MICHIGAN DEPARTMENT OF CONSERVATION
Research and Development Report No. 99*

March 1, 1967

THE TWENTY-SEVENTH ANNUAL INTENSIVE CREEL CENSUS, HUNT CREEK TROUT RESEARCH STATION, 1965[1]

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The Hunt Creek Trout Research Station and its experimental waters (Fig. 1) are located in a 4-square mile area on the headwaters of Hunt Creek in south central Montmorency County. Hunt Creek rises in Harders' Lake in Oscoda County and flows about 10 miles in a northeasterly direction to its confluence with the Thunder Bay River.

During 1965, angling on the experimental ponds and stream sections was censused for the twenty-seventh consecutive year. Waters included were West Fish Lake, Middle Fish Lake, East Fish Lake, Fuller Pond, Fuller Creek, and Hunt Creek. The physical characteristics of the experimental waters have been described in earlier reports; morphometry data and angling regulations that applied to the various units are given in Table 1.

Creel census methods

Each angler fishing on the Area waters was required, by Conservation Commission order, to obtain a free daily permit from

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* Institute for Fisheries Research Report No. 1736.

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

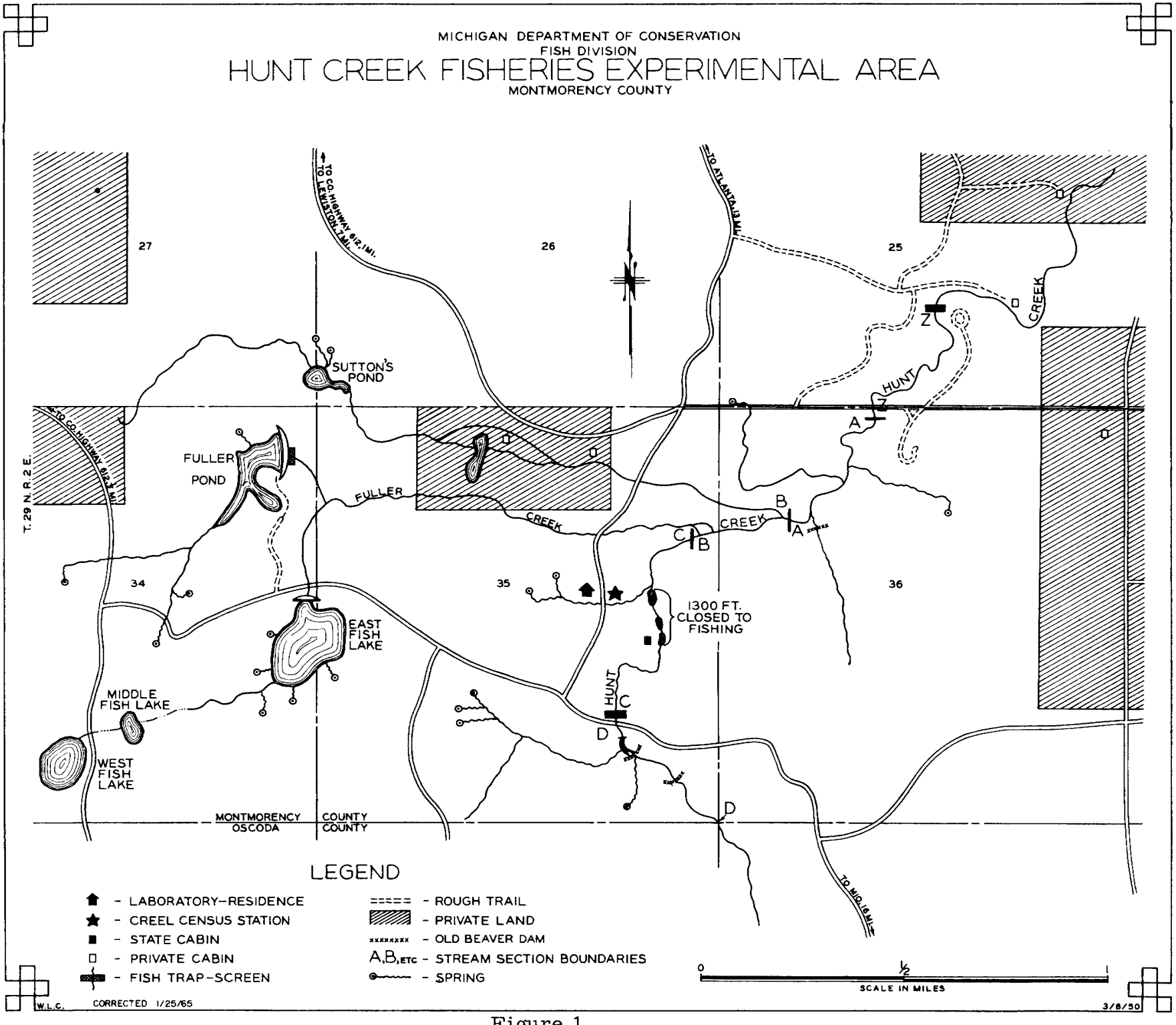
MICHIGAN DEPARTMENT OF CONSERVATION
FISH DIVISION
HUNT CREEK FISHERIES EXPERIMENTAL AREA
MONTMORENCY COUNTY
TO CO. HIGHWAY 612.1 MI.
TO LEWISTON 4 MI.
TO ATLANTA 11 MI.
27
26
25
SUTTON'S POND
FULLER POND
FULLER CREEK
CREEK
HUNT
CREEK
Z
A
B
C
D
T. 29 N. R. 2 E.
TO CO. HIGHWAY 612.1 MI.
34
35
36
EAST FISH LAKE
MIDDLE FISH LAKE
WEST FISH LAKE
1300 FT. CLOSED TO FISHING
MONTMORENCY COUNTY
OSCODA COUNTY
TO MIO 16 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
1/2
1
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 in the Hunt Creek drainage, with angling regulations for 1965

