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FISHERIES DIVISION

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RESULTS OF FISHING AND ANGLER QUESTIONNAIRE ON THE
SOUTH BRANCH AU SABLE RIVER, MASON TRACT,
CRAWFORD COUNTY, MICHIGAN, DURING THE
BURROWING MAYFLY HATCH, 1973

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ABSTRACT

A permit-type of census of angling was conducted on the South Branch Au Sable River during the period June 2 to July 6, 1973. The period was selected to include the mayfly hatch, when fishing is considered to be at its best, and the census covered only the hours from 7 p.m. to 1 a.m. The purpose was to measure fishing pressure, catch, and quality during a period of heavy fishing as background information for possible changes in management. A questionnaire to anglers asked their opinion on whether fishing on the river was too congested, and whether fishing pressure should be reduced by further restrictive regulations. Anglers were required to come to a checking station to get a daily permit, and then return to the station to report on their fishing. Fishing was restricted to flies-only. The legal size was 10 inches on brown trout and 7 inches on brook trout.

During the 35 days of the census, 2,478 one-day permits were issued to 959 different persons, who spent 8,011 hours fishing. Average fishing trip was 3.23 hours; average rate of catch was 0.12 trout per hour. The total catch (fish in the creel) was 979 trout--267 brook trout (av. 8.7 inches) and 712 brown trout (av. 13.9 inches). The 8,011 hours of fishing took (a calculated) 14% of the legal size trout which were in the river during that period. A relatively few fishermen had the better rate of success, did most of the fishing, and caught most of the fish--which is typical of stream trout fishing.

In response to the opinion questionnaire, most fishermen said they were not bothered by other fishermen, and did not want a permit system for fishing on the river.

Introduction

A survey was conducted during June and July of 1973 on the South Branch Au Sable River, Mason Tract, Crawford County, Michigan, to obtain information on fishing and on the attitudes of anglers who fish there. The study was made to coincide with the hatch of burrowing mayflies (genera: Ephemera and Hexagenia, commonly referred to as "brown drakes" and "caddis"). During the past few years fisheries personnel have received many reports from anglers who felt that the river was being over used, resulting in poor fishing, and anglers generally dissatisfied. At least some of these anglers have suggested that the MDNR impose stringent regulations to limit angler use, particularly during the mayfly hatch. Fishery personnel felt that additional data were needed on angling pressure, on distribution of anglers, and on their attitudes, and that data on trout catch and fishing quality were needed, before judgments could be made on changing regulations.

The South Branch Au Sable has been fished under various special fishing rules since 1953. In effect during the 1973 season were: lure restricted to artificial fly, 5-trout creel limit, a 10-inch size limit on brown and rainbow trout, and a 7-inch size limit on brook trout.

Methods

The survey was begun June 2, 1973, and ended July 6, 1973. It covered fishing from 7 p.m. to 1 a.m., EDT. Anglers were required to obtain free permits daily from creel census checking stations located at the two ends of the stream section under study (see Fig. 1). The census was started on June 2 with a single checking station at Chase Bridge; to better serve the anglers, a second station was activated at Smith Bridge on June 14. Both were operated

