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Abstract Submission

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**Title:**

Using Hierarchical Modeling to Predict Common Carp and Bigmouth Buffalo Electrofishing CPUE from Abundance and Environmental Covariate Data

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**Abstract:**

Many assessments of fish populations rely on catch per unit effort (CPUE, i.e., number of fish per hour of electrofishing), but the use of fluctuations in CPUE to infer relative changes in fish populations can be problematic. The relationship between catch rate and fish abundance is highly variable because catchability may not be constant through time and under a wide range of environmental sampling conditions, and it is not possible to separate changes in catchability from changes in population size with CPUE alone. Therefore, we modeled expected CPUE within closed populations as a function of Common Carp and Bigmouth Buffalo biomass density estimates from independent capture-mark-recapture techniques across a range of environmental covariates (e.g., lake surface area, shoreline complexity, water temperature) using a Bayesian hierarchical framework. Models were ranked according to Bayesian Information Criterion, and posterior distributions for expected CPUE were compared against observed CPUE. Overall, the top-ranked models had effect sizes of within lake variables (e.g., water temperature) that were small or non-significant, and had lake-specific variables (e.g., surface area, shoreline complexity) that were positively correlated with expected CPUE.