

# Quarterly Reports

FY 2020 First Quarter

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).

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# Comprehensive Seafloor Substrate Mapping and Model Validation in the Atlantic

**ESPIS Link:** <https://marinecadastre.gov/espis/#/search/study/100106>

**Conducted by:** National Oceanic and Atmospheric Administration (NOAA), National Centers for Coastal Ocean Science (NCCOS)

**National Studies List:** AT-15-06

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



*NCCOS scientist opening the mapping and model validation sampler to release the sediment sample into the bin below*

## Purpose/Information Use:

Previous work by NCCOS to characterize the ocean floor offshore New York identified the need for further site-specific baseline habitat and geologic information within New York Wind Energy Area (NYWEA) and the Mid-Atlantic region.

In this study, BOEM worked with NCCOS to evaluate the potential impact of proposed wind development activities on biological, social, physical and economic resources. The study area encompasses 19,337 mi<sup>2</sup> of coastal and ocean waters off the coast of New York, including state and Federal waters from the southern shores of Long Island to the edge of the continental shelf and from Nantucket Shoals to the shores of New Jersey.

BOEM will use the results of the study to provide baseline data for analysis of proposed development activities.

## Findings/Results:

- A seafloor analysis indicated the seafloor in the study area is generally flat (< 0.2 degrees slope), with a maximum slope of 4.3 degrees, and 99.9% of the area having slope of less than 1.5 degrees.
- In situ sampling indicated the NYWEA is comprised primarily of sand with broken shells. Ripples are the dominant geoform in the study area, and there is an extensive distribution of the common sand dollar and annelids.
- The sediment texture of NYWEA is predominantly well-sorted sand with a conglomeration of pebbles in western portions of the study area.
- Small fish were more abundant and broadly distributed throughout the survey area compared to medium and large size fish, which were strongly associated with the northwest portion of the survey area

## Study Products

Battista T, Sautter W, Poti M, Ebert E, Kracker L, Kraus J, Mabrouk A, Williams B, Dorfman DS, Husted R, Jenkins CJ. 2019. Comprehensive seafloor substrate mapping and model validation in the New York Bight. Sterling (VA): U.S. Department of the Interior, Bureau of Ocean Energy Management. 187 p. Report No.: OCS Study BOEM 2019-069 and NOAA Technical Memorandum NOS NCCOS 255.

# Atlantic Ocean Energy and Mineral Science Forum

**ESPIS Link:** <https://marinecadastre.gov/espis/#/search/study/100269>

**Conducted by:** Bureau of Ocean Energy Management (BOEM)

**National Studies List:** AT-16-07a

**Study Products (available in ESPIS):** Final report



*Deepwater Wind*

## Purpose/Information Use:

BOEM hosted the Atlantic Ocean Energy and Mineral Science Forum (Forum) on November 16 and 17, 2016, in Sterling, Virginia, to present ongoing and recently completed studies that address environmental questions and collect scientific data in support of expansion of energy and non-energy related activities on the Atlantic Outer Continental Shelf. The Forum's objectives were to

- 1) share with the public, including stakeholders and partners in the ocean science community, information from BOEM's and other recently completed studies and ongoing science activities in the Atlantic region;
- 2) identify research needs/information gaps for the development of new studies through BOEM's Environmental Studies Program; and
- 3) provide the public an opportunity to learn how BOEM utilizes the best available scientific information to support our decision-making processes.

The Forum followed an interdisciplinary format to provide the public updates for fish and fisheries, marine mammals, coastal and marine birds, social and cultural resources, environmental stressors, and sound propagation studies, as well as an update on the marine minerals program resource evaluation efforts.

## Findings/Results:

- In all, there were 34 presentations, which are available for viewing in the final report.

## Study Products

Boatman MC, editor. 2017. Atlantic ocean energy and mineral science forum, November 16–17, 2016. Sterling (VA): U.S. Department of the Interior, Bureau of Ocean Energy Management. 695 p. Report No.: OCS Study BOEM 2017-016.

