

WALLEYE STATE OF THE RESOURCE REPORT

FOR SOUTHERN REGION

The Ministry of Natural Resources (MNR) has completed a study to determine the status of walleye populations in Southern Region as part of the *Southern Region Walleye Management Review*. This study is similar to others previously completed in northwestern and northeastern Ontario. MNR initiated this study because walleye are highly sought by anglers and declines in fishing quality have been reported. Walleye is the most valued fish species in Ontario, providing important recreational fisheries. MNR is examining new management options to protect and enhance these fisheries.

This tabloid provides information about what the MNR has learned regarding the status of walleye populations in Southern Region, and information on how you can get involved.

MANAGING WALLEYE IN SOUTHERN ONTARIO PRESENTS UNIQUE CHALLENGES TO MNR

The Southern Region of MNR includes all of Ontario south of the French and Mattawa Rivers (Figure 1). Walleye inhabit at least 417 lakes in the Region, accounting for about 10% of the province's walleye lakes. Although they are native to Ontario waters, many Southern Region walleye lakes contain populations that were introduced in the early part of the twentieth century. In fact, only about one-third of walleye waters in Southern Region contain native walleye populations.

Managing walleye in Southern Region presents significant challenges to resource managers. A number of major metropolitan centres are located in the region, and many areas are popular destinations for cottagers and tourists. Most of the land is privately owned, however most lakes are easily accessible. The combination of these factors results in relatively high fishing effort on many of the lakes and rivers.

In recent years, many anglers have voiced concerns regarding the quality of walleye fishing across the Southern Region. Both the size and number of walleye caught has declined. MNR is examining new management options to protect and enhance these fisheries. ■

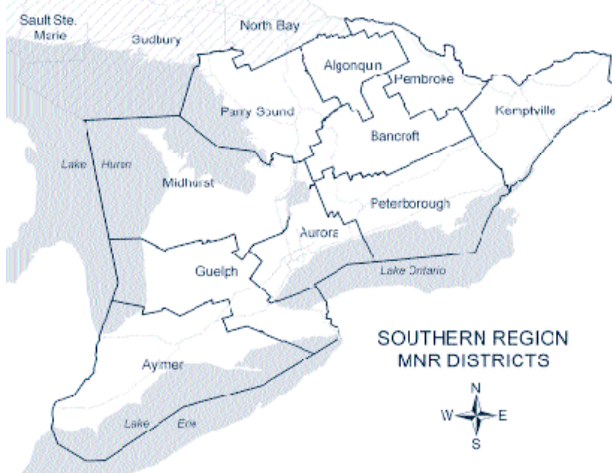


Figure 1: Map of the Southern Region and MNR District boundaries

WALLEYE PRODUCTION AND STRESSORS



A warmer climate in the south supports increased walleye population growth

The amount of fish a water body can support, also called the carrying capacity, depends on a combination of the availability and suitability of habitat and climate. Biologists expect greater walleye carrying capacity in southern waterbodies because a warmer climate and longer growing season supports faster population growth compared to northern waterbodies.

Walleye growth is positively related to temperature. Walleye in the Southern Region grow faster, and reach maturity at a younger age than northern populations. As a result, southern populations are able to sustain higher levels of harvest than their northern counterparts.

Walleye spawning success can vary greatly from year to year. Rapidly warming water can cause eggs to hatch early while prolonged cool weather can delay hatching. A cold period after the hatch can suppress the production of zooplankton that young walleye consume. Year-class strength (the relative number of walleye born in a particular year) can vary 100-fold. One walleye year-class may dominate in a waterbody, while walleye from other year-classes are scarce or absent.

Large shallow lakes with moderate nutrients and low water clarity provide the best walleye habitat

Walleye are adapted to low to moderate light conditions. In clear water, the amount of quality habitat available is more limited than in water with low clarity. As water

clarity increases, the habitat becomes less favourable for walleye and more suitable for other species.

Larger lakes are generally able to support greater numbers of walleye and other fish species due to more varied habitat and increased availability of food resources. Because walleye prefer warmer water than other species, such as lake trout, deep regions of many lakes do not provide suitable habitat for walleye. A large, deep, cold water lake can not support as many walleye as a large, shallow lake with low water clarity.

