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REPORT NO. 644

CREEL CENSUS ON THE HUNT CREEK FISHERIES EXPERIMENTAL AREA, 1940 TROUT SEASON

by

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This report presents the summary of the angling results obtained by intensive creel census methods from the various experimental waters on this state-owned area (see map). Intensive creel census data are available from Sections A, B, C, D, and E of Hunt Creek (Section E was added in 1940), Fuller Creek Beaver Dam, and East Fish Lake. Data which are quite likely incomplete are available for approximately 3/4 mile of Hunt Creek below Section A, for Fuller Creek, for the East Fish Lake outlet, for Sutton's Pond, and for the beaver dam on Tributary No. 2.

Methods

The creel census technique was similar to that employed in 1939, and the creel census blanks were also the same (see Report No. 555). The census clerks for the 1940 trout season were Elmer Pynnonen and Lawrence Bush. During the opening week-end, Dr. James Moffett, O. H. Clark, and the author gave assistance in recording catches.

The anglers' catches were again recorded by the various types of trout water in which they had fished (i.e., lake, beaver dam, or stream). Hunt Creek was divided into five sections, each of which presents a different type of trout habitat. Signs asking for the cooperation of the fishermen were posted in the more remote parts of the area, and these gave directions and distances to the nearest creel census station. In Section A, the limits of two pools were designated by numbered signs, and in Section D one beaver dam was delimited by signs in an attempt to learn in more detail what these parts of a trout stream will produce in numbers and weight of fish.

Results - Hunt Creek Proper

(See also tables 1, 2, 3, 4, 5 and 6)

More anglers used Section D than any other section (170), followed by Section C (142 anglers), Section A (137 fishermen), and Sections B and E respectively (29 and 9 anglers). However, the number of hours of fishing was greatest in Section A (296.25), followed by Sections C, D, B, and E (259.50, 251.00, 86.50, and 8.00). For the entire stream area under census (4.69 acres), a total of 505 anglers fished 901.25 hours (67 more anglers and 120.75 more hours than in 1939). Of this number of anglers, 334, or 66 per cent, caught no fish. This represents an increase of 11 per cent in the number of unsuccessful anglers over the 1939 season (Table 6).

The greatest number of brook trout (152) and the greatest weight of trout (9,412 grams, 20.75 pounds) were removed from Section A, followed by Section C (113 fish, 8,144 grams, 17.95 pounds), Section D (91 fish, 6,179 grams, 13.62 pounds), Section B (41 fish, 3,033 grams, 6.69 pounds), and Section E (9 fish, 606 grams, 1.34 pounds).

The quality of the angling, as measured by the number of brook trout captured per hour of fishing or by the pounds of trout caught per hour of fishing, was as follows for the various sections (averages for the entire 1940 season):

	Catch per hour	Pounds per hour	
Section A	0.51	0.07	(Table 1)
Section B	0.47	0.08	(Table 2)
Section C	0.44	0.07	(Table 3)
Section D	0.36	0.05	(Table 4)
Section E	1.13	0.17	(Table 5)

The trend of the fishing (for the five sections combined) (Figure 1) was as follows: For the first eight weeks of the season (April 27-June 21), only Section A showed a catch per hour of greater than 0.50 fish. The poorest angling of the season was in the two-week period May 11-24, when the catch per hour was 0.18 fish. The best fishing was found to be in the period June 22-July 5, when the catch per hour for the entire experimental stream was 0.90 fish. From July 5-September 2, the catch per hour varied from 0.46 to 0.65 fish. From August 3-September 2, the angling was excellent in Sections B and C, and the catch per hour in those sections varied from 0.80 fish to 1.71 fish per hour.

Compared with the 1939 data, the 1940 catch per hour fell in Section A, increased slightly in Section B, was approximately the same in Section C, and was less than one-half of the 1939 catch per hour in Section D. (Section E was not recorded or was included in Section D in 1939.)

Yield - Pounds of Brook Trout and Number of Legal Brook Trout Removed Per Acre by Anglers

In Table 7 are shown the water acreages of the various sections of Hunt Creek and the number of pounds of trout and the number of legal trout removed from these sections. From these data the number of legal trout

and the number of pounds of legal trout removed per acre of water surface are calculated. Similar data for the 1939 season over the identical sections are also shown. The reader will note that angling during 1940 in Sections A, B, and C yielded more legal fish per acre and more pounds of trout per acre than these sections did in 1939, reflecting to a certain degree the increased angling effort. Section D, on the other hand, showed a startling decrease in yield (from 25.3 pounds of trout per acre in 1939 to 11.5 pounds of trout per acre in 1940) despite only a small decrease in the fishing effort over this water.

It is the writer's opinion that the decrease in the production of Section D from one season to the next might have been caused by a lowering of the water-level in the large beaver dam in Section D, which was caused by erosion of the dam. The dam, after the holes were washed through, lost approximately 12 inches of depth and at least one-third of its area, leaving water only in the old channel, and left most of the tag alder roots (formerly used as shelter by the trout) on shallow silt banks. However, no conclusive evidence can be offered to verify this theory.

Number of Marked Trout from Experimental Plantings or Markings Taken in 1940

During the 1940 trout season, marked brook trout from the following releases were available to the angler in the experimental sections if they had grown to legal size:

Left pectoral clipped - 1,000 native fingerlings - 2 to 4 inches when seined and clipped in August, 1939, in Section C.

Right pectoral clipped - 1,000 hatchery fingerlings - 2 to 4 inches when clipped and released in August, 1939, in Section C.

Dorsal and adipose clipped - Presumably not more than 1,000 (planted in experimental Section D by error) - 2 1/2 to 6 inches when clipped and released in October, 1939, in Section D.

Only one marked brook trout (taken in Section A) entered the legal catch during the 1940 season, a fish of 8.6 inches in length with the left pectoral missing. Presumably this fish was one of the native fingerlings hatched in the spring of 1939, but if so, this particular fish exhibited a rate of growth far above that of the others. Numerous seinings have not brought to light marked fish from any release which approached 7 inches in length.

Yield of Special Pools

Two pools in Section A were delimited with signs during the 1940 season, and the creel census clerk was instructed to question the anglers as to what part of their catches came from these pools. The beaver dam in Section D was also treated similarly.

Pool 1 in Section A is an open pool in the middle of an old beaver meadow of approximately 60 feet in length and varies from 15 to 25 feet in width. There is little or no underwater cover except that provided by an undercut bank and about 4 feet of water in the deepest part of the pool. During the 1940 season, two legal trout (7 1/2, 8 1/4 inches, total weight 4 1/2 ounces), and five undersized trout were caught from this pool.

Pool 2 lies near the upstream end of Section A above the beaver meadow. It is approximately 90 feet long and varies in width from 12 to 20 feet. It has excellent bank cover in the form of tag alder and there are many sunken logs for underwater cover, and the banks are undercut. ~~In~~

In places the depth reaches 4 feet. However, only three legal fish were recorded from this pool (7 1/4, 7 1/2, 7 7/8 inches, total weight 1/2 pound).

