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C. T. Yoder  
W. C. Latta

INSTITUTE FOR FISHERIES RESEARCH  
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GERALD R. COOPER PH.D.  
DIRECTOR

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ADDRESS  
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THE TENTH ANNUAL CREEL CENSUS, PIGEON RIVER TROUT  
RESEARCH STATION, 1958

By

William C. Latta

The Pigeon River Trout Research Station was established in 1949, on the site of the former Pigeon River Forest Headquarters, 13 miles east of Vanderbilt, in Otsego County. The experimental trout waters of the station include seven small limestone sinks or lakes (Ford, Section 4, Hemlock, Lost, West Lost, North Twin and South Twin) and, at the time of the station's establishment, included 4.8 miles of the Pigeon River. This portion of the stream was divided into four experimental sections (A, B, C and D), each approximately 1.2 miles in length (Fig. 1). In 1953, a fifth experimental section (E), also about 1.2 miles long, was added at the upstream end of the controlled area. This addition increased the total length of the experimental area to about 6 miles. Table 1 presents the physical features of the experimental stream sections.

Since 1949, a compulsory permit system has been in effect on the experimental waters. Each angler is required to obtain a free, one-day permit before proceeding to his selected water, whether experimental section of the stream or individual lake, and is also required to report on his trip and to allow examination of his catch by station personnel. He may fish each day in as many sections of the river or individual lakes as he desires, so long as he reports back at the end of fishing in each water.

