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Institute for Fisheries
Research
E. L. Cooper
D. S. Shetter

INSTITUTE FOR FISHERIES RESEARCH
DIVISION OF FISHERIES
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UNIVERSITY OF MICHIGAN

ALBERT S. HAZZARD, PH.D.
DIRECTOR

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ADDRESS
UNIVERSITY MUSEUMS ANNEX
ANN ARBOR, MICHIGAN

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PIGEON RIVER TROUT EXPERIMENT STATION

Objectives and Activities

By

Edwin L. Cooper

The main objectives of the investigations and experiments to be conducted on the Pigeon River have been summarized by A. S. Hazzard (I.F.R. Report No. 1207). The present report is a supplement to this earlier one.

In Michigan, as in some other states, present policies of planting trout in lakes and streams are now believed to be inadequate to furnish good fishing for large numbers of trout fishermen under existing regulations. In the face of high costs of food and labor, it has become impractical to increase the number of legal-sized trout to be planted. A more logical approach to better fishing is in the efficient use of the present hatchery output. It has been known for some time that more than half of the legal-sized trout planted are wasted; wasted in the sense that they are never caught by the fishermen. While this return of trout to the fishermen would be considered high in comparison with similar numbers of planted pheasants, it nevertheless represents a considerable loss in trout that might otherwise be available to our trout fishermen. The Conservation Commission has emphasized the need for information on what happens to these planted trout that are reportedly not caught by the anglers. It is primarily with this need in mind that the Pigeon River Trout Experiment Station is being operated.

In addition, the opportunity for studying wild populations of brook, brown, and rainbow trout in a stream with known fishing intensity will furnish the department with much needed information on the life history of these fish. Wild populations of trout are known to furnish a major portion of the total catch in this state today; their proper management is essential for continued good fishing in the future.

The investigations to be conducted at the Pigeon River Trout Experiment Station may be logically considered under two headings: (1) evaluation of present practices of management, including fishing regulations, environmental improvement, and trout planting policies; and (2) life-history studies of the populations of wild trout in the stream.

Evaluation of Present Management Practices

For reasons cited below, it has been considered both necessary and economical to subject the fishermen to a certain amount of regimentation. Until such time as sampling methods can be shown to give reliable indices of fishing success in situations of low and variable fishing intensity, it is essential that each fisherman be contacted and pertinent data relative to his success in fishing be obtained. For this purpose, a permit-type of creel census is operated from a centrally located checking station. Each fisherman is required to register daily at the checking station, obtain a free-use permit to fish in a specified lake or portion of the Pigeon River and report back to the checking station before fishing in another lake or stream section or before leaving the area.

The sole reason for requiring a fisherman to submit to the somewhat distasteful regimentation of obtaining a daily permit and of reporting

is to obtain accurate records of what he caught. Past experience has shown that the average fisherman is careless in identifying the three species of trout and in recognizing tagged or fin-clipped fish. The success of this research program is so dependent upon the accuracy of the fishing records that the inspection of the individual's catch by trained personnel is essential. The convenient location of a checking station and the designation of easily accessible fishing sections make it relatively easy for the angler to obtain a permit and report his catch. This fact is substantiated by the cooperation received from fishermen during the early part of the 1949 season. The number of known violations, wilful or otherwise, was only about 1 per cent. Most fishermen contacted were favorably impressed with the value of the program and its objectives.

The establishment of a single checking station to which the fisherman must report permits a tremendous saving in personnel and allows more efficient use of working hours on slack fishing days. The type of information to be obtained on fishing in the lakes and different sections of the river is illustrated by the creel census form used (Figure 1). Details of the operation of the permit system are given on the permit form (Figures 2 and 3).

The basic objectives of the creel census are as follows:

- (1) To determine the quality of fishing under known fishing conditions such as the density of the trout populations, fishing intensity, weather conditions, numbers of stock hatchery fish, and varying daily creel limits.
- (2) To determine the productivity of the stream to the fisherman in relation to the numbers of hatchery-reared fish and wild fish.
- (3) To attempt to define the effect of various conditions of weather, barometric changes, phases of the moon, etc., on fishing success.

SPECIAL TROUT CREEL CENSUS—Michigan Department of Conservation

Name of or Stream..... Fisherman's Name.....

T..... R..... Sec..... Residence.....

County..... State.....

Station..... Male..... Female.....

Date..... Lure used.....