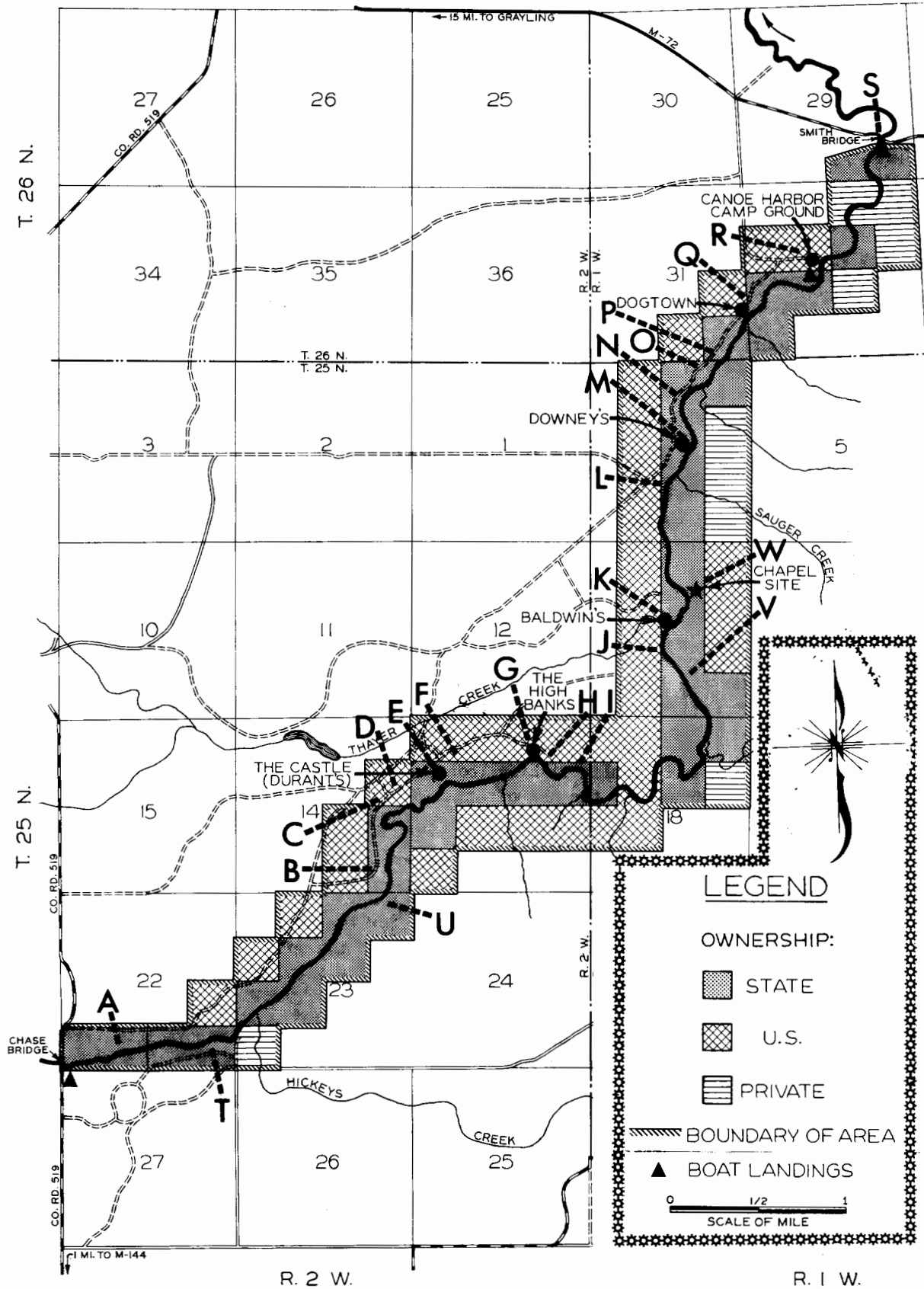


Figure 1. --South Branch of the Au Sable River, Crawford County. Stippled area is the Mason Tract. The two checking stations were at Chase Bridge and Smith Bridge. Letters A through W indicate locations where signs for fishermen were posted at parking areas.

through July 6. These checking stations were staffed from 6 p.m. to 2 a.m. Fishermen were required to wear a numbered arm band while fishing, hopefully to eliminate fishing without a permit. Furthermore, anglers were required to report the results of their fishing upon completion of the angling trip and all anglers were to report in at least by 2 a.m.

To assist anglers in reporting accurately, the entire stream within the Mason Tract (10.1 miles) was divided into 101 one-tenth-mile sub-sections. These sub-sections were posted with numbered signs, progressing downstream. In addition, the vehicle parking areas at access points were posted with lettered signs.

When anglers reported back to the checking station, upon completion of their angling trip, the station clerk recorded various fishery statistics: hours fished, area fished, fish caught, trout species and size creeled, type of fishing gear used, etc. In addition, anglers were asked to fill out a questionnaire concerning their views on the fishing.

DNR personnel made vehicle counts at regularly used access sites except the Canoe Harbor campground. Canoe Harbor was not counted because of much use by non-fishermen. The route traveled to count vehicles was made between 9 p.m. and midnight daily.

Angler Use of River

Angling pressure

A total of 2,478 permits were issued, each for an individual angler trip. Starting with June 14, with the two checking stations in operation, 39% of the permits were issued at the Smith Bridge station, and 61% at Chase Bridge. Some 959 different anglers (i.e., different persons) made these trips and they spent 8,011 hours fishing. The average trip lasted 3.23 hours, not including reported time between checking station and fishing site.

The vehicle count compared to angler
trips and hours recorded

The relationship between angling pressure and the vehicle counts made at river access points is shown in Table 1 and Figure 2. A strong correlation is evident ($r = 0.96$, $df = 33$). It appears that good estimates of fishing pressure could be obtained in the future by making vehicle counts and using the regression equation:

$$\text{Angler trips} = 3.8119 + 2.3283 (\text{vehicles})$$

Limits could be placed at about $\pm 15\%$ for daily estimates using the expression:

$$\pm(2.042 \times 10.704) \sqrt{.0286 + \frac{(28.7714 - \text{vehicles})^2}{74.60 - 1714}}$$

The location of access sites counted is shown in Figure 1 and described in Table 2. It is highly probable that access sites, both in number and location, will remain fairly constant in future years because of the prevailing management philosophy of non-development for the Mason Tract. It is possible, however, that a future change in the average number of anglers per vehicle might alter the relationships. The average number of anglers per vehicle in 1973 was 1.79.

Distribution of fishing pressure
along the stream course

The percentage distribution of total angler hours among the twenty 1/2-mile stream sections, and the proximity of fishing to landmarks are shown in Figure 3. Fishing pressure was somewhat higher at the High Banks, Castle, and Chase Bridge areas, but in general the angler effort was spread out fairly well over the entire stream course.

Table 1. --Vehicle counts at access sites compared with angler trips and total hours of fishing[↓] on the South Branch Au Sable River for each day from June 2 to July 6, 1973

