/search/study/100037*
Conducted by: US Geological Survey
National Studies List: GM-12-03
Study Products (available in ESPIS): Final report, technical report, data, related publications



Positioning of GPS transmitter and harness

Purpose/Information Use:

We investigated spatial, reproductive, and physiological ecology of brown pelicans *(Pelecanus occidentalis)* throughout the northern Gulf of Mexico (GOM). The GOM contains a high density of oil infrastructure and also supports a rich assemblage of seabirds. Understanding the effects of oil and gas activity on seabirds in the region requires a thorough understanding of reproductive ecology, foraging ecology, physiology, and habitat use. Because of its distribution patterns, behavior, and known sensitivity to contaminants, the brown pelican is a good indicator of species-level effects of interaction with coastal and marine development.

Findings/Results:

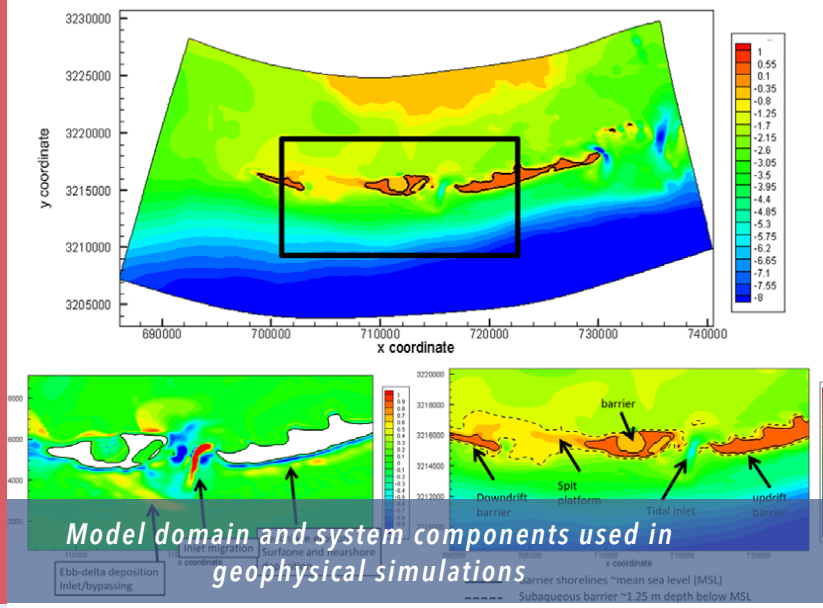
- Home range size and the probability and distance of migration were positively correlated with colony size.
- Pelicans from all colonies overlapped in space use in the Mississippi River Delta region of Louisiana during the nonbreeding season.
- Diet was primarily menhaden in the eastern and central regions but was more varied in the western region.
- Risk of exposure to contaminants was often higher in the western and central GOM compared to the eastern GOM, although factors other than region also contributed to exposure risk.

Final Report:

Lamb JS, Satgé YG, Streker RA, Jodice PGR. 2020. Ecological drivers of brown pelican movement patterns, health, and reproductive success in the Gulf of Mexico. New Orleans (LA): US Department of the Interior, Bureau of Ocean Energy Management. 234 p. Report No.: BOEM 2020-036.

Economic and Geomorphic Comparison of Outer Continental Shelf Sand and Nearshore Sand for Coastal Restoration Projects

ESPIS Link: *https://marinecadastre.gov/espis/#/search/study/100206*
Conducted by: Louisiana State University
National Studies List: GM-14-03-06
Study Products (available in ESPIS): Final report, technical summary



Model domain and system components used in geophysical simulations

Purpose/Information Use:

The goal of this project was to provide a better understanding of the geomorphic and economic benefits and costs of using Outer Continental Shelf (OCS) sediment compared to nearshore (NS) sediment for coastal restoration projects in coastal Louisiana over a 50-year period. The study involved developing and coupling geomorphic and economic sub-models into a decision support framework to assess a wide range of economic trade-offs related to sediment characteristics, technological limitations, sediment transport distance, project scale (spatial and temporal) seasonal risks, and environmental policy.

Findings/Results:

- The higher cost of sediment transport for OCS-sourced projects can be offset in certain cases by the reduced handling losses and increased resilience of larger diameter sands.
- In both baseline and in storm-punctuated scenarios modeled to cover a 50-year project trajectory, researchers found physical advantages in resilience (retaining increased volume and area) for larger grain sands (OCS at 160, 165, 200 µm) compared to nearshore sediments (156 µm). Physical resilience translated to economic efficiencies with increases in sand grain size. Several OCS-sourced project scenarios were found to have lower break-even values (more efficient) than NS-sourced projects with shorter transport distances and lower quality sediment.
- Though project costs are primarily a function of sediment quantity and distance, project efficiency requires a performance-based metric to maximize the return on investment from restoration spending.

