

BOEM ENVIRONMENTAL STUDIES PROGRAM: ONGOING STUDIES

BOEM OCS Region: [Gulf of Mexico](#)

Planning Area: Central

Title: Assessing Trophic Linkages Between Platforms and Pelagic Fishes Using Ultrasonic Telemetry and Active Acoustics (GM-92-42-105)

Total Cost: \$332,567

Period of Performance: FY 2003-2009

Conducting Organization: Louisiana State University [Coastal Marine Institute](#)

BOEM Contact: [Dr. Maureen Mulino](#)

Description:

Background: The offshore petroleum platforms in the northern Gulf of Mexico provide a unique reef-like habitat for encrusting organisms, reef-associated and pelagic fish species. Because the majority of substrate over the mid-shelf off Texas and Louisiana is comprised of sand and mud, platforms provide a virtual oasis of hard structure due to their vertical relief.

High densities of fish are associated with offshore platforms. Many research projects utilizing a wide variety of methodologies have attempted to quantify the high densities of fishes near platforms. Whether the localized increase in fish densities is due to enhanced productivity, which would lead to an increase in fish biomass, or a behavioral attraction to the structure, making fish more susceptible to fishing mortality and overexploitation, is an important question in the ecological function of the platform. Known as the attraction/production issue in artificial reef ecology, the current theory suggests a continuum between the two concepts. One theory suggests artificial reefs and fish attraction devices are potentially increasing localized fish productivity through trophic linkages by concentrating food resources and/or increasing feeding efficiency. The research proposed here will explore whether platforms function in this manner.

In one recent study, the most abundant fish species near a platform located in 60 m of water was the blue runner, *Caranx crysos*. This pelagic species is commonly found in large schools in open water as well as near platforms and is one of the most common medium-sized fish in the gulf. These fish are likely important in the diets of larger predatory fishes, such as tunas and billfish, and appear to be consumed by many other game fish that are common around platforms such as barracuda, amberjack, jack crevalle, cobia, and king mackerel. A recent related CMI project #17802 revealed that zooplankton are an important component of the diet of subadult and adult blue runner. It further indicated that although blue runner are primarily visual predators, they are capable of nocturnal foraging due to the artificial light field around platforms. Hydroacoustic surveys of the upper 14 m of the water column suggested that zooplankton

densities were frequently elevated close to platforms. The results of that study raised several important questions, which the current study is designed to address.

Objectives: This study will examine the three-dimensional foraging behavior of blue runner around a petroleum platform in relation to the distributions of their zooplankton prey. Blue runner will also be acoustically-tagged and monitored for site fidelity and movement patterns among a constellation of platforms. The specific objectives of the study are:

- to quantify the three dimensional distribution of zooplankton prey within the water column around a representative mid-shelf platform;
- to measure the three-dimensional foraging patterns of blue runner around a platform, and to correlate blue runner and zooplankton vertical distributions; and
- to quantify the site fidelity of blue runner to various platforms within a platform complex.

Methods: The multi-year study will consist of a combination of coordinated platform-based and shipboard oceanography. Major study topics and methods include: fish collection for quantification, fish stomach content analysis, tagging of fish for acoustic telemetry, blue runner telemetry experiments, zooplankton collections, and acoustic mapping.

Products: Final report.

Importance to BOEM: This study will provide important understanding of how a valuable pelagic fish species utilizes oil and gas platforms for food and in particular, how it utilizes zooplankton around platforms at night using platform light fields. The study will also provide answers to a variety of questions about the role of oil and gas platforms as fish habitat. The data gathered will provide a basis for modeling the energy flow from zooplankton to higher trophic levels so that linkage of platforms to the fish communities that surround them can begin to be understood. Results will play a role in rigs-to-reefs decision making especially in the Gulf of Mexico but applications will be significant nation-wide.

Current Status: The 2005 field season provided an exceptional dataset on the behavior and movement of small pelagic fishes. A total of 46 adult blue runners and 1 juvenile amberjack were tagged with acoustic transmitters and released around the ST151 platform complex. These fish were then monitored until Aug 26th when Hurricane Katrina forced evacuation of the platform. The hurricane inflicted heavy damage on the platform and completely destroyed one of the six structures in the complex. Field work continued in August 2006. Data from this work will be utilized for determining sight fidelity of blue runner to various platforms within a platform complex. Additional analyses will be performed using all data including determinations of swimming speeds, foraging strategies and temperature preferences.

Field work continued in 2007 for one additional season to make up for lost data due to the storms of 2005. A first draft of the report was received in December 2009. It was

reviewed and returned for revision and reformatting on January 20, 2010. The next draft is expected to be completed by April 2010. Draft was delivered on time. Editing was delayed with the oil spill. Editing has resumed and the final should be available by end of 2012.

Final Report Due: September 2008 (working on no cost extension)

Publications: Brown, H. M. Benfield, S. Keenan, and S. Powers.
Assessing trophic linkages between platforms and pelagic fishes using ultrasonic telemetry and active acoustics.
Proceedings: Twenty-fourth Gulf of Mexico information transfer meeting, January 2007. U.S. Dept. of the Interior, Minerals Management Service, Gulf of Mexico OCS Region, New Orleans, LA

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Affiliated WWW Sites: None

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