F I S H E R I E S R E S E A R C H B O A R D
O F C A N A D A

MANUSCRIPT REPORTS OF THE BIOLOGICAL STATIONS

No.
365

Title

Report of Pollett River Smolt Trap Operation 1947

Author

C. W. Andrews

Pollett River Smolt Trap Operation 1947.

C. W. Andrews.

Trap Site. The trap was placed about 200 yards below the Sanatorium dam as in previous years. This year, however, it was set well towards the west bank, in shallower water than in the middle of the river. Here, too, the rate of flow was less than farther from the shore. In former years the longest fence, about 250 feet, was on the west side; this year it was on the east side and the construction was set so that the fastest flowing water was strained through the longer fence and not through the trap as was the case in previous settings.

The present trap site has several advantages, among them are: (1) It traps smolts that may accumulate in the lake before the trap is set, some of course may leave the lake before the trap is set while others may remain even after it is removed. (2) There is less possibility of trapping "natural" smolts than there would be if the trap was set farther downstream. Adult salmon from the sea have been seen near the ptesent trap site but they cannot ascend the lake dam to spawn above. They probably spawn below the dam and therefore below the trap site although some underyearlings have been seen near the spill pool between the dam and the trap site. (3) There is a plentiful supply of rock for ballast. The site has, however, one major disadvantage, namely,a fast flowing current which increases to "torrent" proportions in time of heavy freshets; this is caused by a bottom gradient of about 12° between the spill pool and the trap. The strength of the current in time of flood coupled with the debris brought downstream by the freshet has swept the trap away on two occasions: June 30, 1944 and June 3, 1947.

Operation and Catch. The trap was completed on May 17 and was carried away by high water on June 3. Table 1 shows the numbers of smolts caught which passed through the trap each day.

Table I.

Date	Smolts	Scale Samples taken	Temp Min.	Temp Max.	Water Height in Trap
May 17	2		49.5	58	16
18	119		50	57.5	15
19	92	75	53	61	15
20	125	120	53.5	54	14.5
21	72	72	52	61.5	14
22	165	165	51.5	61	14
23	208	120	54.5	60.5	14
24	460	160	56	65.5	13.5
25	480	200	57.5	63.0	13.5
26	1867	170	55	68	24
27	275	120	53.5	60	18
28	186	85	53.5	56.5	17
29	18	18	53	56	17.5
30	22	22	54	56	19
31	74	74	50.5	61.5	17
June 1	24	24	51	59.5	15
2	24	24	56	56.5	15.5
3	69	25	47	55.5	50
Totals	4282	1274			

A total of 4282 smolts was trapped of which 36 were picked up dead in the trap during the period of operation. On examination it was found that most of the scales were absent from the dead fish (especially those along the lateral line and tail regions). As in previous years the smolts were marked by removing the adipose and right pelvic fins with sharp scissors. This operation was performed by holding the smolt with the head towards the operator and removing first the adipose fin; then the fish was turned ventral side up and the right pelvic fin removed. Scales and measurements were taken from at least 30 per cent of the daily catch except on May 26 when scales and measurements were taken from about 9 per cent.

Few if any smolts were taken by anglers either before or during the period of trap operation according to anglers' reports and to observations at the dam where in 1944 one quarter of the total smolt run recorded was taken by anglers.

The facts suggest (Table 1) that although the trap fishing period was short, most of the smolt run was trapped. It can be seen, for example, that the first day's catch was small, numbering only 2; the catch increased daily and reached a maximum on May 26 when 1867 were trapped during a moderate freshet. This was followed by an almost daily decrease to May 30 when another small freshet brought the run up from 22 to 74. The run immediately fell off again until a heavy freshet on June 3. On this day the time of the freshet corresponded very closely to that of May 26. On the former date with the trap being fished constantly from the morning on 300 smolts were removed before noon, with the trap then practically emptied. Another 1500 were removed between 2 and 6 P.M. and an additional 67 between 7 and 8.30 P.M. when fishing was stopped.

