

**Study Title:** Development of a Decision Support Tool to Reduce Sea Turtle Dredging Entrainment Risk

**BOEM Information Need(s) to be Addressed:** The Bureau of Ocean Energy Management (BOEM), through its Marine Minerals Program (MMP), authorizes the use of Outer Continental Shelf (OCS) sand resources in shore protection and coastal restoration projects. One of the significant environmental factors which impacts how and when projects are conducted is the potential for entrainment and mortality of federally protected sea turtles when using Trailing Suction Hopper Dredges (TSHD). In accordance with Section 7 of the Endangered Species Act (ESA), BOEM is required to consult with the National Marine Fisheries Service (NMFS) for these potential impacts. As a responsible steward of OCS resources, BOEM seeks to minimize adverse environmental effects related to project specific dredging operations through deliberate project planning efforts and implementation of relevant and effective mitigation measures. Historically, BOEM and federal partners have made a significant investment in improving protective measures and best management practices, principally focusing on dredging windows, the use of sea turtle deflecting dragheads, dredging operational parameters, and relocation trawling. However, there has been little effort to analyze existing data and subsequently tailor these mitigation strategies on a project and/or geographic-specific level. BOEM and its federal partners need to coordinate with both sea turtle and dredging industry technical experts to solicit existing sea turtle behavior and dredging operational data in order to better identify associated dredging entrainment risk parameters. These data will inform the development of a standardized Decision Support Tool (DST) to consistently assess project specific dredging entrainment risk across a regional scale and improve the effectiveness of mitigation planning decisions within state and federal marine mineral resource areas. More informed decisions may minimize impacts to sea turtle species while also decreasing dredging costs through reduced down-time associated with entrainment incidents and potential flexibility of environmental windows in areas with less risk.

**Description:**

Background: Given the operational challenges of open-ocean conditions and the relative distance from borrow to placement areas, TSHDs are often used to dredge and transport OCS sediment resources. TSHDs present a unique risk to three species of protected sea turtles (e.g., loggerhead, green, and Kemp's ridley) in the Atlantic and Gulf of Mexico OCS. Sea turtles are particularly vulnerable to entrainment when they are oriented on the bottom (e.g. foraging) and within the path and suction field of the dragheads. Since 1996 there have been more than twenty one (21) sea turtle mortalities nationwide associated with dredging of OCS sand resources authorized by BOEM.

Established mitigation measures to reduce entrainment risk have been in place for years (Dickerson, et al. 2004) and subsequently incorporated as non-discretionary Terms and Conditions (T&Cs) in NMFS Biological Opinions (BOs). However, residual risk of incidental take still exists and the efficacy of each mitigation measure in the context of a specific project is often not discerned. Though additional engineering modifications of dredging operations could be explored to further reduce this risk, modifications to dredge plant equipment are very costly. Complementary protocols for managing residual risk include hopper dredging windows that are based on assumptions of sea turtle presence/absence relative to water temperature. This conservative broad based approach has reduced entrainment rates in some areas. However, broad implementation of the current dredging window has been questioned as an appropriate method for all project areas irrespective of site-specific considerations. Based on an analysis of historic sea turtle takes in offshore borrow areas, several factors have been linked to increased take risk beyond presence/absence assumptions including: (1) temporal and spatial relationship

of sea turtle behavior (i.e. foraging, migrating, etc.) within the water column relative to draghead operating parameters and (2) borrow area design relative to turtle deflecting draghead efficacy. Considering the full array of all risk factors within the project specific context, targeted mitigation strategies may be more appropriate than conservative presence/absence based dredging windows.

Purpose: The purpose of this study is to bring together a select group of technical experts with a broad knowledge base and understanding of the relationship of dredging entrainment risk relative to sea turtle distribution and behavior, dredge operational parameters, and the implementation of existing mitigation measures. Technical insight will be used to inform the development of a simple standardized geographically and temporally based DST for use by multiple practitioners in the Atlantic and Gulf region to assess project-specific dredging entrainment risk within a common framework. The tool will be used to guide mitigation planning decisions within state and federal marine mineral resource areas.

Objectives:

- Solicit input from technical experts regarding the current state of science with respect to temporal and spatial distribution of sea turtles in the water column relative to OCS sand resources and TSHD entrainment risk
- Identify and leverage existing sea turtle telemetry data and document future telemetry needs to better understand the space use conflicts and interaction of sea turtles with TSHD activities in the OCS
- Solicit specific information from dredging industry representatives pertaining to the various risk factors that may impact the efficacy of current TSHD operational mitigation measures to reduce the entrainment risk of sea turtles when dredging OCS sand resources
- Solicit from technical experts specific risk-reduction methodologies when dredging OCS borrow areas
- Assess and evaluate the existing mitigation suite currently implemented to reduce entrainment risk and solicit ideas for modifying, removing, and/or adding mitigation measures for future consideration
- Identify and weight critical parameters to be incorporated in the DST
- Develop a standardized geographically and temporally based DST for use by multiple practitioners in the Atlantic and Gulf region to assess project-specific dredging entrainment risk within a common framework.