In the beaver dam in Section D, 17 legal brook trout were removed varying from 7 1/4 to 9 1/4 inches in length, and from slightly less than 2 ounces to slightly over 4 ounces in weight. The average size of the fish was 7 1/2 inches and 2 1/4 ounces. A total weight of 2.4 pounds of legal trout was removed from this dam, which during 1940 had at least one-third less water acreage than in 1939.

During 1941, the catch from these special stream areas will be recorded separately again. An attempt will be made to restore the water level in the Section D beaver dam to its 1939 elevation.

Size of Legal Brook Trout Taken by Anglers in Census Sections of Hunt Creek

Almost all the legal trout caught by anglers (398 of 406) were measured. Weights of 391 of 406 fish caught are available, of which 70 were estimated weights. The average lengths and the average weight have been assembled by two-week periods for each section of the stream, and these figures are presented in Table 8.

The average size of all fish taken in the five census sections was 7.6 inches and 2.3 ounces (approximately the same as in 1939). By census sections the average size of legal trout taken was as follows:

Section	Average total length	Average weight
A	7.5 inches	2.2 ounces
B	7.8 inches	2.6 ounces
C	7.7 inches	2.6 ounces
D	7.6 inches	2.4 ounces
E	7.2 inches	2.2 ounces

For the five sections of the stream, the average size of the legal trout caught was greatest in the two-week period August 17-30 (8 inches, 3 ounces), and least during the period May 25-June 7 (7.4 inches, 2 ounces).

The largest fish taken in the several sections were as follows:

Section	Length	Weight
A	10.3 inches	6.0 ounces
B	12.6 inches	11.3 ounces
C	10.7 inches	7.0 ounces
D	9.5 inches	4.7 ounces
E	7.5 inches	2.6 ounces

In all instances the largest fish was also the heaviest fish.

The legal trout taken in Sections B and C had somewhat greater average sizes in 1940 than in 1939, while the average size of brook trout in Section D was almost identical in both years. The average size of the fish removed from Section A decreased slightly.

Angling Pressure on the Experimental Sections of Hunt Creek

The tabulation of the number of hours of angling over the several sections divided by the known acreage of each section provides an accurate measure of the "angling pressure" or "fishing intensity." This unit is the "man-hours of fishing per acre per season," and is useful in determining the intensity of the sport fishery over known acreages of water, and is valuable in year-to-year and stream-to-stream comparisons. Table 9 presents the data on the "angling intensity" experienced on the experimental areas of Hunt Creek. Sections A and B were under considerably greater angling pressure (49 to 160 per cent greater) during 1940 than in 1939, while sections C and D were fished only from 1 to 4 per cent less in 1940 than in 1939. Section E has been excluded from this discussion since it was not recorded in 1939.

If the catch per unit effort is assumed to be constant and the population of legal fish unlimited, an increase in the angling pressure should cause a proportionate increase in the number of/or pounds of legal fish caught per acre. The first assumption is generally not valid, and the second assumption is only rarely true, and then under more or less special conditions. However, it may be possible to detect when a body of water is fished to capacity by comparing the percentage change in the angling pressure from year to year with the percentage increase or decrease of the catch per unit area and the catch per hour. For example, if the angling pressure on a given body of water increases 50 per cent and the number of legal fish caught per acre increases only 5 per cent (the number of fish caught per hour per man of necessity decreases), that body of water might be said to be over-fished with respect to the quality of the fishing as concerns the average angler. On the other hand, if the percentage of legal fish caught per unit area increases with a percentage increase in angling pressure and the catch per hour remains constant or becomes greater, that body of water is probably not being fished to capacity, and could undoubtedly stand more hours of fishing.

On the basis of these theoretical criteria, a study of Table 9 will show that Section A was overfished in 1940, Section B was not fished heavily enough, Section C was fished just about heavily enough, and Section D was overfished during the 1940 trout season. The overfishing of Section D may very well have occurred in 1939, since despite a small decrease in the fishing effort in this section in 1940, there was a disproportionate decrease in the number of pounds of fish caught per acre, and the catch per hour dropped 57 per cent over 1939. As stated elsewhere in the report, the change in elevation in the Section D beaver dam may have been a factor in this very noticeable change in the yield to the angler and the quality of the fishing in this particular section.

Fuller Creek Beaver Pond

(Table 10)

This body of trout water was not as heavily fished in 1940 as in 1939, and was used by only 65 anglers as compared with 112 fishermen in 1939. The percentage of unsuccessful anglers was almost the same (46 per cent in 1940, 45 per cent in 1939). The total hours of fishing in 1940 were only about 60 per cent of those expended in 1939 (144.25 compared with 249.50). The 1940 catch per hour diminished slightly over 1939--0.61 brook trout as compared with 0.66 brook trout in the previous year, and the pounds of fish caught per hour diminished from 0.35 to 0.26.

A total of 88 legal brook trout were removed in 1940 and these fish weighed 37.3 pounds, as compared with 164 fish weighing 88 pounds in 1939. The average size of the brook trout from this beaver pond again exceeded those from any other locality on the experimental area, and averaged 247 millimeters (9.7 inches) in total length, and 195 grams (6.9 ounces) in weight (Table 11). The largest fish taken was a 17-inch brook trout that weighed 1 pound, 15.4 ounces. The average size during the 1940 season was 1.2 inches less, and over 2 ounces less than during the 1939 season.

Since 22 undersized fish were reported as having been caught, it may be concluded that there is some spawning territory in the pond (unobserved up to the present), or that fish living in the beaver pond are able to make their way up into the stream above the impounded area and reproduce there, the young returning to the beaver pond.

The noticeable decrease in the average size of the fish removed in 1940, despite a much reduced fishing pressure, suggests the possibility that the pond was somewhat overfished in 1939, since the catch per hour did not decrease markedly.

The decrease in the fishing effort expended on the beaver pond can be ascribed to the continued presence of a thick mat of duck-weed (Lemna sp.), which almost completely blanketed the water surface of the lower half of the pond. This mat made fly-fishing impossible on that part of the pond, and in places was so heavy that several split shot were needed to carry a baited hook to the bottom. It is also possible that the duck-weed mat was indirectly responsible for the decrease in the average size of fish taken, since a large percentage of the deeper water and good "holes" were completely covered for more than half of the 1940 angling season. This mat of aquatic vegetation provides an excellent example of a natural limitation of the catch in this particular locality.

East Fish Lake

This small (13.5 acres) trout lake was fished by 111 anglers in 1940 (as compared with 63 fishermen in 1939) and 51 per cent caught no fish. A total of 172 legal trout weighing 27.9 pounds were removed from the lake in 308 hours of fishing at the rate of 0.56 trout per hour of fishing effort. Forty-three undersized fish were caught and returned (Table 12).