On June 3 by 6 P.M. only 69 smolts had been taken as against 1867 for the comparable period on May 26. This gives confidence that only a very small proportion of the smolt run was missed by the trap being carried away on June 3. Moreover, comparison with smolt runs of other years indicates that by this date almost the entire bulk of the run may be expected to have passed out of the river.

Thirty-three previously marked smolts were caught a second time. It cannot be said precisely what time elapsed between the marking and the second capture of these fish but probably not more than a few days at the most. The return of marked fish indicates that these smolts must have found their way up through the fence. Because of the nature of a fish's response to turbulance and current it can probably be assumed that they would be more likely to find their way up through the racks than to pass downward through such small spaces. That such a small percentage of the total (0.8 per cent) did return suggests that the trap was fishing efficiently.

The minimum and maximum daily temperatures are given in Table 1. The lowest daily minimum was 47°F (June 3) and the highest maximum daily temperature was 65.5°F. (May 24) respectively.

Other fish caught included 903 suckers, 239 gaspereaux, 90 eels, 5 trout, 4 lampreys and 24 chubs (Semotilus atromaculatus).

Freshets. The water continued high during the period of trap operations and there were two heavy freshets; one on May 26 and a much heavier one on June 3. Previous to May 26 schools of smolts were observed in the Sanatorium lake and on several occasions they were observed "jumping". Undoubtedly the smolts had accumulated in the lake from above during the previous several days. At noon May 26 no smolts were to be found in the trap although 300 had been removed before noon. Rain fell between 8 A.M. and noon and at 1 P.M. the water in the trap was 3 inches higher (17 inches) than at 9 A.M. when the smolts were clearly visible in the trap. At 2 A.M. the water height had increased another 6 inches and it had become quite turbid so that it was impossible to see fish except when they came to the surface as the smolts did in the fast flowing water in the trap. Several hundred smolts were then present as estimated by hand seine hauls. Marking and removal was started and with the assistance of Mr. H. C. White 1500 smolts were removed between 2 and 6 P.M., 67 were marked between 7 and 8 P.M. after which few, if any, smolts remained in the trap. A total of 1867 was removed between 9 A.M. and 8 P.M. That the greater part of the catch trapped in daylight descended when the water became turbid is noteworthy and prompts several questions. Would a similar number have descended in less turbid water of the same depth? Was the diminished light (because of the turbid water) the controlling factor thus bringing about conditions similar to twilight and night where smolts normally descend or was the increased current caused by increase in water height the controlling factor? It is probable that no single factor but a combination of these and others contribute to smolt descent. The effect of any one factor would have to be determined by controlled experimentation.

On June 3 the trap was cleared at 9 A.M. and 17 smolts were removed. The trap was fished again at noon but no smolts were present. Rain fell during the morning becoming heavier towards noon. At 4 P.M. the water height in the trap had increased (16 inches at 9 A.M.) to 36 inches. At 2 P.M. 13 smolts were removed and although the water was so turbid that no fish could be seen in the trap it was apparent that the trap was fairly clear since continuous seine hauls gave no further smolts. Shortly after 4 P.M. when the water

height was about 45 inches 39 smolts were removed and although the trap was not completely cleared it was evident that only a few smolts remained. Mr. White removed 19 smolts about 5.30 P.M. Further fishing was prevented, although Mr. White reported some smolts still in the trap, since the water was now well above the racks and a torrent of water was flowing through the trap. At 6 P.M. the trap broke loose and was carried downstream. This point is marked X in Figure 1. The water height continued to increase and reached its peak at midnight. When the trap broke loose the water was flowing above the racks and near the cat-walk along the whole of the east fence. The water height in the trap at this point was about 55 inches.

A larger and deeper trap placed in a less steep bottom gradient would probably hold under such circumstances. A boom placed above the trap in a convenient place would hold up logs drifting towards the trap.

The size of the smolts from the middle Pollett River in this year is indicated in Figures 2 and 3.

