Environmental Studies Program: Ongoing Studies

Study Area(s):	Gulf of Mexico
Administered By:	Marine Minerals Program
Title:	Environmental Investigation of the Long-Term Use of Trinity Shoal as Sand Resources for Large Scale Beach and Coastal Restoration in Louisiana

BOEM Information Need(s) to be Addressed: Relatively little information relative to physical conditions, pelagic/benthic biology, and biophysical processes is available for this area. The collection and assessment of biological information, as well as site-specific physical process modeling in the areas most likely to be dredged, is critical for BOEM to evaluate the potential consequences of long-term use of the shoals.

Approx. Cost: $700 (in thousands) **Period of Performance:** FY 2007-2014

Description:

Background:

BOEM recognizes the potential for the long-term use of Outer Continental Shelf sand resources for coastal erosion management, a critical challenge to Louisiana's ecosystems and economies. BOEM continues to negotiate agreements with the State of Louisiana and other Federal agencies for planned barrier shoreline and coastal restoration projects.

Many large-scale projects are in the planning stages in coastal Louisiana, some of which will require large volumes of restoration-quality material. The potential physical and biological impacts of dredging offshore shoals are being explored on a regional and local scale through the ~~MMS~~ BOEM ESP; this study focuses on the potential use of Tiger and Trinity shoals located off Vermillion Parish.

Past field and modeling studies conducted offshore Louisiana indicate that inner shelf morphology exerts a significant influence on regional hydrodynamics, reducing wave energy and modulating current velocity, particularly during storm events. The study area is a unique section of coast due to the influence of the Atchafalaya River and its debouching of fine sediment (silts and clays) into the Gulf coastal zone. Subsequent effects of fine grained sediment on the inner shelf must be considered in determining trends in wave propagation and nearshore wave-current properties.

These shoals also support major demersal fisheries for white and brown shrimp. Shrimp are likely dependent upon the system's benthic macro- and meiofaunal (infaunal) communities. Dredging may adversely affect the existing benthic communities and result in altered communities for an unknown period of time after initial recovery. Given the current understanding of the benthic-based shrimp food chain as it pertains to the shoal system, it is not possible to forecast the recovery rate of benthic communities or any impacts on the food chain that might occur after sand mining.

Objectives: The objectives of the study are to provide pertinent information which can be used by BOEM to evaluate potential impacts realized by dredging Tiger and Trinity Shoals.

Methods: Site-specific numerical wave modeling, using fine-mesh sub-grids, will be performed using a state-of-the-art spectral model coupled to hydrodynamic and sediment transport modules to evaluate the cumulative effects of large-scale sand extraction from within the most likely targets. These models will be calibrated and verified using bottom boundary layer observations obtained from multiple tripod deployments. Faunal surveys, in situ water sampling, and sediment sampling will be used to determine abundance, taxonomic composition, community structure, and habitat conditions of macrofaunal and meiofaunual communities. PAR and water column characteristics will be measured through the water column at sampling stations for comparison with biological data. Stable isotope analysis (nitrogen, carbon, sulfur) of consumer and primary producers (benthic microalgae and phytoplankton) will be used to investigate food web dynamics.

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