BOEM
Bureau of Ocean Energy Management

About BOEM
Fact Sheet

The Department of the Interior's Bureau of Ocean Energy Management (BOEM) manages the responsible development of America's offshore energy and mineral resources. The bureau promotes energy independence, environmental protection and economic development through responsible, science-based management of energy and mineral resources on the U.S. Outer Continental Shelf (OCS).

Overview

The United States' natural resources provide its citizens unparalleled opportunities for energy and mineral production, job creation and revenues for the American people. These opportunities can only be realized when these resources are managed thoughtfully. BOEM manages the nation's offshore resources to help meet the country's energy needs. With fewer than 600 employees, BOEM is a fairly small agency tasked with managing almost 2.5 billion acres of the seabed— nearly equal the size of the nation's land acreage. BOEM's primary mission focuses are oil and gas energy, renewable energy and marine minerals, with environmental science underpinning all of our efforts.

BOEM oversees the responsible development of America's **offshore energy and mineral resources**

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Oil & Gas

Domestic energy development is critical for national security and the U.S. economy, and offshore oil and gas resources are vital components of the nation's energy portfolio. In Fiscal Year (FY) 2019, annual OCS production accounted for 16 percent of domestic crude oil and 3 percent of domestic natural gas production. In FY 2019, companies paid over $5.5 billion in bonuses, rent and royalties to extract oil and natural gas in federal waters. Portions of that revenue help fund conservation initiatives such as the Land and Water Conservation Fund and the Historic Preservation Fund.

BOEM is responsible for the development of the National OCS Oil and Gas Leasing Program (National OCS Program), which establishes a five-year schedule of oil and gas lease sales in federal waters. The schedule includes the size, timing, and location of potential oil and gas leasing activity as precisely as possible. The process begins with a Request for Information and culminates with the approval of a National OCS Program, with multiple drafts and opportunities to comment in between.

For more information on BOEM's oil and gas energy activities, visit: **https://www.boem.gov/oil-gas-energy.**

Renewable Energy

As an emerging part of the nation's all-of-the-above energy portfolio, offshore wind energy provides a new source of renewable, domestic energy supply. It also offers the prospect of additional domestic jobs and wages and significant revenues from lease bonuses, rentals on acreage leased, and production operating fees.

BOEM oversees orderly, safe, and environmentally responsible renewable energy development activities on the OCS. The bureau grants leases, easements, and rights of way for offshore renewable energy. BOEM works directly with federal, state, local and tribal governments and other key stakeholders to help identify wind energy areas and issues related to upcoming offshore renewable energy projects.

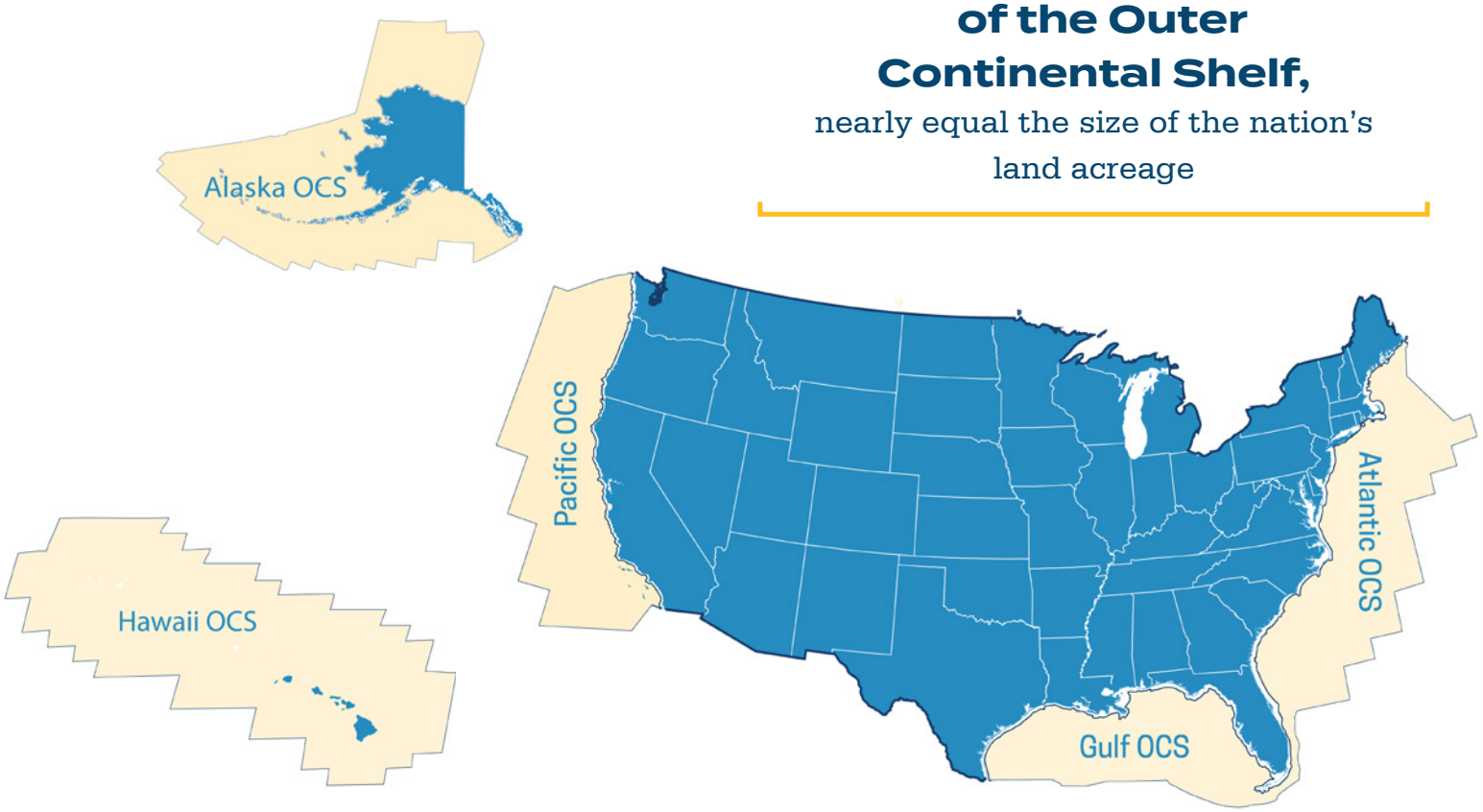
For more information on BOEM's renewable energy activities, visit: **https://www.boem.gov/renewable-energy.**

BOEM manages almost

2.5 billion acres

of the Outer Continental Shelf,

nearly equal the size of the nation's land acreage



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Marine Minerals

In addition to its offshore energy responsibilities, BOEM manages appropriate access to marine mineral resources on the OCS, such as sand and gravel. Shore protection, beach nourishment, and coastal habitat restoration projects are the primary uses of these minerals. To date, BOEM has authorized more than 165 million cubic yards of OCS material for nearly 60 coastal restoration projects in eight states to restore more than 380 miles of the nation's coastline. These projects protect billions of dollars of infrastructure and ecological habitats while restoring public beaches affected by severe erosion. The OCS also has the potential to contain significant volumes of critical minerals that can help support national security and the economy.

For more information on BOEM's marine minerals activities, visit: **https://www.boem.gov/marine-minerals.**

Environment

All of BOEM's activities are underlain by a robust environmental program, which ensures that science-based environmental protection is at the forefront of BOEM's decision making. BOEM prepares and oversees environmental reviews, including National Environmental Policy Act (NEPA) analyses for offshore energy and mineral development. In addition, BOEM develops, funds, and manages rigorous scientific research to inform policy decisions regarding the development of energy and mineral resources on the OCS. Since 1973, BOEM has funded more than $1 billion in scientific research.

For more information on BOEM's environmental activities, visit: **https://www.boem.gov/environment.**

Offices Around the Country

BOEM employees work in three offices across the country: New Orleans, La.; Camarillo, Calif.; and Anchorage, Alaska, as well as two offices in the Washington, DC area.

BOEM strives to protect the environment while overseeing the development of

OCS energy
and mineral resources

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Oil and Gas Energy **Fact Sheet**

The Department of the Interior's Bureau of Ocean Energy Management (BOEM) promotes energy independence, environmental protection and economic development through responsible, science-based management of energy and mineral resources on the U.S. Outer Continental Shelf (OCS). BOEM conducts the planning, leasing, and plan review processes for OCS oil and gas exploration and development activities to ensure that these activities are conducted in a safe and environmentally sound manner, and that the public receives fair market value for the use of OCS energy resources.

Overview

Safe, reliable and affordable domestic energy production powers our economy, promotes jobs and is critical to our nation's security. Offshore oil and gas play an important role in our national energy portfolio. In Fiscal Year (FY) 2019, offshore federal production reached approximately 683 million barrels of oil and 1 trillion cubic feet of gas. This accounted for about 16 percent of all domestic oil production and 3 percent of domestic natural gas production.[1] Also in FY2019, companies paid over $5.5 billion in bonuses, rent, and royalties to extract oil and natural gas in federal waters. BOEM estimates that in FY 2019,[2] the offshore oil and gas industry contributed:

- More than $30 billion to the U.S. economy
- More than 275,000 jobs (approximately 65 percent of these are in the Gulf Coast states; the remainder are spread throughout the U.S.)
- $225 million in revenue sharing programs to Gulf of Mexico states, Alaska and California
- $230 million in grant programs through the Land and Water Conservation Fund and the Historic Preservation Fund

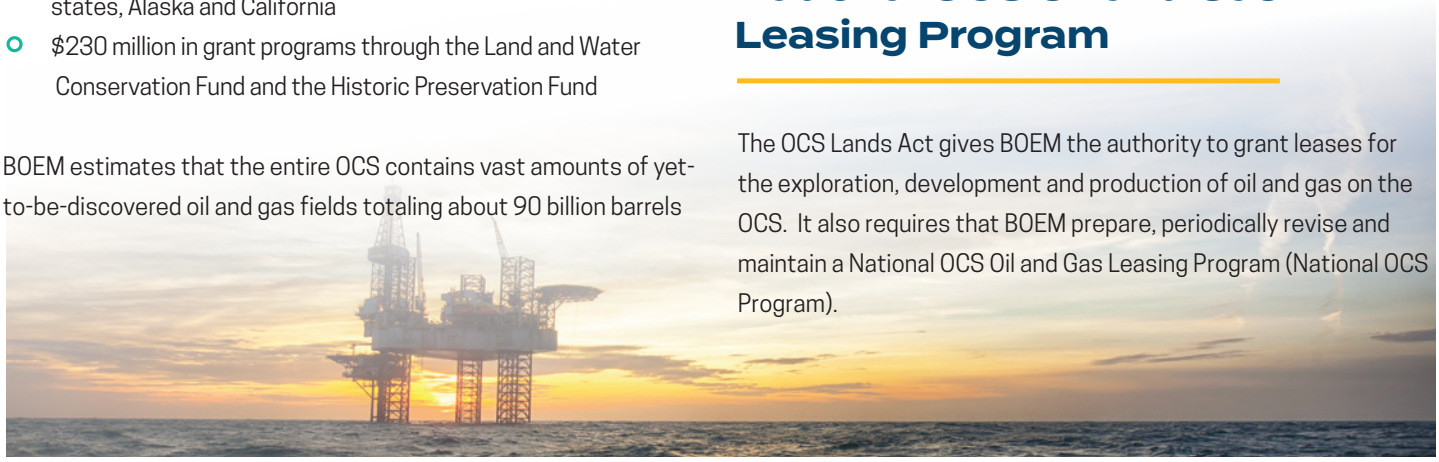
BOEM estimates that the entire OCS contains vast amounts of yet-to-be-discovered oil and gas fields totaling about 90 billion barrels of oil and 327 trillion cubic feet of gas.[3] When properly developed, the OCS helps to provide job opportunities nationwide, power our economy, and pave the way for safe and affordable domestic energy production.

Nearly 1/6 of our
nation's oil
comes from
Outer Continental Shelf resources

BOEM is responsible for stewardship of our nation's offshore energy resources, as well as protecting the environment that the development of those resources could impact.

National OCS Oil and Gas Leasing Program

The OCS Lands Act gives BOEM the authority to grant leases for the exploration, development and production of oil and gas on the OCS. It also requires that BOEM prepare, periodically revise and maintain a National OCS Oil and Gas Leasing Program (National OCS Program).



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The National OCS Program establishes a schedule of oil and gas lease sales for the U.S. OCS after consideration and analysis of all 26 planning areas. The schedule specifies the size, timing and location of potential leasing activity to best meet the nation's energy needs for the five-year period under consideration. The program considers potential environmental damage, oil and gas discovery and adverse impacts on the coastal zone. It also assures that U.S. taxpayers receive fair market value for the rights to produce OCS energy and mineral resources.

