Environmental Studies Program: Ongoing Studies

Study Area(s): Atlantic OCS: Mid Atlantic and South Atlantic

Administered By: Marine Minerals Program

Title: Regional Essential Fish Habitat Geospatial Assessment and Framework of Offshore Sand Features (NT-16-09)

BOEM Information Need(s) to be Addressed: This programmatic study proposes to build upon the outcome of the Marine Minerals Program (MMP) Essential Fish Habitat (EFH) Working Group (NT-12-06). Suggestions from the working group included regional EFH planning methodologies. This study will address this need by developing a geospatial analysis framework to develop regional classification of offshore sand features and associated EFH. Historically, EFH Assessments have been developed on a project by project basis using species and biota information specific to a borrow area. These project by project examinations have led to untested mitigation measures and piecemeal environmental assessment. This study seeks to develop a supportive GIS framework that can be used in a classification scheme to predict environmental effects, assess cumulative effects, and design mitigation strategies on a broader landscape scale (for example, impacts to a shoal with respect to all shoals within a geographic area). Defining and organizing spatial relationships of OCS sand bodies along with habitat type will enable BOEM to improve EFH consultations and coordination with other Federal agencies such as the National Marine Fisheries Service (NMFS) and the US Army Corps of Engineers (Corps).

Total BOEM Cost: (in thousands) $500 **Period of Performance:** FY 2017-2019

Conducting Organization(s): National Oceanic and Atmospheric Administration (NOAA) National Ocean Service (NOS) National Centers for Coastal Ocean Science (NCCOS)

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Description:
Background: The Magnuson-Stevens Fishery Conservation and Management Act requires that any federal agency undertaking or authorizing an action that may adversely affect EFH or federally-managed fish species consult with NMFS. In recent EFH consultations and in the BOEM EFH working group (NT-12-06), NMFS expressed concern about effects to fisheries habitat and federally-managed fishes resulting from project-driven dredging of Outer Continental Shelf (OCS) sand features in the absence of regional habitat management. Various OCS activities, including dredging and wind energy development, may disturb benthic habitat and infaunal/epifaunal communities, such that there are cascading effects on keystone demersal and pelagic fishes (Michel et al., 2013).

Existing bathymetric data and conceptual models can be used to identify and classify geomorphologic features (such as cape-associated shoals, etc.) within regional areas (such as the southeast Atlantic). An on-going MMP study developing a Geospatial Information and Management System will provide a framework for geospatial EFH management. Moreover, sophisticated morphometric analytical tools (that consider sand feature geometry and properties) can be developed to relate geomorphology to diversity/uniqueness of habitat types. The geomorphic form and distribution of seafloor sand bodies and the distribution of benthic organisms and assemblages are influenced by a number of physical processes; therefore, an examination of available current, wave, storm and other oceanographic and meteorological observational data is important to identify ecosystem response to these controls. Once the features are identified, existing information on biological attributes such as EFH and associated biota can be overlain geospatially. BOEM has information on faunal distribution and how it varies with geography (e.g., latitude), geomorphology, and bathymetry (Theroux and Wigley 1998, Brooks, et al. 2006). Utilizing this GIS database, a comparison can be made of the habitat type (geology and physical/chemical processes), localized EFH, and biota of the borrow area to these same attributes within the broader region (such as southeast Atlantic) to identify appropriate mitigation and minimization measures (based on uniqueness, species diversity, etc. of the feature).

The development of a programmatic framework is critical to BOEM's MMP, Office of Renewable Energy (OREP), and numerous federal and state agencies to evaluate and plan for the use of offshore features. Currently, this information is assimilated without the use of regional environmental planning. This programmatic geospatial framework would be employed to identify and integrate offshore morphological features, to facilitate environmental analyses and track these biophysical parameters on a regional scale through time.

Objectives: The purpose of the study is to develop a GIS-based framework that helps to define and employs spatial relationships between EFH and marine geomorphology. Questions to be answered include:
1. What is the level of diversity/uniqueness of varied geomorphic habitats along the Mid- and South Atlantic Coasts?
2. How do the NMFS-established EFH designations overlap with bathymetric/geomorphic classification data?
3. How can we incorporate information about the biota associated with known habitat types (diversity, recovery, geomorphology) and the EFH designations to improve recovery and minimization efforts?
4. How can we tie in physical processes such as currents and waves to management and recovery of sand shoal habitats?
5. What are data gaps associated with linking geomorphic form and biological associations that we need to pursue in future studies?

Methods: To reach this objective this study has five main facets:
1. Develop a regional, high-resolution bathymetric model utilizing most recent data.
2. Classification of the various geomorphic features (e.g. developing a geomorphic classification scheme, conducting a morphometric analysis).

3. Identify regional physical process regimes controlling geomorphology, habitat utilization, and frequency of disturbance
4. Complete a literature analysis to identify biological use of the various geomorphic features.
5. Develop a habitat use assessment framework that will then be utilized to identify attributes/parameters specific to sand features and a sub-region classification scheme to inform regional-scale environmental impacts analyses.

Current Status: This interagency agreement (IAA) with NOAA National Ocean Service (NOS) National Centers for Coastal Ocean Science (NCCOS) has been initiated in September 2017, with a kick-off meeting December 2017. The Project Management Plan (PMP) has been approved.

Final Report Due: 26 months from date of IAA execution (November 2019)

Publications Completed: N/A

Affiliated WWW Sites: N/A

Revised Date: January 29, 2018