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INTENSIVE CREEL CENSUS RESULTS, 1954 TROUT
SEASON, HUNT CREEK FISHERIES EXPERIMENT STATION

By

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Introduction

The waters of the Hunt Creek Fisheries Experiment Station were creel censused intensively during the 1954 season for the sixteenth consecutive year. The waters included in the creel census were: experimental waters of Hunt Creek, Fuller Creek, Fuller Creek Pond, and East Fish Lake. Dimensions of these waters are listed in Table 1.

Method of collecting
creel census data

For the past five years angling on the area has been controlled by the permit system. All anglers who wished to fish the experimental waters first stopped at a centrally located checking station, where they were briefed on the angling regulations and information desired by the clerk on the conclusion of their fishing trip. They were then issued a permit good for that day. On the conclusion of each angler's trip, he was required to return to the checking station, where the following information was placed on the creel census card: angler's name, county of residence (state, if angler was not a resident of Michigan), section(s) fished, species, number, length, weight, and marks

(if any) of all fish taken, and the time spent angling. Scale samples were taken from all wild brook trout, all hatchery rainbow trout, and from selected individuals among hatchery brook trout.

The experimental waters were posted with delimitative signs at all access points. The signs described the various section boundaries, open and closed waters, angling regulations in force, and they contained other information to aid the angler to report accurately on the conclusion of his angling trip.

Legal-size trout available to anglers,
other than native brook trout

A number of the 3,000 hatchery fingerling rainbow trout (2.8 to 5.0 inches), planted in Hunt Creek in October of 1952, survived the 1953 season to enter the 1954 catch. By estimation, from creel census records and population study data, there were 242 rainbow trout available to the anglers during the 1954 season. The 1953 Hunt Creek report (I. F. R. Report No. 1425) described the past plants in more detail.

Nine hundred and sixteen sublegal brook trout (4.7 to 6.5 inches) were planted in Fuller Creek and Section D of Hunt Creek in April, 1953. In 1954, only 5 were creeled, and no population estimate on these fish was made because none of these fish was taken during the fall population study.

The August, 1953, plant of 400 Psychological Research Service (P.R.S.) legal brook trout did not carry over to the 1954 season in any great numbers. Only 15 of these fish were creeled during the season. One individual was taken during the 1954 fall population study. Sixty-eight of these fish were counted in the stream during the 1953 fall population study.

A plant of 400 P.R.S. legal brook trout was put into Hunt Creek in April 1954. This plant was a continuation of the 1953 P.R.S. study of the effect of training on hatchery trout behavior. Anglers took 236 in their creels, and nine more were taken in the fall population study.

East Fish Lake has received plantings of hatchery and wild (from streams) brook trout since 1950 to supplement the number of fish available to anglers. Following is a list of the fish planted since 1950 (all fish marked for identification by year) and data on catch and population for 1954:

Year planted	Number planted	Statistics for 1954		
		Number creeled	Netted at end of season	Minimum number available
1950	500 fing.	4	0	4
1951	1,000 fing.	20	4	24
1952	2,030 fing.	31	33	64
1953	650 subl.	30	6	36
1954	600 subl.	8	18	26

A population estimate was attempted during the fall of 1954, but the estimate was not deemed valid because too few recoveries of marked fish were obtained. The fish listed as "netted at end of season" do not include recoveries of marked fish.

As of February 23, 1955, one 2.8-inch fin-clipped brown trout had been discovered in East Fish Lake. This brown trout (and possibly more of them) was put in the lake with the 1954 fall release of P.R.S. fingerling brook trout.

Angling results

Anglers using the area during 1954 were issued 1,176 permits. Licensees received 955 permits (81 percent); licensees' wives, 69 permits (6 percent); and minors under 17 years old, 152 permits (13 percent).

During 1954, only two anglers failed to return to the checking station upon concluding their angling (a good record). One angler reported in at a later date. The other angler reported by leaving a note attached to the door of the checking station. The only other known violation on the area was committed by one man who thrice fished on the area without a permit before being arrested. His fishing records were included in the final tally. The 1954 angling records are complete, insofar as can be determined.

Angling results, Hunt Creek

A detailed breakdown of angling statistics for all the experimental waters is listed in Table 2.

Section Z, the lowermost experimental section, flows through a partially open meadow. It was easily waded and fished, and was the most popular section on the area during 1954. Aside from being an attractive stretch of water, Section Z has a road running along its east bank; this probably contributed to its popularity. The other sections have no such road.

Population-study records show 52 legal fish as being present in Section Z eight days after the close of the season. These fish, plus those taken by the anglers, accounted for, roughly, 413 fish available to the anglers sometime during the season.

Fishing trips to Section Z during 1954 totalled 363. Anglers were successful on 35 percent of these trips. They fished for 837.75 hours to capture 361 legal trout whose weight was 58.76 pounds. These anglers averaged one fish in the creel for each 2.3 hours they spent on the stream. See Table 2 for breakdown. Fifteen sublegal trout whose weight was 1.63 pounds were also creeled from Section Z. At the time of capture, these fish were, in all probability, of legal length; and shrinkage after death reduced their size. For the most part, the anglers were allowed to keep their short fish. Anglers fishing in the section reported hooking and releasing 1,796 sublegal trout. See Table 4 for angling statistics from 1949 to 1954.

On October 4, 1954, a 15-inch wild brown trout was discovered in the up-trap of the weir located at the lower end of Section Z. We have no previous record of a brown trout attempting to enter the experimental area. However, one brown trout was taken about three-fourths of a mile below the weir by electrofishing in the fall of 1953. Possibly, if the lower weir were removed or not maintained, brown trout would be added to the fauna of the area.

Section A, located immediately upstream from Section Z, flows through an open marsh. It is excellent fly-fishing water. The beaver family that built a bank lodge in the section in 1953 have not attempted to dam the stream. Their effect on fishing in the section was not noticeable during the 1954 season, although the undermined bank near their lodge provided additional cover in that section.

A population estimate of 56 legal fish remaining in the stream at the close of the season plus the number of fish taken during the season indicate that there were at least 265 trout available sometime during the season.