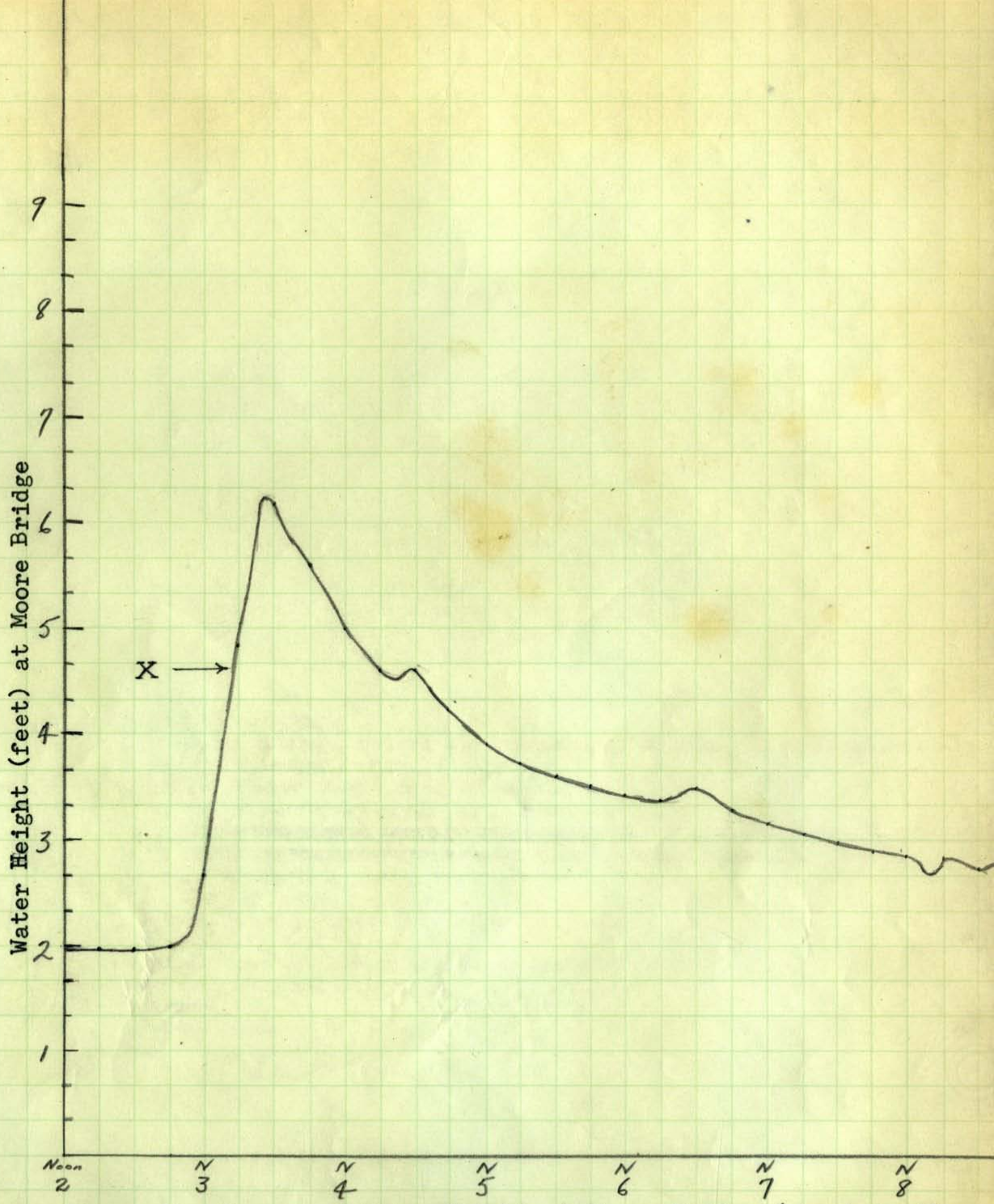

Figure 1. Record of Water Height at Moore Bridge (about 3 miles up river) during freshet of June 3. X= height when trap box was carried away.

