

DEPARTMENT OF NATURAL RESOURCES

# RESEARCH

# REPORT 83

JUNE 1975

## AN EVALUATION OF STOCKING FINGERLING TROUT IN A "TWO-STORY" TROUT LAKE

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### INTRODUCTION

More than 200 lakes in Wisconsin are periodically stocked with trout to provide sport fishing. Most of these lakes are "two-story" lakes--i.e., lakes containing populations of warm water fish such as bass, bluegill, perch, etc. which are stocked with legal-sized trout to augment and add variety to their sport fisheries. The consensus of opinion evolved from field experience is that growth and survival of stocked fingerling trout in "two-story" lakes is poor, thus necessitating stocking legal trout. Little quantitative data is available, however, to substantiate this stocking policy.

Nebish Lake, a 94-acre soft water lake in northern Wisconsin, was chemically treated with rotenone in October 1966 and all fish were removed. In the spring of 1967, the lake was stocked with 4,500 fingerling brown trout, 4,500 fingerling rainbow trout, 38 smallmouth bass, and 31 adult yellow perch. Trout were stocked on 7 June 1967, and ranged between 3.0 and 3.9 inches in total length. Survival of rainbow trout and brown trout after the first year was 39 percent and 16 percent, respectively. During the first 2 years after stocking, trout growth and production were phenomenal due to an abundant year-round food supply of planktonic Crustacea 1 mm in length. During the third summer, this food supply largely disappeared due to overgrazing by a now abundant yellow perch population which had also become stunted. An excellent sport fishery for trout was maintained for nearly 4 years based on the original stocking of fingerling trout. Rainbow trout sustained the fishery for the first two years and brown trout, for the last two years. Total production and harvest of trout flesh was 3,965 lb and 1,717 lb, respectively (Brynildson and Kempinger 1973).

In 1973, Nebish Lake was typical of many "two-story" lakes in northern Wisconsin--i.e., it contained an overabundant, stunted yellow perch population, an overgrazed plankton population, and a modest population of smallmouth bass. Thus an opportunity was available to stock 3-4 inch fingerling trout and quantitatively document their growth, survival and relative contribution to the sport fishery under "two-story" conditions. More importantly, results of this study could also be compared directly with results of the first introduction of fingerling trout in June 1967 in the virtual absence of competition.

## STUDY AREA

Nebish Lake is a 94-acre seepage lake located in the Northern Highlands Fishery Research Area in Vilas County (Fig.1). Maximum depth is 45 ft (Fig. 2), alkalinity is 10-20 mg/l  $\text{CaCO}_3$ , and pH ranges from 6.6-7.1 depending on the time of year. Dissolved oxygen and temperature profiles are described by Brynildson and Kempinger (1973). The fish population consists primarily of stunted yellow perch and slow-growing smallmouth bass.

