

A Reexamination of the Relationship between Electrofishing Catch Rate and Age-0 Walleye Density in Northern Wisconsin Lakes

MICHAEL J. HANSEN*

*College of Natural Resources, University of Wisconsin—Stevens Point,
800 Reserve Street, Stevens Point, Wisconsin 54481, USA*

STEVEN P. NEWMAN

*Bureau of Integrated Science Services, Wisconsin Department of Natural Resources,
8770 Highway J, Woodruff, Wisconsin 54568, USA*

CLAYTON J. EDWARDS

*Forestry Sciences Laboratory, U.S. Forest Service, 1831 Highway 169 East, Grand Rapids,
Minnesota 55744-3399, USA*

Abstract.—We quantified the relationship between the population density (number/acre) of age-0 walleyes *Sander vitreus* (formerly *Stizostedion vitreum*) and electrofishing catch per effort (CPE; number/mi) in 19 Wisconsin lakes to update a 1982 analysis by Serns, who used linear regression through the origin to develop a model from a small data set that has been widely used to estimate age-0 walleye density from electrofishing CPE. We added new data, explicitly tested for the linearity of the relationship, and accounted for the effect of measurement errors. We found that electrofishing CPE was nonlinearly related to the population density of age-0 walleyes, which indicated that the catchability of age-0 walleyes to electrofishing declined with population density. The measurement errors in electrofishing CPE were more than nine times as great as those in age-0 walleye population density, so that the parameters of the relationship between electrofishing CPE and age-0 walleye density were accurately estimated by ordinary-least-squares linear regression. Among lakes, the variation in the catchability of age-0 walleyes to electrofishing was positively related to the variation in specific conductivity but not to the variation in other physical features (shoreline complexity or littoral area) or chemical features (alkalinity or pH). Within lakes, the variation in the catchability of age-0 walleyes to electrofishing was negatively related to the variation in temperature at the time of sampling. We recommend that electrofishing CPE only be used as a crude index of age-0 walleye population density.