Experimental water	Dimensions			1965 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
Totals	2.30	16.9	4.64			
Fuller Creek	1.87	15.7	3.57	Any	none	none
Fuller Pond	...	...	14.6	No live fish	none	5
East Fish Lake	...	...	16.0	No minnows	10	5
West Fish Lake	...	...	10.2	Any	none	5
Middle Fish Lake	...	...	2.5	Any	none	5

[a] Excluded are 1,270 feet of Section C which consists of experimental diversions closed to fishing.

the checking station. Upon completion of angling, he was required to return to the station, allow an examination of his catch, and furnish pertinent information.

During the 1965 season, 1,536 permits were issued to individuals who made 1,800 angling trips. An angling trip resulted whenever one person fished one of the designated stream sections or lakes on the Area; consequently, an angler who fished more than one stream section or lake on any date was listed as making more than one trip.

Male licensees constituted 69.3% of the anglers; female licensees, 1.3%; wives, 6.9%; minor males, 18.8%; and minor females, 3.7%.

Hunt Creek

A summary of the angling pressure and catch for the various waters on the Hunt Creek Area in 1965 is presented in Table 2. The fishing statistics for Hunt Creek from 1939 to 1965 are presented in Table 3. Residual populations of trout in Hunt Creek at the close of each fishing season from 1949 to 1965 (as estimated from collections taken by electrofishing) are shown in Table 4.

Hunt Creek was fished under the state-wide trout stream regulations during 1965.

In Section Z, 123 wild brook trout were caught in 432 hours of fishing and 35% of the 150 trips were successful. A successful trip is defined as one in which at least one legal trout is caught. One wild rainbow trout 12.1 inches long was taken and 744 sublegal brook trout were released. About 76 legal and an estimated 944 sublegal trout

remained after the fishing season. Compared to 1964, there was virtually no change in the numbers of legal or sublegal fish present at the close of the trout season.

Forty-eight per cent of the anglers who fished Section A were successful in 98 trips. They retained 134 wild brook trout weighing 22 pounds, spent 209 hours in fishing, and reported they had released 714 sublegal fish. The post-season population studies indicated that 89 legal and 2, 232 sublegal fish remained or about an 18% decrease in legal fish from 1964.

To study the effect of an almost complete harvest of legal brook trout on the growth, survival, reproduction, and sustained yield of a wild brook trout fishery, all brook trout 7.0 inches or longer encountered while sampling for the 1962, 1963, 1964, 1965 fall population estimates were removed from stream sections Z and A, and transferred to other waters. This removal of the larger fish has lowered the anglers' catch somewhat but has not resulted in a substantial alteration of sublegal fish populations. In the niche vacated by the removal, fish from Fuller Creek and lesser tributaries may make a significant contribution to Hunt Creek recruitment. It also can be hypothesized that for some reason absence of the larger fish has resulted in an increased survival of the smaller fish.

Section B anglers made 72 trips and fished 142 hours. Thirty-nine per cent of the trips were successful and 69 wild brook trout were retained and 590 released. An estimated 39 legal and 1, 222 sublegal trout (an increase of 27% over 1964) remained after the fishing season.