The anglers fishing Section A in 1954 made 172 trips to the stream; they were successful on 42 percent of the trips. They fished for 437.75 hours to capture 209 legal trout whose weight was 32.34 pounds. The anglers averaged one fish for each 2.1 hours on the section. Twelve sublegal trout weighing 1.20 pounds were also creeled. Section A anglers reported releasing 1,367 sublegal trout. See Table 4 for 1939-to-1949 angling statistics for the combined sections A, B, C, and D.

Section B, located immediately upstream from Section A, flows through a dense cedar swamp. Section B normally is subjected to fewer fishing trips than are the other sections of the area because of its isolated position between sections A and C, where there is no road handy. To get to Section B from the checking station, one had to walk 0.3 mile, or if walking in from the nearest road access, 0.5 mile.

From population study and creel census data, there were, roughly, 72 legal trout available in this section sometime during the season.

Section B anglers made 73 trips to the stream; they were successful on 40 percent of these trips. They fished for 121 hours to creel 54 trout weighing 8.73 pounds. These anglers averaged one fish in the creel for each 2.2

hours they fished. Only one trout less than 7 inches (6.9", 0.11 pound) was creeled from Section B; 462 sublegals were returned to the water by anglers.

Section C, immediately upstream from Section B, was the most difficult section to fish because of the vegetation encroaching the stream edge. However, it was a popular section because it is accessible from several points and yields a steady harvest of fish. Mainly, live baits are used in this section.

Approximately 274 fish were available sometime during the 1954 season, in Section C.

Hunt Creek anglers fished on 204 trips in the section; 42 percent were successful; they caught 225 legal trout weighing 36.62 pounds. These anglers averaged one keeper trout for each 2.0 hours fished--the best catch per hour of all sections of Hunt Creek. Section C anglers brought three sublegal trout (0.36 pound) into the checking station. They reported releasing 971 sublegal trout.

Section D, the uppermost section of the experimental water of Hunt Creek, lies directly upstream from Section C. Section D is typified by the series of beaver dams it contains. In 1954, as in past years, the beaver caused the fishing to fluctuate. This season the beaver brought the water level in the large pond behind the No. 3 dam to a new high, making it difficult to wade to choice angling spots. The No. 3 pond sustains the majority of the fishing pressure in Section D.

No availability estimates could be made for Section D, as no population study was made in that section in 1954.

Anglers made 299 trips to Section D; 31 percent were successful, and they creeled 217 legal trout weighing 49.42 pounds. These anglers averaged one trout for each 2.9 hours fished. Only one sublegal trout weighing 0.11 pound was creeled, while 496 were liberated by the anglers.

The information contained in Table 3 is a compilation of the records for sections Z, A, B, C, and D into semimonthly periods. Only wild brook trout were included in the main body of this table to make comparisons with past years possible. Sublegal trout were excluded.

Area anglers made 1,111 trips to the combined sections in 1954, as compared to 881 trips made in 1953. The first two-week period of the season contained the greatest number of anglers on the area; this period also produced the best catch and angling quality. The catch-per-hour index for 1954 was lower than for 1953, for all sections and for unknown reasons. The decrease in catch per hour may have been due to reduced numbers of fish available to the anglers in 1954. The information from the creel census records and population studies indicate that there were at least 1,620 (867 wild) legal trout available to the 1953 anglers, and 1,254 (751 wild) available to the 1954 anglers. That there ^{was} were a greater number of anglers fishing a greater number of hours undoubtedly contributed to the decrease in the catch per unit of effort. Also, the No. 3 beaver pond in Section D had increased in volume of water, and thus presented a more difficult habitat over which to fish. The trend of fluctuation of catch per hour for the 14-day periods for 1953 and 1954 was similar.

Angling results, Fuller Creek
and East Fish Lake outlet

Fuller Creek is a small stream originating about 1/2 mile west of Fuller Creek Pond. After leaving the pond, it flows 812 feet to the southeast, where it joins with the outlet of East Fish Lake, and thence flows east through swamp cover to unite with Hunt Creek at the upper end of Section B. Most of

the angling on Fuller Creek was done on the lower one-fourth of its course. The upper end was difficult to fish because of the swamp cover.

No availability estimates are possible for Fuller Creek as no population study was made in 1954.

Ninety-nine trips were made to this stream in 1954; 38 percent were successful. The anglers creeled 78 legal trout weighing 12.38 pounds in 201.25 hours of fishing. They captured one trout for each 2.6 hours spent on the stream. Three sublegal trout weighing 0.29 pound were also creeled and 791 were returned to the water. See Table 4a for 1940 to 1954 angling statistics.

Angling results, Fuller Creek Pond

Fuller Creek Pond is located on the upper end of Fuller Creek. The pond was originated by beaver, but the water level is now maintained by an earthen fill over the old beaver dam.

No population study was made on the pond in the fall of 1954, so no availability information is on hand.

Area anglers made 67 trips to the pond in 1954 and creeled 16 trout larger than the minimum size of 10 inches; 15 percent of these trips were successful. The 16 trout weighed 10 pounds. An average of one trout was creeled for each 11 hours of fishing. One sublegal trout weighing 0.4 pound was creeled, and 80 sublegals were returned to the waters. Table 4a lists the 1939 to 1954 angling statistics.

Angling results, East Fish Lake

East Fish Lake, a temperate lake of the second order, provided anglers with few native fish in 1954; yet, the total harvest was of normal proportions

when planted fish were tallied in the totals. The planting of fish and the abundance of rough fish in the lake have tended to replace the native population of brook trout.

Population and creel census data indicate that approximately 511 legal trout were available to the anglers sometime during the season; 410 (plus or minus 84) from the fall population study, and 101 removed by anglers. No legal wild trout (10 inches or larger) were taken in the population study.

Angling trips to the lake in 1954 totalled 264; 27 percent were successful. These trips produced 101 trout weighing 44.7 pounds. Fourteen sublegal trout weighing 4.8 pounds were creeled; and 755 small fish were released. Seven white suckers and 63 northern creek chubs were reported caught in 1954. See Table 4b for 1939-to-1954 angling statistics.