| Date | Vehicle count | Angler trips | Total hours fished | Date | Vehicle counts | Angler trips | Total hours fished |
|------|---------------|--------------|--------------------|--------|----------------|--------------|--------------------|
| June | | | | June | | | |
| 2 | 22 | 42 | 102 | 23 | 64 | 159 | 622 |
| 3 | 7 | 11 | 24 | 24 | 52 | 131 | 478 |
| 4 | 5 | 24 | 67 | 25 | 54 | 139 | 521 |
| 5 | 7 | 28 | 80 | 26 | 26 | 58 | 147 |
| 6 | 4 | 25 | 66 | 27 | 48 | 114 | 348 |
| 7 | 10 | 33 | 92 | 28 | 32 | 81 | 258 |
| 8 | 10 | 40 | 103 | 29 | 31 | 78 | 248 |
| 9 | 22 | 43 | 151 | 30 | 43 | 114 | 398 |
| 10 | 26 | 51 | 170 | July 1 | 50 | 113 | 327 |
| 11 | 15 | 36 | 105 | 2 | 27 | 71 | 198 |
| 12 | 31 | 56 | 196 | 3 | 44 | 89 | 284 |
| 13 | 20 | 38 | 92 | 4 | 32 | 62 | 184 |
| 14 | 27 | 58 | 149 | 5 | 34 | 79 | 234 |
| 15 | 34 | 80 | 262 | 6 | 38 | 109 | 296 |
| 16 | 22 | 73 | 260 | | | | |
| 17 | 15 | 41 | 116 | | | | |
| 18 | 25 | 55 | 158 | | | | |
| 19 | 29 | 71 | 218 | | | | |
| 20 | 27 | 66 | 249 | | | | |
| 21 | 40 | 111 | 392 | | | | |
| 22 | 34 | 99 | 416 | Total | 1,007 | 2,478 | 8,011 |

[↓] The angling records (numbers of anglers and hours) are for only part of the day, from 7 p. m. to 1 a. m.

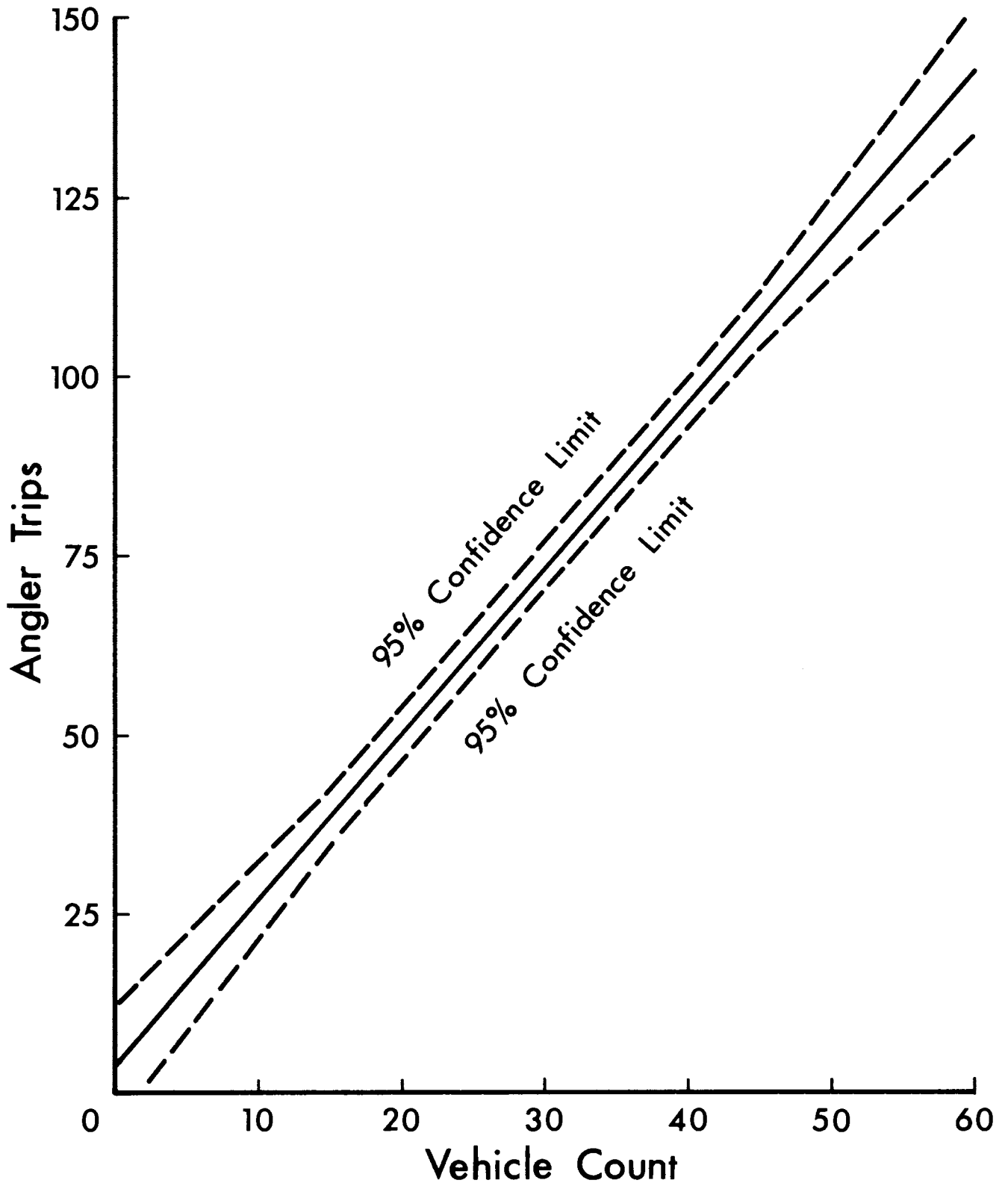


Figure 2. --Relationship between angler trips and vehicle counts at access sites on South Branch Au Sable River, June 2 to July 6, 1973.

