

**ENV Report 30 - Evaluation of Propeller-Induced Mortality on Selected Larval Fish Species**  
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**ABSTRACT**

Mortality of ichthyoplankton entrained through a scale model of a towboat propeller was evaluated in a large (>2 million L) circulating water channel. Five species of fish (larval shovelnose sturgeon *Scaphyrhynchus platorynchus*, larval lake sturgeon *Acipenser fulvescens*, larvae and eggs of paddlefish *Polyodon spathula*, larval blue sucker *Cycleptus elongatus*, and juvenile common carp *Cyprinus carpio*.) were subjected to one or more shear stress levels (634.1, 613, 3,058, 4,743 dynes/cm<sup>2</sup>). Mortality was a linear function of shear stress for all species and life stages. However, conditional mortalities (i.e., subtracting control from treatment mortality) were relatively low (<30 percent) for paddlefish eggs and common carp juveniles. Smaller larvae (lake sturgeon and blue sucker) experienced higher mortalities than larger larvae. However, conditional mortality of blue suckers was less than 50 percent due to high mortality of control groups. Delayed mortality was observed for all larval species, particularly at higher shear stress levels, but none for common carp juveniles and paddlefish eggs. Shear stress created from propeller jet velocities in navigable rivers can exceed 5,000 dynes/cm<sup>2</sup> and is probably the primary force contributing to mortality of ichthyoplankton entrained during vessel passage.