

Geologic and Habitat mapping in Apalachicola Bay, FL

SUMMARY:

Apalachicola Bay is the largest oyster fishery in Florida, and one of the largest in the southeastern US. Two external conditions are threatening this productive fishery. First, the Apalachicola River, the primary source of fresh water to the bay, is in danger of having its discharge reduced by construction of dams to divert water to Atlanta, GA. Second, the largest barrier island along the seaward side of the bay is presently undergoing rapid development. As environmental stresses increase on the bay, there is a growing need to have baseline information on the benthic resources within the Apalachicola Bay system. A broad-scale acoustic survey is needed to achieve this goal, and the USGS, in cooperation with NOAA's Coastal Services Center and the Apalachicola National Estuarine Research Reserve initiated a program during FY 2005 to map the location and distribution of oyster resources throughout the bay. Funding for the field work and data analysis has been provided by NOAA through the Coastal Services Center. This project was initiated during FY 2005 as Task 10 of the Sea and Lake Floor Mapping Project, but it was recommended that it be separated out as a stand-alone project during FY 2006 and beyond. Thus, although this is the first year as a new project, one season of field work has already been completed.

INVESTIGATORS:

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DESCRIPTION:

The objectives of this seafloor mapping program are to collect and interpret continuous coverage sidescan sonar imagery, partial coverage interferometric bathymetry, and high-resolution chirp seismic-reflection data to map the shallow geologic framework of Apalachicola Bay and to map the distribution of oyster beds throughout the Bay. Bottom samples, video imagery and diver observations contribute to verifying the imagery. Beyond the initial goals expected of this cooperative project, this study provides the opportunity to pursue several other technical and scientific goals. First, Apalachicola Bay, with an average depth of 3 m, provides an opportunity to overcome technological challenges of mapping in extremely shallow water. Second, the mapping data will contribute new insights to late Holocene sealevel in the northeastern Gulf of Mexico; a contentious and unresolved topic. Third, the mapping of the bay will provide a framework for studies of storm deposits, possible changes in their frequency during the late Holocene, and their effect on the oyster fishery. The last two goals are an outgrowth of the mapping and will require collection of cores and age dating. Collection of cores was not part of the original proposal, but interest expressed by NOAA's Coastal Services Center and the Florida Geological Survey suggests this addition to the project could be cost-shared at a modest cost to the USGS during FY 2007.

START DATE OF PROJECT:

January 3, 2005

END DATE OF PROJECT:

September 26, 2008

TOPIC:

Aquatic and Marine Processes Related to Human Health, Coastal, Wetland, Riverine, and Associated Watersheds, Develop and Maintain Databases, GIS, and Decision Support Systems

APPROACH:

The initial phase of this seafloor and habitat mapping program is being spread over two field seasons. The mapping involves both acoustic mapping and ground-truth verification. The USGS is taking the lead on the acoustic mapping, and the ground-truth verification and habitat interpretation is being done collaboratively between the USGS and NOAA scientists from the Coastal Services Center and the Apalachicola Bay National Estuarine Research Reserve. During the first sidescan sonar, multibeam sonar, high resolution seismic reflection profile data were collected using the R/V RAFAEL. During the second year the R/V RAFAEL will be used to map the deeper parts of the bay and a newly acquired "Autonomous Surface Vehicle" will be used to map the shallow sections of the bay. Video imaging and direct sampling are being completed by NOAA scientists over the imagery collected during FY 2005 and a second sampling program will be completed after collection of the acoustic data during FY 2006. Data are acquired, processed, analyzed and archived, published in digital form, and made available over the web. The mapping is showing a clear need for cores to understand the stratigraphy of the oyster bars and the timing of their formation, which we hope can be added to this project during FY 2007 and FY 2008.

IMPACT/RESULTS:

The maps produced by this project will provide the first detailed maps of the floor of Apalachicola Bay. Existing oyster bed maps are 30 years old and inaccurate. These maps are requested by the Apalachicola Bay National Estuarine Research Reserve and the state of Florida, and will be used as baseline information in legal disputes between Florida, Mississippi, and Georgia regarding water rights and water management within the Apalachicola River drainage basin.