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Modeling of Dissolved Oxygen in the Houston Ship Channel using WASP5 and Geographic Information Systems

by

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The goal of this research was the establishment of a connection of an existing water quality model to Geographic Information Systems (GIS). The water quality model investigated was the Water Quality Analysis Simulation Program (WASP5), while the actual linkage was performed using object-oriented and FORTRAN programming. The study area chosen to implement this GIS/WASP5 interface was the Upper Houston Ship Channel, which has a history of poor water quality caused by industrial inputs and non-point source loadings from the city of Houston. Initially, the information required for a simple steady state BOD/DO model in the Upper Houston Ship Channel was digitally represented in GIS. In addition, the non-point source loadings into the Houston Ship Channel were determined using a grid-based model developed in GIS. Afterwards, scripts were written in the ArcView programming language, Avenue, in order for ArcView to perform the following tasks: 1) write the input file information, 2) format the input information into the proper WASP5 file, 3) execute the WASP5 subprogram for BOD/DO modeling and model calibration, 4) process the WASP5 output, and 5) assist the user in output visualization. This connection is limited by model complexity, computer speed, and Avenue programming constraints.

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