In total, for all waters, anglers during 1954 made 1,541 trips on the area. They fished 3,809 hours to creel 1,311 trout weighing 262 pounds. In the process, they caught and released 6,718 trout of sublegal size.

Flies-vs.-bait

angling success

In 1954, as in 1952 and 1953, the creel census records were divided into two groups--records for stream angling and those for pond angling--and within each group a comparison was made of angling success of fly fishermen vs. bait fishermen. The stream category included Hunt Creek (except Section D) and Fuller Creek, and the pond category included Fuller Creek Pond, Section D of Hunt Creek, and East Fish Lake. This division was made because fishing methods and trout habitat were somewhat different for the two types of waters.

The column divisions under lure in Table 5 are: flies, statistics of angling trips on which flies alone were used as lures; bait, angling trips on which lures other than flies were used; and combination, angling trips on which both flies and bait were used.

Contrary to the results of the 1952 and 1953 comparison, no difference was found in the ability of fly and bait fishermen to catch fish, as indicated by the average catch per hour per trip in the stream waters. Any difference in the catch-per-hour-per-trip figures for stream fishing listed in Table 5 was the result of chance, not a "real" difference.

There was no difference in the number of successful fly and bait trips to the streams; and, there was no difference in the average size of trout taken by fly and bait fishermen who fished on the streams.

Briefly, the data indicate that the fly and bait fishermen on streams were on equal terms as to their ability to catch comparable numbers of fish, and that the fish they caught were not different in size.

The same held true for fly and bait fishermen on ponds. Both were equally successful when compared by catch per hour per trip, percent of successful trips, and average size of the trout they caught.

Anglers who used both flies and bait in both the stream and pond habitats experienced about as many successful trips and caught about the same numbers of legal trout per unit of effort as did fly anglers or bait anglers. However, for some unknown reason, the average size of the fish taken by this category of anglers was noticeably smaller than the average size of brook trout taken by anglers using flies only or bait only.

This test of comparative abilities of anglers and of size of fish caught was subject to error, as all factors were not exactly comparable. No measure could be made of the relative skill of the fly and bait fishermen--the skill of the angler was a variable that could not be controlled. Probably, that was the cause of the varied results in 1952, 1953, and 1954. The 1952 and 1953 creel census data indicated that the fly fishermen were more efficient at taking fish in streams.

Popularity of lures

As has been true in past years, worms were the most popular lure on the area in 1954 (Table 6). On the combined waters of the area, worms were used on 64.3 percent of all angling trips; flies ranked second, used on 17.2 percent of the trips; minnows ranked third, used on 7.0 percent of the trips; and all other lures were used on 11.5 percent of the trips.

Influence of hook sizes on the ability of fishermen to catch legal and sublegal trout

Measurement of the hook sizes used by anglers on the area waters was begun in 1953 to supplement work being done on the relationship of the mortality of sublegal trout released by anglers to various lures and hook sizes. All hook measurements were based on Allcock's hooks, sizes 2 to 16.

Because of the similarity of data obtained from both the stream and pond waters in 1953, only the stream data for 1954 were analyzed. Two tabulations of the data were made in 1954. One tabulation included sublegal- and legal-size trout caught with each hook; the other included only legal-size trout caught with each hook (Tables 7 and 7a). All individual angling trips, which involved the use of more than one hook size or lure, were rejected for this comparison. A great dissimilarity in the two resulting tables would indicate that the fishermen did not report accurately the number of sublegal trout returned to the water.

The tabulations in Tables 7 and 7a also have a possible source of bias in that equal amounts of angling time were not spent by anglers of equal ability with all hook sizes and lures. This variation is not controllable under conditions imposed by public fishing.

On the assumption that the information contained in Tables 7 and 7a is not invalidated by the above-mentioned variables, then it is our conclusion that there is little, if any, difference between the various hook sizes and lures regarding their relative efficiency to catch trout, as measured by the mean catch per hour per trip. This inference is borne out by the information in Table 7a which lists only those fish seen and recorded by the census clerk. The interpretation of the data in the foregoing table suggests that the size of the fish hook could be restricted without impairing the ability of the angler to catch trout. The above statements apply only to the hooks ranging in size from No. 2 to No. 16, and then only when used with the lure under which they are listed in Tables 7 and 7a.

Rough fish removal from East Fish Lake

The rough-fish removal program on East Fish Lake continued for the third year in 1954. The spring netting procedures employed during 1952 and 1953 were again used in 1954. For netting in the fall of 1954, a map of the lake was gridded into numbered squares, and netting sites were chosen employing a table of random numbers. Table 8 lists the results of the netting program for the past three years.

During the 67 days from April 13 to June 19 (1954) when the nets were in operation, 1,592 white suckers were captured and destroyed--484 more than were captured in the spring of 1952. The 1954 spring netting produced 5.3 more white suckers per day than the 1952 netting, but 4.8 fewer suckers than the 1953 operations. Although no statistical comparison of the average length of the suckers captured in the three years was made, it appears safe to conclude that the netting had caused a reduction in the average size of the suckers remaining in the lake. The average size of 9.2 inches in 1952 had been reduced to 7.1 inches in 1953 and 6.9 inches in 1954.

The fact remains that, although we are reducing the average size of the white suckers, we are not reaching the intended goal of a reduced population of white suckers. The number of small suckers which escape our nets offsets any advantage gained by removing the large old fish. Competition for space and food between suckers and brook trout in the lake apparently continues.

The harvesting of suckers in the fall appears to have had little influence on the total population.

The removal of northern creek chubs from the lake has been of little benefit to the trout population. As seen in Table 8, the netting has done little to reduce the chub population. Our netting gear is ineffective for capturing chubs. The chub population was probably not affected by the fall netting.

In the spring of 1955, one large trap net will be placed in the lake to seal off the outlet bay to hold down the number of chub and sucker spawners able to reach what is thought to be the only spawning bed in the lake.

Tentatively, plans have been made to poison out the fish in East Fish Lake during August of 1956.

