

P/FR/SK/41
HATLEVIK, S. P.
CREEL SURVEY OF HELENE
LAKE: JULY, 1982
CQJI c. 1 mm SMITHERS

A CREEL SURVEY OF
HELENE LAKE
July, 1982

by

S.P. Hatlevik

British Columbia Ministry of Environment
Fisheries Branch
Smithers, B.C.

Skeena Fisheries Report No. 82-03

INTRODUCTION

Helene Lake, barren until stocked with hatchery-reared rainbow trout in 1980, was opened to sport fishing in June, 1982. A creel census was conducted during July, 1982 to provide angler-use and catch information, and to establish some baseline data with which future information could be compared.

This report summarizes the results of this creel census and provides details of age and growth of rainbow trout stocked in a barren lake.

BACKGROUND AND DESCRIPTION OF STUDY AREA

Helene Lake ($54^{\circ} 17'$; $125^{\circ} 02'$) is located about 45 kilometers ENE in a straight line from Burns Lake. It is easily accessible by a forest development road and is about 65 kilometers driving distance from Burns Lake (Figure 1). It covers an area of 170 hectares (420 acres), has a mean depth of 9.7 meters (32 feet) and a maximum depth of 20.1 meters (66 feet). There are no permanent inlet streams (Burns and Tredger, 1974). The lake is drained by Helene Creek which flows about 10 kilometers into Taltapin Lake which in turn drains into the Babine Lake watershed. Until 1980, Helene Lake was devoid of fish.

An impassable waterfall is located on Helene Creek about 3 kilometers downstream from the lake. It is suspected that this barrier

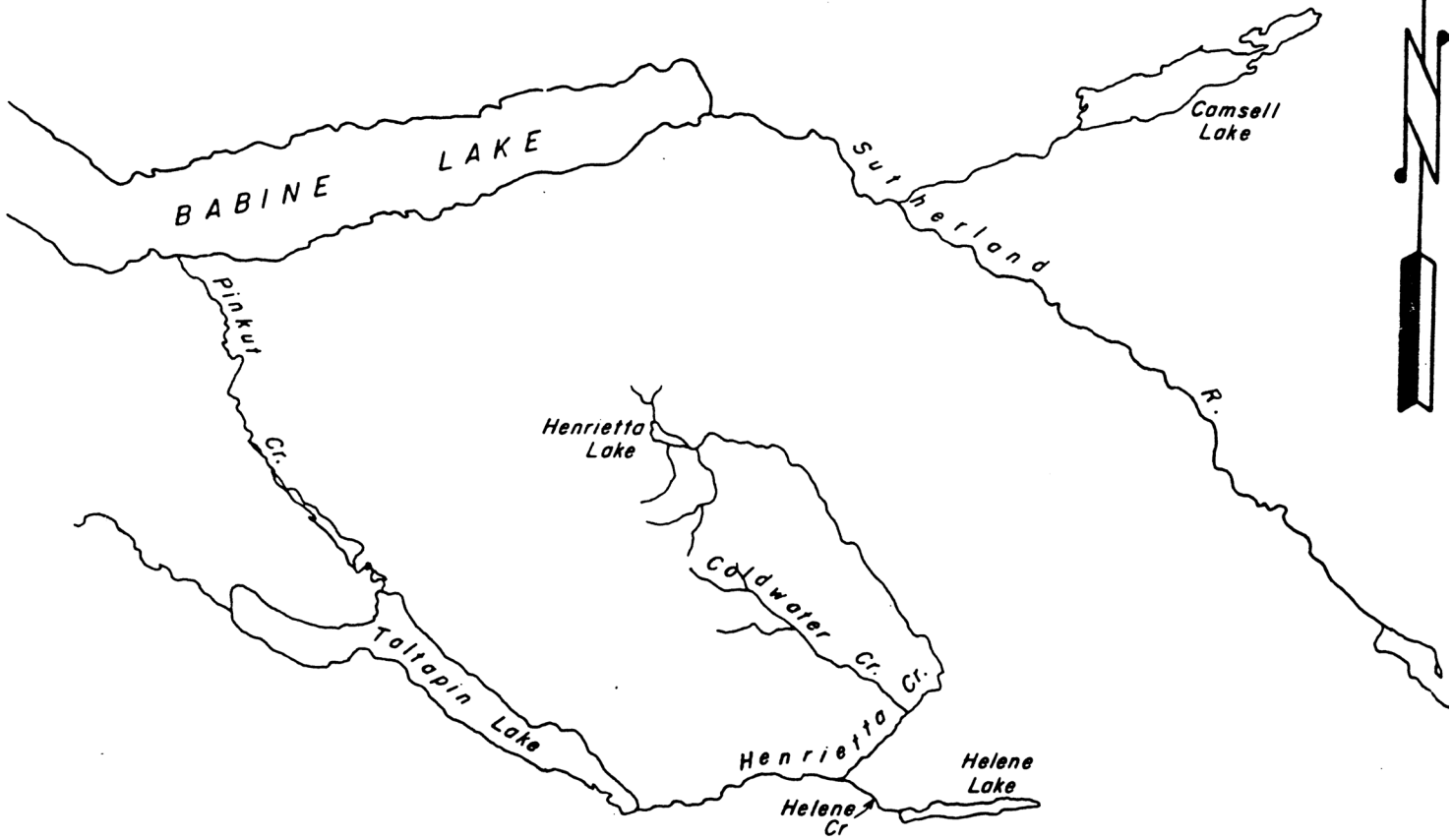
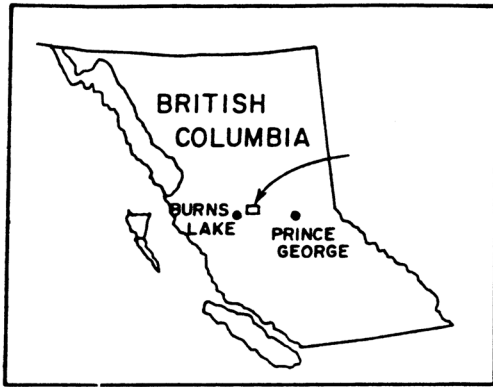


