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Education-Game
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INSTITUTE FOR FISHERIES RESEARCH
DIVISION OF FISHERIES
MICHIGAN DEPARTMENT OF CONSERVATION
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ANN ARBOR, MICHIGAN

October 15, 1953

Report No. 1387

BROOK TROUT ANGLING RESULTS UNDER 7-INCH AND 6-INCH MINIMUM SIZES, HUNT CREEK FISHERIES EXPERIMENT STATION, MONTMORENCY COUNTY, MICHIGAN

by

David S. Shetter and Karl E. Proshek

Abstract

The effect of reducing the minimum size limit from 7 inches to 6 inches for brook trout fishing was studied in three experimental sections of the Hunt Creek drainage, Section C, Section D, and Fuller Creek. Comparisons of angling pressure and catch statistics under the two minimum size limits were made using the intensive creel census data collected yearly between 1939 and 1950 by the staff of the Hunt Creek Fisheries Experiment Station.

In the test sections, angling pressure increased during the period of 6-inch fishing (1946-1950), but not significantly. A part of the increase could be attributed to factors other than the size limit change. A small (6 percent) but significant decrease in the number of unsuccessful angling trips was noted during the period of 6-inch fishing.

During the 1939-1945 period when the minimum size limit was 7 inches, the average yearly total catch was 286 fish; lowering the minimum size

limit to 6 inches increased the average yearly total catch to 700 fish in the period 1946-1950. When the minimum size limit was lowered to 6 inches the average yield per acre increased from 7.99 pounds to 13.23 pounds.

Average angling quality, based on the catch per hour per angler, was better under a 6-inch minimum size limit, but angling quality for brook trout larger than 7 inches was better in the 1939-1945 period when the minimum size limit was 7 inches.

The average total length of brook trout larger than 7 inches was not changed to a significant degree during the period of the 6-inch minimum size regulation (1939-1945, 195.52 mm.; 1946-1950, 194.24 mm.). The average total length of the 6.0- to 6.9-inch trout in the catches ranged between 161.19 and 164.39 mm.

Analysis of Section C population data for the periods 1947-1950 and 1951-1952 suggests that the 6.0- to 6.9-inch size group was held at a lower level during the period when the minimum size limit was 6 inches.

Reducing the minimum size limit from 7 inches to 6 inches is recommended for only those brook trout waters where it can be shown that a high percentage of the population is unharvested because of extremely slow growth.

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Population studies in Section C of Hunt Creek, Montmorency County, in September, 1940 (Shetter and Leonard, 1943), indicated that the brook trout in this general locality were relatively slow-growing. These studies also suggested that appreciable mortality occurred between the third and fourth summers of life. Further, one of the chief complaints of anglers using all parts of Hunt Creek is that numerous fish just under the minimum size limit of seven inches must be returned in the process of capturing a small number of larger fish. From testimony of older anglers this situation existed before, as well as after, the establishment of the Hunt Creek Fisheries Experiment Station in 1939. It was decided to test a lower size limit to determine what the effect might be on the angling quality and the yield to the anglers. The intensive creel census on the experimental waters under the jurisdiction of the station provided a good series of complete angling records on the fishing during a 7-inch minimum size limit from 1939 on.

Beginning with the 1946 trout season, by order of the Conservation Commission, the minimum size limit was lowered to 6 inches in Sections C

and D of Hunt Creek and on Fuller Creek west of the rotary screen. This order was given effect for five seasons, 1946-1950 inclusive. Anglers removing six- to seven-inch trout from the area were given a validating carbon copy of the creel census slip. A comparison of catch statistics from these same waters for the period 1939-1945, when 7 inches was the minimum size limit, with statistics for 1946-1950 provides information on the changes which occurred after the size limit was lowered. The pertinent statistics on angling pressure and catch are presented in Tables 1 to 4.

The differences between the various averages for the two periods in question have been examined by standard statistical methods.[1]

From an experimental standpoint, the Section C, D and Fuller Creek habitats should have remained in the same condition during 1946-1950 as in the period 1939-1945; also the average trout populations and average angling pressure should have remained approximately the same in the two periods. Reference to the tables provides evidence of considerable variation in angling pressure and in the catch.