The average length of the trout taken was 204 millimeters (8.0+ inches), and the average weight was 76 grams (2.8 ounces). These averages include the measurements on the marked hatchery fish recovered. The largest native brook trout taken from this lake was a 12 5/8 inch fish weighing 12 ounces.

Of the 172 legal trout removed from this lake, 128 fish were marked hatchery trout which were planted on April 22, 1940, which was 5 days before the opening of the trout season. Only 44 legal fish, or 25 per cent of the total catch, consisted of native brook trout (Table 13).

In 1939, a total of 51 native brook trout were removed (Table 12).

Of the total weight of the legal catch, 70 per cent consisted of hatchery fish (8,894 grams of 12,668 grams).

The hatchery brook trout released on April 22, 1940 were marked in two ways. One-half (125) were jaw-tagged, and these fish were measured and weighed individually, and scale samples were taken from each fish. The remaining 125 brook trout were measured and fin-clipped; the adipose and left pelvic fins were removed, and this lot of fish was weighed in the entirety. Through the activities of the creel census clerks at Hunt Creek, weights and measurements of 57 tagged and 53 fin-clipped brook trout were obtained.

Since the tagged fish are recognizable as individuals at recovery as well as when tagged, their measurements have been compiled and averaged, and the results of this compilation are presented in Table 14. The planted trout must have lost an appreciable percentage of their weight shortly after release in East Fish Lake, although they continued to grow slightly.

The 71 marked fish recovered during the first two weeks of the 1940 season had been free an average of 13 days. They made an average gain in length of 4.6 millimeters, but suffered an average loss of 8.6 grams, or slightly more than 10 per cent of their average weight when marked. Similar gains in average length and losses in average weight are evident from the marked fish recovered in the two succeeding two-week periods. The marked trout which were captured and measured apparently had gained in length at the expense of nutrients stored in the body, and when these stored-up foods were utilized the fish lost weight.

Possible explanations for the loss in weight following the release of these fish are: (a) extreme competition for the available food

between both planted fish and native trout on one hand, and the perch, creek chubs, suckers, and common shiners on the other; (b) a limited food supply; and (c) the possibility that the introduced trout during the short period for which recoveries were made (38 days) had not learned how and on what to feed under natural conditions. The probable capture by anglers of some of these marked trout during the 1941 season may demonstrate whether or not the planted fish released in East Fish Lake will recover from this severe initial loss in weight and regain their original condition.

A knowledge of the ratio of marked hatchery fish to wild fish in the total catch enables us to make a claculation of the population of native fish at the beginning of the fishing season assuming that the rate of removal and any mortality occurred among marked and unmarked trout in equal proportions. The calculation is as follows:

$$\frac{44 \text{ (unmarked wild fish removed)}}{x \text{ (total population of unmarked wild fish on April 27)}} = \frac{128 \text{ (total marked fish caught}}{250 \text{ (total marked fish available)}} ;$$

$$128x = 11{,}000;$$

$$x = 86 \text{ (total population of wild trout on April 27, 1940).}$$

At the end of the 1940 trout season, the legal-sized brook trout population of East Fish Lake theoretically consisted of the following numbers:

42 wild trout (which were of legal size on April 27)

120 marked trout (2 marked fish were captured in the outlet stream)

In addition to the fish just enumerated, there will also be available for the 1941 angler in East Fish Lake 243 marked brook trout of legal size planted in October, 1940, and 250 marked brook trout of legal size to be released in early April, 1941. For 1941 angling, there will be

available, assuming no loss or migration, a total of 655 legal trout, plus a small but unknown number of native trout which have grown from sub-legal to legal size during the past year, the numerical strength of which cannot be estimated from the data at hand.

Although the number of hours of fishing increased from 1939 to 1940, angling pressure is still comparatively light on the lake at 23 man-hours per acre per season. The yield to the anglers was approximately 12 legal trout per acre, and 2.06 pounds of fish per acre.

Hunt Creek Below Section A

As it is not certain that anglers do not fish upstream into this general area and return downstream without detection by the census clerk, the records for this part of Hunt Creek must be regarded as incomplete. The data gathered probably represent a large percentage of the fishing effort over 3/4 mile of stream below Section A.

In 1940, only 162 anglers used the stream below Section A bridge. Sixty per cent of these anglers caught no trout. A total of 197 legal trout were taken during the season in 423.50 hours of fishing at the rate of 0.47 brook trout per hour of fishing. The total weight of these trout was 12,380 grams (27.2 pounds). Since the water acreage over which this angling was conducted is not known, estimates of the pressure and the per acre yield cannot be made.

The fluctuations in the qaulity of the angling were much the same as those experienced in the sections above it, and the average length and weight (Table 11) of the trout caught were almost identical with the averages for the five sections.

Percentage of Anglers Taking Various Numbers of Trout

The creel census data also have been sorted to determine the proportions of the anglers using the area who took from 0 to 15 trout (Table 16) for the four most heavily fished areas: Hunt Creek (Sections A, B, C, D, and E combined), East Fish Lake, Fuller Creek Beaver Dam, and Below Section A.

According to the records, no angler took a limit catch (15 fish) at any time, although 2 per cent of the fishermen using the Fuller Creek Beaver Dam took 14 fish. The largest percentage of successful anglers took one fish, as might be expected, followed by those taking two fish except in the Fuller Creek Beaver Dam, where a larger number of anglers took three trout than took two trout. Seldom more than 20 per cent of the anglers using any locality took more than three fish. This tabulation further establishes the Fuller Creek Beaver Dam as the best fishing spot on the area (at least during the past two seasons), since a lower percentage of unsuccessful fishermen and a higher percentage of anglers catching one, two, and three trout were reported than from any other locality.

For the sake of completeness, Table 17 has been drawn up to present the entire amount of creel census data available from the 1940 recordings. The last five water areas listed are relatively inaccessible and comparatively unknown to the angling public and were lightly fished. Also, they were not under continuous observation by the personnel of the Experiment Station, therefore the creel census data are very possibly incomplete. This statement applies particularly to Sutton's Pond, the beaver dam on Tributary #2, and Fuller Creek.

In passing, it might be pointed out that the catch per hour of trout in these lightly-fished localities was (with one exception) as good or better than those more heavily fished areas already discussed.

On the entire area, 884 anglers fished for a total of 1,847 hours and caught 910 brook trout. Sixty-one per cent of the total anglers (539) took no fish. The catch per hour of legal fish was 0.47, and 5,463 undersized trout were caught at the rate of 2.96 fish per hour of angling, and returned to the water. The total weight of fish removed by angling was 72,939 grams (160.8 pounds), which gave approximately 1/10 of a pound of fish per hour of angling for each angler.

Residence of Anglers Using the Area

Fishermen from 30 counties of the Lower Peninsula and from four other states fished in the waters of the experimental area. The greatest number of resident anglers (187) came from Montmorency County, the county in which the majority of Hunt Creek is located. Genesee and Wayne Counties (145 each) were well represented.

