

ENVIRONMENTAL STUDIES PROGRAM: Ongoing Studies

Region: National

Planning Area(s): Atlantic, Gulf of Mexico, Pacific

Title: Review of Biological and Biophysical Impacts from Dredging and Use of Offshore Sand

BOEM Cost: \$149,887

Period of Performance: FY 2012-2013

Conducting Organization(s): Research Planning, Inc. (M11PS00116).

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Description:

Background: Since 1993, more than 50 environmental studies have been completed for the Marine Minerals Program (MMP). The studies fall into three general areas of research: (1) biological studies, which address the potential for adverse impacts on marine life as a consequence of dredging sand on the OCS; (2) physical oceanographic studies, which examine the potential for alteration of local wave fields from dredging sand at specific sites; and (3) environmental impact studies, which evaluate the effects of particular types of dredging techniques on various aspects of the physical, chemical, and biological environments and develop appropriate mitigation techniques to alleviate or prevent adverse impacts. The studies have also included ten site-specific high-potential or existing sand borrow areas offshore Atlantic and Gulf coasts. All of the BOEM environmental studies are available in the BOEM database

(http://www.data.boem.gov/homepg/data_center/other/espis/espismaster.asp?appid=1) and are posted on the BOEM website (<http://www.boem.gov/Non-Energy-Minerals/Marine-Minerals-Program.aspx>).

In 2007, BOEM published a study focused on ten site-specific high-potential or existing sand borrow areas offshore of Atlantic and Gulf coasts: “Critical Technical Review and Evaluation of Site-Specific Studies’ Techniques for the MMS Marine Minerals Program” (MMS 2007-047). This was the bureau’s first attempt at integrating and analyzing the results of historically funded studies. The totality of BOEM MMP studies have never been wholly summarized, compared to other domestic and international literature, and reviewed for currency and/or analyzed systematically for data gaps. This study effort proposes to do that for potential impacts to biological resources (including habitat) from beach nourishment or coastal restoration operations.

Beach nourishment and coastal restoration operations generally occur in the following three phases: dredging of the borrow area, conveyance of sand, and placement of sand. This effort would focus on the first two operational phases. Review of impacts related to dredging shall focus on biological impacts related to specific dredging techniques (e.g., hopper dredge and cutterhead dredge) used in the Outer Continental Shelf marine

environment and differences in impacts given dredge technology, operational factors, and biogeography. Impacts include direct impacts, indirect impacts, and cumulative impacts (including biophysical coupling). The conveyance impacts review includes the direct, indirect, and cumulative effects to biological communities due to hopper transport and pump-out operations, any pipeline emplacement, transport, and retrieval, and any ancillary activities, such as the use of in-line boosters or support vessels. The nature of effects will also be differentiated on the basis of operational and biogeographical differences. The study will not involve specific treatment of biological impacts due to sand placement and equilibration, beach shaping, or beach grading.

For dredging and conveyance operations, there will be a robust review of mitigation measures implemented to minimize documented effects. The review will identify the effectiveness of mitigation and basis for that determination. A summary of impacts and mitigation might be developed for each thematic resource and will identify the source of underlying operations causing an impact, impacting factors/activities that determine the nature of impacts, the actual impacts that could occur, and mitigation that explicitly treats the source, factor, and magnitude/severity/duration of impact. The same framework is used by BOEM when analyzing the environmental effects of any proposed site-specific project.

A primary motivation for this study is the lack of recent integration of domestic literature on dredging for beach nourishment/coastal restoration and with international literature on the impacts of marine aggregate dredging, beach nourishment, *etc.* The information collected by both domestic and international studies is regularly used to prepare environmental analyses which are required before a negotiated agreement can be issued. The desired outcome is not a site-specific presentation of impacts, but a synthesized presentation of the nature of impacts that occur across different project area and operational variables.

Objectives:

1. Review and synthesize relevant environmental research that analyze the biological effects of and effect-reducing mitigation used in dredging and conveyance operations in the marine environment. This includes reviewing environmental studies sponsored by the BOEM Marine Minerals Program, as well as major and recent domestic and international research.
2. Identify any major gaps in understanding of biological impacts that need to be addressed and determine which may specifically benefit from further research.

Importance to BOEM: Consolidation and synthesis of this large volume of work, focusing specifically on studies which have examined biological impacts, will enable efficient use of previous studies and to identify which areas are in need of additional study. BOEM also has an immediate need to better document and communicate the efficacy of mitigation (e.g., avoidance through exclusion zones, speed restrictions,

impact-reducing dredging equipment) as it relates to the broad categories of impacts identified.

Current Status: The contract was awarded on 9/19/2011. To date, the contractor has compiled over 200 documents and has begun to review the documents, creating summaries of each and noting points of relevance. The contractor continues to collect, review and evaluate resource documents.

Final Report Due: March 19, 2013

Publications: List any publications available to date, matching the reference format used in the SDP.

Affiliated Web Sites: <http://www.boem.gov/marinemineralsprogram>

Revised Date: May 16, 2012

ESPIS: Environmental Studies Program Information System

All *completed* ESP studies can be found here:

http://www.data.boem.gov/homepg/data_center/other/espis/espisfront.asp