

## Population dynamics of contemporary yellow perch and walleye stocks in Michigan waters of Green Bay, Lake Michigan, 1988-96

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*Abstract.*—Yellow perch *Perca flavescens* and walleye *Stizostedion vitreum* population characteristics were summarized using annual creel surveys conducted during 1985-96, and field sampling and tagging studies conducted in Michigan waters of Green Bay during 1988-96. Recreational catches of yellow perch were highest in the late 1980s, declined in the early 1990s, and rebounded somewhat by about 1995. Angler catch rates were as high as 6.3 perch per hour in 1985 but fell to 0.03 fish per hour in 1994. The best walleye fishery in Michigan waters of Green Bay was in Little Bay de Noc, both in terms of annual harvests and catch rates. Walleye populations are building at other locations and the Menominee River fishery, in particular, has been strong since 1992. Field assessments caught over 27,000 fish representing 17 families and 53 species. Yellow perch was the most abundant fish in field catches, followed by trout-perch *Percopsis omiscomaycus*, spottail shiner *Notropis hudsonius*, johnny darter *Etheostoma nigrum*, and alewife *Alosa pseudoharengus*. Walleye ranked 8<sup>th</sup> in overall catches. Mean size-at-age was generally comparable for both yellow perch and walleye across different areas, years, and collection methods. Trawling data were used to produce indices of young-of-the-year yellow perch abundance, and gill-net data provided an abundance index of perch 178 mm and longer in the bays de Noc. Indices showed that strength of yellow perch year classes varied from year to year and variations were not synchronous between bays. Good to very good recruitment occurred during some years between 1990 and 1996, a period during which yellow perch recruitment in Lake Michigan proper was not detectable. Diet information obtained from 4,879 yellow perch and 416 walleye indicated that food habits have not changed substantially from those reported in previous studies except that an exotic cladoceran, *Bythotrephes cederstroemi*, figured prominently in yellow perch diets in Little Bay de Noc. Exotic fish species that were caught in field samples and reported for the first time in Michigan waters of Green Bay included the threespine stickleback *Gasterosteus aculeatus* and white perch *Morone americana*. Walleye eggs and larvae were collected in Little Bay de Noc, and contributions to fisheries by year classes from non-stocked years provided evidence of successful recruitment from natural reproduction. Totals of 31,272 walleye and 19,572 yellow perch were affixed with individually-numbered jaw tags between 1988 and 1996. Recoveries of tagged fish indicated that yellow perch movement was limited. Walleye ranged farther but no fish were reported outside the waters of Green Bay. On average, walleye tagged in Cedar River were captured farthest from their tagging site. Anglers from 18 different states provided tag-return information. Tagged walleye were caught throughout the day and night. Spawning site fidelity was documented for both yellow perch and walleye based on recaptures of previously-tagged fish during subsequent tagging operations. Preliminary catch-at-age models developed for Little Bay de Noc yellow perch and walleye populations yielded projections of observed vs. predicted harvest, instantaneous mortality rates, and abundance. These models need further development but outputs appeared reasonable.