The amount of nutrients in the lake determines productivity. Lakes with low nutrients may not support an abundance of prey that walleye, as a top predator, depend on.



Walleye in Southern Region are exposed to a number of different stressors which can reduce the number of walleye found in a lake

Walleye in the Southern Region are typically exposed to more or higher levels of stressors than walleye in the north. The prevalence of residential and cottage development on many waterbodies increases the amount of shoreline alteration. A number of land uses are present (e.g. industrial, agricultural, etc.), that may decrease water quality. In addition, the close proximity to the Great Lakes and the high degree of connectivity among lakes increases the likelihood of invasive species introductions. One, or all, of these factors can reduce walleye abundance on a local or regional scale.

WALLEYE PRODUCTION AND STRESSORS

continued

Lakes in the Southern Region are fished more often than those in the north

In 2000, anglers fished over 11 million days in the Southern Region, nearly 4 million days in the Northeast and close to 3 million days in the Northwest. The results of a 2000 survey of recreational anglers in Ontario found that walleye were the species most preferred by anglers, with more than 25% of all fishing effort directed at walleye. Walleye were the most commonly caught fish in 2000, and were second only to yellow perch in terms of the number kept by anglers. The MNR uses fishing regulations such as: closed seasons, sanctuaries, catch limits and size restrictions to ensure angler harvest does not exceed the amount of fish that a lake can produce on a sustainable basis. Fishing regulations in Southern Region have remained largely unchanged for the last 50 years even though the amount of angling effort has increased dramatically.

Invading species can directly or indirectly reduce the amount of walleye a lake can support

Introduced or invading species can have dramatic impacts on a walleye fishery. Some, such as zebra mussels, can dramatically change water clarity, and decrease the suitability of habitat for walleye. Other invaders, such as black crappie, may compete directly with adult walleye for limited resources and/or prey directly on young walleye. As new species are introduced, the balance of the ecosystem is altered and the number of walleye a lake can support is reduced. Managing introduced species is often very difficult. The best means of reducing the impact is to prevent invasions before they occur. MNR currently works with a number of partners to prevent invasions through legislation and public awareness campaigns.

Lakes in Southern Region are often surrounded by development which can have an impact on walleye habitat

Shoreline alterations such as: dredging and the construction of docks, boat houses and retaining walls are often associated with residential and cottage development. The cumulative effects of numerous shoreline alterations on a single lake can have an adverse impact on the fish community. Alterations to shorelines can affect the spawning, nursery and feeding habitats of near-shore species, including walleye, through the destruction of important habitat features, altering water

quality, changing trophic status, or affecting the distribution of prey species. Projects that involve shoreline alterations require approvals from the MNR, the Department of Fisheries and Oceans and/or Conservation Authorities to prevent or mitigate damage to fish and fish habitat.

Walleye are affected by changes in the water quality

The quality of water in our lakes and rivers is directly impacted by a number of factors, including acid precipitation, contaminants, and nutrient loading. Changes in water quality may reduce the suitability of the habitat for walleye, or decrease the productivity of the lake in general. A number of steps have been taken to maintain water quality in provincial waterways; for example improvements in water treatment facilities and increased protection of wetlands.

The number of walleye eggs that survive to hatch can be dependent on water levels at the spawning site

Many lakes and rivers in Southern Region are regulated by water control structures. Excessive fluctuations in water levels, particularly in the spring, have a negative impact on spawning success by limiting the availability of habitat or stranding eggs. In many instances, MNR has established seasonal flow and/or water level requirements to minimize these impacts. In addition, MNR has initiated the Water Management Planning process to balance social, economic and environmental values associated with the operation of hydroelectric facilities. ■



DETERMINING THE STATE OF THE WALLEYE RESOURCE IN SOUTHERN ONTARIO

Walleye management will now be based on a landscape scale, rather than a lake-by-lake approach

Traditional fisheries management has occurred on an individual lake basis where issues were brought forth to local managers. Modern fisheries science has recently emphasized the need to shift to a landscape scale for the management, monitoring, and assessment of fish populations. A landscape approach is the most effective means of managing fisheries resources. Managing lakes in isolation fails to recognize that anglers are mobile and that management actions on one lake may influence angler behaviour on nearby lakes. A landscape approach also provides a more effective means to determine the state of the resource and monitor the effectiveness of management actions. By conducting standardized surveys on many lakes over the course of several years, fisheries managers can get an indication of the relative health of walleye populations on a landscape scale.