# Simulation Modeling of Ocean Circulation and Oil Spills in the Gulf of Mexico

**ESPIS Link:** <https://marinecadastre.gov/espis/#/search/study/100032>

**Conducted by:** RPS ASA

**National Studies List:** GM-11-02

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



Surface oil spilllets from one model time step overlain on the GOM model grid

## Purpose/Information Use:

One of the goals of the Bureau of Ocean Energy Management's (BOEM's) Environmental Studies Program is to perform fates and effects studies to evaluate the physical, chemical and biological processes that affect the impacts of oil and gas drilling and production discharges, spilled oil, and oil dispersants on biological communities. BOEM needs to be able to simulate spill plume behavior in surface and subsurface waters and to perform oil spill risk assessments to help meet research and management goals. Having this capability is essential if BOEM is to understand and quantify the consequences of oil spills and generate accurate risk assessments and effective oil spill contingency plans. The model developed in this study provides a characterization of the potential oil exposure from a 45,000 barrels of oil per day well blowout in different parts of the Gulf of Mexico.

## Findings/Results:

- The time required for the oil to reach the surface and the spatial extent of the oil depend on a number of factors, including the location of the blowout, water depth, use of direct dispersant injection, and crude oil type.
- While the oil droplets are below the surface, a small fraction of the oil dissolves, which might affect sensitive species.
- On the water surface, the floating oil can adversely affect socioeconomic and ecological resources. A significant fraction of the oil is lost to evaporation or dispersed into the water column by breaking waves, where more dissolution would occur.
- In many instances, surface oil ends up on shorelines in amounts large enough to have negative effects on socioeconomic or ecological resources.

## Study Products

Galagan, CW, French-McCay D, Rowe J, McStay L, Crowley, D. 2018. Simulation modeling of ocean circulation and oil spills in the Gulf of Mexico. Volume I: Synthesis report. New Orleans (LA): U.S. Department of the Interior, Bureau of Ocean Energy Management. 164 p. Report No.: OCS Study BOEM 2018-039.

See also Volumes II and III.

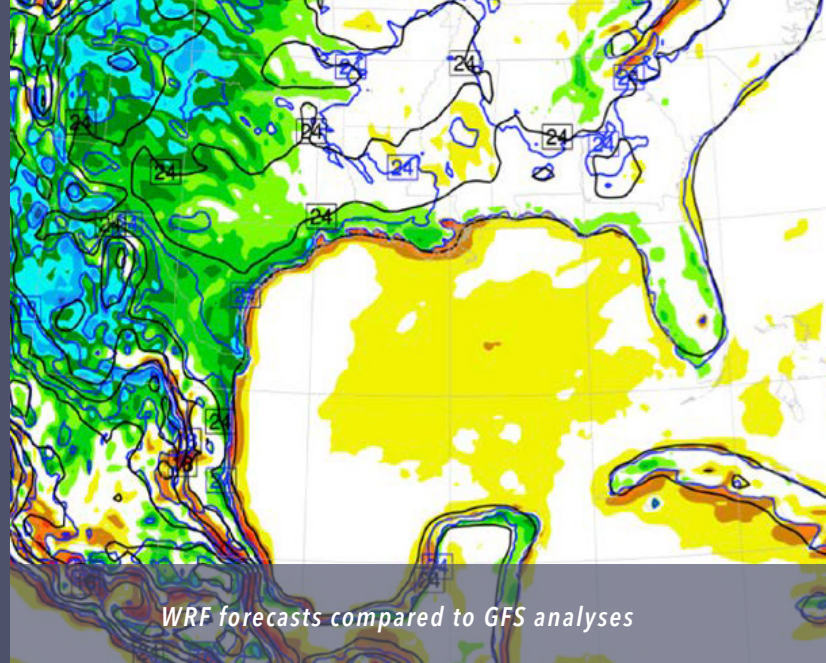
# Enhancing the Capability of a New Meteorological Model for Air Quality and Other BOEM Applications in the Gulf of Mexico

**ESPIS Link:** <https://marinecadastre.gov/espis/#/search/study/100044>

**Conducted by:** National Science Foundation, National Center for Atmospheric Research

**National Studies List:** GM-13-04

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



## Purpose/Information Use:

The Bureau of Ocean Energy Management (BOEM) is responsible under the Outer Continental Shelf Lands Act for determining the potential air impacts of oil and natural gas platforms and other oil and natural gas production sources. Thus, meteorological information about the Gulf of Mexico (GOM) and its coastal areas is central BOEM's mission. To assess the likely transport, dispersion, and modification of air pollutants emitted offshore, BOEM requires estimates of instantaneous and coastal meteorological conditions in the GOM OCS, particularly in the central and western GOM (west of longitude 87.5°).