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[1]

$$\text{Mean (or average)} = \frac{\sum x}{n}$$

$$\text{Standard Deviation} = \sqrt{\frac{\sum x^2 - \frac{(\sum x)^2}{n}}{n-1}}$$

$$\text{Standard Error} = \frac{\text{Standard Deviation}}{\sqrt{n}}$$

$$\text{Standard Error of Difference between means} = \sqrt{(SE_1)^2 + (SE_2)^2}$$

$$t = \frac{\text{Difference between means}}{\text{S.E. of Difference}}$$

Of all the experimental sections where the 6-inch regulation was applied, only Section C appears to have maintained a relatively stable habitat through both of the time periods. Section D was changed very markedly by beaver in 1947, when they built up three dams and more than doubled the water area. This change apparently increased the trout population and the rate of growth. As a result, angling pressure increased in 1948, 1949 and 1950, not because of the 6-inch fish available but because of relatively good fishing for brook trout larger than 7 inches. In Fuller Creek, Shetter and Whalls (1953, MS) have shown that the summer stream temperatures were significantly increased by the replacement of the old Fuller Creek beaver dam in May, 1949, but that angling quality was not affected by this change. (See map, Fig. 1, P. 9, for section locations.)

Angling Pressure

After inauguration of the 6-inch limit, the average number of angling trips per year on the test waters increased from 409 to 538. However, examination of the data indicates that this apparent 24 percent increase is not statistically significant ($t = 1.39$, $P = 83.5$ percent); also, as has already been pointed out, the beaver-wrought changes in Section D biased the experimental conditions in that section. Only in Fuller Creek was there a significant increase in average number of trips per year (from 54 to 138, $t = 3.87$, $P = 99.9+$ percent). The Section C and Section D increases were relatively slight and not of significance ($P = 31.1$ and 39.7 percent respectively). It appears doubtful if the 6-inch regulation was responsible for much of the increase in angling pressure.

Study of the creel census records suggests that the change from a 7- to a 6-inch minimum size created above-average pressure in the early years of the test, but that angling pressure decreased more or less regularly each year after that until termination of the Commission order,

except in Section D (where beaver dams were believed responsible for the increased angling).

Unsuccessful angling trips

During the period 1939-1945, 2,864 trips were made in the test sections, and 1,916 were unsuccessful[2] (66.9 percent). While the minimum size limit was 6 inches, during the period 1946-1950, 2,690 trips were made on the same sections and 1,585 were unsuccessful (58.9 percent). The six percent decrease in unsuccessful trips is probably significant (Chi-square[3] = 3.76, P = 94.7 percent).

Total catch by anglers

Under the 7-inch minimum size limit during 1939-1945, the average yearly catch was 286 brook trout of an average weight of 0.155 pound. From 1946 through 1950 when the size limit was 6 inches, the average yearly catch was 700 brook trout of an average weight of 0.125 pound. A corresponding increase was noted in the yield per acre when the stream was operated under the 6-inch regulation--from 7.99 pounds per acre to 13.23 pounds per acre. The increase in yield per acre fails to parallel the percentage increase in numerical catch because of the smaller average weights of 6- to 7-inch brook trout.

The average yearly catch of 7-inch and larger trout under a 7-inch limit was 286 fish, while under a 6-inch limit it increased to 324 brook trout. The apparent increase in average yearly take of larger brook trout was not statistically significant (t = 0.53, P = 40.4 percent).

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[2] During 1939-1945 an unsuccessful angling trip was one during which no trout 7 inches or larger was taken; during the period 1946-1950 it was a trip during which no trout 6 inches or larger was taken.

[3] Determination by the method outlined on P. 197, section 9.6 of Snedecor (1948)

The Section D catches in the period 1946-1950 bias the data, since a decrease in the average yearly catches of 7-inch and larger trout can be demonstrated for Section C, and only a very slight increase is found for Fuller Creek, during this same period.

A good idea as to the extent to which the data from Section D during the years of beaver occupancy bias the analyses may be gained by comparison of the 1948, 1949, and 1950 Section D data with the other sections for the same years. Also, when the Section D data are eliminated entirely, and the pounds per acre of fish larger than 7 inches are compared for the two periods, it can be shown that in 1939-1945, Section C plus Fuller Creek yielded 5.18 pounds per acre. During the five years when the minimum size was 6 inches, the yield per acre of brook trout larger than 7 inches was 3.68 pounds. When the Section D data are included, these figures are raised to 7.99 and 8.16 pounds respectively.

