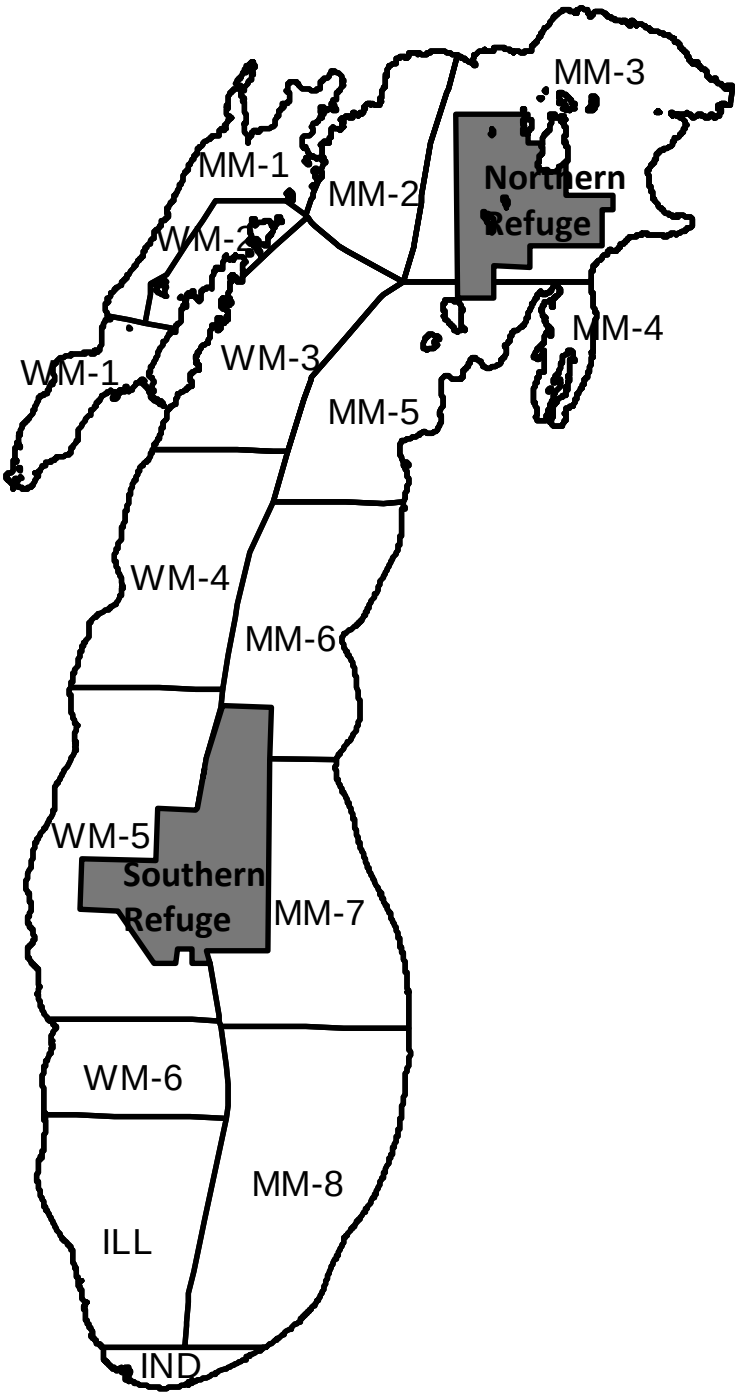
2012 Lake Michigan Lake Trout Working Group Report



Lake Michigan Committee Meeting
March 19, 2013
Duluth, Minnesota

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.

