

# Capture Efficiencies of the Holton and Sullivan Parallel Wires Electrofishing Method

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*Abstract:* The estimation of fish abundance in small streams is often accomplished with removal sampling and an electrofisher. Several electrofishing gears are available, and studies have compared different gear types as well as different sampling techniques, such as the number of passes, with the same equipment. We conducted seven-pass electrofishing removal sampling with two sampling gears (a backpack DC electrofisher and a parallel wire AC electrofisher) within the upper Greenbrier River drainage, West Virginia. We compared the two gear types at 10 paired-sites based on capture efficiencies. Estimates of capture efficiencies (from binary logit analysis) between parallel wire and backpack methods were based on capture data of adults of three relatively common species; western blacknose dace (*Rhinichthys obtusus*), fantail darter (*Etheostoma flabellare*), and mottled sculpin (*Cottus bairdi*). Data were modeled with and without group effects of gear type and with site covariates of water current velocity, water depth, stream width, rock size, and heterogeneity of rock sizes. For the first electrofishing sampling occasion (first pass), estimates of capture efficiency from parallel wire electrofishing were higher for *Rhinichthys obtusus* and lower for *Cottus bairdi* relative to estimates from backpack sampling. Our results likely reflect a difference between DC and AC waveforms, where the electrotaxis effects of DC (induced movement of fish toward the anode) increase capture efficiencies for benthic fishes. Additional work is planned for comparison of DC versus AC parallel wire sampling.

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