PROJECT TITLE: Swimming Performance of Great Lakes Minnows and Darters

INSTITUTION: Wright State University

PRINCIPAL INVESTIGATOR: Stephen J Jacquemin
AFFILIATION: Wright State University – Lake Campus
EFFORT: 0.32 - Summer months requested

OBJECTIVES: This proposed research will assess and establish baseline information for swimming performance of several native species that occur in the Maumee River Basin, the largest watershed of Lake Erie. The objectives of this project are to: 1. Assess sustained, prolonged, and burst swimming performance of 6 species of small bodied non-game fishes including Cyprinidae (4 species) and Percidae (2 species). These species will include common minnows and darters from across the Great Lakes Drainage and will serve as important indicators of response to flow variation. AND 2. Assess covariation of each swimming performance metric with species, sex, and body size.

METHODOLOGY: The study methodology will address sustained, prolonged, and burst swimming speeds for several small bodied species of Cyprinidae and Percidae that occur across the Lake Erie Basin. Swimming performance testing using a Blazka style chamber and will assess sustained, prolonged, and burst metrics using Usust, Ucrit, and Umax calculations for each species across the range of body sizes. This study will include a minimum of 30 individuals, comprising the full range of size classes (minimum to maximum TL), from the following species of Cyprinidae (4) and Percidae (2): Bluntnose Minnow (Pimephales notatus), Spotfin Shiner (Cyprinella spiloptera), Redfin Shiner (Lythrurus umbratilis), Sand Shiner (Notropis stramineus), Greenside Darter (Etheostoma blennioides), and Johnny Darter (Etheostoma nigrum). Fish will be collected from three principal lotic sites along major Maumee River trips: St. Mary’s River, Auglaize River, and Blanchard River.

RATIONALE: Swimming performance is currently one of the best developed metrics to determine swimming abilities and, by extension, for predicting ecological communities given varying flow regimes. This is extremely relevant for biologists, conservationists, and natural resource managers as natural flow regimes are altered on a global scale – the full impact of which is not yet fully understood. Swimming performance studies provide a way to study the potential for fishes to traverse and persist in varying flows. However, there is a gap in the literature of Cyprinidae and Percidae, which is particularly glaring as these two families comprise the majority of North American, including the Great Lakes Drainage, diversity. This signifies a need for additional studies that focus on these smaller bodied groups. The proposed project will also serve as a learning platform for numerous undergraduate science students.

See attached document for full proposal and study description