MICHIGAN DEPARTMENT OF CONSERVATION
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THE TWENTY-SIXTH ANNUAL INTENSIVE CREEL CENSUS AT THE HUNT CREEK RESEARCH STATION, 1964[1]

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The Hunt Creek Research Station and its experimental waters (Fig. 1) are located at the headwaters of Hunt Creek in south central Montmorency County.

Angling on the experimental stream sections and ponds was censused during 1964 for the twenty-sixth consecutive year. Waters included in the census were Hunt Creek, Fuller Creek, Fuller Pond, East Fish Lake, West Fish Lake, and Middle Fish Lake. Morphometry data and angling regulations that apply to the various units are given in Table 1.

Creel census methods

Each angler fishing on the Area waters is required, by Conservation Commission order, to obtain a free daily permit from the Station's office. Upon completion of angling, he must return to the checking station, allow inspection of his catch, and furnish pertinent information.

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* Institute for Fisheries Research Report No. 1717.

1 Contribution from Dingell-Johnson Project F-27-R, Michigan.

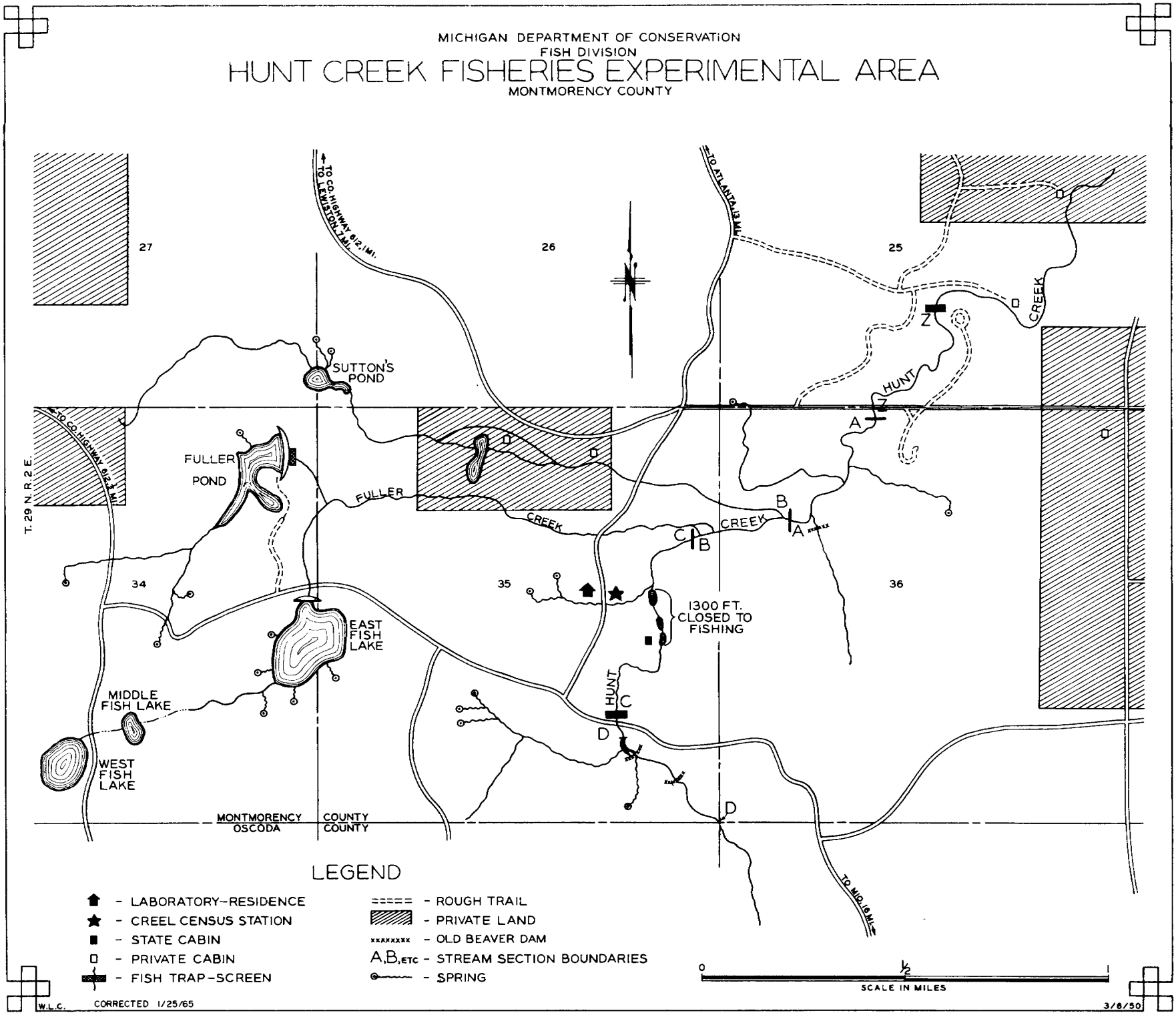
MICHIGAN DEPARTMENT OF CONSERVATION
FISH DIVISION
HUNT CREEK FISHERIES EXPERIMENTAL AREA
MONTMORENCY COUNTY
TO CO. HIGHWAY 612.1 MI.
TO LEWISTON 7 MI.
TO ATLANTA 13 MI.
27
26
25
SUTTON'S POND
FULLER POND
FULLER CREEK
HUNT CREEK
T. 29 N. R. 2 E.
34
35
36
EAST FISH LAKE
MIDDLE FISH LAKE
WEST FISH LAKE
1300 FT. CLOSED TO FISHING
MONTMORENCY COUNTY
OSCODA COUNTY
TO MIO 18 MI.
LEGEND
LABORATORY-RESIDENCE
CREEL CENSUS STATION
STATE CABIN
PRIVATE CABIN
FISH TRAP-SCREEN
ROUGH TRAIL
PRIVATE LAND
OLD BEAVER DAM
A,B,ETC - STREAM SECTION BOUNDARIES
SPRING
0
½
SCALE IN MILES
W.L.C.
CORRECTED 1/25/65
3/8/50

Figure 1

HUNT CREEK FISHERIES EXPERIMENTAL AREA

OBJECTIVE -- The Hunt Creek Fisheries Experiment Station was established in 1939 as a year-round testing ground and outdoor research laboratory where trained biologists might study brook trout and the effects of angling on a typical brook trout stream. The Hunt Creek drainage was chosen because of availability of state-owned stream frontage and also because of the variety of brook trout habitats present in the area.

