

Abstract Submitted
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The Effects of Eddies on Fish Swimming Ability¹ HANS TRITICO, ALINE COTEL, PAUL WEBB, PRATIK PRADHAN, University of Michigan — In order to quantify the effect of turbulent flow perturbations on fish swimming, Creek Chub (*Semotilus atromaculatus*) were swum in low turbulence flume under various eddy fields. The cross-section of the flume where fish are positioned for the tests is 60cm x 60cm. Fish length varied from 10 to 14 cm. Eddies were generated using six arrays of equally spaced cylinders. The cylinder diameter and orientation were varied between arrays to produce eddy fields with differing eddy compositions. The result was a matrix of eddy fields in which the dominant eddies were either smaller, the same size, or larger than the fish length and of either horizontal or vertical orientation. A control was also run using a 1 cm by 1 cm upstream diffuser. An incremental velocity test was conducted in which the speed was increased by 3.6 cm/s every 2 minutes until the fish was exhausted. Simultaneous plan and side view video analysis was conducted producing body oscillation and fin utilization statistics. Using particle image velocimetry, it was determined that eddy size, circulation, and orientation impact the critical swimming speed and fin utilization of creek chub. The tests were designed such that the results may be built upon to guide design of more complicated restoration and fish passage projects.

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