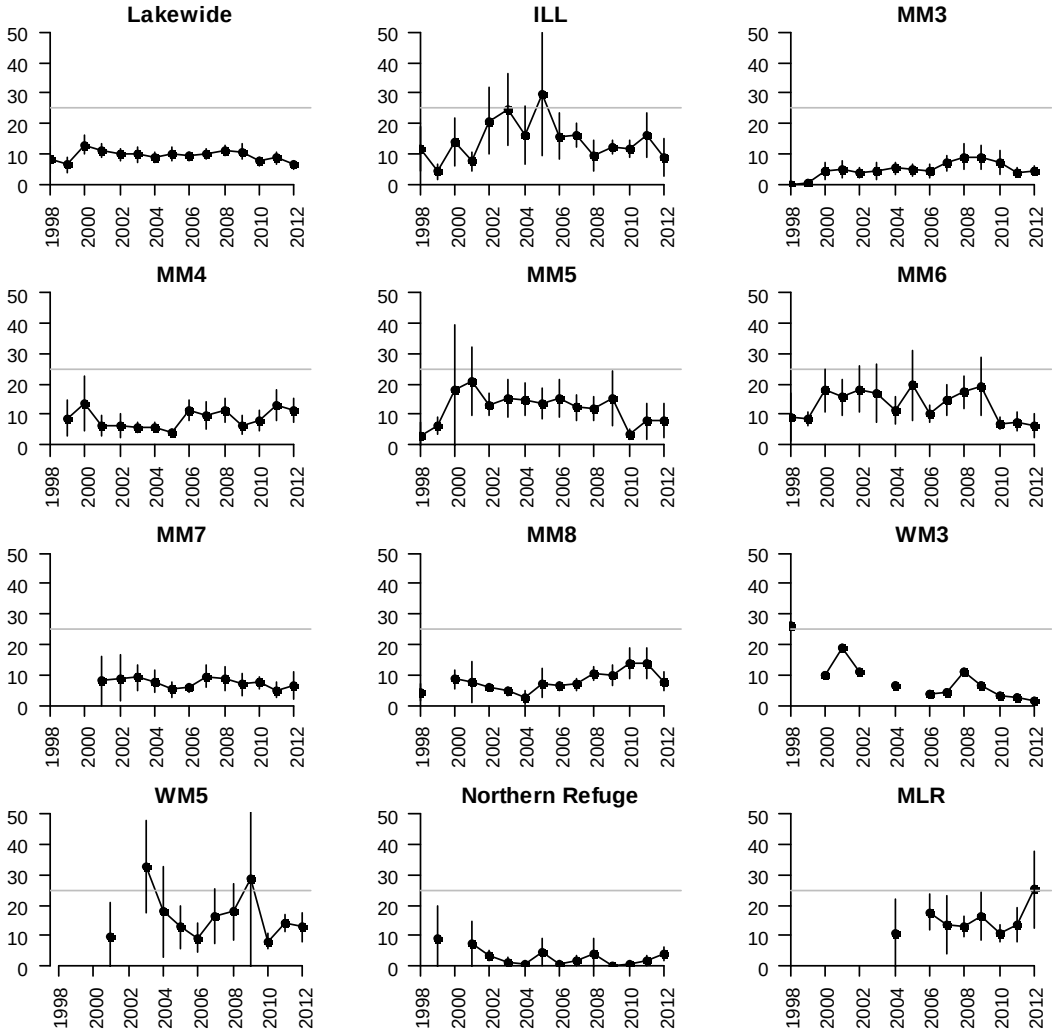
Objective 1 (Increase genetic diversity): Increase the genetic diversity of lake trout by introducing morphotypes adapted to survive and reproduce in deep-water, offshore habitats, while continuing to stock shallow-water morphotypes.

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. In 2012, about 80,000 Klondike Reef strain yearlings were stocked on Northeast Reef in the Mid-lake Refuge (MLR), also known as the Southern Refuge. 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) has been raised in USFWS hatcheries and is scheduled to be stocked into Lake Michigan during 2013.

Objective 2 (Increase overall abundance): 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 2012 indicated that overall abundance remains substantially below the target level of 25 lake trout/1000 ft of net (horizontal line) lakewide (Figure 1). In most areas, abundance was well below the target level. However, abundance has, at times, approached or exceeded the target level in a few statistical districts (Illinois waters, MM-5, MM-6, and WM-5) and in the MLR. According to the spring assessments, lakewide lake trout abundance decreased from about 9 fish/1000 ft in 2011 to about 7 fish/1000 fit in 2012 (Figure 1).

