Lake Trout Working Group Report
Lake Michigan Committee Meeting
March 23, 2010 – Windsor, ON

This report provides a brief overview of the status of lake trout populations and restoration efforts in Lake Michigan. It provides a quick, graphical representation of pertinent data, and is structured to review the population objectives articulated in *A Lake Trout Restoration Guide for Lake Michigan* (Bronte et al. 2008*).* The objectives generally follow the ontogeny of lake trout and recommend population benchmarks to increase the probability of significant and sustained natural reproduction by hatchery-reared fish. Graphical presentations provide current measures within a time series (when available) and compare current values with target values to gauge progress towards restoration.

Bronte, C. R., C. C. Krueger, M. E. Holey, M. L. Toneys, R. L. Eshenroder, and J. L. Jonas. 2008. A guide for the rehabilitation of lake trout in Lake Michigan. Great Lakes Fishery Commission, Misc. Publ. 2008-01, Ann Arbor, MI.

Overall Goal: In targeted rehabilitation areas, reestablish genetically diverse populations of lake trout composed predominately of wild fish able to sustain fisheries.

<u>Objective 1 (Increase genetic diversity):</u> Increase the genetic diversity of lake trout by introducing morphotypes adapted to survive and reproduce in deep-water, offshore habitats, while continuing to stock shallow-water morphotypes.

Results: Klondike Reef strain from Lake Superior has been recommended for introduction to deep-water habitats; the LMC has decided that a limited number should be stocked experimentally in the near future. Lean lake trout from Seneca Lake (Finger Lakes, NY), Apostle Islands (Lake Superior), and Lewis Lake (Lake Michigan remnant) have been selected as the primary lean lake trout strains. Additionally, a remnant, nearshore form of lean lake trout from Parry Sound (Lake Huron) is being raised in FWS hatcheries and should be available for stocking in 2013.

<u>Objective 2 (Increase overall abundance):</u> By 2014, increase densities of lake trout populations in targeted rehabilitation areas to levels observed in other Great Lakes locations where recruitment of wild fish to the adult population has occurred. To achieve this objective, CPUE in spring assessments should consistently exceed 25 lake trout/1000 feet of graded-mesh (2.0 – 6.0 inch) gill net fished.

Results: Spring gill net assessments in 2009 indicate that overall abundance remain substantially below the target level of 25 lake trout/1000 ft of net (horizontal line) lakewide (Figures 1 and 2). In most areas, abundance is well below the target level (Figure 3). However, abundance has, at times, approached or exceeded the target level in a few statistical districts and in the Southern Refuge.

Figure 1. Lakewide relative abundance of lake trout (mean number of fish/1000 ft of graded mesh gill net), spring 1998-2009.

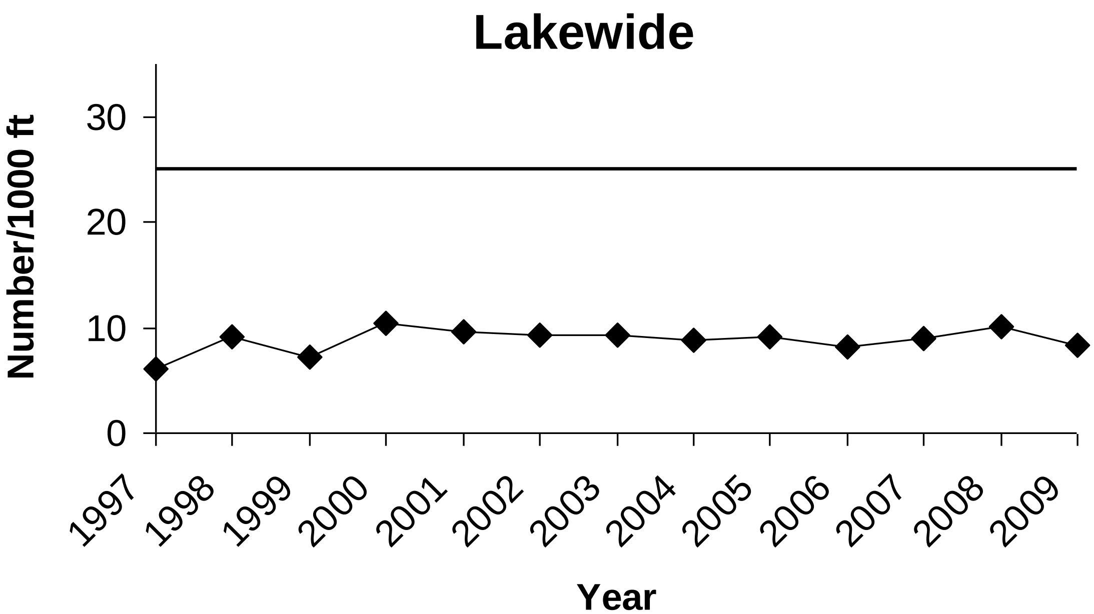


Figure 2. Statistical districts for lake trout management in Lake Michigan.