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Table 1.--Dimensions of the experimental waters on the Hunt Creek drainage, with the angling regulations in force, 1954 season (mileage is listed in parentheses)

Experimental water	Dimensions		Area (acres)	1954 Regulations
	Length (feet)	Average width (feet)		
Section Z	2,397 (0.45)	20.3	1.12	7-inch minimum size, 10 per day
A	2,577 (0.49)	24.3	1.44	Same
B	1,605 (0.30)	17.5	0.64	Same
C [✓]	2,700 (0.51)	11.8	0.71	Same
D [✓]	2,896 (0.55)	50.0	3.11	Same
Total Hunt Creek	12,175 (2.31)	25.1	7.02	7-inch minimum size, 10 per day
Fuller Creek	9,875 (1.87)	15.7	3.57	7-inch minimum size, 10 per day
Fuller Creek Pond	... ...	...	14.58	10-inch minimum size, 5 per day
East Fish Lake	... ...	...	16.00	Same

[✓]Excluding 1,270 feet of Section C around experimental diversions which are closed to fishing.

[✓]The data listed are from a 1949 survey. Beaver activities have altered the average width and area.

Table 2.--Summary of angling statistics, experimental waters of the Hunt Creek Drainage, 1954 season.
 Figures in parentheses represent the numbers of successful fishing trips

Experimental water	Total number of		Anglers' catch				Angling quality		Average size		
	fishing trips	angling hours	Species	Origin	Number	Total pounds	Catch per hour	Pounds per hour	Length (inches)	Weight (pounds)	
Hunt Creek Section Z	363 (128)	837.75	Brook	Wild	143	22.29	0.17	0.03	7.7	0.16	
			Brook	Hatchery	148	22.24	0.18	0.03	7.6	0.15	
			Rainbow	Hatchery	70	14.23	0.08	0.02	8.4	0.20	
	A	172 (73)	437.75	Brook	Wild	150	21.25	0.34	0.05	7.5	0.14
				Brook	Hatchery	19	2.80	0.04	0.01	7.7	0.15
				Rainbow	Hatchery	40	8.29	0.09	0.02	8.3	0.21
	B	73 (29)	121.00	Brook	Wild	32	5.08	0.26	0.04	7.7	0.16
				Brook	Hatchery	5	0.84	0.04	0.01	7.6	0.17
				Rainbow	Hatchery	17	2.81	0.14	0.02	7.9	0.17
C	204 (85)	451.50	Brook	Wild	102	15.62	0.23	0.03	7.7	0.15	
			Brook	Hatchery	67	10.35	0.15	0.02	7.6	0.15	
			Rainbow	Hatchery	56	10.65	0.12	0.02	8.1	0.19	
D	299 (94)	638.25	Brook	Wild	199 ^W	45.76	0.31	0.07	8.6	0.24	
			Brook	Hatchery	16	3.13	0.03	Trace	8.0	0.20	
			Rainbow	Hatchery	2	0.53	0.003	Trace	9.1	0.27	
Hunt Creek Totals, Avg.	1,111 (409)	2,486.25	Brook	Wild	626 ^W	110.00	0.25	0.04	7.9	0.18	
			Brook	Hatchery	255	39.36	0.10	0.02	7.6	0.15	
			Rainbow	Hatchery	185	36.51	0.07	0.01	8.3	0.20	
Fuller Creek	99 (38)	201.25	Brook	Wild	68	11.14	0.34	0.06	7.7	0.16	
			Brook	Hatchery	6	0.70	0.03	Trace	7.2	0.12	
			Rainbow	Hatchery	4	0.54	0.02	Trace	7.5	0.14	
Fuller Creek Pond	67 (10)	181.50	Brook	Wild	15	9.59	0.09	0.06	11.5	0.60	
			Brook	Hatchery	1	0.41	0.01	Trace	10.2	0.41	
East Fish Lake	264 (70)	940.00	Brook	Wild	7	3.75	0.01	Trace	12.0	0.54	
			Brook	Hatchery	62	24.79	0.07	0.03	10.5	0.41	
			Brook	Hunt Creek ^W	32	16.15	0.03	0.02	11.7	0.50	

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^WEight fish not measured or weighed.

^WNative brook trout transferred from Hunt Creek to East Fish Lake.

Table 3.--Semimonthly angling statistics, all experimental sections of Hunt Creek combined, 1954 season.
 Figures in parentheses represent the numbers of successful fishing trips

Dates	Total		Native trout		Angling quality		Average	
	Fishing trips	Angling hours	Number	Weight (pounds)	Catch per hour	Pounds per hour	Weight (pounds)	Length (inches)
April 24-May 7	215 (100)	520.00	174	25.94	0.33	0.05	0.15	7.7
May 8-May 21	88 (43)	210.00	67	10.87	0.32	0.05	0.16	7.8
May 22-June 4	152 (47)	308.00	67	13.06	0.22	0.04	0.19	8.1
June 5-June 18	104 (45)	225.25	71	13.00	0.32	0.06	0.18	8.1
June 19-July 2	97 (42)	216.50	44	7.55	0.20	0.03	0.17	7.8
July 3-July 16	89 (28)	199.75	28	6.86	0.14	0.03	0.25	8.5
July 17-July 30	96 (31)	220.25	52	12.77	0.24	0.06	0.25	8.4
July 31-Aug. 13	89 (26)	195.00	37 ³	5.87	0.19	0.03	0.17	7.8
Aug. 14-Aug. 27	76 (18)	158.50	38 ⁵	4.86	0.24	0.03	0.15	7.5
Aug. 28-Sept. 12	105 (29)	233.00	48	9.22	0.21	0.04	0.19	8.0
Totals: Average Wild brook trout	1,111 (409)	2,486.25	626 ⁸	110.00	0.25	0.04	0.18	7.9
Hatchery brook trout			255	39.36	0.10	0.02	0.15	7.6
Hatchery rainbow trout			185	36.51	0.07	0.01	0.20	8.3

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√Number of fish not weighed or measured.