Development of a new program typically takes at least two years to complete and includes multiple proposals and opportunities for public involvement, including public meetings near the proposed leasing areas. BOEM is currently operating under the 2017-2022 Program. To learn more about this multi-phase process, visit: **https://www.boem.gov/National-OCS-Program/**. BOEM has a number of other responsibilities relating to offshore oil and gas, including the following:

Offshore oil and gas contributed

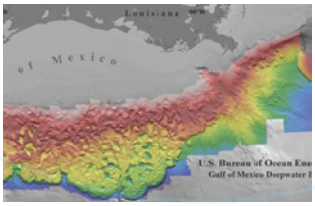
$5.5 billion in leasing revenues

to the U.S. Treasury in FY2019

Resource Evaluation – Conduct resource evaluation through critical geologic and economic analysis to identify areas of the OCS that could be prospective for oil and gas development. Maintain a comprehensive inventory of both discovered oil and gas reserves and undiscovered technically and economically recoverable resources on the OCS.

Exploration and Development Plans – Conduct in-depth review of exploration plans and development and production plans to ensure compliance with regulations for drilling operations.

Energy Economics – Conduct analyses to evaluate and implement policies for the energy and minerals programs relating to lease terms, bidding systems, auction designs, operating conditions and rulemaking.



Mapping and Data – Create, maintain, and provide OCS maps and data, such as OCS blocks and administrative boundaries between adjoining coastal states. Manage, in partnership with the National Oceanic and Atmospheric Administration, the MarineCadastre.gov and Ocean Reports, an integrated marine information system providing authoritative data to meet the needs of the offshore energy and marine planning communities along with tools that can help reduce ocean use conflicts.

Risk Management – Require proper financial assurance from OCS energy lessees to guarantee that their regulatory obligations are satisfied and ensure the American taxpayer is not responsible for shouldering the liability for decommissioning existing or future facilities on the OCS.

[1] Source FY21 Budget Justifications

[2] Source U.S. Department of the Interior, *Agency Financial Report FY2018*

[3] 2016a National Assessment (www.boem.gov/resource-assessment) in mean estimates.

For More Information:

https://www.boem.gov/oil-gas-energy

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Boundary Delineation System
Official Mapping Products
Fact Sheet

Fundamental to BOEM being a responsible steward of the U.S. Outer Continental (OCS) is the creation of official maps with delineated boundaries for monitoring, enforcement, and oversight. Maps illustrating ocean boundaries are critical for conservation, environmental, and economic purposes and to conduct everyday governmental sovereignty functions associated with U.S. insular areas.

Overview

The **Geospatial Services Division (GSD)** of the BOEM Office of Strategic Resources Program provides foundational support for oil and gas, renewable energy, and marine minerals leasing activities by supplying the Bureau with official maps, complex area computations, and boundary data products. These operations support management of the Federal government's OCS leasing program. Additionally, the GSD develops and maintains the Submerged Lands Act boundary, Limit of "8(g) Zone," and the Offshore Marine Cadastral database that contains lease block grids and various offshore boundaries. While the GSD produces many types of mapping products, its staff uses the Boundary Delineation System (BDS) to create the following products:

Index Maps
Index maps provide a visual method so that users can locate the proper map for their project area, just as the name implies.

OCS Leasing Maps (LM)
OCS leasing maps depict the cadastral subdivisions of the OCS that legally define all leasing areas. LMs, however, are available only within the OCS Federal jurisdiction for Texas and Louisiana (see Figure 2). OPDs are used in other areas.

Official Protraction Diagrams (OPD)
Official protraction diagrams depict the cadastral subdivisions of the OCS that legally define all leasing areas.

Supplemental Official Block Diagrams (SOBD)
Supplement LMs and OPDs, covering all Federal waters off the contiguous 48 states, Alaska, Hawaii, and U.S. territories. SOBDs depict areal measurements, offshore boundaries, and their intersection coordinates. They also identify Federal and state land land ownership for individual OCS leasing blocks.

Users of these products will note that the geographic coordinates displayed and used to develop each product vary by location because different BOEM regional offices have access to differing datasets, or datums, from which their maps are made. BOEM publishes these map products in open source Adobe (.pdf) formats that are available at no cost and are downloadable through the Bureau's website. The most current, approved edition for each OPD and SOBD are also available in a compressed WinZip file format. A description of each product type is provided below.

Index Maps

BOEM offers an OCS index map for each region that shows the location, division, and name of each individual detailed map of that area (see Figure 1). Index maps allow users to quickly identify and retrieve the appropriate map for their project area. Note that the Gulf of Mexico Region's Index Map is two index maps in one. The top half of the map is an index for the LMs, and the bottom is an index map for the OPDs. The Atlantic, Alaska, and Pacific Regions are standardized and illustrate only the OPD divisions owning to it long history of leasing in the region..

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Leasing Maps and Official Protraction Diagrams

The most commonly used maps by virtue of the size of the BOEM leasing program are the LMs and OPDs. These are appropriated submerged land plats that depict the cadastral subdivisions of the OCS, and that legally define all leasing areas. LMs are available within the OCS Federal jurisdiction for Texas and Louisiana (see Figure 2). The standard drawing is based upon a seaward extension of the coastal state's State Plane Coordinate System, which is measured in feet. In areas farther offshore in the Gulf of Mexico where LMs have never been generated, OPDs are used.

Standard OPDs of OCS cadastral subdivisions are measured in meters, and based on a grid that is approximately 1 degree latitude by 2 degrees longitude when the latitudes are between 0–48 degrees (Figure 3). The standard drawing changes in the higher latitudes (between 48–75 degrees), where the diagrams are 1 degree latitude by 3 degrees longitude.

Supplemental Official Block Diagrams

As the name implies, SOBDs supplement OPDs and LMs by providing more detail of an area, including legal descriptions. These may be offshore of the contiguous 48 states, Alaska, and Hawaii; as well as the territories of American Samoa, Guam, the Commonwealth of the Northern Mariana Islands, the U.S. Virgin Islands, and the Commonwealth of Puerto Rico.

An SOBD is prepared for each OCS block intersected by an offshore boundary (Submerged Lands Act Boundary, Limit of "8(g) Zone," National Marine Sanctuaries, etc.). Note that not all OPDs contain such boundaries; therefore not all OPDs have SOBDs associated with them. The SOPDs showing areal measurements are signed by representatives of both the Federal and State governments (see Figure 4).

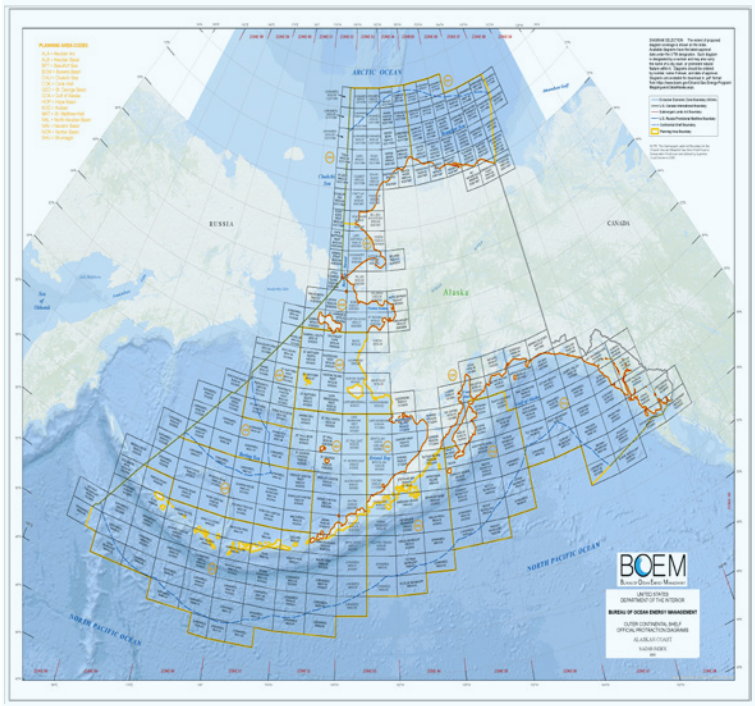

Figure 1. Index Map

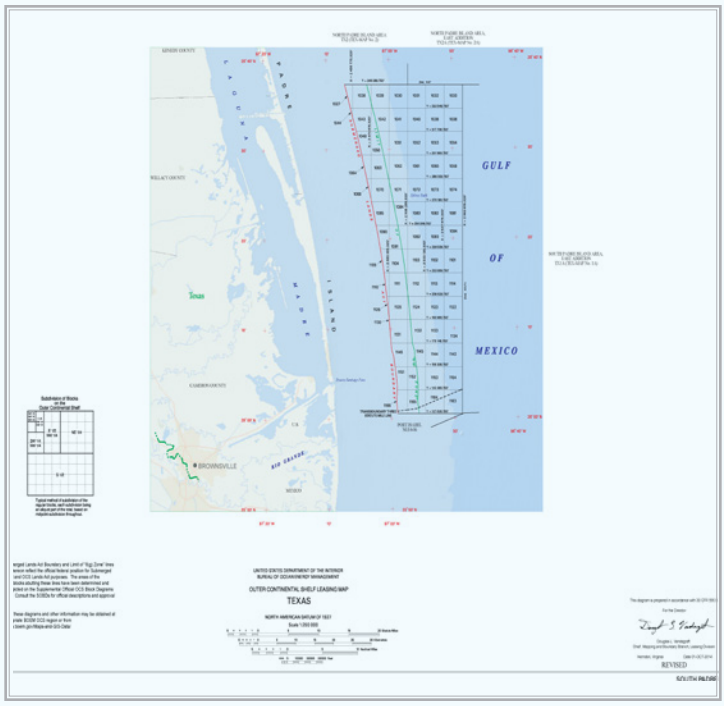

Figure 2. Leasing Map

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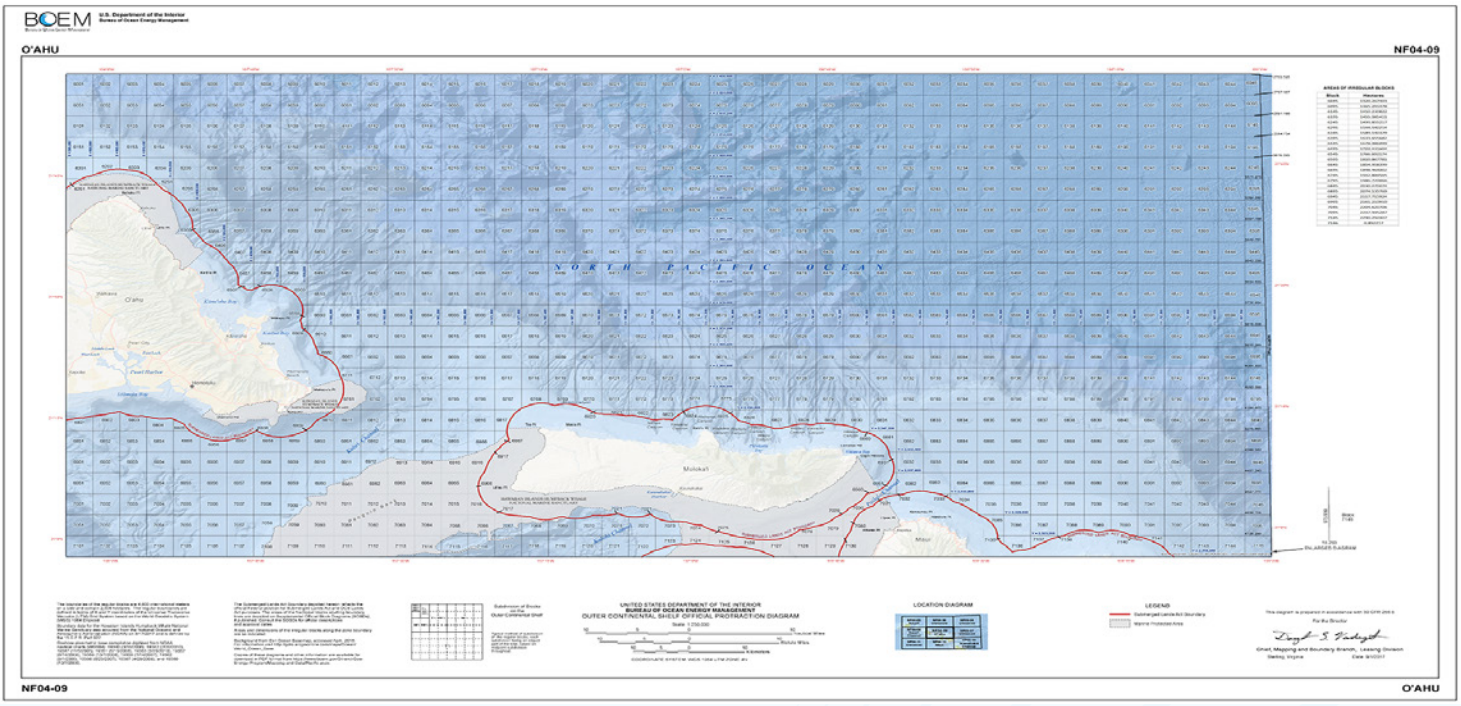