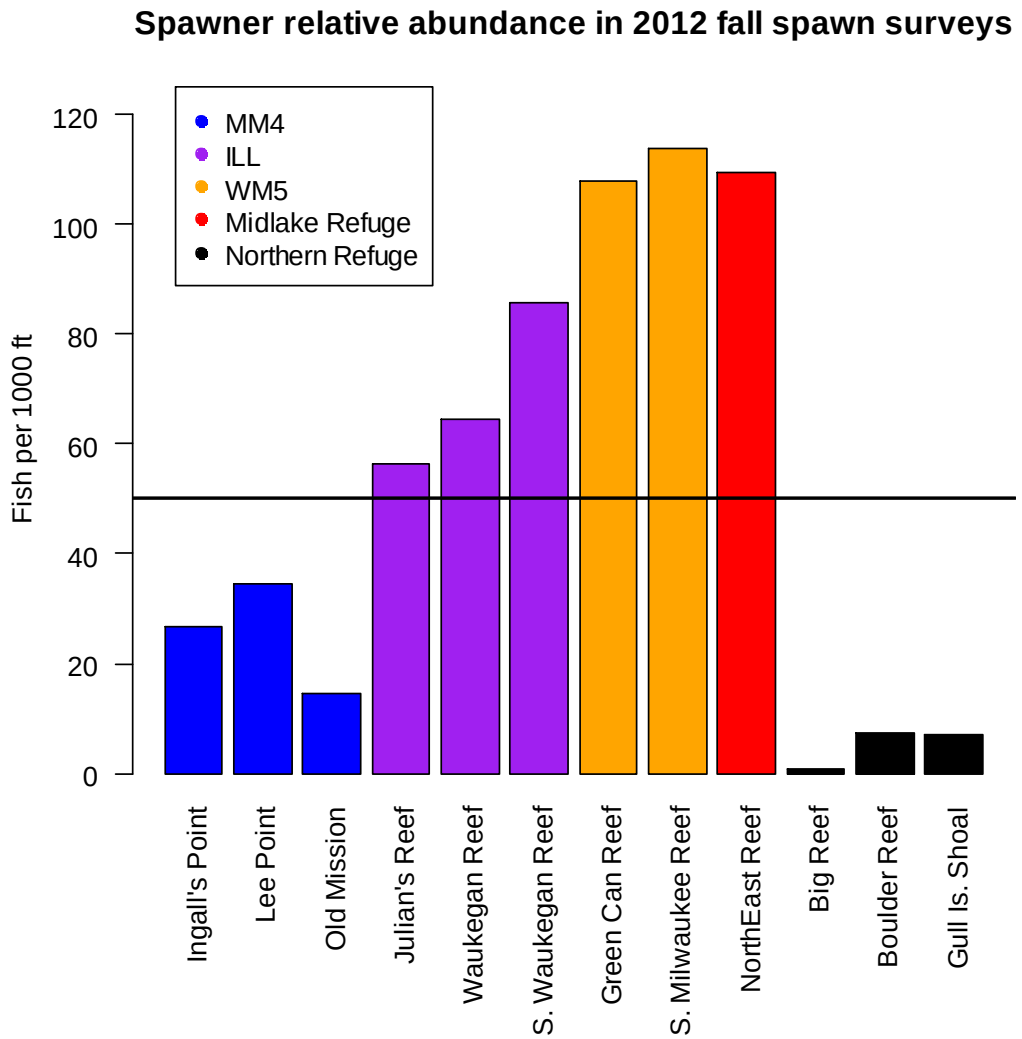
Figure 1. Spring survey lake trout catch per effort (mean number of fish/1000 ft of graded mesh gill net) for Lake Michigan statistical districts and refuges, 1998-2012. Error bars represent the mean ± 2 standard errors.



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 12 spawning areas sampled during fall 2012, 6 areas met or exceeded the target (Figure 2). In some areas, abundance of adult fish is low and may not be adequate to result in egg deposition rates sufficiently high to overcome impediments to rehabilitation. The lowest spawner abundances were measured at Big Reef, Boulder Reef, and Gull Island Reef within the Northern Refuge. These low abundances could be attributed, at least in part, to reduced stocking rates within the Northern Refuge during 1995-2008.

