

**ENV Report 10 - *A Two-Dimensional Flow Model for Vessel-Generated Currents*** by Richard L. Stockstill and R.C. Berger

**ABSTRACT**

The movement of a barge train through a body of water produces a complex pattern of currents and waves. Quantification of these currents has relied on physical models and analytical descriptions. Although empirical methods are practical for many situations, detailed analyses of specific areas are desirable. These empirical relations do not provide time-varying solutions necessary for predicting the duration of vessel-induced events. Also, spatial variations in rivers having backwaters and side channels are not modeled by these expressions. A two-dimensional representation of the equations of motion provides temporal variation of the depth-averaged velocity distribution and the water-surface elevation. This report describes the development of a numerical model to quantify vessel-generated currents and summarizes a series of numerical experiments. Flow fields containing a moving vessel are modeled by specifying a pressure field, representing a vessel hull, which is spatially varying in time. The movement of the pressure field in time is specified to represent a vessel navigating along a channel.