Figure 3. Official Protraction Diagram

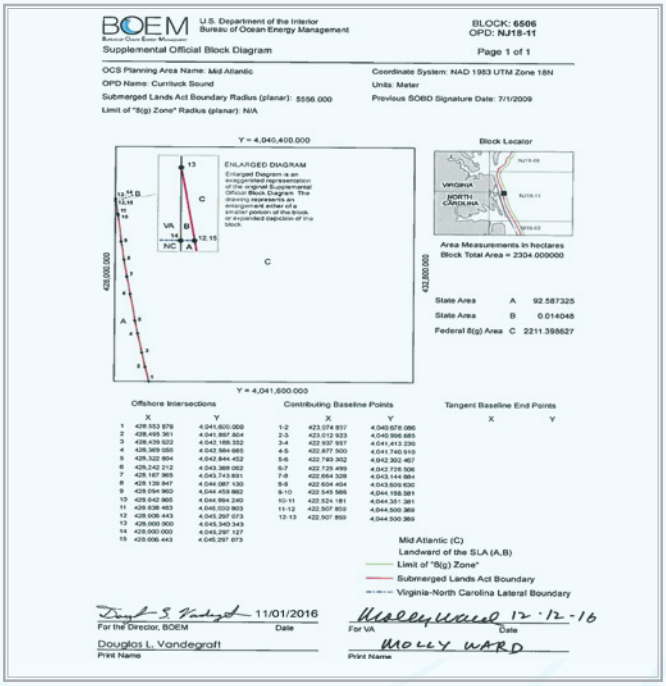


Figure 4. Supplemental Official Block Diagram

For more information about BDS, please see the following fact sheets:

- https://www.boem.gov/Boundary-Delineation-System
- https://www.boem.gov/Projected-Boundaries
- https://www.boem.gov/Other-Boundaries

BOEM
Bureau of Ocean Energy Management

Boundary Delineation System
Overview
Fact Sheet

In order for the Bureau of Ocean Energy Management to meet its mission of managing development of the Nation's offshore resources in an environmentally and economically responsible way, the agency must have accurate, up-to-date mapping and assessment tools and methods. The Boundary Delineation System (BDS), used and maintained by the Geospatial Services Division (GSD), is a set of tools to do just that.

What is the Boundary Delineation System?

The Boundary Delineation System (BDS) is a collection of procedures, data, and GIS software used exclusively by the Geospatial Services Division (GSD) staff to do the following:

- perform complex mathematical offshore boundary computations;
- generate diagrams to depict OCS block information, the Submerged Lands Act boundary, and the Limit of "8(g) Zone" boundary, which
- calculate the corresponding area measurements within those boundaries.

These tasks are accomplished by using commercially available off-the-shelf Geographic Information System (GIS) software detailed procedures executed by experienced staff. The rules that define the workflows and computations to create the data are based on international laws of the sea, Federal regulations, and legal precedence, as well as cadastral survey and geodetic standards, to properly and accurately subdivide the ocean space.

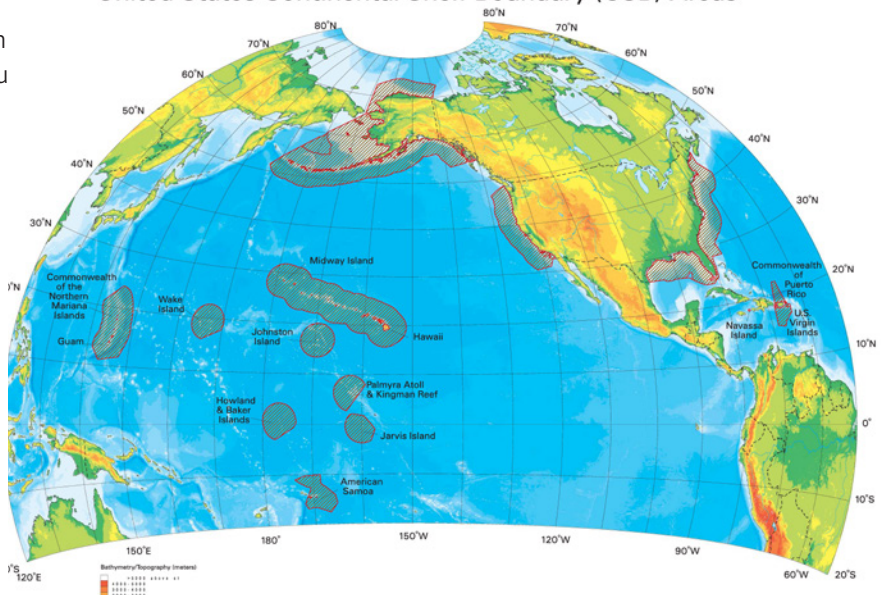
Who benefits from BDS?

Every action at BOEM that can be shown on a map depends on a robust BDS working behind the scenes. Likewise, the Bureau of Safety and Environmental Enforcement (BSEE), the Office of Natural Resources Revenue (ONRR) and the public also rely on and benefit from the standards and automated capability of the BDS. Additionally, the BDS supports the Departmental goal of accountability and accurate reporting required for Outer Continental Shelf (OCS) energy and mineral development.

Using the BDS, the GSD calculates and prepares:

- OCS Leasing Maps (LMs),
- Official Protraction Diagrams (OPDs),
- Supplemental Official Block Diagrams (SOBDs),
- the Submerged Lands Act (SLA) boundary, and
- the Limit of the "8(g) Zone" boundary.

United States Continental Shelf Boundary (CSB) Areas



In addition, the BDS is used to depict other offshore boundaries displayed on BOEM mapping products, including administrative planning areas, state offshore lateral boundaries, and U.S. maritime boundaries and existing treaty agreements.

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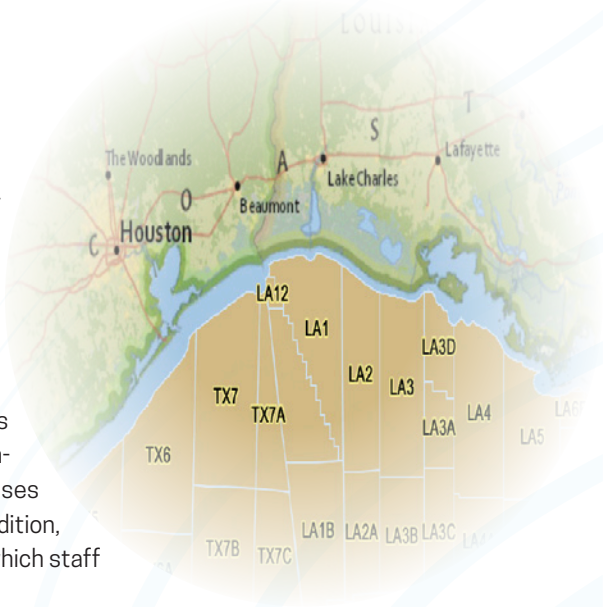
Using BDS, BOEM maintains the Offshore Marine Cadastre, a grid system that subdivides the OCS submerged lands into identifiable units (referred to as protractions, blocks, and aliquots) that define leasing and permitting areas. This cadastre ultimately provides a foundation-level mapping infrastructure for all BOEM, BSEE, and ONRR enterprise systems. The Offshore Marine Cadastre enables BOEM to define, describe, analyze, and account for every acre/hectare of Federal offshore submerged lands for OCS leasing activities. The description of individual blocks, boundaries, and areas on BOEM's official documents constitute legal descriptions of real property that ensures full payment of revenues owed for developing the Nation's energy and natural resources.

How is BDS used?

Once tasked with a boundary mapping project, BDS staff collaborate with all interested offices (e.g., State seeking a Supreme Court decree, BOEM's Office of Strategic Resources regarding lease sale implementation and NOAA regarding changes to a shoreline) with common interests for mapping a particular OCS area. BOEM staff will perform an assessment of all GIS project criteria.



What about TIMS?

GSD staff members keep the Technical Information Management System (TIMS) updated as they produce new data sets and create and refine maps. Although BOEM continues to maintain the TIMS Block and Boundary (B&B) database to support legacy software, it no longer uses TIMS programs to create new data or update existing data, but instead uses the BDS. In addition, the BDS also supports a database that contains updated Offshore Marine Cadastre data, which staff transfers into the TIMS B&B database.

What are the advantages of BDS?

By using commercially available ArcGIS software and tool scripts, staff can efficiently and accurately perform distance and area computations, delineate new boundaries, and revise existing boundaries. The BDS can also create data in the Southern Hemisphere and west of the International Date Line. Furthermore, the BDS allows for the generation of all BOEM offshore cadastral maps to maintain and manage OCS Lease Sale planning, scheduling, and production requirements.

Because the software is commercially available and configurable tool scripts, when vendors upgrade the GIS software, BOEM does not have to re-program custom software to match the update. This flexibility allows BOEM to advance in step with the technology upgrades.

With BDS, GSD staff can:

- efficiently and accurately perform distance and area computations, delineate new boundaries, and revise existing boundaries through the use of commercially available ArcGIS software and tool scripts;
- create data in the Southern Hemisphere and west of the International Date Line, and
- generate all BOEM offshore cadastral maps to maintain and manage OCS Lease Sale planning, scheduling, and production requirements.

In addition, because the software is commercially available, when vendors upgrade the GIS software, BOEM does not have to re-program custom software to match the update. This flexibility allows BOEM to advance in step with the technology upgrades.

For more information about BDS, please see the following fact sheets:

- https://www.boem.gov/Official-Mapping-Products
- https://www.boem.gov/Projected-Boundaries
- https://www.boem.gov/Other-Boundaries

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Boundary Delineation System
Projected Boundaries
Fact Sheet

Coastlines throughout the United States change over time, and so, too, must the two key boundaries that the Bureau of Ocean Energy Management (BOEM) uses and maintains through the Boundary Delineation System (BDS) to identify its mission areas. These boundaries, the Submerged Lands Act (SLA) boundary and Limit of "8(g) Zone" boundary, are the official Offshore Marine Cadastre boundaries from which other area delineations are made.

Projected Boundaries and the SLA Coastline

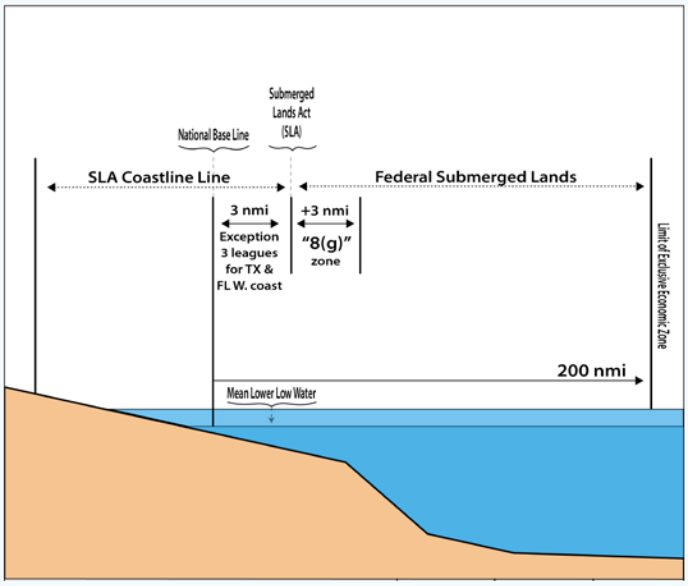

Figure 1. Boundaries Delimiting U.S. Maritime Zones

By using the BDS, specialists in the Geospatial Services Division "project" these boundaries from a common starting point, called the National Baseline (NB, also called the U.S. Normal Baseline) established by the National Oceanic and Atmospheric Administration (NOAA).

The NB denotes the low-water line along the coast as recognized by the individual coastal state. As you might expect, the low-water line changes in response to shoreline erosion, accretion, or avulsion.

Boundaries measured from the NBs are also ambulatory. Figure 1 shows clearly the state submerged lands and the 8(g) zone.

Which coastline is the baseline?