The study goals were to 1) improve the accuracy of an advanced meteorological model (the Weather Research and Forecasting [WRF] model) and its physics to produce the meteorological fields used in air quality modeling; 2) incorporate observational and remote sensing data into the model; and 3) modify the WRF model by including the air-sea interaction and the atmospheric boundary layer processes over the ocean and near the sea-land transition zone. The study results will help inform policy decisions about the development of outer continental shelf energy and mineral resources.

## Findings/Results:

- Approximately 7,300 gridded 15-km analyses of meteorological conditions over the Gulf were produced for 2011–2016, together with approximately 44,000 individual 5-km forecasts.
- The modified WRF models significantly reduced biases in the near-surface variables compared to the previous version of the WRF model.

## Study Products

Snyder C, Liu Z, Rizvi RH. 2019. Enhancing the capability of a new meteorological model for air quality and other BOEM applications in the Gulf of Mexico. New Orleans (LA): US Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region. 45 p. Report No.: OCS Study BOEM 2019-071.

# Empirical Analysis of the OCS Pipeline Network in the Gulf of Mexico

**ESPIS Link:** <https://marinecadastre.gov/espis/#/search/study/100049>

**Conducted by:** Louisiana State University

**National Studies List:** GM-14-03-02

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



## Purpose/Information Use:

Offshore pipelines serve a critical role in linking offshore oil and gas production with onshore demand centers. The pipeline network in the Gulf of Mexico (GOM) Outer Continental Shelf (OCS) is the largest and most complex offshore pipeline system in the world. In 2018, total installed pipeline in the GOM was approximately 47,000 miles—enough to circle the Earth twice. Despite the importance of the pipeline network to oil and gas activity in the GOM, there are no comprehensive public reports on OCS pipeline statistics, few analyses on activity data and trends, and no models that quantify and improve our understanding of OCS pipeline landfalls and the usable life of the system. The result is a network that is poorly documented with major information gaps. This study addresses these information gaps by providing empirical analysis of activity data of OCS pipeline infrastructure.

BOEM will use this information to help improve pipeline management and reduce environmental risk.

## Findings/Results:

- The final report provides information on the offshore pipeline construction industry and networks that operate in the GOM OCS, the regulatory structure that governs operations, pipeline activity trends, and construction and decommissioning costs in the region.
- In 2018, over 80% of crude production and about two-thirds of natural gas supply in the US GOM OCS was produced in water greater than 400 feet deep.
- Deepwater oil is on an upward trajectory, while shallow water oil is trending downward; gas production in both deep and shallow water is declining.
- As production trends diverge, the importance of the infrastructure and activity trends in each region will also diverge, with the structures and pipelines in deepwater becoming more critical in the years ahead and shallow water infrastructure becoming less important.

## Study Products

Kaiser MJ, Narra S. 2019. The offshore pipeline construction industry and activity modeling in the US Gulf of Mexico. New Orleans (LA): US Department of the Interior, Bureau of Ocean Energy Management. 417 p. Report No.: OCS Study BOEM 2019-070.

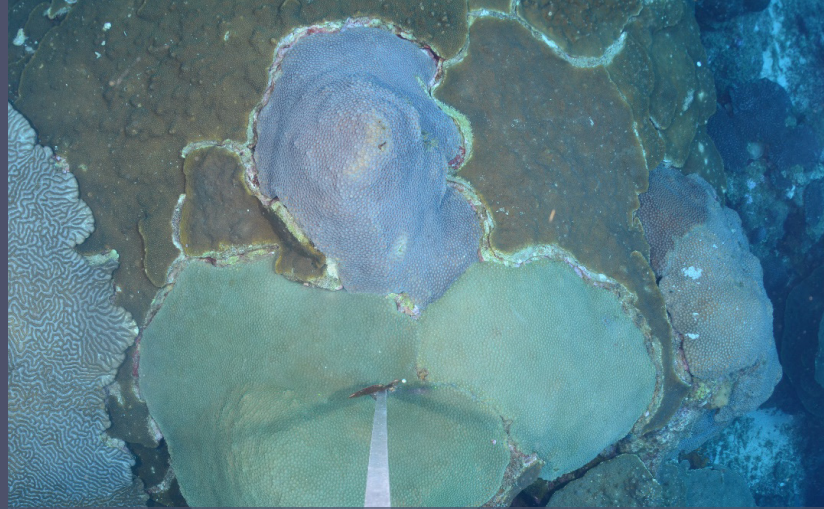
# Long-Term Coral Reef Monitoring at the Flower Garden Banks, Gulf of Mexico: 2016-2018