Table 4.--Summary of the Hunt Creek experimental water angling results from 1939 to 1954, legal wild brook trout

Experimental area and year	Total		Total catch		Catch per hour		Average	
	Fishing trips	Angling hours	Number	Pounds	Number	Pounds	Length (inches)	Weight (pounds)
Hunt Creek, Sec's. A, B, C, and D								
1939	438	780	492	68	0.63	0.09	7.5	0.15
1940	505	901	406	61	0.45	0.07	7.6	0.15
1941	1,015	1,546	722	109	0.47	0.07	7.7	0.16
1942	808	1,267	543	83	0.43	0.07	7.6	0.16
1943	311	540	378	60	0.70	0.11	7.5	0.16
1944	340	640	364	53	0.57	0.08	7.7	0.16
1945	375	637	315	52	0.49	0.08	7.9	0.17
1946	753	1,206	439	68	0.36	0.06	7.6	0.16
1947	607	872	187	26	0.21	0.03	7.6	0.14
1948	504	869	492	78	0.57	0.09	7.7	0.16
1949	432	1,032	527 ¹⁰	87	0.51	0.08	7.8	0.17
1950	369	915	417 ¹⁰	75	0.46	0.08	8.0	0.18
1951	552	1,066	431	76	0.40	0.07	8.0	0.18
1952	488	1,195	556	103	0.47	0.09	8.0	0.19
1953	656	1,587	572	118	0.36	0.07	8.4	0.21
1954	748	1,645	483	88	0.29	0.05	8.0	0.19
Average	556	1,043	458	75	0.44	0.07	...	...
Hunt Creek Sec. Z								
1949	165	375	186	28	0.50	0.08	7.6	0.15
1950	164	473	161 ¹⁰	21	0.34	0.05	7.4	0.13
1951	129	322	124	18	0.39	0.05	7.5	0.14
1952	188	570	222	34	0.39	0.06	7.7	0.15
1953	225	566	183	27	0.32	0.05	7.6	0.15
1954	363	838	143	22	0.17	0.03	7.7	0.16
Average	205	524	170	25	0.32	0.05	...	...

✓Number of fish for which weights and lengths were not recorded.

Table 4a.--Summary of the Hunt Creek experimental water angling results from 1939 to 1954, legal wild brook trout

Experimental area and year	Total		Total catch		Catch per hour		Average	
	Fishing trips	Angling hours	Number	Pounds	Number	Pounds	Length (inches)	Weight (pounds)
Fuller Creek								
1940	20	36	16	3	0.44	0.08	...	...
1941	59	97	33	5	0.34	0.05	...	...
1942	31	39	11	2	0.28	0.05	8.3	0.18
1943	19	25	19	3	0.76	0.10	7.6	0.14
1944	96	145	61	8	0.42	0.06	7.6	0.15
1945 [✓]	102	159	64	9	0.40	0.06	7.5	0.14
1946	223	278	56	8	0.20	0.03	7.4	0.14
1947	212	219	27	4	0.12	0.02	7.5	0.14
1948	190	195	31	5	0.16	0.03	7.7	0.16
1949	115	296	50	8	0.17	0.03	7.6	0.15
1950	107	185	12	2	0.07	0.01	7.6	0.16
1951	110	246	59	9	0.24	0.04	7.6	0.16
1952	85	221	64	10	0.29	0.05	7.6	0.15
1953	86	212	84	14	0.40	0.06	7.8	0.16
1954	99	201	68	11	0.34	0.06	7.7	0.16
Average	104	170	44	7	0.26	0.04	...	...
Fuller Creek Pond								
1939	112	250	164	88	0.66	0.35	10.6	0.54
1940	65	144	88	37	0.61	0.26	9.7	0.42
1941	26	50	57	14	1.13	0.28	8.6	0.35
1942	10	12	6	1	0.51	0.11	8.5	0.21
1943	4	8	14	2	1.81	0.14	7.6	0.13
1944	4	6	36	5	6.55	0.85	7.5	0.14
1945	Pond reverted to stream condition. New dam completed May, 1949.							
1949	2	16	5	1	0.31	0.10	9.1	0.30
1950	136	430	347	109	0.81	0.26	9.3	0.32
1951 [✓]	65	165	22	12	0.13	0.07	11.0	0.53
1952	88	239	43	24	0.18	0.10	11.3	0.56
1953	60	172	33	20	0.19	0.12	11.6	0.62
1954	67	182	15	10	0.09	0.06	11.5	0.60
Average	53	139	69	27	0.50	0.19	...	...

[✓]The period from 1945 to 1948 includes the anglers' results on Fuller Creek Pond, which at this time had reverted from a pond to a stream habitat.

[✓]7" size limit changed to 10", effective opening 1951 season.

Table 4b.--Summary of the Hunt Creek experimental water angling results from 1939 to 1954, legal wild brook trout

Experimental area and year	Total		Total catch		Catch per hour		Average	
	Fishing trips	Angling hours	Number	Pounds	Number	Pounds	Length (inches)	Weight (pounds)
East Fish Lake								
1939	63	126	51	...	0.41	...	...	...
1940	111	308	172	30	0.56	0.10	8.0	0.18
1941	156	386	71	11	0.18	0.03	7.4	0.15
1942	159	289	34	10	0.12	0.03	9.1	0.28
1943	121	200	69	26	0.29	0.13	9.3	0.37
1944	311	651	108	79	0.17	0.12	11.2	0.75
1945	436	928	169	131	0.18	0.14	11.9	0.83
1946	430	935	93	69	0.10	0.07	11.5	0.76
1947	344	711	89	54	0.13	0.08	11.1	0.61
1948	287	853	117	56	0.14	0.07	10.4	0.49
1949	287	1,040	93	71	0.09	0.07	11.5	0.76
1950	218	613	50	39	0.08	0.06	12.3	0.82
1951 [√]	200	732	56	36	0.08	0.05	11.9	0.64
1952	174	596	24	16	0.04	0.03	12.3	0.65
1953	125	446	16	11	0.04	0.03	12.6	0.70
1954	264	940	7	4	0.01	Trace	12.0	0.54
Average	230	609	76	40	0.13	0.03	...	...