Final report:

Caffey RH, Petrolia D, Georgious IY, Miner M, Wang H, Kime B. 2020. Economic and geomorphic comparison of Outer Continental Shelf sand and nearshore sand for coastal restoration projects. New Orleans (LA): US Department of the Interior, Bureau of Ocean Energy Management Report No.: OCS Study BOEM 2020-035. 56 p.

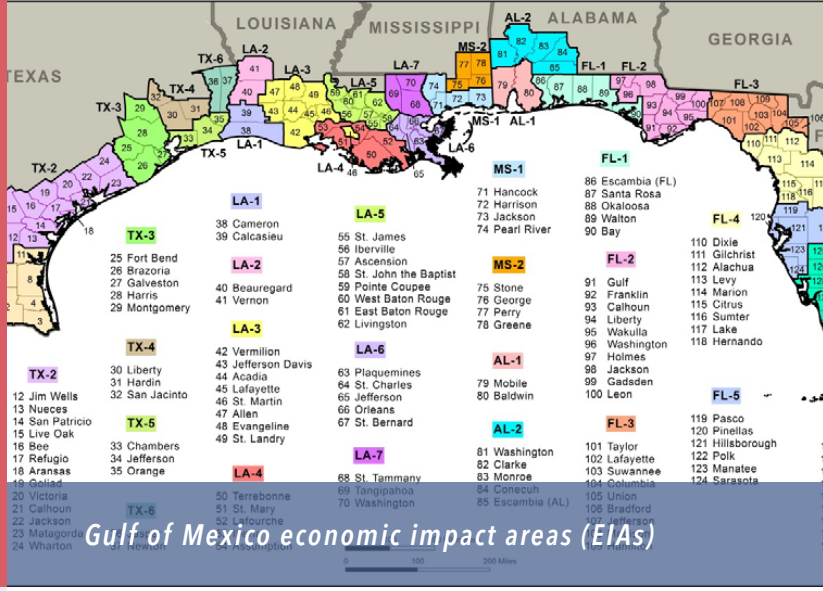
Estimating the Fiscal, Spending, and Profit Impacts of Offshore Oil and Gas Activities

ESPIS Link: *https://marinecadastre.gov/espis/#/search/study/100221*

Conducted by: Industrial Economics, Inc. (IEc)

National Studies List: GM-17-06

Study Products (available in ESPIS): Final report, technical summary



Gulf of Mexico economic impact areas (EIAs)

Purpose/Information Use:

To enhance its capacity for assessing the economic and fiscal impacts of oil and gas activities in the Gulf of Mexico (Gulf) Outer Continental Shelf (OCS) region, BOEM contracted IEc to develop the Cumulative Impacts Model (CIM) and the Lifecycle Impacts Model (LCIM). The development of the CIM and LCIM built upon previous economic and financial analysis frameworks developed by BOEM. The CIM estimates the economic and fiscal impacts of all OCS oil and gas activity occurring in the Gulf for the time period analyzed, which may be a recent historical year or a forecast period of up to 15 years. In contrast, the LCIM estimates the economic impacts and various metrics of financial viability associated with an individual lease or group of leases over their entire life cycle. The economic impacts estimated by the two models include the output, value added, income, and employment associated with OCS oil and gas activity. The estimates of these impacts reflect direct impacts realized by the offshore oil and gas industry, as well as spillover effects to other industries. Complementing their estimates of economic impacts, the CIM and LCIM also calculate the revenues received by Federal, state, and local governments due to OCS oil and gas activities.

Findings/Results:

- IEc developed scenario input templates for entering scenario-specific input data to be used in both CIM and LCIM.
- The economic and fiscal impacts of OCS oil and gas activities depend on a multitude of factors that may vary significantly between scenarios or over time within a scenario. The CIM and LCIM provide a systematic framework that accounts for these factors, enabling BOEM to estimate economic and fiscal impacts consistently across scenarios and over time.
- The outputs generated by these models will provide a more complete picture of the economic and fiscal impacts of OCS oil and gas activity for BOEM's future analyses.

