Habitat Use by Benthic Fishes on Shallow-Water Ridges and Shoals in the Northwest Gulf of Mexico from a Landscape Perspective

R. Allen Brooks[1] and Kenneth J. Sulak[1]
[1]U.S. Geological Survey, Florida Integrated Science Center, Gainessville, Florida

Many of the natural ridge/shoal features found on the continental shelf have been identified as containing exploitable sand deposits. As nearshore reserves become depleted, offshore sand resources are becoming more important. For example, it is estimated that Ship Shoal, located off of Louisiana, contains 1.6 billion cubic yards of sand appropriate for beach renourishment and land stabilization projects. The MMS is planning to use sediments mined from offshore sources to keep up with increased beach renourishment cycles, repair storm damage, prevent erosion, and prevent wetland loss due to anthropogenic alteration and sea level rise. Such areas may be important to biological communities and represent essential fish habitat (EFH) yet little information is available relative to the use of these offshore shoal areas by fish. There is potential long-term adverse impact to organisms as a result of offshore dredging if the physiography of a shoal feature is altered significantly. Before sand resources are exploited, detailed and specific geo-referenced information on biological communities and habitat relationships of organisms is needed. This information is vital if adverse impacts to fish species that inhabit the shoal regions are to be avoided or mitigated in the future.

In this on-going study, fish assemblages are quantitatively evaluated in potential sand resource areas in the northwestern Gulf of Mexico to assess the relationships among sediment types and the spatial distribution of communities. The specific objectives of this study are to: 1) Map and physically characterize discrete sediment-based habitats on Sabine Bank, Texas, 2) Conduct a quantitative assessment of any dominant demersal fish community (including juvenile red snapper) differences between the Sabine Bank habitat versus adjacent deeper waters, and 3) Conduct a quantitative assessment of any dominant demersal fish community (including juvenile red snapper) differences between center versus edge habitat of Sabine Bank.

A mapping contract was awarded by the USGS to Dr. Tim Dellapenna of Texas A&M University – Galveston to both produce high resolution side-scan sonar maps and physically characterize discrete benthic habitats in target areas of Sabine Bank. The data collected thus far displays a fairly homogenous low reflectance, or dark color, over most of the bank, indicative of muddy substrate. However, several ridges of high reflectance can be found on the western portion of the image indicative of hard substrate, most likely sand or shell hash ridges. A second mapping and ground-truthing cruise is presently being conducted.

The USGS has conducted two sampling cruises on Sabine Bank so far. Fifty-four trawls have been made targeting the demersal fish community. The two dominant demersal fish species found thus far are *Arius felis* (hardhead catfish) and *Micropogonias undulatus* (Atlantic croaker). Overall, very few flatfishes (e.g., flounder, tongue fish), gobies, blennies, or searobin species have been recorded on the bank. Preliminary analysis shows some differences in the species composition and abundance of the demersal fish caught relative to landscape location. The final round of benthic fish sampling by the USGS, which is expected to be conducted this spring, will target the hard substrate areas identified by side-scan imagery.