Fig. 1 HELENE LAKE WATERSHED

prevented colonization of Helene Lake by fish of the Taltapin Lake system, into which Helene Creek flows. The B.C. Fish and Wildlife Branch began a stocking program in the fall of 1980, with 50,000 rainbow trout. In the fall of 1982, the Branch planted an additional 35,000 rainbow trout. These were outlet spawner progeny.

Helene Creek, the outlet of Helene Lake, provided the only source of potential spawning habitat in this system. It was of very poor quality and quite limited in extent. In the summer of 1982, artificial spawning platforms were constructed in this creek for a distance of 210 meters downstream from the lake. It was hoped that the stocked rainbows, of which many were due to mature and spawn in the spring of 1983, would utilize this area. This would provide some fry recruitment, and hopefully reduce the annual stocking requirements. The project was funded by the Habitat Conservation Fund.

Angling Regulations in effect during the creel census were: 5 fish daily limit and 10 in possession, including no more than 2 fish over 50 cm (4 in possession).

METHODS

Creel census data were obtained from Helene Lake anglers between July 1 and July 29, 1982. Two Fish and Wildlife personnel interviewed anglers in their boats and on shore. A record was kept of place of residence, number of hours angled, number of fish killed and released, and primary tackle used. Lengths, weights and sex of killed fish were recorded. Only a few scale samples were taken, as the age of the

stocked fish was known. Miscellaneous comments such as surface water conditions and weather were also noted. Anglers were interviewed during 5 of the possible 10 weekend days (including statutory holidays) and 10 of the possible 21 weekdays.

RESULTS

Angler Effort and Success

A total of 97 angling parties comprised of 252 anglers were interviewed by creel census personnel on Helene Lake between July 1 and July 29, 1982 (Table 1). They fished a total of 929 angler-hours and caught 877 rainbow trout for an average catch of .94 fish per angler-hour. Of the total catch, 613 trout (70%) were killed. In terms of angler-days, it is calculated that the total angler effort was 252 angler-days, with an average catch of 3.48 fish per angler-day.