**ESPIS Link:** <https://marinecadastre.gov/espis/#/search/study/100159>

**Conducted by:** NOAA Flower Garden Banks National Marine Sanctuary

**National Studies List:** GM-16-02

**Study Products (available in ESPIS):** Links to NOAA annual reports



*East Flower Garden Bank repetitive deep photostation #07 in 2017 with camera mounted above aluminum t-frame (Photo: G.P. Schmahl, NOAA/FGBNMS)*

## Purpose/Information Use:

Since 1989, a federally supported long-term coral reef monitoring program co-funded by the Bureau of Ocean Energy Management (BOEM) and the National Oceanic and Atmospheric Administration has focused on two study sites atop East Flower Garden Bank (EFGB) and West Flower Garden Bank (WFGB) in the northwestern Gulf of Mexico. In 29 years of nearly continuous monitoring, live corals have consistently covered at least 50% of these two study sites. Despite global coral reef declines in recent decades, EFGB and WFGB have suffered only minimal impacts from hurricanes, recovered from rare coral bleaching events, and shown no evident signs of disease. BOEM uses the data collected by this program to continuously monitor the environmental health of these two areas, which are surrounded by offshore oil and gas operations. The long-term monitoring program exists to help detect any subtle or chronic effects that could potentially impact community integrity as a result of natural and man-induced activities.

## Findings/Results:

- Living coral is the main component of the benthic community (organisms living on and just above the seabed) at EFGB and WFGB, followed by macroalgae, colonizable substrates, and sponges.
- A total of 16 coral species were documented in coral demographic surveys at EFGB and 18 at WFGB (22 species documented for both banks combined). Overall mean coral density was 5 corals/m<sup>2</sup> at both sites.
- Long-spined sea urchin density within the EFGB study site has remained low (ranging from 0–2 per 100 m<sup>2</sup>), but densities within the WFGB study site (1–21 per 100 m<sup>2</sup>) have been significantly higher than EFGB through 2018.
- A total of 29 families and 70 fish species were recorded in 2018 surveys, with wrasses, parrotfish, and damselfish being the most common fish families observed.

## Study Products

Johnston, MA, Blakeway RD, O'Connell K, MacMillan J, Nuttall MF, Hu X, Embesi JA, Hickerson EL, Schmahl GP. 2020. Long-term monitoring at East and West Flower Garden Banks: 2018 annual report. Galveston (TX): U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Flower Garden Banks National Marine Sanctuary. 124 p. Report No.: National Marine Sanctuaries Conservation Series ONMS-20-09.

See also [2017 Annual Report](#).



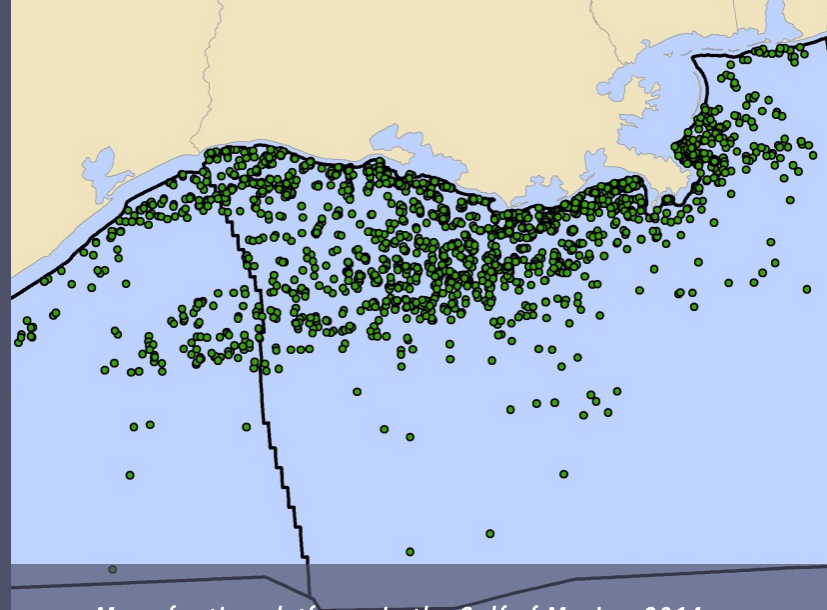
# Year 2017 Gulfwide Emissions Inventory Study

