

1 Introduction

Background

The Upper Mississippi River and Illinois Waterway (UMR-IWW) Navigation Study was designed to resolve technical issues regarding the plan to evaluate the effects of navigation on the resuspension of bottom sediments and determine the migration patterns of these sediments and feasibility of restoring the system's biological resources. Questions have been raised concerning the ecological integrity within the interwoven system of backwater areas and marshes within the study area—the study of hydraulic and hydrologic parameters in a system such as that in the UMR-IWW complex. A number of physical processes operate in the river, and their relative importance can vary both spatially and temporally. Bathymetry and geometry of the river, meteorologically induced currents, wind-induced circulation, inflow from tributaries, and navigation traffic effects are major factors determining riverwide circulation and suspended-sediment patterns. To determine these effects in a technically defensible manner, a sophisticated approach using state-of-the-art equipment for the field investigations is necessary to capture data that are spatially and temporally variable.

Purpose

The purpose of the overall field data collection program was to provide a hydrodynamic and hydrologic monitoring program with emphasis on obtaining information including bathymetry at monitoring stations, currents, water levels, suspended-sediment concentrations, wind velocity, and concurrent navigation data. These parameters will be used in the evaluation of controlling landscape features, ecosystem stability, river morphology, and sediment-transport characterization in three study areas located in the UMR-IWW system. The areas of interest are located in Pools 26 and 8 on the Mississippi River and La Grange Pool on the Illinois River. These data are then to be used in the hydrodynamic and sediment transport modeling efforts to provide the necessary boundary conditions, initial conditions, and verification data for comprehensive numerical simulations. The purpose of this report is to provide a permanent record of the instrumentation

and techniques employed during the field investigation and to make the data available for use.

Scope

This report presents representative results of the field investigation of the UMR-IWW Sedimentation Study during the months of October 1995, July 1996, and September 1996. Measurements consisted of the following:

- a.* Current speed and direction.
- b.* Suspended-sediment concentrations.
- c.* Bottom-sediment samples.
- d.* Water-level fluctuations (waves and navigation traffic drawdown effects).
- e.* Meteorological conditions.
- f.* Navigation vessel information.

This report describes the field investigation equipment and methods used to collect the data, shows representative results of the data reduction efforts, and summarizes the results of these efforts.