The Use of Hydroacoustics and Sediment Coring in Bathymetric Mapping and Modeling

Douglas J. Schnoebelen
IIHR-Hydroscience & Engineering
University of Iowa
323-A C. Maxwell Stanley Hydraulics Laboratory
Iowa City, IA 52242-1585
douglas-schnoebelen@uiowa.edu

Nathan C. Young
IIHR-Hydroscience & Engineering
University of Iowa
133 C. Maxwell Stanley Hydraulics Laboratory
Iowa City, IA 52242-1585
nathan-young@uiowa.edu

ABSTRACT

The record floods of 1993 and 2008 in Iowa’s rivers and streams have highlighted the need of a better understanding of scour, deposition, and sediment transport. Sediment is listed as a major impairment in Iowa streams by the Iowa Department of Natural Resources. Understanding the fate and transport of sediment from agricultural land and stream banks is critical. The use of hydroacoustics and sediment coring are providing new tools for bathymetric mapping, channel morphology, scour, deposition, and potential effects on riverine structures. The Lucille A. Carver Mississippi Riverside Environmental Research Station (LACMRERS)/IIHR-Hydroscience and Engineering are using a multibeam hydroacoustic system and sediment coring to better evaluate sediment process and problems. The multibeam sonar can map at the centimeter scale. Continuous sediment cores of 3–4 m length can be obtained for grain size analysis, chemical composition, and age dating. Research to date has been involved with three different scales and projects on the Mississippi River, Iowa River, and Des Moines River. The Mississippi River data are presented on modeling and potential dredging; the Iowa River in and near Iowa City, Iowa, using bathymetry in conjunction with LIDAR in streamflow modeling is discussed. On the Des Moines River, scour around bridge piers has been conducted, clearly showing areas of scour and rip-rap placement.

Key words: bathymetric mapping—floods—sediment