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INSTITUTE FOR FISHERIES RESEARCH
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CREEL CENSUS AND MARKING EXPERIMENTS ON
FIVE MICHIGAN TROUT STREAMS FOR THE TROUT
SEASON OF 1937

During the summer of 1937, creel censuses by CCC enrollees were established on five different trout streams in order to learn how heavily these streams were used by the anglers of Michigan and the surrounding states, and to find out to what degree the anglers were successful in removing the trout of these streams. The theoretical aim was to take a complete count of all fishermen and all fish caught, but it is doubtful if any total for any stream represents the complete number of fishermen or the actual total of all fish caught because of the following factors:

1. Censuses did not cover the complete fishing day.
2. Carelessness of the census takers.

However, a large enough number of fishermen were contacted on each stream so that an adequate statistical sample of the trout fishing was obtained for the past summer.

In all streams where censuses were maintained, the Institute for Fisheries Research in cooperation with various of the hatcheries also had set up marking experiments with hatchery-raised trout of various sizes and planted at different seasons of the year. The streams on which

these census and marking experiments were conducted were:

1. Pine River (Lake County)
2. North Branch of the Au Sable (Crawford County)
3. South Branch of the Pine and tributaries (Alcona County)
4. Canada Creek (Presque Isle County)
5. Pigeon River (Otsego and Cheboygan counties)

The pertinent results from each stream are here briefly summarized, along with a short discussion on mortality of marked fish (which was negligible), and a small compendium of fishermen's reactions to the planting of legal-sized trout in the Pine River.

Pine River

Creel census on the Pine River was initiated by the Sable River Camp of the CCC at the start of the 1937 trout season, and was conducted by this camp under the direction of Mr. James Gibson until this camp was abandoned on May 27, 1937. At this time the census was taken over by the enrollees of the Irons Camp of the U. S. Forest Service. This agency supervised the collection of records during the remainder of the trout season. The stretch of river covered was approximately 12 miles long, extending from the Walker Bridge (north of Luther) to Thorpe's Bridge. Five stations were maintained, all located at the state-owned camp grounds recently constructed along the river.

Records of the fishing of 2,010 anglers were obtained, of which 108 were non-resident fishermen coming from Illinois (45), Indiana (29), Ohio (28), Oklahoma (2), Pennsylvania (2), Texas and West Virginia (1 each). Resident anglers (1,902) came from 43 counties of the lower peninsula and one county in the upper peninsula. The largest number came from Kent County (515), followed by Wexford (190), Osceola (150) and Barry (146). Wayne County contributed only 105. Western Michigan counties were more largely represented on this stream than any other.

The 2,010 fishermen fished an average of 4.2 hours apiece, and caught 0.8 trout per hour. The average number of trout caught per fisherman was 3.3; the average number of undersized trout caught and thrown back was 0.8 trout per fisherman.

The total legal catch reported was 6,576 trout made up as follows: 3,175 brook trout (average size 9.0 in.), 3306 rainbow trout (average size 9.7 in.), and 95 brown* trout (average size 10.2 in.). Small trout caught and returned to the stream totalled 1,550, divided as follows:

* The identity of the brown trout is questionable.

913 brook trout, 629 rainbow trout, and 8 brown trout.

During the 1937 trout season this stream was stocked* in the months of May, June, July, and August with legal-sized rainbow and brook trout (for details of the stocking see Table 1). With the exceptions of May, when 3,000 brook trout were planted, and June, when 2,000 rainbow and 1,000 brook trout were released, the plantings were of approximately 2,000 brook trout and 1,000 rainbow. For the entire season, 11,520 legal trout were distributed, made up of 7,513 brook trout, 4,007 rainbow trout. Slightly more than one-half of the total of each species were either jaw-tagged or fin-clipped.

Of the marked rainbow planted (2,007), 341 or 17 per cent were taken by fishermen. Of the marked brook trout planted (3,963), 586 or 14.8% were reported caught. It is certain that a larger percentage of the marked trout were caught than these figures indicate, since a number of fishermen were not contacted in the section covered by the census and since some captures were reported from either above or below this section of the Pine River. Although it would be desirable to know the exact percentage of these plantings which reached the fisherman's basket, this information is not as important as the percentage of the angler catch which was made up from the plantings of legal-sized trout and the percentage contributed by previous fingerling plantings and natural reproduction. Since a good share of the fishing was included in the census, these latter calculations are valid even though the complete yield for this part of the stream is not known.