Table 2. --The 1965 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	Percentage trips successful	Hours	Species	Origin	Number	Pounds	Average length (inches)	Trout per hour
Section of Hunt Creek									
Z	150	35	432.0	Brook	W	123	19.310	7.7	0.28
				Rainbow	W	1	0.570	12.1	tr
A	98	48	208.5	Brook	W	134	22.300	7.7	0.64
B	72	39	142.0	Brook	W	69	10.880	7.7	0.49
C	140	30	245.0	Brook	W	71	11.105	7.7	0.29
D	96	18	148.5	Brook	W	30	5.210	8.0	0.20
Totals or average	556	34	1,176.0	Brook	W	427	68.805	7.7	0.36
				Rainbow	W	1	0.570	12.1	tr
				All		428	69.375	7.7	0.36
Fuller Creek	311	44	654.5	Brook(-7")	W	504	37.300	6.0	0.77
				Brook(+7")	W	172	25.470	7.6	0.26
Totals or average				All	W	676	62.770	6.4	1.03

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Table 2. --continued

Experimental water	Fishing pressure			Yield					
	Trips	Percentage trips successful	Hours	Species	Origin	Number	Pounds	Average length (inches)	Trout per hour
Fuller Pond	242	62	870.0	Brook	W	34	13.985	10.1	0.04
				Brook	H	51	14.680	9.1	0.06
				Brown	T	20	19.780	14.0	0.02
				Brown	H	102	54.150	10.9	0.12
				Rainbow	T	21	20.005	13.8	0.02
				Rainbow	H	189	86.280	10.6	0.22
Totals or average				All		417	208.880	10.8	0.48
East Fish Lake	539	32	1,877.5	Brook	W	8	4.170	11.3	tr
				Brook	H	78	42.145	11.1	0.04
				Rainbow	H	236	273.055	13.6	0.13
Totals or average				All		322	319.370	13.0	0.17
West Fish Lake	102	50	300.0	Brook	H	93	26.280	9.4	0.31
				Brown	H	17	5.450	9.8	0.06
				Rainbow	H	76	22.290	9.7	0.25
Totals or average				All		186	54.020	9.5	0.62
Middle Fish Lake	50	54	109.0	Brook	H	63	20.430	9.6	0.58
				Rainbow	H	28	7.810	9.7	0.26
Totals or average				All		91	28.240	9.7	0.83
All Waters	1,800	40	4,987.0	Brook	W	1,145	149.730	7.0	0.229
				Brook	H	285	103.535	9.6	0.057
				Brown	T	20	19.780	14.0	0.004
				Brown	H	119	59.600	10.8	0.0238
				Rainbow	W	1	0.570	12.1	tr
				Rainbow	T	21	20.005	13.8	0.0042
				Rainbow	H	529	389.435	11.8	0.106
Totals or average				All		2,120	742.655	8.9	0.425

Table 3.--A summary of the fishing pressure, catch, and success on Hunt Creek for wild brook trout of legal size, 1939-1965

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

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Table 3. --continued

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								
1964	588	995	408	63	0.41	0.06	7.7	0.15
1965	406	744	304	49	0.41	0.07	7.7	0.16
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
1965	150	432	123	19	0.28	0.04	7.7	0.16

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, 1949-1965

Year	Section Z		Section A		Section B		Section C	
	Sub-legal	Legal	Sub-legal	Legal	Sub-legal	Legal	Sub-legal	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
1965	944	76	2,232	89	1,222	39	1,592	21

In Section C, 71 wild brook trout were harvested in 245 hours and 30% of the 140 trips were successful. Three sublegal trout were creeled and 765 released. The fall population estimates indicated that 21 legal trout (an increase of 5 over the 16 that remained in 1964) and 1, 592 sublegal trout (a 3% decrease) were present.

Section D of Hunt Creek, the uppermost section, has reverted to stream conditions since the loss of the beaver dams in 1960. Angling in Section D produced 30 wild brook trout in 149 hours. Ninety-six trips were made and 18% of the trips were successful. They creeled 2 sublegal trout and returned 192 to the stream.

For Hunt Creek as a whole, 556 angling trips were made, a decrease of 27% from 1964. The 34% success ratio was virtually the same, but the catch of 427 (69 lb.) wild brook trout showed a decrease of 21% (116 fish) from that of 1964. The fish from Section D averaged 8.0 inches in length; the average length of the fish from Sections Z, A, B, and C was 7.7 inches. Anglers spent 1, 176 hours on Hunt Creek as compared to 1, 465 hours in 1964, and creeled fish at the rate of 0.36 trout per hour.

Fuller Creek

In 1965 the size limit and creel limit for brook trout in this stream were removed for the first time by Conservation Commission order. Anglers who fished these waters and had catches incompatible with the statewide regulations were given a copy of their creel census

slip, signed by a staff member, to validate their possession of what would be considered overlimits and/or sublegal fish on other trout waters of the state.

This liberalization of the regulations was reflected in the greatest amount of fishing pressure ever recorded for Fuller Creek. There was a 96% increase in trips and an 84% increase in hours fished as compared to 1964. The catch of 172 brook trout at least 7.0 inches long (Table 5) was the highest recorded except for 1956 when Fuller Pond was drained and the stream received an influx of fish from the pond that made a significant contribution to that year's catch.

