



Bias Associated with Sampling Interval in Removal Method for Fish Population Estimates

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Abstract: One of the fundamental problems facing fisheries biologist is determining population abundance. Often indirect methods of determining population size must be employed, including mark and recapture, area-density measurements and catch-effort techniques. Removal methods of population estimation are based on the relationship between catch per effort and cumulative catch. These methods may be biased if the collection technique used, such as electrofishing, violates the underlying assumptions of the catch-effort method. These assumptions are a closed population, a constant catchability coefficient that relates effort to catch, and the probability of capture of any individual fish is the same as that for any other fish. A study was conducted to determine if increasing the time interval between electrofishing passes reduces bias in estimating population size. Four stream reaches were repeatedly sampled by electrofishing at 15, 30, 60 or 120 minute intervals. Electrofishing was followed by rotenone application in order to measure total numbers and biomass of fish present. Percent differences in estimated and measured numbers and weights of fish were calculated for each sampling interval. The 15 minute sampling interval resulted in percent differences between observed biomass and estimated biomass that were significantly higher than all other sampling schemes. The high 15 minute interval average difference was followed by a lower difference for the 30, 60, and 120 minute intervals as might be expected if fish "forgot" the electrofishing experience as time increased between runs.

Key words: *Catch per unit effort, rotenone, sampling bias, electrofishing*

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