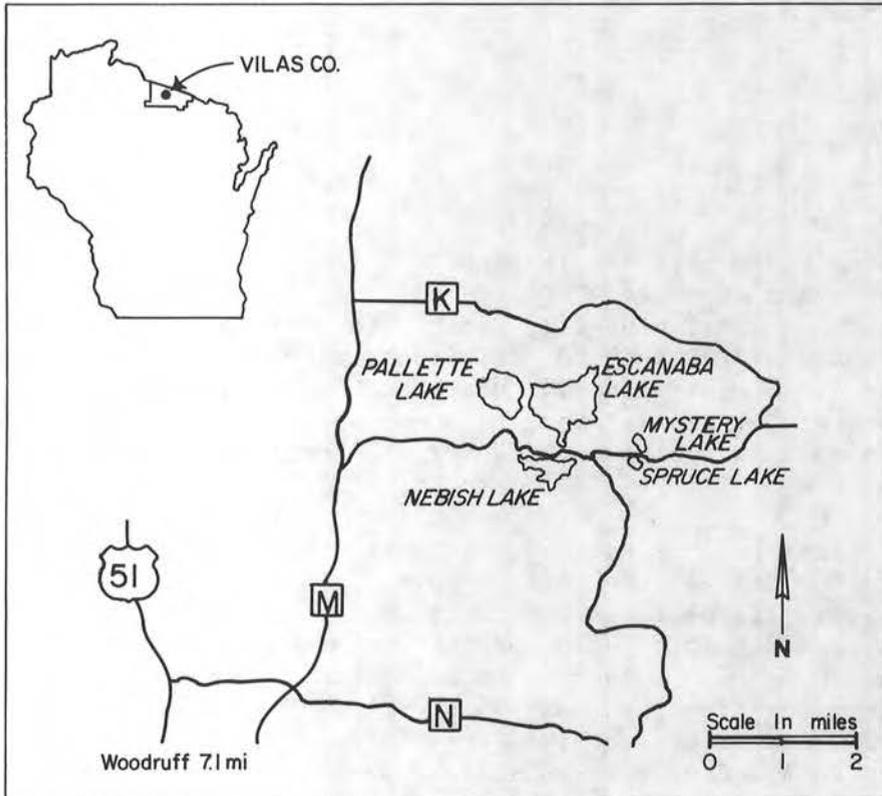


FIGURE 1. Location of Nebish Lake within the Northern Highlands Fishery Research Area, Vilas County.

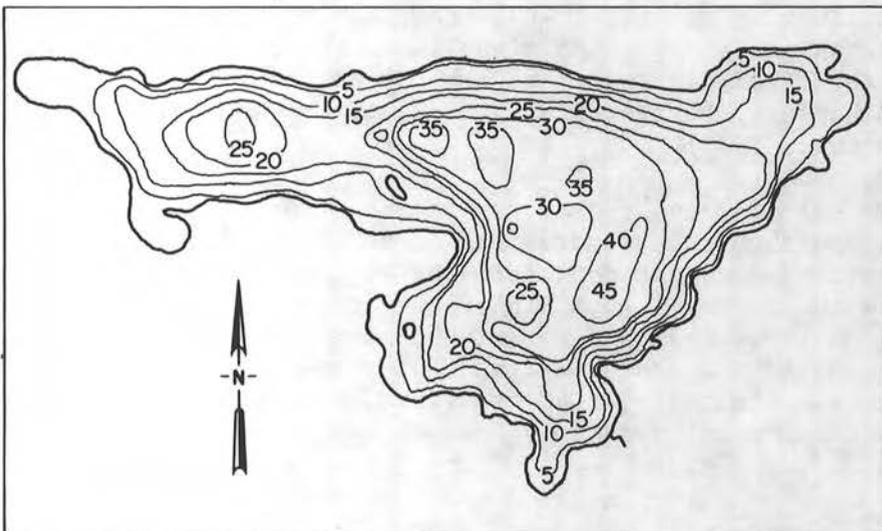


FIGURE 2. Contour map of Nebish Lake.

## METHODS

### Trout Stocking

Nebish Lake was stocked with 4,500 fingerling brown trout and 4,500 fingerling rainbow trout on 31 May 1973. Brown trout ranged in length from 3.0 to 3.9 inches, with an average of 3.3 inches. Rainbow trout ranged in length from 3.1 to 4.2 inches, with an average of 3.7 inches.

### Trout Population Inventories

Eight, 4-foot fyke nets (4 with 1-1/4" mesh and 4 with 3/8" mesh) were fished on the nights of 31 May, and 3, 4, 5, 6, and 7 June 1973. Six, 4-foot fyke nets (3/8" mesh) were fished on the nights of 23 October and 6 November 1973. The shoreline of Nebish Lake was electrofished using a boom-shocker boat equipped with a 230-volt AC generator on the nights of 29 September, 22 October, and 13 November 1973.

Six, 4-foot fyke nets (3/8" mesh) were fished on the nights of 30 April, and 2, 3, 4, 5, 6, and 8 May 1974. The shoreline of Nebish Lake was electrofished using a boom-shocker boat equipped with a 230-volt AC generator on the nights of 25 and 26 September and 9 and 24 October 1974.