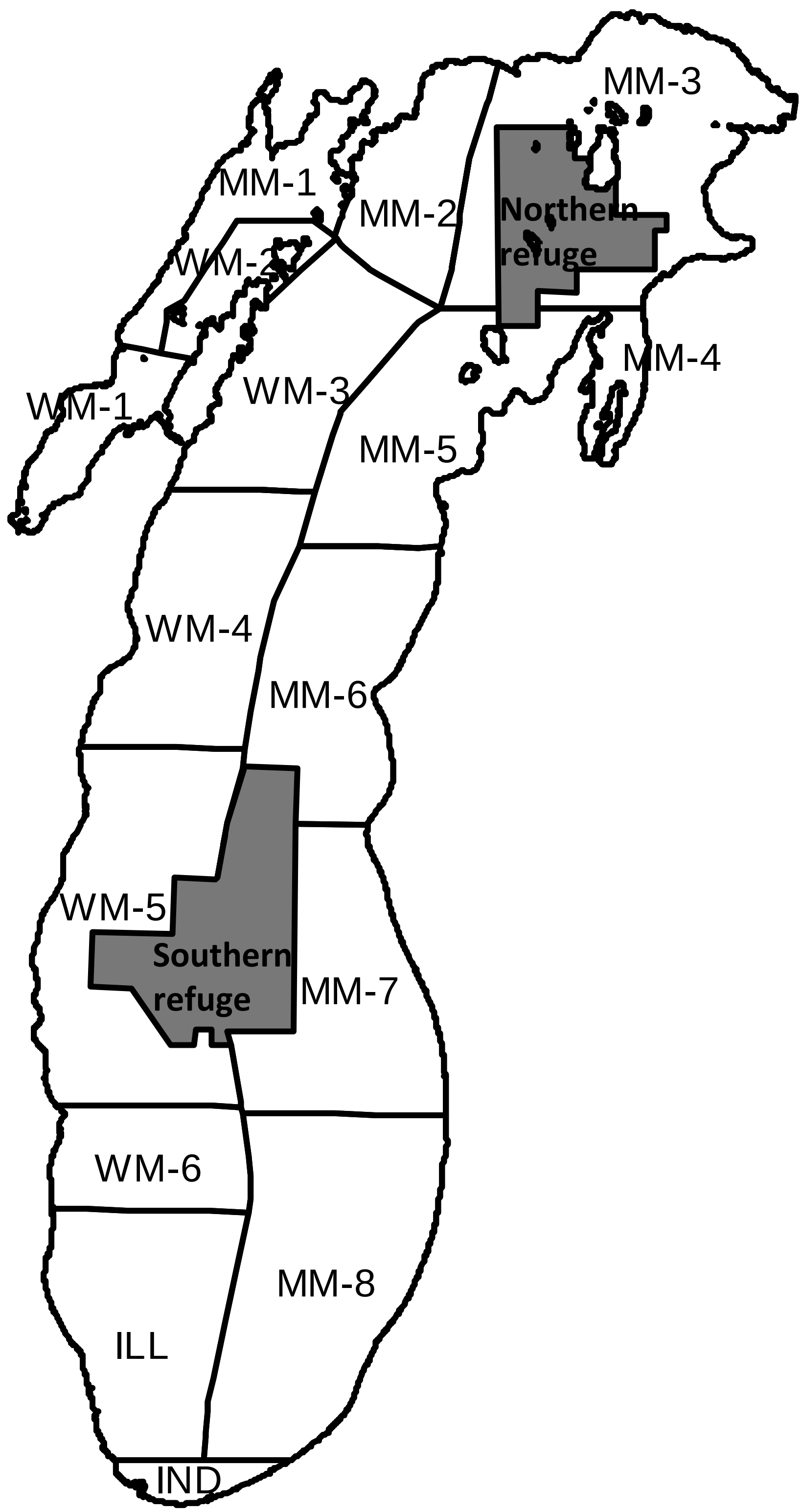