SPECIES		LEGAL SIZE FISH											
		Individual lengths (inches)											
Brook Trout	Marked												
	Unmarked												
Brown Trout	Marked												
	Unmarked												
Rainbow Trout	Marked												
	Unmarked												

(List other species on reverse side of slip)

TIME FISHED	A.M. →	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
	P.M. →	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲



Draw line through hours and half hours fished

Figure 1

Fishing Permit — Pigeon River Trout Research

Issued by _____ Good only for date of _____

The undersigned _____ of _____
(Name) (County of Residence, or State)

in return for permission to fish in posted sections of the Pigeon River in government Sections 4, 9, 10 and 17 of T 32 N, R 1 W, Otsego County, and to fish in Hemlock Lake (located in T 33 N, R 1 W, Cheboygan County) and Ford, Section 4, North Twin, South Twin, Lost, and West Lost lakes (all in T 32 N, R 1 W, Otsego County) agrees to return to the checking station on the conclusion of fishing and report on the results of angling, and he agrees to limit his fishing to the single lake or the certain specified section of the Pigeon River, until after he has reported to the checking station on the fishing specified by this permit. The holder of this permit agrees to allow any catches to be examined by employees of the Conservation Department. The holder of this permit also acknowledges that failure to observe the general regulations for the taking of fish, or the special regulations ordered for this area by the Conservation Commission, constitutes a misdemeanor for which the permit-holder may be prosecuted.

The specified water to be fished, under terms of this permit, is checked (✓) below:

- | | | |
|---|--|--|
| <input type="checkbox"/> Pigeon River Section A | <input type="checkbox"/> Hemlock Lake | <input type="checkbox"/> South Twin Lake |
| <input type="checkbox"/> Pigeon River Section B | <input type="checkbox"/> Ford Lake | <input type="checkbox"/> Lost Lake |
| <input type="checkbox"/> Pigeon River Section C | <input type="checkbox"/> Section 4 Lake | <input type="checkbox"/> West Lost Lake |
| <input type="checkbox"/> Pigeon River Section D | <input type="checkbox"/> North Twin Lake | <input type="checkbox"/> _____ |

Signed _____ Fishing License No. _____
(Angler's signature)

Address _____

MICHIGAN DEPARTMENT OF CONSERVATION

Figure 2

REGULATIONS IN EFFECT ON PIGEON RIVER TROUT RESEARCH WATERS

1. Permit-holder must keep permit on his or her person while fishing and display it on request of members of the Department.
2. Permit-holder must return to the checking station on conclusion of fishing and report on the results of angling, at which time permit must be surrendered, and he must do this before going to some other water to fish.
3. Hemlock, Ford, Section 4, North Twin, South Twin, Lost, and West Lost lakes are all designated trout lakes, on which the use of live minnows for bait is unlawful, and the daily limit is 5 trout. No other special regulations on these lakes.
4. On posted Sections A and B of the Pigeon River, the daily creel limit is 5 trout. No other special regulations in effect on Sections A, B, C and D of the Pigeon River during 1949.
5. Fish must not be cleaned until after examination at the checking station.

BE A GOOD SPORTSMAN. HANDLE SMALL FISH CAREFULLY SO YOU OR SOMEONE ELSE MAY CATCH THEM IN THE FUTURE. EXERCISE CARE WITH BURNING TOBACCO OR CAMPFIRE. BURY YOUR TRASH AND HELP KEEP YOUR WOODLANDS AND STREAMS CLEAN. REPORT VIOLATIONS OF THE LAWS TO THE NEAREST AGENCY OF THE CONSERVATION DEPARTMENT.



Figure 3

For purposes of experimental control, four sections of the stream have been designated. These sections together with the regulations and stocking plan are described below. All township section numbers refer to T. 32N., R. 1 W.

Stream Section A. Cornwell Dam in Section 4, upstream to the old Forest Service Headquarters' bridge in Section 10. This portion of the stream will not be stocked with hatchery trout. Fishing regulations in this section permit only 5 trout per day.

Stream Section B. From the last designated point in Section 10 upstream to the footbridge at the present State Forest Headquarters in Section 9. This section will be stocked monthly with legal-sized brook, brown and rainbow trout in equal numbers; each fish to be measured, weighed and tagged for future identification. Fishing regulations in this section permit only 5 trout per day, to furnish a comparison with section A which will not be stocked and with section C which is comparably stocked but under the present state-wide daily limit of 15 trout.

Stream Section C. From the last designated point upstream to the fire line in the center of Section 17. This stream section will be stocked in the same manner as Section B, but there will be no change in fishing regulations.

Stream Section D. From the last designated point upstream to the Vanderbilt road-bridge on Section line 17-20. This section will not be stocked, nor will there be any change in fishing regulations.

The change in fishing regulations and variation in the planting program were made in an attempt to determine the effect of a lower daily limit in spreading the catch of hatchery fish over more fishing days and among more different fishermen. It will also be possible to determine

the relative catchability of the three species of fish. Information on growth, and gain or loss of weight and condition of hatchery fish after planting will be obtained by individual weights and measurements of the fish at the time of tagging and at recovery. More definite information than available heretofore should ^{also} be secured on migration and carry-over from various plantings.

