ENVIRONMENTAL STUDIES PROGRAM: ONGOING STUDIES

Region: Atlantic

Planning Area(s): Mid-Atlantic

Title: Exploration and Research of Mid-Atlantic Deepwater Hard Bottom Habitats and Shipwrecks with Emphasis on Canyons and Coral Communities

Total Cost: $3.075,051 **Period of Performance:** FY 2010-2015

Conducting Organization: CSA Ocean Sciences, Inc.

BOEM Contact: Gregory Boland

Description:

Background: It is well known that there are many locations with significant areas of hard bottom in the mid-Atlantic deepwater, particularly associated with canyon features. These habitats can include significant populations of corals (including gorgonians). These areas would be well represented on seismic surface anomaly geophysical maps but there are no significant seismic survey data in this area at this time. Early studies from the late 1970s and through the early1980s (many funded by Minerals Management Service (MMS) (now the Bureau of Ocean Energy Management (BOEM)) have documented many canyon areas including significant boulders and rock outcrops, some with high relief with a high diversity of associated attached communities. Megafauna associated with canyons were shown to be different and more diverse than on surrounding continental slope habitats. Previous studies were often limited by surface-towed camera systems that could not maneuver closely into the highest relief (and presumably the highest density communities) along canyon outcrops. Additional exploration and sampling of canyon communities as well as exploration for other areas of potential significant hard bottom areas is needed for informed decisions regarding the distribution of hard bottom communities and the sensitivity of associated biological communities to impacts.

Objectives: The purpose of this study is to focus on exploration and study of selected habitats that will refine the understanding of the distribution and complexity of hard bottom communities in the mid-Atlantic slope area. Targeted areas include Norfolk, Washington and Baltimore canyons. Realities of available ship time limited work to only Baltimore and Norfolk canyons. If patchy distribution of sensitive communities is observed, one major objective will be to develop a predictive model utilizing environmental conditions that result in the observed distribution of significant high-density hard bottom communities that are sensitive to impacts from oil and gas development activities. A portion of the exploration and research effort will also be directed at archaeological resources. Limited surveys and site-specific investigations of archaeological targets will be done to obtain necessary information regarding required avoidance of these resources.

Methods: Similar to studies in the Gulf of Mexico, this project will require the use of sophisticated submergence facilities capable of high resolution bottom imagery as well as extensive sample collection. This could include autonomous underwater vehicles (AUVs) for mapping as well as imagery (e.g. Woods Hole *Sentry*) as well as manned submersibles. A high-end Remotely Operated Vehicle (ROV) will also fulfill most, if not all study needs. A towed bottom camera sled as was used in the early 1980's would not be desirable as high relief hard bottom areas could not be sampled. Large-scale mapping will be required to define substrate type and distribution of significant hard bottom areas both associated with canyons as well as more distant slope areas. Some older industry seismic data may be usable as well as more recent multibeam data. Independent mapping could be done on a less expensive vessel without the cost of submergence facilities. Focused studies on selected communities will collect samples as well as incorporate process studies to determine community composition, complexity and sensitivity to impacts. Surveys and in-depth investigations including imagery of potential shipwreck sites is also a component of the project. This project is sponsored by the National Oceanographic Partnership Program (NOPP) including interagency partnering with the National Oceanic and Atmospheric Administration's Office of Ocean Exploration and Research (OER) providing submergence and research vessel facilities expected for all of the field sampling years. There may be additional opportunity for partnership with the (NOAA) deepwater coral program. The U.S. Geological Survey will be collaborating directly with the BOEM contractor and participating on all field sampling cruises with separate funding within USGS. Their subject material will be incorporated into the final report deliverable to BOEM.

Importance to BOEM: Knowledge of the distribution and sensitivity of unique biological habitats in deep water is necessary for management decisions regarding consideration of potential oil and gas leasing and development in the Atlantic region. Study results will help to define mitigations and need for avoidance of hard bottom areas and associated sensitive coral communities in deepwater. The mid-Atlantic canyon areas have been investigated in the past, but most information is more than thirty years old. In addition, surveys and investigations of archaeology targets in the lease area will provide preliminary information for avoidance of these resources.

Current Status: Awarded 9/23/10

Final Report Due: 9/22/15

Publications:

Brooke, S., and Ross, S.W. 2014. First observations of the cold-water coral *Lophelia pertusa* in mid-Atlantic canyons of the USA. Deep-Sea Res. II. 104:245-251 http://dx.doi.org/10.1016/j.dsr2.2013.06.011.

Affiliated WWW Sites: None

Revised Date: February 2015

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