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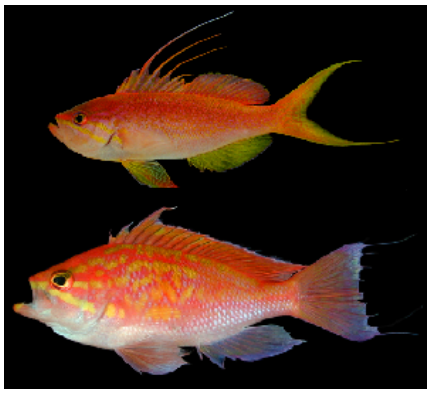
Outer Continental Shelf Ecosystem Program: The Pinnacles Project

The USGS Florida Caribbean Science Center's Outer Continental Shelf Ecosystem Project conducts detailed studies of the community structure, habitat association and food web structure of deep reef fishes in the northeastern Gulf of Mexico. USGS biologists work cooperatively with federal and state researchers on various aspects of life history, management and conservation of deepwater reef fishes and their essential habitat.



Dominant members of the Pinnacles deep reef community, the red barbier (top) and the roughtongue bass (bottom).

Background

The Pinnacles project is designed to identify patterns of demersal fish distribution, community structure, and trophic relationships on reefs and reef-associated biotopes of the outer continental shelf, and to define species composition of demersal fishes associated with reef-like carbonate banks and mounds in an area known as "the Pinnacles" in the northeastern Gulf of Mexico.

The USGS Research Team deploying Chevron traps to sample the Pinnacles fish fauna.

Reef-like prominences in deep-water along the continental shelf edge were discovered in the northern Gulf of Mexico nearly 70 years ago. Most of these formations are fossil reefs that are no longer actively accreting, and do not support true reef-building algae or corals. Although reefs on the outer continental shelf lack contemporary reef-builders, they nonetheless support a well-developed community of reef-dependent and reef-associated organisms and a relatively diverse fish fauna when compared to surrounding soft sediments. Research objectives of this program are to provide detailed information on the distribution and ecology of fishes inhabiting these deep reef communities.

Current Research

USGS biologists have undertaken oceanographic research cruises from August 1997 to February 2000 the Pinnacles region to document reef fishes and identify patterns of fish community structure. Collections have been made on numerous study reefs to provide voucher specimens for positive identification of fishes, and have resulted in one of the most extensive surveys of any deep reef community in the world. Additional collections were made by using a Remotely Operating Vehicle (ROV) equipped with a suction sampler at specific locations on each reef feature, and to collect species that have not been previously sampled by any other means. Reef fish community structure, including species abundance and microhabitat association, has also

Fishes collected for study.

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Remote Operating Vehicle (ROV) equipped with suction sampler, provided by the National Undersea Research Center at UNC-Wilmington.

been documented by high-resolution videotape surveys using the ROV. Food habits of dominant reef fish species, and a resulting food web model describing the trophic structure of the deep reef community, is being produced by examining stomach contents of collected fishes.

Future Direction

High-resolution benthic mapping of the northeastern Gulf of Mexico outer continental shelf and upper continental slope, using continental multi-beam bathymetry in cooperation with Dr. Jim Gardner, USGS-Menlo Park.

Investigations involving the age, growth, recruitment and migration patterns of dominant Pinnacles fishes in cooperation with the South Carolina Department of Natural Resources and Florida Marine Research Institute.

Use of Acoustic Doppler Current Profilers (ADCP) to document fine scale patterns of water currents around reef features and determine how these currents influence food availability for resident reef fishes.

Survey and document adjacent regions in the northeastern Gulf of Mexico to compare the geology and biological communities of these areas to the Pinnacles reefs.

Research Partners

Minerals Management Service, Environmental Studies Division, New Orleans, LA.

North Carolina National Estuarine Research Reserve, Wilmington, NC.

National Marine Fisheries Service, Southeastern Fisheries Research Centers, Panama City, FL and Pascagoula, MS.

Florida Marine Research Institute, St. Petersburg, FL.

South Carolina Department of Natural Resources, Marine Resources Research Institute, Charleston, SC.

National Undersea Research Center, University at North Carolina-Wilmington, NC.

Gulf Coast Research Laboratory, Ocean Springs, MS.

Rare groupers that occur along the Pinnacles reef tract include, from left to right, the Spanish flag, the speckled hind, and the Warsaw grouper.

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