

# Flower Garden Banks National Marine Sanctuary

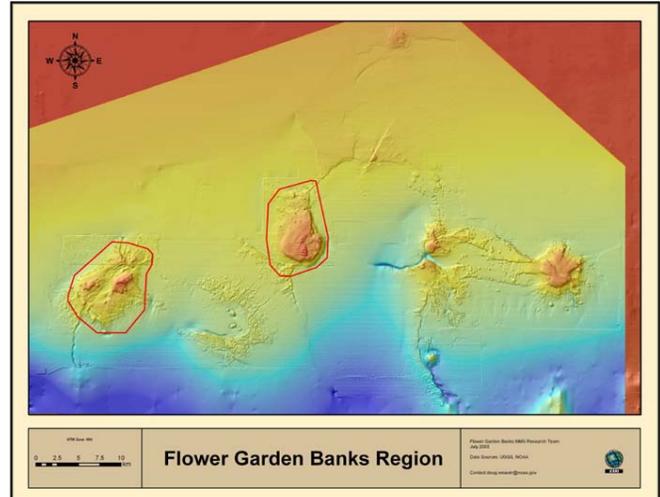
## Ecosystem Connectivity

### Management Issue

A full understanding is needed of the mechanisms controlling the level of connectedness (i.e. ecological linkages) among hard-bank ecosystems in the Gulf of Mexico. The living resource assemblages in the regional may depend on structural, migratory, life history requirements, and planktonic connections.

### Description

New data showing structurally continuous and intermittent low relief hard-bottom between some banks of the northwestern Gulf of Mexico suggest opportunities for direct connections for mobile animals. Studies on regional oceanography indicate the potential for genetic connectedness through larval transport. Some species appear to depend on bank resources only for certain portions of their life history. The role of these mechanisms in supporting site specific populations may vary between species, and needs to be better understood in order to assess vulnerabilities to removal, disease, invasive species, and other threats to survival of natural populations. The information will also affect decisions about sizing and zoning and the number of banks protected by the Flower Garden Banks National Marine Sanctuary (FGBNMS or Sanctuary) and federal other regulations.



*High resolution bathymetry illustrating structural connectivity between the Flower Garden Banks and to the banks east of the Sanctuary.*

*Map credit: ONMS*

### Questions and Information Needs

- 1) What species migrate along hard-bottom features between banks?
- 2) What services do the features provide (e.g., food availability, navigation, ontogenetic)?
- 3) What species move primarily in the water column rather than over hard-bottoms and what are the principal routes and spatial scales of migration?
- 4) Are their movements related to resource requirements at different life stages or other resource needs?
- 5) What species depend primarily on planktonic dispersal to populate the banks?
- 6) What are the principal routes and spatial scales of dispersal for different species?
- 7) What factors are likely to influence the threat of invasion by non-indigenous species known to exist in the region?
- 8) To what extent do offshore structures enhance the likelihood of movement between banks by native and non-native species?
- 9) Would the operation of an offshore terminal processing liquefied natural gas put any components of the planktonic larval assemblage at risk?

*Updated: 5/1/2010*

*For More Information -- <http://www.sanctuaries.noaa.gov/science/assessment>*

## Scientific Approach and Actions

- High resolution bathymetry
- Tagging and tracking animals
- ROV surveys to compare potential migration pathways and document behaviors
- Drifter buoys and plankton surveys
- Comparisons of genetic structure for different species
- Platform surveys by divers and ROVs
- Lab or field tests on plankton vulnerability to temperature change

## Potential Key Partners and Information Sources

Minerals Management Service, US Geological Service (USGS); Texas A&M Geochemical and Environmental Research Group; National Centers for Coastal Ocean Science; University of Houston; Wildlife Conservation Society; Florida State University; Texas A&M University; Harte Research Institute



*Manta ray tagged with acoustic transmitter, swimming past acoustic receiver. Photo credit: FGBNMS*

## Management Support Products

- Maps depicting levels of connectedness for different resource groups (these could be based on species similarity, migration patterns, dispersal patterns)
- Descriptions and depictions of temporal and spatial aspects of controlling factors affecting connectivity
- Maps showing likely sources of non-indigenous species and patterns of invasion
- Estimates of minimum effective distance between Sanctuary or zoning units to ensure short-term genetic transfer
- Estimates of vulnerability of different planktonic forms to temperature anomalies
- Habitat maps

## Planned Use of Products and Actions

- Recommendations regarding improved sizing and number of Sanctuary units
- Establishment of zones to protect particularly vulnerable species (those whose recovery potential is limited)
- Response plans for specific types of invasive species
- Recommendations regarding platform decommissioning
- Recommendations for re-evaluation of Minerals Management Service No-Activity Zones

## Program References

### FGBNMS Management Plan Review Process

- Public Scoping Reports

### Other Documents

- 2004 ONMS Science Needs Assessment

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