Evaluation of an underwater camera method to sample freshwater fish assemblages under the ice

Ben Patschull

University of Wisconsin – La Crosse

Department of Biology, M.S. Aquatic Sciences Program

Abstract:

Ice cover has long restricted our understanding of the habitat use patterns of fishes in temperate aquatic ecosystems by preventing the use of conventional sampling methods. Using methods developed for shallow marine ecosystems, we described the suitability of standardized underwater camera (UWC) sampling in Stoddard Island Complex and Lawrence Lake; two backwaters on the Upper Mississippi River. To assess the efficacy of the UWC sampling method in backwater habitats, we analyzed the viewing radius using environmental covariates collected at each randomly selected site ($n = 42$ per lake). Using AICc model selection techniques we found that water clarity was included in substantially more top performing models than the other environmental variables, suggesting water clarity is the main variable impacting viewing radius. Sampling time and site number were also analyzed to optimize the efficiency of the method. We analyzed of accumulated Bluegill (*Lepomis macrochirus)* catch over the ten minute sampling period, which showed no clear inflection point. We used rarefaction analysis to identify the number of sampling units necessary to capture species richness, which showed species richness was captured after 20 sites. Our rarefaction and sampling time results suggest that future UWC sampling should include fewer sites, but longer recorded samples at each site.