

ABSTRACT

The harvest of walleye by sport and commercial fisheries in lakes St. Clair and Erie is under a cooperative management program involving several states and two countries. In this report we present the results of a long-term tag-recapture study as well as corroborative evidence of stock discreteness from studies of population characteristics such as growth and allelic frequencies of walleye in these waters. Walleye were tagged in the spring from 1975–87 in lakes St. Clair and Erie. Tag-recapture data indicate a general tendency for walleye to move northward after tagging. Walleye tagged in Lake St. Clair had higher recovery rates and lower survival rates than walleye tagged in Lake Erie. A reward-tag study in Lake St. Clair provided an estimate of a non-reporting rate of approximately 33% which is comparable to rates in the literature for other species. Data from the Ontario commercial (gill-net) fishery, Michigan Department of Natural Resources trap-net surveys, and sport fisheries from western Lake Erie and Lake St. Clair were analyzed with a catch-at-age model which permitted estimation of population abundance (12.2 to 34.5 million fish), fishing mortality rate (0.19 to 0.37), and annual survival rate (0.57 to 0.68). It appears that exploitation rates for the sport fishery in the western basin exceeded those of the commercial fishery from 1978–82. In recent years (1983–87), exploitation rates were comparable. Average abundance and catch of walleye in the western basin were 12.2 and 3.4 million fish in 1978–82; average abundance and catch in 1983–87 were 34.5 and 5.2 million fish. We found good agreement between the estimate of the harvest from creel surveys and that from the catch-at-age model for Lake Erie. Walleye abundance and harvest in Lake St. Clair were 10% of the values for the western basin of Lake Erie. Two discrete stocks were delineated by analysis of allelic frequencies of samples from Lake St. Clair and Lake Erie spawning populations. These two stocks are the western basin of Lake Erie and Lake St. Clair stocks. No further subdivision of stocks was possible based on the genetic analysis of 21 loci. These genetically different stocks intermix in the northern waters of this system. Based on a consideration of the results of the genetic analysis, catch-at-age analysis, and tag-recapture study we recommend independent but coordinated management of the walleye populations in Lake St. Clair and Lake Erie.