Great Lakes Fishery Commission – Fish Passage Guild Analysis

Position: Post-doctoral Fishery Research Scientist

Background: The bi-directional selective fish passage (FishPass) project at the Boardman (Ottaway) River's Union Street Dam in Traverse City, MI is a multi-agency collaboration aimed at providing up- and down-stream passage of desirable fishes while simultaneously blocking or removing undesirable and invasive fishes. Developing selective passage solutions for a mixed assemblage of fish requires an approach that accounts for variability within the assemblage by grouping species into guilds on the basis of their sortable attributes. Passage and blockage schemes can then be formulated on the basis of differences and commonalities among guilds as opposed to the less efficient prospect of sorting individual species. The FishPass Advisory Board has identified the research needs to identify key phenological, morphological, behavioral, and physiological attributes that can be used to sort fishes; and identify guilds of fish to be sorted on the basis of their attributes.

Initial lists of Great Lakes species and sortable attributes have been defined by the project team. An extensive literature review (including unpublished agency data, grey literature, and expert consultation) is required to compile existing data on sortable attributes. Analytical methods for developing guilds are flexible and could involve conventional multivariate clustering (e.g., Balon 1975, Balon 1977, Winemiller & Rose 1992), Bayesian clustering, or even machine learning, depending on the expertise of the successful candidate and consultation with the project team. We anticipate obtaining more complete data for a subset of species and less complete data for the remainder of Great Lakes species; therefore, we suspect the data set could be parsed into model training and test sets as an approach to inclusive guild derivation. Expert opinion or analytical approaches to estimate missing data, could also be considered to further populate the data set.

Responsibilities: The primary research objective is to determine if Great Lakes fishes can be grouped into sortable guilds on the basis of their phenological, morphological, behavioral, and physiological attributes. Research to achieve this objective has been partitioned into two phases; (1) conduct data acquisition through extensive literature, agency data review, estimation, and expert consultation to build a database on sortable attributes of Great Lakes fishes; (2) conduct classification analysis to derive sortable guilds for the Great Lakes and Boardman River fishes. The duration of each phase is 12 months (two years total). Findings from this work will be used to develop selective fish passage schemes at FishPass. The incumbent will lead the publication of 1-2 peer-reviewed journal articles per research phase and will present findings to the FishPass Advisory Board and at scientific conferences.

Qualifications: The ideal candidate will have a PhD in biology (ideally ecology, animal behavior, and/or functional morphology); or alternatively in statistics, mathematics, or bioinformatics with a background in biology or ecology. Strong quantitative and statistical modeling skills, and a demonstrated ability to effectively communicate science via publications and conference presentations are required. Experience with synthetic activities including literature reviews, data compilations, database development, and expert surveys is also preferred.

Applicants are encouraged to submit a cover letter, CV, relevant publications, and names and contact information for three references to Dan Zielinski (dzielinski@glfc.org). The anticipated start date for the position is June 1, 2021. The work can largely be done remotely. Applicants who have an existing academic affiliation, support for engagement in the project from their current supervisor, and the ability to work remotely are encouraged to apply