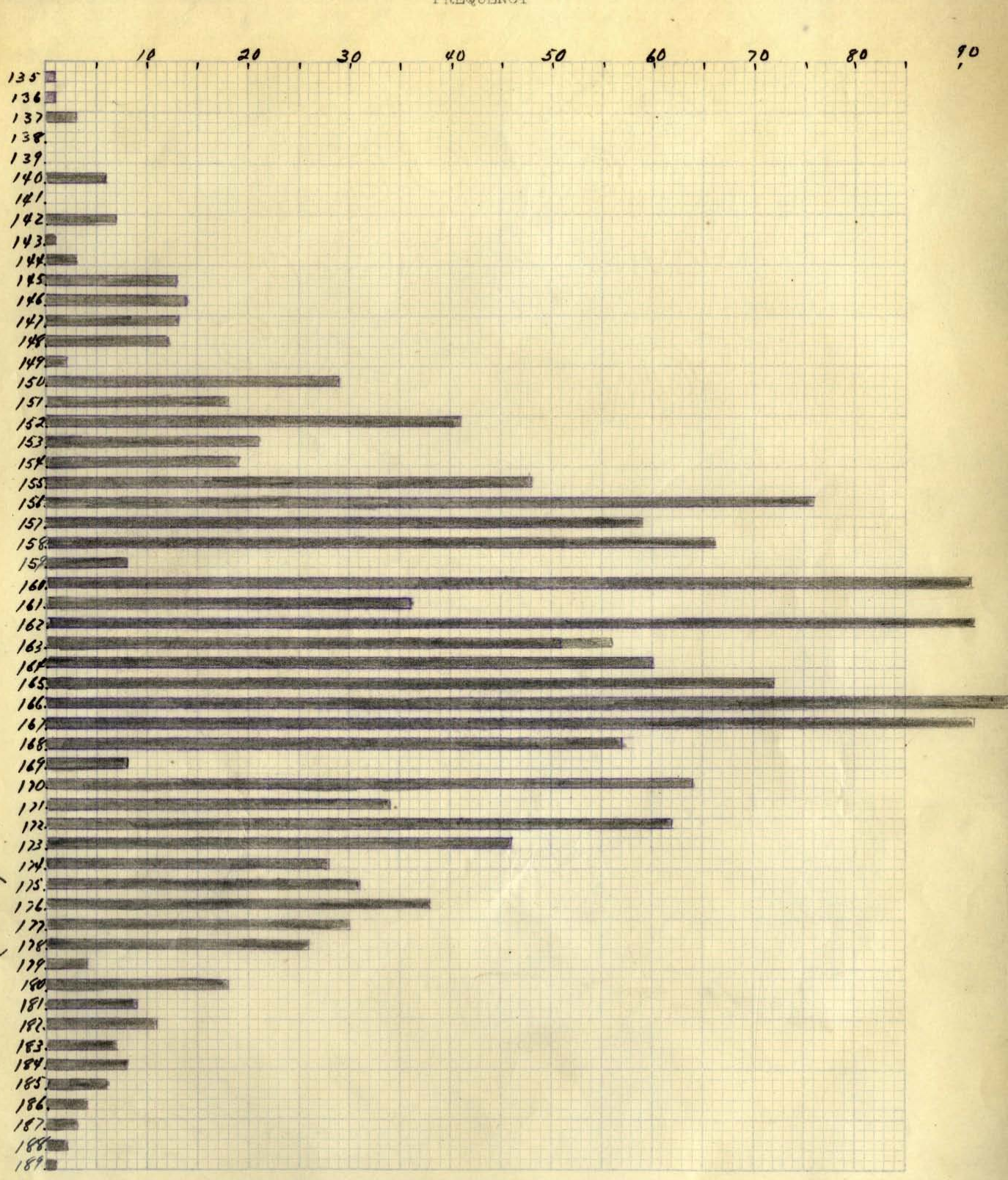

Fig. 2. Length-frequency histogram of the 1947 Smolt catch. Pollett River, N.B.

