Gray's Reef National Marine Sanctuary

Managing Biodiversity

Management Issue

In order to adequately protect Gray's Reef National Marine Sanctuary (GRNMS or Sanctuary) resources, managers need to understand biodiversity in the Sanctuary.

Description

A typical view representing the abundance and diversity of organisms which can be found on the rocky outcroppings of the sanctuary's ledge features. Photo credit: GRNMS

The Sanctuary is one of the largest nearshore live-bottom reefs in the southeastern United States. The Sanctuary contains rocky ledges and sandy flats and comprises scattered limestone rock outcroppings which support soft corals, non-reef building hard corals, bivalves and sponges, as well as associated fishes and sea turtles. The live-bottom habitat of GRNMS is of particular biological importance and contains biological assemblages consisting of sessile invertebrates such as sea fans, sea whips, hydroids, anemones, ascidians, sponges, bryozoans and corals. The Sanctuary also attracts reef-associated fishes including bottom-dwelling and mid-water fish species. An estimated 180 species of fish have been recorded in the Sanctuary. Several species of marine mammals, sea turtles and sea birds all utilize the Sanctuary at various times of the year. Diversity at GRNMS is very high compared to shelf sites at similar depths elsewhere, but there are no baseline data to determine how it may be shifting. Understanding the diversity of these species and habitats and how they may be changing would help managers protect the natural resources of the Sanctuary.

Questions and Information Needs

1) What is the baseline biodiversity within the Sanctuary?
2) How does the biodiversity change over time?
3) Does fishing activity alter biodiversity in the sanctuary, and if so, how?
4) What data sets exist from which biodiversity information can be extracted?
5) Are there biodiversity "hot spots" which require added protection and/or resources?
6) How do episodic hydrographic events (e.g. cold water intrusions and Gulf Stream eddies) impact biodiversity?
7) How does episodic sediment transport in the Sanctuary affect biodiversity of organisms attached to the substrate?

Scientific Approach and Actions

- Conduct a literature search of biodiversity related information to evaluate what is already known about biodiversity in the Sanctuary
- Produce a species inventory of organisms found in the Sanctuary
- Solicit contributions of unpublished data sets for use in determining biodiversity indices
- Develop database into which biodiversity related data can be stored for analysis; integrate into GIS for adding species layer into existing habitat and usage layers
- Conduct field biodiversity assessments for benthic infauna, invertebrate and fish assemblages
- Gather information on human use of the Sanctuary to determine if/how those activities are impacting biodiversity
- Gather information on hydrographic events to evaluate how they may be influencing biodiversity

Potential Key Partners and Information Sources

Georgia Southern University; NOAA's National Centers for Coastal Ocean Science, Skidaway Institute of Oceanography; Reef Environmental Education Foundation, South Carolina Department of Natural Resources; NOAA's National Center for Coastal Environmental Health and Bimolecular Research

Management Support Products

- Annotated bibliography of literature related to biodiversity in the Sanctuary
- Database of existing information related to biodiversity
- GIS layer of biodiversity information
- Analysis of human impacts on biodiversity

Planned Use of Products and Actions

- Education and outreach products that utilize biodiversity information to educate the public on the unique and valuable nature of the Sanctuary
- Incorporate biodiversity information into management decisions about use of the Sanctuary
- Identify areas of high biodiversity for increased protection

Even living organisms, such as the sponge pictured here, function as habitat which contributes to the biodiversity of the Sanctuary; in a recent study, more than twenty-four thousand organisms could be found living on a single sponge. Photo credit: GRNMS

Program References

GRNMS Management Plan

- Strategy RM-3: Assess and Characterize Sanctuary Resources
  - Activity A: Develop and update the GIS database
  - Activity B: Characterize benthic habitat
  - Activity D: Develop the sanctuary characterization

- Strategy RM-4: Maintain and Enhance Monitoring Programs
  - Activity A: Monitor the status and health of fish
  - Activity B: Design and implement an invertebrate monitoring program
  - Activity E: Support and enhance regional ocean observation systems

GRNMS Condition Report

- Questions 6, 8, 9, 10, 11, 12, 13 and 14

ONMS Performance Measures

- By 2015, 100% of the sanctuary system is adequately characterized
- Number of sites in which habitat, based on long-term monitoring data, is being maintained or improved