Angling quality under a 7-inch and under a 6-inch minimum size limit

It has been more or less standard practice in fisheries research to use the simple catch per hour index (total catch divided by total hours) as a measure of angling quality. Unfortunately such indices cannot be treated statistically to obtain measures of their variation. However, it is possible to treat statistically the catch per hour per angler, as determined from individual trip-records from the three stream sections and two time periods involved in this study.

The statistical data concerning changes in angling quality are shown in Table 5, for each test section and for all test sections combined. The 1946-1950 figures on angling quality for brook trout 7 inches and larger were obtained by eliminating the catches of 6.0- to 6.9-inch fish. This procedure yielded catch per hour per angler indices that represent the angling quality for the larger brook trout while the 6-inch minimum size

limit was in effect. These indices are compared with similar indices for the same test waters obtained when the minimum size was 7 inches (1939-1945). As a result of the statistical examinations it was concluded:

1. Total angling quality (measured by catch per hour per angler) was significantly better under a 6-inch size limit on Sections C and D, but very little if any better on Fuller Creek.

2. The angling quality for brook trout larger than 7 inches was significantly better under a 7-inch size limit in Section C and in Fuller Creek; in Section D the difference in quality indices between the two periods approached significance, and was somewhat better during the 7-inch fishing.

3. The combined data for the three test sections suggest that total angling quality was significantly better when a 6-inch minimum size limit was in force, but that angling quality for brook trout larger than 7 inches was distinctly better under a 7-inch size limit.

Average size of angler-caught brook trout larger than 7 inches before (1939-1945) and during (1946-1950) the six-inch minimum size limit

The average total length of the brook trout taken by angling in each of the stream sections operating under the reduced minimum size limit is given in Table 6, for the period 1939-1945 and 1946-1950. The differences in average total lengths were tested for significance by the "t" test.

In Section C and in Fuller Creek, trout larger than 7 inches in the anglers' catch were very slightly smaller in average size during the period of 6-inch fishing, but the small differences were not significant (Section C, P = 86.9 percent); Fuller Creek, P = 89.5 percent). In Section D an increase of 7.54 mm. (approximately 0.4 inch) in average size for the 1946-1950 period was highly significant (P = 99.9+ percent).

However, when the data for the three years 1948, 1949, and 1950 (the years when beaver occupancy apparently improved ecological conditions for the Section D brook trout population) are eliminated, and the 1946 and 1947 Section D data only are treated statistically, it can be shown that there was little, if any, difference in the average sizes of angler-caught brook trout between the 1939-1945 and 1946-1947 periods (P = 16.6 percent).

The inclusion of the Section D catches for the years 1948, 1949 and 1950 alters the comparison of all three stream sections for the two time periods. When included, the data suggest that the average size of the angler-caught brook trout larger than 7 inches increased from 195.52 mm. to 199.46 mm. (P = 99.9+ percent). Excluding the Section D angler-caught fish for the years 1948, 1949 and 1950, the 1939-1945 average total length of 195.52 mm. was slightly greater than the 1946-1950 average total length of 194.24 mm., a non-significant difference (P = 87.4 percent).

It is concluded that the average total length of the anglers' catches of brook trout larger than 7 inches was not influenced by the change in the minimum size regulation.

The average total length of angler-caught 6.0- to 6.9-inch brook trout

The average total length of the special trout for the various sections and years are given in Table 7. In Section C, the catch varied in average total length from 159.69 mm. (1947) to 169.05 mm. (1950); in Section D from 161.57 (1947) to 166.30 (1950); in Fuller Creek from 161.03 (1949) to 162.81 mm. (1947). For the three sections combined the yearly averages ranged between 161.19 mm. (1947) and 164.39 mm. (1950). Although the differences were very small, they were statistically significant at the 95 percent level or higher, in 6 of the 10 possible comparisons. The average size of the 6.0- to 6.9-inch fish in 1946, 1948, 1949 and 1950

exceeded those creeled in 1947; 1950 fish were larger than 1946 fish; 1950 fish were also slightly longer than the 1948 fish.

Population changes

No valid population estimates are available for any of the test sections prior to 1947. It is possible to compare the average Section C fall population data for the years 1947, 1948, 1949, and 1950 with 1951 and 1952. (Table 8). These estimates were made with electric shocker in the manner described by Shetter (1947). The populations of 6.0- to 6.9-inch brook trout remaining after the fishing seasons are given, along with the estimated populations of brook trout larger than 7 inches.