MICHIGAN DEPARTMENT OF CONSERVATION  
FISH DIVISION  
PIGEON RIVER TROUT RESEARCH AREA  
OTSEGO AND CHEBOYGAN COUNTIES

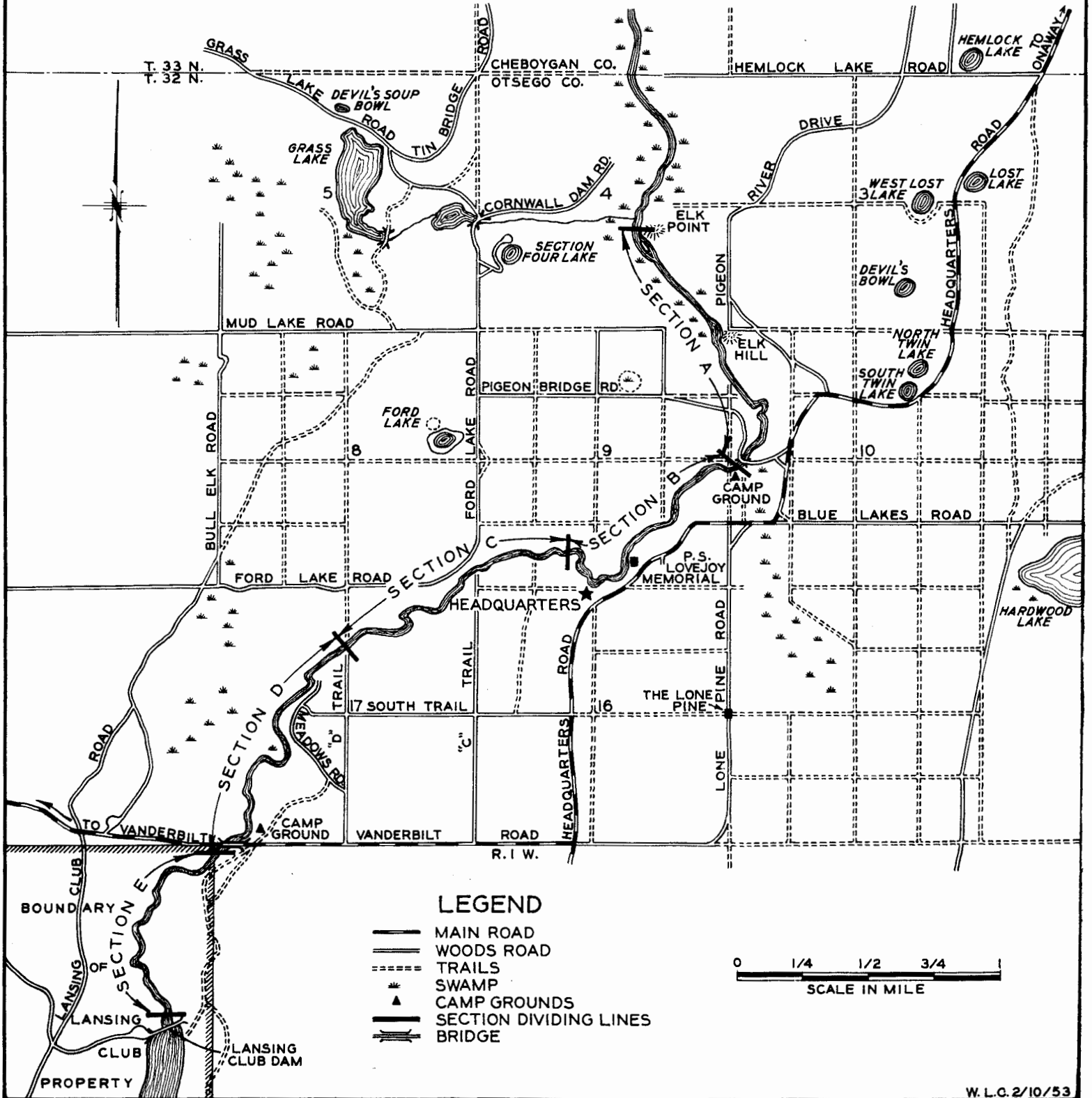


Figure 1

## THE PIGEON RIVER TROUT RESEARCH AREA

This research and experimental area is located in the northeastern corner of Otsego County and a small portion of Cheboygan County in the Pigeon River State Forest. Here five and one-half miles of the Pigeon River and seven trout lakes have been designated as experimental waters for studies on brook, brown, and rainbow trout. This program, as is also true with other functions of the Fish Division, is financed solely from the sale of fishing licenses and trout stamps. Its success depends to a large extent on the cooperation of the fishing public in supplying the information needed to maintain and improve trout fishing.

The Pigeon River in this experimental area is divided into five convenient fishing sections as indicated on the reverse side of this sheet. Seven trout lakes of unusual character are included in the trout research program. These lakes are believed to have been formed geologically through the solution of underlying limestone by ground water, and a settling of the surface layer of sand and gravel, producing cone-shaped pot holes, some with nearly vertical banks 50 to 60 feet high.

In order to obtain a complete record of the fishing in this area, each fisherman is required to register daily at the checking station, obtain a free permit to fish in any lake or portion of the stream and report back to the checking station before fishing in another lake or stream section or before leaving the area. Some experimental changes in the usual regulations governing trout fishing in Michigan are made from time to time in order to learn how necessary such restrictions are and whether changes may improve the angling quality. The special regulations will be stated on the fishing permit.

In addition to the information on fishing success collected from persons in the area, many other research projects are being followed by department personnel. Periodic estimates are made of the trout populations and information on rate of growth of the fish and their success in spawning is obtained. Studies of the returns from hatchery plantings are being made to determine their value and need.

The correct stocking programs for lakes of the type found in the Pigeon River Research Area, which lack natural spawning facilities, are being determined by plantings of different species of varying size and at different seasons of the year.

Table 1.--Morphometry of experimental stream sections, Pigeon River  
Trout Research Station\*

Section	Length (miles)	Average width (feet)	Area (acres)
A	1.31	45	7.16
B	1.19	41	5.90
C	1.13	40	5.39
D	1.18	40	5.65
E	1.17	40	5.67

\*Data for Sections A, B, C and D from Cooper, 1953. Length of Section E from Bacon, Shetter and Cooper, 1958. Width of Section E was estimated by Waters (1957a).

The creel census serves as a tool in evaluation of experimental methods of trout management, such as special regulations, methods of plantings, etc., as well as providing information concerning the basic biology of trout. Because a compulsory permit system was in effect, insuring a complete, or nearly complete, census, information could be secured which could not otherwise be obtained. Previous annual creel census reports have appeared as Institute for Fisheries Research Reports Numbers 1250, 1288 (Cooper, 1950, 1951), 1512, 1521, 1527 (Waters, 1957a, 1957b, 1957c), 1544 (Bacon, Shetter and Cooper, 1958) and 1560 (Latta, 1959).

It is the primary purpose of this report to record certain features of special interest concerning the trout fishing in the research area so that the data may serve, with limitations, as indices of general trout fishing in Michigan. These features are: fishing success according to experimental section of the stream and to individual lake, according to lure used, according to time of season, and according to the frequency of trips of individual anglers; the various classes of anglers using the area; the residence of anglers; the age composition of the catch; and fishing success through the years since the establishment of the research station. Data are also presented on the annual post-season fall population estimate made in the experimental area of the stream in order that the degree of exploitation by anglers may be noted.

In addition to the creel census, the activities of the research station personnel are concerned with special research projects, some of which may or may not utilize the creel census as a research tool, and some of which are conducted on waters outside the area under creel census. The results of these special projects are given in separate reports, inasmuch as the projects often continue over a number of years. Since the experimental plantings of

hatchery fish in the stream are special projects, the data recorded in this report do not include records of hatchery fish, but wild trout only.<sup>1/</sup> Likewise, since the entire fisheries in the lakes are the result of hatchery plantings involved in special projects, the results of the lake fishing have been, in general, reserved for separate reports, except for certain features of general interest which are included here.

During 1958, except for the month of January, the station was under the supervision of the author. Gerald F. Myers was in charge during January. The rest of the permanent staff, in addition to the author and Mr. Myers, included Harold H. Brado and Doyle E. Edson. During the first two days of the fishing season, Gayle D. Betts and Kiyoshi G. Fukano provided additional help. Mr. Betts also assisted during the post-season fall population estimate of the number of trout in the river. Supervisory assistance, in 1958, was provided by Gerald P. Cooper and David S. Shetter.

#### Creel census

Since the establishment of the research station, certain special regulations have been in effect. The regulations have been, or will be, evaluated in separate reports; however, they are summarized in Table 2, to aid in an interpretation of the creel census results.

Table 3 presents the catch statistics for 1958 for the stream sections.<sup>2/</sup> Although fishing pressure, as measured by the total number of fishing trips

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<sup>1/</sup>In 1958, only project 26d, a test of the relative effects of stream improvement on three species of trout, utilized hatchery fish. Section A, the improved section, and Section B, the control section, each received a planting of 975 trout (300 brook, 300 brown and 375 rainbow), 6 to 7 inches in length, in the late fall of 1957. The experiment was discontinued at the end of the 1958 fishing season. See Appendix for more details.

