MMS Technical Announcement

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Minerals Management Service
Gulf of Mexico OCS Region

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High-Resolution Integrated Hydrology-Hydrodynamic Model: Development and Application to Barataria Basin, Louisiana

OCS Study MMS 2004-063

The Minerals Management Service (MMS), Gulf of Mexico OCS Region, announces the availability of a new study report, *High-Resolution Integrated Hydrology-Hydrodynamic Model: Development and Application to Barataria Basin, Louisiana.*

This is the final report of a series focused on coastal marine environmental modeling and completes the program to model the physical, geological, chemical, and biological interactions of estuarine and shelf systems of coastal Louisiana. Coastal marine environmental modeling targets the development of numerical models of estuarine shelf interactions with the ultimate objectives of formulating a coupled hydrodynamic-ecological model that includes biological and sedimentological components.

Here, the development of a high-resolution integrated hydrology-hydrodynamic model of Barataria Basin is presented. The hydrology model component explicitly accounts for the local hydrological cycle over the surrounding drainage basins of the Barataria Basin. Using observed precipitation and estimated evaporation over the surrounding drainage basins, the hydrology model provides estimates of local runoff. The hydrology model is coupled to a high-resolution, two-dimensional, depth-integrated hydrodynamic model of the Barataria Basin in order to simulate the hydrodynamic response of Barataria Basin to hydrological, tidal, and wind forcing. A flood event during Tropical Storm Allison in June 2001 resulted in a significant rise in sea-level heights, especially in the upstream region of the basin. The integrated model captured a significant portion of the observed sea-level variations during the flood. Model results also provide information on the impacts of freshwater diversions at Naomi, West Pointe a la Hache, and Davis Pond on water level and salinity in the basin, and these impacts are shown to be greatest in the mid-bay region. However, even after a month some isolated areas still remain without noticeable influence of the diversion.

Estuarine environments represent nursery grounds for some of the economically important fisheries of Louisiana, most notably menhaden and shrimp. The same currents that transport their shelf-spawned larvae into the estuaries may transport pollutants as well. Information obtained from the present model simulations will help to make quantitative environmental assessments of surface pollution transport from OCS to estuarine and marsh environments.

This report is available only in compact disc format. The disc is available from the Minerals Management Service, Gulf of Mexico OCS Region, at a charge of $15.00 by referencing OCS Study MMS 2004-063. The report may be ordered through the Minerals Management Service's on-line ordering system at **http://www.gomr.mms.gov/WebStore/front.asp**. You will be able to obtain this report also from the National Technical Information Service in the near future. Here are the addresses. You may also inspect copies at selected Federal Depository Libraries.

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Telephone requests may be placed at
(504) 736-2519 or 1-800-200-GULF
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5285 Port Royal Road
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The Minerals Management Service is the federal agency in the U.S. Department of the Interior that manages the nation's oil, natural gas, and other mineral resources on the Outer Continental Shelf in Federal offshore waters. The agency also collects, accounts for, and disburses mineral revenues from Federal and American Indian lands. MMS disbursed more than $8 billion in FY 2003 and more than $135 billion since the agency was created in 1982. Nearly $1 billion from those revenues go into the Land and Water Conservation Fund annually for the acquisition and development of state and Federal park and recreation lands.

MMS Main Website: **www.mms.gov**
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