Table 2. --Twenty-three locations of signs for anglers at parking areas on the South Branch Au Sable River, Crawford County, Michigan

(See also Fig. 1. Sign locations identified by letter, A-W)

North side of river:

- A. 1/2 mile below Chase Bridge
- B. Second trail road below Chase Bridge
- C. Hard to find
- D. West end of airport
- E. Castle
- F. East end of airport
- G. High Banks
- H. Below High Banks on same road
- I. End of High Banks road
- J. Between Baldwins and High Banks
- K. Baldwins
- L. High rollaway between Baldwins and Downeys
- M. Downeys, west end
- N. Downeys, middle parking area
- O. Downeys, lower end of parking lot
- P. Between Downeys and Dog Town
- Q. Dog Town
- R. Canoe Harbor
- S. Smith Bridge

South side of river:

- T. Forest Rest
 - U. End of Peterson Road, or Daisy Bend
 - V. First Y in road leading to the chapel
 - W. Chapel parking lot
-

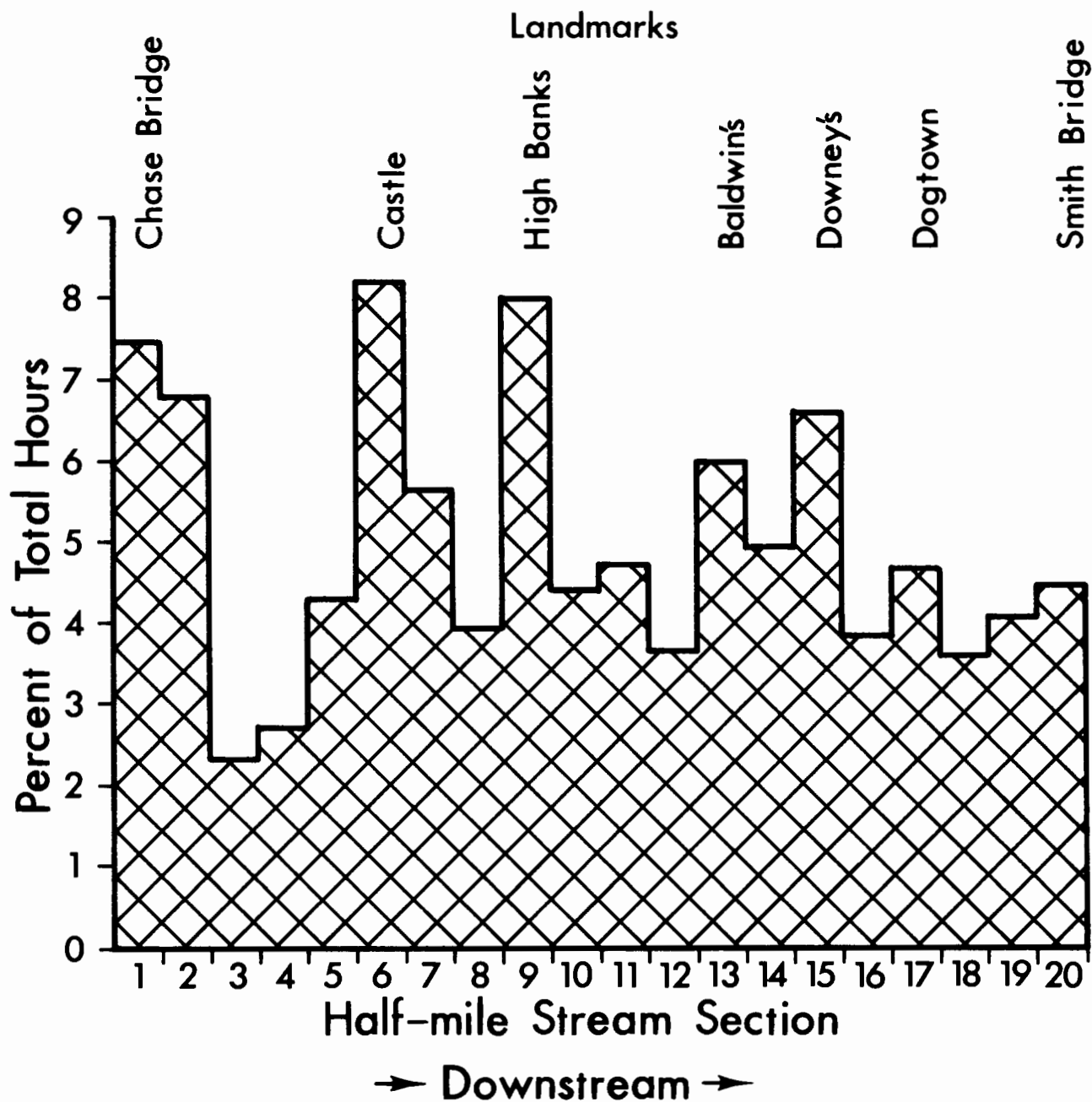


Figure 3. --Percentage distribution of total angler hours among the 20 half-mile sections of South Branch Au Sable River, Mason Tract, June 2 to July 6, 1973. Note that locations of landmarks (above) coincide with peaks of fishing pressure.

A correlation test was made comparing the daily vehicle counts made at access sites by the MDNR, with access sites used by the anglers as reported on their questionnaires. Good agreement was found ($r = 0.79$, $df = 20$) indicating accurate reporting and good cooperation by the anglers.

Distribution of fishing pressure
by time of day

The percentage of the hours fished within various time strata is given in Table 3. Fishing activity peaked between 9 and 10 p.m., or the first hour after dark. Only 3% of the fishing occurred after midnight.