<sup>2/</sup>In Table 3, and other tables that follow, catch per hour per trip was determined by taking a simple average of the catch per hour for each fishing trip.

Table 2.--Experimental regulations, Pigeon River and  
Pigeon River Research Station lakes, 1949-1958

Years	Water and regulations <sup>1</sup>							
	Stream sections						Lakes	
	A, B		C, D		E <sup>2</sup>		Creel limit (trout per day)	Minimum legal length (inches)
	Creel limit (trout per day)	Minimum legal length (inches)	Creel limit (trout per day)	Minimum legal length (inches)	Creel limit (trout per day)	Minimum legal length (inches)		
1949-50	5	7	15	7	...	...	5	7
1951-52	5	7	2	9	...	...	5	7
1953-54	5	7	2	9	10	7	5	7
1955-58	5	7	5	9	10	7	5	7

<sup>1</sup>Lure was restricted to artificial flies only in Sections C and D of the river in 1958 and in Ford Lake in 1955-58. Minnows were prohibited in the lakes (state-wide restriction on all designated trout lakes).

<sup>2</sup>Section E was added in 1953.

Table 3.--Results of creel census on experimental stream sections,  
Pigeon River Trout Research Station, 1958

Stream section	Number of trips	Percentage successful	Anglers' catch								Hours fished	Average catch per hour per trip (number of fish)
			Brook trout		Brown trout		Rainbow trout		Total			
			Number	Weight (pounds)	Number	Weight (pounds)	Number	Weight (pounds)	Number	Weight (pounds)		
A	384	22.4	152	26.90	28	15.00	4	1.14	184	43.04	991.0	0.17
B	544	26.7	191	35.08	48	18.64	4	1.78	243	55.50	1,308.5	0.18
C	177	20.9	35	9.80	18	7.48	2	0.62	55	17.90	480.0	0.11
D	211	10.9	26	8.73	9	5.03	1	0.34	36	14.10	570.0	0.06
E	283	42.8	490	84.73	13	5.70	...	...	503	90.43	855.5	0.53
<b>Total</b>	<b>1,599</b>	<b>25.8</b>	<b>894</b>	<b>165.24</b>	<b>116</b>	<b>51.85</b>	<b>11</b>	<b>3.88</b>	<b>1,021</b>	<b>220.97</b>	<b>4,205.0</b>	<b>0.22</b>



made and total hours fished, was lower than in any year since the addition of Section E to the experimental water in 1953, the fishing success, as measured by the percentage of successful anglers and average catch per hour per trip, was higher than in any year since 1954. However, the total number of trout caught (1,021) was only 163 more than the total for 1957. In general, 1957 was one of the poorest years in all categories of the census, as a result of the flood of the experimental sections of the river on May 15, 1957 (see Latta, 1959, for details of the flood). Section E, the part of the experimental water most adversely affected by the flood (much of the food-producing gravel bottom was covered by shifting sand and much of the cover was destroyed), again in 1958, as in all other years except 1957, produced about half of the total catch. Fishing success in 1958 in Section E, after the low in 1957, was again up to the norm of previous years with an average catch per hour per trip of 0.53 fish and with 42.8 percent of the anglers successful.

In 1958, Sections C and D had, in addition to a minimum size limit of 9 inches (a regulation that has been in effect since 1951), a further restriction that only artificial flies could be used as a lure. There was no apparent change in fishing success but the catch as a percentage of the total dropped slightly from previous years with this change from no restriction of lure to flies only.

Table 4 presents the catch statistics for the Pigeon River lakes. The fishery consists entirely of hatchery brook trout planted as fingerlings in the fall, with the exception of Section 4 Lake where brook trout fry are planted in the spring. Fishing success was similar to that of previous years; it was much better than in the experimental stream sections. Ford Lake, with a flies-only restriction, rated highest among the lakes in catch per hour per trip and in percentage of successful anglers, for the first time since the regulation was imposed in 1955.

Table 4.--Results of creel census on Pigeon River lakes, 1958

Lake	Number of trips	Percentage successful	Anglers' catch (brook trout)	Hours fished	Average catch per hour per trip (number of fish)
Ford	163	51.5	289	360.0	0.83
Section 4	172	34.3	172	444.5	0.30
Hemlock	339	50.1	569	995.0	0.66
Lost	260	50.4	424	660.5	0.59
West Lost	385	46.2	518	1,044.5	0.50
North Twin	372	45.2	544	988.5	0.60
South Twin	289	27.7	232	664.0	0.29
Total	1,980	43.9	2,748	5,157.0	0.54

With regard to fishing success according to lure used, stream anglers using flies had a lower total catch and catch per hour per trip than anglers using worms (Table 5). Flies were used most frequently, with worms and worms-spinner combination following in that order. In the lakes, worms were used most frequently and accounted for the greatest part of the catch.

Table 6 gives the total weight of the anglers' catch and fishing success by weekly periods. As in previous years, fishing success declined in July.

Table 7 shows fishing success arranged according to the number of times that individual anglers fished. With a few exceptions anglers who fished many times were more successful than those who fished only once or twice. Computing from Table 7, 31 percent of the fishermen caught 80 percent of the fish and 8 percent of the fishermen caught 51 percent of the fish, which is almost identical with the 1957 results. This pattern of success has not varied much in the past years.