These data include angling results of the creel survey personnel. They angled a total of 120 hours, caught 256 fish, of which 18 (7%) were killed, for an average catch per angler hour of 2.13 fish. An exclusion of their data results in an effort of 809 angler-hours with a total catch of 621 fish, of which 595 (96%) were killed. The success rate is reduced to .77 fish per angler-hour.

Total angler effort for July was estimated to be 1900 angler-hours (or 514 angler-days) with a total catch of 1794 fish, of which 1246 were killed (Table 2). Extrapolating to a full season fishery (June to October) the results indicate an angler effort of 9,500 angler-hours (1260 angler-days) and a catch of 8970 fish, of which 6230 were killed. The success ratio would still be .94 fish per angler hour or 3.48 fish per angler-day.

Table 1. Daily catch statistics for anglers on Helene Lake during July, 1982.

| July Date | No. of Parties | No. of Anglers ¹ | No. of Angler Hours | No. of Rainbow Killed | No. of Rainbow Released | Total Catch | Catch per Angler Hour | Catch per Angler Day ¹ |
|-----------|----------------|-----------------------------|---------------------|-----------------------|-------------------------|-------------|-----------------------|-----------------------------------|
| 1 | 20 | 57 | 207 | 166 | 29 | 195 | .94 | 3.42 |
| 3 | 7 | 14 | 50.5 | 34 | 15 | 49 | .97 | 3.50 |
| 8 | 10 | 28 | 139.75 | 94 | 42 | 136 | .97 | 4.86 |
| 9 | 4 | 9 | 36 | 28 | 5 | 33 | .92 | 3.67 |
| 14 | 2 | 5 | 9.5 | 0 | 4 | 4 | .42 | 0.80 |
| 15 | 7 | 16 | 33 | 18 | 15 | 33 | 1.00 | 2.06 |
| 16 | 4 | 7 | 21 | 4 | 30 | 34 | 1.62 | 4.86 |
| 17 | 15 | 36 | 114 | 92 | 23 | 115 | 1.01 | 3.19 |
| 18 | 10 | 28 | 95.5 | 64 | 1 | 65 | .68 | 2.32 |
| 22 | 1 | 2 | 12 | 7 | 0 | 7 | .58 | 3.50 |
| 23 | 3 | 8 | 44 | 17 | 20 | 37 | .84 | 4.63 |
| 24 | 6 | 17 | 52 | 54 | 4 | 58 | 1.12 | 3.41 |
| 27 | 2 | 5 | 32 | 2 | 38 | 40 | 1.25 | 8.00 |
| 28 | 3 | 9 | 32 | 20 | 27 | 47 | 1.47 | 5.22 |
| 29 | 3 | 11 | 51 | 13 | 11 | 24 | .47 | 2.18 |
| | 97 | 252 | 929 | 613 | 264 | 877 | .94 | 3.48 |

¹ No. of anglers = No. angler days

Table 2. Projected estimates of angler effort and catch on Helene Lake for the month of July, 1982.

A. WEEK-END DAYS

| July Date | No. of Anglers | No. of Angler Hours | No. of Rainbow killed | No. of Rainbow Released | Total Catch |
|--------------|----------------|---------------------|-----------------------|-------------------------|-------------|
| 1 | 57 | 207 | 166 | 29 | 195 |
| 3 | 14 | 50.5 | 34 | 15 | 49 |
| 17 | 36 | 114 | 92 | 23 | 115 |
| 18 | 28 | 95.5 | 64 | 1 | 65 |
| 24 | 17 | 52 | 54 | 4 | 58 |
| July Total | 152 | 519.0 | 410 | 72 | 482 |
| Season Total | 304 | 1038 | 820 | 144 | 964 |