Out-of-state anglers were represented by 42 Ohio fishermen, 10 Pennsylvania anglers, 5 fishermen from Indiana, and 2 fishermen from Wisconsin (Table 18).

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Table 1. Intensive Creel Census Data,

Section A, Hunt Creek, 1940 Trout Season

Two-week periods	No. of fisher-men	No. taking no fish	% tak-ing no fish	No. hours fished	Legal brook No.	Legal brook Catch per hour	Illegal brook No.	Illegal brook Catch per hour	Weight of legal fish (grams)	Grams per hour	Pounds per hour
Apr.27-May 10	16	10	63	24.25	11	0.45	82	3.38	576	23.75	0.05
May 11-24	12	8	67	36.50	5	0.14	135	3.70	326	8.93	0.02
May 25-June 7	34	23	68	55.50	20	0.36	317	5.71	1,140	20.54	0.05
June 8-21	12	8	67	20.00	12	0.60	130	6.50	896	44.80	0.10
June 22-July 5	22	6	27	57.75	52	0.90	352	6.10	3,351	58.03	0.13
July 6-19	8	6	75	15.25	9	0.59	74	4.85	503	32.98	0.07
July 20-Aug. 2	12	8	67	23.50	21	0.89	102	4.34	1,243	52.89	0.12
Aug. 3-16	10	8	80	27.00	10	0.37	157	5.81	588	21.78	0.05
Aug. 17-30	7	5	71	22.50	9	0.40	72	3.20	629	27.96	0.06
Aug. 31-Sept. 2	4	3	75	14.00	3	0.21	41	2.93	160	11.43	0.03
Totals and averages, 1940	137	85	62	296.25	152	0.51	1462	4.94	[1] 9,412	31.77	0.07
Totals and averages, 1939	105	53	50	199.00	143	0.72	1071	5.38	[2] 9,080	45.6	0.10

[1] Weights for 19 fish estimated.

[2] Weight exclusive of 11 legal trout caught and released.

Table 2. Intensive Creel Census Data,

Section B, Hunt Creek, 1940 Trout Season

Two-week periods	No. of fisher-men	No. taking no fish	% tak-ing no fish	No. hours fished	Legal brook		Illegal brook		Weight of legal fish (grams)	Grams per hour	Pounds per hour
					No.	Catch per hour	No.	Catch per hour			
Apr. 27-May 10	8	6	75	11.50	2	0.17	34	2.96	40	3.48	0.008
May 11-24	6	6	100	11.75	0	0	27	2.30	0	0	0.00
May 25-June 7	10	8	80	18.50	5	0.27	187	10.11	315	17.03	0.04
June 8-21	5	4	80	8.75	2	0.23	57	6.51	107	12.23	0.03
June 22-July 5	2	1	50	3.00	2	0.67	17	5.67	111	37.00	0.08
July 6-19	...	...	...	...	...	...	...	...	...	...	...
July 20-Aug. 2	5	4	80	4.50	1	0.22	22	4.89	45	10.00	0.02
Aug. 3-16	5	0	0	10.75	12	1.12	37	3.44	1,157	107.63	0.24
Aug. 17-30	1	0	0	1.75	3	1.71	1	5.71	262	149.71	0.33
Aug. 31-Sept. 2	5	0	0	16.00	14	0.88	62	3.88	996	62.25	0.14
Totals and averages, 1940	47	29	62	86.50	41	0.47	444	5.13	[1] 3,033	35.06	0.08
Totals and averages, 1939	23	16	70	33.50	15	0.45	239	7.13	[2] 492	14.7	0.03

[1] Weights of 4 fish estimated.

[2] Weight exclusive of 6 fish caught and released.

Table 3. Intensive Creel Census Data,

Section C, Hunt Creek, 1940 Trout Season

Two-week periods	No. of fisher-men	No. taking no fish	% tak-ing no fish	No. hours fished	Legal brook		Illegal brook		Weight of legal fish (grams)	Grams per hour	Pounds per hour
					No.	Catch per hour	No.	Catch per hour			
Apr.27-May 10	26	18	69	46.25	16	0.35	171	3.70	779	16.84	0.04
May 11-24	16	14	88	42.00	5	0.12	145	3.45	279	6.64	0.01
May 25-June 7	20	17	85	34.75	3	0.09	166	4.78	145	4.17	0.009
June 8-21	9	6	67	14.00	5	0.36	52	3.71	380	27.14	0.06
June 22-July 5	10	5	50	16.25	17	1.05	72	4.43	1,022	62.89	0.14
July 6-19	3	1	33	3.50	2	0.57	19	5.43	180	51.43	0.11
July 20-Aug. 2	27	16	59	53.25	20	0.38	225	4.23	1,644	30.87	0.07
Aug. 3-16	14	7	50	24.00	22	0.92	66	2.75	1,639	68.29	0.15
Aug. 17-30	12	7	58	19.00	15	0.79	34	1.79	1,454	76.53	0.17
Aug. 31-Sept. 2	5	0	0	6.50	8	1.23	45	6.92	622	95.69	0.07
Totals and averages, 1940	142	91	64	259.50	113	0.44	995	3.83	[1] 8,144	31.38	0.07
Totals and averages, 1939	145	95	64	262.75	112	0.43	1332	5.07	[2] 7,243	27.6	0.06

[1] Weights for 18 fish estimated.

[2] Weight exclusive of 6 legal trout caught and returned.

Table 4. Intensive Creel Census Data,

Section D, Hunt Creek, 1940 Trout Season

Two-week periods	No. of fishermen	No. taking no fish	% taking no fish	No. hours fished	Legal brook No.	Legal brook Catch per hour	Illegal brook No.	Illegal brook Catch per hour	Weight of legal fish (grams)	Grams per hour	Pounds per hour
Apr. 27-May 10	37	30	81	47.25	12	0.25	152	3.22	760	16.08	0.04
May 11-24	20	14	70	34.50	13	0.38	98	2.84	738	21.39	0.05
May 25-June 7	32	28	88	40.25	4	0.10	130	3.23	191	4.75	0.01
June 8-21	12	8	67	15.50	6	0.39	36	2.32	406	26.19	0.06
June 22-July 5	10	4	40	21.00	17	0.81	50	2.38	1,085	51.67	0.11
July 6-19	6	2	33	10.50	6	0.57	28	2.67	518	49.33	0.11
July 20-Aug. 2	17	15	88	18.25	4	0.21	32	1.75	319	17.48	0.04
Aug. 3-16	19	10	53	40.00	20	0.50	72	1.80	1,582	39.55	0.09
Aug. 17-30	11	7	64	12.75	7	0.55	28	2.20	471	36.94	0.08
Aug. 31-Sept. 2	6	4	67	11.00	2	0.18	10	0.91	109	9.91	0.02
Totals and averages, 1940	170	122	72	251.00	91	0.36	636	2.53	[1] 6,179	24.62	0.05
Totals and averages, 1939	155	75	48	263.25	220	0.84	859	3.26	[2] 13,563	51.5	0.11

[1] Weights of 24 fish estimated.

