ENV Report 15 - ***Wave height predictive techniques for commercial tows on the UMRS*** by Sandra K. Martin

ABSTRACT

Physical model studies and prototype data have been collected and analyzed as part of the Upper Mississippi River-Illinois Waterway System (UMRS) Navigation Feasibility Study for the purpose of developing a vessel wave predictive tool for commercial tows. The approach used was to examine existing analytical techniques for predicting wave heights produced by vessels, determine their suitability and applicability to the vessels and waterways of the UMRS, and modify/validate them with physical model and available prototype data. Based on the literature reviewed and the analysis, both a method of predicting the maximum secondary wave height produced by a moving commercial tow and the time-history associated with it are presented in this report. The wave-height model was based on the development of coefficients related to the hull cross-sectional area and relates maximum wave height to distance from sailing line and the vessel speed. This equation is appropriate for predicting maximum secondary wave height for the purposes of estimating ecological impacts as well as designing bank protection.