Anglers made 311 trips, fished 655 hours, and harvested 676 trout (63 lb.). Four per cent of the anglers had only "regular" fish that were 7.0 inches or longer, 21% of them had only "special" fish less than 7.0 inches long, and 19% of them had both "regular" and "special" trout. Thus, 44% of the trips were successful. The "special" fish averaged 6.0 inches long, the "regular" fish averaged 7.6 inches long, and the over-all average was 6.4 inches. Anglers reported they had released 1,069 fish, or an average of 3.4 fish per angler, as compared to 1964 when 159 anglers released 1,302 fish for an average of 8.2 fish per angler.

Fuller Pond

Fuller Pond is an impoundment of about 15 acres maintained by an earthen embankment at an old beaver dam site. During 1965,

Table 5. A summary of the fishing pressure, catch, and success on Fuller Creek for wild brook trout of legal size (7.0+), 1940-1965

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
1965	311	655	172	26	0.26	0.04	7.6	0.15

anglers on Fuller Pond spent 870 hours (242 trips) and 62% were successful. This was the highest use ever recorded for this pond. Hatchery-planted trout in the catch included 51 brook, 102 brown, and 189 rainbow trout. Also, 20 brown and 21 rainbow trout that had been transferred from other waters were taken. In addition, 34 wild brook trout were taken for a total catch of 417 fish that weighed 209 lb. They averaged 10.8 inches long and were caught at the rate of 0.48 fish per hour. This catch, in terms of numbers of fish creeled, was the highest recorded for the pond.

East Fish Lake

East Fish Lake anglers spent 1,878 hours and caught 322 trout that weighed a total of 319 lb. (Table 2) and averaged 13.0 inches in length. Seventy-three per cent of the catch was composed of rainbow trout, 24% were hatchery brook trout, and 3% were wild brook trout. The rainbow catch consisted of those planted in the fall of 1964 (89%) and carryovers from the fall of 1963 (11%). One carryover brook trout was 14.0 inches long and weighed 1.31 lb.

Due to their better survival, rainbow trout in East Fish Lake continued to make a greater contribution to angling than brook trout.

West Fish and Middle Fish lakes

West Fish Lake is a 10-acre seepage basin with a maximum depth of 10 feet; Middle Fish Lake, a 2.5-acre seepage basin, has a

maximum depth of 5 feet. Anglers who fished West Fish Lake made 102 trips, fished 300 hours, and 50% were successful. They caught 186 fish that weighed 54 lb. and averaged 9.5 inches in length. Anglers caught 91 trout from Middle Fish Lake in 109 hours. These fish averaged 9.7 inches in length and weighed 28 lb. Of the 50 anglers, 54% were successful.

All waters

From all waters on the Area, 2,120 trout that weighed 743 lb. were creeled (Table 2). The weight was up 2% and the numerical catch was up 29% from 1964, establishing new Area records. Forty per cent of the anglers were successful. They made 1,800 trips and fished 4,987 hours. The average size of the trout caught was 8.9 inches long and the rate of catch was about 1 trout for every 2 1/3 hours of fishing.

Number of trout caught per trip

The number of fishing trips in which different numbers of trout were creeled is presented in Table 6. Where the daily creel limit was 10 trout and the minimum size was 7.0 inches, 66.4% of the anglers failed to catch at least one trout, and 0.4% of the anglers made limit catches. Anglers creeled 6 fish or more on 1.3% of the trips; this constituted 12.9% of the fish taken from Hunt Creek.

Where the daily creel limit was 5 trout and the minimum size was 10.0 inches, 67.7% of the fishermen were unsuccessful. Limit catches were made on 1.7% of the trips. Forty-four per cent of the

Table 6.--Number and percentage of fishing trips in which different numbers of trout were creeled under various regulations at Hunt Creek Trout Research Station, 1965

Total catch per trip	I[a]		II[b]		III[c]		IV[d]	
	Number of trips	Percentage	Number of trips	Percentage	Number of trips	Percentage	Number of trips	Percentage
0	369	66.4	365	67.7	166	42.1	173	55.6
1	78	14.0	92	17.1	49	12.4	36	11.6
2	45	8.0	44	8.2	53	13.5	25	8.0
3	34	6.1	19	3.5	31	7.9	13	4.2
4	12	2.1	10	1.8	28	7.1	12	3.9
5	11	2.0	9	1.7	67	17.0	8	2.6
6	2	0.4	...	...	...	...	3	1.0
7	2	0.4	...	...	...	...	8	2.6
8	...	...	...	...	...	...	7	2.3
9	1	0.2	...	...	...	...	4	1.3
10	2	0.4	...	...	...	...	5	1.6
11	...	...	...	...	...	...	2	0.6
12	...	...	...	...	...	...	2	0.6
13	...	...	...	...	...	...	1	0.3
14	...	...	...	...	...	...	6	2.0
15	...	...	...	...	...	...	...	...
16	...	...	...	...	...	...	2	0.6
17	...	...	...	...	...	...	1	0.3
18	...	...	...	...	...	...	2	0.6
19	...	...	...	...	...	...	1	0.3
Totals	556	100.0	539	100.0	394	100.0	311	100.0

[a] Hunt Creek: 10 trout, 7" minimum.