Table 8 gives the age composition of the anglers' catch and average total length and weight of each age group. Two-year-olds predominated in the catch for all three species--brook, brown and rainbow trout. Three brook trout in the catch were over four years old. Brook trout of these ages (age-groups V and VI) have not been represented in the catch since 1954.

The length and weight data of Table 8 suggest that the growth of brown and rainbow trout was more rapid than that of brook trout; the difference may be even greater than indicated by the data, for Cooper (1953) has shown that anglers catch more of the faster-growing individuals among brook trout than among brown trout. Also, the differential in size between one-year-old and two-year-old fish is probably greater than indicated in Table 8 because most of the yearlings were taken during the later part of the fishing season after

Table 5.--Fishing success according to lure used, Pigeon River Trout Research Station, 1958

Lure	Number of trips	Percentage successful	Number of trout caught				Hours fished	Average catch per hour per trip (number of fish)
			Brook	Brown	Rainbow	Total		
S T R E A M								
Worms	482	30.7	378	29	4	411	1,285.5	0.27
Worms and spinner	227	29.1	183	5	1	189	649.0	0.26
Flies	717	21.3	222	78	6	306	1,753.5	0.17
Minnows	5	40.0	4	1	...	5	15.5	0.38
Insects	9	....	...	...	...	...	10.0	....
Artificials <sup>1</sup>	31	22.6	16	2	...	18	87.5	0.13
Naturals <sup>2</sup>	4	....	...	...	...	...	12.5	....
Other <sup>3</sup>	122	28.7	90	1	...	91	385.0	0.24
Unknown	2	50.0	1	...	...	1	6.5	0.20
<b>Total for stream</b>	<b>1,599</b>	<b>25.8</b>	<b>894</b>	<b>116</b>	<b>11</b>	<b>1,021</b>	<b>4,205.0</b>	<b>0.22</b>
L A K E S								
Worms	1,132	46.4	1,637				3,057.0	0.52
Worms and spinner	310	42.9	414				787.0	0.51
Flies	81	32.1	63				168.5	0.34
Insects	4	25.0	1				11.5	0.06
Artificials <sup>1</sup>	31	16.1	8				53.0	0.16
Naturals <sup>2</sup>	1	....	...				1.0	....
Other <sup>3</sup>	246	35.8	304				692.0	0.53
Unknown	12	66.7	32				27.0	1.81
<b>Ford Lake (flies)</b>	<b>163</b>	<b>51.5</b>	<b>289</b>				<b>360.0</b>	<b>0.83</b>
<b>Total for lakes</b>	<b>1,980</b>	<b>43.9</b>	<b>2,748</b>				<b>5,157.0</b>	<b>0.54</b>

<sup>1</sup>Artificial lures other than flies.

<sup>2</sup>Natural baits other than worms, minnows or insects.

<sup>3</sup>Other refers to a combination of the above lures, two or more lures used successively on same trip or a lure other than listed above.

Table 6.--Fishing success and total weight of anglers' catch by weekly period, Pigeon River, 1958

Week	Number of trips	Percentage successful	Anglers' catch						Total catch	Total weight	Hours fished	Average catch per hour per trip (number of fish)
			Brook trout		Brown trout		Rainbow trout					
			Number	Weight (pounds)	Number	Weight (pounds)	Number	Weight (pounds)				
Apr. 26-May 2	173	48.6	275	50.10	17	7.00	2	1.00	294	58.10	451.0	0.55
May 3-May 9	70	61.4	113	21.28	5	1.60	3	0.86	121	23.74	234.5	0.48
May 10-May 16	103	33.0	75	13.12	9	4.81	2	0.76	86	18.69	293.5	0.31
May 17-May 23	75	38.7	75	13.10	2	0.66	1	0.32	78	14.08	197.5	0.29
May 24-May 30	101	22.8	54	9.98	3	1.07	0	....	57	11.05	278.0	0.16
May 31-June 6	73	23.3	28	6.00	5	2.02	0	....	33	8.02	204.0	0.13
June 7-June 13	59	22.0	23	4.56	4	1.71	0	....	27	6.27	148.0	0.21
June 14-June 20	52	23.1	10	2.51	4	1.37	1	0.44	15	4.32	147.5	0.12
June 21-June 27	84	17.9	18	3.60	7	3.28	1	0.32	26	7.20	222.0	0.10
June 28-July 4	100	24.0	37	6.76	10	4.08	0	....	47	10.84	247.5	0.16
July 5-July 11	133	15.0	17	3.74	9	4.22	0	....	26	7.96	368.5	0.07
July 12-July 18	113	17.7	20	3.91	9	5.19	1	0.18	30	9.28	247.0	0.12
July 19-July 25	107	18.7	26	4.84	8	2.86	0	....	34	7.70	226.0	0.15
July 26-Aug. 1	42	19.0	12	2.25	2	2.20	0	....	14	4.45	93.5	0.13
Aug. 2-Aug. 8	57	21.1	44	7.48	6	1.83	0	....	50	9.31	124.0	0.38
Aug. 9-Aug. 15	51	7.8	15	2.92	2	0.76	0	....	17	3.68	118.5	0.14
Aug. 16-Aug. 22	70	8.6	11	1.72	3	0.44	0	....	14	2.16	226.0	0.07
Aug. 23-Aug. 29	65	21.5	18	2.97	5	4.64	0	....	23	7.61	205.5	0.13
Aug. 30-Sept. 5	46	10.9	4	0.60	1	0.24	0	....	5	0.84	110.0	0.03
Sept. 6-Sept. 12	6	33.3	5	0.68	1	0.14	0	....	6	0.82	16.0	0.26
Sept. 13-Sept. 14	19	36.8	14	3.14	4	1.74	0	....	18	4.88	46.5	0.33
<b>Total</b>	<b>1,599</b>	<b>25.8</b>	<b>894</b>	<b>165.26</b>	<b>116</b>	<b>51.86</b>	<b>11</b>	<b>3.88</b>	<b>1,021</b>	<b>221.00</b>	<b>4,205.0</b>	<b>0.22</b>