The Submerged Lands Act of 1953 (SLA) recognizes that coastal states have title to the navigable lands within their boundaries, including maritime waters within approximately 3 geographical miles from the coastline, although that measure varies in some states. There are three instances when the SLA boundary coastline differs from the NB, the most common being when the U.S. Supreme Court issues a decision or fixes a boundary by decree. The Supreme Court has fixed the boundaries along the coasts of Texas, Louisiana, Alabama, Mississippi and California, as well as the Chukchi and Beaufort Seas of Alaska.

A boundary can also become fixed when SLA-specific data provides a more accurate depiction of the line and in some cases where the shoreline is associated with the U.S. Army Corps of Engineers (USACE) permit process. The NB has been integrated into the SLA boundary for Atlantic coast states and Washington and Oregon, and the SLA is ambulatory in these areas.

In cases where the SLA boundary has changed, the Federal Government works individual states to identify and fix the new SLA coastline. BOEM's GDS staff uses the BDS to calculate the new boundary. That's the case in 16 BOEM planning areas. Table 1 shows the status of the ambulatory baselines per BOEM planning areas. The GSD and NOAA are reviewing these areas in an effort to update them. "MMS" in the Baseline Type column refers to a predecessor boundary to the SLA boundary.

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Table 1. Status of Ambulatory Baselines

Region	Planning Area	Baseline Effective Date	Baseline Type
Alaska	Aleutian Basin	No Baseline	N/A
Alaska	Hope Basin	1991, 2004	MMS
Alaska	Norton Basin	1991, 2004	MMS
Alaska	Navarin Basin	No Baseline	N/A
Alaska	St. George Basin	1991, 2004	MMS
Alaska	Bowers Basin	No Baseline	N/A
Alaska	Kodiak	2003	MMS
Alaska	Gulf of Alaska	1993, 1997, 1998, 2004	MMS
Atlantic	North Atlantic	2004	NB
Atlantic	Mid-Atlantic	2004	NB
Atlantic	South Atlantic	2004	NB
Atlantic	Straits of Florida	2004	NB
Atlantic	U.S Virgin Islands	1999	Unpublished
Atlantic	Puerto Rico	1999	Unpublished
Pacific	Washington and Oregon	1997, 2006	MMS and NB (unpublished)
Gulf of Mexico	Eastern	1995, 1997, 1998	MMS

Limit of "8(g) Zone" Boundary

The name of the second boundary refers to the section of the Outer Continental Lands Act (OCSLA) that establishes an area where the Federal Government and the adjacent state share revenue from economic activity. It is the zone between SLA boundary and a line projected 3 nautical miles seaward of the SLA boundary line, or put another way, it's the area that lies generally between approximately 3 and 6 nautical miles offshore. Within this area, revenues from mineral development are shared with the coastal states. For Texas and Florida (Gulf of Mexico Coast), the zone is between 9 nautical miles and 12 nautical miles.

For more information about BDS, please see the following Fact Sheets:

- https://www.boem.gov/Boundary-Delineation-System
- https://www.boem.gov/Official-Mapping-Products
- https://www.boem.gov/Other-Boundaries

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Boundary Delineation System
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While the coastline and the boundaries projected from it are essential to BOEM's work, there are other mission-critical boundaries that the Geospatial Services Division must maintain in the Boundary Delineation System (BDS) that are independent of the Submerged Lands Act (SLA) Coastline. These other boundaries of note are not "projected" from the coastline; however, they still require maintenance as part of the official Offshore Marine Cadastre.

Non-Projected Marine Boundaries

Geospatial Services Division defines and prepares all non-projected offshore boundary data from original source documents, including acts of Congress, international treaty agreements, and Outer Continental Shelf (OCS) lease sales. The non-projected boundary types prepared by the GSD are explained below:

Planning Area

A planning area is a large, contiguous portion of the OCS that consists of defined OCS blocks, and is considered as an entity for administrative planning purposes. This authoritative boundary is required for developing the National OCS Oil and Gas Leasing Program and is typically derived from GSD's equidistant and ellipsoidal calculations. BOEM currently has 26 planning areas within the OCS.

Military Mission Line

This boundary is a Department of Defense line found to the west of Florida that delineates an area for military testing and training, typically occurring east of the line. The Gulf of Mexico Energy Security Act (GOMESA) established this line, closing the area to new oil and gas leasing through June 30, 2022. The closure was extended 10 years by Presidential Memorandum dated Sept. 8, 2020.

State Offshore Lateral Boundary

This boundary delimits the approximate location between two states seaward of the coastline and terminates at the SLA boundary. The coastal land boundary description is not available because most state boundary locations have not been officially described beyond the coast or are disputed between states. The lateral boundaries serve as an approximation used to determine a starting point for creating BOEM's OCS Administrative Boundaries.

NOAA Marine Protected Areas

In the U.S., these protected areas come in a variety of forms and are established and managed by all levels of government. They are uniquely classified as marine sanctuaries, estuarine research reserves, ocean parks, and marine wildlife refuges. MPAs may be established to protect ecosystems, preserve cultural resources such as shipwrecks and archaeological sites, or sustain fisheries production to restrict human activity for a conservation purpose, typically to protect natural or cultural resources (see https://marineprotectedareas.noaa.gov/aboutmpas/).

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NOAA Maritime Boundaries

The maritime boundary (MB) line separates one country from another as defined by treaty or agreement. For the U.S., the MB is entered into force with the advice and consent of the U.S. Senate (e.g., U.S. - Mexico Maritime Boundary, U.S. - Mexico Continental Shelf Boundary) (see Figure 1). Generally, a maritime boundary is delineated at a distance from a jurisdiction's coastline. The United Nations Convention on the Law of the Sea establishes that the territorial waters of a country can extend up to 12 nautical miles (nm) (22.227 kilometers) from the low-tide mark of the sea.

NOAA Maritime Limits

The Economic Exclusion Zone limit (EEZ) is a sea zone limit prescribed by the 1982 United Nations Convention on the Law of the Sea, over which a sovereign state has special rights regarding the exploration and use of marine resources, including energy production from water and wind. The U.S. EEZ limit extends no more than 200 nm from the territorial sea boundary (often defined as the mean low water line along the U.S. coast) and is adjacent to the 12 nm territorial sea of the U.S., including the Commonwealth of Puerto Rico, Guam, American Samoa, the U.S. Virgin Islands, the Commonwealth of the Northern Mariana Islands, and any other territory over which the United States exercises sovereignty (see Figure 1).

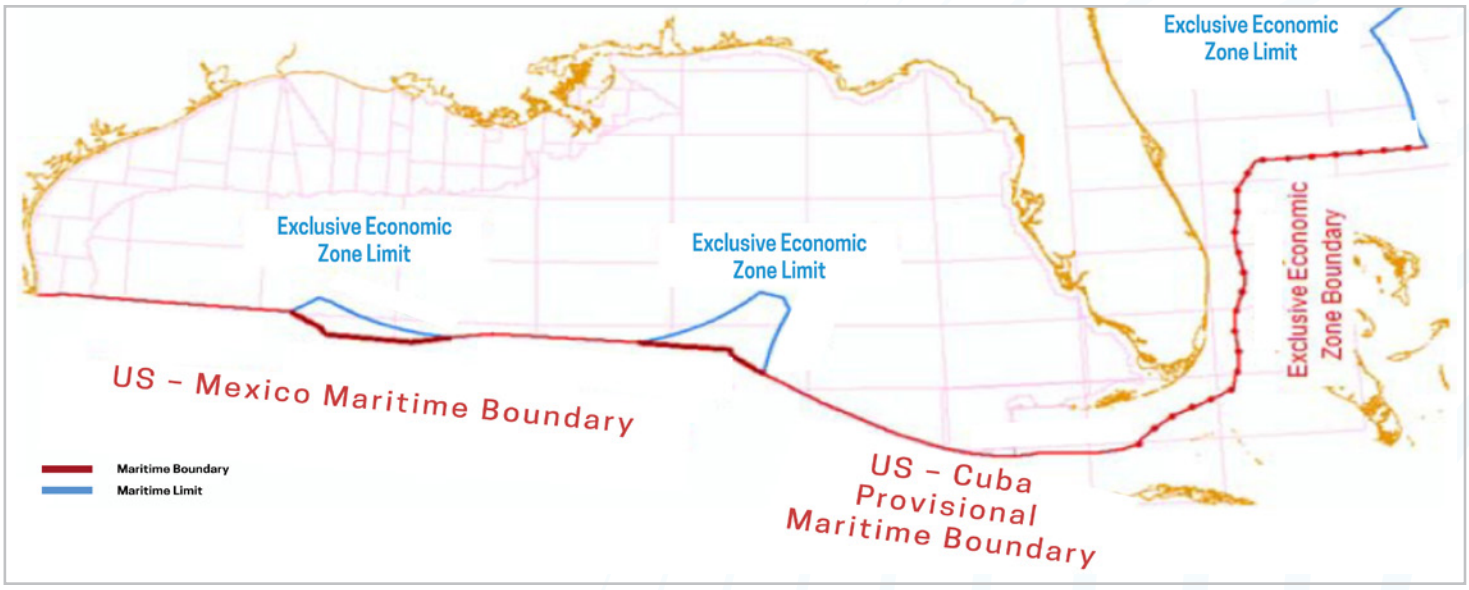

Figure 1. Gulf of Mexico and Pacific Index Maps

Continental Shelf Boundary

The Continental Shelf Boundary (CSB) delineates the seaward limit of the Department of the Interior's administrative and enforcement responsibility under the Outer Continental Shelf Lands Act and the SLA. Consistent with international law, the limit of the OCS may be co-terminus with the 200 nm EEZ.

For more information about BDS, please see the following Fact Sheets:

- https://www.boem.gov/Boundary-Delineation-System
- https://www.boem.gov/Official-Mapping-Products
- https://www.boem.gov/Projected-Boundaries

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Renewable Energy **Fact Sheet**

The Department of the Interior's Bureau of Ocean Energy Management (BOEM) promotes energy independence, environmental protection and economic development through responsible, science-based management of energy and mineral resources on the U.S. Outer Continental Shelf (OCS). BOEM is responsible for overseeing offshore renewable energy development in federal waters in an economically and environmentally sound manner. While BOEM's offshore renewable energy portfolio consists of several resources—including ocean wave and ocean current energy—offshore wind energy has garnered the most interest to date.

Overview

Safe, reliable and affordable domestic energy production powers our economy, promotes jobs and is critical to our nation's security. Offshore wind is an abundant and efficient alternative domestic energy resource found close to major coastal cities, where more than half of the U.S. population resides and energy needs are high. Compared to onshore wind, offshore winds are generally stronger and more consistent. Since higher wind speeds can produce significantly more energy and electricity, there is increasing interest in developing offshore wind energy on the OCS.

Demand for offshore wind energy has never been greater. Technological advances, falling costs, increased interest and tremendous economic potential make offshore wind the most promising avenue for diversifying the national energy portfolio.

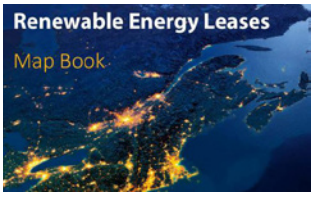
Significant job growth is expected in several offshore wind industries, including manufacturing, construction, supply chain, operations, maintenance and transportation.[1] Increased job opportunities are also expected in restaurants, hotels and other service industries.

Under the Energy Policy Act of 2005, BOEM facilitates the responsible development of renewable energy resources on the OCS through conscientious planning, stakeholder engagement, comprehensive environmental analysis and sound technical review.

OVER >

For any proposed OCS development, BOEM evaluates the potential impacts on ocean users, historic and cultural resources and the marine environment. BOEM uses a multi-phased process to grant access to ocean areas that are suitable for wind energy development that consists of the following phases:

Planning and Analysis – Identify potential areas for wind energy leasing through collaborative, consultative and analytical processes. Conduct environmental compliance reviews and consultations with Tribes, states and natural resource agencies.



Leasing – Issue commercial wind energy leases, either through a competitive or noncompetitive process. Commercial leases give the lessee exclusive rights to develop and submit its plans for BOEM approval, not to construct any facilities.

Site Assessment – Receive Site Assessment Plan (SAP), the lessee's detailed proposal for construction of a meteorological tower and/or the installation of meteorological buoys on the leasehold. Conduct site characterization surveys and studies (e.g., avian, marine mammal, archeological). BOEM must approve the SAP before the lessee conducts these activities.

Construction and Operations – Receive the lessee's Construction and Operations Plan (COP), which details a wind energy project's construction and operations plan. BOEM conducts environmental and technical reviews of the COP before deciding whether to approve, modify, or deny the plan. The developer must submit a plan to decommission facilities prior to the end of the lease term.

To learn more about this multi-phase process, visit: **https://www.boem.gov/Commercial-Leasing-Process-Fact-Sheet**.