[√]7" size limit changed to 10", effective opening 1951 season.

Table 5.--Flies versus bait--relative angling quality on stream and pond waters, 1954 season

Water group	Lure	Total		Total catch				Average length		Percent successful trips
		Fishing trips	Angling hours	Number	Number per hour	Number per hour per trip		Inches	Standard error	
						Average	Standard error			
Streams	Flies	138	295.75	109	0.369	0.404	0.078	7.76	0.067	33
	Bait	742	1,660.75	766	0.461	0.474	0.036	7.79	0.024	40
	Combination	32	95.00	51	0.534	0.630	0.181	7.53	0.113	38
	<u>Total</u>	<u>912</u>	<u>2,051.50</u>	<u>926</u>	<u>0.451</u>	...	...	...	...	38
Ponds	Flies	68	134.50	34	0.253	0.231	0.072	9.15	0.303	24
	Bait	537	1,553.25	287	0.185	0.184	0.019	9.54	0.099	28
	Combination	25	72.00	13	0.181	0.128	0.177	8.35	0.355	28
	<u>Total</u>	<u>630</u>	<u>1,759.75</u>	<u>334</u>	<u>0.190</u>	...	...	...	...	28

Percent of probability that catch per hour per fishing trip was different when different lures were fished (t test)

Percent of probability that the average length of the anglers' catch was different when different lures were fished (t test)

	Streams	Bait	Combination
Flies		58.18	74.14
Bait		...	54.06
Ponds			
Flies		47.12	41.08
Bait		...	24.34

	Streams	Bait	Combination
Flies		22.54	91.80
Bait		...	97.56
Ponds			
Flies		77.74	91.44
Bait		...	99.88

Percent of probability that the number of successful trips was different when different lures were fished (Chi-square test)

	Streams	Bait	Combination
Flies		85	24
Bait		...	1
Ponds			
Flies		66	3
Bait		...	5

Table 6.--Numerical relationship of types of lures employed by anglers, 1954 season. Calculated on total basis, i.e., on stream waters worms were used on 545 angling trips. These trips may also involve the use of flies, plugs, etc.

Lure fished	Streams		Ponds		Combined waters	
	Fishing trips	Percent of total	Fishing trips	Percent of total	Fishing trips	Percent of total
Worms	545	63.3	440	65.5	985	64.3
Flies	171	19.9	93	13.8	264	17.2
Minnows	52	6.0	56	8.3	108	7.0
Spinner- worms	54	6.3	37	5.4	91	5.9
Plugs	2	0.2	32	4.8	34	2.2
Insects	20	2.3	6	0.9	26	1.7
Spinner- minnows	13	1.5	...	...	13	0.8
Spinning- gear	4	0.5	5	0.7	9	0.6
Salmon eggs	...	...	4	0.6	4	0.3
Total	861	100.00	673	100.00	1,534	100.00

Table 8.--Summary of rough fish netted from East Fish Lake, 1952, 1953, and 1954

Species and period netted		Number			Pounds		Average		Sample size
		Days netted	Fish caught	Fish per day	Total	Per acre	Pounds	Inches	
Suckers									
1952	Apr. 23-June 22	60	1,108	18.5	479.0	29.9	0.44	9.2	1,088
1953	Apr. 13-June 30	77	2,165	28.1	342.1	21.4	0.16	7.1	2,165
1954	Apr. 13-June 19	67	1,592	23.8	195.0	12.2	0.12	6.9	1,592
1952	Oct. 19-Nov. 5	17	184	10.8	21.6	1.4	0.12	6.6	184
1953	Oct. 14-Oct. 30	16	171	10.7	24.7	1.5	0.14	7.0	98
1954	Oct. 7-Nov. 8	32	318	9.9	...	...	...	...	...
Chubs									
1952	Apr. 23-June 22	60	448	7.5	32.2	2.0	0.07	5.5	448
1953	Apr. 13-June 30	77	386	5.0	21.3	1.3	0.06	4.9	386
1954	Apr. 13-June 19	67	678	10.1	33.6	2.1	0.05	5.0	678
1952	Oct. 19-Nov. 5	17	121	7.1	12.2	0.8	0.10	6.6	121
1953	Oct. 14-Oct. 30	16	71	4.4	11.0	0.7	0.15	6.1	23
1954	Oct. 7-Nov. 8	32	362	11.3	...	...	...	...	...

Numerical composition of white suckers, by age groups, netted in East Fish Lake spring netting periods (percentage in parentheses)

	I	II	III	IV	V	VI
1952	7 (0.6)	670 (61.6)	197 (18.1)	214 (19.7)		
1953	125 (5.8)	1,276 (58.9)	741 (34.2)	20 (0.9)	3 (0.2)	
1954	73 (4.6)	951 (59.7)	476 (29.9)	89 (5.6)	2 (0.1)	1 (0.1)

Percent of probability that the distribution of suckers in each age group was different for the three years, as determined by the adjusted Chi-square test

	I	II	III	IV	V
1952 <u>vs.</u> 1953	99.9+	84	99.9+	99.9+	
1952 <u>vs.</u> 1954	99.9+	83	99.9+	99.9+	
1953 <u>vs.</u> 1954	87	36	99.5	99.9	20

File with Institute Report #1444.
MICHIGAN DEPARTMENT OF CONSERVATION

INTEROFFICE COMMUNICATION

March 1, 1956

TO: F. A. Westerman, Chief, Fish Division
FROM: G. P. Cooper, Director, I.F.R.
SUBJECT: Institute Report No. 1444

Concerning this report please see earlier correspondence between Messrs. Westerman, Leonard and Hazzard. As a result of the earlier correspondence, Dr. Shetter has made some further study of creel census and weir records at the Hunt Creek station, and his conclusions from this further study are contained in his letter of January 19, 1956 to this office, as per copy enclosed.

