BOEM ENVIRONMENTAL STUDIES PROGRAM: ONGOING STUDIES

BOEM OCS Region: Gulf of Mexico

Planning Area: Central

Title: Short-term Movement, Home Range, and Behavior of Red Snapper Around Petroleum Platforms in the Northern Gulf of Mexico as Determined by High Resolution Acoustic Telemetry (GM-92-42-104)

Total Cost: $206,748 **Period of Performance:** FY 2003-2007

Conducting Organization: Louisiana State University Coastal Marine Institute,

BOEM Contact: Dr. Maureen Mulino

Description:

Background: Knowledge of the fish assemblage and its behavior around artificial reefs is essential to the evaluation of cumulative effects on the community of the original habitat induced by deployment of artificial structures, e.g., the potential increase in biomass, and for understanding the relationships between natural and artificial habitats needed for management of available resources.

While it has been demonstrated that juvenile red snapper (and other reef fishes) have a strong preference for habitats with some vertical relief, it has been hypothesized that oil and gas platforms and their adjacent footprints or shadows provide exceptionally high-quality habitat, such that fishes located there have a survival advantage over conspecifics located in other artificial and natural environments. Increased habitat quality on, or immediately around, oil and gas platforms is believed to be derived from increased *in situ* food production associated with encrustation by fouling organisms, by increased physical habitat via structures that extend from the bottom to the surface of the water column, and by protection from being harvested as bycatch via the no-trawl zones immediately around platforms. However, this hypothesis remains to be tested at spatial and temporal scales relevant to local populations, even though estimates suggest that high numbers of reef fishes are located in "refuge" around platforms legs. This project reflects the belief that understanding of the role that oil and gas platforms play in reef fish population dynamics is limited in part by lack of understanding of how fish use platforms on a minute-to-minute and day-to-day basis. Understanding the behavior and associated vertical and horizontal spatial distributions of reef fishes around platforms at various time scales, and site fidelity associated with differences in habitat structure, is central to management and preservation of fish communities on both active and toppled platforms.

Objectives: This project will study the role that Gulf oil and gas platforms play as habitat for juvenile and adult reef-associated species such as red snapper. A network of hydrophones will be used to track the movement of acoustically tagged fish near a platform with sub-meter accuracy in three-dimensional space. These values will be

related to body size, time of day, and habitat type (platform underwater complexity) to provide a detailed picture of fish movements around platforms at the scales of minutes and meters. This study will be coupled with two additional previously funded CMI projects. The combined efforts will provide unprecedented understanding of how individual red snapper use oil and gas platforms at multiple temporal and spatial scales and will provide answers to a variety of questions about the role of oil and gas platforms as fish habitat, especially with regard to those features that distinguish oil and gas platforms from other types of artificial reefs.

Methods: An array of autonomous hydrophone receivers will be deployed to make continuous obse4rvations of acoustically tagged fish. The telemetry system used will be the VRAP radio buoy system (VEMCO Ltd., Nova Scotia) which allows real-time tracking of fish positions. Unique-frequency acoustic transmitters will be surgically implanted in red snapper captured for this study. Fish will be continuously tracked 24 hours a day for a 30-day period. Water temperature, dissolved oxygen, and salinity will be profiled daily at the platform of release during the 30-day deployment of the receiver buoys. Several analytical tools and statistical methods are available to estimate home range and fish movement patterns. These analysis techniques will provide quantitative description of the home range sizes, habitat affinities and utilization, and intra-specific spatial interactions.

Products: Final report.

Importance to BOEM: The information generated from this research is highly relevant to federal, regional and state agencies as more than 4,000 structures are found in OCS waters and a little over 150 retired structures have been sited as artificial reefs to date with one goal being augmenting of fisheries stocks. Many more structures will be decommissioned in coming years. This study will provide unprecedented understanding of how a commercially valuable reef fish species utilizes oil and gas platforms at multiple temporal and spatial scales and it will provide answers to a variety of questions about the role of oil and gas platforms as fish habitat.

Current Status: Field work for tagging fish and installation of transducer receivers began in 2003.─Discovery of some naturally occurring underwater sounds that interfere with transducer effectiveness was used to improve data recovery from fish tags in 2004. Additional field work was scheduled for 2005 but was not accomplished due to delays and weather problems. Additional field work was performed in 2006 but will require one final field season in 2007 due to weather delays. A no-additional-cost modification to the contract was made in 2006. Additional time is still needed for final report production at this reporting period. The investigators have been working with some new algorithms that provide more accurate localizations and numbers of detections from the acoustic data. Final report delivered November 2011.

Final Report Due: November 2007

Publications:	McDonough, Michael and James Cowan, Jr. Oil Platforms and Red Snapper Movement. Proceedings: Twenty-fifth Gulf of Mexico Information Transfer Meeting, January 2009. U.S. Dept. of the Interior, Minerals Management Service, Gulf of Mexico OCS Region, New Orleans, LA.
Affiliated WWW Sites:	None
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