BOEM engages key stakeholders throughout these processes to ensure early communication with interested and potentially affected parties, which is critical to managing potential conflicts. In addition, the bureau has established Intergovernmental Renewable Energy Task Forces for areas where there is interest in developing offshore renewable energy. Each task force collects and shares information that would be useful and relevant to BOEM's decision making process. BOEM is also integrating regional perspectives into the task forces to better utilize the shared regional interests and concerns between states.

BOEM also engages the task forces – as well as a broad spectrum of agencies, universities and other stakeholders – to identify critical data gaps and fund studies on areas for renewable energy development where physical and biological environment information may be lacking.

[1] Source: New York State Energy Research and Development Authority, et.al. U.S. Job Creation in Offshore Wind: A Report for the Roadmap Project for Multi-State Cooperation on Offshore Wind (NYSERDA Report 17-22) **https://www.northeastwindcenter.org/wp-content/uploads/US-job-creation-in-offshore-wind.pdf** p. 25 (Oct. 2017)

Wind Energy Commercial Leasing Process

In 2009, Department of the Interior announced final regulations for the Outer Continental Shelf (OCS) Renewable Energy Program, which was authorized by the Energy Policy Act of 2005 (EPAct). DOI's Bureau of Ocean Energy Management (BOEM) is responsible for implementing these regulations, which provide a framework for issuing leases, easements and rights-of-way for OCS activities that support production and transmission of renewable energy, including offshore wind, ocean wave energy, and ocean current energy.

Importance of Stakeholder Engagement

To help inform BOEM's planning and leasing process, BOEM has established Intergovernmental Renewable Energy Task Forces in states that have expressed interest in development of offshore renewable energy. The role of each Task Force is to collect and share relevant information that would be useful to BOEM during its decision-making process. To date, 14 BOEM Intergovernmental Task Forces have been established in California, Delaware, Florida, Hawaii Maine, Maryland, Massachusetts, New Jersey, New York, North Carolina, Oregon, Rhode Island, South Carolina, and Virginia. Task Force meetings have helped identify areas of significant promise for offshore development and provided early identification of, and steps toward resolving, potential conflicts.

The Process

BOEM's renewable energy program occurs in four distinct phases: (1) planning and analysis, (2) lease issuance, (3) site assessment, and (4) construction and operations. The figure below outlines BOEM's process for authorizing wind energy leases.

Planning and Analysis	Leasing	Site Assessment	Construction and Operation
• BOEM publishes Call for Information and Nominations • BOEM identifies priority Wind Energy Areas (WEAs) offshore. WEAs are locations that appear most suitable for wind energy development, or • BOEM processes unsolicited lease application as applicable • BOEM may prepare an Environmental Assessment for Lease Issuance and Site Assessment Activities	• BOEM determines whether Competitive Interest exists • If Competitive Interest exists, BOEM notifies the public and developers of its intent to lease through Sale Notices before holding a lease sale • If Competitive Interest does not Exist, BOEM negotiates a lease (note: issuance may be combined with plan approval)	• Lessee conducts site characterization studies • Lessee submits Site Assessment Plan (SAP) • BOEM conducts environmental and technical reviews of SAP, eventually deciding to approve, approve with modification, or disapprove the SAP • If approved, Lessee assesses site (usually with meteorological tower(s) and/or buoy(s)	• Lessee may conduct additional site characterization • Lessee submits Construction and Operations Plan (COP) • BOEM conducts environmental and technical reviews of COP, eventually deciding to approve, approve with modification, or disapprove the COP • If approved, Lessee builds wind facility

Intergovernmental Task Force Engagement

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Planning and Analysis

The planning and analysis phase seeks to identify suitable areas for wind energy leasing consideration through collaborative, consultative, and analytical processes that engage stakeholders, tribes, and state and Federal government agencies. This is the phase when BOEM conducts environmental compliance reviews and consultations with tribes, states, and natural resource agencies.

Leasing

The leasing phase results in the issuance of a commercial wind energy lease. Leases may be issued either through a competitive or noncompetitive process. A commercial lease gives the lessee the exclusive right to subsequently seek BOEM approval for the development of the leasehold. The lease does not grant the lessee the right to construct any facilities; rather, the lease grants the right to use the lease area to develop its plans, which must be approved by BOEM before the lessee can move on to the next stage of the process.

Site Assessment

The site assessment phase includes the submission of a Site Assessment Plan (SAP), which contains the lessee's detailed proposal for the construction of a meteorological tower and/or the installation of meteorological buoys on the leasehold. The lessee's SAP must be approved by BOEM before it conducts these "site assessment" activities on the leasehold. BOEM may approve, approve with modification, or disapprove a lessee's SAP. It is also during this phase that the lessee would conduct site characterization surveys and studies (e.g., avian, marine mammal, archeological).

Construction and Operations

The construction and operations phase consists of the submission of a Construction and Operations Plan (COP), which is a detailed plan for the construction and operation of a wind energy project on the lease. BOEM conducts environmental and technical reviews of the COP and decides whether to approve, approve with modification, or disapprove the COP. Prior to the end of the lease term, the developer must submit a plan to decommission facilities.

Need for Ongoing Research

The Renewable Energy Program is supported by a substantial investment in research and data collection. The areas that are appropriate for renewable energy development have likely never been studied for such development and, in some cases, there is information lacking about the physical and biological environment. BOEM engages the Task Forces, as well as a broad spectrum of agencies, universities and other stakeholders, to identify the critical data gaps and independently or through partnerships seeks to fund studies through its Environmental Studies Program. The need for continuing to pursue information to ensure access to the OCS for renewable energy development and to ensure that such development is environmentally appropriate is a high priority for BOEM.

For more information
Visit us at http://www.boem.gov/Renewable-Energy.

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FACT SHEET

ENVIRONMENTAL STEWARDSHIP

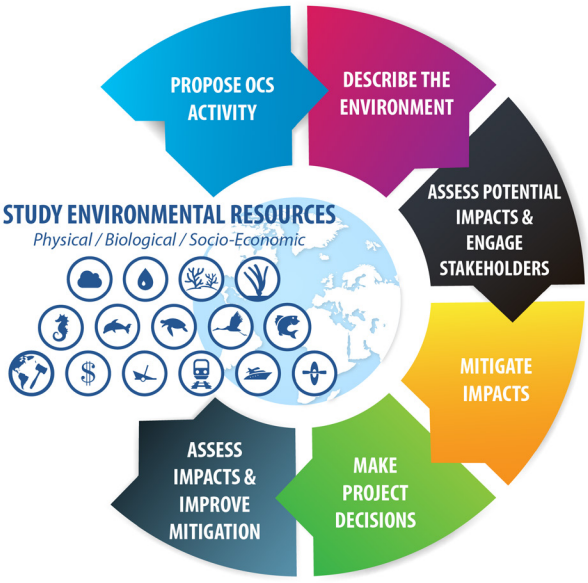
Integrating Science, Policy, and Decision Making

The Webster dictionary defines stewardship as "the careful and responsible management of something entrusted to one's care." Environmental stewardship is integral to the Bureau of Ocean Energy Management's (BOEM's) mission to manage development of the Nation's offshore resources: oil and gas, renewable energy, and marine minerals such as sand and gravel. The Outer Continental Shelf Lands Act (OCSLA) directs BOEM to study and consider coastal, marine, and human environmental impacts when making decisions on how to effectively promote energy independence, environmental protection, and economic development.

To ensure that environmental protection is a primary consideration in BOEM's decisions, our environmental program focuses on two core components which constantly engage with and inform each other. **Environmental assessment** includes the activities we perform to evaluate the impacts of BOEM's proposed actions and to involve the public, and federal, state and tribal governments in the process; **environmental science** is where we obtain the best available data and information about environmental resources. Assessment determines what science is needed, and science provides the knowledge for making accurate assessments.

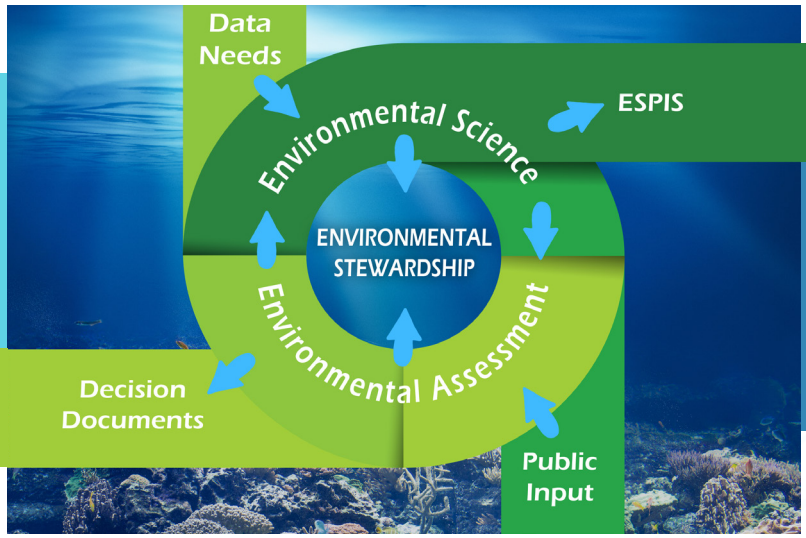
Environmental Assessment

- Evaluate impact of proposed actions
- Consult, coordinate, and collaborate with governmental entities and stakeholders to prevent and/or minimize impacts to specific resources
- Encourage meaningful public participation in the decision making process



Environmental Science

- Serve as a leading contributor to the growing body of scientific knowledge about the marine and coastal environment, funding more than $1 billion in research since 1973
- Cover a broad range of disciplines, including physical oceanography, atmospheric sciences, biology, social sciences (economics, archaeology), and fates and effects of oil or gas in the sea
- Leverage resources for research through inter- and intra-agency agreements and cooperative agreements with federal and state partners, universities, and public colleges in coastal states
- Ongoing interaction between studies and assessment activities helps BOEM prioritize and target specific information needs, fill knowledge gaps in time for future decisions, and maintain our high level of commitment to environmental stewardship.



Applying Federal Law and Policy to Fulfill Our Stewardship Responsibilities

More than 30 regulations, executive orders, and policies are integral to BOEM's decisions. These include, but are not limited to OCLSA, the National Environmental Policy Act (NEPA), and other laws such as the:

- Clean Air Act
- Clean Water Act
- Coastal Zone Management Act
- Endangered Species Act
- Migratory Bird Treaty Act
- Marine Mammal Protection Act
- Magnuson-Stevens Fishery Conservation Management Act
- National Historic Preservation Act

Executive Orders (EOs) and Department of the Interior (DOI) Secretarial Orders:

- **EO 12114:** Environmental Effects Abroad
- **EO 12898:** Environmental Justice
- **EO 13007:** Indian Sacred Sites
- **EO 13089:** Coral Reef Protection
- **EO 13186:** Responsibilities of Federal Agencies to Protect Migratory Birds
- **EO 13766:** Expediting Environmental Reviews and Approvals for High Priority Infrastructure Projects
- **EO 13777:** Enforcing the Regulatory Reform Agenda
- **EO 13783:** Promoting Energy Independence and Economic Growth
- **EO 13795:** Implementing an America-First Offshore Energy Strategy
- **EO 13807:** Establishing Discipline and Accountability in the Environmental Review and Permitting Process for Infrastructure Projects
- **Secretarial Order 3355:** Streamlining NEPA Reviews and Implementation of Executive Order 13807
- **Secretarial Order 3350:** America-First Offshore Energy Strategy
- **EO 13175 of Nov. 6, 2000**. Consultation and Coordination with Indian Tribal Governments. 65 Fed. Reg. 67249 (Nov. 9, 2000).
- **DOI Policies on Consultation with Indian Tribes** (Dec. 1, 2011), and Consultation with Alaska Native Claims Settlement Act (ANCSA) Corporations (Aug. 10, 2012).

About the Bureau of Ocean Energy Management

The Bureau of Ocean Energy Management (BOEM) promotes economic development, energy independence, and environmental protection through responsible, science-based management of offshore conventional and renewable energy, and marine mineral resources.

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Bureau of Ocean Energy Management

FACT SHEET

ENVIRONMENTAL STUDIES PROGRAM

Science for Informed Decisions

The Bureau of Ocean Energy Management (BOEM) promotes energy independence, environmental protection and economic development through responsible management of offshore resources on the Outer Continental Shelf (OCS) based on the best available science. BOEM's **Environmental Studies Program (ESP)** develops, funds and manages rigorous scientific research to inform policy decisions regarding OCS resource development.