[b] East Fish Lake: 5 trout, 10" minimum.

[c] Fuller Pond, West and Middle Fish lakes: 5 trout, no size limit.

[d] Fuller Creek: no creel or size limit.

total catch was made by anglers who caught 3 or more fish (7% of the trips). On 25.3% of the trips, anglers caught either 1 or 2 trout and accounted for 56% of the fish harvested from East Fish Lake.

On the waters with a 5-trout creel limit (but no minimum size limit) 57.9% of the anglers reported to the checking station with at least 1 trout. Seventeen per cent of the anglers creeled their limit and 32% of the anglers caught 3 or more fish, accounting for 77.8% of the catch.

With neither a creel nor a size limit on Fuller Creek, 55.6% of the anglers were unsuccessful but 7.1% caught at least 10 fish. This fraction of successful anglers was responsible for 43.9% of the fish taken. Thirty-six of the fishermen checked into the station with 1 fish, and one had 19 fish, the maximum number creeled by any individual.

Biweekly angling effort and catch

A biweekly summary of the fishing pressure and catch on the Area waters is shown in Table 7. As in prior years, the heaviest fishing pressure occurred during the first period of the season when about 25% of the angling effort was expended and about 21% of the total catch for the season was taken.

On the stream, 18% of the catch occurred during the first period; on the lakes, 23%. During the first period on the lakes, 33% of the brook, 18% of the rainbow, and 19% of the brown trout were caught. In the better lakes, rainbow trout provided a more favorable seasonal distribution because they are less catchable. In the marginal lakes,

Table 7. --Angling effort and catch of brook, brown, and rainbow trout by 2-week periods from waters of the Hunt Creek Trout Research Station in the 1965 trout season

2-week period	Hunt Creek			Fuller Creek		Fuller Pond			
	Hours	Catch		Hours	Catch	Hours	Catch		
		Brook	Rainbow		Brook		Brook	Brown	Rainbow
1	194.0	44	...	131.0	158	119.5	2	27	18
2	126.0	52	...	57.0	68	6.0	...	...	...
3	152.0	45	1	65.0	62	88.5	5	20	47
4	43.5	15	...	31.0	77	63.0	16	18	32
5	103.0	17	...	45.5	76	197.0	8	18	61
6	140.0	48	...	85.5	59	105.0	24	21	15
7	111.0	46	...	102.0	68	76.0	4	8	17
8	121.5	42	...	76.5	36	110.5	15	5	8
9	66.5	28	...	29.0	7	32.0	2	2	3
10	118.5	90	...	32.0	65	72.5	9	3	9
Totals	1,176.0	427	1	654.5	676	870.0	85	122	210

(continued, next page)

Table 7. --continued

2-week period	East Fish Lake			West Fish Lake				Middle Fish Lake		
	Hours	Catch		Hours	Catch			Hours	Catch	
		Brook	Rainbow		Brook	Brown	Rainbow		Brook	Rainbow
1	769.0	68	78	30.5	13	...	5	16.5	24	...
2	162.5	9	28	82.0	71	6	28	19.5	28	8
3	108.5	...	2	55.5	1	1	10	40.5	11	18
4	65.5	1	19	16.5	3	1	3	4.5	...	...
5	147.5	1	18	8.0	...	...	...	10.0	...	...
6	214.0	3	29	52.5	3	2	22	15.0	...	2
7	103.5	...	16	17.0	...	4	5	...	...	...
8	107.5	1	12	6.5	...	...	...	...	...	...
9	50.5	...	9	3.0	...	...	...	3.0	...	...
10	149.0	3	25	28.5	2	3	3	...	...	...
Totals	1,877.5	86	236	300.0	93	17	76	109.0	63	28

the brook trout made a greater contribution because they were harvested more readily before summer high water temperatures occurred.

Age distribution of wild brook trout

The age distribution of the wild brook trout taken from the Hunt Creek Area waters is presented in Table 8. About 72% of the fish taken from Hunt Creek were 2-year-old fish and about 25% were 3-year olds. From Fuller Creek, about 35% were I's, 54% were II's, and 11% were III's. Of the 8 wild brook trout caught from East Fish Lake, 4 were 2-year-old fish, 2 were yearlings, and the other 2 were 3-year olds. Twenty-nine per cent of the Fuller Pond wild brook trout belonged to age-group I, 62% belonged to age-group II, and 9% to age-group III. The oldest brook trout taken was a known-age fish from Hunt Creek that was 5 years old.

