Environmental Studies Program: Ongoing Study

Field	Study Information
Title	Benthic Community Characterization at BOEM "No Activity Zones"
Administered by	Gulf of Mexico Regional Office
BOEM Contact(s)	Alicia Caporaso (Alicia.Caporaso@boem.gov)
Procurement Type(s)	Interagency Agreement
Conducting Organization(s)	Flower Garden Banks National Marine Sanctuary (NOAA)
Total BOEM Cost	$776,088
Performance Period	FY 2023–2028
Final Report Due	TBD
Date Revised	October 25, 2023
Problem	BOEM defines 13 "No Activity Zones" (NAZs; presumed to encompass the most ecologically sensitive areas of the Topographic Features) based on the best available scientific information, including recently updated bathymetry and backscatter imagery. However, in situ data collection and habitat characterization of the epifaunal benthic communities have been limited, including at locations of mutual interest to the Flower Garden Banks National Marine Sanctuary (FGBNMS) and BOEM. Improved understanding of the extent and composition of benthic species within these managed areas would improve management agencies' ability to detect and respond to environmental and anthropogenic disturbances by informing mitigation policies and practices, along with other NEPA analyses and consultations.
Intervention	Thirteen NAZs within the FGBNMS will be visually surveyed using remotely operated vehicle (ROV) methodology like that developed in the BOEM-funded Deep-Water Reconnaissance of Potentially Sensitive Biological Features study (Sammarco 2017). Scientific diving teams will also conduct demographic surveys of vulnerable Scleractinian (stony) corals. Unidentified and/or unique organisms will be collected for taxonomic identification.
Comparison	Data collection and analysis will allow BOEM to improve the current NTL 2009 G39 and associated stipulations and mitigations through the development of tailored NAZs and associated mitigations appropriate for each topographic feature.
Outcome	This study will provide BOEM with information needed to support and revise NTL 2009-G39 through quantitative characterization of benthic communities and habitats within GOM NAZs, comparison of communities at topographic features with and without NAZs, and potentially other information about the role NAZ protections are or are not playing for benthic communities and their ecological resilience.
Context	The hermatypic coral reefs of East and West Flower Garden Banks are well documented to be among the healthiest in the western Atlantic and Caribbean region. Such reefs are hot spots for marine biodiversity for a variety of fish and

	invertebrate species, including threatened and endangered species and species of commercial and recreational importance.

BOEM Information Need(s): Better understanding of the benthic community and habitats of Northern Gulf of Mexico (GOM) topographic features (aka banks or topographic highs) within the established BOEM No-Activity Zones (NAZs) would improve the efficacy of resource protection and management efforts. The 13 current NAZs, as described in BOEM's Notice to Lessees (NTL) 2009-G39, were designed based on topographic data and benthic characterization methods that are now decades out of date. In the 40 years since their initial exploration, there has been relatively little additional in situ data collection and analysis by which BOEM may improve and strengthen the current NTL and associated stipulations and impact mitigations.

Background: BOEM's NTL 2009-G39 provides guidance for the protection of sensitive biological features within NAZs in the GOM through the prohibition of bottom disturbing activities and release of drilling wastes associated with oil and gas development. The NAZs are based on historical topographical data and limited characterization of associated biological communities from the 1980s and designated around topographic highs using isobaths uniquely specific for each topographic feature. The stipulations imposed within NAZs prohibit activities that may directly impact vulnerable organisms. Parts of a topographic bank located below the specified isobath are not included within an NAZ but may still be subject to mitigations applied by BOEM to minimize negative impacts. At this time, communities and habitats within most GOM NAZs are poorly understood. GM-17-07 "Multibeam Survey of Small Topographic Features to Determine Efficacy of Current "No Activity Zones") compiled existing or collected new multibeam echosounder imagery and provided updated bathymetry and (in some cases) backscatter data to illustrate the location and shapes of the underlying seafloor in order to enable updated NAZ polygon boundaries to be created. However, this effort did not provide any visual imagery or biological or geological collections/sampling.

Objectives: The primary objective of this study is to provide BOEM with additional in situ information needed to support and revise NTL 2009-G39 through quantitative characterization of benthic communities and habitats at NAZs, comparison between topographic features with and without NAZs, and potentially other information about the role NAZ protections are or are not playing for benthic communities and their ecological resilience.

Methods: The 13 NAZs within the recently expanded (January 2021) Flower Garden Banks National Marine Sanctuary (FGBNMS) will be quantitatively, visually surveyed using remotely operated vehicle (ROV) methodology similar to that developed for the BOEM-funded Deep-Water Reconnaissance of Potentially Sensitive Biological Features study (Sammarco, 2017). Specific survey methods will be developed collaboratively with the FGBNMS. In addition, scientific diving teams will conduct detailed demographic survey of vulnerable Scleractinian (stony) corals. Unidentified and/or unique organisms will be collected for accurate taxonomic identification and other potential uses.

To address the question of community resilience, the idea that biodiversity promotes ecosystem functionality and stability will be assumed and classic biodiversity metrics (alpha and beta diversity) will be examined. Further temporal variance of the community structure and diversity will be examined to assess stability.

This study will utilize BOEM-acquired assets including the new Oceanbotics ROV purchased for the FGBNMS Long-Term Monitoring project (GM-18-x01). The FGBNMS will leverage existing relationships

with partner research institutions to provide technical diving and scientific planning and analysis expertise to enable robust community assessment and characterization within NAZs. The BOEM scientific dive team may also contribute to fieldwork and data collection.

Specific Research Question(s):

1. What are the distributions, abundance, and demography of coral species and other taxa within GOM NAZs?
2. Do the current GOM NAZs support resilience of the communities and habitat located within and adjacent to them?
3. Are benthic communities and habitats within and among GOM NAZs continuous, heterogenous, or on a spectrum between the two? Does identified variation between NAZ communities indicate the need for unique mitigation parameters?
4. Do GOM NAZs support undescribed species of Scleractinian corals, black corals, octocorals, or sponges that are new to science or are novel records in the GOM?

Current Status: Ongoing

Publications Completed: None

Affiliated WWW Sites: None

References:

Sammarco PW. 2017. Deepwater reconnaissance of potentially sensitive biological features surrounding shelf-edge topographic banks in the northern Gulf of Mexico. New Orleans (LA): U.S. Department of the Interior, Bureau of Ocean Energy Management. 109 p. Report No.: OCS Study BOEM 2017-024.