B. WEEK DAYS

| July Date | No. of Anglers | No. of Angler Hours | No. of Rainbow Killed | No. of Rainbow Released | Total Catch |
|---------------------|----------------|---------------------|-----------------------|-------------------------|-------------|
| 8 | 28 | 139.75 | 94 | 42 | 136 |
| 9 | 9 | 36 | 28 | 5 | 33 |
| 14 | 5 | 9.50 | 0 | 4 | 4 |
| 15 | 16 | 33 | 18 | 15 | 33 |
| 16 | 7 | 21 | 4 | 30 | 34 |
| 22 | 2 | 12 | 7 | 0 | 7 |
| 23 | 8 | 44 | 17 | 20 | 37 |
| 27 | 5 | 32 | 2 | 38 | 40 |
| 28 | 9 | 32 | 20 | 27 | 47 |
| 29 | 11 | 51 | 13 | 11 | 24 |
| July Total | 100 | 410.25 | 203 | 192 | 395 |
| Season Total | 210 | 861.5 | 426 | 403 | 830 |
| Grand season totals | 1514 | 1900 | 1246 | 547 | 1794 |

Angler Origin and Tackle Preference

Of the 252 anglers interviewed, 160 (63%) were local residents, 77 (31%) were residents of British Columbia, and 15 (6%) were non-residents of British Columbia.

From Table 3, it can be seen that the most frequently used terminal tackle was a "combination", which accounted for 296 angler-hours, or 32% of the total effort. The term "combination" was attributed to those anglers who tried many tackle types and to whom it would have been virtually impossible to allocate number of hours angled or number of fish caught for each classification of tackle used.

Of the anglers who could specify a particular gear type, fly fishermen were the most numerous in the census, accounting for 167 angler-hours (18% of total effort). Anglers using lures with bait were the most successful, accounting for 362 fish (41% of the total catch) and a catch per angler-hour of 1.46. Lures were the least productive type of terminal tackle - accounting for 111 fish (13%) of the total catch and catch per angler-hour of .51.

Table 3. Angler effort and catch by different terminal tackle on Helene Lake, July 1-29, 1982.

| | Lure | Lure & Bait | Fly | Combination | Total |
|--------------------------|---------|----------------|---------|-------------|----------------|
| Angler Hours (%) | 218(23) | 248(27) | 167(18) | 296(32) | 929(100) |
| Total Catch (%) | 111(13) | 362(41) | 164(19) | 240(27) | 877(100) |
| Catch per Angler-Hour | 0.51 | 1.46 | 0.98 | 0.81 | $\bar{x}=0.94$ |

Rainbow Trout Life History

All of the fish caught were liberated into Helene Lake in October, 1980 at the age of four months. When this survey was conducted in July, 1982, they were two years of age. Scale samples were taken from sixty-three fish, and kept for future reference.

Of the 613 fish killed, lengths, weights and sex were obtained from a sub-sample of 364 rainbows. These fish ranged in length from 25 cm to 47 cm. About 42.4% of these fish were within the 35.0 to 39.9 cm length class (Table 4). For the females, the minimum length was 25.0 cm, the maximum length was 47.0 cm and the average length was 36.0 cm. For the males, the minimum length was 27.0 cm, the maximum length 44.0 cm, and the average length 35.8 cm. The sub-sample was comprised of 134 males and 230 females, for a sex ratio of 1 male to 1.7 females.

Table 4. Length - frequency distribution of angler caught Rainbow Trout from Helene Lake, July 1-29, 1982.

| Length (cm) | Males | | Females | | Combined Sexes | |
|----------------|-------|-------|---------|-------|----------------|-------|
| | No. | % | No. | % | No. | % |
| 25 - 29.9 | 7 | 5.2 | 16 | 7.0 | 23 | 6.3 |
| 30 - 34.5 | 44 | 32.8 | 65 | 28.3 | 109 | 29.9 |
| 35 - 39.9 | 53 | 39.6 | 101 | 43.9 | 154 | 42.4 |
| 40 - 44.9 | 30 | 22.4 | 47 | 20.4 | 77 | 21.1 |
| 45 - 49.9 | - | -- | 1 | 0.4 | 1 | 0.3 |
| TOTALS | 134 | 100.0 | 230 | 100.0 | 364 | 100.0 |

DISCUSSION

If the angling results from the Fish and Wildlife survey crew are excluded, it becomes readily apparent that most anglers killed all their fish. Of the 621 fish they caught, only 6 were released.

For the most part, rainbow trout in Helene Lake were not difficult to catch, especially in June when the season first opened. In July and August, with warmer water temperatures the fish tended to move into the deeper, cooler water and angling along the lake shore became less successful. In late July and August, anglers reported soft-fleshed, "muddy tasting" fish.

