

STUDY 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

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BACKGROUND: One of the most pressing federal fisheries management concerns in the Gulf of Mexico (GOM) region is the overfished status of red snapper *Lutjanus campechanus*. Red snapper are demersal reef-associated fish that are distributed along the continental shelf throughout the GOM. In the waters of the northern GOM there are over 4,000 functioning oil and gas platforms and they can act as artificial reefs by providing habitat that potentially increases the growth and survival of the individuals, by affording shelter for protection from predation and spawning substrate, and by acting as a visual attractant for organisms not otherwise dependent on hard bottom. Artificial reefs, such as oil and gas platforms, may be useful tools for fishery managers if they increase production, but many researchers question whether they are a positive influence on reef stock dynamics. There have been doubts about whether they produce or attract fish. The resolution to this question is essential to the management of reef fish stocks.

OBJECTIVES: This project will study the role of GOM oil and gas platforms 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.

DESCRIPTION: Two telemetry experiments were performed on platforms in the GOM. Red snapper were collected aboard a charter fishing vessel during the summers of 2005 and 2006. Collections were performed at a complex of petroleum production platforms known as “the Circle” because they surround a salt dome, a common geological formation in southern Louisiana from which oil is extracted. The fish used in this study were caught at several platforms, all fish were released at the platforms around which the Vemco® radio acoustic positioning (VRAP) system was deployed. The VRAP system was deployed around one platform each year to track the movements of red snapper around the structures. To analyze the data, fish positions were plotted. Spectral analysis can detect cycles in presences and absences and this would detect periodicity. Distance, speed and depths were also analyzed.

SIGNIFICANT CONCLUSIONS: Few studies provide insight about how red snapper use artificial habitats in the short-term. The two years of data collected here provide this information, and together, illuminate to some extent how red snapper use platforms, albeit that pattern of use varied slightly between years. In 2006, we were able to collect a complete two-week dataset that provides the best short-term picture. The 2006 data show that fish departed individually throughout the two weeks sample period; feather plots showing that large movements were possible beginning from the time of release support the hypothesis that predation was taking place. The fish tagged in this study exhibited almost binomial behavior; fish either exhibited high site fidelity—two months or more—or almost none at all—leaving the study area in less than two weeks.

STUDY RESULTS: In 2005, we captured and implanted 16 red snapper. In 2006, we captured and implanted 20 red snapper. The positions recorded by VRAP appear to cluster largely around the platform for each fish in each year over the experimental time interval. Plotting the number of fish detected per hour-of-study revealed that detections appeared to decrease through time in both years. The LOESS regression plot from 2005 and 2006 revealed highest values during nighttime hours, with fewer detections occurring during the day.

STUDY PRODUCT: McDonough, M. and J.H. Cowan, Jr. 2013. 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. U.S. Dept. of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region, New Orleans, Louisiana. OCS Study 2013-0123. 71 pp.

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