

## ABSTRACT

Thirty lakes in southern Michigan were studied to determine if food availability, chemical and physical factors and habitat type influenced the growth rate of bluegills (Lepomis macrochirus). The lakes studied spanned a continuum of bluegill growth rates which allowed for comparisons of the relative importance of several limnological factors. The limnological factors considered were; benthic biomass from discrete lake zones, zooplankton size and density, macrophyte density, algal concentration, nutrients (nitrates, ammonia, orthophosphate and total phosphorus), secchi disk transparency, chlorophyll, dissolved oxygen, alkalinity and morphometric variables (lake area, area of discrete lake zones and maximum depth). Data on the growth rate of bluegill were available from the Michigan Department of Natural Resources (MDNR) and were ranked according to the growth index for Michigan fishes.

Few variables differed for lakes with good or poor growth. Macrophyte density correlated negatively and zooplankton size correlated positively with bluegill growth rate. The multiple linear regression model developed in the final analysis used bluegill growth rate as the dependent

variable and macrophyte density, zooplankton size and profundal benthos as the independent variables ( $r^2 = 0.598$ ,  $\alpha = 0.05$ ).

A number of relationships among the variables studied were noted. Macrophytes played a key role in the size distribution and abundance of zooplankton. Lake morphology, similarly, played a key role in the distribution of macrophytes.