Fall Walleye Index Netting (FWIN) is a provincially standardized netting protocol that has been used to assess the status of walleye populations. Biologists believe that there is a relationship between the FWIN catch and the abundance of walleye in a lake. To gain a better understanding of the health of walleye populations in the Southern Region, a representative sample of lakes covering the range of physical and chemical characteristics was assessed using FWIN. This

represented 129 surveys, on more than 100 waterbodies out of the total of 417 known walleye lakes in the Region.

FWIN surveys also provided information regarding the characteristics of the lakes in each region. Lakes in Southern Region are generally smaller, shallower, clearer, and contained more nutrients than those in northern Ontario.

The low abundance, increased growth rates, and absence of large female walleye is of concern

Walleye growth rates were high in Southern Region, with an annual increase in average total length of 4.7 cm (nearly 2") from age 1 to age 9 (Figure 2). By age 2, a Southern Region walleye is approximately 350 mm (~14"); compared to approximately 300 mm (~12") in the north. By age 4, an average Southern Region female walleye is about 460 mm (~18") in length; in the north this fish would average only 400 mm (~16"). This increased early growth rate is likely due to the combination of lower abundance of walleye, which reduces competition for food resources and an extended growing season in southern lakes.

The relative abundance of walleye in Southern Region averaged only 2.8 walleye per net. By comparison, catch rates in the Northwest Region averaged 10.7 walleye per net, and 6.4 walleye per net in the Northeast Region (Figure 3). In addition, the relative abundance of adult walleye was much lower in Southern Region (1.0 adult walleye per net) than in either the Northeast or Northwest Region (1.5 and 3.2 adult walleye per net respectively). The low abundance of walleye in the south can likely be attributed to the higher prevalence of stressors, including higher angler effort, compared to walleye populations in the north.

The age structure of southern Ontario walleye populations is also cause for concern. In general, fewer age classes were represented, and the average maximum age was low. Walleye in Southern Region

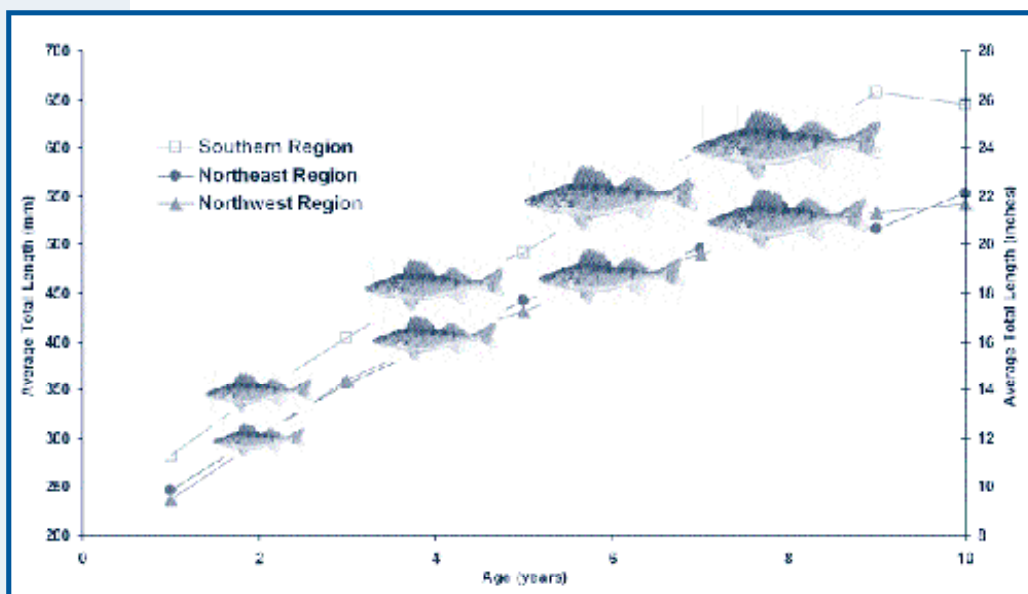


Figure 2: Growth rates of walleye (total length at age) based on Fall Walleye Index Netting (FWIN) data from each Region. Walleye in Southern Region grow more rapidly than do walleye from northern populations.

