

BOEM ENVIRONMENTAL STUDIES PROGRAM: ONGOING STUDIES

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

Planning Area: Central and Western

Title: Determining the Geographic Distribution, Maximum Depth, and Genetic Affinities of Corals on Offshore Platforms, Northern Gulf of Mexico (GM-92-42-117)

Total Cost: \$60,804

Period of Performance: FY 2004-2010

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

BOEM Contact: [James Sinclair](#)

Description:

Background: Approximately 3,600 oil and gas structures are present on the continental shelf of the northern Gulf of Mexico. Some platforms occur near the Flower Garden Banks (FGB) National Marine Sanctuary. In an earlier study (#17808), diver surveys documented coral communities on 11 of 13 platforms around the FGB, nine were hermatypic scleractinians, the most abundant of which were the broadcasting spawners *Madracis decactis*, *Diploria strigosa*, and *Montastraea cavernosa*. Preliminary genetic analyses on coral populations of the three dominant species (one brooder and two broadcasters) indicate that the populations on the platforms and on the two Flower Garden Banks (East and West) appear to be independent. The presence of hermatypic scleractinian corals on these platforms indicates an expansion of coral distribution or at least an increase in their populations in this region, where such would not have otherwise been possible without the artificial hard substrate provided by offshore platforms. Currently, there are no data on the extent to which colonization has taken place throughout the northern GOM. This study will expand sampling of platforms in the northern GOM to determine the extent of colonization on and off the continental shelf, and with respect to depth. Patterns of coral community development will be studied on the platform jackets to the maximum depth possible, using dive teams for depths of ≤ 39 m, and an ROV for greater depths on some selected platforms.

Objectives: This study will determine the extent to which coral communities have developed on offshore platforms in the northern GOM, with respect to geographic distribution and depth. Specific objectives include the following:

- Examine patterns of coral community development to the maximum depth possible, using diver surveys (to a depth of 39 m) and an ROV on the jackets of select platforms throughout the northern GOM.
- Examine patterns of coral community structure on these platforms as a function of

distance from shore.

- Define the geographic limits of these coral communities in the northern GOM as a function of known seawater characteristics (temperature, salinity, turbidity, sediment load, oxygen, etc.).
- Determine the degree of genetic affinity between populations of select species of corals, considering inter-platform variation, and variation between the platforms and the FGB.

Methods: Surveys will be performed on select platforms throughout the northern GOM following four cross-shelf transects, extending from nearshore to beyond the edge of the continental shelf, as follows: 1) From Corpus Christi, TX; bearing = 125° SE; 2) From Port Arthur/Lake Sabine, LA; bearing = 170° S; 3) From Timbalier Island, LA; bearing = 180° S; and 4) From Mobile Point, AL; bearing = 192° S. Patterns of coral community structure will be examined on these platforms as a function of distance from shore. Through molecular genetic analyses, the degree of genetic affinity between populations of our target species will be determined, considering inter-platform variation, and variation between the platforms and the FGB. DNA fingerprinting will be performed on these corals using Amplified Fragment Length Polymorphism (AFLP) assays, a technique which has been specifically adapted for use on coral tissue.

Products: A final report describing the results of the project.

Importance to BOEM: Results will provide an assessment mechanism which will assist MMS 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 and the Flower Garden Banks.

Status: Results of the first phase (formerly GM-92-42-81) are officially combined with this project. The first phase demonstrated that hermatypic corals are relatively common on structures near the Flower Garden Banks (first major publication: Sammarco, Atchison, Brazeau Boland, and Gleason, 2004, Marine Ecology Progress Series). All field work has been completed. The current project has discovered significant range information from east to west as well as through the north/south and depth gradients. Other discoveries include the first reported black coral on offshore oil and gas platforms (Boland and Sammarco 2005). A contract modification was made adding a total of \$49,454 to the existing contract for additional storm-related expenses. The final report is currently under review in proof form.