GPC:pab
Encl. 3
cc: J. W. Leonard
D. S. Shetter

G. P. Cooper

1444
MAR 2 1956
FISH DIVISION

C O P Y

January 19, 1956

TO: G. P. Cooper, Director, Institute for Fisheries Research
FROM: D. S. Shetter, In Charge, Hunt Creek Fisheries Research Station
SUBJECT: Institute Report No. 1444

Please refer to Hazzard's letter to Westerman of 11/18/55, and Westerman's letter to J. W. Leonard of 5/20/55. Before he left Al asked me to try to find some evidence in our files concerning the speculations by himself and J. W. Leonard, and this memorandum is the result.

Creel census, migration figures, and population study estimates for Sections Z, A, B and C were utilized for the years 1949 through 1955, since only for that portion of the stream can we obtain a reasonably accurate estimate of losses or additions by migration (the blocking weirs were installed April 1, 1949).

The essential figures are given in the accompanying tables. As you will see, the pin-pointing of any correlations with certainty is rendered rather complex when you consider the controlled and uncontrolled variations which were ;

1. Poor fish-trapping arrangements during most of 1949 resulting in the capture of relatively few fish.
2. Installment of a better upstream trap at Sec. Z in the fall of 1953, increasing the number of immigrants taken in comparison with earlier years.
3. Overtopping of Sec. D traps on several occasions in 1954 and 1955 because of Sec. D beaver dam failures, possibly increasing the estimated populations of those years, and immigrants taken in the traps.
4. Considerable variation in angling pressure.

It appears desirable to determine if planting hatchery fish has affected the numbers of wild brook trout which left the area. With regard to legal plantings it was assumed that any direct effect would be during the year of planting.

Accordingly, years of no planting were compared with years when hatchery fish of legal size were planted in Sections Z, A, B and C. The average gains by migration for years of not planting and planting were subjected to the t test.

Yrs. not planted	Net gain by migration	Yrs. planted	# Planted	Net gain by migration
1949	+57	1951	296	- 8
1950	- 2	1953	400	-29
1952	- 3	1954	400	+69
		1955	378	+26
Totals	+52			+58
Average	+17.33			+14.50
Std. Dev.	±34.35			±12.82
Std. error	±19.83			±21.41

$t = \frac{2.83}{29.18} = 0.09$ with 5 d.f. = Less than 10 per cent chance that the averages differ significantly.

Subject to some of the inherent errors previously mentioned the statistical examinations above lend weight to the thesis that the plantings of legal fish did not induce migration of legal wild fish out of the area.

In the analysis of the effect of the fingerling plantings the data were grouped by years following no fingerling releases and years following fingerling plantings:

Yrs. following no plant	Net gain by migration	Yrs. following planting	#Planted	Net gain by migration
1949	+ 9	1953	3000	-1219
1950	-632	1955	4000	- 889
1951	-556			
1952	-512			
1954	-961			
Totals	-2652			-2108
Average	- 530.4			-1054
Std. Deviation	± 349.2			± 233.3
Std. error	± 156.15			± 165.0

$$t = \frac{523.6}{227.07} = 2.31, \text{ with } 5 \text{ d.f.}, P=92.7\%.$$

Again, subject to the uncontrollable factors mentioned previously, this analysis hints that planting of fingerling trout may have increased the numbers of migrants among wild brook trout of less than 7 inches in size.

The difference between the two mean losses would have been even greater had 1954 been eliminated from the calculations, or included with the years following planting. Observations suggest that the fairly good survival of the 1952 fingerling rainbow trout released in October had a carryover effect extending into 1954.

As to the relationship between catch per hour and other factors, study of the table and the accompanying graphs suggest that, within certain limits, the catch per hour increases as the stock of available legal fish increases, provided angling pressure does not undergo a large increase at the same time.

It would appear that when legal fish are planted and fished over at near normal or abnormal rates, such fish are in the stream a comparatively short time, and place little or no strain on the habitat. This general thought has been expressed by others.

On the other hand, the tabulations suggest that when larger numbers of fingerlings are introduced, before angling and other types of loss can reduce their numbers, considerable time must elapse before biological equilibrium is reached. In the meantime severe competition occurs for food and living space between all classes of fish and fish of the same class. This would involve mortality and/or migration. In the case of the two fingerling releases in this experimental water, the population of young-of-the-year trout of the experimental sections in September was roughly doubled by the introduced fish.

David S. Shetter

Statistics for Sections Z, A, B, C, Hunt Creek for analysis of the possible effect of hatchery plantings. Numbers of fish are given in parentheses under catch per hour figures.

Year	Total angling hours	Catch/hr.				Net change, Migration		September Population		A ✓	Plantings	
		Wild Brook	Hatch. Brook	Hatch. Rainbow	Total	Legals	Sub-legals	Legals	Sub-legals		Legals	Fing.
1949	773	0.48 (371)	---	---	0.48	+57	+ 9	88	4,576	402		
1950	890	0.37 (331)	---	---	0.37	- 2	-632	225	6,258	558		
1951	888	0.39 (349)	0.02+ (25)	---	0.42	- 8	-556	209	6,752	862	296 [✓] s	
1952	1,163	0.44 (515)	---	---	0.44	- 3	-512	205	7,387	723		3000 [✓] (f)
1953	1,304	0.32 (418)	0.23 (295)	0.06 (77)	0.61	-29	-1,219	121	7,498	1,122	400s	
1954	1,848	0.23 (427)	0.13 (239)	0.10 (183)	0.46	+69	-951	139	9,420	943	400sp	4000(f)
1955	1,252	0.44+ (556)	0.19+ (241)	0.01+ (12)	0.65	+26	-889	292	7,229	1,207	378s	

✓ A = Estimated legal trout available = Catch (of wild brook trout and rainbow trout) + Sept. population estimate of wild brook and rainbow ± Migration + Hatchery planting.

✓ 2 Eighty-eight of these were 6-7 inches at release.