Table 7.--Fishing success according to frequency of fishing trips,  
Pigeon River, 1958

Frequency	Number of anglers	Number of trips	Total catch	Average catch per hour per trip (number of fish)
45	1	45	43	0.37
23	1	23	12	0.29
22	2	44	27	0.30
20	2	40	3	0.04
18	1	18	16	0.28
17	3	51	36	0.23
16	1	16	20	0.30
15	1	15	5	0.17
14	3	42	7	0.07
13	2	26	48	0.77
12	1	12	1	0.03
11	2	22	68	1.00
10	4	40	43	0.39
9	2	18	4	0.11
8	5	40	21	0.12
7	5	35	59	0.62
6	4	24	15	0.24
5	21	105	89	0.28
4	19	76	61	0.27
3	39	117	89	0.23
2	122	244	154	0.20
1	546	546	200	0.12
<b>Total</b>	<b>787</b>	<b>1,599</b>	<b>1,021</b>	<b>0.22</b>

Table 8.--Age composition of anglers' catch and average length and weight of age groups, Pigeon River, 1958\*

Species	Age group	Number	Average total length (inches)	Average weight (pounds)
Brook	I	98	7.5	0.15
	II	705	8.0	0.17
	III	72	9.7	0.30
	IV	11	11.7	0.52
	V	2	13.8	0.88
	VI	1	13.7	0.84
Brown	I	31	7.8	0.16
	II	64	10.3	0.40
	III	15	13.4	0.90
	IV	4	14.8	1.12
	V	1	20.2	2.94
Rainbow	I	1	8.2	0.18
	II	10	10.2	0.37

\*The ages of five brook trout and one brown trout were not determined.

most of the season's growth had taken place, whereas the catch of the two-year-old fish was spread more uniformly throughout the season.

Cooper (1952) determined the rates of exploitation of brook and brown trout in the Pigeon River by comparing the season's catch with the population left at the end of the season (fall population count by shocker). He found that three brook trout were caught for each one remaining in the stream at the end of the season, and that one brown trout was caught for each three remaining. Comparable figures from the 1958 data were taken from Sections A, B and E combined, which have a seven-inch size limit and no lure restriction (Table 9). The rate of exploitation for brook trout in these sections was 82 percent and for brown trout 24 percent, a ratio of about four caught to one remaining in the stream for the brook trout, and a ratio of one to three for the brown trout. The fact of greater angler exploitation of brook trout than of brown trout in the Pigeon River has not changed in the years since Cooper's report, although the rates of exploitation of each species have varied somewhat from year to year.

In Sections C and D, under a nine-inch size limit and a regulation imposed this year restricting the lure to flies only, the exploitation rate for brook trout was 50 percent (a one-to-one ratio) and for brown trout 31 percent (about a one-to-two ratio). The exploitation rates in these sections have not changed under the flies-only regulation from the 1957 rates, but they have decreased from the 1956 rates of 81 percent for brook trout and 52 percent for brown trout. The 1957 rates may have been affected by the flood. One year under the flies-only regulation is not long enough to draw any conclusions concerning rates of exploitation. Too few data for rainbow trout were obtained to justify a general conclusion concerning this species.



Table 9.--Exploitation of wild trout, Pigeon River, 1958

	Species of trout		
	Brook	Brown	Rainbow
<hr/>			
Sections A, B and E (7-inch minimum)			
Number caught by anglers (7.0 inches and larger)	833	89	8
Population estimate, September (7.0 inches and larger)	186	286	2
Percentage exploitation	81.75	23.73	80.00
<hr/>			
Sections C and D (9-inch minimum, flies only)			
Number caught by anglers (9.0 inches and larger)	61	27	3
Population estimate, September (9.0 inches and larger)	61	60	1
Percentage exploitation	50.00	31.03	75.00
<hr/>			

Table 10 gives the number of fishing trips made by licensed and non-licensed anglers, i.e., wives or minors, to the experimental waters. Licensed anglers accounted for 77 percent of the fishing on the stream and 66 percent of the fishing on the lakes. The remainder of the fishing was done by non-licensed anglers. Among stream fishermen, 88 percent of the fishing was by Michigan residents; among lake fishermen 96 percent was by Michigan residents. During the past five years, the above percentages have varied little.