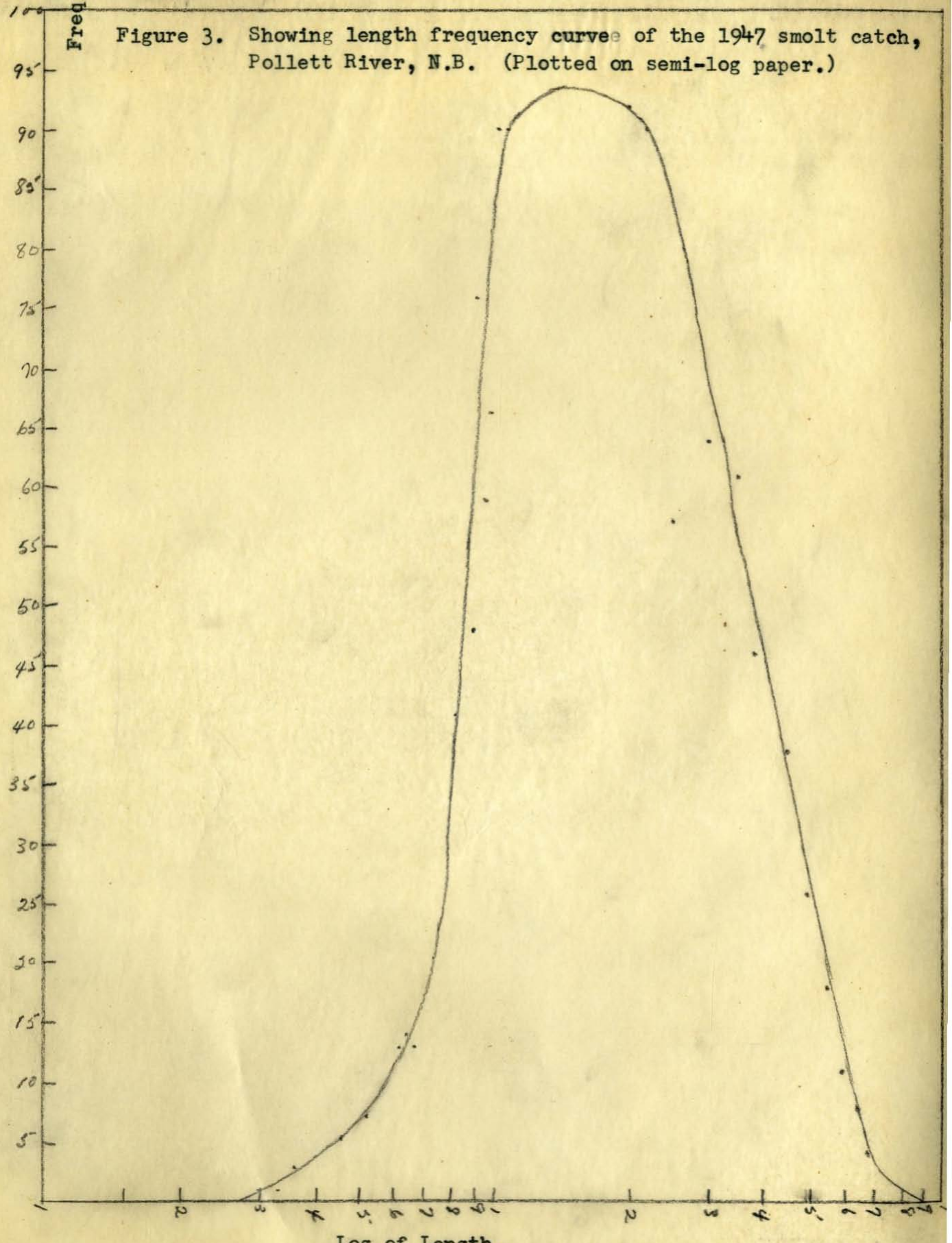

Figure 3. Showing length frequency curve of the 1947 smolt catch, Pollett River, N.B. (Plotted on semi-log paper.)