

LIFE HISTORY OF KITIMAT RIVER STEELHEAD TROUT
FROM ANGLERS' CATCHES IN 1976 AND 1977

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LIFE HISTORY OF KITIMAT
RIVER STEELHEAD TROUT FRO
BJEW c. 1 mm SMITHERS

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INTRODUCTION

The steelhead trout sport fishery on Kitimat River, located at the head of Douglas Channel on the north coast of British Columbia (Fig. 1), occurs during the months of March, April, and May. An angler use and creel survey was conducted on the fishery during 1976 and 1977 for which the objectives were two-fold:

- 1) To collect detailed information on the steelhead fishery as to angler origin, effort and success.

- 2) To collect and analyze data concerning the biology of Kitimat River steelhead, including basic life histories.

The intent of this report is to record in a logical fashion age and size data of Kitimat River steelhead (item (2) above). Creel census information referred to in (1) above is reported by Eccles, et al (M.S. 1977).

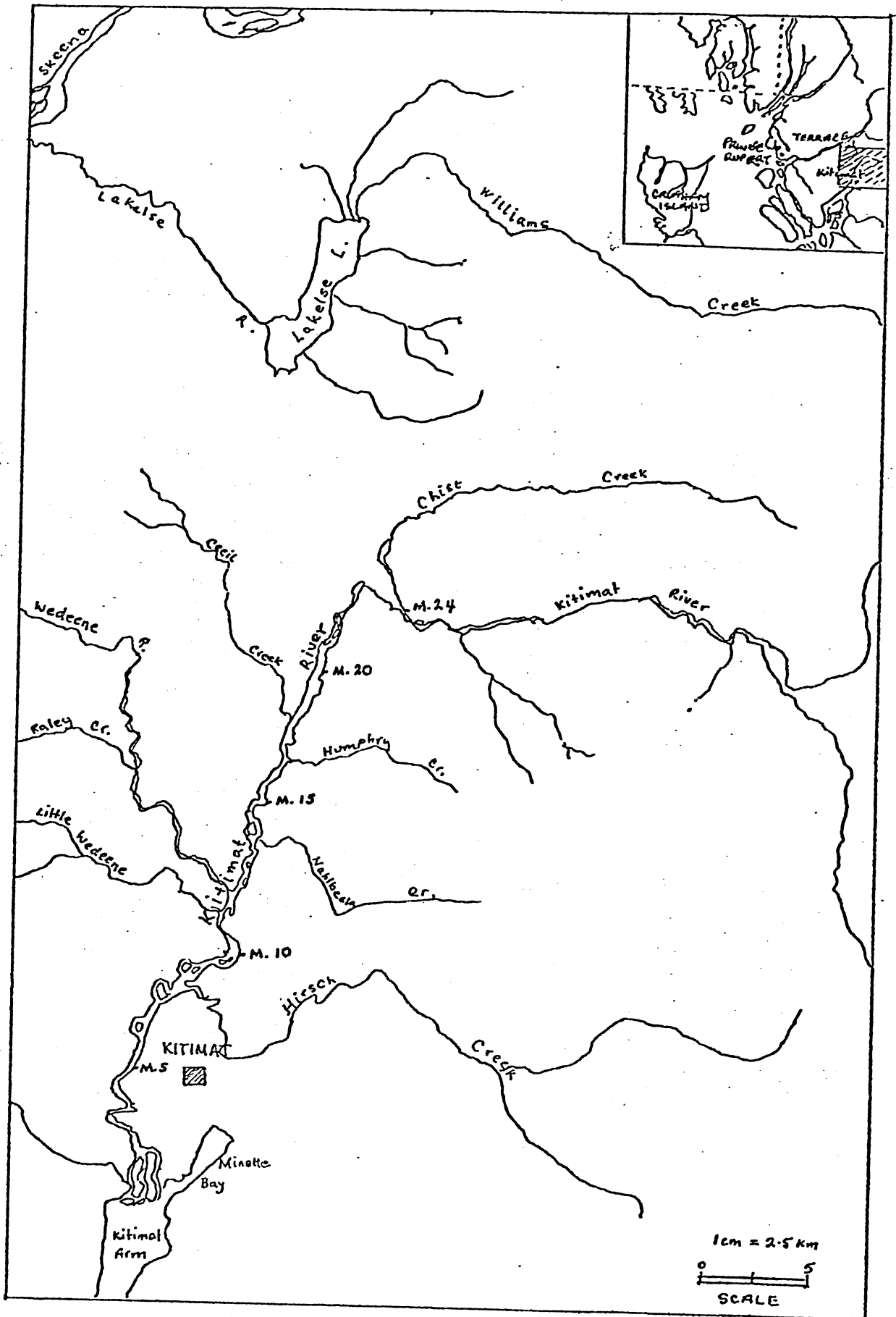


Fig. 1 - Kitimat River

METHODS

Methods used in collection and analysis of steelhead scales were as described by Narver and Withler (1974). Two high quality scales from each adult were placed on acetate strips and impressions made with a heated press. The impressions were interpreted using a Microcom 1600 microfiche viewer.

The age designation formula used is also as described by Narver and Withler (1974), modified slightly to accommodate the high proportion of kelts that are taken in the sport fishery. For example, a 3.2S1 fish spent its initial three years rearing in freshwater (3.) smolted and went to sea for two years (.2) prior to making its first successful spawning migration after its third winter in the ocean (S), then returned to the ocean for another winter followed by its second spawning migration (1). A kelt of the same age would have the "1" replaced by another "S" (3.2SS).

RESULTS

ADULT STEELHEAD AGE-SEX RELATIONSHIPS

