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STUDY TITLE: Deepwater Coral Distribution and Abundance on Active Offshore Oil and Gas Platforms and Decommissioned “Rigs-to-Reefs” Platforms

REPORT TITLE: Deepwater Coral Distribution and Abundance on Active Offshore Oil and Gas Platforms and Decommissioned “Rigs-to-Reefs” Platforms

CONTRACT NUMBERS: M08AC12865 (1435-01-04-CA-32806-39929)

SPONSORING OCS REGION: Gulf of Mexico

APPLICABLE PLANNING AREA: Central and Western

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KEY WORDS: Platforms, Artificial Reefs, Coral, *Madracis decactis, Oculina diffusa, Phyllangia Americana, and Tubastraea coccinea*, scleractinian, Rigs-to-Reefs

BACKGROUND: Thousands of oil platforms in the N. Gulf of Mexico provide hard substratum there which has not been present in shallow water for thousands of years. These platforms, acting as numerous artificial islands throughout the region, have facilitated the geographic expansion of Caribbean reef coral populations. The US-DOI Bureau of Ocean Energy Management has provided for the “reefing” platforms as artificial reefs to create additional hard substratum habitat in this region, with the ultimate objective being to promote fisheries development.

OBJECTIVES: The effectiveness of these “Rigs-to-Reef” structures in promoting coral community development on the toppled platforms in deep water using ROV reconnaissance (max. depth ~110 m) was assessed.

DESCRIPTION: Coral community development on five toppled platforms was compared with that on two active, standing production platforms.

SIGNIFICANT CONCLUSIONS AND STUDY RESULTS: The corals found on the platforms were the hermatypic/zooxanthellate *Madracis decactis* and several ahermatypic/azooxanthellate ones - *Tubastraea coccinea, Oculina diffusa,* and *Phyllangia americana*.

When comparing standing and toppled platforms, there was no significant difference in total coral density. This was due primarily to varying, non-correlated, opposing species-specific changes in abundance between the two types of structures. That is, *M. decactis* and *T. coccinea* densities were significantly higher on toppled Rigs-to-Reefs structures. In the latter case, the corals were found on the "bottom" portion of the legs that had been up-ended during the toppling process, presumably having settled and grown there after toppling. On the other hand, *P. americana* was more abundant on standing platforms than on the toppled ones. The densities of *Oculina diffusa* were found to be equivalent on both types of structures.

With respect to depth distribution, when all corals were considered together, they were distributed more deeply on standing platforms than on toppled Rigs-to-Reefs structures. This was particularly true in *O. diffusa*, *P. americana,* and *Tubastraea coccinea.* There was no significant difference between depth distributions between the two types of structures in *Madracis decactis*. All corals of this species were found to occur in depths of $\leq$50 m. This was most likely due to this species being zooxanthellate and requiring light for survival and growth. It is believed that the reduction in density of all coral colonies on the Rigs-to-Reefs structures in deeper water may be due to physical disturbance upon removal of the platform and additional disturbance during deployment of the structures at their new site.

The above data suggest that Rigs-to-Reefs structures do serve as a substrate for coral settlement. The probability of continued growth of the corals, however, varies species-specifically between structure types. Toppling did not appear to enhance development of hermatypic coral populations, increase coral abundances in general, or create a three-dimensional reef-like habitat which could promote demersal fish community development.

STUDY PRODUCT: Sammarco, P. W. 2013. Deepwater coral distribution and abundance on active offshore oil and gas platforms and decommissioned "Rigs-to-Reefs" platforms. U.S. Dept. of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico Region, OCS Study BOEM 2013-217