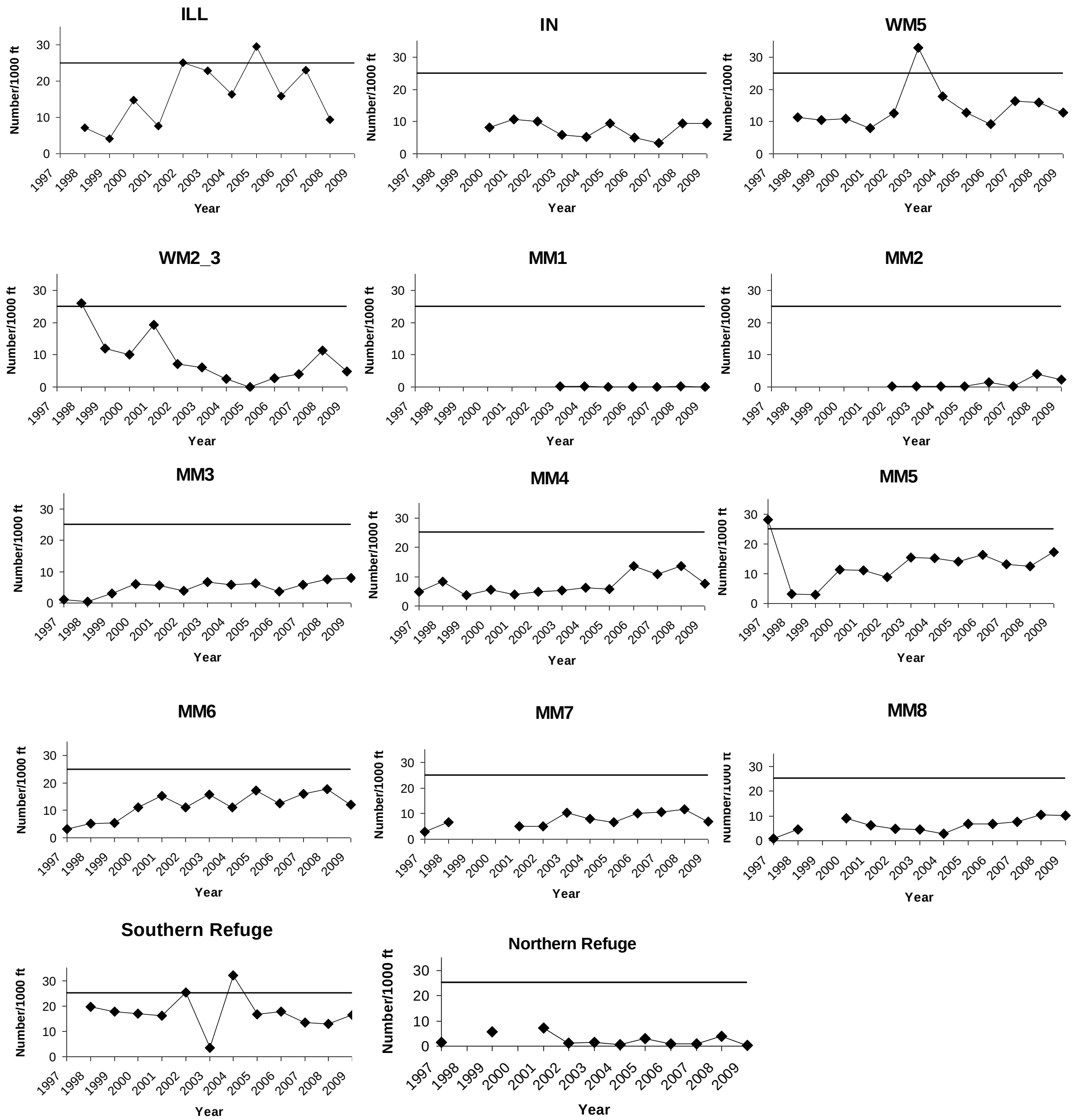