If it is assumed that the unmarked legal-sized trout planted were taken in the same proportion as the marked, the total number of unmarked rainbows caught may be estimated at 338; the number of unmarked brook trout at 525.

*

Organization and direction of the planting program were handled most efficiently by R. G. Fortney, District Supervisor of Fisheries Operations.

The total number of rainbow trout caught as a result of legal-sized planting was 879 or 26% of the total rainbow catch. Legal-sized plantings of brook trout yielded 1,111 fish or 33% of the total catch of brook trout for the season. This means that about one out of four rainbow and one out of three brook trout taken by fishermen in the Pine River this summer were the result of plantings of legal-sized fish. Previous fingerling plantings and natural reproduction contributed 74% of the rainbow and 67% of the brook trout catches. Of the total number of trout of all species taken, 26.⁵/₁% was due to the heavy planting of large fish through the season.

Although detailed analyses have not been performed on the recovery figures, it would appear that when trout are planted by the usual method of releasing 500 or more at one spot on the stream during the open season, a much higher percentage will be taken out than if the trout are dispersed from a boat as it drifts downstream. This is borne out by the extreme differences in the percentage of recovery shown in the May and June brook trout plantings (40.4 per cent and 2.6 per cent respectively).

Although the majority of trout released were taken within three miles of where they were planted, a small percentage were definitely reported from points on the Pine River well outside the census area. One brook trout was recovered one mile below Petersen's Bridge in Wexford County, and several moved down to the mouth of Poplar Grove Creek. One rainbow trout was taken in the middle of the Ne-Bo-Shone property, and one was reported from just above the Skookum Bridge. There were also some verbal reports of marked hatchery fish being taken in the region of Edgetts, but no tag numbers were ever received from that area.

Comparison of the fishing on the Pine River for the period August 15-September 7, 1936, and August 14-September 6 can be made, as there was a creel census taken for the above period during 1936 (Report No. 416). Results from the two tabulations show that the fishing was distinctly

Table 1

Planting Record, Pine River, 1937

Month Planted	Brook Trout			Rainbow Trout			Total Trout	How Planted
	Tagged	Fin-clipped	Unmarked	Tagged	Fin-clipped	Unmarked		
May 18, 1937	1,000	...	2,000	...	...	...	3,000	Spot
June 15, 1937	959	...	...	1,007	...	1,000	2,966	Boat and Spot
July 13, 1937	504	500	1,000	250	250	500	3,004	Boat
Aug. 10, 1937	500	500	550	250	250	500	2,550	Boat
Totals	2,963	1,000	3,550	1,507	500	2,000	11,520	

better during the last three weeks of the 1937 trout season, as the catch per angler of 222 fishermen was 3.8 trout, while in 1936 the catch per angler of 342 fishermen was 1.4 trout. The catch per hour in 1937 was 0.87 trout, while in 1936 the catch per hour was 0.5 trout. However, in 1936 the average size of the rainbow taken was 12.1 inches; in 1937 it was 9.2 inches. Brook trout taken in 1936 averaged 8.5 inches, but were slightly larger during August of 1937, averaging 8.9 inches.

Although considerable variation in the catch might be expected for the same period in two successive years, there can be little doubt but that the larger number of trout caught in 1937 was due to plantings of legal-sized fish.

Pigeon River

Creel census on the Pigeon River was conducted during the 1937 trout season by enrollees of Camp Pigeon River, a CCC camp under the direction of Mr. Ted Wilcoxon. Four stations were maintained on the stream, located at the Vanderbilt Road Bridge, Old Headquarters, Tin Bridge, and the Wolvering (Red) Bridge.

A total of 1,153 fishermen were recorded from this stream. The fishing period averaged 3.5 hours apiece. The average catch of trout per hour was 0.5. The total catch recorded for the stream was 1,912 trout divided as follows: 1,202 brook (average size 8.2 in), 566 rainbows (9.1 inches), and 144 brown trout* (average size 7.9 in.).

On August 4, 1937, 985 marked rainbow trout of legal size were released in the Pigeon River in several places where it flows through the Pigeon River State Forest. Of these marked fish, 141 were reported by fishermen to the creel census clerks, yielding a recovery percentage of 14.3. In looking over the records, it has been noted also that approximately 77 per cent of the total rainbow catch for the stream was made in the month after

* From the initial planting of 7 months old fish of this species in 1936.

the planting (August 7-September 6). The hatchery rainbow made up 32.2 per cent of the total catch for the August 7-September 6 period. During this same period over twice as many wild rainbow trout were taken as were caught between April 24-August 6, possibly being stimulated to rise because of competition for food or space brought on by the release of the hatchery fish in the same waters.