Number of trips made per angler

Table 4 summarizes the information on trip frequency for individual anglers. Single-trip anglers numbered 488 and accounted for only 20% of the total trips fished. In contrast, 35 anglers who made 10 trips or more accounted for 19% of the total fishing. Forty-five percent of the effort was expended by 134 individual anglers, each making 5 trips or more.

Residence of anglers

A summary of angler residence by county in Michigan, and by state or country for non-residents, is given in Table 5. Michigan residents came mainly from the counties of southeastern lower Michigan, and the local counties of Roscommon and Crawford. Out-of-staters accounted for 9.4% of the angler trips.

Fishing methods

Of 2,478 trips only 8 were recorded as fishing from boats or canoes, and 3 anglers fished from shore; thus most angling was done by wading the stream. Anglers used the fly rod on all but 4

Table 3. --Percentage distribution of total angling hours during the evening period from 7 p.m. to 1 a.m. among six one-hour time strata, on South Branch Au Sable River, June 2 to July 6, 1973

| Time strata, EDT | Percentage |
|------------------|------------|
| 7 p.m. - 8 p.m. | 12 |
| 8 p.m. - 9 p.m. | 21 |
| 9 p.m. -10 p.m. | 28 |
| 10 p.m. -11 p.m. | 24 |
| 11 p.m. -12 p.m. | 12 |
| 12 p.m. - 1 a.m. | 3 |

Table 4. --Number of fishing trips made by individual anglers on the South Branch Au Sable River, during evening hours (7 p.m. -1 a.m.) only, June 2 to July 6, 1973

| Trips per angler | Individual anglers | Total trips | Trips per angler | Individual anglers | Total trips |
|------------------|--------------------|-------------|------------------|--------------------|-------------|
| 1 | 488 | 488 | 15 | 2 | 30 |
| 2 | 197 | 394 | 16 | 2 | 32 |
| 3 | 88 | 264 | 17 | 1 | 17 |
| 4 | 52 | 208 | 18 | -- | -- |
| 5 | 29 | 145 | 19 | -- | -- |
| 6 | 28 | 168 | 20 | -- | -- |
| 7 | 13 | 91 | 21 | 1 | 21 |
| 8 | 17 | 136 | 22 | -- | -- |
| 9 | 12 | 108 | 23 | -- | -- |
| 10 | 10 | 100 | 24 | 1 | 24 |
| 11 | 4 | 44 | 25 | -- | -- |
| 12 | 3 | 36 | 26 | 2 | 52 |
| 13 | 6 | 78 | | | |
| 14 | 3 | 42 | | | |
| | | | Total | 959 | 2,478 |

Table 5. --Angler trips on South Branch Au Sable River, 7 p. m. to 1 a. m., June 2 to July 6, 1973, analyzed by residence of anglers as to counties in Michigan and states outside of Michigan

| Residents of Michigan | | Out-of-state | | | |
|-----------------------|-----------------|--------------|-----------------|--------------|-----------------|
| County | Number of trips | County | Number of trips | State | Number of trips |
| Roscommon | 421 | Lapeer | 12 | Ohio | 92 |
| Saginaw | 314 | Presque Isle | 12 | Illinois | 48 |
| Oakland | 289 | Calhoun | 11 | Pennsylvania | 29 |
| Bay | 160 | Wexford | 9 | Indiana | 25 |
| Midland | 147 | Gd. Traverse | 7 | California | 8 |
| Wayne | 129 | Montcalm | 7 | Missouri | 5 |
| Genesee | 108 | Alpena | 6 | Wisconsin | 4 |
| Washtenaw | 66 | Shiawassee | 6 | Arizona | 3 |
| St. Clair | 63 | Huron | 5 | Florida | 3 |
| Ingham | 60 | Jackson | 5 | Kansas | 3 |
| Macomb | 60 | Livingston | 5 | Minnesota | 3 |
| Crawford | 59 | Montmorency | 5 | Connecticut | 2 |
| Clinton | 28 | Charlevoix | 4 | N. Carolina | 2 |
| Gratiot | 27 | Houghton | 4 | Virginia | 2 |
| Tuscola | 25 | Lenawee | 4 | Nebraska | 1 |
| Mecosta | 24 | Osceola | 4 | New Jersey | 1 |
| Iosco | 24 | Alcona | 3 | Canada | 1 |
| Kalamazoo | 19 | Chippewa | 2 | | |
| Kent | 19 | Ionia | 2 | Total non- | |
| Ogemaw | 18 | Newaygo | 2 | resident | 232 |
| Eaton | 15 | Allegan | 1 | Total | |
| Monroe | 15 | Arenac | 1 | resident | 2, 246 |
| Ottawa | 13 | Gladwin | 1 | | |
| Clare | 12 | Missaukee | 1 | Grand | |
| Isabella | 12 | | | total | 2, 478 |
| | | Total | 2, 246 | | |

angler trips; the latter used spinning rods. Anglers were rather vague in reporting what flies they used for fishing; some 89% used dry flies and 11% used wet flies.

Results of Fishing

Catch

Anglers creeled 267 brook trout and 712 brown trout for a total catch of 979. Brook trout averaged 8.7 inches long and 0.28 pound; brown trout averaged 13.9 inches total length and 1.10 pounds.

The length distribution of trout creeled, and relative numbers by size category, are given in Table 6. The largest brook trout taken was 14.2 inches long and weighed 1.50 pounds. The largest brown trout was 25.8 inches and weighed 6.13 pounds.