[2] Weights exclusive of 9 legal trout returned to water.

Table 5. Intensive Creel Census Data,

Section E, Hunt Creek, 1940 Trout Season

Two-week periods	No. of fishermen	No. taking no fish	% taking no fish	No. hours fished	Legal brook		Illegal brook		Weight of legal fish (grams)	Grams per hour	Pounds per hour
					No.	Catch per hour	No.	Catch per hour			
Apr.27-May 10	2	1	50	1.25	4	3.20	5	4.00	294	235.20	0.52
May 11-24	3	3	100	3.75	0	0.00	0	0.00	0	0.00	0.00
May 25-June 7	1	1	100	0.50	0	0.00	0	0.00	0	0.00	0.00
June 8-21	...	...	...	...	...	...	...	...	...	...	...
June 22-July 5	...	...	...	...	...	...	...	...	...	...	...
July 6-19	...	...	...	...	...	...	...	...	...	...	...
July 20-Aug. 2	...	...	...	...	...	...	...	...	...	...	...
Aug. 3-16	2	2	100	1.00	0	0.00	...	...	...	...	...
Aug. 17-30	...	...	...	...	...	...	...	...	...	...	...
Aug. 31-Sept.2	1	0	0	1.50	5	3.33	7	4.67	312	208.00	0.46
Totals and averages	9	7	78	8.00	9	1.13	12	1.50	606*	75.75	0.17

*Weight for 5 fish estimated.

Table 6. Intensive Creel Census Data,

Hunt Creek, Sections A, B, C, D, E, 1940 Trout Season

Two-week periods	No. of fisher-men	No. taking no fish	% tak-ing no fish	No. hours fished	Legal brook No.	Legal brook Catch per hour	Illegal brook No.	Illegal brook Catch per hour	Weight of legal fish (grams)	Grams per hour	Pounds per hour
Apr.27-May 10	89	65	73	130.50	45	0.34	444	3.40	2,449	18.77	0.04
May 11-24	57	45	79	128.50	23	0.18	405	3.15	1,343	10.45	0.02
May 25-June 7	97	77	79	149.50	32	0.21	800	5.35	1,791	11.98	0.03
June 8-21	38	26	68	58.25	25	0.43	275	4.72	1,789	30.71	0.07
June 22-July 5	44	16	36	98.00	88	0.90	491	5.01	5,569	56.83	0.13
July 6-19	17	9	53	29.25	17	0.58	121	4.14	1,201	41.06	0.09
July 20-Aug. 2	61	43	70	99.50	46	0.46	381	3.83	3,251	32.67	0.07
Aug. 3-16	50	27	54	102.75	64	0.62	332	3.23	4,966	48.33	0.11
Aug. 17-30	31	19	61	56.00	34	0.61	135	2.41	2,816	50.29	0.11
Aug. 31-Sept.2	21	7	33	49.00	32	0.65	165	3.37	2,199	44.88	0.10
Totals and averages	505	334	66	901.25	406	0.45	3549	3.94	[1] 27,374	30.37	0.07
Totals and averages A,B,C,D, 1940	498	327	66	892.25	397	0.44	3537	3.96	[2] 26,768	30.00	0.07
Totals and averages A,B,C,D, 1939	438	240	55	780.50	492	0.63	3534	4.53	[3] 30,378	38.9	0.09

[1] Weights of 70 fish estimated.

[2] Weights of 65 fish estimated.

[3] Weight exclusive of 38 fish caught and returned to the water.

Table 7. Yield of the Several Sections of Hunt Creek,

1939 and 1940 Trout Seasons

(Under "legal fish per acre," actual numbers removed are shown in parentheses)

Stream section	Length (in feet)	Width (in feet)	Area (acres)	Pool grade	1939 Results			1940 Results		
					Pounds of legal fish removed	Pounds of fish produced per acre	Legal fish per acre	Pounds of legal fish removed	Pounds of fish produced per acre	Legal fish per acre
A	2,577	24.3	1.44	$S_1T_2F_2$	20.02	13.9	99 (143)	20.75	14.4	105 (152)
B	1,605	17.5	0.64	$S_2T_2F_3$	1.09	1.7	23 (15)	6.69	10.5	64 (41)
C	3,970	11.8	1.07	$S_2T_2F_3$	15.97	14.9	105 (112)	17.95	16.8	106 (113)
D	2,386	21.5	1.18	$S_1T_2F_2$	29.90	25.3	186 (220)	13.62	11.5	77 (91)
E	1,250	11.8	0.36	$S_3T_2F_3$	...	...	...	1.34	3.7	25 (9)
Totals or averages	11,788	17.4	4.69	$S_2T_2F_3$	66.98	15.4	112 (492)	60.35	12.8	84 (406)

Table 8. Average Total Length (Millimeters) and Average Weight (Grams)

From the Census Sections of Hunt Creek, 1940 Trout Season.

(For ease in changing these measurements to inches and ounces

178 mm. = 7 inches — 28.4 gm. = 1 ounce
190 mm. = 7½ inches — 57 gm. = 2 ounces
203 mm. = 8 inches — 84 gm. = 3 ounces)

Two-week period	Section A		Section B		Section C		Section D		All sections	
	Average length	Average weight	Average length	Average weight	Average length	Average weight	Average length	Average weight	Average length	Average weight
Apr.27-May 10	187 (11)	52	177 (1)	40	192 (15)	53	198 (11)	69	192 (38)	57
May 11-24	193 (5)	63	...	...	185 (5)	56	185 (13)	57	187 (23)	58
May 25-June 7	188 (20)	57	189 (5)	63	183 (3)	48	180 (4)	48	187 (32)	56
June 8-21	198 (12)	75	185 (2)	54	197 (5)	76	190 (6)	68	195 (25)	72
June 22-July 5	191 (51)	66	187 (2)	55	188 (18)	64 (16)	189 (17)	64	190 (88)	65 (86)
July 6-19	183 (9)	56	...	...	198 (1)	90 (2)	187 (6)	86	185 (16)	71 (17)
July 20-Aug. 2	186 (21)	59	179 (1)	45	203 (20)	82	202 (4)	80	195 (46)	71
Aug. 3-16	183 (10)	59	216 (13)	113	199 (21)	78	199 (20)	79 (19)	200 (64)	83 (63)
Aug. 17-30	194 (9)	70	210 (3)	87	211 (15)	89 (11)	191 (7)	67	202 (34)	84 (30)
Aug.31-Sept.2	187 (3)	53	199 (14)	71	199 (8)	78	182 (2)	55	194[1] (32)	69
Averages, totals	189 (151)	62.3	202 (41)	81.5	197 (111)	74.2 (105)	192 (90)	68.6 (89)	193 (398)	68.9 (391)

[1] Totals for the last period include 5 fish from Section E which averaged 183 mm. long and 62 gm. in weight.