In conjunction with the above experiment, it was decided to further test the popular idea that scatter planting by boat allows a greater number of fishermen to share the hatchery plantings. One half of each monthly plant will be distributed by boat as evenly as possible throughout Sections B and C. The other half of the planting will be spot planted in two accessible pools. A complete creel census should give the best possible information concerning the fate of five monthly plantings of 900 trout each.

Various experiments involving the seven small lakes on the area are being conducted by Howard Tanner under the supervision of Dr. Robert C. Ball. Creel census records will be obtained from these lakes in the operation of the permit-system of fishing. These experiments are as follows:

✓
Fertilization of Trout Lakes

During the past three years several trout lakes in the Pigeon River Forest area have been studied to determine methods of increasing the growth rate of the trout in the lakes and produce a better yield of fish to the angler.

✓ This summary of fertilization studies was prepared by Prof. R. C. Ball of Michigan State College.

For two summers, 1946, 1947, South Twin Lake was treated with commercial fertilizer every three weeks. The addition of fertilizer increases the minute plants and animals that serve directly or indirectly as food of the trout, thus producing more food for the fish; and greater growth of the fish results. The direct result that can be seen on the lake is the growth of algae around the margin of the lake and on the few plants near shore.

At the time of fertilization there were both trout and perch in the lake, and scale studies of these fish indicated that their growth rate was greater than perch in North Twin Lake, a nearby, similar lake.

The winter following the second summer of fertilization was a severe one with frequent snows that kept the surface of the lakes in this region covered. During this winter South Twin Lake "winterkilled." The oxygen was reduced to a point that all of the trout and many of the perch died. As the adjoining North Twin Lake did not kill out during that winter, it is evident that the effects of the fertilizer brought about the oxygen depletion.

Last summer all fish were removed from the trout lakes in which there were perch and other undesirable fish. These lakes were later stocked with trout. It is important that no other fish be introduced into these lakes as such an introduction would probably ruin the chances of developing good fishing.

At the present time four trout lakes, Lost, West Lost, Section 4, and Hemlock, are being fertilized. The amount of fertilizer being added is much less than was put in South Twin before it winterkilled.

A biologist is stationed in this area, whose entire duties are concerned with the study of just what effects the fertilizer is having on the lakes and to determine whether these effects are of benefit to

the angler. His duties include the taking of dredge samples of the bottom organisms to enable him to determine whether or not the fertilizer increases their numbers. These bottom-dwelling animals serve as food for the trout. He is also making chemical analyses and taking temperatures from top to bottom to detect any changes that may occur. Scales are being collected from the fish to study the rate of growth.

The effects of the fertilizer on the lakes this summer can be seen in the slightly turbid water and the growth of algae around the margins of the lakes.

Life History Studies

The ability to correctly manage trout resources depends upon a knowledge of the important features of the life history of these fish. Inventories of habitats and of populations, studies of spawning success, mortality at different ages and sizes, (and their causes), growth rate, and migrations are all necessary to formulate the best possible program of continued yield of the fishery. Michigan releases nearly a million legal-sized trout in its streams and lakes each year, yet the major portion of the trout catch comes from naturally spawned fish. Many fishery workers now believe that better management of these wild populations of trout offer greater possibilities for improving trout fishing than by increasing artificial propagation. Controlled conditions of fishing on the Pigeon River make possible the evaluation of these policies.

During the first year at the Pigeon River, emphasis must be placed on a biological inventory of the stream, especially of the experimental areas. Better knowledge of the density of the trout populations, growth characteristics, relative survival from one year to the next and migratory

tendencies are essential in order to interpret differences in catch statistics. To make the maximum use of data derived from population estimates, a systematic program of collection of data is to be followed. Periodically, estimates of the trout populations in the experimental sections will be made. At these times all trout will be counted and a large number will be weighed, measured and scale sampled. Detailed examination of these periodic samples will reveal mortality rates, rate of growth, change in condition, population fluctuations due to migration, etc. The creel census data taken concurrently will furnish additional information concerning the effects of fishing on the stocks of fish.

One of the questions of importance in the present system of trout planting has to do with the rapid disappearance of the planted trout in the immediate vicinity of release. Do these trout migrate from the area in large numbers or are they taken by disease or predators other than man? A large proportion of each planting is always unaccounted for. It is hoped that frequent observations combined with extensive use of efficient collecting devices such as the electric shocker will shed some light on this question. In this connection, the construction of weirs between stream sections is considered necessary, although the cost will be high.

The present methods of estimating fish populations in streams by sampling are unproven as to accuracy. Experiments designed to measure the efficiency of these methods under different environmental conditions are planned, in order that the population estimates may be as accurate as possible. Techniques involving the adequacy of different sizes of samples, apparent fluctuation of population densities throughout

the year, and marking and tagging experiments, all will be simplified somewhat by the construction of weirs and the complete creel census.

INSTITUTE FOR FISHERIES RESEARCH

Edwin L. Cooper

Report approved by A. S. Hazzard

Report typed by B. J. Bair