In theory, if the take by anglers of 6.0- to 6.9-inch brook trout reduced the catchable portion of the population significantly, then during the years when the Section C minimum size limit was 6 inches, the average population in the 6.0- to 6.9-inch size group should be significantly smaller than when the size limit returned to 7 inches.

Sections A and B operated under a 7-inch minimum size during the entire 1947-1952 period. The average population of both 6.0- to 6.9-inch and 7.0 plus-inch fish for 1947-1950, when compared with 1951-1952 averages, were about the same (P + 10.3 to 77.0 percent). In Section C, the average population of 7.0 plus-inch fish for 1947-1950 did not differ significantly from the 1951-1952 average (P = 53.4 percent). However, a definite increase in the 6.0- to 6.9-inch population of Section C can be shown after the minimum size limit returned to 7 inches in 1951-1952. The average population in 1947-1950 was 29.50 fish; in 1951-1952 it was 73.50 fish (P = 99.9+ percent). These figures suggest that the 6-inch fishing reduced the average population of 6.0- to 6.9-inch fish in Section C over 50 percent during 1947-1950.

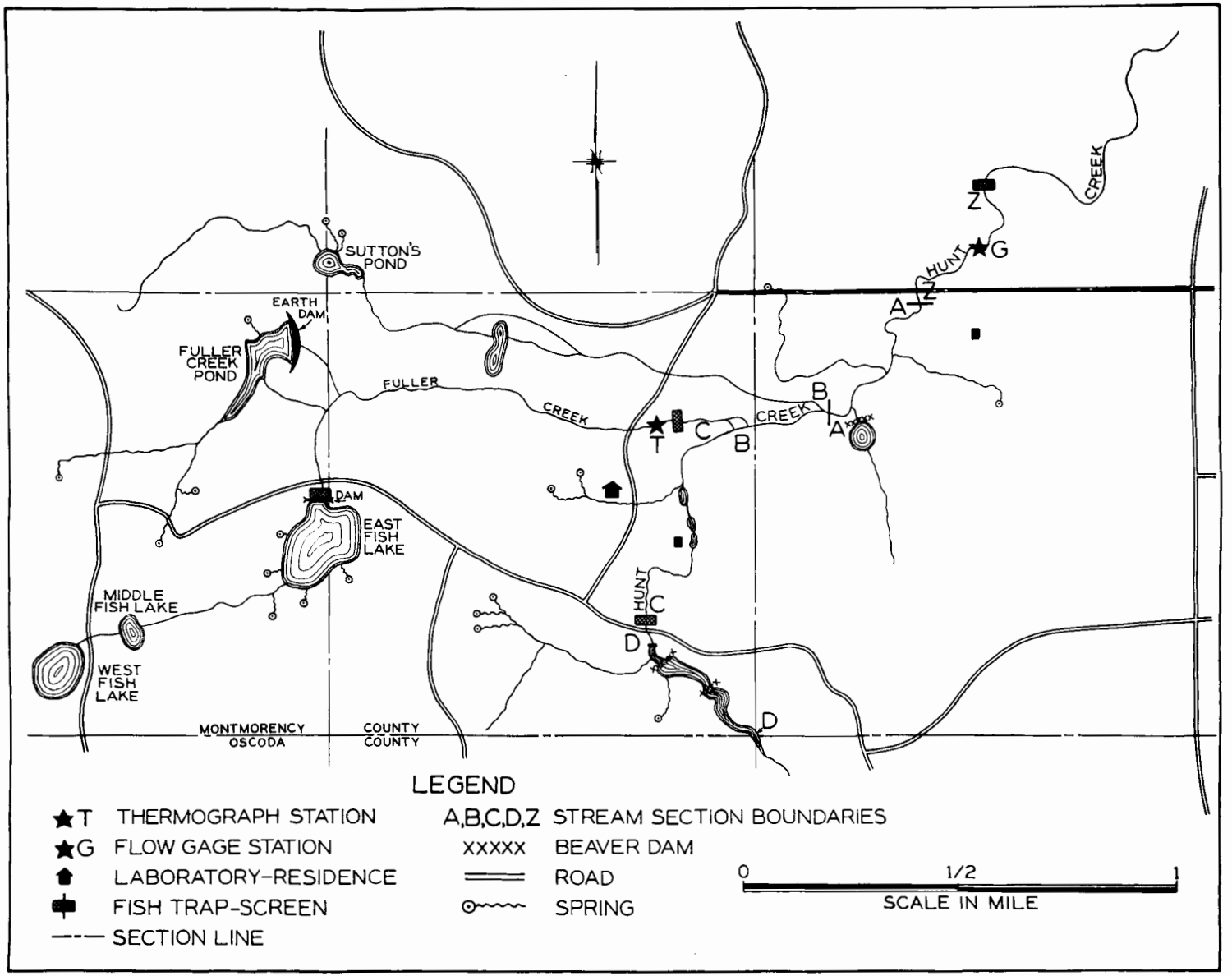

Fig. 1. Map of experimental sections of Hunt Creek. Roads and stream courses were traced from Conservation Department aerial photographs made in 1938.

The increase in the 6.0- to 6.9 inch populations in Section C in 1951 and 1952 can not be ascribed to downstream migration from Section D. Trap records from the fish traps maintained at the Section C/Section D bulkhead since April, 1949, show that the migration of 6.0- to 6.9-inch fish into and out of Section C to and from Section D has been as follows: September 26, 1949 - September 20, 1950 - 18 in., 12 out - gain 6; September 20, 1950 - September 26, 1951 - 15 in., 39 out - loss 24; September 26, 1951 - September 15, 1952 - 36 in., 53 out - loss 17. As no trap is operated at the lower end of Section C it is not possible to make any statements concerning Section C population changes that might occur as a result of movement into or out of Section B.

Possible effect of a 6-inch size limit on spawning success

Observation has shown that many brook trout females in Hunt Creek, and almost all of the male fish, are mature at a size of 6 inches. The present 7-inch minimum size limit protects these fish through one spawning season. The population data from Section C suggests that the numbers of mature trout might be noticeably lowered were the size limit reduced to 6 inches permanently. Heavy angling pressure under such a limit could make inroads on this stock, and reduce the numbers of eggs laid down, which in turn could eventually lower the numbers of creel-size fish available for angling. This may have happened in Section C, where the habitat was more or less constant during the two experimental periods. The average yearly catch of brook trout larger than 7 inches was significantly lower during the period of 6-inch fishing than during the 1939-1945 period when the limit was 7 inches ($t = 3.35$, $P = 99.9+$ percent).

