Environmental Studies Program: Ongoing Study

Study Area(s): Western Gulf of Mexico

Administered By: Gulf of Mexico OCS Region

Title: Coral Reef Ocean Acidification Sentinel Site in the Flower Garden Banks National Marine Sanctuary: Field Support (NSL #GM-14-05b)

BOEM Information Need(s) to be Addressed: BOEM scientists require an understanding of multiple stressors on an ecosystem to conduct environmental assessments required by NEPA. Coral reef communities are expected to be uniquely impacted by climate change stressors and ocean acidification (OA). This study will provide field support in the assessment of OA variability in the Flower Garden Banks National Marine Sanctuary.

Total BOEM Cost: $100,000 **Period of Performance:** FY 2014–2019

Conducting Organization(s): NOAA – Flower Garden Banks National Marine Sanctuary

Principal Investigator(s): Emma Hickerson (emma.hickerson@noaa.gov)

BOEM Contact(s): Dr. Rebecca Green (rebecca.green@boem.gov)

Description:
Background: Ocean acidification, or the ongoing increase in acidity of the Earth's oceans, is one possible outcome of climate change which has the potential to seriously threaten ocean health. Anthropogenic releases of carbon dioxide into the atmosphere since the mid-18th century have resulted in an increase of atmospheric CO_2 concentrations, with the ocean absorbing a significant fraction of this CO_2. However, when CO_2 is absorbed by seawater, chemical reactions occur that reduce both seawater pH and the concentration of carbonate ions in a process known as "ocean acidification" (OA) (NOAA, 2010). Coral reef ecosystems are of unique concern because their ability to precipitate calcium carbonate and net accretion rates may be impacted by OA. Experimental observations beginning in the 1990s have suggested that declining levels of calcification will occur with increasing ocean acidification. BOEM and its predecessors have studied the Flower Garden Banks for several decades (since the 1970's), making this coral reef ecosystem a sensible choice for establishment of an OA sentinel site in GOM offshore waters. It also compliments NOAA's current OA plans for the region. The historic physical, chemical, and biological measurements at this location will aid in determining an optimal location for a sentinel site in Flower Garden Banks National Marine Sanctuary (FGBNMS) and will contribute background for future observed changes in this ecosystem.

Objectives: The overarching goal of this Interagency Agreement is to provide field support (primarily ship time) during 3 years of sampling as required by the related

study: “Coral Reef Ocean Acidification Sentinel Site in the Flower Garden Banks National Marine Sanctuary: Date Collection and Analysis” being lead by TAMU.

Methods: This Interagency Agreement will fund ship time as required to support data colelction of OA-related measurements. As a partner on this study, NOAA FGBNMS will provide diver support on these cruises, as well as support of this project during the regularly-scheduled FGBLTM quarterly cruises.

Current Status: Coordination is ongoing between FGBNMS and TAMU on placement of the mooring and consideration of ship time scheduling. FGBNMS divers deployed the bottom OA package during May – July, 2017 for initial testing.

Final Report Due: N/A

Publications Completed: N/A

Affiliated WWW Sites:

https://marinecadastre.gov/espis/#/search/study/27205

Revised Date: February 14, 2018