State ownership has made possible various experimental restrictions and management procedures not otherwise feasible.

The purpose of the investigations is to find out by observation or by controlled experiments what methods of fish management will increase the quality of the brook trout angling and also preserve the species for the enjoyment of future anglers, and to learn how best to utilize the various types of trout water available.

THE ANGLERS' PART IN OUR RESEARCH -- The best measure of an experimental procedure in trout management is how it affects the angler's catch. Therefore, registration of anglers and collection of creel census records constitute an important part of the work each year. Such records provide a measure of the effects of changes in size and creel limits, and, in connection with marking experiments and year-round population estimates, reveal origin and movements of trout within the system. Creel census records compared with population estimates correspond to sales records compared with production schedules in industry.

RESEARCH HERE DURING THE LAST TEN YEARS -- has indicated that:

(1) Natural reproduction is more than adequate in Hunt Creek;
(2) Fall plantings of hatchery-reared brook trout fingerlings contribute less than 3% to the anglers' catches in subsequent years;
(3) Stream improvement, properly carried out, can improve the quality of angling;
(4) Tributary streams are not an important source of adult fish for main stream angling;
(5) In the proper type of lake good trout fishing can be created by the elimination of rough fish populations. Rainbow trout will provide better fishing than brook trout for more anglers.

Some of the other accomplishments of the station include detailed food studies of the brook trout by Dr. J. W. Leonard, who also identified new species of trout stream insects not previously described; an exhaustive study of the use of brook trout scales in age and growth studies of Michigan brook trout by Dr. E. L. Cooper; the development of the electric shocker as a substitute for seines in trout population investigations; definitive studies on hooking mortality and the effects of lure restrictions on catch and population.

CURRENT INVESTIGATIONS -- include continuing study of trout mortality in all of the station waters, detailed studies on the trout populations of the stream and ponds, investigations of the effect of beaver dams on the fishing in portions of trout streams, food habits investigations of the various trout species, digestion rate experiments, and observations on predator habits.

REGULATIONS -- Except for about 1,300 feet of stream in Section C of Hunt Creek, all the waters on the map on the reverse of this sheet are open to angling. The posted waters, marked by Departmental signs, are open to angling under the following restrictions set by the Conservation Commission:

(1) Each angler must first obtain at the checking station a daily free-use permit before fishing.
(2) Each angler must report the results of his fishing at the checking station on conclusion of his angling.
(3) Special regulations are to be observed in certain waters and such waters will be posted with appropriate signs. Otherwise the usual regulations for other waters of the state are in effect on the Hunt Creek Area.

FIVE-YEAR AVERAGES, CERTAIN WATERS

STATISTICS	HUNT CREEK - Z-A-B-C-D					FULLER CREEK				
	1939-1943	1944-1948	1949-1953	1954-1958	1959-1963	1939-1943	1944-1948	1949-1953	1954-1958	1959-1963
Total angler-days.....	615	516	674	880	748	32	165	101	155	153
Total hours fished.....	1,007	845	1,626	1,772	1,444	49	199	232	320	300
Legal brook trout taken.	495	349	673	711	810	17	48	52	95	107
Total pounds creeled....	76	55	117	130	138	3	7	8	16	16
Legal trout per hour....	0.49	0.41	0.41	0.40	0.56	0.34	0.24	0.23	0.30	0.36
Average total length....	7.6	7.7	7.9	7.9	7.9	7.9	7.5	7.6	7.8	7.7

STATISTICS	EAST FISH LAKE					FULLER POND				
	1939-1943	1944-1948	1949-1953	1954-1958	1959-1963	1939-1943	1944-1948	1949-1953	1954-1958	1959-1963
Total angler-days.....	122	362	201	239	451	43	--	70	58	90
Total hours fished.....	262	816	685	772	1,579	93	--	204	156	265
Legal brook trout taken.	181	111	56	132	394	64	--	91	25	92
Total pounds creeled....	50	78	39	61	314	28	--	33	13	48
Legal trout per hour....	0.69	0.14	0.08	0.17	0.25	0.69	--	0.45	0.16	0.35
Average total length....	8.7	11.3	11.8	10.8	12.3	9.8	--	9.7	11.0	11.0

Table 1.--Morphometry of experimental waters of Hunt Creek drainage, with angling regulations for 1964

Experimental water	Dimensions			1964 regulations		
	Length (miles)	Average width (feet)	Area (acres)	Lure	Minimum length (inches)	Daily creel limit
Section of Hunt Creek						
Z	0.45	20.3	1.12	Any	7	10
A	0.49	24.3	1.44	Any	7	10
B	0.30	17.5	0.64	Any	7	10
C[a]	0.51	11.8	0.71	Any	7	10
D	0.55	11.0	0.73	Any	7	10
Total, Hunt Creek	2.30	16.7	4.64			
Fuller Creek	1.87	15.7	3.57	Any	7	10
Fuller Pond	...	...	14.6	No live fish	10	5
East Fish Lake	...	...	16.0	No minnows	10	5
West Fish Lake	...	...	10.2	Any	7	5
Middle Fish Lake	...	...	2.5	Any	7	5

[a] Excluded are 1,270 feet of Section C given over to experimental diversions that are closed to fishing.

During the 1964 season, 1,499 permits were issued to anglers who made 1,913 fishing trips. A "trip" is defined as one person fishing one of the designated stream sections or lakes on the Area. An angler was listed as making more than one trip on any date when he fished more than one stream section, lake, or pond. The 1964 fishing pressure represents the highest angler use of the Area in its 26-year history.

Male licensees made 71.4% of the trips; female licensees, 0.6%; wives, 7.7%; minor males, 17.6%; and minor females, 2.7%.