Angler success

Anglers fished 8,011 hours to creel 979 trout, for an average catch of 0.12 trout per hour. This means 8 1/2 hours of angling to creel a trout.

Many studies have shown that catch per hour varies widely among individual anglers. Fishermen on the South Branch Au Sable proved to be no exception. Anglers who said they fished the river 20 times or more over the previous two years had catch rates (during this study) which averaged 0.16 trout per hour. This was 33% better than the catch (0.12) of those who said they had fished 6 to 19 times, and 100% better than the catch (0.08) of those who had fished 0 to 5 times. Either "the more you fish, the better you get," or "the better you are, the more you fish!"

The total number of trout caught and the catch of trout per hour are given for each day in Table 7. The total daily catch improved considerably starting about June 9, which coincides with

Table 6.--The length distribution of trout (number of fish) creeled by anglers in the South Branch Au Sable River, during the period from June 2 to July 6, 1973

| Inch group [↓] | Brown trout | Brook trout | All trout |
|-------------------------|-------------|-------------|-----------|
| 7 | -- | 78 | 78 |
| 8 | -- | 100 | 100 |
| 9 | -- | 48 | 48 |
| 10 | 53 | 18 | 71 |
| 11 | 88 | 13 | 101 |
| 12 | 132 | 7 | 139 |
| 13 | 119 | 2 | 121 |
| 14 | 101 | 1 | 102 |
| 15 | 93 | -- | 93 |
| 16 | 61 | -- | 61 |
| 17 | 37 | -- | 37 |
| 18 | 14 | -- | 14 |
| 19 | 4 | -- | 4 |
| 20 | 6 | -- | 6 |
| 21 | 2 | -- | 2 |
| 22 | 1 | -- | 1 |
| 23 | -- | -- | -- |
| 24 | -- | -- | -- |
| 25 | 1 | -- | 1 |
| Total | 712 | 267 | 979 |

[↓] Figure given is the lower limit of a 1-inch interval; e. g., 7 represents 7.0-7.9, etc.

Table 7. --The daily catch and catch per hour of trout creeled by anglers in the South Branch Au Sable River, during the evening period from June 2 to July 6, 1973

| Date | Total hours fished by all anglers | Number of trout caught | | | Catch per hour | | |
|--------|---|---------------------------|----------------|--------------|----------------|----------------|--------------|
| | | Brown trout | Brook trout | All trout | Brown trout | Brook trout | All trout |
| June | | | | | | | |
| 2 | 102 | 3 | 5 | 8 | 0.03 | 0.05 | 0.08 |
| 3 | 24 | 1 | 2 | 3 | 0.04 | 0.08 | 0.12 |
| 4 | 67 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 |
| 5 | 80 | 5 | 2 | 7 | 0.06 | 0.02 | 0.09 |
| 6 | 66 | 2 | 1 | 3 | 0.03 | 0.02 | 0.05 |
| 7 | 92 | 4 | 3 | 7 | 0.04 | 0.03 | 0.08 |
| 8 | 103 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 |
| 9 | 151 | 19 | 4 | 23 | 0.13 | 0.03 | 0.15 |
| 10 | 170 | 38 | 11 | 49 | 0.22 | 0.06 | 0.29 |
| 11 | 105 | 16 | 2 | 18 | 0.15 | 0.02 | 0.17 |
| 12 | 196 | 20 | 19 | 39 | 0.10 | 0.10 | 0.20 |
| 13 | 92 | 7 | 10 | 17 | 0.08 | 0.11 | 0.18 |
| 14 | 149 | 9 | 25 | 34 | 0.06 | 0.17 | 0.23 |
| 15 | 262 | 7 | 14 | 21 | 0.03 | 0.05 | 0.08 |
| 16 | 260 | 11 | 14 | 25 | 0.04 | 0.05 | 0.10 |
| 17 | 116 | 8 | 6 | 14 | 0.07 | 0.05 | 0.12 |
| 18 | 158 | 2 | 8 | 10 | 0.01 | 0.05 | 0.06 |
| 19 | 218 | 13 | 4 | 17 | 0.06 | 0.02 | 0.08 |
| 20 | 249 | 37 | 10 | 47 | 0.15 | 0.04 | 0.19 |
| 21 | 392 | 34 | 10 | 44 | 0.09 | 0.03 | 0.11 |
| 22 | 416 | 80 | 9 | 89 | 0.19 | 0.02 | 0.21 |
| 23 | 622 | 32 | 6 | 38 | 0.05 | 0.01 | 0.06 |
| 24 | 478 | 60 | 15 | 75 | 0.13 | 0.03 | 0.16 |
| 25 | 521 | 41 | 22 | 63 | 0.08 | 0.04 | 0.12 |
| 26 | 147 | 14 | 0 | 14 | 0.09 | 0.00 | 0.09 |
| 27 | 348 | 48 | 5 | 53 | 0.14 | 0.01 | 0.15 |
| 28 | 258 | 30 | 5 | 35 | 0.12 | 0.02 | 0.14 |
| 29 | 248 | 5 | 0 | 5 | 0.02 | 0.00 | 0.02 |
| 30 | 398 | 37 | 7 | 44 | 0.09 | 0.02 | 0.11 |
| July 1 | 327 | 22 | 12 | 34 | 0.07 | 0.04 | 0.10 |
| 2 | 198 | 16 | 1 | 17 | 0.08 | 0.01 | 0.09 |
| 3 | 284 | 28 | 16 | 44 | 0.10 | 0.06 | 0.16 |
| 4 | 184 | 10 | 6 | 16 | 0.05 | 0.03 | 0.09 |
| 5 | 234 | 38 | 12 | 50 | 0.16 | 0.05 | 0.21 |
| 6 | 296 | 15 | 1 | 16 | 0.05 | 0.00 | 0.05 |
| Total | 8,011 | 712 | 267 | 979 | 0.09 | 0.03 | 0.12 |

