

## BOEM ENVIRONMENTAL STUDIES PROGRAM: ONGOING STUDIES

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

**Planning Area:** Central and Western

**Title:** Deep-Water Coral Distribution and Abundance on Active Offshore Oil and Gas Platforms and Decommissioned "Rigs-to-Reefs" Platforms (GM-92-42-126)

**Total Cost:** \$320,232

**Period of Performance:** FY 2006-2010

**Conducting Organization:** [Coastal Marine Institute](#), Louisiana State University to Louisiana Universities Marine Consortium (LUMCON)

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### **Description:**

Background: At present, there are approximately 3,600 oil and gas structures in the northern Gulf of Mexico (GOM), most of them occurring offshore from Louisiana and Texas. The shelf there is comprised almost entirely of soft sediment. The platforms provide hard substratum, extending up through shallow water, where no solid substrate exists or has existed for tens of thousands of years. They have provided new habitat for a wide variety of epibenthic fauna and flora, extending from the surface to a depth of hundreds of meters. Prior to the introduction of platforms, hard substratum was limited to scattered banks and shoals. Hard-bottom organisms were restricted to those banks. Platforms represent a novel development for the GOM and have provided thousands of artificial islands, affording suitable substratum for settlement of shallow-water marine organisms where, otherwise, none would be possible.

Early studies reported the growth of hermatypic (reef-building) scleractinian corals on the platforms in the GOM. This has been confirmed through more recent studies including the two preceding CMI projects and has been expanded to confirm the presence of both hermatypic (reef-building) and ahermatypic (non-reef-building) scleractinian corals on the platforms. Studies have demonstrated that oil and gas platforms within a 65 km radius of the Flower Garden Banks (FGB) not only possess limited thriving benthic communities, they also possess coral communities. Coral species diversity is moderately high there, (up to 11 species), with better developed communities being found on platforms  $\geq 15$  yrs old. The corals also had species-specific depth distributions.

More recent broad-scale surveys have demonstrated that both hermatypic and ahermatypic corals have colonized platforms not only around the FGB but also throughout the northern continental shelf in the western and central GOM, particularly near the shelf edge. The platforms are clearly facilitating "island-hopping" by coral larvae as a dispersal mechanism. The FGB are also apparently capable of self-seeding, increasing community stability on the banks. The FGB may also be serving as a source

of larvae for colonization of the deeper portions of platforms and artificial reef systems.

Objectives: The specific objectives of this study include the following:

- Examine coral community development at >39 m depth using an ROV/AUV on select platforms in the northern GOM, and 33-39m using divers.
- Define comparative distributions and abundances there for hermatypic and ahermatypic corals.
- Determine genetic affinities between deep-water corals on platforms vs. shallower corals and those in artificial reef zones.
- Assess success of coral community development on toppled platforms within these zones.
- Assess any effects of aggressive invasive species which may thwart reef development.

Methods: Observations and collections will be performed by divers above 40 m of depth and using a remotely operated vehicle (ROV) equipped with lights and a manipulator to survey major portions of the jacket, including horizontal support structures from 40 m depth to the bottom. The study will target the Ship Shoal, West Cameron, and High Island areas, since this is where high densities of corals have been documented on platforms. It is also where a number of “Rigs-to-Reefs” Zones are located. The first aspect of the study will be to survey and quantify the adult coral communities on toppled platforms within the artificial reef zones and the deeper portions of platforms at the edge of the continental shelf in the northern Gulf. This will be done via direct diver surveys and ROV surveys, and will be performed from an independent charter vessel.

Products: Final report.

Importance to BOEM: Results will provide an assessment mechanism which will assist BOEM and other agencies in making informed decisions regarding the potential for well developed coral colonies existing on platforms prior to decommissioning. The study will also provide direct information on coral genetic connectedness between platforms (both standing and Rigs-to-Reefs) and the FGB. With the completion of this third dimension in understanding how corals colonize oil and gas platforms, BOEM will be well prepared to address questions relating to this significant animal group when needed in discussions regarding decommissioning, aquaculture etc.

**Status:** Field work began in May of 2007. Diving operations were performed on a total of three different standing platforms and one toppled Rigs-to Reefs structure. ROV operations were very successful using the SeaBotix LBV300S<sup>6</sup>. In addition to the previous standing platforms, two additional platforms too deep for diving were surveyed all the way to the bottom at 102 m and 84 m with the SeaBotix ROV. Additional field work took place in November of 2007. A final field sampling cruise was accomplished in May of 2008. All field sampling has been completed. Draft report is under review.

**Final Report:** Draft report under review.

**Publications:** Sammarco, P.W., G.S. Boland, J. Sinclair, A. Lirette, and

Y.H. Tung. 2008. Rigs-to-Reefs structures and coral community development in the northern Gulf of Mexico: a first view. pp. 179-181. In: McKay, M. and J. Nides, eds. 2009. 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. OCS Study [MMS 2009-051](#). 298 pp.

**Affiliated WWW Sites:** [Coastal Marine Institute](#)

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