BOEM ENVIRONMENTAL STUDIES PROGRAM: Ongoing Studies

Region: Headquarters

Planning Area(s): All

Title: Characterization of Underwater Sound Produced by a Hopper Dredge during Dredging, Pump-out, and Placement Operations

Conducting Organization: U.S. Army Corps of Engineers, Engineer Research and Development Center

Total Cost: $30,000 **Period of Performance:** FY 2012-2013

BOEM Contact: Geoffrey Wikel

Description:
Background: Noise produced during dredging operations could affect marine mammals, sea turtles, and fishes. Effects could include potential changes in foraging and self-locating behavior, communication masking, impaired detection of sounds of predators and/or prey, decreased hearing sensitivity, and/or increased stress. Recent efforts monitoring noise produced by hopper dredges during marine aggregate dredging operations in the North Sea have recently shown noise levels are sufficient to cause harassment to several species of marine mammals. To date, there have been limited in-depth studies in U.S. waters examining the current U.S. dredge fleet and operating conditions. There are notable differences in ambient noise, dredge plant technology and age, as well as the source material being dredging in the U.S. and North Sea – all relevant factors in determining sound characteristics.

Under the U.S. Army Corps of Engineers (USACE) Dredging Operations and Environmental Research Program, the Engineer Research and Development Center (ERDC) has established a new monitoring program that measures sound data produced by dredging and dredged material placement operations across different dredge types, substrate types, and setting. Before that the previous sound mapping efforts related to open-ocean hopper dredging in U.S. waters date to the 1980s, and those observations suggest that produced and received sound levels are greater than more recent observations.

The USACE ERDC expanded monitoring efforts to include an open ocean dredging project offshore Wallops Island, VA. The proposed study represents a collaborative effort between the USACE, NASA, and BOEM. In 2011 National Aeronautics and Space Administration (NASA) undertook a beach fill project at Wallops Island Flight Facility using Outer Continental Shelf sand. The project presented an unique opportunity to monitor sound as three different hopper dredges were used.

Objectives: The objectives of this study are to 1) characterize noise generation and sound propagation from sand and gravel dredge operations ambient sound levels, 2) compare dredge plant noise to ambient noise levels, and 3) compare dredge plant noise to operational phase.

Methods:

- Passive acoustic monitoring to measure sound from different trailing suction hopper dredges during different operational phases.
- Post-processing and statistical analysis of noise produced from by equipment use and operational phase.
- Compare sound levels observed to engine loading and operational state using Automatic Identification System (AIS) data and Dredge Quality Management (DQM) data required to be collected during dredge use.

Importance to BOEM:
BOEM needs to understand the magnitude and zone of influence of the sound generated in order to determine potential effects to marine mammals, sea turtles, and fish and any need for mitigation or monitoring. This study can provide for more informed coordination with NWS and FWS under the requirements of the Marine Mammal Protection Act, Endangered Species Act, and Magnuson Stevens Fishery Conservation and Management Act.

Current Status: Field work is complete. Data is undergoing post-processing and analysis.

Final Report Due: March 2013 (subject to change)

Revised Date: September 19, 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