Final Report:

Price JC, Ewen MD, Isom J, Ebersole J, Lehr J. 2020. Cumulative impacts model and lifecycle impacts model for assessing economic and fiscal impacts of offshore oil and gas activities. New Orleans (LA): US Department of the Interior, Bureau of Ocean Energy Management. 108 p. Report No.: OCS Study BOEM 2020-032.

DOI Partnership: Distinguishing Between Human and Natural Causes of Change in Nearshore Ecosystems Using Long-term Data from DOI Monitoring Programs

ESPIS Link: *https://marinecadastre.gov/espis/#/search/study/26950*

Conducted by: Industrial Economics, Inc. (IEc)

National Studies List: PC-11-02

Study Products (available in ESPIS): Final report

Map of kelp forest monitoring site locations

Purpose/Information Use:

The purpose of this project was to distinguish between human and natural causes of changes in nearshore ecosystems using long-term data (beginning in 1980) from Department of the Interior (DOI) monitoring programs. The partnership set four primary objectives:

(1) work with two DOI agencies to assimilate, document, and publish their long-term data sets on kelp forest community structure at the northern Channel Islands and San Nicolas Island;

(2) expand the spatial scope of these data sets by integrating them with other long-term kelp forest monitoring programs in the region and with appropriately scaled temporal and spatial environmental data to produce a data resource with unrivaled temporal, spatial, and taxonomic scope;

(3) analyze integrated data sets across multiple spatial and temporal scales to ascertain patterns of variation in population and community dynamics and to identify key environmental and anthropogenic factors that drive them; and

(4) use the fully integrated data sets to collaborate with BOEM partners and other BOEM-funded programs on issues relevant to BOEM's mission.

The project's value to BOEM lies in its ability to assist managers in detecting and evaluating possible impacts from offshore energy activities, and in developing options to mitigate these impacts. The data sets will also aid in predicting potential ecosystem impacts due to climate change and in advancing adaptive management, both of which are goals central to DOI stewardship responsibilities and trust resources.

Findings/Results:

- When developing a program, the spatial extent of monitored sites should consider the spatial extent of expected perturbations or impacts. In general, small-scale impacts are difficult to detect.
- The ability of a monitoring program to detect impacts is enhanced if (1) a suite of species is monitored rather than a single species, and (2) analyses adjust for the correlation of populations size through time.

Final Report:

Reed DC, Rassweiler A. 2020. DOI partnership: distinguishing between human and natural causes of changes in nearshore ecosystems using long-term data from DOI monitoring programs. Camarillo (CA): US Department of the Interior, Bureau of Ocean Energy Management. 117 p. Report No.: OCS Study BOEM 2019-063.

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.

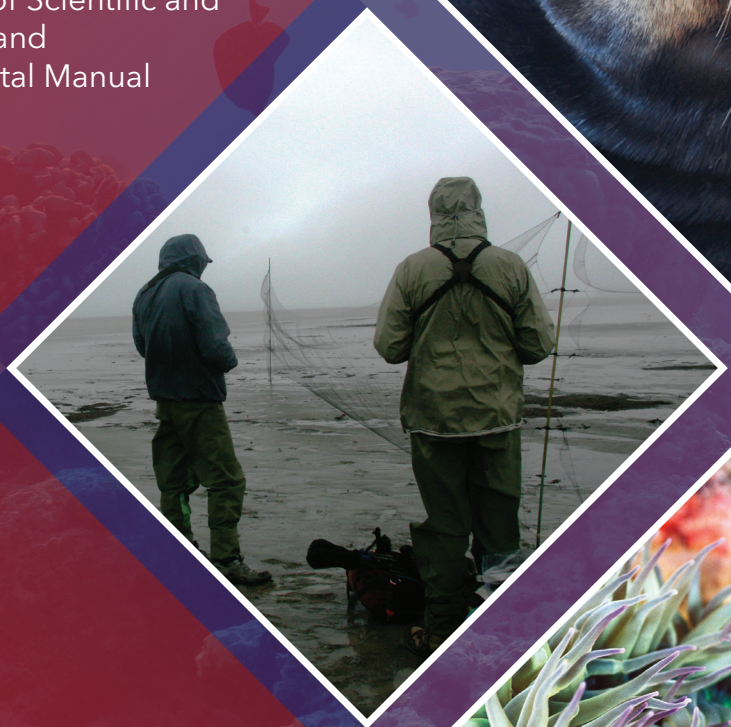
The Bureau of Ocean Energy Management

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).

Visit us at **www.boem.gov/studies**



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