The hatchery rainbow, even though in the stream for only one month, made up 25 per cent of the total rainbow catch (141 of 566).

South Branch of the Pine

Creel census of approximately five miles of the South Branch of the Pine River and approximately four miles of its tributaries in Alcona County was conducted during the trout season of 1937 by the enrollees of the Glennie Camp under the direction of the Wildlife Division of the U. S. Forest Service. Five checking stations were maintained, located as follows: on Kurtz Creek, on Samyn Creek, at the Pine River Rearing Station, at the first bridge below the Rearing Station, and at the end of the Pine River Trail. These points were chosen because the river is otherwise relatively inaccessible.

During the 1937 trout season, 696 resident fishermen from 27 different counties and 32 non-resident sportsmen fished the South Branch of the Pine. Thirty of the non-residents were Ohioans, one was from Illinois, and one was from Washington, D. C.

These 728 fishermen creeled 517 legal trout, divided as follows: 441 brook trout averaging 7.3 inches, 59 rainbow trout averaging 7.9 inches, and 17 brown trout averaging 9.1 inches. They also captured and threw back 487 brook trout averaging 5.6 inches, 68 rainbow trout averaging 5.6 inches, and 6 brown trout averaging 6.3 inches, or a total of 561 illegal trout.

Of the 728 fishermen recorded by the census takers, 531 took no fish. The average number of legal trout caught per hour was 0.2; the average

number of legal trout caught per fisherman was 0.7, while the average number of undersized trout caught was 0.8.

These waters were the scene of release of marked fingerling brook trout both in the fall of 1936 and in the spring of 1937 before the trout season opened. Details of the plantings are given in Table 2.

It will be noted in the preceding table that the hatchery fingerlings released in the spring entered into the 1937 legal size catch of the stream to a much greater degree than did those released in the fall of 1936, despite the fact that only 19.2 per cent of the 571 fish released in the spring were 7 inches or larger at release on April 8, 1937.

Of the total legal-sized catch during the past summer, 69 or 13.3 per cent was of the hatchery planting made in the spring of 1937, while only 3, or 0.5 per cent, came from the hatchery planting made in the fall of 1936.

It would therefore appear that if brook trout could be held in the hatcheries till the spring of the year following their hatching and raised to an average size of 6 1/2 inches, they would give a greater return to the fishermen in the immediate season following planting than if released in the stream in the fall as 5 1/2 inch fingerlings.

A comparison of the movements of the fish planted at the two seasons of the year shows that those planted in the spring appear to have dispersed much more widely than did those planted in the fall, although recoveries of fall planted fish are too few to permit a definite conclusion. Recoveries of the spring planted fish were made as far as 2 1/2 miles downstream, 1/4 mile up the South Branch of the Pine, 2 1/2 miles up Kurtz Creek, and 1/2 mile up Samyn Creek. Recoveries from the fall plantings were made in the vicinity of Kurtz Creek planting, where 5 tagged fish of the Kurtz Creek plant were taken. Two of the fish planted at the Pine River Rearing Station were

Table 2

Data on Plantings and Recovery of Marked Brook Trout
in the South Branch of Pine River (Alcona County) and Tributaries

Where Planted	Date Planted	Number Planted	Average Length (Inches)	How Marked	Number Recovered		Recovery Percentage
					Legal	Undersize	
Kurtz Creek	10/6/36	135	5.61	Tagged	3	2	3.7
Samyn Creek	10/5/36	246	5.33	Tagged	...	...	0.0
S. Br. Pine	10/6/36	115	5.66	Tagged	1 ^a	1 ^a	1.7
S. Br. Pine	4/8/37	571	6.31	Fin-clipped	69 ^b	8	12.1

^a These fish were caught up Kurtz Creek.

^b Two of these fish were caught in Samyn Creek, four in Kurtz Creek.

caught well up Kurtz Creek, showing a movement of some 2 1/2 miles up this stream from the point of release. None of the tagged fish released below the power dam on Samyn Creek were reported, although there were 75 hours of fishing recorded for Samyn Creek.

North Branch of the Au Sable River

Creel census on the North Branch of the Au Sable River was conducted during the 1937 trout season by the enrollees of Camp Au Sable, a CCC camp, under the direction of Mr. Emerson Frye, in the region of the town of Lovells, Michigan.