E. L. Cooper's studies (1952, in press) on the Pigeon River indicate strongly that even a 7-inch size limit is probably too low for many

Michigan brook trout waters to permit the full realization of the growth potential of the faster-growing members of the population. Also he demonstrated that angling continually removes the faster-growing members of the population. Reduction of the size limit an additional inch merely aggravates the situation, and protects only the slowest-growing runts with less egg-producing capacity.

To summarize briefly, lowering the size limit to 6 inches on the waters discussed had the following general effects:

1. It increased angling pressure slightly but not significantly during the early years.

2. The percentage of unsuccessful angler-trips was decreased a slight but probably significant amount.

3. The total catch, in terms of numbers during the period of the 6-inch limit, was almost three times higher, and the pounds per acre yield was almost twice as great, as during the period when the minimum size limit was 7 inches. However, as would be expected, the average weight of all angler-caught fish was less during the 6-inch fishing.

4. Total angling quality as measured by catch per hour per angler was significantly better under a 6-inch minimum size regulation than under a 7-inch law, but angling quality for fish larger than 7 inches was significantly better when the size limit was 7 inches.

5. A comparison of the Section C populations of 6.0- to 6.9-inch fish during 1947-1950 with Section C populations in 1951 and 1952 suggests that the 6-inch fishing reduced the fall populations of this size group by over 50 percent. In Sections A and B, where the size limit remained at 7 inches through the entire period, little difference was found in the 6.0- to 6.9-inch populations during the two periods.

The 6-inch regulation did not provide fishing of a type that would be classed as sporting. It attracted novice anglers, and to some degree, the "meat-hunters." Where a brook trout stream has a reasonable capacity to grow fish, such a regulation should not be considered. Only where growth and population studies combined with creel census data demonstrate conclusively that a high percentage of the population goes unharvested should lowering the minimum size limit to 6 inches be utilized as a management tool.