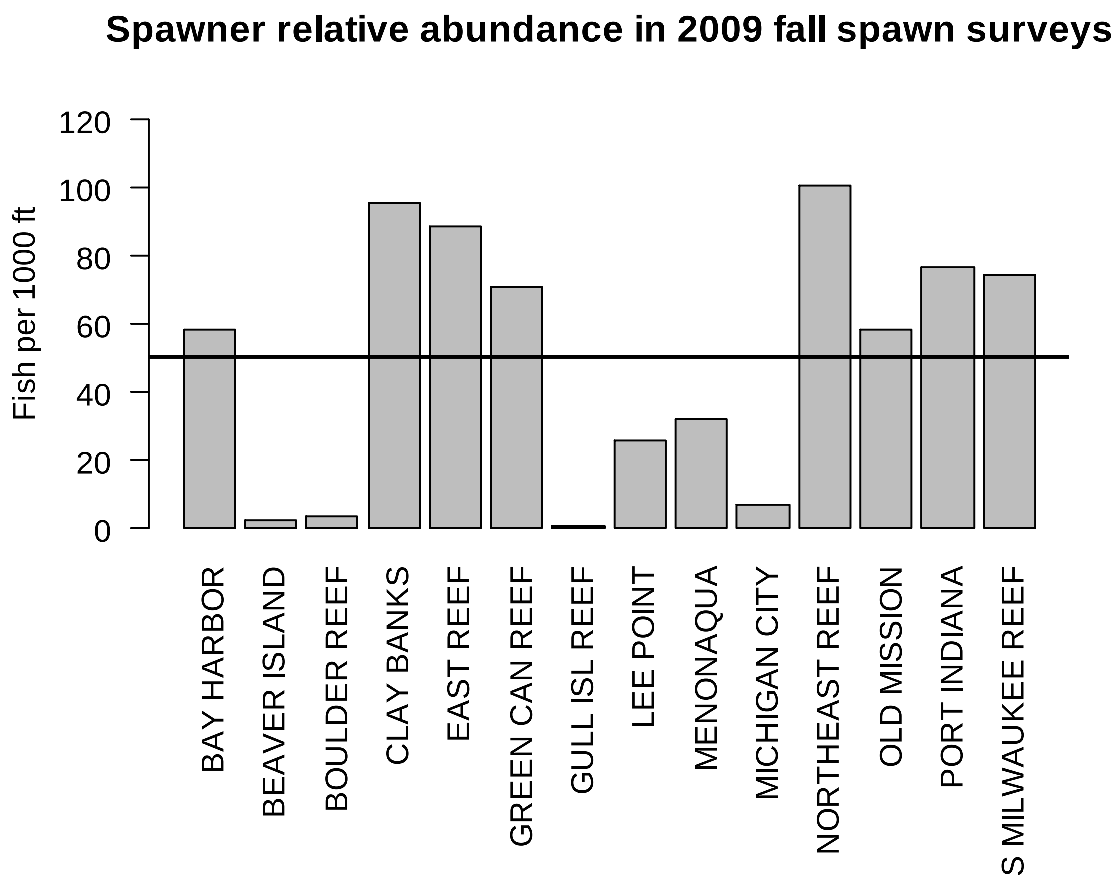
Figure 3. Relative abundance of lake trout (mean number of fish/1000 ft of graded mesh gill net) by statistical district and refuge, spring 1998-2009.