Recovery of planted trout

The catch results for plantings made in recent years in East Fish Lake, West Fish Lake, Middle Fish Lake, Fuller Pond and Section D of Hunt Creek are presented in Table 2. These data are minimal because (1) additional fish from recent stockings will be caught later, (2) some trout of sublegal size were creeled, and (3) undoubtedly some fish were illegally removed from the Area.

From 1958 to 1962 matched plantings of 300 rainbow and 300 brook trout were made in East Fish Lake in mid-October at the rate of about 38 trout per acre. These fish averaged 8.9 inches long. In October 1963 the stocking rate was increased to 56 trout per acre. The number of rainbow trout planted was doubled while the number of brook trout and the average length of the fish remained the same. Annual returns from these rainbow trout plantings of 1958 through 1962 (Table 2) show that 85% of the number planted were caught (a 345% return

Table 2.--Angler catch of trout released in the experimental waters of the Hunt Creek Area, 1958-1964

Area and date of planting	Species[a]	Trout planted[b]			Legal trout creeled		Total legal trout creeled to date			
		Number	Pounds	Average length (inches)	1959-1963	1964	Number		Pounds	
							Total	Percentage	Total	Percentage
East Fish Lake										
Oct. 1958	S	300	75	8.9	88	...	88	29.3	49.7	66.3
Oct. 1959	S	300	78	8.9	68	...	68	22.7	33.7	43.2
Oct. 1960	S	300	84	8.9	158	...	158	52.7	73.8	87.9
Oct. 1961	S	300	79	8.9	139	...	139	46.3	63.9	80.9
Oct. 1962	S	300	78	8.9	112	2	114	38.0	54.9	70.4
Oct. 1963	S	300	81	8.9	...	107	107	35.7	46.4	57.3
Dec. 1962	S	150	45	9.5	61	...	61	40.7	26.9	59.8
Dec. 1963	S	150	60	10.0	...	61	61	40.6	26.4	44.0
East Fish Lake										
Oct. 1958	R	300	69	8.9	233	...	233	77.7	271.4	393.3
Oct. 1959	R	300	75	8.9	248	...	248	82.7	222.0	296.0
Oct. 1960	R	300	76	8.9	276	...	276	92.0	265.7	349.6
Oct. 1961	R	300	74	8.9	255	...	255	85.0	208.5	281.8
Oct. 1962	R	300	74	8.9	236	33	269	89.7	300.1	405.5
Oct. 1963	R	600	139	8.9	...	306	306	51.0	198.1	142.5
Fuller Pond										
April 1962	S	400*	28	5.5	9	4	13	3.3	9.1	32.5
April 1962	S	400	26	5.5	48	3	51	12.8	28.6	110.0
April 1962	R	400	26	5.5	82	14	96	24.0	99.8	383.8
Oct. 1963	S	300	79	9.0	...	125	125	41.7	72.4	91.6
Oct. 1963	R	300	69	9.0	...	140	140	46.7	94.6	137.1

(continued next page)

Table 2.--concluded

Area and date of planting	Species[a]	Trout planted[b]			Legal trout creeled		Total legal trout creeled to date			
		Number	Pounds	Average length (inches)	1959-1963	1964	Number		Pounds	
							Total	Percentage	Total	Percentage
West Fish Lake										
April 1963	S	100	21	8.2	48	...	48	48.0	9.8	46.7
	B	100	21	8.2	23	3	26	26.0	7.3	34.8
	R	100	21	8.2	49	...	49	49.0	10.1	48.1
	S	150	14	5.5	0	0	0	0.0	0.0	0.0
	B	150	14	5.5	21	6	27	18.0	6.8	48.6
	R	150	14	5.5	7	...	7	4.7	1.0	8.3
Sept. 1963	S	169	34	7.9	...	14	14	8.0	4.7	13.8
	S	158*	27	7.8	...	21	21	13.0	4.0	14.8
Winter 1963-64	S	583	33	4.0-6.5	...	4	4	0.6	0.4	1.2
Middle Fish Lake										
April 1963	S	20	8	10.5	14	...	14	70.0	6.1	76.3
	B	40	16	10.5	17	...	17	42.5	7.3	45.6
	R	30	12	10.5	19	...	19	63.3	6.7	55.8
	S	20	4	8.2	10	...	10	50.0	2.4	60.0
	B	40	8	8.2	20	...	20	50.0	5.1	63.8
	R	30	6	8.2	15	...	15	50.0	2.9	48.3
April 1964	B	50	27	10.0+	...	23	23	46.0	12.0	44.4
	R	50	22	10.0+	...	37	37	74.0	15.0	68.2
	B	5	15.5	20.0	...	0	0	0.0	0.0	0.0
	R	5	15.5	20.0	...	4	4	80.0	12.3	79.4
Hunt Creek (Section D)										
Oct. 1962	S	285*	57	8.1	94	2	96	34.0	17.5	30.1

[a] S = brook, B = brown, R = rainbow.

[b] All trout planted were from hatcheries except for three lots (marked by asterisk) which were wild brook trout transferred from other waters.

by weight). From the 1963 plant, 306 fish weighing 198 lb. were creeled in 1964, or a 51% recovery numerically and a 142% return in weight. Doubling the stocking rate did not double the catch. There is a suggestion here that the higher rate of stocking is excessive for the habitat.

The angler recoveries from 1958 to 1964 of the October brook trout plantings in East Fish Lake amounted to 37% of the number and 68% of the weight planted (Table 2). Two brook trout carry-overs from the 1962 plant were taken in 1964 but this was an abnormal occurrence and few additional recoveries are expected.

In December 1962, 150 hatchery brook trout from the same lot which furnished the October planting were released after ice formed on East Fish Lake. Anglers creeled 61 legal and 10 sublegal of these fish for a total recovery of 47%. This test was duplicated in December 1963 and 61 legal and 1 sublegal fish were taken for a recovery rate of 41%. Planting brook trout after ice formation did not materially improve the fishing.