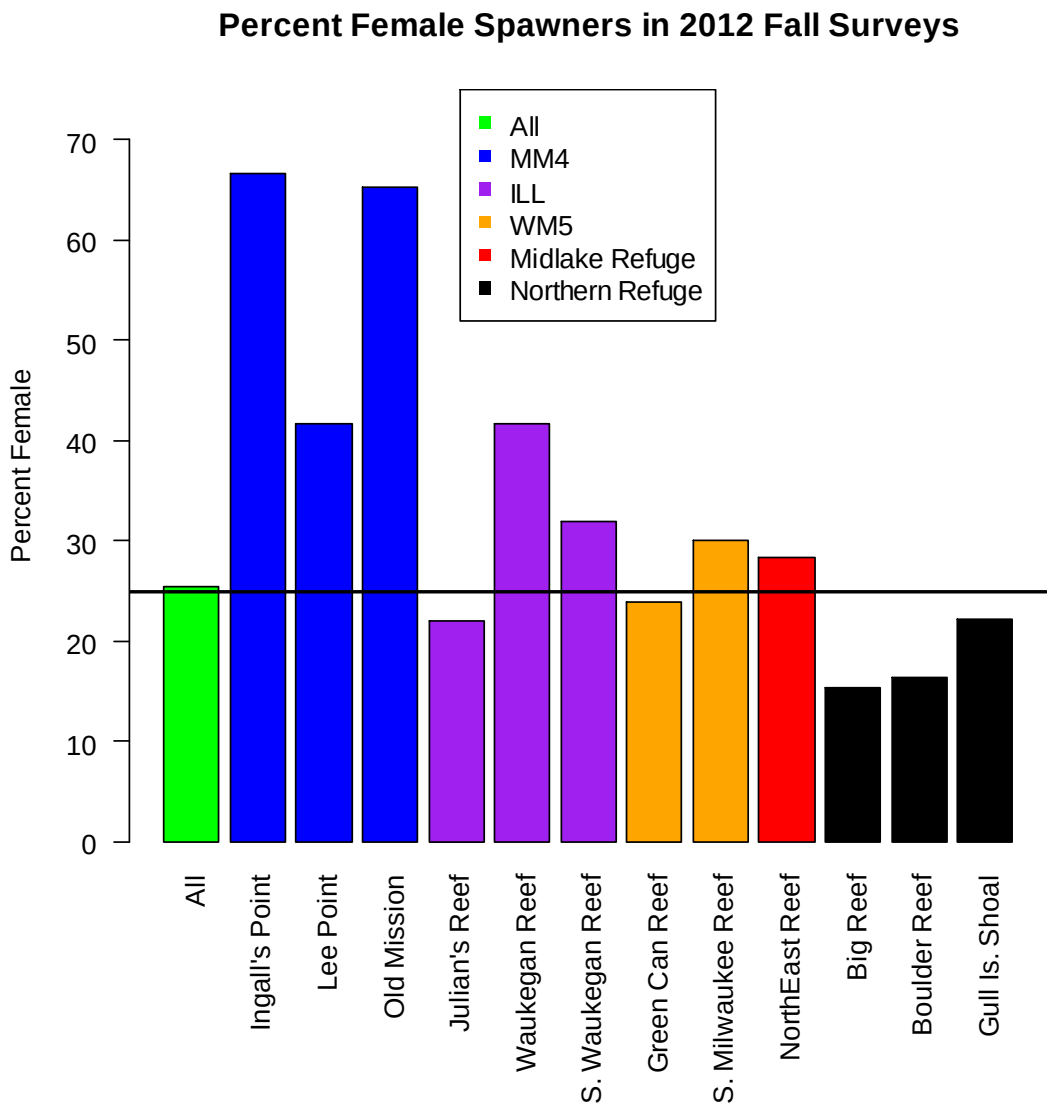
Figure 2. Relative abundance of lake trout spawners, by reef, in 2012 fall spawner surveys (4.5-6.0 inch mesh gill nets). Horizontal black line represents the LTWG fall survey benchmark of 50 fish per 1000 ft of gill net.