Objective 3 (Increase adult abundance): By 2020, achieve densities of spawning adult lake trout in targeted rehabilitation areas comparable to those observed in other Great Lakes locations where recruitment of wild fish to the adult population has occurred. To achieve this objective, CPUE in fall assessments should consistently exceed 50 fish/1000 ft of graded-mesh (4.5-6.0 inch) gill net fished.

Results: Of the 14 spawning areas sampled during fall 2009, 8 areas met or exceeded the target (Figure 4). In other areas, abundance of adult fish is low and likely inadequate to result in egg deposition rates sufficiently high to overcome impediments to rehabilitation. The lowest spawner abundances were measured at Beaver Island, Boulder Reef, and Gull Island Reef within the Northern Refuge. These low abundances could be attributed, at least in part, to reduced stocking rates during 1995-2008.

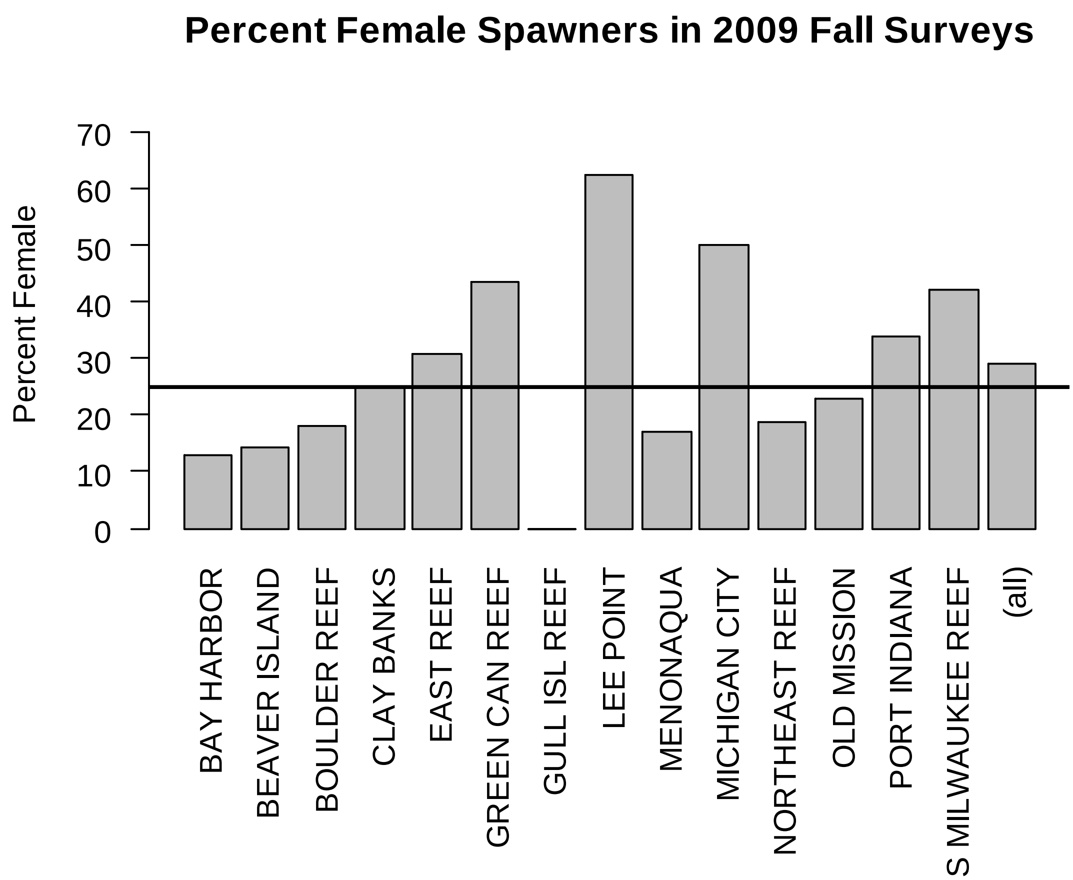
Figure 4. Relative abundance of lake trout spawners by location in 4.5-6.0 inch mesh gill nets in fall 2009.



Objective 4 (Build spawning populations): By 2024, spawning populations in targeted rehabilitation areas stocked prior to 2008 should be at least 25% females and contain 10 or more age groups older than age 7. These milestones should be achieved by 2032 in areas stocked after 2008.

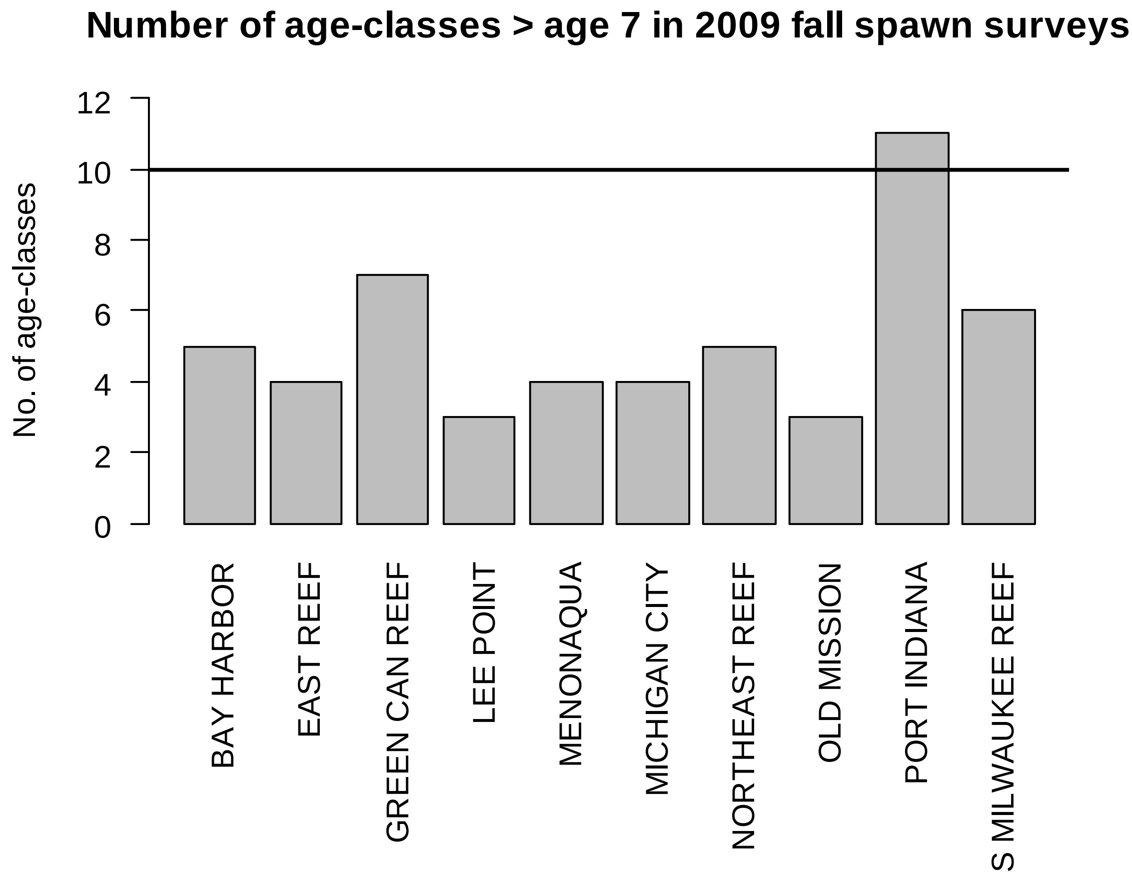
Results: Half of the sites sampled during fall 2009 exceeded the target for female percentage (Figure 5). Most of these were located in the central or southern portions of Lake Michigan.