### Trout Harvest

DNR personnel stationed at the Northern Highlands Fishery Research Area conducted a year-round compulsory creel census on Nebish Lake as part of their general operations during 1973-75. All fish creeled were measured and weighed. Stomachs from angler-caught smallmouth bass were collected in 1973 to determine relative predation levels on trout.

## RESULTS AND DISCUSSION

No fingerling trout were captured in Nebish Lake during fyke-netting operations conducted on 6 of the first 8 nights following release of the fingerlings in the lake. However, many of the larger smallmouth bass caught in the fyke nets were satiated and at least half a dozen trout were regurgitated during handling (personal communication from J. J. Kempinger, Project Leader, Northern Highlands Fishery Research Station). Whether the regurgitated trout were trapped in the fyke nets and then eaten by the bass could not be determined but it is unlikely that such extensive fyke netting would fail to capture at least a few of the fingerling trout. No smallmouth bass were caught by anglers during the first month and a half following trout stocking, thus, bass stomachs were not available to quantitatively document bass predation on fingerling trout.

Stomachs of 87 smallmouth bass caught by anglers during the last two weeks in July 1973 were examined and contained no trout remains. Most (84) of these bass ranged in length from 6.5 to 10.9 inches with an average weight of 127 g or 0.3 lb. The absence of trout in these stomachs indicated that trout were either scarce in Nebish Lake or too large to be preyed upon by most smallmouth bass in the size range sampled.

No trout were captured in fyke nets fished in Nebish Lake in October and November 1973. However, one brown trout (7.1 inches and 83 g) was captured during electrofishing operations conducted in November. Growth of this trout was somewhere between 3.2 and 4.1 inches during the 5-1/2 months of residence in the lake.

No trout were seen or captured during fyke netting and electrofishing conducted in the spring and fall, 1974.

Total angler harvest from the 9,000 fingerling trout stocked in Nebish Lake consisted of one rainbow trout taken through the ice in January 1975. Length and weight of this fish was 18.3 inches and 1,153 g (2.5 lb), respectively.

Growth of the single brown trout captured with electrofishing gear in November 1973 and the single rainbow trout caught by an angler in January 1975 was excellent, but of little importance in view of the almost 100 percent mortality of trout apparent during the first 5-1/2 months in Nebish Lake.

#### SUMMARY

On 31 May 1973, 4,500 brown trout and 4,500 rainbow trout fingerlings were stocked in Nebish Lake. Trout ranged from 3.0 to 4.2 inches in total length. Large smallmouth bass captured in fyke nets set in early June 1973 were satiated and regurgitated half a dozen fingerling trout during handling. Only 1 brown trout was captured during fyke netting and electrofishing conducted in the spring and fall of both 1973 and 1974. Survival of fingerling trout was essentially nil after 5-1/2 months in Nebish Lake. Total angler harvest consisted of 1 rainbow trout caught by an ice fisherman in January 1975. Growth of the trout which survived in Nebish Lake was excellent.

Stocking fingerling trout 3-4 inches in length in a "two-story" lake containing smallmouth bass and an abundant, slow-growing yellow perch population is not recommended because of the high probability of poor trout survival due, at least in part, to fish predation.

#### LITERATURE CITED

Brynildson, O. M. and J. J. Kempinger. 1973. Production, food and harvest of trout in Nebish Lake, Wisconsin. Dep. Nat. Resour. Tech. Bull. No. 65. 20 pp.

#### ACKNOWLEDGMENTS

Special thanks are due to J. J. Kempinger, Project Leader in charge of the Northern Highlands Fishery Research Station, and his crew for their assistance during most of the fyke netting and electrofishing operations.

This study was supported in part by funds from the Federal Aid to Fish Restoration Act under Dingell-Johnson Project F-83-R.

Edited by Susan Nehls.

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