

Chapter 1. Abstract

This report summarizes findings from several phases of the Upper Mississippi River/Illinois Waterway (UMR/IWW) Bank Erosion Study. Tasks completed to date include a literature study of bank erosion, an aerial reconnaissance survey, and a field survey trip organized and conducted by the lead agency, the U.S. Army Corps of Engineers, Rock Island District. Major emphasis of this report is given to the findings from the field survey.

The research team included scientists and engineers from the Illinois State Water Survey (ISWS), the University of Iowa - Iowa Institute of Hydraulic Research (IIHR), and the U.S. Army Corps of Engineers, Rock Island, St. Paul, St. Louis, and Huntington Districts. The principal authors for this report are the ISWS and IIHR. A geomorphologist from Anderson Environmental Services also participated in the trip on the Upper Mississippi River. Field survey trips were conducted in the Fall of 1995 and covered reaches from River Mile (RM) 854 to RM 0 on the Upper Mississippi River, and from RM 286 to RM 0 on the Illinois Waterway. The research team assessed bank conditions on both sides of the main rivers and took detailed information at selected erosion sites where they formed opinions of the causative mechanisms for each location. In addition to describing the detailed data collected and analyses of these 72 individual sites, this report has included comprehensive erosion mapping of the entire length of both rivers in appendix J. Description of the study, data collection methodology, a database, and characterization of bank erosion are given in Chapters 1 - 5.

During the field survey, the team selected 72 erosion sites (29 sites on the Illinois Waterway and 43 sites on the Mississippi River) for further study. The bank sections, site photos, bank and subaqueous soil conditions, and site descriptions are given in chapter 6 for the IWW and chapter 7 for the UMR. During the analysis and report preparation stages, it was decided that the ISWS would take major responsibilities in writing the IWW portion of this report and that the IIHR would write the UMR portion with contribution from Anderson Environmental Services.

For the selected sites on the IWW (80 bank sections from 29 sites), the research team observed multiple erosion processes at most of the selected bank sections. The most frequently identified erosion mechanisms are seepage, stage fluctuations, flood flows, navigation traffic, wave activities, and eddies and disturbed flows. A more detailed summary of the IWW field survey data, analysis and discussion can be found in Chapter 6.

Bank failure and erosion conditions on the Upper Mississippi River also showed significant flood impacts. Analyses of surficial soil samples showed the banks were mantled by primarily sand and gravel in the upper reach of the river, silt and sand in the middle reach, and clay and silt in the lower reach. Most of the bank failure and erosion sites showed flood damage as the dominating erosion cause. Surficial, wave-induced erosion and erosion associated with direct barge impact, propeller wash and cabling to trees was present at some fleeting and mooring and lock approach sites.

Approximately fifty-one sites out of seventy-five of the UMR study sites (including observation sites) were within the upper portion of the navigation pools. Many of these active erosion sites are also historically dredged material placement sites. Below St. Louis, historical flood flow reworking of the channel margins was also observed. A more detailed summary of the UMR field survey data, analysis and discussion can be found in the summary section of Chapter 7.

A measurement of the length of severely eroded reaches, as marked on the navigation charts (appendix J), shows that there are approximately 115 bank miles on the IWW and 240 bank miles on the UMR. This represents that approximately 20 percent of the total bank length of the IWW and 14 percent of the UMR are actively eroding.

The appendices include the literature review, scope of work, stage histograms at each site, dredging history and the location of dredged material placement sites, fleeting areas, particle size distributions for collected samples, cross sectional profiles and UTM coordinates for the 72 erosion sites, geomorphology report, database of field notes, navigation charts with bank erosion marking, and field photos. Archeology sites reports and historic property are on file at the appropriate Corps of Engineers District offices.