The long-term vision for the ESP is to be first in class, the best research program possible in the context of BOEM's mission and constraints. A **National Academies BOEM Committee on Offshore Science and Assessment (COSA)** provides additional program peer review and advice on achieving this vision, including input on the criteria used in developing and approving studies and the process leading to approval. To this end, the ESP asks three key questions: *what does BOEM need to know, what strategic questions should be posed, and what criteria should be used to prioritize studies for addressing these questions?* These questions will help guide the ESP over the next five to 10 years.

BOEM's environmental studies cover a broad range of disciplines, including physical oceanography, atmospheric sciences, biology, protected species, social sciences (including economics and cultural resources), and the environmental impacts of energy development. BOEM incorporates findings from the studies program into its consultation process, environmental reviews and National Environmental Policy Act (NEPA) documents, which are used to determine steps to mitigate and/or monitor the impact of offshore conventional energy, renewable energy and mineral resource development on the OCS.

Through the ESP, BOEM is a leading contributor to the growing body of scientific knowledge about the marine and coastal environment, funding more than $1 billion in research since ESP's beginning in 1973. Technical summaries of more than 1,800 BOEM-sponsored environmental research projects and more than 3,600 research reports are publicly available online through the Environmental Studies Program Information System **(ESPIS)**. The system provides unprecedented access to and discovery of ESP data and information with text, map-based queries, and other tools for use by the ocean science community. Quarterly Reports disseminate the findings.

BOEM oversees scientific research conducted through contracts, cooperative agreements with state institutions or public colleges and universities in affected coastal states, and inter- and intra-agency agreements. Such arrangements and partnerships enable BOEM to leverage resources, meet national priorities and satisfy common needs for robust scientific information. ESP's expertise is often sought for intergovernmental and international forums. The ***Studies Development Plan*** for Fiscal Years 2019-2021 summarizes research priorities and potential new studies for the next three years, subject to the availability of funds.

The Department of the Interior established a **Scientific Integrity Policy** in 2011 to ensure and maintain the integrity of scientific and scholarly activities used in Departmental decision making. BOEM has fully adopted the policy and is committed to securing independent environmental research, which is peer-reviewed and considered during every stage of the decision-making process. The proposal, selection, research, review, environmental studies and reports follow 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). The policy is available **online**.

Environmental Studies by Region & Program

Alaska Studies

Environmental studies in Alaska integrate information across multiple disciplines, including: protected and endangered species; physical oceanography; wildlife biology; subsistence and traditional knowledge; and air quality. Current regional studies focus on monitoring and understanding the changing environment in the Beaufort Sea, Chukchi Sea, and Cook Inlet Planning Areas, but studies may also be initiated in other OCS areas as guided by the **National OCS Oil and Gas Leasing Program**. The ESP actively collaborates with other U.S. and international Arctic science programs, such as the **U.S. Arctic Research Commission** (USARC), the **U.S. Interagency Arctic Research Policy Committee** (IARPC), and working groups of the **Arctic Council**. The ESP promotes regional stakeholder participation in BOEM research through the **BOEM/University of Alaska Coastal Marine Institute**, established in 1993.

Gulf of Mexico Studies

Ongoing studies in the Gulf of Mexico range from the Gulf of Mexico Marine Assessment Program for Protected Species **(GOMMAPPS)**, to other biological research including chemosynthetic communities and deepwater corals and coral acidification, and archaeological and physical studies of the Loop Current and air quality. The ESP pioneered social and economic research on the complex network of interrelationships among the energy industry and the GOM region. Research informs the sustainable use of OCS marine minerals for coastal restoration projects and nascent interest in renewable energy. In 2017, BOEM and the Louisiana State University celebrated the **Coastal Marine Institute's** 25th anniversary.

Pacific Studies

The ESP pioneered ocean research along the entire Pacific Coast of the United States. The current program includes platform biology studies, a long-standing highly acclaimed **multi-agency intertidal monitoring program**, research on protected species (such as **PacMAPPS**) and studies to support renewable energy development along the West Coast and offshore Hawaii.

Atlantic Studies

In support of the Energy Policy Act of 2005, ESP collects information to inform decisions on renewable energy development. This includes a suite of studies to address the distribution and movements of birds, marine mammals, and sea turtles on the OCS, notably the Atlantic Marine Assessment Program of Protected Species **(AMAPPS)**. Other studies evaluate the socioeconomic consequences of offshore wind development, for example, on fishing, tourism, shipwrecks and paleolandscapes. Atlantic research also informs the Marine Minerals Program for coastal restoration, shore protection, and resilience planning pre- and post storms such as hurricanes, and decisions on potential oil and gas development in the Mid- and South Atlantic.

National Studies

ESP headquarters-developed and managed studies have bureau-wide applicability. They include genetics research and archiving of OCS invertebrates by the **Smithsonian**, renewable energy, space-use conflicts, marine mammal research, acoustics, and support of the Oil Spill Modeling Program.

About the Bureau of Ocean Energy Management

The Bureau of Ocean Energy Management (BOEM) promotes economic development, energy independence, and environmental protection through responsible, science-based management of offshore conventional and renewable energy, and marine mineral resources.

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Environment
Fact Sheet

The Department of the Interior's Bureau of Ocean Energy Management (BOEM) promotes energy independence, environmental protection and economic development through responsible, science-based management of energy and mineral resources on the U.S. Outer Continental Shelf (OCS). BOEM ensures that environmental protection—informed by the best available science and law—is a foremost concern and an indispensable consideration in BOEM's decision making.

Overview

The Merriam-Webster Dictionary defines stewardship as "the careful and responsible management of something entrusted to one's care." BOEM's approach to the development of ocean energy and minerals comes with our unwavering dedication to responsible stewardship. The bureau is committed to ensuring that America's ocean environment and marine life are protected when planning and leasing for energy and marine mineral development.

The OCS Lands Act directs BOEM to study and consider coastal, marine and human environmental impacts when making decisions on how to effectively promote energy independence, environmental protection, economic development and national security. BOEM applies more than 30 federal regulations, statutes, executive orders and policies – including the National Environmental Policy Act (NEPA) – into our decisions.

BOEM has funded more than **$1 billion** **in scientific research since 1973**.

OVER >

To ensure that environmental protection is a primary consideration in our decisions, BOEM focuses on two core components that constantly engage with and inform each other:

Environmental Assessment – BOEM aims to constantly improve how environmental risk is assessed and communicated so that options for environmentally protective measures are targeted, transparent and compelling to decision-makers. By using science, regulatory frameworks and input from others, the bureau considers the potential for BOEM activities to impact the ocean's physical characteristics, biological resources and marine or coastal uses that are important to the environment and society.

Environmental Studies – BOEM develops, conducts and oversees world-class scientific research to inform policy decisions. The bureau's environmental studies cover a broad range of disciplines, including physical oceanography, atmospheric sciences, biology, protected species, social sciences (including economics and cultural resources) and the environmental impacts of energy development. BOEM manages pioneering and ongoing research studies nationally and in the Atlantic and Pacific Ocean, the Gulf of Mexico and offshore Alaska.

Ongoing interaction between studies and assessment activities helps BOEM prioritize and target specific information needs, fill knowledge gaps in time for future decisions and maintain our high level of commitment to environmental stewardship.

For More Information:

https://www.boem.gov/environment

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FACT SHEET

Geological and Geophysical (G&G) Surveys

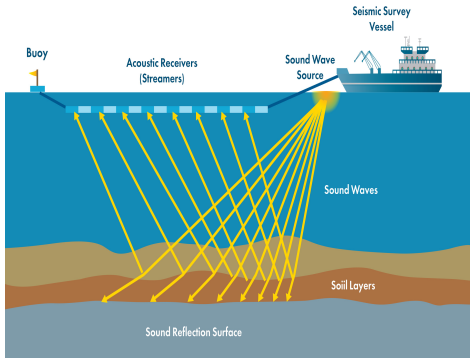
Why Are Geological and Geophysical (G&G) Surveys Conducted?

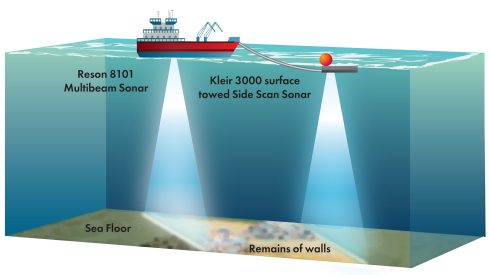
G&G surveys are conducted to: (1) obtain data for oil and gas (O&G) exploration and production, (2) aid in siting offshore (i.e., O&G, renewable energy) structures, and (3) locate marine mineral resources. More specifically, G&G surveys are necessary to make informed decisions about O&G resources, engineering decisions regarding the construction of offshore projects, and informed estimates regarding the composition and volume of sand and gravel resources. Such data are also used to ensure the proper use and conservation of Outer Continental Shelf (OCS) energy resources and the receipt of fair market value for the leasing of public lands.

What Types of G&G Surveys Are Conducted for BOEM-related Activities?

Deep Penetration Seismic Airgun Surveys for O&G Exploration. These surveys are conducted by vessels towing an array of airguns that produce low frequency sound pulses that penetrate deep into the subsurface and are then reflected and recorded by receivers to image deep geological features. Deep penetration seismic surveys are often acquired prior to the drilling phase of O&G exploration. These types of surveys are not appropriate for siting renewable energy structures or locating sand resources.

High Resolution Geophysical (HRG) Surveys for O&G Exploration, Renewable Energy Siting, and Sand and Gravel Resource Identification. HRG surveys use sound waves that are reflected off subsea structures to collect data on conditions both at the seafloor and the shallow subsurface. HRG equipment generally include off-the-shelf marine sonars and survey equipment (e.g., multi-beam echo sounders, side scan sonars, sub-bottom profilers). HRG systems usually use higher frequencies than those used in seismic airgun surveys and image smaller structures with a higher level of detail.





Last updated: November 2018

What Are the Potential Impacts to Marine Life?

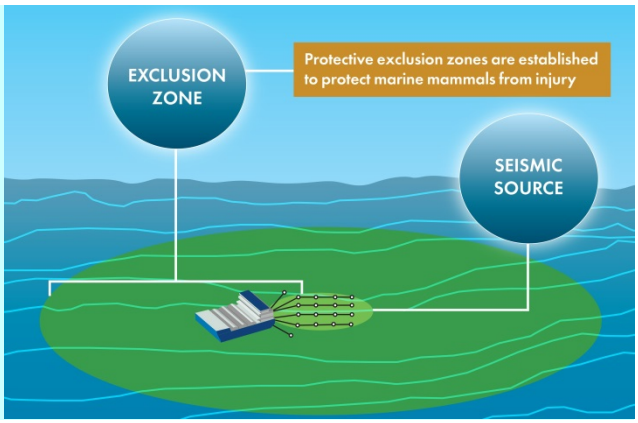
Some marine species rely on sound to communicate and gain information about their environment that is critical to survival and reproductive success. Human-made (anthropogenic) sound can affect certain species of marine life in a variety of ways, from minor behavioral modifications to major impacts, such as permanent or temporary hearing loss. The potential for impacts is largely tied to: (1) the individual animal (species, age, hearing range, prior exposure to sound source), (2) what the animal is doing at the time of exposure (feeding, migrating, mating), (3) the context and characteristics of the sound being heard, and (4) other physical environmental factors.

Seismic airgun surveys produce broadband, low-frequency sounds. Such sounds are within the hearing range of a number of marine mammals, and protection measures are especially important when conducting these activities because of their potential impacts to marine life.

HRG sound sources generally operate in discrete frequency bands and for shorter durations than seismic airgun surveys. Although different marine mammal species can be classified as low, mid and high frequency hearers, no marine mammals hear frequencies above 200 kHz, so only a few HRG sources (i.e., sub-bottom profilers, boomers and sparkers) are detectable by marine mammals. HRG surveys put out less energy than seismic airguns and operate in smaller areas. Therefore, the size of the area impacted by sound is much smaller, though they can impact marine animals at close ranges (mostly within 200 meters). No injury to marine mammals or sea turtles is expected from these sound sources, as sound has been shown to diminish rapidly with distance from the sound source.

How Does BOEM Help to Ensure Marine Life Is Protected From Potential Impacts?