Figure 5. Percentage of fall spawners that were female by location, fall 2009.



Age compositions of spawning lake trout at sites sampled during fall 2009 were well below those required to meet restoration targets. Only one site in southern Lake Michigan at the Port of Indiana met the target of 10 or more age-classes older than age 7 (Figure 6). However, it should be kept in mind that not all of the coded-wire tag (CWT) data for 2009 were available at the time of this report being written. In previous years, the fall catch of lake trout spawners in the Southern Refuge of Lake Michigan included more than 10 age-classes older than age 7.

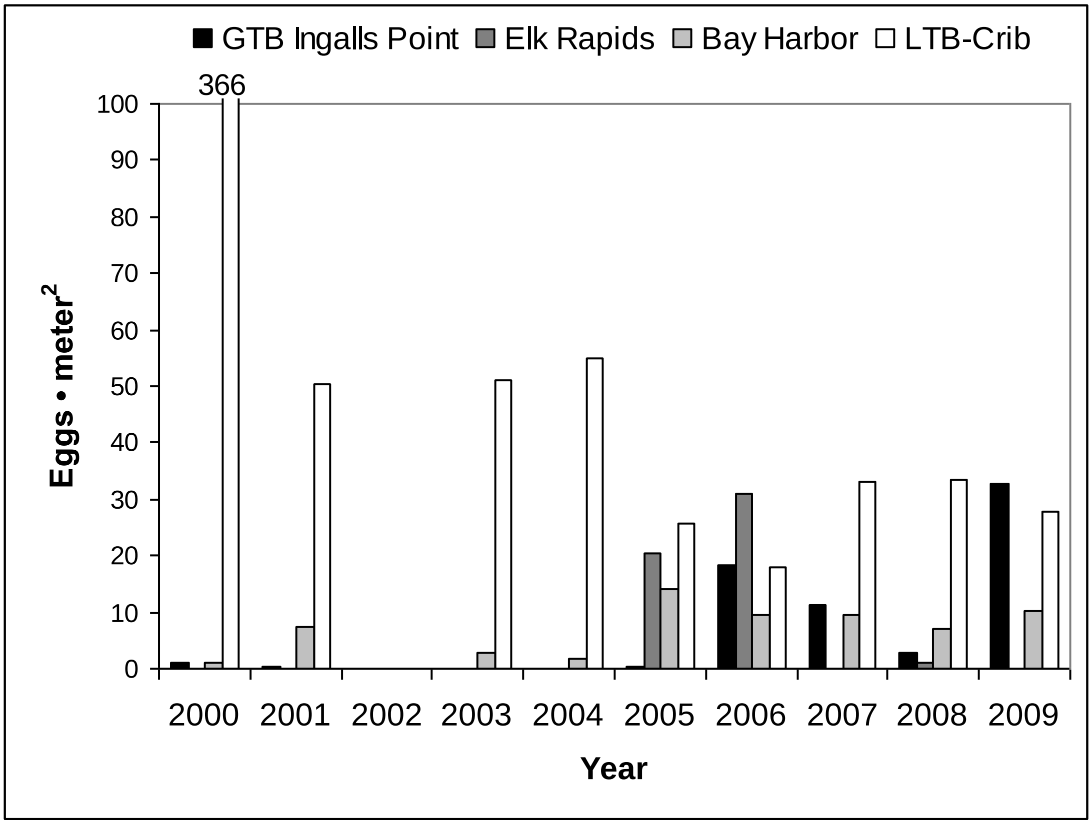
Figure 6. Number of age-classes older than age 7 in spawner surveys by location, fall 2009.