Records for this stream show that a total of 1,904 fishermen waded this famous stretch of water. Of this number, 277 were non-resident fishermen coming from Florida (4), Illinois (4), Indiana (15), Missouri (2), New York (2), Ohio (242) and Pennsylvania (8). Resident fishermen came from 46 counties in the lower peninsula and one county in the upper peninsula. Wayne County contributed approximately 40 per cent of the anglers, and Genesee County about 14 per cent, with Saginaw in third place with about 8 per cent. The remainder were distributed largely from counties in the eastern half of the lower peninsula.

The 1,904 anglers reported that they had removed 3,143 legal trout divided as follows: 2,525 brook trout, 76 rainbow trout, and 542 brown trout. The undersized trout reported caught and returned to the water were: 885 brook trout, 22 rainbow trout, and 51 brown trout.

The average number of hours fished was 3.5; the average number of trout caught per hour was 0.5; the average number of legal trout taken per fisherman was 1.65; the average number of illegal trout hooked per fisherman was 0.5.

On October 13, 1936, 9,778 fin-clipped brook trout fingerlings averaging 3.5 inches total length were released in the North Branch of the

Au Sable, half being distributed at the Twin Bridges and half at Anderson's Bridge (Report No. 393). A control experiment was also set up at the same time. The purpose of this release of marked fingerlings was to determine what contribution such a planting would make to the fisherman's catch in the following season.

Recounts in July, 1937 on the control experiment held at the Grayling Hatchery showed that the fin-clipped brook trout had had a mortality of 15.7 per cent. On this basis, assuming an equal mortality in nature in the North Branch of the Au Sable, there should have been approximately 8,100 of the previous fall (1936) planting still alive, and available to the fishermen, if they were of legal size.

It is very evident that this planting did not contribute to the 1937 catch on the North Branch, as only 3 fin-clipped brook trout (or 0.11 per cent) were reported in the catch of the fishermen during the past season.

Canada Creek

Creel census was conducted on approximately 3 miles of Canada Creek during the 1937 trout season by the CCC veterans camp located at Clear Lake near Atlanta, Michigan. This stream is a tributary of the Black River and is reputedly a good brook trout stream. On April 26, 1937, 500 jaw-tagged fingerling brook trout of an average size of 5.5 inches were planted from the Grayling Hatchery in order to see what results might be obtained from such a planting.

Tabulations of the season's records indicate that a total of 455 fishermen spent an average of 3.1 hours each on their trips to Canada Creek. Of these fishermen, 222 or slightly less than one-half of them took no fish.

The legal catch for the season was 673 trout, consisting of: 665 brook trout, 5 rainbow, and 3 brown trout. The average number of legal trout caught per hour was 0.5, and the number of legal trout captured per fisherman was 1.5. The number of undersized trout released was 1,221, represented by the following: 1,196 brook trout, 22 rainbow trout, and 3 brown trout; an average of 2.7 undersized fish per fisherman. In addition to trout, the following species were also reported: bluegills, perch, horned dace, shiners, suckers, and chubs.

Of the 1,196 undersized brook trout reported, 133 were known to be from the planting of April 26, 1937, since this number bore jaw-tags. Not one of these fish was reported as being of legal size. This would tend to demonstrate that in streams of this type planting advanced fingerling brook trout of 5.5 inches total length, even in the spring of the year has no effect on the catch of legal trout during the fishing season of the same year.

The greatest number of fishermen using the stream came from Presque Isle County, followed by Wayne County anglers and Genesee County sportsmen. In all, fishermen from 24 counties, living mostly in eastern Michigan fished the stream. Out-of-state fishermen came from Canada (2), Florida (2), Illinois (3), Kentucky (1), Ohio (12) and Oklahoma, New York, Pennsylvania, and Wisconsin (1 each).

Mortality Due to Marking

Hatchery Experiments

When the planting began on May 18, 1937, there was no space available at any convenient hatchery to carry on a control experiment so that mortality due to the tagging operation might be determined. A control experiment was set up, however, shortly after the August planting at the Grayling Hatchery. Communication with Mr. Hans Petersen, Supervisor of the Grayling Hatchery, dated September 23, advises us that there has been no mortality among the tagged or control fish, which were all legal fish.