BOEM has worked with the National Oceanic and Atmospheric Administration (NOAA) Fisheries and other agencies to identify protection measures that focus on: (1) avoiding injury from exposure to airgun and HRG sound sources to marine animals in close proximity to the source, and (2) reducing the potential for behavioral disruption. Examples may include, but are not limited to, the following:



- **Exclusion zones around vessels**. Operators establish an “acoustic exclusion zone” for each survey, so that the zone is clear of any marine mammals and sea turtles for a certain amount of time before acoustic sound sources can be operated.
- **Visual monitoring by trained protected species observers**. Protected species observers continuously monitor the exclusion zone for marine mammals and call for immediate shut down of sound sources if marine mammals are detected within or approaching this exclusion zone.
- **Ramp-up Procedures.** Airguns and HRG equipment (when technically feasible) are slowly ramped-up, rather than turned on immediately at full power, so that animals have an opportunity to move away from potentially disturbing levels of sound.
- **Passive acoustic monitoring (PAM).** Nighttime or poor visibility operation is allowed only when passive acoustics are used. Today’s PAM systems include detection, classification, and localization software capabilities that allow PAM observers to hear a marine mammal vocalize, determine its location, and classify species type.
- **Time-area closures to protect North Atlantic right whales (NARW) and sea turtles.** For airgun surveys, seasonal time-area closures are in place to protect NARWs within their designated critical habitat and select areas within their migration route and calving and nursery grounds.

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Marine Minerals **Fact Sheet**

The Department of the Interior's Bureau of Ocean Energy Management (BOEM) promotes energy independence, environmental protection and economic development through responsible, science-based management of energy and mineral resources on the U.S. Outer Continental Shelf (OCS). BOEM manages non-energy marine minerals (sand, gravel, etc.) in the OCS in a manner that facilitates access, promotes responsible use and minimizes or avoids environmental impacts.

Overview

Erosion along U.S. coastal beaches, dunes, barrier islands and wetlands is a serious problem affecting the nation's natural resources, energy supply, defense, public infrastructure and tourism. OCS sand and gravel resources are vital for the construction of coastal protection and restoration projects, including efforts to protect coastal communities, national defense facilities and federal and state infrastructure. Natural disasters have also increased demand for emergency sediment to restore damaged areas.

The OCS Lands Act gives BOEM the authority to manage minerals on the OCS. BOEM leases sand, gravel or shell resources from the OCS for shore protection, beach nourishment and barrier island restoration providing vigorous safety and environmental oversight. The bureau also evaluates and manages other strategic and critical minerals to support our nation's security and economy.

To date, BOEM has authorized more than 165 million cubic yards of OCS material for 60 coastal restoration projects in eight states, restoring more than 380 miles of the nation's coastline. .[1] Current statistics are available at **https://www.boem.gov/MMP-Current-Statistics**.

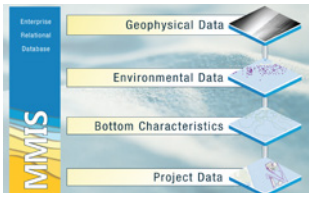
In 2019, BOEM joined federal, state and local partners to celebrate the completion of Phases 1 and 2 of the Mississippi Coastal Improvement Program. This included the restoration of Ship Island, which will be the largest coastal restoration initiative in the bureau's history.

Since 1995, more than
165 million cubic yards
of material has been allocated for
coastal restoration
and other projects

OVER >

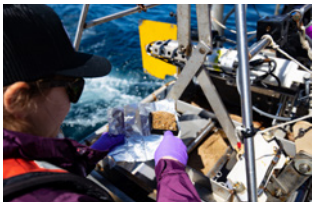
Marine minerals are most critical along the Atlantic and Gulf Coasts, with an evolving interest in the Pacific and Alaska. As the sole federal agency responsible for leasing OCS marine minerals, BOEM has a number of initiatives and responsibilities including the following:

National Offshore Sand Inventory – Maintain an inventory of national sand resources available for coastal protection and restoration. The inventory helps reduce response time in disaster recovery and facilitate long-term planning and ensures all parties have access to detailed offshore information that is critical to decision making.



Marine Minerals Information System (MMIS) – Maintain system of offshore sediment data from multiple sources, including BOEM-funded research, to create a one-stop, interactive tool that provides public access to information and data on offshore mineral resources throughout the U.S. Atlantic, Gulf of Mexico and Pacific OCS. To learn more about BOEM's MMIS, visit: **https://mmis.doi.gov/BOEMMMIS/**.

Environmental Oversight – Implement science strategy that focuses on identifying compatible sediment deposits and conducting necessary environmental studies to make informed decisions regarding the use of federal mineral resources. Oversee/support environmental assessments, environmental impact statements, and consultations on the effects of dredging on biological, physical and cultural resources. Use science to make informed decisions regarding the use of OCS mineral resources. Identify sound mitigation practices to minimize or avoid impacts.



Marine Mineral Research – Utilize four types of research—biological studies, physical modeling studies, environmental impact investigations and marine mineral resource evaluations —to evaluate the effects of specific proposed dredging or mining operations, as required under current environmental laws. Incorporate results into lease requirements and stipulations for dredging of OCS marine minerals.

Critical Minerals – Inventory and identify new supplies of marine mineral resources of commercial or economic interest. Continue to work with other federal agencies to determine which areas of the OCS have potentially significant critical mineral resources, with a focus on cobalt, manganese and rare earth elements. These minerals are essential cathode components in Lithium-ion batteries and are used in a range of applications from personal electronics to electric vehicles to military uses.

The success of BOEM's marine minerals initiatives depends on partnerships with other federal agencies, state and local governments, regional planning bodies, industry, business communities, academia, non-governmental organizations, Tribes and the general public.

BOEM conducts meetings with regional sand management working groups to discuss coastal restoration issues, concerns and challenges. These meetings encourage information and perspective sharing. They also foster communication and coordination and program updates on funding opportunities, research efforts and coastal projects.

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Marine Acoustics **Fact Sheet**

BOEM established the Center for Marine Acoustics in 2020 to create a streamlined approach to BOEM's acoustic studies and modeling efforts. Staffed by acoustics and modeling experts, the Center addresses both naturally occurring sounds and those generated by industrial activities that BOEM regulates, including offshore oil and gas, renewable energy and marine minerals. The Center positions BOEM to become a recognized leader on marine acoustics within the federal government and internationally.

Managing Impacts of Human-Generated Sound on Marine Life

A critical part of BOEM's mission is to protect the environment while ensuring the safe development of offshore energy and marine mineral resources on almost 2.5 billion acres of U.S. federal waters.

With about 200 environmental staff members, including specialists in marine biology, ecology, and oceanography, BOEM works tirelessly to produce, evaluate, and incorporate the best available science in all of our management decisions.

By driving original research to fill knowledge gaps and by oveseeing environmental reviews, BOEM has played a key role in improving the overall scientific understanding of the potential effects of anthropogenic (human-generated) sound on marine life. BOEM has also played an important role in adaptive management by constantly adjusting to evolving information and needs.

BOEM was one of the earliest federal pioneers in sponsoring research on ocean sounds, beginning in the 1980s. Since 1998, BOEM has invested more than $95 million in protected species and acoustics-related research by using four general research methods:

- literature reviews, syntheses, and workshops,
- field surveys,
- empirical studies in the laboratory and in the field, and
- sound source verification and modeling.

The Context for Understanding Sound in the Marine Environment

Once considered silent, the seas are now known to be alive with sounds. Some sounds are from natural, non-biological sources such as storms, earthquakes, and waves. Other sounds are generated by animals that use acoustic signals to communicate and to navigate within their environment. Finally, human activities such as shipping, energy development, military operations, construction, commercial fishing, and recreation introduce sounds into the marine environment.

When these anthropogenic sounds are unwanted, they are generally referred to as noise. As human presence in the offshore environment has grown, so have the anthropogenic noise levels.

Current science shows us that some of these sounds may adversely affect marine life in certain situations. Some sounds can interrupt important biological behaviors (courtship, nursing, feeding and migration) and can interfere with communication between animals. In more extreme instances, exposures to sounds at high levels or for extended periods of time can lead to physiological effects, including hearing loss and mortality.

The impacts to marine life are challenging to predict because they depend upon the acoustic qualities of the sound source, the oceanographic conditions in which the sound is produced, the hearing abilities of the species of interest, and the behavioral context in which the animal receives the sound.

OVER >

BOEM-Funded Acoustics Reseach

Present-day research funded by BOEM covers a range of topics, including: bioacoustics of fish and marine mammals; measuring source levels and propagation of anthropogenic sound sources; ambient noise measurements; methods to detect, classify, and locate marine life; measuring hearing thresholds of key marine species; observing behavioral responses to anthropogenic sound sources; and improving mitigation methods. With our many federal and academic partners, BOEM has been examining the complex issue of cumulative effects of multiple stressors on marine mammals.

Balancing human activities with the protection of marine life can be a difficult task, but as BOEM approaches its management decisions, it uses the best science available. This includes, for example, an understanding of the transmission of man-made sounds in our decision-making process. While debates on best mitigation practices remain, and opinions on the path forward are diverse, BOEM continues to implement strict mitigation and monitoring measures to help minimize potential impacts on marine species. BOEM remains steadfastly committed to funding and supporting the science needed to better understand anthropogenic sounds and their impacts on marine life.

Selected Workshops and Syntheses

BOEM also partners with diverse stakeholders to share information and ideas on science needs as well as best management practices, often by supporting workshops and syntheses. They include the following:

- Proceedings of Meetings on Acoustics; Effects of Noise on Marine Life (Open Source) 2010, 2013, 2016, and 2019. In 2020, the Acoustical Society of America published a paper by two BOEM scientists based on their 2019 conference presentation.
- Effects of Sound in the Ocean on Marine Mammals Conference (2018)
- Assessment of cumulative effects of anthropogen stressors on marine mammals (2017)

Integrating Science and Policy

Understanding the potential impacts of anthropogenic (human-induced) noise on marine life is complex. Given the uncertainty regarding the current scientific understanding of impacts, BOEM's strategy is to implement an adaptive approach that: (1) identifies information needs during our environmental assessments, then (2) addresses those needs by supporting new scientific research. The results from BOEM studies and other emerging research are applied to future reviews of offshore resource development projects.

Decisions can then align with BOEM's environmental stewardship responsibilities and requirements under a suite of environmental laws (e.g., National Environmental Policy Act, Endangered Species Act, Marine Mammal Protection Act, Magnuson-Stevens Fishery Conservation and Management Act).

- Effects of Noise on Fish, Fisheries, and Invertebrates in the U.S. Atlantic and Arctic from Energy Industry Sound-Generating Activities Workshop (2013)
- Quieting Technologies for Reducing Noise During Seismic Surveying and Pile Driving Workshop (2014)
- Assessment of cumulative effects of anthropogenic stressors on marine mammals (2017)

For more information on BOEM-funded acoustics research:

- **Center for Marine Acoustics** – https://www.boem.gov/center-marine-acoustics
- **Acoustics at BOEM issue of BOEM Ocean Science** – https://www.boem.gov/ocean-science-2019
- **Environmental Studies Program Information System (ESPIS)** – https://marinecadastre.gov/espis

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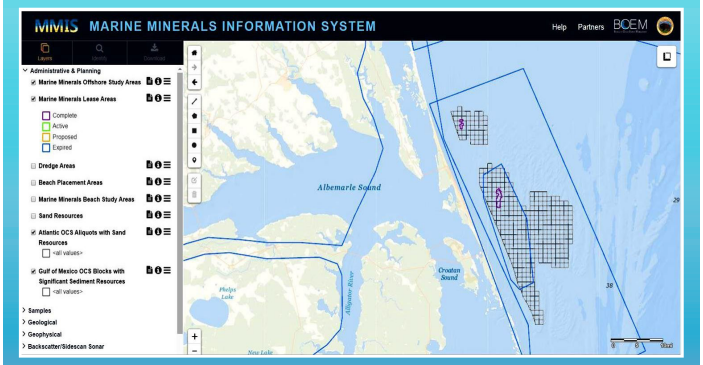
FACT SHEET

Marine Minerals Information System

Integrating and Visualizing Marine Minerals Data for Science, Policy, and Decision-Making

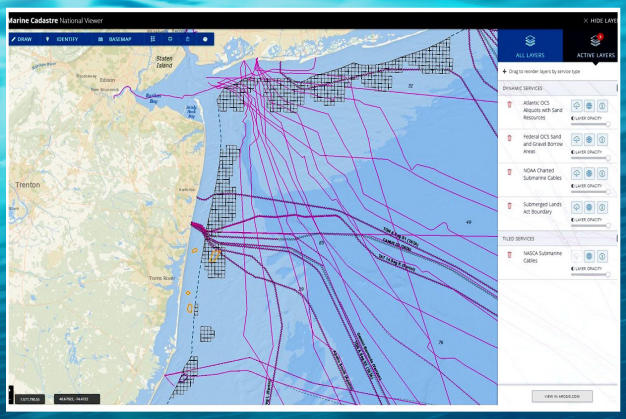
Context: Outer Continental Shelf (OCS) sand and gravel resources are vital sources of material for the construction of coastal protection and restoration projects, including efforts to protect coastal communities, national defense facilities, and federal and state infrastructure. In recent years, there has been a growing demand for OCS sediment for planned projects, as well as for emergency needs to restore areas damaged by natural disasters. At the same time, proponents of planned infrastructure projects are requesting higher volumes of OCS sediment, driven by diminishing resources in state waters and a high frequency of recent storms along the Atlantic and Gulf of Mexico coasts. Further, given the significant number of other ocean users (e.g., developers of offshore energy projects, and owners and operators of submerged telecommunication or power cables), BOEM strives to reduce or eliminate the potential for multiple use conflicts or environmental impacts that could result from marine minerals projects, which can make it challenging to identify new potential areas from which to borrow or dredge sediment.