<u>Objective 5 (Detect egg deposition):</u> By 2021, detect a minimum density of 500 viable eggs/m^2 (eggs with thiamine concentrations > 4 nmol/g) in previously stocked areas. This milestone should be achieved by 2025 in newly stocked areas.

Results: Egg deposition rates remain low in northern Lake Michigan, where the measured densities of lake trout eggs are consistently less than 60 eggs/m^2 (Figure 7).

Figure 7. Numbers of lake trout eggs observed per square meter in northern Lake Michigan fall egg deposition surveys. Egg deposition was measured using standard egg bag methodologies (Jonas et al.2005).

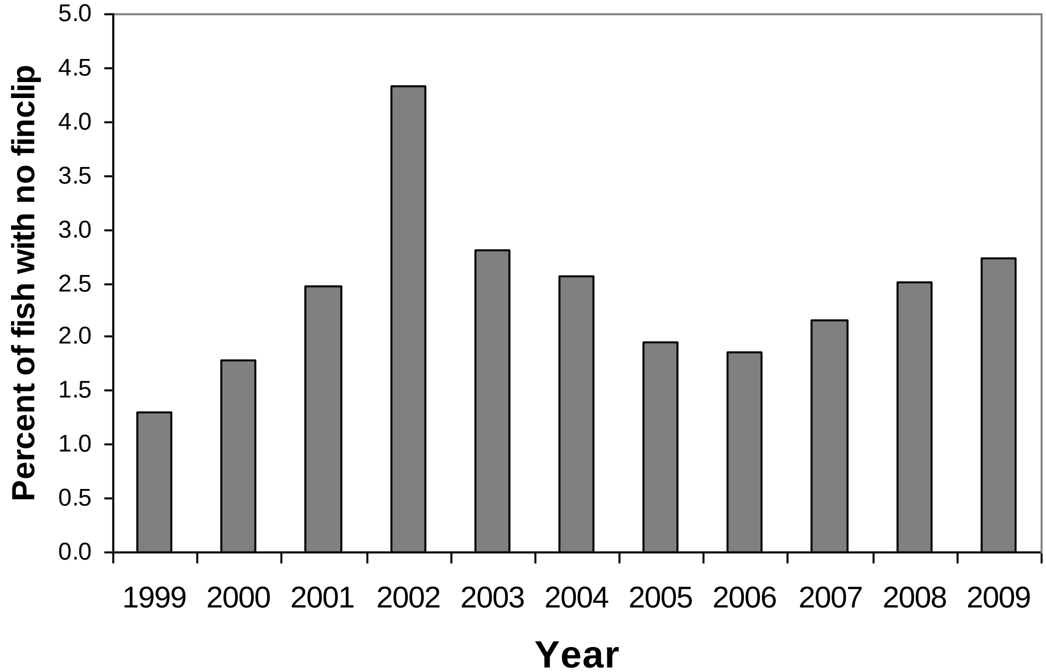


Jonas, J. L., R. M. Claramunt, J. D. Fitzsimons, J. E. Marsden, and B. J. Ellrott. 2005. Estimates of egg deposition and effects of lake trout (*Salvelinus namaycush*) egg predators in three regions of the Great Lakes. Canadian Journal of Fisheries and Aquatic Sciences 62(10):2254-2264.

<u>Objective 6 (Detect recruitment of wild fish):</u> Consistent recruitment of wild lake trout in targeted rehabilitation areas should occur as follows: by 2022 detect age-1 fish in bottom trawls, by 2025 detect age-3 fish in spring graded-mesh-gill-net assessments, and by 2028 consistently detect sub-adults.

Results: Less than 3% of lake trout of all ages captured during spring 2009 were those that had no fin clip, which indicates little natural reproduction (Figure 8). Additionally, since 1973, less than 2% of the lake trout captured annually in the USGS fall bottom trawl surveys were unclipped fish.

Figure 8. Percentage of lake trout captured in spring without fin clips. Lack of a fin clip may suggest that the fish was produced in the lake.



<u>Objective 7 (Achieve restoration):</u> By 2037, 75% or more of the lake trout in deep- and shallow-water habitats should be age-10 and younger and of wild origin.

