

THREE DIMENSIONAL HYDRODYNAMIC MODELING OF THE CHICAGO RIVER: COMPARATIVE STUDY BETWEEN EFDC AND DELFT3D

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Chicago Waterways System (CWS) is a highly engineered and complex combination of natural rivers and artificial canal. Although not very long, CWS is famous for the engineering feat that directed its flow south away from the Lake Michigan into which it previously used to drain. In this research work two three dimensional models, Environmental Fluid Dynamics Code (EFDC) and Delft3D are applied to the portion of the CWS and there results are examined in comparative manner. The results from the numerical simulation are validated with the help of the observed stage data obtained from the US Geological Survey (USGS) gauging station inside the domain modeled in this work. A grid sensitivity test is conducted for both the model and its impact on the results obtained are examined. Computational time taken by both the models, for conducting unsteady simulation is also compared. Delft3D-FLOW is a multidimensional hydrodynamic simulation program which calculates unsteady flow and transport phenomenon on a rectilinear or a curvilinear boundary fitted grids. EFDC solves three dimensional vertically hydrostatic, free surface, turbulent averaged equations of motions for a variable density fluid