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PROGRESS REPORT--FERTILIZATION OF PIGEON RIVER TROUT LAKES THROUGH SUMMER OF 1948

By

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The following progress report covers the first summer of work on the fertilization of natural trout lakes project. The outline previously submitted explains the project in detail.

Introduction

The work accomplished during the first summer can be divided into two sections. The first part deals with the preliminary examination of the lakes as to their suitability for trout and with a report of the poisoning of four lakes. The second section deals with pre-fertilization data concerning the chemical, physical and biological phases of the problem.

I. Selection and Preparation of Trout Lakes to be Utilized in the Problem.

A. Selection of the Lakes.

There are, rather closely grouped, nine of the solution lakes in the project area. These nine lakes were examined by R. W. Eschmeyer (1935-37). He found one of the lakes to be too shallow for fish of any kind and thus eliminated it from further consideration as a test lake. The eight remaining lakes, Ford, North Twin, South Twin, West Lost, Lost, and Section 4 in Otsego County and

Hemlock and The Devil's Soup Bowl (Paul Bunyan's Punch Bowl) in Cheboygan County, are the subjects of his paper "Experimental Management of a Group of Small Michigan Lakes" (Eschmeyer, 1938).

These eight lakes were considered for possible use in the present study. Ford Lake, larger and quite different from the other seven, was eliminated early for several reasons. The remaining seven were examined early in the summer of 1948. Six were found to be suitable for trout. The seventh, The Devil's Soup Bowl, was sounded and was found to have a maximum depth of 13 or 14 feet. On this basis it was rejected as being too shallow for trout. The shoreline of this lake reveals its former depth of 22 feet as recorded by Eschmeyer in 1938.

B. Elimination of Undesirable Fish.

Gill nets, hook and line fishing, and visual observations were used to determine the fish populations of the six lakes. Results of these examinations indicated that complete removal of the existing fish populations from four of the lakes would be warranted and necessary in order to prepare the waters for further study of management of trout lakes. The remaining two, Hemlock and Lost Lake, contained only brook trout and minnows as nearly as could be determined.

North and South Twin, West Lost, and Section 4 were treated with rotenone by a stream improvement crew on August 2 and 3, 1948.

Previous to the application of poison, 100 legal brook trout, marked by removal of the adipose fin, were planted in each lake. In West Lost, 225 pumpkinseeds were caught by hook and line, their anal fins removed by clipping, and returned to the lake during the week immediately preceding the poisoning. It was felt that such a procedure would facilitate accurate estimation of the proportion of fish recovery

to be made subsequently, and contribute to the value of the study. During the application of poison, cages containing yellow perch were suspended at different depths in each lake. In every case these fish were dead when examined on the day following the rotenone treatment.

Following the application of poison a complete recovery of all fish in the four lakes was attempted. A check was maintained for a week and all fish floating, stranded on shore, or lying on the bottom within reach of a long handled scap net were recovered. These checks demonstrated the presence of the following species:

South Twin Lake

Yellow perch
Fathead minnow
Western banded killifish

North Twin Lake

Yellow perch
Golden shiner
Common sucker
Red bellied dace
Bluntnose minnow
Fathead minnow
Brook trout (8--all sub-legal)

West Lost Lake

Yellow perch
Pumpkinseed sunfish
Common sucker
Bluntnose minnow
Brook trout (2--sub-legal)

Section 4 Lake

Yellow perch
Common sucker
Bluntnose minnow
Rainbow trout (1--18")

No attempt was made to recover minnows, or young-of-the-year specimens of other species. Except in two cases, these small fish were unimportant. One hundred pounds of golden shiners were recovered from North Twin. Young-of-the-year fish were nearly absent except in the case of the pumpkinseeds of West Lost, and those were very small. In all cases yellow perch predominated in numbers and weight.

Toxicity tests conducted August 21-24, 19 to 22 days following the poisoning, indicated that the four lakes were no longer toxic.

II. Collection of Pre-Fertilization Data.

A. Chemical Analyses.

An important question in applying fertilizer to trout water is whether or not the fertilizer will alter the lake chemically, and, indirectly, thermally to such a degree as to render it no longer suitable as trout water. In order to establish adequately the chemical and thermal conditions existing in each lake prior to fertilization, an extensive program of chemical and thermal observations was undertaken. At weekly intervals throughout the summer series of temperatures and chemical analyses were taken from top to bottom on each lake. Included in these checks were weekly turbidity readings. This information has been charted and graphed and is ready for comparison with similar information taken during and following the fertilization period. Similar information will be collected during the winter months.

B. Biological Sampling.

1. A fish sample was collected from each lake poisoned, for the purpose of scale examination.
2. A total of 300 bottom samples (50 from each lake) was collected. These samples will be examined during the winter of 1948-49.
3. Secchi disc readings provided quantitative plankton data. Qualitative sampling was conducted on each of the six lakes.
4. A plant collection was made from each lake and the weed beds charted on maps.

C. Soil Samples.

Two series of soil samples were taken from each lake, and turned over to Dr. Lawton of the Michigan State College Soils Department for

analysis. It is hoped that from his findings there may emerge information which will permit a more accurate selection to be made in the future of the fertilizer suitable for use in the lakes, and that they will provide an evaluation of the lakes based on nutrient qualities.

D. Planting of Fish.

Brown trout were selected as the species best suited to our needs; it was felt further that this project offered an opportunity to test the results of brown trout plantings in lakes, a procedure not adequately tested in Michigan waters.

The brown trout received from the Grayling Hatchery were yearlings averaging 5-3/5 inches total length. A sample of 500 was measured previous to planting to determine the length-weight ratio at the time of planting. These fish were stocked at the rate of approximately 500 to the acre, or 13,550 fish in the six lakes. The plant was made September 14-16.

Unfortunately, through a misunderstanding, Oden Hatchery planted fingerling brook trout in North and South Twin, West Lost and Lost Lake at the ratio of 500 to the acre on September 13. These fish averaged 3 inches in length.

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