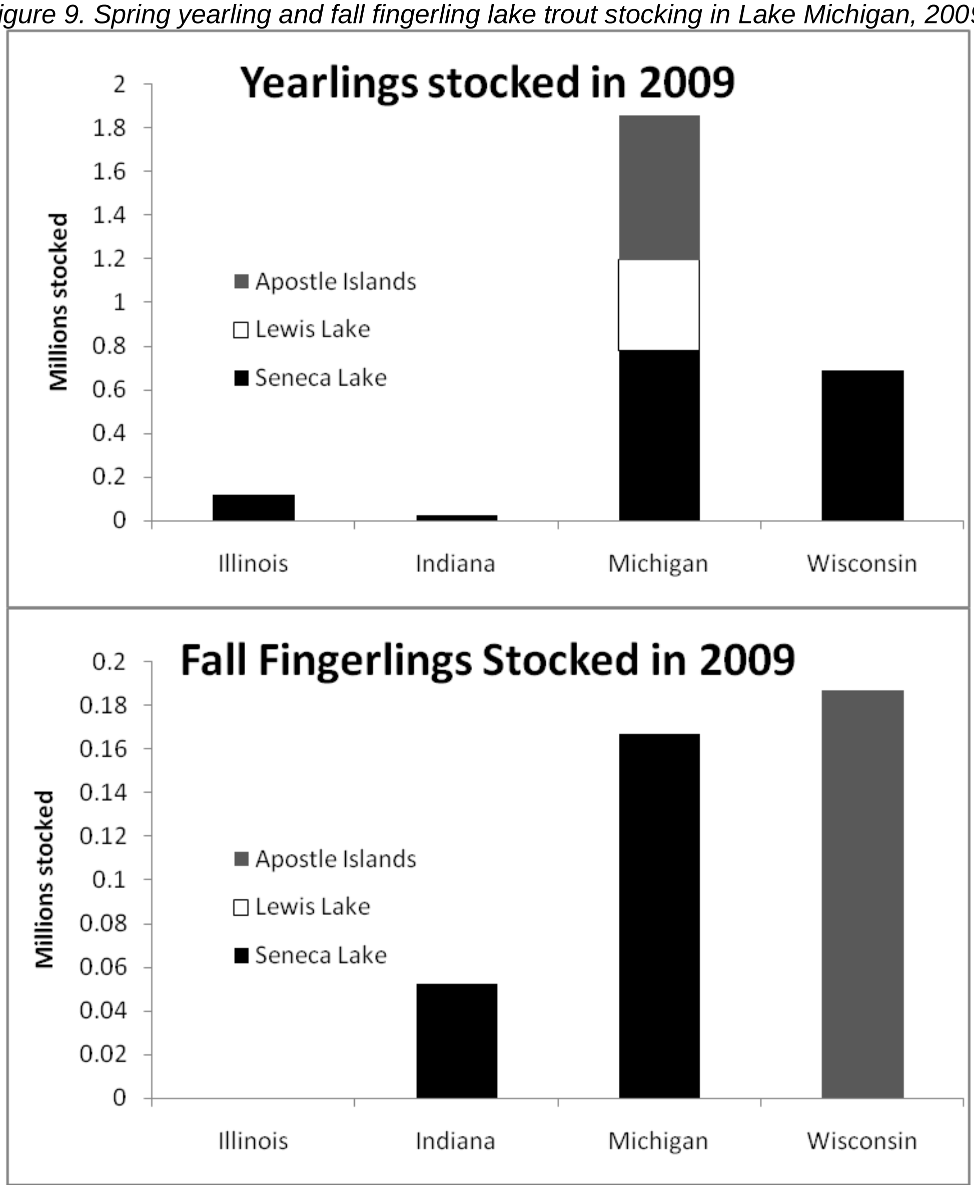
Results: Populations far from targets.

Lake trout stocking

The U. S. Fish and Wildlife Service stocked a total of 2.69 million yearling (14-16 months old) lake trout into Lake Michigan in 2009. Stocking totals for each state jurisdiction were 118,160 in Illinois, 22,267 in Indiana, 1,859,777 in Michigan, and 690,455 in Wisconsin (Figure 9). All yearling fish received a RP fin clip. No lake trout with an AD fin clip and coded wire tags (ADCWT) were stocked into Lake Michigan during 2009. The stocked yearling lake trout consisted of three strains: Apostle Islands, Lewis Lake, and Seneca Lake. Additionally, 406,000 fall fingerlings of two strains (Apostle Islands and Seneca Lake) were stocked into Indiana (52,160), Michigan (167,052), and Wisconsin (186,788) waters (Figure 9). The fall fingerlings received a LPRV fin clip. Details on lake trout stocking can be found in:

Hanson, D. 2010. Stocking summary for Lake Michigan 1976-2009. LMC report.

Figure 9. Spring yearling and fall fingerling lake trout stocking in Lake Michigan, 2009.



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