**ESPIS Link:** <https://marinecadastre.gov/espis/#/search/study/100161>

**Conducted by:** Eastern Research Group, Inc.

**National Studies List:** GM-16-04

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



*Map of active platforms in the Gulf of Mexico, 2014*

## Purpose/Information Use:

The Bureau of Ocean Energy Management (BOEM) is responsible under the Outer Continental Shelf Lands Act for determining the potential air impacts of oil and natural gas platforms and other oil and natural gas production sources. BOEM also has responsibilities under the National Environmental Policy Act to assess the cumulative air quality impacts of oil and natural gas production. The goal of this study is to develop an air pollutant emissions inventory for all Gulf of Mexico (GOM) Outer Continental Shelf (OCS) oil and gas production-related sources for 2017. The results of the study will provide BOEM the tools needed to assess the extent to which OCS oil and gas activities impact the states and provide the states with the information they need to perform their State Implementation Plan demonstrations to the US Environmental Protection Agency.

## Findings/Results:

- OCS oil and gas production platforms, and production-related vessels and helicopters account for 99% of total methane emissions, 74% of carbon monoxide emissions, 59% of volatile organic compound emissions, 36% of particulate matter emissions, 34% of nitrogen oxides emissions, and 21% of sulfur dioxide emissions in the GOM inventory.
- Between 2014 and 2017 the overall total emissions estimates for all sources decreased, except for a very slight increase in the nitrogen dioxide emissions, due to the addition of boilers as an emission source on commercial marine vessels.
- The overall total criteria pollutant and greenhouse gas emission estimates for non-platform OCS oil and gas production sources decreased in 2017.
- Between 2005 and 2017, deepwater platforms accounted for an increasing portion of the emissions, despite only minor changes in the number of these platforms.

## Study Products

Wilson D, Billings R, Chang R, Do B, Enoch S, Perez H, Sellers J. 2019. Year 2017 emissions inventory study. New Orleans (LA): US Department of the Interior, Bureau of Ocean Energy Management. 231 p. Report No.: OCS Study BOEM 2019-072.

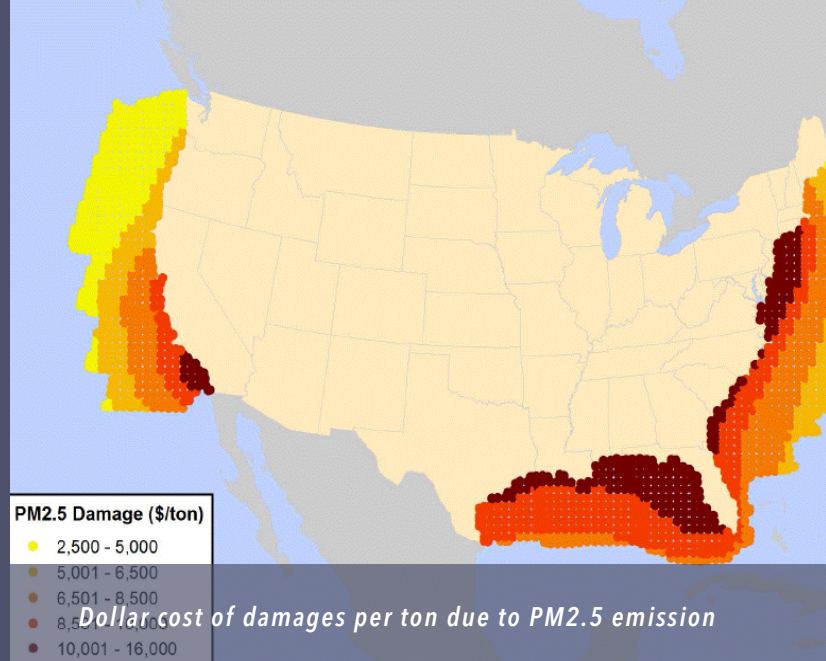
# Update and Improve BOEM's Offshore Environmental Cost Model and Related Analyses

**ESPIS Link:** <https://marinecadastre.gov/espis/#/search/study/100234>

**Conducted by:** Industrial Economics, Inc.

**National Studies List:** NT-18-x01

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



## Purpose/Information Use:

To inform development of the National Outer Continental Shelf (OCS) Oil and Gas Leasing Program, the Bureau of Ocean Energy Management (BOEM) relies upon the Offshore Environmental Cost Model (OECM) to estimate the environmental and social costs (ESC) of program scenarios under consideration. This project was designed to update model data and refine the OECM's methods for estimating several categories of ESC. The update to the model did not generate any analytic results *per se*, but BOEM will generate results when it uses the revised model to assess the impacts of the National OCS Oil and Gas Leasing Program in the future. These updates and refinements will help ensure that the OECM provides policymakers with reliable ESC estimates.