the start of the Ephemera hatch. The good fishing continued at this higher level through the Hexagenia hatch. Of special interest is the fact that the higher daily catches were not reflected in a higher catch per hour. I ran a test comparing the total daily catch with total hours fished each day, and found a high correlation ($r = 0.74$, $df = 33$). Apparently, as fishing gets better, more people show up to fish, and the result is a relatively stable catch per hour.

At least one trout was creeled on 23% of the angler trips. Taking a different approach, of the 959 different persons fishing the river in the evening during the study period, 303 or 32% of them were successful in creeling one or more trout, whereas two-thirds of them got "shut out." A more detailed breakdown of the distribution among anglers of trout creeled is given in Table 8. The "top" angler creeled 34 trout or 3.5% of the total catch made during the period; the 5 most successful anglers accounted for 10.3% of the catch, and the top 24 anglers took 31.2% of the catch.

Comparison of 1973 with 1960-63 Census Data

During the 1960, 1961, 1962, and 1963 trout seasons, the Fisheries Division conducted a stratified, random-type creel census on the South Branch Au Sable River for angling effort and trout catch (Alexander and Shetter, 1967). From this earlier census, I sorted out information that pertained to the second quarter of the trout season, and for the evening time strata (6 p.m. to 11 p.m., EST), so that comparisons might be made with data of the present study. The June 2-July 6 strata censused this year corresponds with the second quarter of the trout season in the 1960-63 census. This year's time stratum, 7 p.m. to 1 a.m., EDT, differs only by the one extra hour (12 midnight to 1 a.m. EDT) when compared to the period surveyed in 1960-63. During this year's survey, only 3% of the fishing

Table 8. --Distribution among 959 anglers, of 979 trout creeled on the South Branch Au Sable River, during evening hours, June 2 to July 6, 1973

| Number of trout caught | Anglers catching trout | Total trout caught |
|------------------------|------------------------|--------------------|
| 0 | 656 | 0 |
| 1 | 113 | 113 |
| 2 | 68 | 136 |
| 3 | 39 | 117 |
| 4 | 22 | 88 |
| 5 | 10 | 50 |
| 6 | 19 | 114 |
| 7 | 8 | 56 |
| 8 | 5 | 40 |
| 9 | 3 | 27 |
| 10 | 2 | 20 |
| 11 | 1 | 11 |
| 12 | 2 | 24 |
| 13 | 2 | 26 |
| 14 | 4 | 56 |
| 15 | 1 | 15 |
| 16 | -- | -- |
| 17 | 2 | 34 |
| 18 | 1 | 18 |
| -- | -- | -- |
| 34 | 1 | 34 |
| Total | 959 | 979 |

occurred during this last hour of the stratum; thus the time intervals of the census were basically the same during the two periods. The 1960-63 census covered 16.1 miles of the river, compared to the 10.1 miles censused this year. Thus, only 63% of the values for angling pressure and trout catch in 1960-63 were used to compare with this year's results. The assumption is made that fishing effort and catch were uniform over the river in 1960-63, which to me seems not unreasonable.

Table 9 gives angling pressure, catch, and catch rate for the South Branch of the Au Sable River in the Mason Tract during 1973 compared to 1960-63; the figures for 1960-63 are corrected for comparable stream mileage. It appears that significant changes have occurred in fishing pressure and catch per hour. Hours fished in 1973 were up nearly two-fold, during which there was a corresponding drop in catch rate to about half the former level, and a total catch of about the same number for trout over 10 inches long. In other words, the total catch of trout over 10 inches held up, but catch per hour declined in proportion to the increase in fishing pressure.

The amount of fishing from boats and canoes might have been reduced in 1973 due to the permit requirement. Angling from boats and canoes during the burrowing mayfly hatch usually accounts for only a minor fraction of the fishing. Whereas we recorded some 52 angling trips by boat or canoe in the 1960-63 census, only 8 such trips were recorded in the 1973 census period. The permit and reporting requirement imposed in 1973 was more inconvenient for boat and canoe fishermen than for others; thus they may have elected to fish elsewhere.

Brown trout in the creel averaged 13.1 inches long in 1960-63, compared to 13.9 inches during 1973; this seems to be a fairly significant increase, and suffice to say, the size of brown trout did not decrease much during the last decade.

Table 9. --Angling pressure, catch,¹ and catch rate (with confidence limits) on the South Branch Au Sable River, Mason Tract, during the burrowing mayfly hatch in 1973, and a comparable period in 1960-63

| | 1960-63 | 1973 |
|----------------|--|---|
| | Size limit: 10-inch on all trout | Size limit: 10-inch on brown; 7-inch on brook |
| Total hours | 4, 207 ± 1, 090 | 8, 011 |
| Catch | | |
| Total | 740 ± 250 | 979 |
| > 10 inch | 740 ± 250 | 753 |
| Catch per hour | | |
| Total | .177 ± .056 | .122 |
| > 10 inch | .177 ± .056 | .094 |

¹ The creel limit was 5 trout per day during both periods.