DETERMINING THE STATE OF THE WALLEYE RESOURCE IN SOUTHERN ONTARIO

continued

generally do not live as long as those in the north, and many older age classes are absent from the population. The average maximum age observed in the south (12 years old) is three years less than the northeast (15 years old) and four years less than the northwest (16 years old). Southern populations averaged two fewer age classes (6 age classes) than those in the northeast (8 age classes), and four fewer than the northwest (10 age classes). The lower number of age classes and lower maximum age observed in the south are likely related to the greater amount of stress on southern populations.

A spawning population spread across a number of year-classes is important for the long-term stability of a population. The Spawner Diversity Index provides a measure of the diversity of adult female age classes. The index values range from zero to one. A value near one indicates a population where the adult female population is abundant and well balanced among a large number of age classes. A value near zero is typical of a population where the abundance of the adult female population is low, and dominated by very few age classes, with many weak or entirely absent. Both the Southern Region (0.49) and Northeast Region (0.58) walleye populations fall below the threshold value for healthy walleye populations (0.66); whereas the Northwest Region is slightly higher (0.67).

The combination of these parameters (abundance, growth rates, age structure, and spawner diversity index) can assist biologists in classifying the status of the population. When viewed across the region, biologists get a 'snapshot' of the status of the walleye resources on a landscape scale. The Southern Region has fewer walleye; and more importantly fewer large, adult females than those in the Northeast or Northwest Regions. These characteristics are often associated with stressed or unhealthy walleye populations. High catch rates occurred more frequently in the north, particularly the Northwest Region (Figure 4). More than 60% of FWIN surveys in Southern Region had catch rates of less than 2 walleye per net. Very few surveys (three) had catch rates greater than 10 walleye per net in Southern Region. These catch rates were common in the northern regions, especially in the Northwest. The low abundance of walleye observed in Southern Region appears to be related to the increased stressors that these populations face, in particular increased angler harvest. ■

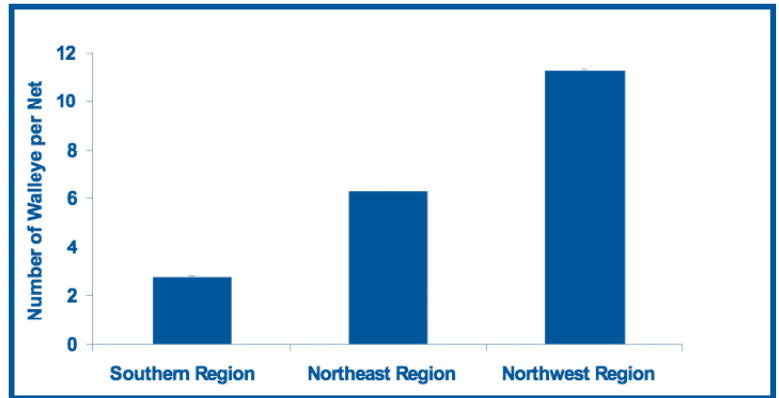


Figure 3: Comparison of walleye abundance (number per net) among regions of Ontario based on Fall Walleye Index Netting (FWIN).

