

Public Abstract

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Title:DEVELOPMENT AND VALIDATION OF STANDARDIZED SAMPLING PROTOCOLS FOR ASSESSING FRESHWATER MUSSEL POPULATIONS IN MISSOURI

Freshwater mussels are among the most threatened aquatic fauna in North America. Given the need for continued monitoring of threatened mussel species, an evaluation of the effectiveness of metrics from visually-based sampling methods is an essential step in assessing populations. We surveyed 14 sites in the Meramec River Basin in East-central Missouri to determine the effectiveness of visual sampling methods and to determine the effects of habitat variability on the effectiveness of these methods. At each site, we employed three visual methods for estimating mussel abundance; timed visual searches (TVS), systematic strip transects, and stratified randomly placed visual 0.25 m² quadrats. We excavated substrate at each 0.25 m² quadrat to determine baseline densities for each species. We compared the results of density estimates or CPUE of each visual method with density estimates based on excavated quadrat samples, which we considered the most rigorous of our sampling approaches and a useful baseline. Sampling efficiencies (SE) of visual-based quadrats were calculated and used to determine if visual techniques provide reasonable approximations of overall mussel abundances and to investigate factors that influenced SE. Sampling efficiency averaged 0.45 (Std. Err. = 0.05) across species, and varied greatly among taxa and the 3 rivers included in this study, and was influenced by temperature, discharge, and, to a lesser extent, by other factors. Correspondence of TVS and transects with excavation varied amongst taxa, but was typically low, and was affected inconsistently by habitat factors. Species detection probabilities were highest for TVS (0.45 – 1.00, mean = 0.84) and lowest for visual quadrats (0.17 – 1.00, mean = 0.71; strip transects had intermediate values (0.23 – 1.00, mean = 0.75). Detection probabilities for most species were not affected by habitat variability, those that were affected, were inconsistent. These results will be used to produce validated and standardized sampling protocols for freshwater mussels of Missouri.