Summary of lures used

The 1965 catch also is summarized according to lure used in Table 9. On the streams, earthworms or worm and spinners proved to be the most popular lures, were used on 76% of the trips, and accounted for 89% of the trout caught. Five per cent of the fish were caught on flies, the third most popular lure. They were used on 8% of the trips. Worm and spinner was the most successful lure; on the average, those fishermen who used it caught one fish every 55 minutes.

Table 8.--The age distribution of wild brook trout caught by anglers in experimental waters, 1965

Water	Age group	Number of fish	Average length (inches)	Percentage of total catch
Sections Z + A, Hunt Creek	I	7	7.1	2.7
	II	194	7.5	75.5
	III	54	8.3	21.0
	IV	1	11.4	0.4
	V	1	14.8	0.4
Total		257		100.0
Sections B + C + D, Hunt Creek	II	114	7.4	67.0
	III	54	8.3	31.8
	IV	2	10.2	1.2
Total		170		100.0
Fuller Creek	0	1	2.7	0.1
	I	235	5.7	34.8
	II	367	6.6	54.3
	III	72	7.8	10.7
	IV	1	8.6	0.1
Total		676		100.0
East Fish Lake	I	2	10.6	25.0
	II	4	10.8	50.0
	III	2	13.1	25.0
Total		8		100.0
Fuller Pond	I	10	8.9	29.4
	II	21	10.3	61.8
	III	3	12.6	8.8
Total		34		100.0
All waters	0	1	2.7	0.1
	I	254	5.9	22.2
	II	700	7.1	61.1
	III	185	8.2	16.2
	IV	4	10.1	0.3
	V	1	14.8	0.1
Total		1,145		100.0

Table 9.--Effort, catch, and catch per hour by various types of fishing lures used in the waters at the Hunt Creek Station, 1965

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	556	64.1	739	66.9	1,229.5	0.60
Worm and spinner	104	12.0	241	21.8	219.5	1.10
Flies	68	7.9	58	5.3	141.5	0.41
Minnow	28	3.2	33	3.0	46.0	0.72
Insect	35	4.0	17	1.5	60.5	0.28
Artificial lure	18	2.1	4	0.4	29.0	0.14
Natural lure	4	0.5	1	0.1	4.0	0.25
Combination	54	6.2	11	1.0	100.5	0.11
Totals	867	100.0	1,104	100.0	1,830.5	0.60
Ponds						
Earthworm	517	55.4	604	59.4	1,826.5	0.33
Worm and spinner	101	10.8	71	7.0	375.5	0.19
Flies	12	1.3	18	1.8	21.5	0.84
Insect	1	0.1	2	0.2	2.5	0.80
Artificial lure	98	10.5	118	11.6	222.0	0.53
Natural lure	3	0.3	1	0.1	12.5	0.08
Combination	201	21.6	202	19.9	696.0	0.29
Totals	933	100.0	1,016	100.0	3,156.5	0.32

On the ponds, earthworms and worm and spinner were used by 66% of the fishermen and caught 66% of the fish. Anglers using a combination of lures caught about 20% of the fish and those who used flies were the most successful, catching fish at the rate of 1 fish every 71 minutes. In general, the success of a lure depended upon the extent of its usage.

Types of fishing gear used

In Table 10 is presented a summary of the types of fishing gear used in the Hunt Creek Area during 1965. These categories are based, for the most part, on the kind of reel used with the various rods. A spinning reel with a fly rod was classified as spinning gear and a spinning rod with a fly reel was classed as fly-fishing tackle. In most instances, anglers used an appropriate reel with their rod. Spinning gear was the most popular on both the streams and the ponds. It was used by about 56% of the stream anglers and 80% of the pond anglers.

Residence of anglers

The residence of the anglers who made the 1, 800 trips to the Area is summarized in Table 11. Thirty-nine counties from the Lower Peninsula, eight states, and one Canadian Province were represented. There were no anglers from the Upper Peninsula. About 17% came from Montmorency or adjacent counties, 31% from the metropolitan area of southeastern Michigan, and about 18% from

Table 10.--Number of trips during which various kinds of fishing gear were used in the waters of the Hunt Creek Research Station, 1965

Type of gear	Streams	Lakes
Fly	303	90
Spin	482	745
Cast	57	54
Cane pole	17	1
Telescope	6	...
Combination	...	43
Unknown	2	...
Totals	867	933

Table 11.--Residence of anglers fishing the waters at the Hunt Creek Research Station in 1965