The greatest amount of fishing pressure in the Pigeon River was supplied by residents of Wayne County, with local residents from Otsego County placing second (Table 11). Of the 83 counties in Michigan, 55 were represented by at least one angler; excluding Michigan, 10 states were represented. Ohio and Indiana supplied most of the out-of-state anglers.

On the lakes the local residents from Otsego County outnumbered the Wayne County residents (Table 12). Fifty-one counties of Michigan and 11 states contributed at least one angler. The distribution, in general, was similar to that for the stream.

Table 13 gives the annual totals of fishing pressure and fishing success for the experimental waters of the Pigeon River since 1949. Because various experimental management methods have been tested during these years, interpretation of the data is somewhat complicated. Fishing pressure has declined steadily since 1954, but fishing success, after a steady decline from 1954 through 1957, increased slightly in 1958.

#### Post-season fall population estimate

The fall population of trout in the experimental area of the Pigeon River was determined by the Petersen method of mark-and-recapture (see Waters, 1957a). Two runs with a direct-current shocker were made through the 6 miles of stream

Table 10.--Classes of anglers using the Pigeon River experimental waters, 1958, percentages in parentheses

	Licensed males	Licensed females	Wives	Minor males	Minor females	Total
S T R E A M						
Resident	1,085	1	144	156	22	1,408 (88.1)
Nonresident	129	17	...	35	10	191 (11.9)
Stream total	1,214 (75.9)	18 (1.1)	144 (9.0)	191 (12.0)	32 (2.0)	1,599 ...
L A K E S						
Resident	1,244	4	249	352	57	1,906 (96.3)
Nonresident	51	10	...	10	3	74 (3.7)
Lakes total	1,295 (65.4)	14 (0.7)	249 (12.6)	362 (18.3)	60 (3.0)	1,980 ...

Table 11.--Residence of anglers fishing Pigeon River, 1958

County	Angler trips	County	Angler trips	County or State	Angler trips
Wayne	318	St. Clair	8	Wexford	2
Otsego	236	Eaton	7	Delta	1
Oakland	127	Lapeer	7	Dickinson	1
Bay	92	Leelanau	6	Grand Traverse	1
Genesee	87	Livingston	6	Hillsdale	1
Muskegon	81	Arenac	5	Isabella	1
Ingham	63	Lenawee	5	Montcalm	1
Washtenaw	51	Sanilac	5	Newaygo	1
Kent	36	Iosco	4	Van Buren	1
Shiawassee	27	Monroe	4	<u>Total</u>	<u>1,408</u>
Charlevoix	23	Ottawa	4	Michigan	1,408
Macomb	20	Presque Isle	4	Ohio	152
Alpena	17	Berrien	3	Indiana	14
Saginaw	16	Clare	3	Illinois	6
Allegan	15	Gratiot	3	Kentucky	4
Branch	15	Kalamazoo	3	Pennsylvania	4
Tuscola	15	Montmorency	3	Wisconsin	4
Midland	13	Clinton	2	Missouri	3
Cheboygan	12	Emmet	2	New York	2
Calhoun	11	Luce	2	California	1
Jackson	11	Mecosta	2	Massachusetts	1
St. Joseph	11	Ogenaw	2		
Gladwin	9	Roscommon	2	<u>Total</u>	<u>1,599</u>

Table 12.--Residence of anglers fishing Pigeon River lakes, 1958

County	Angler trips	County	Angler trips	County or State	Angler trips
Otsego	356	Kalamazoo	12	Missaukee	3
Wayne	231	Oceana	12	Ionia	2
Oakland	137	Tuscola	12	Barry	1
Genesee	131	Clare	11	Crawford	1
Charlevoix	126	Emmet	10	Isabella	1
Shiawassee	109	Livingston	9	Ottawa	1
Bay	86	Antrim	7	Wexford	1
Muskegon	84	Allegan	6	<u>Total</u>	<u>1,906</u>
St. Clair	74	Alpena	6	Michigan	1,906
Saginaw	72	Huron	6	Ohio	39
Presque Isle	57	Mecosta	6	Indiana	6
Cheboygan	52	Newaygo	6	New Jersey	6
Washtenaw	40	Branch	5	New York	6
Kent	35	Clinton	5	Illinois	4
Midland	34	Eaton	5	Maryland	4
Ingham	32	Montmorency	5	Minnesota	3
Macomb	28	St. Joseph	5	Delaware	2
Gratiot	23	Sanilac	5	Pennsylvania	2
Jackson	18	Benzie	4	Florida	1
Calhoun	16	Berrien	3	<u>Wisconsin</u>	<u>1</u>
Arenac	12	Lenawee	3	Total	1,980

Table 13.--Results of creel census, Pigeon River, 1949-1958

Year	Number of trips	Percentage successful	Trout caught				Hours fished	Average catch per hour per angler (number of fish)
			Brook	Brown	Rainbow	Total		
1949	2,233	26.2	793	198	57	1,048	6,817.0	0.15
1950	2,160	27.3	917	255	18	1,190	6,195.0	0.18
1951	2,846	15.4	453	228	10	691	7,076.0	0.10
1952	1,450	24.5	464	127	47	638	3,957.5	0.16
1953 <sup>↓</sup>	1,943	24.9	742	203	88	1,033	5,689.0	0.23
1954 <sup>↓</sup>	2,427	32.8	1,435	437	66	1,938	6,584.5	0.30
1955 <sup>↓</sup>	2,039	25.3	959	250	33	1,242	5,775.5	0.20
1956 <sup>↓</sup>	1,979	24.8	869	266	15	1,150	5,527.0	0.19
1957 <sup>↓</sup>	1,699	23.2	721	120	17	858	4,490.0	0.18
1958 <sup>↓</sup>	1,599	25.8	894	116	11	1,021	4,205.0	0.22

<sup>↓</sup>Section E added in 1953.