Table 9. Comparison of Angling Pressures in the Various Experimental Sections of Hunt Creek, the Percentage Increase in Angling Pressures, and the Percentage Increase in Yield of Pounds of Legal Trout Per Acre. (Exclusive of Section E, Which Was Not Censused in 1939.)

Section	Area (acres)	Hours fishing 1939	Hours fishing 1940	Pressure[2] per acre 1939	Pressure[2] per acre 1940	Pounds of fish per acre, 1939	Pounds of fish per acre, 1940	Percentage change in pressure 1939 to 1940	Percentage change in pounds per acre of fish 1939 to 1940
A	1.44	199.00	296.25	138	206	13.9	14.4	+49	+3
B	0.64	33.50	86.50	52	135	1.7	10.5	+160	+517
C	1.07	262.75	259.50	246	243	14.9	16.8	-1	+13
D	1.18	263.25	251.00	223	213	25.3	11.5	-4	-55
Totals	4.33	780.50[1]	893.25	180	206	15.4	13.6	+14	-12

[1] Includes 22 hours of 1939 angling where the sections fished were not clearly designated.

[2] Pressure per acre is given in terms of man-hours of angling per acre of water surface for the entire season.

Table 10. Intensive Creel Census Data,

Fuller Creek Beaver Pond, 1940 Trout Season

Two-week periods	No. of fisher-men	No. taking no fish	% tak-ing no fish	No. hours fished	Legal brook No.	Legal brook Catch per hour	Illegal brook No.	Illegal brook Catch per hour	Weight of legal fish (grams)	Grams per hour	Pounds per hour
Apr. 27-May 10	24	16	67	47.25	13	0.28	1	0.02	3,706	78.43	0.17
May 11-24	5	1	20	7.50	6	0.80	5	0.67	1,359	181.20	0.40
May 25-June 7	1	0	0	2.00	1	0.50	0	0.00	794	397.00	0.88
June 8-21	...	...	...	...	...	...	...	...	...	...	...
June 22-July 5	5	1	20	18.00	14	0.78	4	0.22	1,608	89.33	0.20
July 6-19	5	3	60	8.00	4	0.50	3	0.38	578	72.25	0.16
July 20-Aug. 2	8	2	25	16.50	11	0.67	0	0.00	2,897	175.58	0.39
Aug. 3-16	8	5	63	19.25	7	0.36	5	0.26	1,031	53.56	0.12
Aug. 17-30	9	2	22	25.75	32	1.24	4	0.16	4,947	192.12	0.42
Aug.31-Sept.2	...	...	...	...	...	...	...	...	...	...	...
Totals and averages,1940	65	30	46	144.25	88	0.61	22	0.15	[1]16,920	117.30	0.26
Totals and averages,1939	112	51	45	249.50	164	0.66	28	0.11	[2]39,933	160.00	0.35

[1] Weights of 33 fish estimated.

[2] Weight exclusive of 9 fish released after capture and 1 fish lost from creel.

Table 11. Average Length (Millimeters) and Average Weight (Grams) by Two-week Intervals From Fuller Creek Beaver Dam, East Fish Lake, and Hunt Creek Below Section A

Two-week periods	Fuller Creek Beaver Pond		East Fish Lake		Below A	
	Average length	Average weight	Average length	Average weight	Average length	Average weight
Apr.27-May 10	277 (13)	285	206	78 (109)	188 (44)	55
May 11-24	252 (6)	227	200	71 (53)	186 (26)	54
May 25-June 7	375 (1)	794	208	82 (6)	189 (28)	59
June 8-21	...	...	...	...	213 (18)	100
June 22-July 5	219 (14)	112	...	...	193 (46)	66
July 6-19	235 (4)	142	...	...	194 (3)	66
July 20-Aug. 2	275 (11)	263	210	86 (4)	186 (9)	63
Aug. 3-16	234 (7)	147	...	...	195 (10)	67
Aug. 17-30	238 (32)	161	...	...	195 (11)	68
Aug. 31-Sept. 2	...	...	...	...	...	...
Totals, averages	247 (88)	195	204	76 (172)	192 (195)	64

Table 12. Intensive Creel Census Data,

East Fish Lake, 1940 Trout Season

Two-week periods	No. of fishermen	No. taking no fish	% taking no fish	No. hours fished	Legal brook No.	Legal brook Catch per hour	Illegal brook No.	Illegal brook Catch per hour	Weight of legal fish (grams)	Grams per hour	Pounds per hour
Apr.27-May 10	35	8	23	121.75	109	0.90	24	0.18	8,074	66.32	0.15
May 11-24	27	9	33	87.00	53	0.61	8	0.09	3,756	43.17	0.10
May 25-June 7	23	17	74	47.50	6	0.13	4	0.08	493	10.38	0.02
June 8-21	3	3	100	3.75	0	0.00	0	0.00	0	0.00	0.00
June 22-July 5	1	1	100	1.00	0	0.00	0	0.00	0	0.00	0.00
July 6-19	5	5	100	12.00	0	0.00	0	0.00	0	0.00	0.00
July 20-Aug. 2	9	6	67	20.00	4	0.20	7	0.35	345	17.25	0.04
Aug. 3-16	6	6	100	10.50	0	0.00	0	0.00	0	0.00	0.00
Aug. 17-30	2	2	100	4.50	0	0.00	0	0.00	0	0.00	0.00
Aug.31-Sept.2	...	...	...	...	...	...	...	...	...	...	...
Totals and averages, 1940	111	57	51	308.00	172	0.56	43	0.14	12,668	41.13	0.09
Totals and averages,1939	63	49	77	125.50	51	0.41	68	0.54	------Not known------		

Table 13. Number and Per Cent of Wild and Hatchery Brook Trout Removed by Anglers From East Fish Lake, 1940 Trout Season

Two-week periods	Legal brook trout caught				Percentage of brook trout in total catch	
	Wild	Tagged	Fin-clipped	Total	Wild	Hatchery
April 27-May 10	30	41	38	109	27	73
May 11-24	5	23	25	53	9	91
May 25-June 7	5	1	...	6	83	17
June 8-21	...	...	...	...	...	...
June 22-July 5	...	...	...	...	...	...
July 6-19	...	...	...	...	...	...
July 20-Aug. 2	4	...	...	4	100	...
Aug. 3-16	...	...	...	...	...	...
Aug. 17-30	...	...	...	...	...	...
Aug. 31-Sept. 2	...	...	...	...	...	...
Totals	44	65	63	172	25	75

Table 14. Average Increase in Total Length (Millimeters), and Average Increase in Weight (Grams) of the Marked Trout Recovered in East Fish Lake, Given by Two-week Periods

Two-week period	Number of marked fish recovered	Average size at marking[1]		Average size at recovery		Average increase		Range in number of days between planting and recovery
		Length	Weight	Length	Weight	Length	Weight	
Apr.27-May 10	71	195.6	78.9	200.2	70.3	+4.6	-8.6	5 to 16
May 11-24	38	195.6	78.9	199.2	69.8	+3.6	-9.1	19 to 32
May 25-June 7	1	195.6	78.9	200.0	64.0	+4.4	-14.9	38

[1] Since the fin-clipped brook trout could not be distinguished as individuals, the average size of the 250 fish marked have been given under "Average size at marking."