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: On average, the percentage of females in the fall spawner surveys conducted during 2012 exceeded the benchmark value of 25% (Figure 3). Moreover, the percentage of females in the fall spawner catch during 2012 exceeded 25% at 7 of the 12 locations included in the plot.

Figure 3. Percentage of fall spawners that were female by location, fall 2012. Horizontal black line represents the LTWG fall survey benchmark value of 25%.

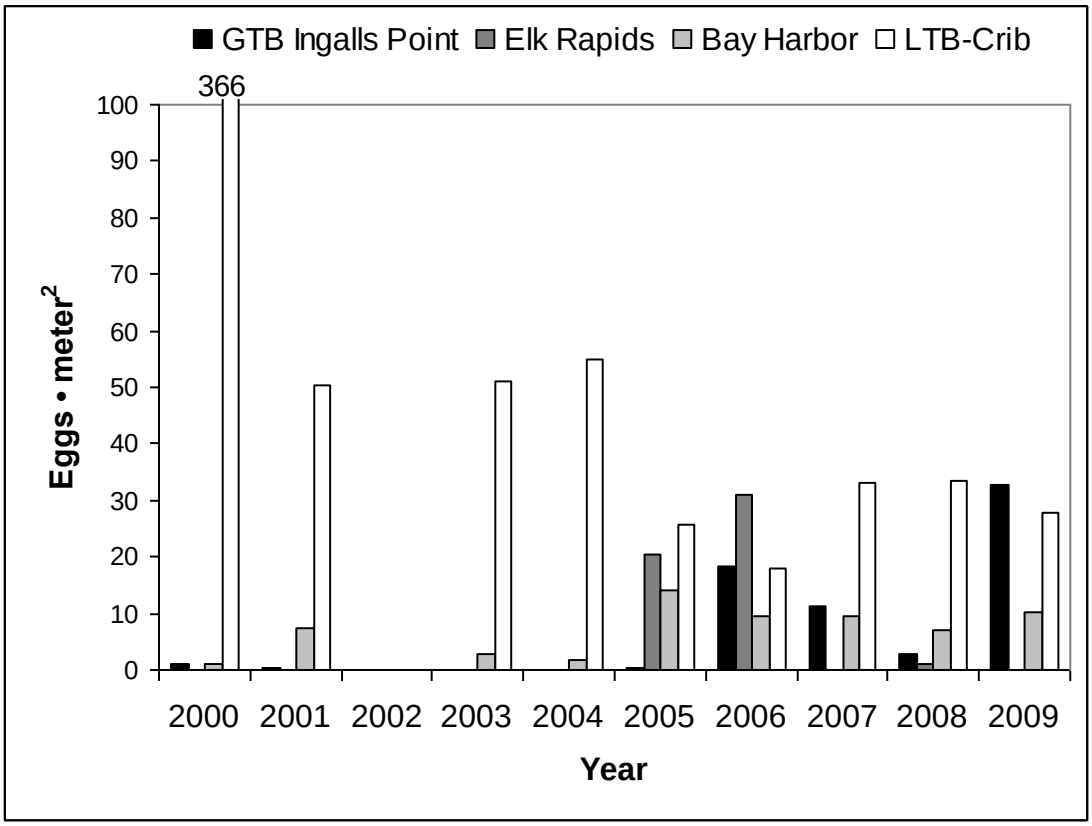


Data on the age composition of spawning lake trout during fall 2012 were not available at the time of writing this report. Consequently, the second part of Objective 4 regarding age composition of the lake trout spawners could not be assessed.

Objective 5 (Detect egg deposition): 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 have remained low at the sites where egg deposition has been measured in northern Lake Michigan during 2000-2009. Nearly all of the measured densities of lake trout eggs have been less than 60 eggs/m^2 (Figure 4).

Figure 4. 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).

