

INTEGRATED FLOW AND WATER QUALITY MODELING FOR ECOSYSTEM RESTORATION IN THE LAKE CALUMET AREA

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Lake Calumet is located in the southeastern Chicago, Cook County, Illinois. More than a century ago, the Calumet region was the largest wetland complex in the Great Lakes area. Today, remnant wetlands and a few other natural areas are interspersed among active and abandoned industries, slag piles generated by nearby steel manufacturers, and chemical waste disposal sites and landfills. Efforts have been made towards restoring the area to an environmental friendly and ecologically attractive park in the region since late 1990. In June 2000, Chicago Mayor and Illinois Governor announced a new vision for the Calumet area, which marks the first comprehensive attempt to strike a balance between the area's ecology and its economy-to foster a healthy, productive, and sustainable environment for plants, animals, fish, birds, and people in the area.

This paper will present the integrated modeling approaches with hydrology-hydraulics-water quality models for assessing ecosystem restoration plans in the Lake Calumet area. In this effort, SWMM model applications were developed for the Lake Calumet Cluster Site and the adjacent open spaces it affects, including Indian Ridge Marsh, Big Marsh, Heron Pond, and Dead Stick Pond to simulate flow and solute transport from land surface into marshes under different management scenarios; HEC-RAS model has been used to evaluate the impact of control structures to the flood levels in the marshes; MODFLOW and MT3D models are used to estimate the seepage and concentration of specific conductance, total dissolved solids, copper and lead from the Cluster Sites under the existing and remedial scenarios. A WASP model was developed for the Indian Ridge marsh to integrate the discharges from overland areas and the contaminated groundwater from the Cluster Sites to assess the long term impact to the water quality in the marsh area, which is ultimately one of the major concerns for the ecosystem restoration in the area.