A control experiment on the fin-clipping operation was set up at the Harrietta Hatchery during July, simultaneously with the release of the July planting. Fifty legal-size brook and fifty rainbow trout of the same stock from which the plantings were drawn were fin-clipped and placed with an equal number of unclipped fish in one of the oval hatchery pools. A letter from Mr. A. J. Walcott, dated September 22, 1937, advises us that there have been no mortalities among the experimental fish. These trout were measured in August, and at that time there was no indication that the clipping operation had in any way affected their growth.

Field Observations

After the planting made on July 13, 1937, Dr. J. W. Leonard was camped on the Pine River at Lincoln Bridge, where he conducted bottom food studies. On two different dates Dr. Leonard cruised portions of the stream where plantings of trout had been effected and recorded the number of marked and unmarked fish found dead.

On July 17, 1937 in approximately 2 miles of stream between the "Sugar Bowl" and the Lincoln Bridge, Dr. Leonard picked up six unmarked brook trout, three fin-clipped brook trout, five tagged brook trout, and two unmarked rainbow trout.

On August 7, 1937, Dr. Leonard cruised the Pine between Canfield Rollways and Lincoln Bridge and found two tagged rainbows which had died. On the same day he cruised between Silver Creek and the "Sugar Bowl" and found no dead fish in that particular stretch of the water.

From these counts mentioned above, it is concluded that unmarked fish are as likely to die as are the marked fish. It is probable that all the brook trout found between the "Sugar Bowl" and Lincoln Bridge were hatchery fish, since the ratio of marked to unmarked trout was 1 to 1 in the planting of this area. This ratio indicates that the marking operations are not responsible for the mortality.

Dr. Leonard preserved specimens of dead trout, both marked and unmarked, which were not too badly decomposed, and these fish have been pathologically examined by Mr. Lowell Woodbury to determine causes of death where possible. Mr. Woodbury stated after his dissections of the marked fish that it was extremely doubtful if the tagging or the fin-clipping operation was responsible for death in any case. In both marked and unmarked trout where pathological symptoms were observed, death was caused by some sort of a blow followed by internal bleeding. This type of injury might be easily inflicted on the marked specimens due to handling in the marking process, or in their transference.

It may be concluded that the mortality incurred in the planting and marking has been negligible, and one that could not be avoided in sorting and transporting large numbers of legal sized trout by the present means available for their distribution.

Reaction of Fishermen to Planting

Trout of Legal Size

Judging from the comments heard during the summer of 1937 while the junior author was in the field, a majority of the fishermen who expressed their sentiments concerning the Pine River plantings were definitely in favor of such type of fish distribution. The adverse comment came for the most part from fishermen native to the regions close by the Pine, and who have fished the stream all their lives. Probably their sorest complaint is that their favorite stretches are now more readily reached by the public, since the new camp sites permit much more of the stream to be fished than was hitherto the case. The accessibility of the formerly remote sections plus the planting of fish during the past summer no doubt reacted unfavorably with the local fishermen, since an increased number of fishermen were attracted to their favorite holes. Other criticisms were that the hatchery fish were not gamy on the line, and tasted of liver when eaten. The latter objections are controversial, as can readily be seen by the portions of letters here appended. All of these comments were received in unsolicited letters from anglers who had fished the Pine River during the 1937 trout season, and the original letters are on file in the files of the Institute for Fisheries Research.

J. Leslie Livingston
Grand Rapids, Michigan

July 21, 1937

"Much to my surprise, I found that the recently released fish were the equal of the others as far as eating qualities are concerned. In common with a majority of experienced trout fishermen, I rather dislike to catch tagged fish as one feels that they are more or less 'tame fish.' However, I am sure that none of us would be able to tell the difference in any way if the tags were not present."

William E. Fulton
Rockford, Ill.

June 4, 1937

"As to the edibility of the tagged fish, my friend and I checked very carefully and were unable to detect any difference in the taste between the tagged and other fish." (All may have been hatchery fish--A.S.H.)

May 25, 1937

". The tags were taken from a catch of 22 fish made by my friend and myself. We are grateful to you for the lively time we had."

E. L. Birdenbaugh
Lansing, Michigan

July 5, 1937

"I want to comment on the fighting qualities; there was no noticeable difference than (in) those that were not tagged." (Again may have all been recently planted fish--A.S.H.)

Judge A. M. Crampton
Moline, Illinois

August 1, 1937

"I congratulate you on your splendid efforts. The writer is a director of the Moline Conservation Club and is vitally interested in your program."

Dr. W. H. Bethune
Grand Rapids, Michigan

August 6, 1937

"I am of the opinion that fishing has improved considerably this year over past years."

