

Predator-prey and Competitive Interactions Among Walleye, Yellow Perch, and Other Forage Fishes in Saginaw Bay, Lake Huron

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Abstract.—We investigated predator-prey interactions among walleye *Stizostedion vitreum*, yellow perch *Perca flavescens*, and other forage fishes in Saginaw Bay, Lake Huron during May-October 1986-1988. We wanted to determine the extent of interactions between walleye and yellow perch and their impact on the forage fish community. Walleye primarily consumed cyprinids, young-of-the-year clupeids, and rainbow smelt *Osmerus mordax*, but age-2 and age-3 walleye relied on yellow perch during the summer of 1988 after a cold spring delayed clupeid recruitment. Although walleye diets varied among years, prey appeared to be abundant, and walleye growth was fast during each year of the study. Yellow perch consumed large numbers of chironomid larvae and zooplankton. Piscivory by yellow perch was rare, and represented opportunistic predation on benthic species such as trout-perch *Percopsis omiscomaycus*. Results of energetics modeling suggest that yellow perch subsist near a maintenance ration for much of the growing season and experience slow growth, energy depletion, and high natural mortality. The underlying reason appears to be a lack of large benthic invertebrates, which may be a result of eutrophic conditions in the inner Bay. Other forage fish populations were abundant and stable during the 3 years of the study. Predation on the forage fish community was low because walleye were rare. Most yellow perch died before attaining a size that would facilitate piscivory.

Saginaw Bay, Lake Huron presently supports an extensive sport fishery for walleye and a combined sport and commercial fishery for yellow perch (see Table 1 for a list of common and scientific names of fishes collected during this study). Since 1980, the populations of these two species have increased in response to stocking programs (walleye) and protection from overharvest (both species) (Keller et al. 1987). The management goal for Saginaw Bay was to

produce large populations of both species with fast individual growth rates. While walleye growth was fast, growth of yellow perch was apparently slow. A shortage of large yellow perch caused dissatisfaction among user groups. The simultaneous resurgence of both species in recent times created a potential management problem in that increased predator density could tax the forage base. Additionally, competitive interactions between walleye and yellow perch could constrain