Three lots of 400 each of wild brook, hatchery brook, and hatchery rainbow trout were stocked in Fuller Pond in April 1962. The hatchery fish averaged 5.5 inches long and ranged from 4.5 to 6.5 inches in length. The wild trout were transferred from Hunt Creek, had the same average size as the hatchery fish, but ranged in length from 3.0 to 6.9 inches. These wild fish were divided into two size groups and marked differently. The 260 fish under 5.4 inches were marked by clipping the left pelvic fin and the 140 larger fish were marked by clipping the right pelvic fin.

None of these fish were harvested in 1962 because of the 10-inch size limit on Fuller Pond. An unknown amount of hooking mortality occurred but it is believed to have been low because little fishing was done in the pond after the first one-third of the 1962 season. Recovery in 1963 consisted of 9 transferred wild brook trout (all from the small size group), 48 hatchery brook trout and 82 hatchery rainbow trout. In 1964, 4 more transplanted wild brook trout (2 from each size group), 3 hatchery brook trout and 14 hatchery rainbow trout from the 1962 planting were taken. The total weight of the 1963 and the 1964 returns, expressed in percentages of planting weights, was 33, 110 and 384% respectively.

Obviously, the rainbow trout gave much better returns than either wild or hatchery brook trout, and the recovery of hatchery brook trout exceeded that for wild brook trout. The wild trout, although of the same average size as the hatchery brook trout, averaged about 1 year older when planted and it is believed their maturity is in some way related to their survival, and ultimately to the difference in angler recovery. During the spawning period in the fall of 1962 the wild fish attempted to move out of the pond but were trapped in the outlet weir and returned to the pond; possibly the mature fish were more vulnerable to predators at this time of year.

In October 1963 Fuller Pond was planted with 300 brook and 300 rainbow trout that averaged 9.0 inches long. During 1964, anglers caught 42% of the brook trout and 47% of the rainbow trout, or a recovery rate of 92% and 137% by weight, respectively.

West Fish Lake is a 10-acre seepage lake with a maximum depth of 10 feet. Water temperatures reach 80 F at the surface and 69 F at the bottom in midsummer so the habitat is very marginal for trout at this time of year. Suckers, sticklebacks, mudminnows, Iowa darters, golden shiners, red-bellied dace and fathead minnows comprise the natural fish population.

Trout were first introduced into West Fish Lake in the fall of 1960 for the purpose of studying the utilization of minnows by brook, brown and rainbow trout. Trout planted prior to April 1963 were recovered by the staff with various types of sampling gear. In 1963 West Fish Lake was censused for the first time after it was stocked in April with brook, brown and rainbow trout (100 legals and 150 sublegals of each).

During 1963, the recovery rate by anglers for the legal-length plantings amounted to 48%, 23%, and 49% respectively. Three additional brown trout were taken in 1964 to bring the brown trout recovery rate up to 26%. None of the sublegal brook trout were caught in 1963 but 14% of the brown trout and 5% of the rainbows were taken. Six more brown trout from this sublegal plant were creeled in 1964, thereby raising the brown trout return rate to 18%.

In September 1963, 158 wild brook trout over 7.0 inches long were removed from Sections Z and A of Hunt Creek and planted in West Fish Lake along with 169 hatchery brook trout of the same average length (7.8 inches). Eight per cent of the hatchery fish and 13% of the wild fish were caught in 1964.

In December, January, and February (1963-1964) a total of 583 hatchery brook trout from 4.0 to 6.5 inches long also were planted at monthly intervals in West Fish Lake. These fish were survivors of an experiment conducted in the Hunt Creek diversions and four of them were caught.

To determine further the extent that trout would utilize minnows, Middle Fish Lake, a 2.5-acre seepage basin with a maximum depth of 5 feet, was stocked for the second time in April 1964. The planting consisted of 50 each of brown and rainbow trout over 10 inches and 5 each of brown and rainbow trout that averaged 20.0 inches. It was expected that an increase in fishing pressure would result from the knowledge that a few large fish were present. Of the smaller fish, 46% of the browns and 74% of the rainbows were caught; 80% of the large rainbows were taken.

In October 1962, 285 wild brook trout (7.0 inches or larger) were transferred from Sections Z and A to Section D in Hunt Creek. Anglers caught 95 of these fish in 1963 and 2 more in 1964 for a total return of 97 (34%).

Angling results

A summary of angling statistics for the various waters of the Area is given in Table 3. The state-wide trout fishing regulations applied to all stream waters in 1964. Residual populations of trout at the close of each fishing season from 1949 to 1964, as estimated

Table 3.--The 1964 fishing pressure and catch at the Hunt Creek Trout Research Station
[W = wild; H = hatchery; T = transferred wild trout]

Experimental water	Fishing pressure			Yield					
	Trips	Percent trips successful	Hours	Species	Origin	Number	Pounds	Average length (inches)	Trout per hour [a]
Section of Hunt Creek									
Z	178	33	470.0	Brook	W	135	20.795	7.6	0.29
				Brown	W	1	1.290	14.7	tr
				Rainbow	W	1	0.220	9.0	tr
A	108	49	235.5	Brook	W	139	21.075	7.6	0.59
B	75	45	136.0	Brook	W	73	11.250	7.7	0.54
C	234	25	381.0	Brook	W	119	18.050	7.7	0.31
				Brown	W	1	1.780	17.6	tr
				Brown	H	1	1.250	15.4	tr
D	171	27	242.0	Brook	W	77	12.200	7.9	0.32
				Brook	T	2	0.425	8.8	tr
				Rainbow	W	1	0.115	7.6	tr
Total, Hunt Creek	766	33	1,464.5	Brook	W	543	83.370	7.7	0.37
				Brook	T	2	0.425	8.8	tr
				Brown	W	2	3.070	16.2	tr
				Brown	H	1	1.250	15.4	tr
				Rainbow	W	2	0.335	8.3	tr
				All		550	88.450	7.7	0.38
Fuller Creek	159	34	356.0	Brook	W	144	20.700	7.6	0.40
Fuller Pond	251	49	733.0	Brook	W	27	12.005	10.5	0.04
				Brook	T	4	3.750	13.4	0.01
				Brook	H	128	74.950	11.4	0.17
				Brown	W	1	0.875	12.8	tr
				Rainbow	W	3	2.720	13.2	tr
				Rainbow	H	154	120.335	12.4	0.21
				All		317	214.635	11.8	0.43