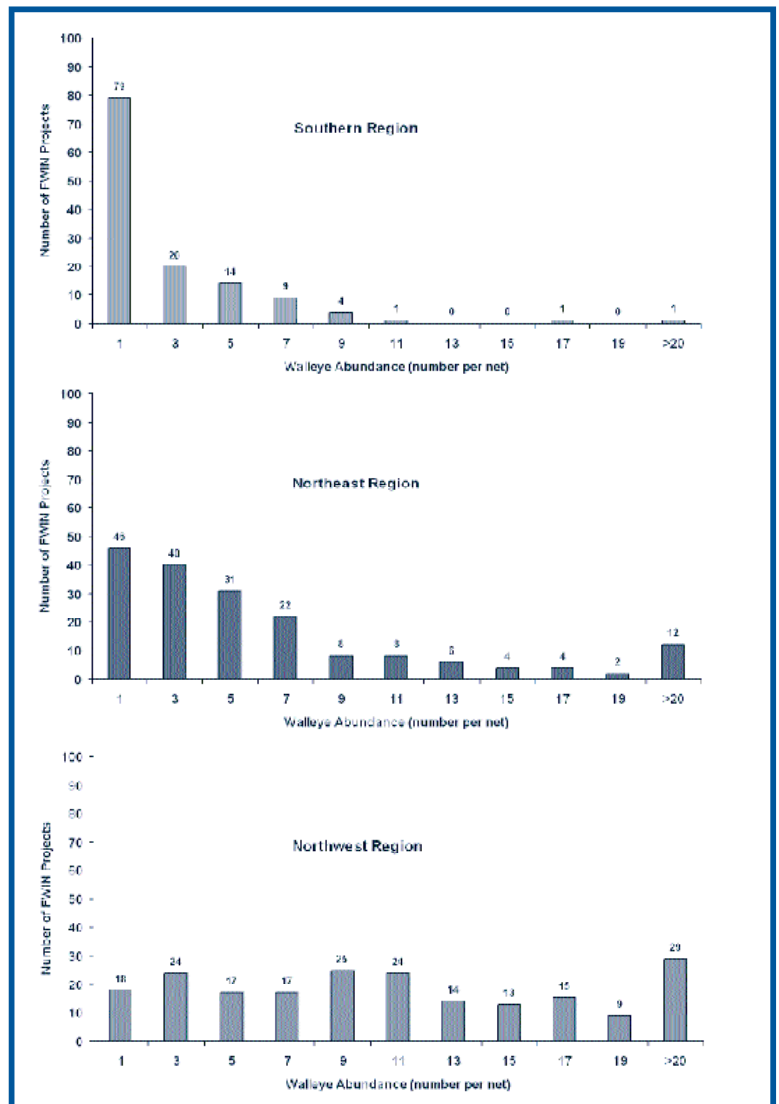


Figure 4: Summary of the results from Fall Walleye Index Netting (FWIN) surveys in MNR Regions by abundance (number per net). The number of lakes in a particular abundance category is indicated by the number above each bar.

SOUTHERN REGION WALLEYE MANAGEMENT REVIEW

MNR has worked with volunteers and fishing clubs on projects ranging from the rehabilitation of walleye spawning beds to the rearing and stocking of walleye. These efforts have been valuable but will not sustain walleye populations without further actions. One approach taken by fisheries managers to address a declining population was to attempt to enhance it through artificial stocking. Supplementary stocking of walleye (stocking over top of an existing population) has been shown to be generally ineffective in increasing walleye populations, regardless of whether the existing population is native or introduced. Young walleye become cannibalistic within a few weeks of hatching, particularly in areas with high walleye fry density. If natural walleye have a size advantage over hatchery-reared fish, they will prey upon their smaller, stocked cousins. Similarly, if the walleye are stocked at a larger size they will feed heavily on the smaller native fish. Most importantly, however, supplemental stocking does not address the reasons that walleye populations have declined in the first place.

Fisheries managers now understand that easy access, lengthy open seasons, high catch-and-possession limits, and lack of size limitations have resulted in harvest levels that have degraded southern walleye populations, particularly in waters close to urban centres. MNR is initiating a review of recreational fishing regulations for walleye in Southern Region to establish regulations that will promote healthy walleye populations.

MNR is reviewing walleye regulations in southern Ontario and seeks your input

As part of our commitment to public consultation on fish and wildlife management, MNR is seeking input from anglers, tourist operators, and other interested individuals, during the *Southern Region Walleye Management Review*. MNR will work with stakeholders and the public to provide healthy, sustainable walleye populations in southern Ontario, and a healthier natural environment. In early 2005, MNR will be inviting representatives from various stakeholder groups to form a committee which will provide input to walleye management in Southern Ontario.

MNR will be hosting public Information Centres at several locations in Southern Region during the summer of 2005. The purpose of these Information Centres will be to provide background information on the health of walleye populations in the region, as well as to discuss potential management options. Members of the public will be invited to provide comments and concerns related to the various options. This will help MNR ensure that new regulations promote healthy, sustainable walleye populations that provide improved angling opportunities for the people of Ontario. ■



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