Table 15. Intensive Creel Census Data

Below Section A, Hunt Creek, 1940 Trout Season

Two-week periods	No. of fisher-men	No. taking no fish	% taking no fish	No. hours fished	Legal brook		Illegal brook		Weight of legal fish (grams)	Grams per hour	Pounds per hour
					No.	Catch per hour	No.	Catch per hour			
Apr.27-May 10	26	14	54	60.00	44	0.73	218	3.63	2,424	40.40	0.09
May 11-24	24	14	58	70.50	26	0.37	180	2.55	1,404	19.91	0.04
May 25-June 7	25	13	52	55.00	28	0.51	470	8.55	1,661	30.20	0.07
June 8-21	8	4	50	18.00	18	1.00	44	2.44	1,687	93.72	0.21
June 22-July 5	29	15	52	84.00	48	0.57	334	3.98	3,025	36.01	0.08
July 6-19	23	20	87	54.75	3	0.05	168	3.07	198	3.62	0.01
July 20-Aug. 2	10	7	70	26.75	9	0.34	92	3.44	563	21.05	0.05
Aug. 3-16	5	2	40	18.50	10	0.54	89	4.81	670	36.22	0.08
Aug. 17-30	10	6	60	31.00	11	0.35	65	2.10	748	24.13	0.05
Aug.31-Sept. 2	2	2	100	5.00	0	0.00	25	5.00	0	0.00	0.00
Totals and averages,1940	162	97	60	423.50	197	0.47	1,685	3.98	12,380*	29.23	0.06

*Weights of 27 fish estimated.

Table 16. Percentage of Fishermen Catching From 0 To 15 Trout in Censused Areas, Hunt Creek Experimental Area, 1940 Trout Season

Locality	Percentage of anglers taking various numbers of trout															
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Hunt Creek	66	15	7	5	2	2	0.9	0.6	0.9	0.2	...	...	...	...	...	...
East Fish Lake	51	17	10	4	4	6	3	3	2	...	...	...	1	...	...	...
Fuller Creek Beaver Dam	46	21	11	13	3	2	2	...	...	...	...	...	...	...	2	...
Below A	60	16	9	4	2	2	2	2	2	0.5	...	...	0.5	...	...	...

Table 17. Intensive Creel Census Data,

Hunt Creek Experimental Area, 1940 Trout Season

Station	No. of fishermen	No. taking no fish	% taking no fish	No. hours fished	Legal fish		Illegal fish		Weight of legal fish (grams)	Grams per hour	Pounds per hour
					No.	Catch per hour	No.	Catch per hour			
A	137	85	62	296.25	152	0.51	1,462	4.94	9,412	31.77	0.07
B	47	29	62	86.50	41	0.47	444	5.13	3,033	35.06	0.08
C	142	91	64	259.50	113	0.44	995	3.83	8,144	31.38	0.07
D	170	122	72	251.00	91	0.36	636	2.53	6,179	24.62	0.05
E	9	7	78	8.00	9	1.13	12	1.50	606	75.75	0.17
Fuller Creek Beaver Pond	65	30	46	144.25	88	0.61	22	0.15	16,920	117.30	0.26
E. Fish Lake	111	57	51	308.00	172	0.56	43	0.14	12,668	41.13	0.09
Below A	162	97	60	423.50	197	0.47	1,685	3.98	12,380	29.23	0.06
Fuller Creek	20	11	55	36.25	16	0.44	85	2.34	1,271	35.06	0.08
E. Fish Lake Outlet	6	2	33	6.50	4	0.62	3	0.46	262	40.31	0.09
Beaver Pond Above E	6	1	17	15.50	25	1.61	36	2.32	1,896	122.32	0.27
Pine Ridge Creek Trib. #2	7	6	86	9.50	1	0.11	40	4.21	55	5.79	0.01
Sutton's Pond	2	1	50	2.25	1	0.44	0	0.00	113	50.22	0.11
Totals and averages	884	539	.61	1,847.00	910	0.49	5,463	2.96	72,939*	39.49	0.09

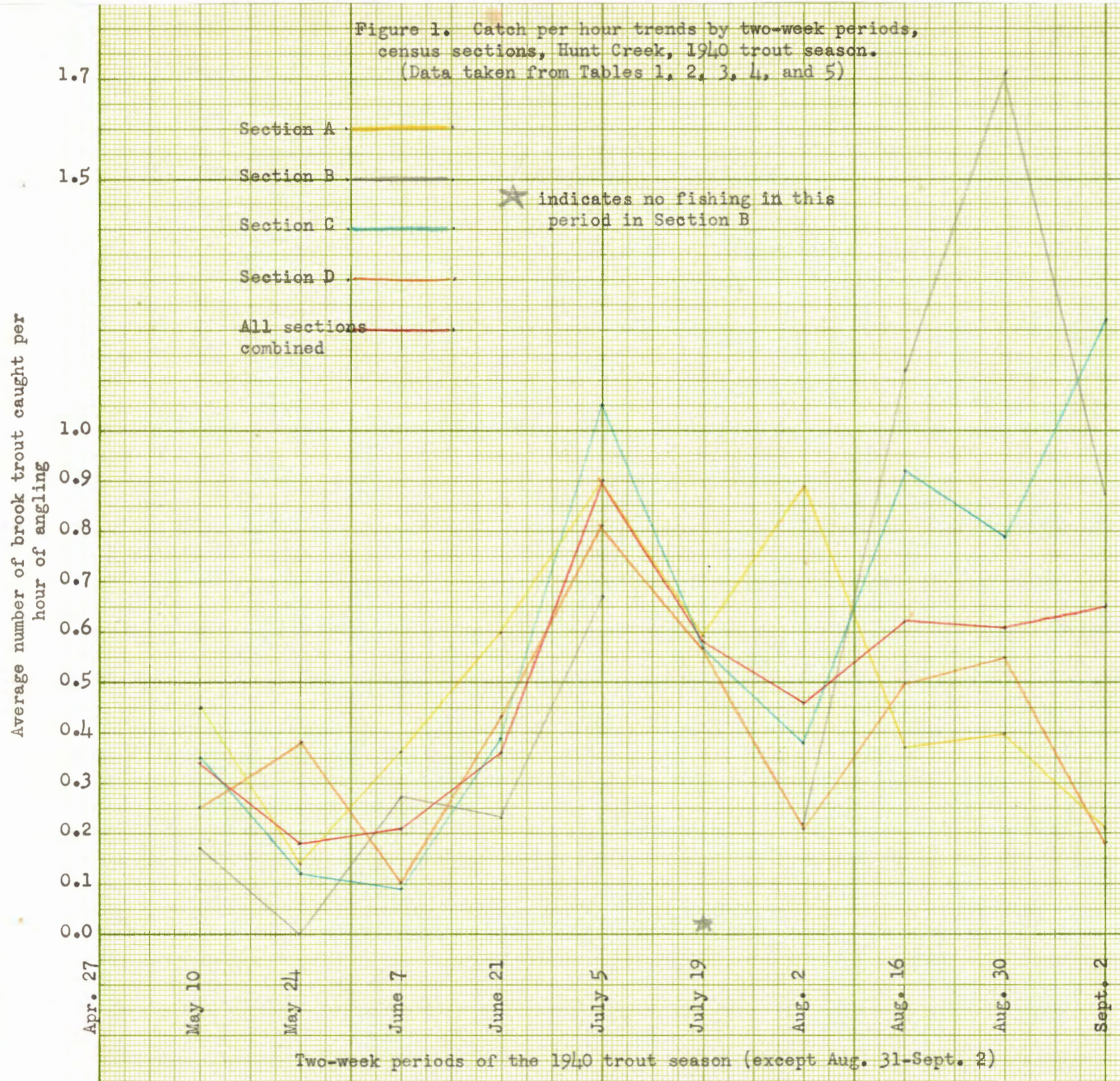
* Weights of 155 fish estimated.