One hundred and twenty-five steelhead scale samples were collected from angler caught steelhead during the 1976 and 1977 spring fishery. One hundred and ten of the samples had scales that were readable for total age determination. Fourteen age groups were identified in the sample, six for maiden fish and eight for repeat spawners (Table 1).

Table 1. Steelhead trout age groups from Kitimat River for 1976 and 1977. Scales with regenerated freshwater zones are listed separately. Kelt age groups and numbers are parenthesized.

| Age Group | Number of Steelhead | Number Of Males | Number Of Females | Percent of Total |
|-----------------|---------------------|--------------------|----------------------|---------------------|
| 3.2 (3.1S) | 30 | 17 (2) | 13 (5) | 27 |
| 3.3 (3.2S) | 11 | 6 | 5 (1) | 10 |
| 3.4 | 1 | 1 | 0 | 1 |
| 3.1S1 | 3 | 1 | 2 | 3 |
| 3.2S1 (3.2SS) | 16 | 1 | 15 (6) | 14 |
| 3.1SS1 | 2 | 1 | 1 | 2 |
| 3.2SS1 (3.2SSS) | 2 | 0 | 2 (1) | 2 |
| 3.2SSS1 | 1 | 0 | 1 | 1 |
| 4.2 (4.1S) | 18 | 11 (1) | 7 (1) | 16 |
| 4.3 (4.2S) | 15 | 6 (1) | 9 (1) | 14 |
| 4.4 | 1 | 1 | 0 | 1 |
| 4.1S1 (4.1SS) | 6 | 2 (1) | 4 | 5 |
| 4.2S1 (4.2SS) | 3 | 1 | 2 (1) | 3 |
| 4.2SS1 | 1 | 0 | 1 | 1 |
| <u>14</u> | <u>110</u> | <u>48 (5)</u> | <u>62 (16)</u> | <u>100</u> |
| ----- | | | | |
| R.1S1 | 3 | 2 | 1 | |
| R.1SS1 (R.2SSS) | 2 | 0 | 2 (1) | |
| R.2 (R.1S) | 5 | 2 | 3 (1) | |
| R.2S1 | 1 | 0 | 1 | |
| R.3 (R.2S) | <u>4</u> | <u>2 (1)</u> | <u>2</u> | |
| | 15 | 6 | 9 | |

The dominant age groups observed among the sample (n = 110) were 3.2 (27%), 4.2 (16%), 3.2S1 (14%), 3.3 (10%) and 4.3 (14%). Included in these age groups were 18 kelts with age classes ending in an "S" notation (Table 1). Note that the ocean age of a .1S kelt is the same ocean age as an unspawned .2 maiden fish.

Of the total sample (n= 110), first-time spawners comprised 69% and repeat spawners, 31%. Among the repeat spawners, fish of age 3.2S1 were the most frequently observed. This age group included six kelts designated 3.2SS.

