**ENV Report 43 – Hydraulic Effects of Recreational Boat Traffic on the Upper Mississippi River System Volume 1 – Main Test; Volume 2 – Appendices A-C** – by Sandra K Knight, T.M. Parchure

## ABSTRACT

Increased recreational boating traffic in the Upper Mississippi River will have an impact in conjunction with other stresses on the UMRS ecosystem. While the impact will consist of hydraulic, biologic and sediment disturbances, this report focuses on the effect of recreation traffic as related to wake waves and their potential for resuspending nearshore sediments. Field measurements were conducted in Pool 8 of the Upper Mississippi River near La Crosse, WI, to obtain data on wake waves and sediment resuspended in the nearshore zone and the results were used to validate numerical models. Potential maximum wave heights were assigned to vessel class and distance range from the sailing line. A generalized time-history wave response was developed for use in modeling sediment resuspension. Characteristics of field sediment were determined through laboratory tests. A new procedure was developed for sediment classification. A verified numerical model was used for making quantitative predictions of wake-wave-induced suspended sediment concentrations in the nearshore zone. Data on nearshore sediment characteristics were used as input to the model. Effect of wave height, wave period, vessel frequency, water depth, type of vessel, characteristics of vessel, and sediment properties were evaluated. Comparisons were made between effects of commercial tows versus recreational boats.