Table 3.--concluded

Experimental water	Fishing pressure			Yield					
	Trips	Percent trips successful	Hours	Species	Origin	Number	Pounds	Average length (inches)	Trout per hour [a]
East Fish Lake	592	36	2,121.5	Brook	W	9	4.545	10.9	tr
				Brook	H	170	74.710	10.7	0.08
				Rainbow	W	2	1.905	13.5	tr
				Rainbow	H	339	270.060	12.2	0.16
				All		520	351.220	11.7	0.25
West Fish Lake	83	27	238.5	Brook	T	21	3.955	8.6	0.09
				Brook	H	18	5.105	9.2	0.08
				Brown	H	9	4.225	11.6	0.04
				All		48	13.285	9.4	0.20
Middle Fish Lake	62	37	141.0	Brown	H	23	12.015	11.3	0.16
				Rainbow	H	41	27.375	11.8	0.29
				All		64	39.390	11.6	0.45
All waters	1,913	36	5,054.5	Brook	W	723	120.620	7.8	0.14
				Brook	T	27	8.130	9.3	0.01
				Brook	H	316	154.765	10.9	0.06
				Brown	W	3	3.945	15.0	tr
				Brown	H	33	17.490	11.5	0.01
				Rainbow	W	7	4.960	11.9	tr
				Rainbow	H	534	417.770	12.2	0.11
				All		1,643	727.680	10.0	0.33

[a] tr = less than 0.005.

from collections taken by electrofishing, are shown in Table 4. The physical characteristics of the experimental waters were described in earlier reports.

Hunt Creek

A summary of the fishing statistics for Hunt Creek from 1939 to 1964 is presented in Table 5. In 1964 a total of 543 wild brook trout, 2 wild transferred brook trout, 1 wild rainbow trout, 1 hatchery brown and 2 wild brown trout were taken; these trout averaged 7.7 inches in length and were creeled at the rate of 0.38 fish per hour. Anglers spent 1,465 hours on this stream and 33% of the 766 fishing trips were successful. The catch of wild brook trout showed a slight increase over that of 1963 when 520 fish were taken. Descriptions of the fishery in each stream section are presented below.

Anglers who fished Section Z harvested 135 wild brook trout, 1 wild brown trout and 1 wild rainbow trout in 1964. The brook trout averaged 7.6 inches in length. Fishing pressure amounted to 470 hours and 33% of the trips were successful. A successful trip is one in which at least one trout larger than 7.0 inches is caught. Four sublegal fish (0.37 lb.) were creeled and 734 trout were released. A post-season population estimate made in September showed that 78 legal and 949 sublegal trout remained. The residual population of sublegal trout was down slightly from the previous fall but the number of legal fish was about the same (Table 4).

Table 4.--The fall populations of legal (7.0+ inches) and sublegal (1.5-6.9 inches) wild brook trout in sections Z, A, B and C, Hunt Creek, 1949-1964

Year	Section Z		Section A		Section B		Section C	
	Sublegal	Legal	Sublegal	Legal	Sublegal	Legal	Sublegal	Legal
1949	1,413	95	2,156	41	1,040	15	1,437	19
1950	1,989	89	1,687	70	1,231	29	1,351	41
1951	1,210	71	1,940	41	896	23	2,159	34
1952	1,130	75	2,472	44	1,109	28	2,126	21
1953	1,641	42	2,957	35	1,157	19	1,305	16
1954	1,545	40	3,203	47	1,407	9	2,328	27
1955	1,276	88	2,563	105	1,147	30	1,638	44
1956	904	109	2,403	158	1,003	29	2,212	30
1957	1,527	67	3,015	68	1,257	35	2,632	31
1958	1,455	54	2,459	72	1,288	44	2,555	35
1959	1,190	263	2,331	280	1,349	99	1,682	32
1960	1,481	105	2,689	157	1,444	66	1,884	34
1961	1,285	109	1,548	102	1,085	42	1,088	26
1962	1,065	115	2,518	174	1,268	71	1,902	42
1963	1,030	72	2,201	87	1,093	30	2,170	37
1964	949	78	2,169	108	964	32	1,636	16

Table 5.--A summary of the fishing pressure, catch, and success on Hunt Creek for wild brook trout of legal size, 1939-1964

Section and year	Total fishing		Total catch		Catch per hour		Average size	
	Trips	Hours	Number	Pounds	Number	Pound	Length (inches)	Weight (pound)
A, B, C and D								
1939	438	780	461	67	0.59	0.09	7.5	0.15
1940	505	901	406	60	0.45	0.07	7.6	0.15
1941	1,015	1,546	706	113	0.46	0.07	7.7	0.16
1942	808	1,267	532	83	0.42	0.07	7.6	0.16
1943	311	540	372	59	0.69	0.11	7.5	0.16
1944	340	640	337	53	0.53	0.08	7.7	0.16
1945	375	637	312	52	0.49	0.08	7.9	0.17
1946	753	1,206	434	68	0.36	0.06	7.6	0.16
1947	607	872	184	26	0.21	0.03	7.6	0.14
1948	504	869	476	78	0.55	0.09	7.7	0.16
1949	432	1,063	517	87	0.49	0.08	7.8	0.17
1950	369	915	415	75	0.45	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	1,649	483	88	0.29	0.05	8.0	0.19
1955	702	1,522	508	94	0.33	0.06	8.0	0.19
1956	704	1,245	585	104	0.47	0.08	7.8	0.19
1957	668	1,307	630	123	0.48	0.09	8.1	0.20
1958	701	1,257	583	121	0.46	0.10	8.2	0.21
1959	590	1,060	433	81	0.41	0.08	7.9	0.19
1960	641	1,179	674	122	0.57	0.10	8.0	0.18
1961	601	1,084	500	78	0.46	0.07	7.7	0.16
1962	541	959	752	131	0.78	0.14	7.9	0.17
1963	559	1,028	365	59	0.36	0.06	7.8	0.16
1964	588	995	408	63	0.41	0.06	7.7	0.15

