

Growth, Survival, and Straying of Three Lake Trout Strains Stocked in the Refuge of Northern Lake Michigan

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Abstract.—Although some twenty year classes of lake trout (*Salvelinus namaycush*) have been stocked in Lake Michigan since 1965, significant reproduction has not occurred anywhere in the lake. A shortage of mature lake trout was a suspected cause of reproductive failure. Consequently, in 1986, a 2,330 km² refuge was established in northern Lake Michigan to permit the lake trout stock to build spawner biomass. The objective of the study was to evaluate survival, growth, and straying characteristics of three strains of lake trout stocked in the northern refuge. No significant differences were found in the relative survival rate, growth, or straying among Apostle Island outcross, Marquette domestic, and the Wyoming strains of lake trout as 4-year-old fish. Straying from the refuge occurred, but all strains were found outside the refuge in similar proportions of 12-15%. Twenty-four percent of the anglers' catch of 4-year-old lake trout from the Little Traverse Bay-Grand Traverse Bay area and 14% from the Leland-Frankfort area consisted of strays from the northern refuge. Based on this study I make three recommendations. First, the Marquette domestic strain should continue to be used for this project because of its many years of successful performance and availability. Second, the numbers of lake trout planted in the offshore northern refuge should not be used to estimate the catch quota of inshore lake trout, because to do so would grossly inflate the harvest quota. Third, strays from the northern refuge should not be included when estimating survival rate of other lake trout stocks by catch-curve analysis, because a disproportionately large representation of the former in the catch will tend to bias the survival rate estimate.

A long-standing goal of fishery management in Lake Michigan has been recolonization of the lake by self-sustaining populations of lake trout. To that end, the stocking of hatchery-reared lake trout (*Salvelinus namaycush*) in Lake Michigan began in 1965, and annual stockings have ranged from 837 thousand to 2.3 million in Michigan's waters alone. Nevertheless, in Lake Michigan, achievement of a self-sustaining population of lake trout has been a colossal failure. The lack of meaningful reproduction by lake trout

anywhere in Lake Michigan has been attributed to causes ranging from contaminated lake water (Willford et al. 1981) to a critical shortage of spawning trout (Dorr et al. 1981).

Two lake trout refuges were established in Lake Michigan to accommodate a long-term, multi-agency research study designed to evaluate the growth, survival, and straying characteristics of three strains of lake trout, to permit the lake trout stock to build spawner biomass, and ultimately to quantify the stock-recruitment relationship (Brown 1984).