(5 experimental sections). Trout caught on the first run were marked by clipping the top corner of the caudal fin; length was recorded and they were liberated where they were caught. Records of marked and unmarked fish from the second run permitted an estimate of the population by species, size group and experimental section.

Table 14 presents the results of the 1958 fall population estimate, by stream section, species and four length groups of fish. The total population for the six miles of river was 11,966 brook, 5,174 brown and 63 rainbow trout, or 24.2 pounds of trout per acre.

The total population has not been this large since 1954 when it reached a high of 21,117 trout. The increase over the populations of 1955 through 1957 has taken place primarily in the smaller size groups; there has been a decrease in the number of fish greater than 9.9 inches in length. The fear that the 1957 flood, which so visibly altered the stream bottom of Section E by covering a large portion of it with sand and which removed much of the natural cover, would adversely affect the trout production was apparently groundless. In 1958, there was an estimated 3,950 trout of all sizes in Section E, which is the largest number recorded since 1954. The production of 2,790 young-of-the-year fish (size group, 0-3.9 inches) was also the highest since 1954. In the years 1954-56, young-of-the-year production in Section E (measured as a percentage of the total number of young-of-the-year estimated to be present in all of the experimental water) varied from 21 to 28 percent. In 1957, this production dropped to 15 percent, but in 1958 it was again up to 23 percent. The number of fish 4.0 inches and larger in Section E has not varied percentagewise in the last five years. Expressed as a percentage of the total number of that size, they have made up 25, 23, 25, 24 and 23 percent of the population in the years 1954-58, respectively.

Table 14.--Results of post-season population estimate (wild trout only),

Pigeon River, 1958

Stream section	Species of trout	Total length (inches)								All sizes		
		0-3.9		4.0-6.9		7.0-9.9		>9.9		Number	Weight (pounds)	Pounds per acre
		Number	Weight (pounds)	Number	Weight (pounds)	Number	Weight (pounds)	Number	Weight (pounds)			
A	Brook	319	4.1	167	11.5	61	10.3	4	1.7	551	27.6	3.9
	Brown	548	7.9	133	6.6	103	18.5	15	18.4	799	51.4	7.2
	Rainbow	4	0.1	...	...	2	0.4	...	...	6	0.5	0.1
	Total	871	12.1	300	18.1	166	29.2	19	20.1	1,356	79.5	11.2
B	Brook	1,151	14.9	275	19.7	33	5.8	2	0.8	1,461	41.2	7.0
	Brown	957	13.8	192	9.4	74	13.0	24	25.3	1,247	61.5	10.4
	Rainbow	16	0.2	3	0.1	...	...	...	...	19	0.3	0.1
	Total	2,124	28.9	470	29.2	107	18.8	26	26.1	2,727	103.0	17.5
C	Brook	2,051	25.5	656	46.1	204	35.7	10	4.2	2,921	111.5	20.7
	Brown	1,041	14.7	192	8.3	85	15.6	21	20.9	1,339	59.5	11.0
	Rainbow	34	0.5	3	0.2	...	...	1	0.4	38	1.1	0.2
	Total	3,126	40.7	851	54.6	289	51.3	32	25.5	4,298	172.1	31.9
D	Brook	2,223	27.5	1,162	81.9	276	50.1	9	5.4	3,670	164.9	29.2
	Brown	937	13.3	168	6.9	68	12.2	29	31.1	1,202	63.5	11.2
	Rainbow	...	...	...	...	...	...	...	...	...	...	...
	Total	3,160	40.8	1,330	88.8	344	62.3	38	36.5	4,872	228.4	40.4
E	Brook	2,390	29.8	887	54.4	83	15.6	3	1.3	3,363	101.1	17.8
	Brown	400	5.9	117	4.4	55	10.2	15	14.0	587	34.5	6.1
	Rainbow	...	...	...	...	...	...	...	...	...	...	...
	Total	2,790	35.7	1,004	58.8	138	25.8	18	15.3	3,950	135.6	23.9
All sections	Brook	8,134	101.8	3,147	213.6	657	117.5	28	13.4	11,966	446.3	15.0
	Brown	3,883	55.6	802	35.6	385	69.5	104	109.7	5,174	270.4	9.1
	Rainbow	54	0.8	6	0.3	2	0.4	1	0.4	63	1.9	0.1
	Total	12,071	158.2	3,955	249.5	1,044	187.4	133	123.5	17,203	718.6	24.2



Table 15 shows the number and weight of trout estimated to be present in the experimental waters of the Pigeon River each year since 1949. There was an increase in numbers from 1949 to 1954, a decrease through 1956, and an upward trend in 1957-58.