County	Number of trips	County, state or province	Number of trips
Montmorency	274	Livingston	10
Wayne	239	Eaton	8
Bay	224	Gladwin	7
Oakland	143	Sanilac	7
Genesee	110	Iosco	5
Macomb	97	Barry	3
Ingham	61	Otsego	2
Monroe	55	Berrien	1
Midland	54	Calhoun	1
Saginaw	50	Charlevoix	1
Oscoda	34	Montcalm	1
St. Clair	30	Muskegon	1
Hillsdale	25	Presque Isle	1
Jackson	25	Total	1,672
Antrim	24	Ohio	95
Lenawee	24	Illinois	18
Tuscola	21	West Virginia	4
Lapeer	20	Georgia	3
Arenac	18	California	2
Shiawassee	18	Indiana	2
Washtenaw	18	Pennsylvania	2
Isabella	15	South Carolina	1
Huron	13	Ontario	1
Allegan	11	Total	128
Kent	11		
Branch	10	Grand total	1,800

the tri-county complex of Bay, Saginaw, and Midland. About 7% of the anglers were nonresidents, most of whom were from Ohio.

Recovery of planted trout in Area lakes

Table 12 summarizes the results of plantings made since 1958 in the experimental waters of the Area. These data must be regarded as minimal because some trout of sublegal size were creeled; additional trout from recent stockings will be caught subsequently; and undoubtedly some fish were illegally removed from the Area.

East Fish Lake.--From 1958 to 1962, East Fish Lake was planted at the rate of about 38 fish per acre in mid-October with matched plantings of 300 brook and 300 rainbow trout that averaged 8.9 inches long. Annual returns from the rainbow plantings show that, on the average, 85% of the number planted were caught, or a 345% return by weight.

In October 1963 and 1964, the stocking rate of rainbow trout was increased to 600 fish but the average length of the fish remained the same as before. From the 1963 plant, 331 fish weighing 262 lb. were creeled for a 55% numerical recovery and a 189% weight recovery. The 1964 plant resulted in a catch of 211 fish that weighed 209 lb., or 35% of the number and 129% of the weight planted.

The October brook trout plantings from 1958 to 1964 resulted in angler recovery of an average of 35% of the number and 64% of the weight planted by the close of the 1965 trout season. After ice cover

Table 12.--Angler catch of trout released in the experimental lakes of the Hunt Creek Area, 1958-1965

Area and date of planting	Species[a]	Trout planted[b]			Legal trout creeled		Total legal trout creeled to date			
		Number	Pounds	Average length (inches)	1959-1964	1965	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	114	...	114	38.0	54.9	70.4
Oct. 1963	S	300	81	8.9	107	1	108	36.0	47.7	58.9
Oct. 1964	S	300	80	8.9	...	61	61	20.3	33.8	42.3
Dec. 1962	S	150	45	9.5	61	...	61	40.7	26.9	59.8
Dec. 1963	S	150	60	10.0	61	...	61	40.7	26.4	44.0
Dec. 1964	S	150	60	10.0	...	16	16	10.7	7.0	11.7
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	269	...	269	89.7	300.1	405.5
Oct. 1963	R	600	139	8.9	306	25	331	55.2	262.4	188.8
Oct. 1964	R	600	162	8.9	...	211	211	35.2	208.8	128.9
Fuller Pond										
April 1962	S	400*	28	5.5	13	...	13	3.3	9.1	32.5
April 1962	S	400	26	5.5	51	...	51	12.8	28.6	110.0
April 1962	R	400	26	5.5	96	1	97	24.2	101.5	390.4
Oct. 1963	S	300	79	9.0	125	...	125	41.7	72.4	91.6
Oct. 1963	R	300	69	9.0	140	1	141	47.0	97.6	141.4
July 1964	S	300	11	4.5	...	40	40	13.3	12.3	111.8

Table 12.--continued

Area and date of planting	Species[a]	Trout planted[b] Number	Pounds	Average length (inches)	Legal trout creeled 1959-1964	1965	Total legal trout creeled to date: Number Total	Number Percentage	Pounds Total	Pounds Percentage
Fuller Pond										
July 1964	S	300	11	4.5	...	11	11	3.7	2.4	21.8
July 1964	R	300	11	4.5	...	31	31	10.3	15.2	138.2
July 1964	R	300	11	4.5	...	20	20	6.7	7.5	68.2
Mar. 1965	R	35*	34	13.3	...	21	21	60.0	20.0	58.8
Mar. 1965	B	89*	85	13.3	...	20	20	22.5	19.8	23.3
April 1965	R	200	50	9.1	...	136	136	68.0	58.9	117.8
April 1965	B	200	55	9.1	...	102	102	51.0	54.2	98.5
West Fish Lake										
April 1963	S	100	21	8.2	48	...	48	48.0	9.8	46.7
	B	100	21	8.2	26	...	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	...	...	...	...	...	...
	B	150	14	5.5	27	...	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
April 1965	S	150	42	9.3	...	93	93	62.0	26.3	62.6
	B	150	42	9.3	...	17	17	11.3	5.5	13.1
	R	150	42	9.5	...	76	76	50.7	22.3	53.1
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