Final Report: Under review in proof form

Publications: Sammarco, P.W., A.D. Atchison, D.A. Brazeau, G.S. Boland, and D.F. Gleason. 2004. Expansion of coral communities within the northern Gulf of Mexico via offshore oil and gas platforms. Marine Ecology Progress

Series. 280:129-143.

Sammarco, P.W., A.D. Atchison, and G.S. Boland. 2002. Drilling platforms as environmental Assets: Developing an assessment protocol using adult and juvenile corals. In: McKay, M. and J. Nides, eds. 2003. Proceedings: Twenty-first annual Gulf of Mexico information transfer meeting, January 2002. U.S. Dept. of the Interior, Minerals Management Service, Gulf of Mexico OCS Region, New Orleans, LA. OCS Study [MMS 2003-005](#) p 183-200.

Sammarco, P.W. and A.D. Atchison. 2003. Coral communities and recruitment on offshore drilling platforms in the northern Gulf of Mexico: Summary. pp. 6-7. In: McKay, M. and J. Nides, eds. 2004. Proceedings: Twenty-second annual Gulf of Mexico information transfer meeting, January 2003. U.S. Dept. of the Interior, Minerals Management Service, Gulf of Mexico OCS Region, New Orleans, La. OCS Study [MMS 2003-073](#). 488 pp.

Sammarco, P.W. A. D. Atchison, and G. S Boland. 2005. Distribution of corals colonizing oil and gas platforms in the northwestern Gulf of Mexico: A preliminary report. pp. 429-437. In: McKay, M. and J. Nides, eds. 2005. Proceedings: Twenty-third Gulf of Mexico information transfer meeting, January 2005. U.S. Dept. of the Interior, Minerals Management Service, Gulf of Mexico OCS Region, New Orleans, LA. OCS Study [MMS 2005-066](#). 612 pp.

Atchison A. D., P.W. Sammarco, D.A. Brazeau. 2005. Genetic affinities between corals on the Flower Garden Banks vs. oil/gas platforms in the northern Gulf of Mexico: implications for dispersal. pp. 438-445. In: McKay, M. and J. Nides, eds. 2005. Proceedings: Twenty-third Gulf of Mexico information transfer meeting, January 2005. U.S. Dept. of the Interior, Minerals Management Service, Gulf of Mexico OCS Region, New Orleans, La. OCS Study [MMS 2005-066](#). 612 pp.

Boland, G.S. and P.W. Sammarco. 2005. Observations of the antipatharian “black coral” *Plumapathes pennacea* (Pallas, 1766) (Cnidaria: Anthozoa), northwest Gulf of Mexico. *Gulf of Mexico Science* 23: 127-132.

Sammarco, P.W., A.D. Atchison, D.A. Brazeau, G.S. Boland, and A. Lirette. 2008. Coral distribution, abundance, and genetic affinities on oil/gas platforms in the northern Gulf of Mexico: a preliminary look at the big picture. pp. 334-347. In: McKay, M. and J. Nides, eds. 2008. 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. OCS Study [MMS 2008-012](#). 494 pp.

Sammarco, P.W., A.D. Atchison, D.A. Brazeau, G.S. Boland, and A. Lirette. 2009. Coral distribution, abundance, and genetics in the northern Gulf of Mexico: role of the Flower Garden Banks and oil/gas platforms. pp. 174-178. 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:

For related information see the MMS Gulf of Mexico Region's [Rigs to Reef Program](#)

Something for Teachers & our younger Friends!
[Islands of Life Poster](#) and [Islands of Life Teacher's Packet](#) teacher's packet. The Gulf's offshore oil and gas platforms serve as artificial reef systems for marine life and provide recreational opportunities for SCUBA divers and sport fishermen. This 23-page guide has text, illustrations, photos, a quiz, and puzzles.

[Rig Diving](#) Photo story of SCUBA diving around the offshore platforms ("rigs") in the Gulf of Mexico. (This file may take a couple of minutes to load--6.70MB.)

Some additional information!
[Gulf of Mexico Offshore Oases Poster](#) and [Gulf of Mexico Offshore Oases Teacher's Packet](#)

Also see [Flower Garden Banks Information](#).

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