

STUDY TITLE: Northeastern Gulf of Mexico Coastal and Marine Ecosystems Program: Ecosystem Monitoring, Mississippi/Alabama Shelf

REPORT TITLE: Northeastern Gulf of Mexico Coastal and Marine Ecosystem Program: Ecosystem Monitoring, Mississippi/Alabama Shelf; First Annual Interim Report

CONTRACT NUMBER: BRD 1445-CT09-96-0006

SPONSORING OCS REGION: Gulf of Mexico

APPLICABLE PLANNING AREA: Northeastern Gulf of Mexico

FISCAL YEARS OF PROJECT FUNDING: 1996-2000

COMPLETION DATE OF REPORT: January 1998

COST: FY 1997: \$1,844,279; CUMULATIVE PROJECT COST: \$4,215,022

PROJECT MANAGER: Dr. David Gettleton

AFFILIATION: Continental Shelf Associates, Inc.

ADDRESS: 759 Parkway Street, Jupiter, Florida 33477

PRINCIPAL INVESTIGATORS*: Neal W. Phillips, William W. Sager, William W. Schroeder, Ian D. Walsh, Mahlon C. Kennicutt II, Frank J. Kelly, Norman L. Guinasso, Jr., Keith D. Spring, Bruce D. Graham, David B. Snyder, Ian R. MacDonald, Paul A. Montagna

KEY WORDS: Northeast Gulf of Mexico, pinnacles, geophysical reconnaissance, geology, sediment dynamics, geochemistry, physical oceanography, hydrography, benthic ecology, hard bottom communities, fish, micro-habitat studies, recruitment.

BACKGROUND: The Mississippi-Alabama pinnacle trend area is an important multiple use area for human commerce, fisheries harvest, recreation, and other activities, including oil and gas exploration and development. Because of the petroleum industry's interest in the area and the potential for environmental impacts, an understanding of hard bottom communities and the dominant environmental processes that influence the system is critical. Two major mapping/characterization studies in the pinnacle region have been funded by the MMS, the Mississippi-Alabama Marine Ecosystems Study and the Mississippi-Alabama Shelf Pinnacle Trend Habitat Mapping Study. However, information on pinnacle communities and related hard bottom features still consist mainly of descriptive observations from a limited number of reconnaissance surveys.

OBJECTIVES: The objectives of this multidisciplinary study are to describe and monitor biological communities and environmental conditions at three types of hard bottom features along the Mississippi-Alabama outer continental shelf: (1) high-relief pinnacles of 10 to 15 m relief; (2) medium-relief features of approximately 5 m relief; and (3) low-relief hard bottoms of less than 5 m relief. The primary focus of the program is the monitoring of hard bottom community structure and dynamics, including epibiota and fishes. This will include descriptions of the communities, differences in community structure among sites with differing vertical relief and location, and determination of relationships between community structure and various environmental parameters. Potentially important characteristics include substrate relief, microtopography, and sediment cover, as well as water temperature, salinity, dissolved oxygen, near-bottom current patterns, and presence and extent of nepheloid layers.

DESCRIPTION: This program represents the first of four phases, each lasting approximately 12 months:

- Phase 1: Reconnaissance, Site Selection, Baseline Characterization, Monitoring, and Companion Studies,
- Phase 2: Monitoring and Companion Studies;
- Phase 3: Monitoring and Companion Studies; and
- Phase 4: Final Synthesis

The program consists of an integrated suite of monitoring and process-oriented companion studies to be conducted at nine sites. Four monitoring components form the core of the program. These are hard bottom communities, fish communities, geology/sediment dynamics/geochemistry, and physical/oceanography/hydrography. Hard bottom and fish community monitoring cruise consist mainly of video and photographic sampling at each site.

SIGNIFICANT CONCLUSIONS: This first year consisted of a delineation of the five "megasites of approximately 25 to 35 km² to be revisited for detailed study.

STUDY RESULTS: This Annual Interim Report summarizes the first year (Phase 1) of a four-year program to characterize and monitor hard bottom features on the Mississippi/Alabama outer continental shelf. Phase 1 included three cruises. Cruise 1A (November 1996) was a geophysical reconnaissance of five "megasites" containing potential monitoring sites, Cruise 1B (March 1997) was a visual reconnaissance of candidate sites that had no previous video or photographic data. Cruise 1C (May 1997), which was conducted after nine final sites had been selected and approved, was the first of four cruises during which monitoring and process-oriented "companion studies" are to be conducted. Activities during Cruise 1C included setting up fixed stations, collecting samples and data, and deploying oceanographic and biological mooring. Monitoring program components include geology/sediment dynamics, geochemistry, physical oceanography, and hydrography, hard bottom communities, fish communities, and two companion studies (micro-habitat studies and epibiont

recruitment). For each component, the report presents historical background information, study rationale, field and laboratory methods, and preliminary results.

STUDY PRODUCT: Continental Shelf Associates, Inc. and Texas A&M University, Geochemical and Environmental Research Group, 1998. Northeastern Gulf of Mexico Coastal and Marine Ecosystem Program: Ecosystem Monitoring, Mississippi/Alabama Shelf; First Annual Interim Report. U.S. Dept. of the Interior, U.S. Geological Survey, Biological Resources Division, USGS/BRD/CR-1997-0008 and Minerals Management Service, Gulf of Mexico OCS Region, New Orleans, LA, OCS Study MMS 97-0037. 226 pp.