(continued next page)

Table 5.--concluded

Section and year	Total fishing		Total catch		Catch per hour		Average size	
	Trips	Hours	Number	Pounds	Number	Pound	Length (inches)	Weight (pound)
Z								
1949	165	375	186	28	0.50	0.07	7.6	0.15
1950	165	473	160	21	0.34	0.04	7.4	0.13
1951	129	322	124	18	0.39	0.06	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
1955	139	293	198	29	0.68	0.10	7.6	0.15
1956	176	354	197	32	0.56	0.09	7.6	0.16
1957	113	218	127	22	0.58	0.10	7.9	0.17
1958	84	175	101	15	0.58	0.09	7.6	0.15
1959	97	197	118	17	0.60	0.09	7.5	0.14
1960	227	541	509	91	0.94	0.17	8.0	0.18
1961	172	390	151	22	0.39	0.06	7.6	0.15
1962	161	386	297	48	0.77	0.12	7.7	0.16
1963	153	395	155	25	0.39	0.06	7.7	0.16
1964	178	470	135	21	0.29	0.04	7.6	0.15

Section A fishermen creeled 139 wild brook trout that weighed 21 pounds in 236 hours of fishing. Forty-nine per cent of the trips were successful. Four sublegal fish (0.44 lb.) were retained and 738 sublegal fish were released. An estimated 108 legal and 2, 169 sublegal trout were left after the fishing season. These estimates indicate a 24% increase in the residual population of legal trout over that of 1963 and a 2% drop in the sublegal population.

To measure the effect of a complete harvest of legal trout (7.0 inches and over) on reproduction, growth and sustained yield in a wild brook trout fishery, nearly all of the legal fish from Sections Z and A were removed during the course of the 1962 and 1963 fall population censuses and transferred elsewhere. This operation was continued in 1964. To date the removal of the brook trout larger than 7.0 inches captured during fall population studies from sections Z and A has lowered the anglers' catches slightly during the following season. However, the populations of sublegal fish in following years do not seem to have been significantly altered (Table 4).

In Section B, 73 wild brook trout were caught in 136 hours of fishing and 45% of the 75 trips were successful. Five sublegal trout were kept and 709 were released. The post-season population estimates indicated that 32 legal and 964 sublegal trout remained. Compared to 1963, there was virtually no change in the number of legal trout present but the sublegal population was down by 12%.

Angling in Section C produced 119 wild brook, 1 wild brown, and 1 hatchery brown trout. In 234 trips fishermen spent 381 hours and 25%

of the trips were successful. They creeled 8 sublegal fish (0.765 lb.) and returned 1,274 to the stream. The fall population estimates showed that 16 legal and 1,636 sublegal fish remained. This represents a 57% decrease in the legal population, and a 25% decrease in sublegal fish as compared to the previous fall. However, the 1963 catch from Section C was only 69% of the 1964 catch.

The uppermost section of Hunt Creek (Section D) reverted to stream conditions after the beaver dams washed out in November 1960. Anglers who fished Section D creeled 77 wild brook, 2 transferred wild brook, and 1 wild rainbow trout. They fished 242 hours during 171 trips and caught at least one trout on 27% of the trips.

Fuller Creek

The angling results for Fuller Creek since 1940 are summarized in Table 6. In 159 trips to Fuller Creek in 1964, anglers fished 356 hours and creeled 144 wild brook trout (21 lb.) that averaged 7.6 inches long. The catch was the third highest recorded since 1940. Fishing pressure dropped 29% from that of 1963.

Fuller Pond

Fuller Pond is a 15-acre impoundment maintained by an earthen enbankment at an old beaver dam site. During 1964, anglers recovered 154 hatchery rainbows, 128 hatchery brook trout, and 4 of the wild brook trout transferred from Hunt Creek. In addition 27 wild

Table 6.--A summary of the fishing pressure, catch, and success on Fuller Creek for wild brook trout of legal size, 1940-1964

Year	Total fishing		Total catch		Catch per hour		Average size	
	Trips	Hours	Number	Pounds	Number	Pound	Length (inches)	Weight (pound)
1940	20	36	16	3	0.44	0.08	...	0.19
1941	59	97	21	3	0.22	0.03	...	0.15
1942	31	39	11	2	0.28	0.05	8.3	0.18
1943	19	25	19	3	0.76	0.12	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	196	31	5	0.16	0.03	7.7	0.16
1949	115	295	43	6	0.15	0.02	7.4	0.13
1950	107	185	12	2	0.06	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	0.07	7.8	0.16
1954	99	201	68	11	0.34	0.05	7.7	0.16
1955	110	214	68	10	0.32	0.05	7.6	0.14
1956	230	476	192	35	0.40	0.07	8.0	0.18
1957	179	377	76	12	0.20	0.03	7.6	0.15
1958	159	332	71	11	0.21	0.03	7.7	0.16
1959	126	234	70	11	0.30	0.05	7.8	0.16
1960	134	222	98	15	0.44	0.07	7.6	0.15
1961	135	246	99	14	0.40	0.06	7.6	0.14
1962	152	299	161	25	0.54	0.08	7.7	0.16
1963	216	501	106	16	0.21	0.03	7.7	0.15
1964	159	356	144	21	0.40	0.06	7.6	0.14

brook, 1 wild brown and 3 wild rainbow trout were taken, for a total catch of 317 fish that weighed 215 lb. They averaged 11.8 inches long and were caught at the rate of 0.43 fish per hour. In 251 trips to the pond anglers spent 733 hours and 49% were successful. This is the highest usage recorded for the pond, and the best yield in terms of total catch and poundage.

East Fish Lake

Fishing pressure on East Fish Lake reached a new high in 1964--2,122 hours. Anglers caught 520 trout that weighed a total of 351 lb. (Table 3), the largest catch by number and weight yet recorded for East Fish Lake. The bulk of the catch (77% by weight) was composed of rainbow trout as in 1963. This catch consisted of fish planted in the fall of 1963 (89.7%), 1963 spring plants (9.7%), and two wild rainbow trout (0.6%). These respective groups averaged 11.6, 17.9, and 13.5 inches in length.

