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Lake Herring Spawning Grounds of the St. Marys River with Potential Effects of Early Spring Navigation

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Abstract.–The St. Marys River, which connects Lakes Superior and Huron, is one of the few strongholds of lake herring (*Coregonus artedi*) in Lake Huron. The river is also a thoroughfare for international shipping. Proposals to extend navigation by one week into the early spring raised concerns over the effects on lake herring hatch. Fundamental to assessing the risk is knowledge on location of lake herring spawning grounds. Variable mesh gill nets were fished late October to mid November 1993 through 1996 (128 net sets in all) in the study area between Izaak Walton Bay (above the locks) to lower Lake Munuscong. Lake herring were inspected for sex and maturity levels with the presence of ripe, partially spent and spent females as indicators of spawning activity. Catch rates of female lake herring in spawning condition were compiled in a geographic information system database (GIS) and expressed on 3-D graphic plots for visual inspection of important spawning grounds. A hydraulic flow model was used to predict the dispersion of the eggs from spawning grounds. Stranding of fish on the spring ice shelf by passing vessels was also monitored. Spawning lake herring were detected throughout most of the study area, however, three locations emerged as being of greater relative importance. They were Baie de Wasai vicinity of upper Lake Nicolet, Garden River vicinity, and upper Lake George. Multiple regression analysis failed to clearly link lake herring catch rate to physical characteristics of water velocity, depth, distance to the navigational channel and temperature. The flow model indicated that some areas of relative importance had less distance traveled by drifting eggs, however, there were exceptions and regression analysis of importance and distance traveled detected no significant relationship. The areas of least usage by spawning lake herring were the navigation channel and locks vicinity. Stranded fish on the spring ice shelf were documented from only two locations; the Dunbar area of Lake Nicolet and below the Rock Cut. During the two years of monitoring, strandings averaged only 0.5 fish per 100 m per vessel passage and occurred during a narrow time span. This study documented lake herring spawning grounds while a companion study examined the effect of vessel traffic on lake herring egg incubation in the field. Collectively, the results indicate that lake herring can achieve some successful spawning in St. Marys River despite navigation and ice-breaking operations as conducted during the study period which included a 25 March Soo Locks opener. Recommendations include making permanent the temporary speed limit reduction on the river as well as prohibiting any further channelization of the river.