Assessing Mesophotic and Deep Benthic Communities and Their Habitats For Restoration Following the Deepwater Horizon Oil Spill Using an Ecosystem-based Approach

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Abstract

Mesophotic and deep benthic communities (MDBC) are vast and complex environments that provide essential ecosystem services to the Gulf of Mexico (GOM) . Over 770 square miles of deep-sea habitat and 4 square miles of mesophotic habitat were injured by the *Deepwater Horizon* (DWH) oil spill.

Funding acquired from the Natural Resource Damage Assessment is supporting the following projects to restore MDBC: mapping, ground-truthing and predictive habitat modeling; habitat assessment and evaluation; coral propagation technique development; and active management and protection. Project goals include:
• 	restore mesophotic and deep benthic communities and species injured by the spill;
• 	actively manage these communities to protect against threats and provide a framework for monitoring, education, and outreach;
• 	improve understanding of MDBC to inform management and ensure habitat resilience.

This presentation will describe the planning and implementation activities for the habitat assessment and evaluation project. Using an ecosystem-based approach, the project will identify and fill data gaps for benthic life histories, diversity, population and community structure, and trophic connectivity in concert with characterizing the associated environmental conditions within soft sediment and coral habitats. This information will help establish baseline conditions and characterize communities at injured and reference sites, and identify the environmental drivers of species, population, and community-level patterns and interactions. Surveys and discrete collections will also support determinations of ages, growth rates, and reproductive potential of mesophotic and deepwater corals, as well as their health and condition. In addition, the project will maximize the effectiveness of MDBC restoration and protection efforts through the use of population genetics and predictive modeling.

Project results will fill critical gaps in our understanding of the biology, ecology, health, biodiversity, recovery, and resilience of mesophotic and deep-sea habitats (corals and soft sediments) and will support and inform restoration planning and implementation for MDBC.
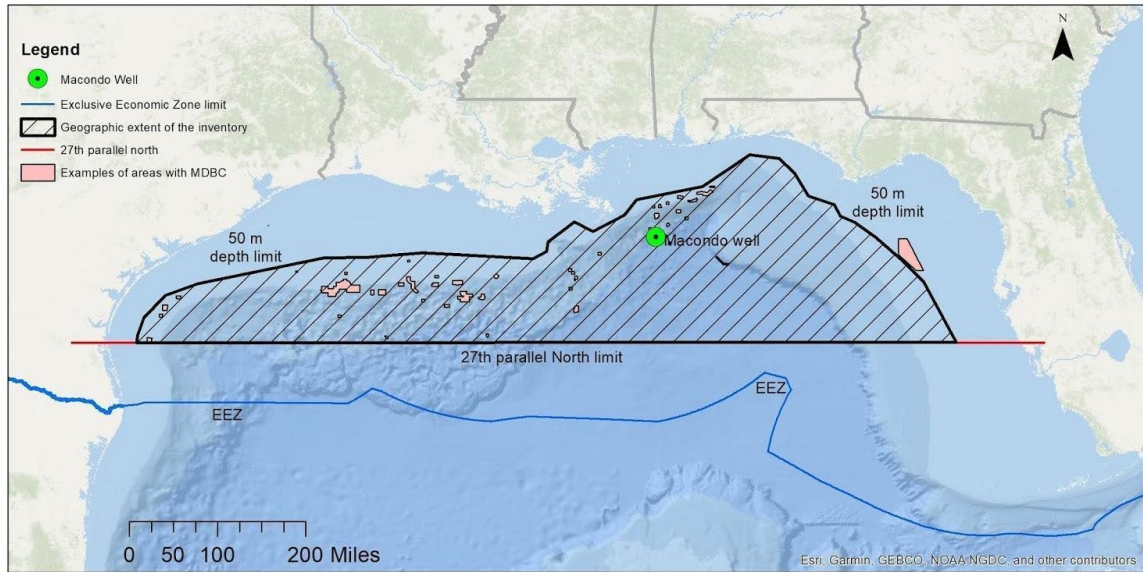
Figure 1: General study area for mesophotic and deep benthic community restoration activities. This area is defined by the 27th north degree latitude and the 50 m isobath in the northern Gulf of Mexico.