Map depicting various data sets for offshore North Carolina. The user selects data categories on the left, then zooms in to learn more about a resource, such as the source of the data, whether a resource is being leased, its bathymetry and dimensions, its characteristics (grain size, color and other attributes), where it will be placed, and other ocean uses such as submerged communication cables or unexploded munitions.

Ensuring all parties have access to detailed offshore information is critical to responsible decision-making. To help address this need, BOEM's Marine Minerals Program has developed the Marine Minerals Information System *(MMIS)* Viewer as part of the National Offshore Sand Inventory. The MMIS is a one-stop, state-of-the-art interactive support tool, available online, that provides public access to data and information relevant to the non-energy offshore mineral resources throughout the U.S. Atlantic, Gulf of Mexico and Pacific OCS. It is accessible at *https://mmis.doi.gov/BOEMMMIS.*

How does the MMIS fit into the National Offshore Sand Inventory? Fundamental to being a good steward of a resource is knowing how much exists. Therefore BOEM has made it a priority to create a *National Offshore Sand Inventory*. Marine minerals geological, geophysical, and environmental information collected throughout the past three decades provides the underlying organization for the inventory, while recent and ongoing data collection and analysis helps us further our understanding of available marine mineral resources. The inventory includes data archived by academic, governmental, and other sources; this information is captured in the MMIS to support proactive planning for expected and emergency needs.



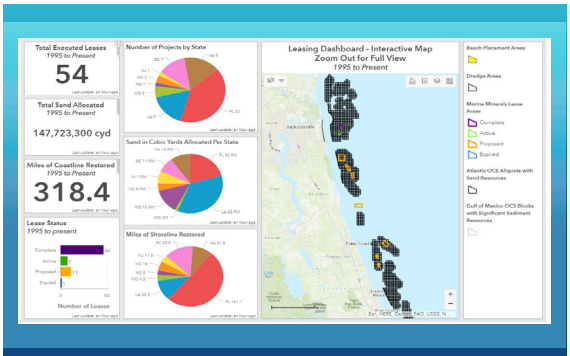
*The MMIS is hosted on a Department of the Interior platform. The viewer and select datasets can be found at **MarineCadastre.gov**, which BOEM developed in partnership with the NOAA Office for Coastal Management.*

MMIS data feeds into the MarineCadastre. This map displays data such as Atlantic OCS sand resource areas and other relevant data. Other data sets allow the user to view existing offshore projects, submerged power lines, shipwrecks, or offshore oil and gas infrastructure in other regions.

How does it work? By selecting any of the data layers, the interactive map viewer allows users to easily download, visualize, and explore geographic data about non-energy offshore materials. More than 20 data layers are available in the viewer, and are available for download in several formats (e.g., geodatabase, shapefile, or .csv files). Map-based queries enable users to find relevant marine minerals information products, which have been generated from other authoritative sources.

What types of information does it contain? Through the MMIS, users can find information about marine minerals lease areas, core sample information derived from multiple sources, identified sand resources, and beach nourishment and coastal restoration sites. The system pulls from more than 30 years of BOEM-funded geological and geophysical research, much of it previously stored on CDs and in PDFs. The MMIS is the result of coordination through our *partnerships* with other federal agencies and state and local governments, particularly research conducted through our cooperative agreements with states.

What is on the dashboard? The easy-to-navigate dashboard shows information on a local, state and national level, including sand volumes leased, lease and nourishment sites, miles of coastline restored, and the number of projects.



Snapshot of the dashboard

Who can use the system? BOEM expects that coastal communities, government officials, coastal engineers and planners, academics, and those involved in national defense, telecommunications, offshore energy, or fisheries will find the MMIS Viewer to be an informational and educational tool that supports responsible resource stewardship.

Does the MMIS provide environmental data? The MMIS provides citations for BOEM environmental study reports and environmental assessments through the *Environmental Studies Program Information System (ESPIS)* or through *MMP in Your State pages*, and includes topics such as sea turtle behavior or habitat, and fish use of shoal habitat in specific offshore areas. Geological and geotechnical data are incorporated into the MMIS to help future analysis and inform reviews under the National Environmental Policy Act (NEPA) process.

Learn more at *https://mmis.doi.gov/BOEMMMIS* or *https://www.boem.gov/Marine-Minerals-Program/*

About the Bureau of Ocean Energy Management

The Bureau of Ocean Energy Management (BOEM) promotes economic development, energy independence, and environmental protection through responsible, science-based management of offshore conventional and renewable energy, and marine mineral resources.

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FACT SHEET

Marine Minerals Program

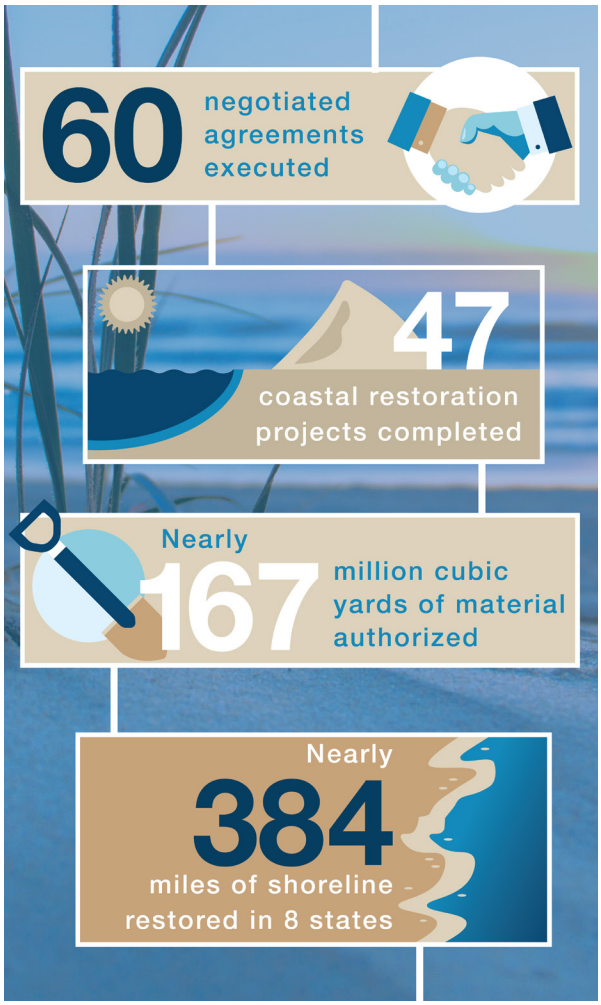
Preserving and Restoring the Nation's Beaches and Promoting Coastal Resilience

BOEM's ***Marine Minerals Program*** (MMP) manages Outer Continental Shelf mineral leasing (primarily sand and gravel) for coastal restoration, and commercial leasing of gold, manganese, and other hard minerals. Pursuant to ***Executive Order 13817,*** the MMP and the U.S. Geological Survey (USGS) are ***collaborating*** to determine which 35 critical minerals are located on the OCS. Domestically sourced critical minerals could reduce the Nation's vulnerability to economic disruption and negative national security impacts caused by a break in imports used in manufacturing and other sectors.

BOEM ensures that the removal of any mineral resource is conducted in a safe and environmentally sound manner, and that any adverse environmental impacts are avoided or minimized.

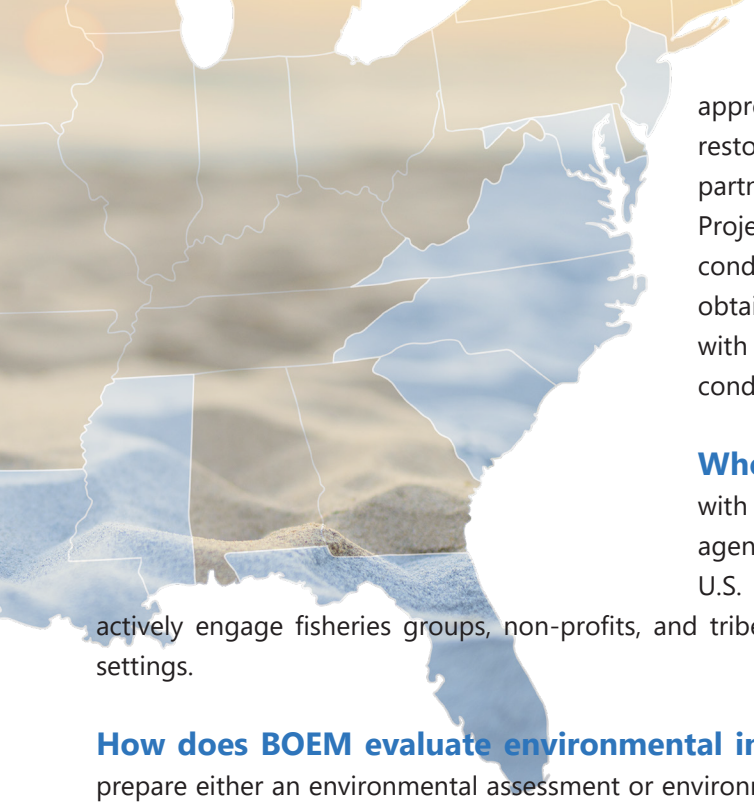
What are the primary uses of marine minerals? Marine minerals are used primarily in coastal restoration projects, including beach nourishment and habitat restoration, with increased attention to building resilience to deal with future storms and rising sea levels.

Why is this program beneficial? Access to and identification of OCS sand resources is critical for the long-term success and cost-effectiveness of shore protection, beach nourishment, and habitat restoration projects. Erosion of the nation's beaches, dunes, and coastal wetlands affects natural resources, energy, defense, public infrastructure, and tourism, which are important to healthy ecosystems and the economy at all levels.



What is the demand for marine minerals? In recent years the bureau has experienced a significant increase in the volume of sediment requested and the number of requests to use OCS sand resources. This trend is most likely due to a diminishing supply of available material in state waters, increased coastal erosion due to more frequent and intense storms, and sea level rise. BOEM maintains a ***National Offshore Sand Inventory,*** including data housed within a GIS-based ***Marine Minerals Information System (MMIS)*** that helps identify sediment quality, quantity, location, and accessibility. The inventory informs planning, improves response time, and bolsters preparedness.

Where are projects located? OCS material has been used for about four dozen coastal restoration projects in Florida, Louisiana, Maryland, Mississippi, New Jersey, North Carolina, South Carolina, and Virginia. Taking a regional approach, the MMP sponsors new offshore surveys from Maine to Texas and California. BOEM has followed the



approach it used after Hurricane Sandy in 2012, when it supported coastal restoration projects in several Atlantic states, and sponsored research partnerships to update offshore sand maps and database in 13 states. Projects generally consist of four phases: identifying sand resources and conducting environmental reviews prior to project approval; dredging to obtain sand and/or gravel; placing it along the shoreline; and engaging with partners and stakeholders to monitor dredging site and placement conditions.

Who are our stakeholders and partners? The MMP works with local governments, state geological surveys and environmental agencies, the U.S. Army Corps of Engineers, USGS, NOAA Fisheries, U.S. Fish and Wildlife Service, National Park Service, and NASA. We actively engage fisheries groups, non-profits, and tribes in workshops, Sand Management Working Groups, and other settings.

How does BOEM evaluate environmental impacts? The bureau must review all environmental impacts and prepare either an environmental assessment or environmental impact statement. BOEM requires mitigation measures and other stipulations to protect physical, biological, and cultural resources. Stipulations often include dredging time-frame constraints, dredge location constraints, lighting requirements, equipment requirements, monitoring requirements for threatened and endangered species, and buffers surrounding cultural resources and hard-bottom habitat.

Ship Island restoration through the Mississippi Coastal Improvement Project is a joint effort between BOEM, the National Park Service, the U.S. Army Corps of Engineers Mobile District, and the State of Mississippi. In 1969, Category 5 Hurricane Camille cut Ship Island in two, creating the Camille Cut. Restoring Ship Island will protect coastal communities and ecosystems. Once complete, Ship Island will be the largest BOEM coastal restoration project to date.

For more information, visit: ***http://www.boem.gov/Marine-Minerals-Program/***

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