Table 15.--Post-season population estimate of wild trout, Pigeon River, 1949-1958

Year	Number	Weight (pounds)	Pounds per acre	Number	Weight (pounds)	Pounds per acre	Number	Weight (pounds)	Pounds per acre
	<u>Section A</u>			<u>Section B</u>			<u>Section C</u>		
1949	585	48.2	6.7	1,373	91.7	15.5	3,287	148.4	27.5
1950	930	61.2	8.5	2,334	140.9	23.9	2,460	141.2	26.2
1951	1,380	74.7	10.4	3,063	134.8	22.9	4,322	180.7	33.5
1952	1,454	85.3	11.9	3,714	117.8	20.0	6,406	234.1	43.4
1953	2,249	127.3	17.8	3,287	173.2	29.4	5,022	354.9	65.8
1954	2,285	90.3	12.6	4,005	218.2	37.0	5,011	307.7	57.1
1955	1,545	100.6	14.1	1,888	107.2	18.2	3,523	192.1	35.6
1956	960	58.4	8.1	1,389	92.3	15.7	2,961	138.2	25.6
1957	970	62.6	8.8	1,799	71.0	12.0	3,436	135.1	25.1
1958	1,356	79.5	11.2	2,727	103.0	17.5	4,298	172.1	31.9
	<u>Section D</u>			<u>Section E</u>			<u>All sections</u>		
1949	2,491	135.6	24.0	...	...	...	7,736	423.9	17.6
1950	4,525	231.2	40.9	...	...	...	10,249	574.5	23.8
1951	5,746	336.8	59.6	...	...	...	14,511	727.0	30.2
1952	5,348	266.0	47.1	...	...	...	16,922	703.2	29.2
1953 <sup>1</sup>	4,080	304.0	53.8	3,681	229.2	40.4	18,319	1,188.6	39.9
1954	4,503	286.3	50.7	5,313	226.1	39.4	21,117	1,128.6	37.9
1955	2,749	200.2	35.4	2,705	156.0	26.0	12,410	756.1	25.4
1956	2,451	124.8	22.1	2,852	114.8	20.3	10,613	528.5	17.8
1957	2,725	146.9	26.0	1,897	106.3	18.7	10,827	521.9	17.5
1958	4,872	228.4	40.4	3,950	135.6	23.9	17,203	718.6	24.2

<sup>1</sup>Section E added in 1953.

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## Appendix

Since detailed treatment of all special research projects will be made in separate reports, no experimental data or conclusions are given here. However, brief descriptions of special projects in progress at the Pigeon River station during 1958 follow:

1. Testing of a higher minimum size and bait restriction in the Pigeon River (project 29L). A nine-inch minimum size limit has been in effect in Sections C and D since 1951. In 1958, the angling lure was restricted to artificial flies only, in addition to the higher minimum size. The effects of these special regulations will be evaluated through the creel census and fall population studies for the period 1951 through date of completion, 1962.

2. Effects of stream improvement on density of trout populations (project 26b). Stream improvement structures were constructed in Section A of the experimental area in 1953; this section of stream had previously been wide and shallow, with shifting sand and little natural cover. A preliminary evaluation of the structures was made by comparisons, using anglers' catch and population estimates, of the years 1949-53 (before improvement) with the years 1954-56 (after improvement); see I. F. R. Report No. 1541 by Thomas F. Waters. In 1959, a report will be prepared to cover the years 1949-53 (before improvement) and 1954-58 (after improvement). The study is to be continued. The plan is to remove all man-made improvement structures from Section A during the spring of 1959, and study the effects on trout during the next five years.

3. Survival to the creel of fall plantings of sublegal trout in an area of stream where improvement structures have been placed (project 26d). The experiment will compare the survival rates of fall plants of sublegal brook, brown and rainbow trout in an area of stream which has deep holes and fast water created by stream improvement structures (Section A) with survival

rates in an area of stream lacking these characteristics (Section B). It is hypothesized that deep holes and fast-water habitat will favor the survival of the rainbow trout over the other two species. Evaluation will use the number of recoveries in the creel census and in the fall population studies. The first planting consisting of 300 brook, 300 brown and 375 rainbow trout, 6 to 7 inches in length, in each section was made in the fall of 1957; returns have been compiled for the year 1958. However, the experiment was discontinued with the extension of project 26b (above) in which the stream improvement structures will be removed from Section A. A brief report covering the results for the one year of the experiment will be prepared.

4. Fingerling trout planting--Pigeon River lakes (project 30f). This project was initiated in 1952 to determine the survival to the creel of fingerling brook trout planted in the lakes in the fall. Lakes included in this project are South Twin, North Twin, Lost, West Lost, Ford and Hemlock. Since the advent of pellet feeding in the hatcheries and the consequent increase in growth of hatchery trout, the size of trout planted in the fall was increased in 1956 to 5-6 inches, rather than fingerling size. In 1957, the planting rate was reduced from 500 per acre to 100 per acre with the expectation that better growth and greater survival would result.

5. Effect of a fly-fishing-only regulation on brook trout in lakes (project 29j). In 1955, a special regulation restricting the lure used to "artificial flies only" was imposed on Ford Lake to determine if this special regulation would increase the anglers' catch. In the fall of 1956, population studies were conducted in Ford Lake, and in Hemlock Lake where other lures are permitted, to compare the mortalities in these two lakes with and without the flies-only regulation. Population estimates were made in the spring and fall of 1957, and will be continued, in order to determine the pattern of mortality.