H. A. Beaver
Cadillac, Michigan

"In two hours fishing I took thirteen brook trout from 9 to 12 inches without a single rainbow.

"I know these fish were of this planting (May) for they were soft, and much less gamy than native brook trout.

"Have written this more as a matter of information than as a suggestion, believing you might be glad to know the actual experience of one man which could have been duplicated by any number as long as the fish lasted no matter how poor a fisherman he might have been."

Claude Lydell
Comstock Park, Michigan

June 26, 1937

"All the fish I took were in poor condition, nothing in their stomachs; and all but one had an inflamed spot on under side of jaw where the tag initiated it, I suppose. No fight or pep in them, as is usual with a Rainbow

The junior author fished the Pine four days after the July planting and caught both tagged and fin-clipped trout. All of these fish fought with the vigor and dash of wild specimens. After they came from the frying pan, neither he nor Dr. Leonard were able to distinguish the marked from the unmarked by their flavor.

Conclusions

From the results obtained where marked legal-sized trout were planted during the season, it would seem that from 14 to 17 per cent of such fish may be taken by anglers that same season. Whether this is a larger percentage of the plant than would result in succeeding years from stocking a like number of fingerlings or fry cannot be stated at this time.

A higher percentage of the legal-sized trout are caught by fishermen when plantings of 500 or more are made at one spot than when the same number of fish are scattered from a planting boat. However, the "meat hunter" benefits more by such spot plantings than does the sportsman.

The great majority of the legal-sized trout taken were recovered within three miles of the point of planting, although a few marked fish were caught at considerable distances up or downstream from where they were liberated.

Of the five streams studied, the catch per hour of trout averaged 0.5 in three streams. The South Branch of the Pine River (Huron National Forest) yielded only 0.2, while the Pine River in Lake County produced 0.8 legal trout per fisherman hour. It is interesting to note that a census during the last three weeks in August, 1936 on the Pine River also showed an average catch per hour of 0.5 fish. It is reasonable to conclude that legal-sized plantings were at least partly responsible for the better fishing on the Pine River this season. Whether this increase is necessary to the satisfaction of the angler and whether the greatly increased costs justifies this improvement in the catch are questions which cannot be answered by biological research.

Results from the Pigeon River planting of legal-sized rainbows suggests a serious hazard in planting fish of this size which has not previously been considered. Apparently planting these large fish caused the trout already

present in the stream to bite more freely, possibly due to a sudden increase in competition for food or space. This resulted in large catches of adult fish which had originated from previous fingerling plantings and natural reproduction. This theory needs more thorough testing before conclusions can be drawn, but if planting large fish results in severe drains on the adult trout population as well as the newly planted fish, serious depletion of the trout stock left for spawning that season and for next season's fishing may result.

If planting legal-sized fish works this way, it may well account for complaints frequently heard by the senior author on streams in Utah and New York, where such planting has been practised over a period of years. The old timers who know those rivers claim that there are very few big fish caught any more and that the only fish which can be taken (and those with ridiculous ease) are the trout just above legal size recently planted by the state. This is another aspect of the problem which should be carefully checked in succeeding years.

Where fingerling brook trout averaging 5.5 inches or less total length were planted either in the fall or in the spring, no results were found to accrue to the fishermen in the following trout season, as was demonstrated by the experiments in the North Branch of the Au Sable and in Canada Creek.

On the South Branch of the Pine River where brook trout of an average length of 6.31 inches total length were planted in the spring, 12 per cent were taken by the fishermen in the same season. Plantings of smaller fingerlings released in the preceding fall as in the case of the North Branch of the Au Sable or in the spring, gave negligible results during the fishing season immediately following.

In order that these experiments may be completed, it is necessary to have creel censuses on all streams covered this year. It may be that a

large number of the fingerlings released in the fall of 1936 will enter into the catch of the 1938 season, and this number should be determined. The plantings of legal-sized fish in the Pine and Pigeon should also be followed in order to determine what percentage may be expected to go into the fisherman's creel in succeeding seasons.

It is also the desire of the Institute to mark releases of legal-sized fish in the Pine River this fall and next spring before the opening of the season to see what results are obtained from plantings at these two seasons of the year. Until these last mentioned experiments have run their course it would be unwise to offer opinions on which is the best time to plant the various sizes of fish.

INSTITUTE FOR FISHERIES RESEARCH

By A. S. Hazzard and David S. Shetter