Table 12.-continued

Area and date of planting	Species [a]	Trout planted [b] Number	Pounds	Average length (inches)	Legal trout creeled 1959-1964	1965	Total legal trout creeled to date Number Total	Number Percentage	Pounds Total	Pounds Percentage
Middle Fish Lake										
April 1963	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	0.0
	R	5	15.5	20.0	4	0	4	80.0	12.3	79.4
April 1965	S	100	28	9.3	...	63	63	63.0	20.4	72.9
	R	100	28	9.2	...	28	28	28.0	7.8	27.9

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

[b] All trout planted were hatchery trout except those lots marked with an asterisk which were transferred from other waters.

formed on East Fish Lake in 1962, 1963, and 1964, 150 hatchery brook trout from the same lots which furnished the October plantings were released each December. The average length of these fish was matched to the average length that the earlier plant had attained by this time. Angler recovery rates in 1963 and 1964 from the 1962 and 1963 plants were 41% for each season. In 1965, anglers creeled 11% of the fish from the December 1964 plant. Planting brook trout after ice formation did not result in increased survival to the angler's creel.

The change from a planting rate of about 38 fish per acre to 67 fish per acre annually has not resulted in a proportionate increase in the recorded catch from East Fish Lake. It appears that either this higher rate of stocking is excessive for the habitat, or that increased density of the fish population has accelerated either illegal removal or predation.

Fuller Pond. --One rainbow trout from an April 1962 plant and another from an October 1963 plant were creeled during 1965 (Table 12). In July 1964 Fuller Pond was stocked with 600 brook and 600 rainbow trout with a size range of 4.0 to 5.0 inches (mean length, 4.5 inches). Because most of the predator activity had been observed in the upper portion of the pond, one-half of the fish of each species were marked by excising the left pelvic fin and one-half marked with a right pelvic fin clip. The fish with a left pelvic clip were released at the embankment, and those with a right pelvic clip were released in the stream a short distance above Fuller Pond.

None of these fish were creeled during 1964, although an unknown amount of hooking mortality occurred. In 1965, 13% of the left pelvic- and 4% of the right pelvic-clipped brook trout were creeled, or a weight return of 112% and 22%, respectively. The numerical return from the rainbow trout planting was nearly equal, with 10% of the left pelvic and 7% of the right pelvic fish caught, and a weight return of 138% and 68%.

In an effort to compare the food habits, growth, and vulnerability to the angler of the brown and the rainbow trout, brown trout were introduced into Fuller Pond for the first time in March 1965. Eighty-nine brown trout and 35 rainbow trout were transferred from other waters. Both groups had an average length of 13.3 inches. Anglers caught 60% of the rainbows and 23% of the browns with a weight recovery of 59% and 23%.

Furthermore, a matched planting of 200 each of hatchery brown and rainbow trout that averaged 9.1 inches in length was made in April 1965. Recovery consisted of 136 rainbow trout and 102 brown trout or a numerical return of 68% and 51% and a weight return of 118% and 99%, respectively.

There is a suggestion here that brown trout are less vulnerable to angling than rainbow trout, and that their vulnerability is inversely related to their size.

West Fish Lake.--This lake becomes very marginal trout water in midsummer when bottom temperatures reach 69 F and surface water temperatures reach 80 F. Trout were first introduced

into West Fish Lake in the fall of 1960 for the purpose of studying the comparative utilization of minnows by brook, brown, and rainbow trout. The natural fish population at this time was composed of suckers, sticklebacks, mudminnows, Iowa darters, golden shiners, redbellied dace, and fathead minnows. Trout planted prior to April 1963 were recovered by the staff with various types of gear. In 1963, angling on West Fish Lake was censused for the first time.

In April 1965, West Fish Lake received a planting of 150 each of brook, brown, and rainbow trout that averaged 9.3 inches long. Anglers creeled 93 (62%) of the brook, 17 (11%) of the brown, and 76 (51%) of the rainbow trout (Table 12). No trout from previous plantings were caught.

Middle Fish Lake. --To further determine the extent that trout would utilize minnows, Middle Fish Lake was stocked and censused for the third time in April 1965. The planting consisted of 100 each of brook and rainbow trout that averaged 9.3 inches long. Sixty-three per cent of the brook and 28% of the rainbow trout were caught. In the future, submarginal lakes such as Middle Fish Lake could provide a short-term fishery if recreational pressure should create such a need.

Acknowledgments

G. D. Betts, L. L. Langdon, B. Miller, D. D. Brooks, and M. R. Fenby assisted in the collection of the creel census records.

G. D. Betts, L. L. Langdon, and B. Miller determined the ages of the wild trout caught.

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