The projected monthly estimates of angler-effort and catch, based on July data, are of course very general and not meant to be taken as hard evidence. They are based on the assumption that July is a "bell-weather" month and is representative of angler-effort and catch for the other months. It is quite likely that angling is most intensive in June (when the season first opens); tapers off somewhat in July and August; and picks up again in September, carrying over into October. Some angling may occur even in November.

Throughout the day, anglers generally tried nearly all types of terminal tackle (lures, bait, flies) and various combinations of tackle (willow leaf and flies; willow leaf and worms). Few could recall how many hours were spent angling with a certain type of gear. Quite often, they could not remember how many fish had been caught with each particular type of tackle. Consequently, the figures representing success ratios with various types of terminal tackle are susceptible to liberal interpretation. It is sufficient to say that, at least in 1982, nearly any type of terminal tackle caught fish in Helene Lake.

The average length of 36 cm indicates remarkable growth for these two year old fish. Generally, two year old rainbows can be expected to be within 12 to 25 cm in length. The rapid growth is not surprising though, as these were the first transplants introduced into a barren lake with a tremendous food supply. It is expected that in future years the average length of fish will decline as the food supply becomes reduced and stabilizes at a lower level.

The sex ratio of 1 male to 1.7 females suggests a preponderance of females killed in the fishery. There are three possible explanations for this. Male rainbow trout can mature prematurely at two years of age, while females do not usually mature until three years. In the spring and early summer of 1982, many rainbows exhibiting spawning colours were seen scattered throughout upper Helene Creek. They were all precocious males and had entered the creek to spawn. Their journey was in vain however, as females were not observed in the creek. However the exodus of precocious males out of the lake would help to account for a preponderance of females taken in the fishery.

A second explanation is that many of the precocious males which entered Helene Creek continued downstream in search of females; dropped over the impassable waterfalls, and were unable to return back to the lake.

SUMMARY

1. During the month of July, 1982, Fish and Wildlife personnel interviewed anglers on Helene Lake during fifteen of the possible thirty-one days.
2. A total of 252 anglers were interviewed. They accounted for 929 angler-hours (or 252 angler-days) and caught 877 rainbow trout (of which 613 were killed) for an average catch of .94 fish per angler-hour (3.48 fish per angler-day).
3. The Fish and Wildlife survey crew angled a total of 120 hours, caught 256 fish of which 18 were killed, for an average catch of 2.13 fish per angler-hour. An exclusion of their information results in an effort of 809 angler-hours with a total catch of 621 fish, of which 595 (96%) were killed. The success rate is reduced to .77 fish per angler-hour.
4. Based on the data gathered, the estimates of total effort and catch for July, 1982, are projected to be 1900 angler-hours (or 514 angler-days) with a catch of 1794 fish of which 1246 were estimated to be killed. If it is assumed that the July totals are representative of an average angling month, and that the sport fishery extends from June 1 to October 31, then the projected totals for the 1982 fishery (5 months) are as follows: a total effort of 9,500 angler-hours (1260 angler-days) and a catch of 8970 fish of which 6230 were killed.
5. Of the anglers interviewed, 63% were local resident, 31% were B.C. residents and 6% were non-residents of B.C.
6. The most frequently used terminal tackle was a combination of willow-leaf and worm or willow-leaf and fly, accounting for 58.5% of the total effort. The willow-leaf and worm was the most productive, with an average catch of 1.46 fish per angler-hour. Lures were the least productive, with an average catch of .51 fish per angler-hour.
7. All the fish caught were hatchery stock transplanted into Helene Lake in the fall of 1980 and were two years old.
8. From a sub-sample of 364 fish, about 42% were within the 35 cm to 39.9 cm length class. The minimum length was 25 cm, the maximum length 47 cm and the average length 36 cm.
9. The sex ratio was 1 male to 1.7 females.

REFERENCE

Burns, J. and D. Tredger, 1974. Helene Lake Survey Data. Unpubl. M.S. Fish and Wildlife Branch, Victoria, B.C.