## Findings/Results:

- The refinements made to the OECM represent important improvements to the model.
- Across multiple cost categories, the model now estimates impacts based on more recent data.
- The methodological improvements to the OECM enable the model to assess ecological impacts and impacts related to changes in crude oil and refined petroleum exports more rigorously than was previously possible.

## Study Products

Industrial Economics, Inc. 2018. Forecasting environmental and social externalities associated with Outer Continental Shelf (OCS) oil and gas development, Volume 1: 2018 revised Offshore Environmental Cost Model (OECM). Sterling (VA): U.S. Department of the Interior, Bureau of Ocean Energy Management. 120 p + appendices. Report No.: OCS Study BOEM 2018-066.

See also Volume 2.

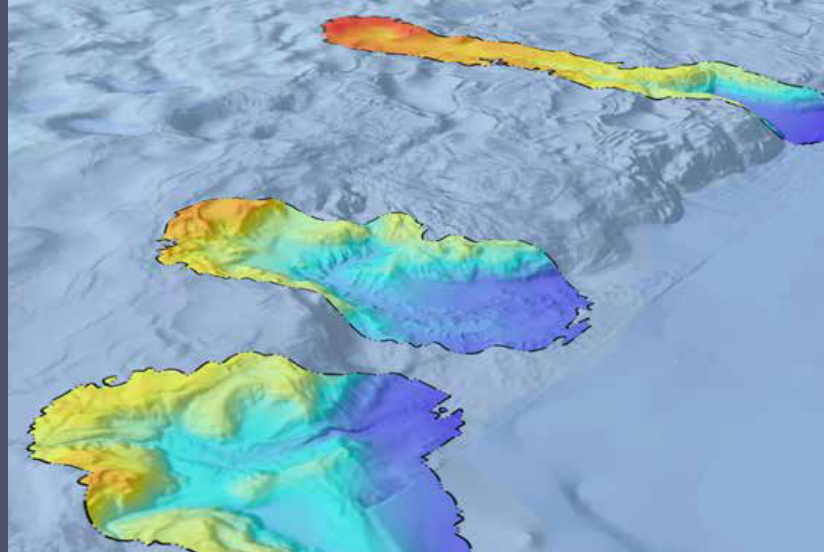
# Submarine Canyons of the United States Outer Continental Shelf Atlas

**ESPIS Link:** <https://marinecadastre.gov/espis/#/search/study/100268>

**Conducted by:** CSA Ocean Sciences Inc.

**National Studies List:** NT-18-x03

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



*From top to bottom: Keathley Canyon, Alaminos Canyon and Perdido Canyon in the Gulf of Mexico region*

## Purpose/Information Use:

BOEM's Office of Environmental Programs supports programmatic environmental assessments on the Outer Continental shelf (OCS) and coordinates and prepares associated National Environmental Policy Act analysis with input from Federal, state, local government agencies, tribes, interest groups, and the general public. Several of these entities have previously suggested programmatic exclusion of some submarine canyons from OCS energy/mineral development activities. In reviewing the mapping and other information on OCS submarine canyons, BOEM found that it was scattered among various websites and publications. The bureau decided to develop an atlas that would serve as a single depository of maps and information on the major submarine canyons of the OCS. To accomplish this, the contractor (CSA) inventoried and delineated the canyons using a methodology similar to terrestrial watershed mapping. A criteria-based algorithm generated spatial polygons used to calculate canyon slope, length, and depth. CSA also conducted a concurrent literature review that provided notable facts (e.g., on species presence) for each canyon.

## Findings/Results:

- Subject matter experts selected 71 of 130 possible submarine canyons for inclusion in the atlas.
- For the 71 canyons presented in detail, Atlantic canyons were typically longer and deeper (mean length: 112 mi, average maximum depth: 12,913 ft); the Gulf of Mexico had the fewest canyons (5); Alaska had the most canyons (35); and the Pacific typically had the shortest canyons (mean length 98 km).

## Study Products

CSA Ocean Sciences Inc., De Leo FC, Ross SW. 2019. Large submarine canyons of the United States Outer Continental Shelf atlas. Sterling (VA): US Department of the Interior, Bureau of Ocean Energy Management. 51 p. Report No.: OCS Study BOEM 2019-066.

## 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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