

# INTRODUCTION

With the increase in fishing pressure nationally in recent years (Anonymous 1982) and angler sophistication and efficiency because of advanced technology and "how-to" clinics and magazines, many state natural resource agencies are investigating ways to regulate sport fishing to protect more vulnerable species from overharvest. Among natural resource agencies, there also appears to be a move away from the philosophy of maximum sustained yield (MSY) management toward one of optimum sustained yield (OSY), in which the "qual-

ity" (the definition can be quite varied) of the fish harvested is considered (Carlton 1975).

One of the more effective and most frequently used methods of regulating harvest in order to improve a fishery is the use of a minimum length limit (Fox 1975). The purpose of this study was to contrast the sport fishery and life history parameters for smallmouth bass (*Micropterus dolomieu*) and yellow perch (*Perca flavescens*) before and after an 8-inch minimum length limit on smallmouth bass in Nebish Lake, Wisconsin. Another objective was to deter-

mine whether an 8-inch length limit would increase the angling yield of smallmouth bass by an estimated 22% (Kempinger 1978).

Nebish Lake was chemically treated in 1966 (Kempinger and Christenson 1978) and restocked in 1967 to compare angling quality before and after the manipulation (Christenson et al. 1982) and to describe the population development of reintroduced smallmouth bass and yellow perch (Kempinger et al. 1982). During the 1972-81 period, neither species was regulated by a bag limit or a closed season.

# THE STUDY AREA

Nebish Lake, one of five lakes in the Northern Highland Fishery Research Area, is located on undeveloped, state-owned land in the Northern Highland State Forest in central Vilas County (Fig. 1). Access to the lake is provided at an unimproved boat landing with parking facilities for about 10 cars and boat trailers. The lake has a surface area of 94 acres, a shoreline of 3.2 miles, and a maximum depth of 50 ft. The bottom contour is irregular, with a sharp dropoff along most of the perimeter, which limits the abundance of rooted aquatic plants.

Nebish Lake is an infertile seepage lake with a total alkalinity of 8.0-16.0 ppm. Other water quality characteristics are shown in Table 1.

TABLE 1. Chemical and physical characteristics of Nebish Lake during spring and summer, 1969.\*

Parameter	Spring**		Summer**	
	Surface	Bottom	Surface	Bottom
Alkalinity (mg/L CaCO <sub>3</sub> )	10.0	11.0	8.0	16.0
pH	6.9	6.8	7.1	6.1
Nitrite (mg/L)	0.005	0.003	0.0	0.002
Nitrate (mg/L)	0.1	0.1	<0.1	0.1
Ammonia (mg/L)	0.0	0.0	<0.03	0.46
Organic nitrogen (mg/L)	0.43	0.43	0.67	0.97
Dissolved phosphate (mg/L)	<0.03	0.0	0.0	0.07
Total phosphate (mg/L)	0.2	0.2	0.1	0.4
Sulfate (mg/L)	<2.0	<2.0	8.0	9.0
Chloride (mg/L)	<0.5	<0.5	<0.5	<0.5
Calcium (mg/L)	2.3	2.2	1.9	2.6
Magnesium (mg/L)	1.55	1.6	1.12	1.25
Sodium (mg/L)	0.42	0.45	0.45	0.55
Potassium (mg/L)	0.52	0.55	0.45	0.55
Dissolved oxygen (mg/L)	9.6	8.7	7.9	0.0
Specific conductance (µmhos/cm)	—	—	30	45
Temperature (C)	5.5	5.5	22.2	7.2
Secchi disk (m)	4.25	—	4.0	—

\* From Kempinger et al. 1982.

\*\* Spring and summer sampling dates were 28 April 1969 and 28 July 1969, respectively.