

Assessment of Lake Trout populations in Michigan waters of Lake Superior

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Background

Regular assessment of Lake Trout *Salvelinus namaycush* populations supports management needs and Lake Trout rehabilitation. These assessments require the use of research vessels like the R/V Lake Char (Photo 1), which is used by the Marquette Fisheries Research Station in Lake Superior. The assessments measure relative abundance, age composition, growth, and mortality rates of lean Lake Trout in Michigan waters of Lake Superior. Furthermore, the 2000 Consent Decree of the Treaty of 1836 negotiated by the State of Michigan, Native American tribes, and the federal government requires annual assessment of lean Lake Trout stocks to develop safe harvest levels for the commercial and recreational fisheries in Treaty waters.



Photo 1. R/V Lake Char.

Lake Superior is currently the only Great Lake where multiple unique Lake Trout forms are still found (Photo 2). In addition to the lean form that is common to all Great Lakes, humpback, redbfin, and siscowet (fat trout) forms also inhabit Lake Superior. Prior to 1996, Lake Trout assessment in Michigan waters was directed at lean Lake Trout populations in depths of 40 fathoms or less. Siscowets were often captured in these assessments and humpbacks rarely, but our surveys did not really sample for them. Analyses of commercial fishing at depths greater than 40 fathoms during the late 1980s and early 1990s and lake-wide inter-agency assessments in 1996 and 1997 that included all depths to 100 fathoms indicated that siscowet Lake Trout may be the dominant predator in the lake and even in depths considered to be lean Lake Trout habitat. Both sport and commercial fisheries currently target lean Lake Trout because these fisheries are concentrated near shore, there is a preference for the lean form, and regulations based on contaminant body-burden discourage the harvest of siscowets. However, all forms of Lake Trout are harvested in both commercial and sport fisheries to some extent. Therefore, assessment of Lake Trout in Lake Superior must be a comprehensive program for all Lake Trout types that includes surveys at all depths and both nearshore and offshore regions.

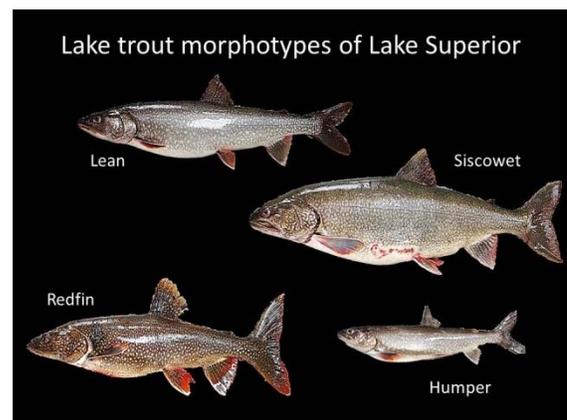


Photo 2. Different types of Lake Superior Lake Trout.

Objectives

- (1) To determine relative abundance, length and age composition, sex, maturity, sea lamprey wounding, growth, and mortality for lean and siscowet Lake Trout in Lake Superior waters of Michigan.
- (2) To determine relative abundance, diet, and demographics (age, growth, etc.) of all Lake Trout forms, other predator fish, and forage fish at various depths in Lake Superior.
- (3) To calculate total allowable catch (TAC) for Lake Trout in Michigan's Lake Superior management areas.

Results

Wild lean Lake Trout populations have mostly recovered from collapse in the 1950s due to 1) an aggressive recovery program employing sea lamprey suppression; 2) stocking of appropriate hatchery fish; and 3) well targeted harvest restrictions. Recovery began with the buildup of large populations of hatchery Lake Trout which was superseded by wild fish in the 1980s. In recent years, abundance and recruitment of most Lake Trout populations are declining from the near historic high levels to more expected values and are showing declining growth, symptoms of too large a population. Siscowet is the most abundant form of Lake Trout in Lake Superior occupying deep water areas and have recovered from depressed levels in the 1940s. Harvest is low, though emerging industrial interest in extracting omega-3 fatty acid from siscowets may develop a demand. Sea lamprey wounding rates on siscowets are higher than measured for lean lake trout, though the mortality inflicted may not be higher than that experienced by lean lake trout. There is a potential that siscowet populations may act as a buffer to sea lamprey predation on lean lake trout. Although leans and siscowets do not appear to compete with other, there may be more complex relationships between the two types. Similar to leans, siscowets are at high levels and experiencing declining growth issues.

Data summarized from this study have been and are used in fisheries models to assist in determining annual Lake Trout harvest quotas and to develop sport fish regulations for Lake Superior. Furthermore, study data on sea lamprey marking for Lake Trout are used by the U.S. Fish and Wildlife Service Sea Lamprey Control Program to direct their control efforts to trouble areas. Lean and siscowet Lake Trout diet data from this study are also being used to develop fish community models of Lake Superior that help managers understand the interactions between fish species under different management options such as stocking or changes in fish harvest.

Additional detailed information on this study can be found at http://www.michigan.gov/dnr/0,4570,7-153-10364_52259_19056-333302--,00.html.