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Table 1.--Creel census results, Section C, Hunt Creek, 1939 to 1950 inclusive

Area: 1939, 1940--1.07 acres
1941-1950---0.71 acres

Minimum legal size	Year	Total angling trips	Percent of unsuccessful trips	Total angling hours	Trout over 7 inches				Trout over 6 inches				Average weight, pounds
					Total catch	Total pounds	Catch per hour	Pounds per acre	Total catch	Total pounds	Catch per hour	Pounds per acre	
7 inches	1939	145	65.5	262.75	112	15.97	0.43	14.93					0.143
	1940	142	64.1	259.50	113	17.96	0.44	16.79					0.159
	1941	255	69.4	443.00	180	31.75	0.41	44.72					0.176
	1942	253	77.1	391.50	117	18.72	0.30	26.37					0.160
	1943	78	53.8	135.00	90	13.44	0.67	18.93					0.149
	1944	87	62.1	163.75	62	10.31	0.38	14.52					0.166
	1945	123	61.8	226.25	102	17.11	0.45	24.10					0.168
	Total	1,083		1,881.75	776	125.26							
	Average	155	67.4	268.82	111	17.89	0.41	22.01					0.161
6 inches	1946	258	60.0	425.50	110	18.36	0.26	25.86	298	34.96	0.70	49.24	0.117
	1947	247	70.4	363.00	45	6.03	0.12	8.49	170	16.27	0.47	22.92	0.096
	1948	151	60.9	252.00	58	8.97	0.23	12.63	160	18.23	0.63	25.68	0.114
	1949	101	42.6	248.00	79	12.27	0.32	17.28	199	23.94	0.80	33.72	0.120
	1950	104	52.9	252.00	59	8.67	0.23	12.21	139	15.85	0.55	22.32	0.114
	Total	861		1,540.50	351	54.30			966	109.25			
	Average	172	60.3	308.10	70	10.86	0.23	15.30	193	21.85	0.63	30.77	0.113

Table 2.--Creel census results, Section D, Hunt Creek, 1939 to 1950 inclusive

Area: 1939-1947---1.18 acres
1948 2.98 acres
1949, 1950--3.11 acres

Minimum legal size	Year	Total angling trips	Percent of unsuccessful trips	Total angling hours	Trout over 7 inches				Trout over 6 inches				Average weight, pounds
					Total catch	Total pounds	Catch per hour	Pounds per acre	Total catch	Total pounds	Catch per hour	Pounds per acre	
	1939	155	48.4	263.25	220	29.90	0.84	25.34					0.136
	1940	170	71.8	251.00	91	13.62	0.36	11.54					0.150
	1941	430	70.7	570.25	252	40.39	0.44	34.23					0.160
7	1942	331	71.9	513.25	196	28.26	0.38	23.85					0.144
	1943	107	68.2	161.25	78	13.33	0.48	11.30					0.171
inches	1944	92	62.0	181.75	64	10.40	0.35	8.81					0.163
	1945	121	60.3	185.50	101	16.40	0.54	13.90					0.162
	Total	1,406		2,126.25	1,002	152.30							
	Average	201	67.0	303.75	143	21.76	0.47	18.44					0.152
	1946	249	61.4	402.00	122	19.84	0.30	16.81	312	36.02	0.78	30.53	0.115
	1947	202	70.3	288.25	53	7.94	0.18	6.73	150	16.56	0.52	14.03	0.110
6	1948	260	49.2	473.75	334	55.75	0.71	18.71	545	69.67	1.15	23.38	0.128
	1949	244	51.6	663.75	342	60.64	0.52	19.50	564	81.87	0.85	26.32	0.145
inches	1950	182	51.1	498.25	247	50.99	0.50	16.40	333	58.94	0.67	18.95	0.177
	Total	1,137		2,326.00	1,098	195.16			1,904	263.06			
	Average	227	56.5	465.20	220	39.03	0.47	16.88	381	52.61	0.82	22.76	0.138

