

Recent History and Management of the State-Licensed Commercial Fishery for Lake Whitefish in the Michigan Waters of Lake Michigan

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Abstract.—Over the past 20 years, a restructuring of the commercial fishing industry on Michigan's upper Great Lakes has resulted from a shift in the state's Great Lakes management policy. The state's policy stresses recreational rather than commercial fishing, implementation of limited entry, delineation of zone management, an effort to rehabilitate lake trout (*Salvelinus namaycush*), which entailed conversion from traditional gill nets to trap nets, and litigation by tribal entities.

Catch and effort data, reported obligatorily by commercial fishermen and supplemented by seasonal age and size data collected by the state, have allowed calculation of mortality, age distribution, growth, and catch quotas for lake whitefish (*Coregonus clupeaformis*). Trends in commercial yield during the 1980s show peak whitefish catches around 1985 in management zones WFM00 and WFM01, followed by decreasing harvests through 1988. Catches have been higher in zones WFM06 and WFM08 during the last few years than earlier in the decade.

Annual total mortality rates during 1983-88 were high for whitefish stocks in management units WFM00 (0.77-0.88) and WFM01 (0.73-0.86), but they were low in units WFM06 (0.45-0.51) and WFM08 (0.45-0.48). Whitefish stocks in zones WFM00 and WFM01 have sustained themselves at some level short of collapse despite high total mortality rates. Apparently collapse has been averted because an adequate spawning biomass composed of large, older whitefish was distributed in depths unavailable to trap nets for much of the fishing season, and because conditions in northern Green Bay have been consistently favorable for whitefish reproduction. Age distribution in landed catches was dependent on time of year and gear. Whitefish catches in zones WFM06 and WFM08 included larger proportions of older fish, and fish larger than 500 mm were significantly heavier when compared to catches of fish from the two northern zones.

Yields were simulated under minimum size limits (MSL) of 432 mm, 457 mm, and 483 mm in each management unit. The balance between the costs and benefits of various MSLs cannot be adequately evaluated without field testing. Contradictions between calculated catch quotas and reported yields may exist due to the use of 3-year averages for parameters used in models.

A summary of management observations and recommendations for Lake Michigan whitefish contained in this report includes: (1) commercial catches should continue to be sampled during May, July, and October in all zones except WFM06, which requires only May sampling unless fall fishing resumes; (2) zone WFM07 has the potential to support a modest harvest should interest arise, and exploitation of stocks in WFM06 and WFM08 has potential to expand; (3) the maximum trap-net depth restriction should be retained at 27 m; (4) the indiscriminate expansion of the trawl fishery should not be allowed; (5) target annual total mortality rates should be set at 65% and target instantaneous fishing rate should be 0.60; (6) the fisheries in zones WFM06 and WFM08 are suitable for experimental study sites to test effects of implementing different MSLs, and changing the MSL in zones WFM00 and WFM01 should be deferred until such field studies are complete; (7) an index of pre-recruit whitefish, accurate knowledge of age structure of the catch, and reliable reporting of catch and effort are important for forecasting yield; and (8) stocks in zones WFM00 and WFM01 should be managed jointly by Michigan and Wisconsin.

The state-licensed commercial fishing industry on the upper Great Lakes has been subjected to several revolutionary transformations that began in 1966. The impact of these transformations, which occurred over a period of approximately 20 years, was to reduce the number of state-controlled commercial fishing licenses on Lake Michigan from 405 in 1967 to 30 in 1987. The restructuring of the commercial fishery was the result of a change in Great Lakes management policy, limited entry, zone management, conversion from traditional gill nets to trap nets, and the displacement of state-licensed commercial fishermen from areas of the lake allocated for exclusive use by Indians fishing under treaty rights.

The purposes of this report are to: (1) describe briefly the events leading to the restructuring of the fishery and management of lake whitefish (*Coregonus clupeaformis*) stocks by catch quota; (2) document the biological data and commercial catch statistics that were used in the setting of quotas; and (3) present the yearly catch quotas from 1986 through 1989.

Recent History and Study Perspective

Restructuring of the Fishery

In 1966, the Michigan Department of Natural Resources (MDNR) established a Great Lakes fishery management policy which

made recreational fishery management the primary goal and relegated the heretofore dominant commercial fishery to a secondary role (Keller and Smith 1989). Thus the essential framework, upon which subsequent management decisions would be based, was in place.

Limited entry was implemented on all of Michigan's waters of the upper three Great Lakes in 1969. The purposes of limiting entry to the commercial fishery were to: (1) preserve, protect, and enhance the fishery resource itself; (2) make the commercial fishery an asset that contributes to the public good rather than being a liability; and (3) restore and improve the economic viability of the commercial fishing business (W. R. Crowe, MDNR memorandum, 1968). Concurrent with limited entry, a Zone Management Plan was also enacted. The Zone Management Plan mostly excluded gill nets from areas and depths of Lake Michigan that were considered to be prime habitat for lake trout (*Salvelinus namaycush*) rehabilitation. The plan also prohibited commercial harvest of major sport species such as lake trout, walleye (*Stizostedion vitreum*), and yellow perch (*Perca flavescens*).

Michigan began rehabilitation of the Lake Michigan lake trout in 1965. Within several years, it became evident that a virtually unrestricted gill-net fishery was incompatible with restoration of lake trout. Consequently, a request by the MDNR to ban gill nets from the upper Great Lakes was tentatively approved by the Michigan Natural Resources