From the October (1963) planting of brook trout, anglers creeled 107 fish; from the December (1963) planting, 61 fish. These fish averaged 10.7 inches long. Also caught were 2 carry-over brook trout that averaged 14.1 inches long, and 9 wild brook trout that averaged 10.9 inches.

Because of better survival, rainbow trout continue to contribute more to East Fish Lake angling success than brook trout. Fishing pressure has increased annually since the inception of rainbow trout planting in this lake.

West Fish and Middle Fish lakes

Anglers made 83 trips to West Fish Lake, fished 239 hours, and caught 48 fish that weighed 13 lb. and averaged 9.4 inches in length. Twenty-seven per cent of the anglers were successful.

Anglers made 62 trips to Middle Fish Lake, fished 141 hours, and caught 64 fish that weighed 39 lb. and averaged 11.6 inches in length. Thirty-seven per cent of the anglers were successful. Recoveries of planted fish from these two lakes are tabulated in Table 2.

All waters

From all experimental waters on the Area, 1,643 trout (728 lb.) were creeled on 1,913 trips which involved 5,055 hours of angling (Table 3). The numerical catch was up 2% from 1963, and the weight 7.5% over that of the previous year which establishes a new Area record. The average size of the trout caught was 10.0 inches; the rate of catch was one legal trout per 3 hours of fishing; and 36% of the anglers were successful.

Number of trout caught per trip

The number of catches of various sizes is shown in Table 7 On waters with a daily creel limit of 10 trout and a minimum length of 7.0 inches, anglers creeled 6 or more trout on 2.4% of the trips. These catches accounted for 22.3% of the total Hunt and Fuller creek

Table 7.--Number and percentage of fishing trips during which different numbers of trout were creeled, Hunt Creek Trout Research Station, 1964

Total catch per trip	Regulation[a]					
	10 trout, 7 inches[b]		5 trout, 7 inches[c]		5 trout, 10 inches[d]	
	Number of trips	Percent	Number of trips	Percent	Number of trips	Percent
0	621	67.1	100	68.9	508	60.3
1	138	14.9	14	9.7	116	13.8
2	73	7.9	9	6.2	79	9.4
3	45	4.9	14	9.7	51	6.0
4	10	1.1	2	1.4	35	4.1
5	16	1.7	6	4.1	54	6.4
6	11	1.2	...	...	...	...
7	5	0.6	...	...	...	...
8	2	0.2	...	...	...	...
9	2	0.2	...	...	...	...
10	2	0.2	...	...	...	...
Totals	925	100.0	145	100.0	843	100.0

[a] Daily creel limit and minimum legal length.

[b] Hunt Creek and Fuller Creek.

[c] West Fish and Middle Fish lakes.

[d] East Fish Lake and Fuller Creek Pond.

harvest in 1964. Limit catches were made on 0.2% of the trips but no trout were caught on 67% of the fishing trips.

From waters with a daily creel limit of 5 fish and a minimum size of 7.0 inches, anglers caught 3 or more trout per trip on 15% of the trips, and these catches accounted for 71.4% of the trout caught. Anglers who caught 1 or 2 trout per trip made 16% of the trips and accounted for 28.6% of the catch. No trout were caught on 69% of the trips.

Where the daily creel limit was 5 trout and the minimum size was 10.0 inches, 60.3% of the anglers were unsuccessful in catching at least one trout and 6.4% of the anglers made limit catches. Limit catches comprised 32% of the total catch. On 23.2% of the trips anglers caught either 1 or 2 trout per trip--which comprised 32.7% of the season's harvest from these waters. Anglers who caught 3 or more trout per trip made 67.3% of the catch and this occurred on 10.5% of the trips.

Bi-weekly angling effort and catch

A summary of the fishing pressure and catch on the Area waters by 2-week periods is presented in Table 8. The heaviest fishing pressure occurred during the first period of the season when 34% of the angling effort was expended and 42% of the season's catch was taken.

Although 25% of the catch was creeled during the first 2 weeks of the season on the streams, recruitment from the sublegal stock of wild brook trout throughout the season provided a continuous supply of fish for the angler. On the lakes, 73% of the brook trout catch and 42%

Table 8.--Angling effort and catch of brook, brown, and rainbow trout by 2-week periods in the 1964 trout season from waters of the Hunt Creek Research Station

2-week period	Hunt Creek				Fuller Creek		East Fish Lake		
	Hours	Catch			Hours	Catch	Hours	Catch	
		Brook	Brown	Rainbow		Brook		Brook	Rainbow
1	284.0	140	...	...	84.5	33	957.0	149	164
2	209.5	56	1	2	30.5	3	132.0	12	26
3	118.0	44	...	...	17.5	23	148.5	3	35
4	101.5	46	...	...	9.5	11	77.0	4	22
5	152.0	58	1	...	12.0	9	111.5	3	35
6	99.5	23	...	...	28.5	5	205.5	3	21
7	161.5	42	...	...	47.0	18	133.0	3	15
8	136.0	45	...	...	39.5	9	123.0	...	6
9	83.0	5	...	...	1.5	...	113.0	1	8
10	119.5	86	1	...	85.5	33	121.0	1	9
Totals	1464.5	545	3	2	356.0	144	2121.5	179	341

2-week period	Fuller Pond				West Fish Lake			Middle Fish Lake		
	Hours	Catch			Hours	Catch		Hours	Catch	
		Brook	Brown	Rainbow		Brook	Brown		Brown	Rainbow
1	232.0	99	..	47	101.5	27	7	42.5	10	18
2	103.5	12	..	37	19.5	5	2	46.5	8	17
3	69.5	11	..	21	92.5	6	..	37.0	3	6
4	90.0	4	..	19	2.0	1	..	9.0	2	..
5	29.0	1	..	..	...	..	..	...	..	..
6	80.0	2	..	14	19.0	..	..	...	..	..
7	51.0	3	1	5	...	..	..	4.5	..	..
8	19.5	2	..	4	4.0	..	..	...	..	..
9	14.0	8	..	1	...	..	..	1.5	..	..
10	44.5	17	..	9	...	..	..	...	..	..
Totals	733.0	159	1	157	238.5	39	9	141.0	23	41

of the rainbow catch also occurred during the first period. The lesser vulnerability of the rainbow gave a better seasonal distribution of their harvest than the brook trout and prolonged the interest of the anglers. After the first period, angling effort remained quite constant except for a spurt over the Fourth of July week end.

