

Marine Minerals Program Research and Studies

The Bureau of Ocean Energy Management (BOEM) manages the responsible exploration and development of energy and mineral resources on the Outer Continental Shelf (OCS). BOEM's [Marine Minerals Program](#) (MMP) is the sole federal program responsible for management of non-energy resources (primarily sand and gravel) from the OCS, mostly for beach nourishment and coastal restoration projects. Because BOEM must ensure that the removal of any mineral resources is done in a safe and environmentally sound manner, the MMP invests in research to comply with the National Environmental Policy Act (NEPA) and other environmental laws to avoid or minimize potential adverse impacts to the marine, coastal, and/or human environments.

[MMP research](#) funding comes from the Environmental Studies Program and the Office of Strategic Resources. Staff and stakeholders identify information needs and data gaps for further study while evaluating potential environmental impacts of MMP-related activities. Study results inform policy decisions regarding OCS resource development. The MMP also invests in sand and gravel resource evaluation studies to identify existing and potential sand resources and strategically manage needs and impacts. Traditionally, these studies are executed through cooperative agreements with state entities. Many MMP reports, study profiles, and research for other BOEM program areas are accessible through BOEM's [Environmental Studies Program Information System](#) (ESPIS) and the [MMP studies page](#). Since MMP's start in 1992, BOEM has invested over \$40 million to identify non-energy resources on the OCS, conduct scientific research, and lease OCS resources to local communities and Federal agencies in need.

ONGOING AND PROPOSED STUDIES

[**Ecological Function and Recovery of Biological Communities within Dredged Ridge-Swale Habitats in the South-Atlantic Bight**](#), University of Florida, U.S. Army Corps of Engineers (USACE), U.S. Navy, and NASA, Atlantic OCS, 2013-2019 (ongoing). BOEM needs to observe prolonged biological, physical, and chemical recovery of borrow areas to understand the importance of dredged habitats to benthic communities and fish and the post-dredging recovery. Existing project-specific, post-construction monitoring is not of sufficient duration to fully understand the dynamics and recovery of shoal complexes associated with capes. Observations over an extended time frame, and incorporating multiple dredge events allow BOEM to examine the process of disturbance and recovery, and improve regional management of offshore habitat availability for prey and fish species. This knowledge will improve effects analyses in NEPA documents and relevant consultations.



Jessica Mallindine, BOEM Gulf of Mexico marine biologist, tags a coastal shark species in the Canaveral Shoals Study. Photo: NASA

[**Regional Essential Fish Habitat Geospatial Assessment and Framework of Offshore Sand Features**](#), National, 2017-2018 (ongoing). This study will address the need for regional EFH planning methodologies by developing a geospatial tool that includes regional classification of offshore sand features and associated EFH. Historically, EFH assessments have been developed on a project-by-project basis using species and habitat information specific to a borrow area. By defining and organizing spatial relationships of OCS sand resource areas and sand features important to fish habitat, BOEM will be able to improve EFH consultations and coordination with other federal agencies such as the National Marine Fisheries Service and the US Army Corps of Engineers.

[**Development of a Decision Support Tool to Reduce Sea Turtle Dredging Entrainment Risk**](#), NOAA Office for Coastal Management, National, 2015-2017 (ongoing). One significant environmental

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factor which impacts how projects are designed and constructed is the potential for entrainment and mortality of federally protected sea turtles when using Trailing Suction Hopper Dredges (TSHDs). In collaboration with sea turtle and dredging industry technical experts, BOEM and its federal partners have developed a standardized decision support tool to assess project-specific dredging entrainment risk and improve the effectiveness of mitigation planning decisions within marine mineral resource areas. Additional information on the study is available at: <http://arcg.is/298s5BO>

[Sea Turtle Movement and Habitat Use in the Northern Gulf of Mexico.](#) BOEM, in collaboration with USGS, is deploying satellite tags with depth-logging capabilities on turtles captured during relocation trawling. Trawling boats travel in front of hopper dredge ships to capture the turtles, after which they are tagged and relocated. This allows for data collection on turtle depth, dive profiles, movement patterns, their use of varying thermal zones in the water column, and time spent on the bottom in the vicinity of dredging. Dredging occurs primarily in the bottom portion of the water column so the amount of time turtles spend near the bottom influences dredge entrainment risk. Additional data (i.e., by-catch species) are collected to assess available diet and benthic composition of bottom habitat in order to model the habitat. To accomplish this, scientists tag the turtles with internal Passive Internal Transponder (PIT) tags, and collect blood and tissue samples for genetic and isotope analyses. This knowledge will improve baseline data for the species, aid in risk reduction analyses, hone NEPA and Essential Fish Habitat (EFH) consultations, and support species management.

[Gulfwide Sand Inventory.](#) *Gulf of Mexico.* To serve the public interest in offshore sand resources, coastal restoration, and coastal resiliency, BOEM is coordinating with the Gulf of Mexico states to assess sand resources, particularly off the coast of Mississippi and Texas. The availability, nourishment quality, and location of sand resources are imperative for sustainability of the Northern Gulf coast. Barrier islands, coastal marshes, and bay environments not only serve as popular tourism destinations and support critical infrastructure, but they also provide protection from potentially devastating impacts of storms, relative sea level rise, and oil spills. An OCS sand budget for the Northern Gulf will allow for better assessment of sand resources that could be used for future coastal restoration efforts that will aide in coastal resiliency.



Researchers from Louisiana State University and the University of New Orleans collect sediment cores from the Gulf of Mexico. Photo: LSU

RECENTLY COMPLETED STUDIES

[Characteristics of Sounds Emitted during High-Resolution Marine Geophysical Surveys,](#) **Naval Undersea Warfare Center Division (NAVSEA) and U.S. Geological Survey (USGS), National, 2015-2016.** Scientific questions regarding the impact of noise in the marine environment have resulted in an increasing number of regulations and mitigation strategies to reduce the risk associated with high-resolution marine geophysical surveys performed in U.S. waters. However, data to estimate the ecological risk associated with the operation of various technologies are often lacking. This study quantified the characteristics of sounds radiated by a variety of commercial marine geophysical survey systems, and calibrated and analyzed acoustic data from 18 different marine survey systems to support future permit applications and in-water measurements in coastal U.S. waters.

[Review of Biological and Biophysical Impacts from Dredging and Handling of Offshore Sand,](#) **Research Planning, Inc., National, 2011-2013.** The MMP faces increasingly complex issues due to increased demand for OCS sand, including resource allocation, cumulative impacts from repeated use, impacts on fisheries and essential fish habitat, protection of archaeological sites, oil and gas infrastructure, and renewable energy infrastructure. It is critical that BOEM use the best available science while conducting environmental reviews of proposed leases and agreements. This report summarizes current knowledge on the potential impacts of OCS sand dredging and conveyance operations, and describes mitigation measures to reduce or eliminate adverse impacts to specific valued resources, such as marine mammals, sea turtles, and fishes.

Learn more at <http://www.boem.gov/Marine-Minerals-Program/>, and follow us on [Facebook](#), [Twitter](#), and our other social media channels.