
**An 8-Inch Length Limit on Smallmouth Bass:
Effects on the Sport Fisheries and Populations
of Smallmouth Bass and Yellow Perch in
Nebish Lake, Wisconsin**

by
Steven L. Serns

Technical Bulletin No. 148
Department of Natural Resources
P.O. Box 7921
Madison, WI 53707

1984

CONTENTS

ABSTRACT i

INTRODUCTION 4

THE STUDY AREA 4

METHODS 5

RESULTS 6

Fishing Pressure 6
Effects on Smallmouth Bass 6
 Density and Biomass 6
 Angler Harvest, Yield, and Harvest Rate 6
 Mortality and Exploitation Rate 9
 Growth 13
Effects on Yellow Perch 17
 Density and Biomass 17
 Angler Harvest, Yield, and Harvest Rate 17
 Mortality and Exploitation Rate 17
 Growth 17

DISCUSSION 20

Fishing Pressure 20
Effects on Smallmouth Bass 20
 Density and Biomass 20
 Angler Harvest, Yield, and Harvest Rate 21
 Mortality Rate 21
 Growth 22
Effects on Yellow Perch 22

SUMMARY AND MANAGEMENT CONSIDERATIONS 23

LITERATURE CITED 24

List of Tables

- 4 TABLE 1. Chemical and physical characteristics of Nebish Lake during spring and summer, 1969.
- 7 TABLE 2. Annual fishing pressure before and after an 8-inch length limit on smallmouth bass.
- 7 TABLE 3. Estimated number of adult smallmouth bass in the spring, before and after an 8-inch length limit.
- 8 TABLE 4. Estimated biomass of smallmouth bass in the spring, before and after an 8-inch length limit.
- 8 TABLE 5. Smallmouth bass young-of-the-year densities and mean lengths in fall, before and after an 8-inch length limit.
- 9 TABLE 6. Harvest, yield, and harvest rate of smallmouth bass, before and after an 8-inch length limit.
- 9 TABLE 7. Size distribution of harvested smallmouth bass, before and after an 8-inch length limit.
- 10 TABLE 8. Angler harvest and yield of smallmouth bass ≥ 7.8 inches after an 8-inch length limit.
- 11 TABLE 9. Angler harvest and yield of smallmouth bass before an 8-inch length limit.
- 12 TABLE 10. Instantaneous (Z) and annual (A) mortality rates, survival rates (S), and correlation coefficient (r) for smallmouth bass, before and after an 8-inch length limit.
- 12 TABLE 11. Total annual mortality rates (A) and exploitation rates (μ) for smallmouth bass, before and after an 8-inch length limit.
- 14 TABLE 12. Mean total length at various ages of smallmouth bass collected in the spring, before and after an 8-inch length limit.
- 14 TABLE 13. Mean weight of smallmouth bass collected in spring, before and after an 8-inch length limit.
- 15 TABLE 14. Mean calculated weights and length-weight regression formulae of smallmouth bass collected in the spring, before and after an 8-inch length limit.

- 15 **TABLE 15.** Annual instantaneous growth rates (G), mean biomass (\bar{B}), and production (P) of age III and IV smallmouth bass, for selected years before and after an 8-inch length limit.
- 16 **TABLE 16.** Equilibrium yield calculations for smallmouth bass in relation to changing assumptions on instantaneous growth rates (G) and natural mortality rates (M).
- 17 **TABLE 17.** Estimated number of yellow perch, by 1/2-inch group, before and after an 8-inch length limit on smallmouth bass.
- 18 **TABLE 18.** Estimated spring biomass of yellow perch, by 1/2 inch group, before and after an 8-inch length limit on smallmouth bass.
- 18 **TABLE 19.** Harvest, yield, and harvest rate of yellow perch, before and after an 8-inch length limit on smallmouth bass.
- 19 **TABLE 20.** Instantaneous (Z) and annual (A) mortality rates and survival (S) rates for yellow perch, before and after an 8-inch length limit on smallmouth bass.
- 19 **TABLE 21.** Annual angler exploitation rates (μ) of yellow perch, before and after an 8-inch length limit on smallmouth bass.
- 19 **TABLE 22.** Mean total length and age of male yellow perch captured at ice-out, before and after an 8-inch length limit on smallmouth bass.
- 20 **TABLE 23.** Mean total length and age of female yellow perch captured at ice-out, before and after an 8-inch length limit on smallmouth bass.
- 23 **TABLE 24.** Comparison of fishery and population statistics, before and after an 8-inch size limit on smallmouth bass.

List of Figures

- 5 **FIGURE 1.** Location of Nebish Lake in the Northern Highland Fishery Research Area, Vilas County.
- 21 **FIGURE 2.** Smallmouth bass natural reproduction in relation to summer water temperature in Nebish Lake, 1974-81.