TECHNICAL SUMMARY

STUDY TITLE: Review of Biological and Biophysical Impacts from Dredging and Handling of Offshore Sand

REPORT TITLE: Review of Biological and Biophysical Impacts from Dredging and Handling of Offshore Sand

CONTRACT NUMBER: M11PD00219

SPONSORING OCS REGION: Headquarters, Herndon, Virginia

APPLICABLE PLANNING AREAS: Atlantic and Gulf coasts

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KEY WORDS: OCS sand borrow areas, dredging, impacts, data gaps, recommendations

BACKGROUND: As the demand for OCS sand increases, the BOEM Marine Minerals Program is facing increasingly complex issues, such as resource allocation, cumulative impacts from repeated use, fisheries conflicts, protection of archaeological sites, oil and gas infrastructure, renewable energy infrastructure, and essential fish habitat issues, among others. It is critical that BOEM uses the best available science in their environmental review of proposed leases and memorandums of agreement (MOA), so that all necessary and effective precautions are taken to reduce potential impacts during sand dredging and conveyance to the placement site.

This report provides a summary of the current *state-of-the-knowledge* of the potential impacts of OCS sand dredging and conveyance operations to biological resources and their habitats and rates of habitat recovery post-dredging. Furthermore, we synthesize dredging guidelines and recommended practices to minimize impacts and speed habitat recovery, and mitigation measures to reduce or eliminate adverse impacts to specific valued resources, such as marine mammals, sea turtles, and fishes. Every lease or MOA issued by BOEM includes specifications in the form of mitigation measures to reduce or eliminate adverse environmental impacts that were identified during environmental review and consultations. Although mitigation strategies are implemented, there is little information, based on rigorous collection of quantitative data, on the effectiveness of their intended purpose. It is important to have the scientific basis to show that these requirements are effective.

OBJECTIVES: The project objectives were to: 1) Review and synthesize relevant environmental research that analyzes the biological effects of and effect-reducing mitigation used in dredging and conveyance operations in the marine environment; and 2) Identify specific knowledge gaps that may exist and recommend new studies to address the major gaps, for both potential impacts and the efficacy of mitigation measures.

DESCRIPTION: A comprehensive literature search was completed to identify relevant existing information, environmental studies sponsored by BOEM, as well as major and recent domestic and international research. Resource categories included: Benthic communities and habitats within and adjacent to borrow areas and their trophic connections to nektonic communities; Fishes and essential fish habitat within and adjacent to borrow area; Foraging seabirds; Threatened and endangered species at risk (and designated critical habitats), including Cetaceans (baleen whales and toothed odontocetes); Sirenians (West Indian manatee); Sea turtles (all species that occur in the vicinity of borrow areas); and Staghorn and elkhorn corals.

Impact-driving mechanisms included: 1) Alteration of benthic habitat at the borrow areas; 2) Increased turbidity in the water column; 3) Increased sedimentation/deposition on the seafloor; 4) Pumping/entrainment near the seafloor; 5) Sound; 6) Vessel operations; 7) Water quality; and 8) UXO, shipwrecks, other hard structures temporarily exposed during dredging. Within each resource category, the findings of relevant studies are summarized, important data gaps are mentioned, and studies are suggested to address these gaps The summary for each resource includes tables for each impacting mechanism that synthesizes what is know about the potential effect, spatial extent, duration, frequency, and severity of impact; availability of empirical information to support impact assessment; and proposed mitigation measures and what is known about their effectiveness.

The final section of the report provides an overall summary of the study results and recommends studies to address the major data gaps for the following groupings: Benthic Resources, Communities, and Habitats (3 studies); Trophic Interactions (5 studies); Dredging Practices/Mitigation Measures (3 studies); Sound Impacts (2 studies); and Seabirds (1 study).

STUDY PRODUCTS: Michel, J., A.C. Bejarano, C.H. Peterson, and C. Voss 2013. Review of Biological and Biophysical Impacts from Dredging and Handling of Offshore Sand. U.S. Department of the Interior, Bureau of Ocean Energy Management, Herndon, VA. OCS Study BOEM 2013-0119. 234 pp.