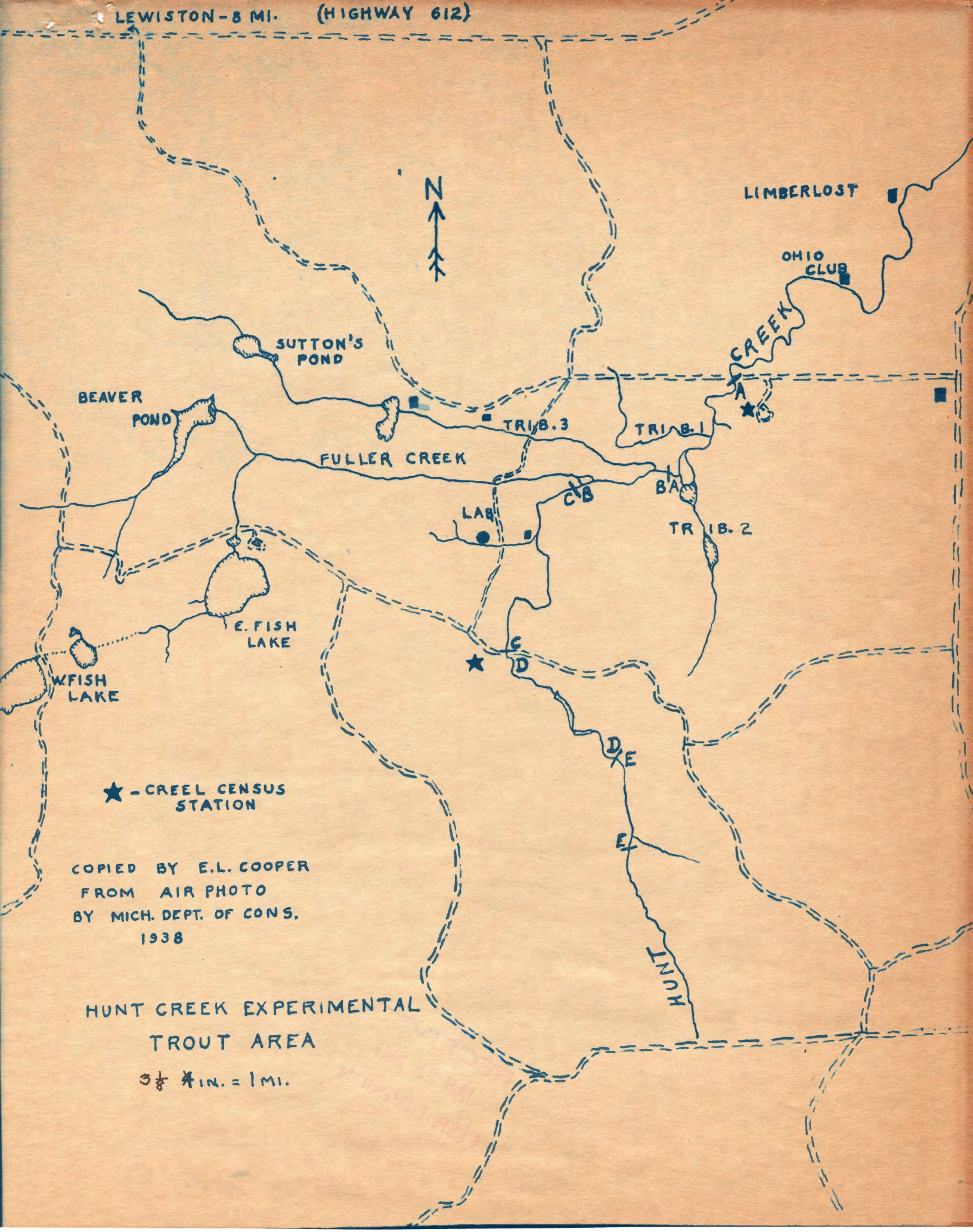
Table 18. Residence of Fishermen

Using the Hunt Creek Area, 1940 Trout Season

County	Number of anglers	State	Number of anglers
Alpena	24	Indiana	5
Bay	17	Ohio	42
Berrien	1	Pennsylvania	10
Calhoun	12	Wisconsin	2
Clinton	1		
Crawford	3	Total	59
Genesee	145		
Gratiot	1		
Ingham	21		
Iosco	1		
Jackson	76		
Kent	2		
Livingston	2		
Macomb	11		
Midland	5		
Montmorency	187		
Muskegon	1		
Oakland	22		
Oscoda	29		
Otsego	1		
Ottawa	1		
Presque Isle	9		
St. Clair	23		
Saginaw	15		
Sanilac	4		
Shiawassee	4		
Tuscola	1		
Van Buren	1		
Washtenaw	49		
Wayne	145		
Total	814		
Unknown	11		
		Grand Total	884

Figure 1. Catch per hour trends by two-week periods, census sections, Hunt Creek, 1940 trout season. (Data taken from Tables 1, 2, 3, 4, and 5)




LEWISTON - 8 MI. (HIGHWAY 612)
N
LIMBERLOST
OHIO CLUB
CREEK
SUTTON'S POND
BEAVER POND
TRIB. 3
TRIB. 1
FULLER CREEK
A
B
C
D
E
LAB
TRIB. 2
E. FISH LAKE
W FISH LAKE
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TROUT AREA
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