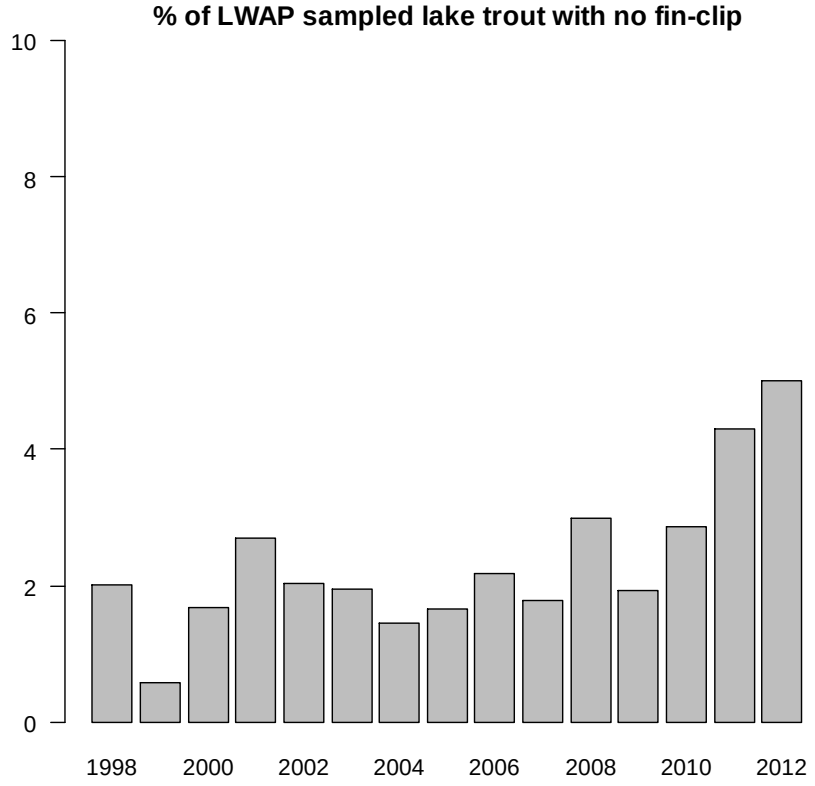


Jonas, J. L., R. M. Claramunt, J. D. Fitzsimons, J. E. Marsden, and B. J. Ellrott. 2005. Estimates of egg deposition and effects of lake trout (Salvelinus namaycush) egg predators in three regions of the Great Lakes. Canadian Journal of Fisheries and Aquatic Sciences 62(10):2254-2264.

Objective 6 (Detect recruitment of wild fish): 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: In 2012, 5.0% of lake trout caught during the spring LWAP survey were fish that had no fin clip which is above the recently estimated 3.0% rate of marking error (fish released from the hatchery without a fin-clip). This suggests that natural reproduction is slowly increasing in at least some areas of Lake Michigan (Figure 5). In 2011 and 2012, about 20% of the juvenile lake trout incidentally caught in gill nets set for bloaters off the Door Peninsula and Mid-lake reef in Wisconsin during February surveys were unclipped fish and most were <500 mm in length. In 2013, gillnet collections off the Door Peninsula returned 22% (29 of 129) unclipped while bottom trawls near Manitowoc had an unclipped recovery rate of 21% (7 of 33). The most substantive evidence of natural reproduction was in 2012 fall spawn surveys in Illinois waters were 50% (262 of 528) of lake trout were unclipped. Lastly the USGS Great Lakes Science Center (GLSC) fall bottom trawl survey in September and October of 2012 caught 4 age-0 lake trout and 2 were wild. Since 2005, 18 of the 113 lake trout, or 16% of the lake trout, caught in the GLSC bottom trawl survey were unclipped. Prior to 2005, less than 2% of the lake trout caught in the GLSC bottom trawl survey were unclipped.

Figure 5. Percentage of lake trout captured in spring LWAP surveys without fin clips. Lack of a fin clip suggests that the fish was produced in the lake.



