

2005 Lake St. Lawrence Warmwater Fisheries Assessment

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A cooperative fisheries assessment program for Lake St. Lawrence was initiated between the New York State Department of Environmental Conservation (NYSDEC) and the Ontario Ministry of Natural Resources (OMNR) in 1986. This program originated as an extension of the Thousand Islands and Middle Corridor assessment programs and is intended to measure long term trends in relative abundance, growth, age structure and condition of the fish community. Since 1996 the Lake St. Lawrence program has been maintained by NYSDEC.

Methods

A new standard gear was adopted for this assessment in 2005 to standardize with the Thousand Islands assessment of NYSDEC and OMNR. Gill nets were converted from multifilament to monofilament utilizing the same mesh dimensions, hanging ratios, and panel height/length of the previous net. Monofilament gill nets measuring 200 ft (61 m) long by 8 ft (2.4 m) deep having eight panels measuring 25 ft (7.6 m), with mesh arranged in increasing size from 1.5-6 in (38-152 mm) stretch measure were used.

Gill nets were set overnight and fished an average of 18.3 hours at standard New York (n=16) and Ontario (n=16) sites described by Klindt and Town (2002). Net sites were stratified in equal number by depth as shallow and deep (12-25 ft. and 30-50 ft., respectively). Total and species specific catch per unit effort (CUE; catch per gill net night) were calculated. Data were not corrected for change in sampling gear, and were entered into the NYSDEC Statewide Fisheries Database.

Data collected from fish included total length (TL), weight, sex, and stage of maturity. Scale samples were taken from percids and centrarchids for age analysis. Cleithra were removed from northern pike for more reliable age determination.

Results and Discussion

The 2005 Lake St. Lawrence assessment was conducted from 12 to 14 September. Surface water temperatures ranged from 71-72° F (21-22° C). A sample of 518 fish comprising 18 species was collected (Table 1). One specimen each of silver lamprey (*Ichthyomyzon unicuspis*) and round goby (*Neogobius melanostomus*) were collected but do not appear in Table 1. The catch was dominated by yellow perch (27.2%), smallmouth bass (26.2%), and rock bass (21.0). Total CUE increased by 67% from 2004 to 16.19 fish/net/night, which remains below the long-term average of 17.0 (Figure 1). Increased total CUE is possibly due to some anomalous survey catches in 2004 related to cooler than usual water temperatures. Yellow perch alone account for 59% of the reduction in total CUE in 2004.

Yellow perch CUE increased 149% from 1.78 fish/net/night in 2004 to 4.44 in 2005 (Figure 2). In 2004, reduced CUE affected all sizes and ages of yellow perch, suggesting that 2004 catches were anomalous (Figures 3 & 4 respectively). The increase could also be attributable to increased catchability of yellow perch (up to 36%), as reported by McCullough (2005) in the Thousand Islands using identical monofilament nets.

Localized impacts on yellow perch populations from predation by Double-crested cormorants (*Phalacrocorax auritus*) have been reported previously in Lake St. Lawrence (Klindt and Town 2003, 2004, 2005). Regurgitated cormorant pellets were collected in 2005 from Strachan Island, located in the lowermost portion of the fisheries assessment area. Pellet analysis described by Johnson et al. (2006) indicated that diet was comprised predominantly of yellow perch (50.3%). Total number of yellow perch consumed at the colony in 2005 was estimated at 1.02 million, an increase of approximately 10% from the 2004 estimate of 0.93 million (Johnson

et al. 2005) . The number of active nests at Strachan Island increased from 244 in 2004 to 281 in 2005 (J.Farquhar, NYSDEC, pers. communication).

Gill net sites were stratified by distance from the nesting colony as described by Klindt and Lantry (2001). Yellow perch CUEs for “upriver” (>7.75 mi) and “colony” (within 7.75 mi) net strata were 3.24 and 5.80, respectively (Figure 5), a dramatic increase in both from 2004. The CUE differential between the upriver and colony strata is the largest observed since 1994. Pellet analysis showed an increase in round goby consumption from 1.7% of the diet in 2004 to 19.6% in 2005 (Johnson et al. 2005, 2006). The resurgence in the “colony” strata CUE may be a result of cormorant prey selectivity in favor of goby over yellow perch. Continued goby expansion may aid in yellow perch recovery as cormorants have been shown to feed almost exclusively on goby where high densities exist in Lake Ontario (Ross et al., 2005).

Smallmouth bass CUE has been relatively stable since 1998, but increased to 4.28 fish/net/night in 2005, well above the long term average of 2.34 fish/net/night (Figure 6). Gear change may be responsible for increased CUE, as increased catches were generally experienced across age and size distributions (Figures 7 and 8). In addition, young-of-the-year (YOY) smallmouth and largemouth bass, which typically are not collected in this assessment, were captured in record numbers in 2005 (n=11 and 9, respectively). Presence of YOY bass of both species may indicate potentially strong 2005 year classes, or increased catchability with monofilament nets.

Mean length of smallmouth bass at age-6 in Lake St. Lawrence continues to increase (Figure 9) as reported by Klindt and Town (2005), and was 15.9 inches in 2005. A similar trend has been reported for smallmouth bass in the Thousand Islands (McCullough and Town 2004) and in Lake Ontario (Chrisman and Eckert 1998). Increased round goby abundance in the survey area may improve foraging opportunities and increase growth rates of bass and other piscivores in Lake St. Lawrence.

Walleye CUE (1.44) increased by 100% from 2004 and has risen above the long term average of 1.22 fish/net/night (Figure 10). Age-1 and 2 fish dominated the catch in 2005 (Figure 12) suggesting strong 2003 and 2004 year classes. The length-frequency distribution of the walleye catch appears in Figure 11.

Northern pike CUE (0.44) decreased slightly from 2004 to 0.44 fish/net/night, below the long term average of 0.52 (Figure 13). Total length of northern pike ranged from 9.3-33.4 inches (Figure 14). The catch was evenly distributed over a wide range of year classes (Figure 15). Netting strata were not designed to take advantage of limited littoral zone habitat, therefore northern pike are poorly represented in this assessment.

References

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