DEVELOPMENT, CALIBRATION, AND SENSITIVITY ANALYSES OF A HIGH-RESOLUTION DISSOLVED OXYGEN MASS BALANCE MODEL FOR THE NORTHERN GULF OF MEXICO

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A high-resolution dissolved oxygen mass balance model was developed for the Louisiana coastal shelf in the northern Gulf of Mexico. GoMDOM (Gulf of Mexico Dissolved Oxygen Model) was developed to assist in evaluating the impacts of nutrient loading on hypoxia development and extent. Model runs also provided insight into important nitrogen, phosphorus, carbon and ecological processes that contribute to hypoxia. GoMDOM uses a 6-km square grid with 26 vertical sigma layers. The model simulates twenty state variables and describes carbon, nitrogen, phosphorus, silicon, dissolved oxygen, phytoplankton, and zooplankton dynamics. Hydrodynamic model inputs were provided by the U.S. Navy Research Laboratories' EPACOM. Water quality data to support model calibration and corroboration were collected during the 2003-2007 U.S. EPA Gulf Ecology Division sampling program. Nutrient and other constituent loads were estimated for 56 tributaries. Loading estimates were obtained from USGS estimates for the Mississippi and Atchafalaya Rivers and from water quality and flow data for other inflows. Atmospheric loads were obtained from the U.S. EPA CMAQ model. This abstract does not necessarily reflect policy of the U.S. EPA.