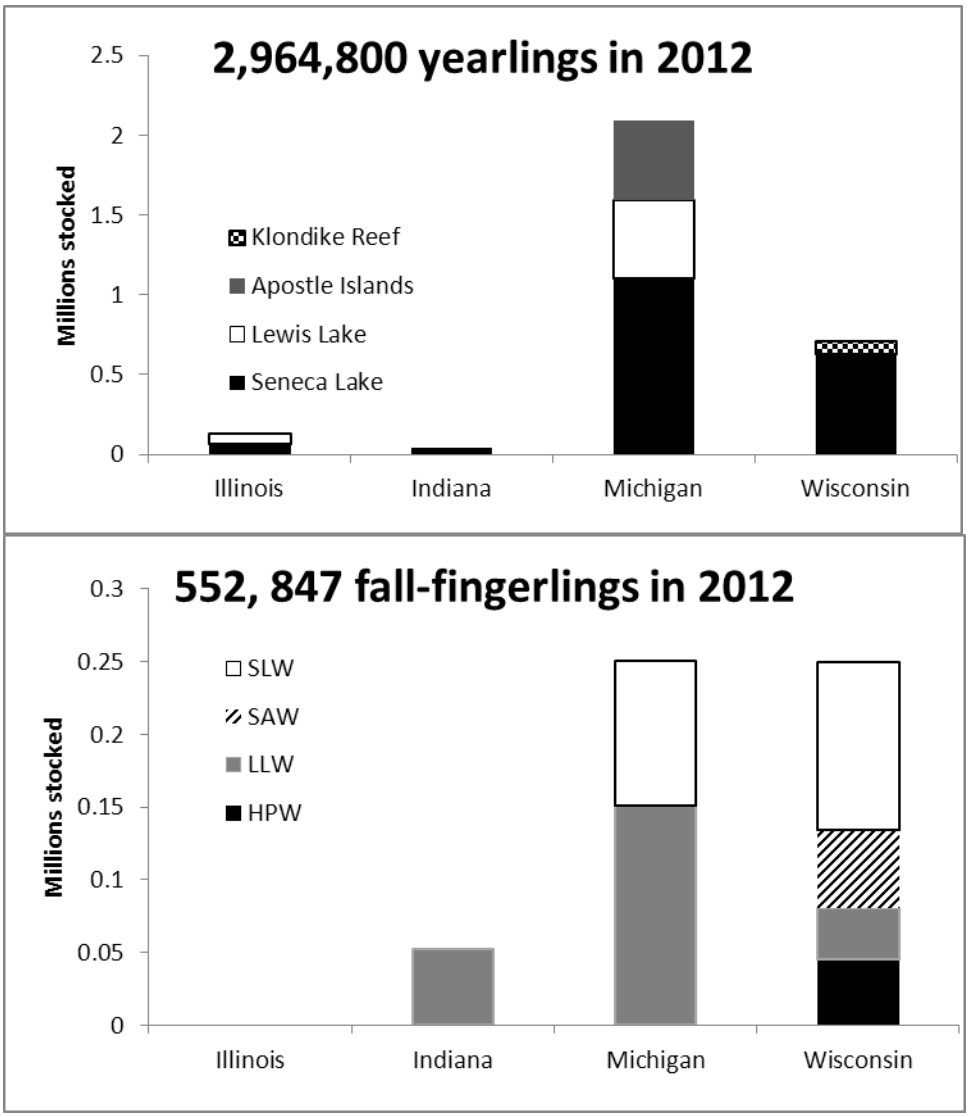
Objective 7 (Achieve restoration): By 2037, 75% or more of the lake trout in deep- and shallow-water habitats should be age-10 and younger and of wild origin.

Results: Populations far from targets.

Lake trout stocking

The U. S. Fish and Wildlife Service stocked a total of 2.96 million yearling (14-16 months old) lake trout into Lake Michigan in 2012. Stocking totals for each state jurisdiction were 122,692 in Illinois, 42,420 in Indiana, 2,093,339 in Michigan, and 703,349 in Wisconsin (Figure 6). All yearling fish received an AD fin clip paired with a coded wire tag. The stocked yearling lake trout consisted of four strains: Apostle Islands, Lewis Lake, Seneca Lake, and Klondike Reef. All Klondike Reef strain lake trout were stocked at Northeast Reef. Additionally, 552,847 fall fingerlings (Parry Sound, Lewis Lake, Apostle Islands, and Seneca Lake) were stocked into nearshore waters of Lake Michigan.

Figure 6. Spring yearling and fall fingerling lake trout stocking in Lake Michigan, 2012.



The Lake Michigan Lake Trout Working Group

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