ENV Report 59 – ***Flow Through the Wheels of Towboats in 600-ft Lock on the UMR-IWW*** by Stephen T. Maynord.

ABSTRACT

Due to tow length being greater than lock length for most tows on the Upper Mississippi River System, tows must break in half and use two lockages to pass through the lock. A double lockage requires the towboat to use propeller thrust for a considerable amount of time while in the lock chamber. Entrainment of fish into the propeller jet and mortality is a concern of the U. S. Army Corps of Engineers (USACE). To address concerns about fish mortality, one component in the evaluation is the amount of flow through the wheels of the towboats during lock passage. A field study was conducted to evaluate towboat operation during the double lockage. Duration and propeller speed were recorded for tows passing through the lock. The average upbound unloaded tow from the field study passed 49 percent of the water volume of the lock through the wheels. The average downbound loaded tow from the field study passed 228 percent of the water volume of the lock through the wheels. These results are limited to relatively low flow conditions on the river. Data are needed for higher flows as well as for upbound loaded and downbound unloaded tows.