Age distribution of wild trout in the catch

The age distribution of the wild brook trout taken from the Area waters is summarized in Table 9. About 76% of the stream-caught fish were 2-year-old fish and approximately 19% were 3-year-olds. Eighty-six per cent of the wild brook trout caught from East Fish Lake and Fuller Pond also belonged to age-group II and 14% were yearlings. No brook trout older than 4 years were caught.

Summary of lures used

In Table 10 the 1964 catch is summarized according to the lure used. On the streams earthworms or worm and spinners were used on 84% of the trips and accounted for 80% of the catch. Fly fishermen made 7% of the trips and caught 9% of the fish. Anglers who fished with other live baits or a combination of lures made 9% of the trips and caught 11% of the fish. Anglers who used minnows had the highest success rate. On the average, they caught three fish every 2 hours.

On the ponds two-thirds of the anglers used either earthworms or a worm and spinner combination and caught 67% of the total catch.

Table 9.--The age distribution of wild brook trout caught by anglers in experimental waters, 1964

Water	Age group	Number of fish	Average length (inches)	Percentage of total catch
Sections Z + A, Hunt Creek	I	4	7.3	1.5
	II	235	7.5	85.8
	III	33	8.0	12.0
	IV	2	8.6	0.7
Total		274	...	100.0
Sections B, C, + D (Hunt Creek) and Fuller Creek	I	27	7.2	6.5
	II	289	7.6	69.6
	III	95	8.1	22.9
	IV	4	10.3	1.0
Total		415	...	100.0
East Fish Lake and Fuller Pond	I	5	10.3	13.9
	II	31	10.7	86.1
Total		36	...	100.0
All waters	I	36	7.7	5.0
	II	555	7.7	76.5
	III	128	8.1	17.7
	IV	6	9.7	0.8
Total		725	...	100.0

Table 10.--Effort, catch, and catch per hour by various types of fishing lures used in the waters at the Hunt Creek Research Station, 1964

Waters and lures	Number of trips	Percentage of total trips	Number of trout caught	Percentage of total catch	Number of hours fished	Average catch per hour
Streams						
Earthworm	657	71.0	448	64.5	1,313.5	0.34
Worm and spinner	119	12.9	110	15.8	225.0	0.49
Flies	67	7.2	59	8.5	153.5	0.38
Minnow	27	2.9	49	7.1	32.0	1.53
Insect	11	1.2	4	0.6	12.0	0.33
Natural lure	1	0.1	0	0.0	1.5	0.00
Combination	43	4.7	24	3.5	83.0	0.29
Totals	925	100.0	694	100.0	1,820.5	0.38
Ponds						
Earthworm	548	55.5	521	54.9	1,853.5	0.28
Worm and spinner	107	10.8	116	12.2	362.0	0.32
Flies	13	1.3	8	0.8	19.5	0.41
Artificial lure	100	10.1	103	10.9	249.5	0.41
Natural lure	1	0.1	4	0.4	2.5	1.60
Combination	219	22.2	197	20.8	747.0	0.26
Totals	988	100.0	949	100.0	3,234.0	0.29

Anglers using natural lures, or a combination of lures, made 22% of the trips and creeled 21% of the trout caught. On 12% of the trips anglers employed artificial lures (flies or hardware) and accounted for 12% of the fish.

In general, the success of a particular lure was directly proportional to the extent of its usage.

Types of fishing gear used

The types of fishing gear used in the Area during 1964 are listed in Table 11. These categories are based primarily on the kind of reel used with various rods. For example, a fly rod with a spinning reel was classified as spinning gear; a spinning rod with a fly reel was listed as fly-fishing gear. About 53% of the anglers fished the streams with spinning gear, as did 82% of those who fished the lakes.

Residence of anglers

The residence (county) of the anglers who made the 1,913 trips to the Area is tabulated in Table 12. No anglers were from the Upper Peninsula but 36 counties from the Lower Peninsula were represented, as were 9 states. About 20% came from Montmorency and adjacent counties, 30% came from the metropolitan area of southeastern Michigan, and 19% from the tri-county area of Saginaw, Bay City, and Midland. Non-residents comprised about 4% of the total, most of whom came from Ohio.

Table 11.--Number of trips during which various kinds of fishing gear were used in the waters of the Hunt Creek Trout Research Station, 1964

Type of gear [a]	Streams	Ponds
Fly	383	68
Spin	487	812
Cast	36	59
Cane pole	12	4
Combination	2	41
Unknown	5	4
Totals	925	988

[a] See text for definitions.

Table 12.--Residence of anglers fishing the waters at the Hunt Creek Research Station in 1964

County	Number of trips	County or state	Number of trips
Montmorency	339	Livingston	10
Wayne	322	Alpena	5
Bay	238	Ionia	5
Oakland	142	Sanilac	5
Genesee	140	Eaton	4
Macomb	83	Montcalm	4
Ingham	70	Otsego	4
Saginaw	62	Presque Isle	4
Midland	56	Roscommon	4
Monroe	44	Antrim	2
Oscoda	42	Barry	1
St. Clair	32	Iosco	1
Washtenaw	31	Total	1,832
Isabella	26	Ohio	65
Gladwin	23	Illinois	4
Jackson	20	Delaware	3
Huron	18	Idaho	2
Arenac	16	Minnesota	2
Hillsdale	16	New York	2
Lenawee	16	Arizona	1
Shiawassee	15	South Carolina	1
Lapeer	11	Wisconsin	1
Tuscola	11	Total	81
Calhoun	10	Grand total	1,913

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