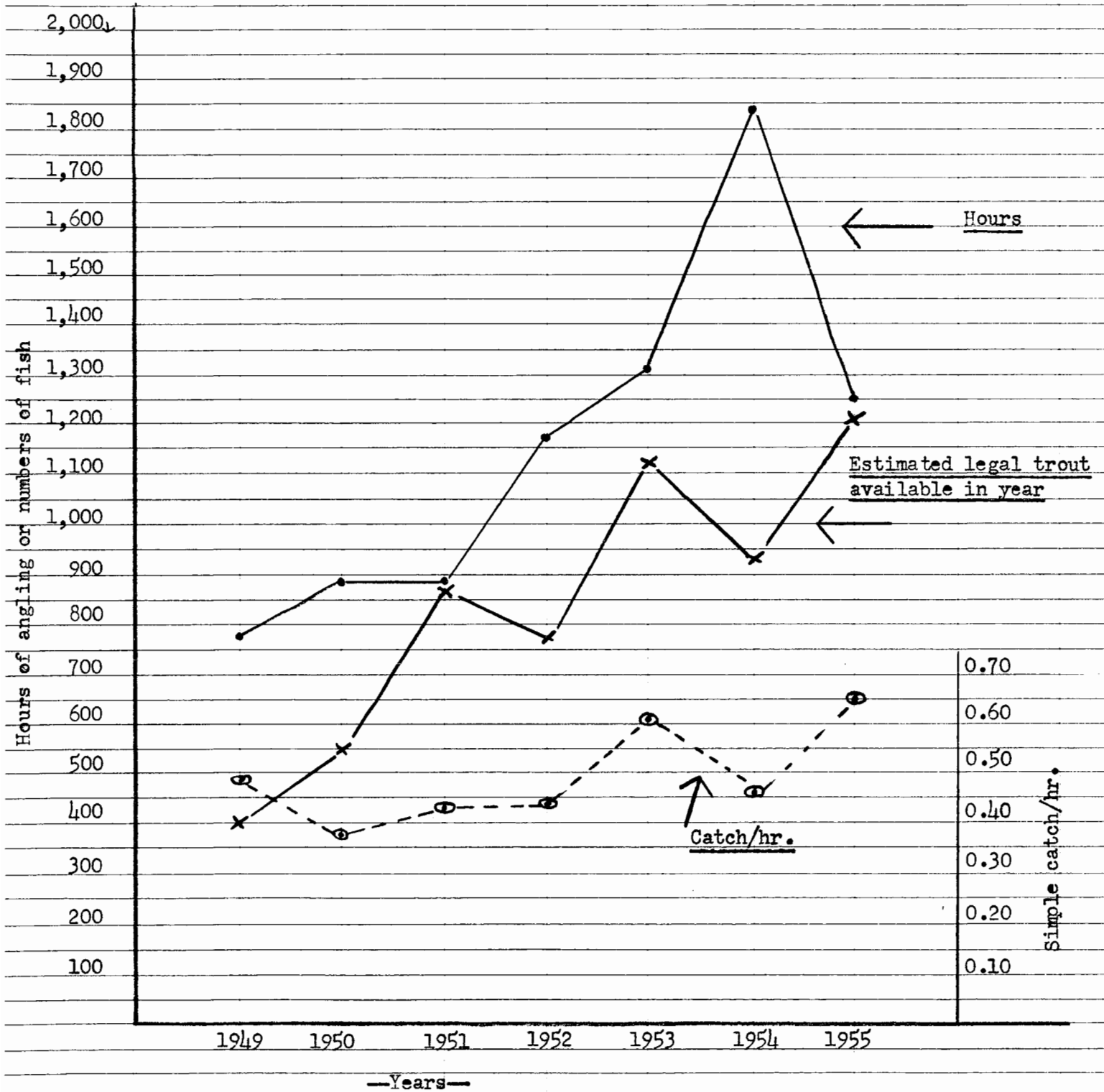
✓ 3 Rainbow trout, all other plantings were brook trout.

f = fall

s = in season

sp = spring pre-season

Relationship between estimated stock of legal fish, angling pressure, and catch per hour, Sections Z, A, B, C, Hunt Creek, 1949-1955.



Research - misc

MICHIGAN DEPARTMENT OF CONSERVATION

INTEROFFICE COMMUNICATION

November 18, 1955

TO: F. A. Westerman, Chief, Fish Division
FROM: A. S. Hazzard, Director, Institute for Fisheries Research
SUBJECT: Institute Report No. 1114

In cleaning out my files I am embarrassed to note that apparently I never replied to your letter of May 20 on this subject. I had it marked for discussion with Dave Shetter but apparently I forgot to bring it to his attention during conferences this past summer. We discussed this subject yesterday and Dave has promised to review his figures and also to compare them with the weir trap records as suggested by Dr. Leonard. It will be interesting to determine if Dr. Leonard's suggested conclusion is verified by these figures. If so, it would mean that we are definitely interfering with the natural production of the stream as a result of trout plantings. As I recall, the results at the Pigeon River interpreted by Dr. E. L. Cooper earlier indicated he felt that plantings of at least legal size trout merely supplemented the wild production.

A. S. Hazzard

ASH:ajh
cc: D. S. Shetter
J. W. Leonard

abu (W)

RECEIVED
NOV 21 1955
FISH DIVISION

Research - misc.

May 20, 1955

TO: Dr. A. S. Hassard, Director, Institute for Fisheries Research
FROM: F. A. Westerman, Chief, Fish Division
SUBJECT: Institute Report No. 1444

Dr. Leonard in returning Institute Report No. 1444 entitled "Intensive Creel Census Results, 1954 Trout Season, Hunt Creek Fisheries Experiment Station" to our files has appended a note which is as follows:

"In reading this report, it appears to me that the catch-per-hour figures for the experimental stream sections are about the same as for earlier years if both wild and hatchery trout are counted. I wonder if this means, simply, that only so many fish will stay in this water and if the wild population is augmented by legal plantings, a corresponding number of wild fish move out?

"It would be interesting to compare the weir trap records."

FAN:vb

Fred -

In reading this report, it appears to me that the catch-per-hour figures for the experimental stream sections are about the same as for earlier years if both wild and hatchery trout are counted. I wonder if this means, simply, that only so many fish will stay in this water and if the wild population is augmented by (over)

legal plantings, a corresponding
number of wild fish move out?
It would be interesting to compare
the weir trap records.

Joe