

Chapter 1: Introduction to Michigan Fish Stocking Guidelines

Fish stocking is an important part of fisheries management programs in Michigan. The stocking of fish in inland and Great Lakes waters has been very successful in creating many new fisheries and rehabilitating many others. Recreation fishing is the largest and highest-valued use of the state's fishery resources. Approximately two million Michigan residents and 334,000 non-resident tourists fish in Michigan each year. Approximately one-third of all recreational fishing in Michigan depends on stocked fish, including a substantial portion of Great Lakes trout and salmon fishing. In fiscal year 2003-04, fish production in Michigan cost \$7,242,118, which accounted for 29.5% of the Fisheries Division's budget. Anglers spend approximately \$850 million per year with effects on the tourism and fishing equipment sectors of Michigan's economy of \$2.0 billion per year.

All fish found in the Great Lakes, bays of the Great Lakes, connecting waters between those lakes, and inland lakes and streams are property of the State of Michigan (Michigan Compiled Laws § 324.47301 and § 324.48702(1)). Under the public trust doctrine, Michigan holds all fish within Michigan's jurisdictional waters in trust for the benefit of the people of Michigan. Michigan's obligation to preserve and protect its resources is prescribed by Article 4, § 52 of the Michigan Constitution. The Michigan Legislature has implemented this constitutional mandate by establishing the Michigan Department of Natural Resources (MDNR, in the Natural Resources and Environmental Protection Act, 1, Act 451, Part 5, § 324.501), and established duties for the Department (in Act 451, Part 5, § 324.503): "The department shall protect and conserve the natural resources of this state; provide and develop facilities for outdoor recreation; ...prevent and guard against the pollution of lakes and streams within the state and enforce all laws provided for that purpose with all authority granted by law; and foster and encourage the protection and propagation of game and fish". The department has authority to regulate the taking or killing of fish, animals, or game birds for protection or preservation purposes, and may promulgate rules and orders as necessary under Act 451, Part 411, § 324.41102. The Department has the authority to regulate stocking of spawn, fry, or fish into public waters under Act 451, Part 487; and the Department has the authority to regulate the importation of game fish and eggs under Act 451, Parts 459 and 487. The importation of Oriental weatherfish *Misgurnus anguillicaudatus*, grass carp *Ctenopharyngodon idellus*, ide *Leuciscus idus*, rudd *Cardinius erythrophthalmus*, bitterling *Rodeus sericeus*, tench *Tinca tinca*, and species in the Family *Salmonidae* are prohibited without permit, under Department of Natural Resources Administrative Rules R299.1051 et seq.

Under the authority of Part 413 of 2003 PA 270 it is unlawful to possess or transport any live transgenic (genetically engineered) organisms or the following nonnative fish: bighead carp *Hypophthalmichthys nobilis*, black carp *Mylopharyngodon piceus*, silver carp *Hypophthalmichthys molitrix*, grass carp *Ctenopharyngodon idellus*, members of the family Channidae (known as snakeheads), Japanese weatherfish, ide, rudd, bitterling, and tench. Under the authority of Part 411 of 1994 PA 451, FO-209.03, it is unlawful to possess or transport Eurasian ruffe *Gymnocephalus cernuus*, tubenose goby *Proterorhinus marmoratus*, or round goby *Neogobius melanostomus*.

The Department regulates stocking in public waters, including the Great Lakes and connecting waters, inland waters with public access, and all water bodies connected by intermittent or permanent streams and channels to public waters. Private waters are those entirely confined by private land, with no connections to public waters. A determination of whether a water body is public or private is sometimes difficult to make because of historical precedents and various legal issues. For information regarding public and private waters in Michigan, refer to "Guide to Public Rights on Michigan Waters" (Anonymous 1993).

Fisheries Division has various policies that aid in guiding fish stocking programs. Fisheries Division has specific procedures for preparing and approving fish stocking recommendations. Stocking recommendations are developed by management and research biologists for individual water bodies. These recommendations are peer reviewed and evaluated at various administration levels prior to approval

for stocking. Evaluations are required to determine the effectiveness of stocking in each water body (Borgeson 1987).

There are four purposes for stocking fish. These include: restoration of fish populations; provide diverse sportfishing opportunities (introductory, continuous, and supplemental stocking), improve ecosystem balance; and aid experimental studies. Consideration of numerous factors is needed in making recommendations for each water body. Some of these include: costs, benefits, affects on the aquatic community, genetic effects on existing fish populations, biological soundness, community support, geographical need, existing regulations, and availability of fish. Protecting and restoring habitat is usually the most important method for managing self-sustaining fish communities. Stocking is usually not recommended where fish populations are self-sustaining. Stocked fish can negatively affect healthy fish communities through degradation of genetic fitness (Kapusinski and Jacobson 1987), competition, predation, and other biological factors. Stocked fish generally demonstrate poor survival in the presence of healthy fish populations, so benefits are usually small and sometimes lacking. Expected and demonstrated benefits of stocking programs must be reasonable because these programs are expensive. To assess the success of management actions in areas of natural reproduction, hatchery stocks should be uniquely marked to distinguish hatchery and wild fish, and to assess possible hatchery-wild interactions.

The stocking of fish is one method available to fisheries managers to assist in the management of fisheries resources. This publication is intended to be a guide for managers to assist in determining the appropriate time, place, and quantities of fish to stock in order to meet specific management objectives. These guidelines will be updated, as new information becomes available. Other information that can be consulted regarding fish stocking and management in Michigan include Fisheries Division's Broodstock Management Proposal and Manual of Fisheries Survey Methods (Schneider 2000).

1.1 Historical Stocking Perspective

Stocking of fish by the State of Michigan began in 1874 when Atlantic salmon *Salmo salar* fingerlings were released from the Crystal Springs State Fish hatchery near Niles (Anonymous 1974). Stocking was initiated to replenish perceived depletion of native stocks and to establish new species such as rainbow trout *Onchorhynchus mykiss* and brown trout *Salmo trutta*. During the following 125 years, practically every potentially useful species has been stocked.

During the early development of culture techniques in Michigan, most fish (predominantly trout and lake whitefish *Coregonus clupeaformis*) were stocked as sac-fry or fry. Soon after 1930, stockings gradually shifted away from fry stockings toward larger fingerlings and in the 1940s began to shift to sizes large enough for legal harvest. The stocking of legal-sized trout intensified in the 1950s and 1960s, and then ceased due to a change in statewide stocking policy. Since 1965, our stocking program has emphasized yearling sub-legal trout (put-grow-take), because that size optimized costs and benefits.

Rearing the youngest fish (sac-fry) is obviously cheaper than fry, fingerlings, or yearlings. However, numerous studies have shown that larger fish often survive better in the wild. Stocking catchable-fish can produce unwanted results in terms of human behavior (crowds and truck chasing). Other studies have shown that stocking fish may compete with wild fish (Bachman 1984 and Vincent 1987). While stocking large fish can be beneficial, managers must consider both the costs and benefits in determining the best size of fish to stock.

While the majority of fish stocking by the state has involved coldwater species, large numbers of coolwater and warmwater species were stocked during the first half of the 1900s. By 1947, most stocking of warmwater fish had stopped (Cooper 1948) because most lakes already contained the desired species, and most of these species reproduced well enough that additional stocking was not warranted. This may not be true for some species unable to reproduce naturally, most notably walleye *Sander vitreus*.

1.2 References

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