Table 3.--Creel census results, Fuller Creek, 1939 to 1950 inclusive

Area: 3.57 acres

Minimum legal size	Year	Total angling trips	Percent of unsuccessful trips	Total angling hours	Trout over 7 inches				Trout over 6 inches				Average weight, pounds
					Total catch	Total pounds	Catch per hour	Pounds per acre	Total catch	Total pounds	Catch per hour	Pounds per acre	
	1939	48	70.8	86.75	23	4.02	0.27	1.13					0.175
	1940	20	55.0	36.25	16	2.80	0.44	0.78					0.175
	1941	59	66.1	96.50	33	4.77	0.34	1.34					0.145
7	1942	31	75.9	39.25	11	2.02	0.28	0.57					0.184
	1943	19	47.4	25.00	19	2.62	0.76	0.73					0.138
inches	1944	96	66.7	144.75	61	8.34	0.42	2.34					0.137
	1945	102	61.8	159.25	64	9.09	0.40	2.55					0.142
	Total	375		587.75	227	33.66							
	Average	54	65.1	83.96	32	4.81	0.39	1.35					0.148
	1946	194	65.5	277.75	56	7.74	0.20	2.17	147	15.80	0.53	4.43	0.107
	1947	155	58.7	219.00	27	3.84	0.12	1.08	120	11.97	0.55	3.34	0.100
6	1948	140	62.8	195.75	31	4.95	0.16	1.39	123	12.86	0.63	3.60	0.105
	1949	110	51.8	282.00	45	6.12	0.16	1.71	174	16.34	0.62	4.58	0.094
inches	1950	93	65.6	184.50	12	1.90	0.07	0.53	67	6.82	0.36	1.91	0.102
	Total	692		1,159.00	171	24.55			631	63.79			
	Average	138	61.3	231.80	34	4.91	0.15	1.38	126	12.76	0.54	3.57	0.101

Table 4.--Creel census results, Section C and Section D of Hunt Creek, and Fuller Creek combined, 1939 to 1950 inclusive

Area: 1939-1940--5.82 acres; 1941-1947--5.41 acres; 1948 7.26 acres; 1949-1950--7.39 acres

Minimum legal size	Year	Total angling trips	Percent of unsuccessful trips	Total angling hours	Trout over 7 inches: Total catch	Trout over 7 inches: Total pounds	Trout over 7 inches: Catch per hour	Trout over 7 inches: Pounds per acre	Trout over 6 inches: Total catch	Trout over 6 inches: Total pounds	Trout over 6 inches: Catch per hour	Trout over 6 inches: Pounds per acre	Average weight, pounds
7 inches	1939	348	58.6	612.75	355	49.89	0.58	8.57					0.141
	1940	332	67.5	546.75	220	34.38	0.40	5.91					0.156
	1941	744	69.9	1,109.75	465	76.91	0.42	14.09					0.165
	1942	615	74.3	944.00	324	49.00	0.34	8.97					0.151
	1943	204	60.8	321.25	187	29.39	0.58	5.38					0.157
	1944	275	63.6	490.25	187	29.05	0.38	5.31					0.155
	1945	346	61.3	571.00	267	42.60	0.47	7.80					0.160
	Total	2,864		4,595.75	2,005	311.22							
	Average	409	66.9	656.53	286	44.46	0.45	7.99					0.155
6 inches	1946	701	62.1	1,105.25	288	45.94	0.26	8.41	757	86.78	0.68	15.89	0.115
	1947	604	67.4	870.25	125	17.81	0.14	3.26	440	44.80	0.51	8.21	0.102
	1948	551	55.9	921.50	423	69.67	0.46	9.60	828	100.76	0.90	13.87	0.122
	1949	455	49.7	1,193.75	466	79.03	0.39	10.69	937	122.15	0.78	16.52	0.130
	1950	379	55.1	934.75	318	61.56	0.34	8.33	539	81.61	0.58	11.04	0.151
	Total	2,690		5,025.50	1,620	269.01			3,501	436.10			
	Average	538	58.9	1,005.10	324	53.80	0.32	8.16	700	87.22	0.70	13.23	0.125

Table 5.--Mean catch per hour per trip, and other statistics, for Sections C and D of Hunt Creek and Fuller Creek, for various time periods and minimum size limits