The catch of all trout during the survey period in 1973 amounted to 10.6 trout per acre. By species, this was 7.7 brown trout and 2.9 brook trout. Population estimates of legal size trout remaining in the river in the fall (of 1972 and 1973) showed an average standing crop of 37.4 trout per acre, consisting of 28.5 brown trout and 8.9 brook trout. In the 1960-63 study it was determined that 23.9% of all fishing hours, and 28.6% of the season's catch, occurred during the time of the burrowing mayfly hatch (June 2 to July 6 in 1973). If we assume that these relationships still held for 1973, then the 1973 season's catch can be estimated at 37.1 legal trout per acre. And, in a next step, if we estimate angler exploitation by the formula:

$$\text{Exploitation (\%)} = \frac{\text{Total catch}}{\text{Total catch} + \text{Fall standing crop}}$$

we arrive at the conclusions that during the entire season, anglers on the South Branch caught 50% of the legal size trout that were available; furthermore that fishing during the present study in 1973 (evening, June 2 to July 6) took 14% of the available legal trout in the river. These rough estimates are not broken down further by species, because hatchery trout plantings (Mason gift) complicate the interpretations. For several years the Mason gift plants have consisted of about 1,000 to 1,200 legal size trout, but in 1972-73 the planted fish were either very large, or they were sublegal in size, and neither group was generally available to the anglers in June of 1973. During the 1961 census, 28% of the catch was composed of fin-clipped hatchery trout, and in 1962 it was 33%. In 1973 the catch was almost entirely of wild fish.

Questionnaire Results

A copy of the angler questionnaire is given as Figure 4. Responses to questions 5 through 10 were as follows:

Question 5. --How many times have you fished the Mason Tract of the South Branch during the past two years? Nine percent of the anglers said none, 27% fished 1-5 times, 24% fished 6-20 times, and 40% fished more than 20 times.

Question 6. --Was there a fly hatch on your stretch of water tonight? Thirty-seven percent of the anglers reported no hatch; whereas hatches were noted by 63% of the fishermen. Most anglers did not answer the second part of the question pertaining to hatch intensity or type of mayfly.

Question 7. --Did the trout rise to them? Apparently anglers did not know whether trout were rising to mayflies or not; thus most anglers did not answer the question.

Question 8. --Did other fishermen disrupt your fishing? Most anglers answered this question and the vast majority, 85%, said not at all; 14% indicated a little; and only 1% said their fishing was spoiled.

Question 9. --Regulations to reduce pressure during June and early July on the South Branch are being considered. To do this would mean that fishing would be by permit only. Which of the following would you prefer? Twelve percent of the anglers said they wanted fishing reduced by one-half, 3% wanted it cut by three-fourths, whereas 85% said they wanted no permits; just leave things as they are!

Question 10. --If you prefer less fishing pressure through a permit system, which one of the following systems sounds best? The majority of anglers did not answer this question, because in the previous question they indicated that they wanted no change. A minority of anglers who said they wanted less fishing pressure

Trout Fisherman Questionnaire
South Branch Au Sable River

1. Name _____ 2. Date _____
3. Number of persons in your party _____
4. Area fished (see map) _____
5. How many times have you fished the Mason Tract of the South Branch during the past two years? Check (X)
None ____ 1-5 times ____ 6-20 times ____ More than 20 ____
6. Was there a fly hatch on your stretch of water tonight: Check (X)
No ____ Yes ____ How heavy was the hatch? Light Medium Heavy
"Caddis" (Giant Mayfly) ____ ____ ____
Brown drake ____ ____ ____
7. Did trout rise to them? None ____ Few ____ Many ____
8. Did other fishermen disrupt your fishing? Check one (X)
Not at all ____ A little ____ Spoiled fishing ____
9. Regulations to reduce pressure during June and early July on the South Branch are being considered. To do this would mean that fishing would be by permit only. Which of the following would you prefer: Check one (X)
() Cut fishing pressure by 1/2 during this time.
() Cut fishing pressure by 3/4 during this time.
() Leave things as they are--no permits.
10. If you prefer less fishing pressure through a permit system, which one of the following systems sounds best? Check one (X)
() Issue a fixed number of permits each day at Roscommon by drawing fishermen's names out of a hat. "Winners" in drawings might be limited to a certain number of permits per year.
() Issue a fixed number of permits at Roscommon each day on a first come, first served basis.
() Issue 1/2 permits by an advance drawing of mailed applications and remainder by a daily drawing in Roscommon. "Winners" in drawings might be limited to a certain number of permits per year.

Figure 4. --Questionnaire filled out by trout fishermen on South Branch Au Sable River, Mason Tract, during June 2 to July 6, 1973.

responded as follows: 59% proposed to issue a fixed number of permits at Roscommon each day on a first-come, first-served basis; 32% wanted half the permits issued by advance drawing of mailed applications and the remainder by a daily drawing in Roscommon; the other 9% would issue a fixed number of permits each day at Roscommon by drawing fishermen's names out of a hat.

Some anglers made comments like: why issue permits from Roscommon only? Why not from Grayling, Mio, at a river checking station, etc?

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Literature Cited

Alexander, Gaylord R., and David S. Shetter. 1967. Fishing and boating on portions of the Au Sable River in Michigan, 1960-63. Trans. Amer. Fish. Soc., 96: 257-267.

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