Section	Period	Minimum size limit (inches)	Mean catch per hour per trip	Standard deviation	Standard error	t value	P (percent probability that means are different)
C	1946-1950	6	0.575	0.993	0.034		
						4.88	99.9+
	1939-1945	7	0.375	0.768	0.023		
						6.36	99.9+
	1946-1950 [1]	7	0.197	0.481	0.016		
D	1946-1950	6	0.725	1.223	0.036		
						6.02	99.9+
	1939-1945	7	0.460	0.928	0.025		
						1.80	92.8
	1946-1950 [1]	7	0.397	0.792	0.024		
Fuller Creek	1946-1950	6	0.572	1.045	0.040		
						1.42	84.4
	1939-1945	7	0.481	0.939	0.050		
						6.13	99.9+
	1946-1950 [1]	7	0.156	0.456	0.017		
All combined	1946-1950	6	0.638	1.111	0.021		
						8.00	99.9+
	1939-1945	7	0.430	0.873	0.016		
						7.95	99.9+
	1946-1950 [1]	7	0.271	0.636	0.012		

[1] The data on these lines are based on the catch of brook trout 7.0 inches or larger that were observed in the creels during the period of the 6-inch minimum size limit.

Table 6.--The average size of brook trout larger than 7 inches during the periods when 7 inches (1939-1945) and 6 inches (1946-1950) were the minimum size limits (7.5 inches = 190 mm., 8.0 inches = 203 mm.)

Section	Period	Number of brook trout [2]	Average total length, mm.	Standard error	t value	P (percent probability that means are different
C	1939-1945	734	197.31	0.7262	1.51	86.9
	1946-1950	345	195.50	0.9570		
D	1946-1947 [1]	175	194.24	1.4981	0.21	16.6
	1939-1945	974	194.59	0.6661	7.74	99.9+
	1946-1950	1,080	202.13	0.7108		
Fuller Creek	1939-1945	208	193.55	1.2866	1.62	89.5
	1946-1950	172	190.63	1.2618		
All combined	1946-1947 [1]	692	194.24	0.6892	1.53	87.4
	1939-1945	1,916	195.52	0.4695	5.45	99.9+
	1946-1950	1,597	199.46	0.5499		

[1] With the data from 1948, 1949, and 1950 of Section D eliminated (years when beaver activity noticeably affected the fishing for the larger brook trout).

[2] The numbers of fish listed here will not agree with the totals given in the other tables for the following reasons:

1. Some fish larger than 7 inches were returned to the water, but reported.
2. Some fish larger than 7 inches were eaten before reporting angling results.

Table 7. The average size of the 6.0- to 6.9-inch brook trout, 1946-1950

Section	Year	Number [1] of brook trout	Average total length, mm.	Standard error
Section C	1946	186	163.16	0.5149
	1947	124	159.69	0.6097
	1948	102	163.77	0.6336
	1949	117	163.68	0.6918
	1950	78	164.05	0.7666
Section D	1946	185	163.17	0.5211
	1947	97	161.57	0.6730
	1948	153	163.97	0.4417
	1949	218	165.31	0.4695
	1950	80	166.30	0.7593
Fuller Creek	1946	91	162.53	0.7763
	1947	93	162.81	0.7531
	1948	91	160.86	0.6676
	1949	129	161.03	0.6235
	1950	55	162.11	0.9275
All combined	1946	462	163.04	0.3400
	1947	314	161.19	0.3943
	1948	346	163.10	0.3543
	1949	464	163.71	0.3399
	1950	213	164.39	0.4741

[1] The numbers of fish listed here will not agree with the totals given in the other tables because an appreciable number were returned to the water.

Table 8. Statistics on fall population changes on brook trout larger than 6.0 inches, Sections A, B and C, Hunt Creek, 1947-1950 inclusive, compared with 1951-1952.

Stream Section	Time period	Size of fish (inches)	Average estimated population	Standard deviation	Standard error	t value	P (percent probability that means are different)
A	1947-1950	6.0-6.9	134.75	42.12	21.06	0.67	49.7
	1951-1952		120.50	3.46	2.45		
	1947-1950	7.0+	48.50	13.91	6.96	0.13	10.3
	1951-1952		49.50	4.90	3.46		
B	1947-1950	6.0-6.9	37.50	11.36	5.68	0.44	34.0
	1951-1952		40.0	1.41	0.21		
	1947-1950	7.0+	21.25	10.15	5.08	1.20	77.0-
	1951-1952		29.00	5.66	4.00		
C	1947-1950	6.0-6.9	29.50	4.20	2.10	10.85	99.9+
	1951-1952		73.50	4.90	3.46		
	1947-1950	7.0+	25.50	6.95	3.48	0.73	53.4
	1951-1952		31.50	10.58	7.48		