The freshwater age groups for one hundred and ten Kitimat steelhead were 3. (60%) and 4. (40%) (Table 2). The ratio of males: females does not appear to vary significantly between age 3. and 4.

Table 2. Numbers and percentages of male and female steelhead Of different freshwater ages from Kitimat River in 1976 and 1977 (n = 110).

| | | Freshwater Age | | Total |
|--------|---|----------------|----|-------|
| | | 3. | 4. | |
| Male | n | 27 | 21 | 48 |
| | % | 56 | 44 | 100 |
| Female | n | 39 | 23 | 62 |
| | % | 63 | 37 | 100 |
| Total | n | 66 | 44 | 110 |
| | % | 60 | 40 | 100% |

Within the sample of 85 first-time spawners (n= 125), 53 (63%) were of ocean age .2 or .1S (kelts). This age group includes 65% of the male sample and 59% of the female sample. Thirty-one percent of the males and 41 per cent of the females were of ocean age .3 or .2S (Table 3).

Table 3. Numbers and percentages of male and female steelhead of different ocean ages from Kitimat River in 1976 and 1977 (Scales with regenerated freshwater zones included. Repeat spawners excluded. Kelts are included and parenthesized).

| | | Ocean Age | | | | |
|--------|---|-----------|----------|----------|-------|--|
| | | .2 (.1S) | .3 (.2S) | .4 (.3S) | Total | |
| Male | n | 30 (3) | 14 (2) | 2 (0) | 46 | |
| | % | 65 | 31 | 4 | 100 | |
| Female | N | 23 (7) | 16 (3) | 0 (0) | 39 | |
| | % | 59 | 41 | - | 100 | |
| Total | n | 53 (10) | 30 (5) | 2 (0) | 85 | |
| | % | 63 | 35 | 2 | 100 | |

Forty (32%) of the total sample of 125 fish were repeat spawners (Table 4). Thirty-two (80%) were returning for a second time, seven for a third time and one a fourth time. Repeat spawning females (80%) outnumbered repeat spawning males (20%).

Table 4. Numbers and percentages of males and females of different ocean age groups of repeat spawning steelhead sampled in Kitimat River in 1976 and 1977. (The numbers of kelts in each ocean age group are parenthesized. Sample size of 125 includes scales with regenerated freshwater zones.)

| | | Ocean Age | | | | | | |
|--------|---|----------------|----------------|------------------|------------------|--------------------|---------|------|
| | | .1S1 (.1SS) | .2S1 (.2SS) | .1SS1 (.1SSS) | .2SS1 (.2SSS) | .2SSS1 (.2SSSS) | % Total | |
| | | Total Sample | | | | | | |
| Male | n | 5 (1) | 2 (0) | 1 (0) | 0 | 0 | 8 | |
| | % | 62.5 | 25 | 12.5 | - | - | 100 | 6.4 |
| Female | n | 7 (0) | 18 (7) | 3 (1) | 3 (1) | 1 (0) | 32 | |
| | % | 22 | 56.2 | 9.4 | 9.4 | 3 | 100 | 25.6 |
| Total | n | 12 (1) | 20 (7) | 4 (1) | 3 (1) | 1 (0) | 40 | |
| | % | 30 | 50 | 10 | 7.5 | 2.5 | 100 | 32 |

The overall sex ratio for the Kitimat sample was 1:1.03 males to females.

LENGTH-WEIGHT RELATIONSHIPS

Length and weight data were collected from as many angler-caught steelhead as possible. Males and females of ocean age .2 had virtually the same average length (72 cm.) and weight (4.1 kg.) (Table 5). Males of ocean age .3, however, were both longer and heavier than their female counterparts (90 cm. and 8 kg. as opposed to 82 cm. and 6.1 kg.).

Table 5. Weights and fork lengths of male and female steelhead of different ocean ages from Kitimat River angler samples in the spring of 1976 and 1977. (Repeat spawners not included. Kelts excluded from weight calculations.)

| Sex | Ocean Age | Average | Range | Number |
|----------------------|-----------|---------|--------------|--------|
| <u>Weights - Kg.</u> | | | | |
| Male | .2 | 4.1 | 2.3 to 6.5 | 27 |
| | .3 | 8.0 | 6.6 to 10.7 | 12 |
| | .4 | 12.7 | 10.9 to 14.5 | 2 |
| Female | .2 | 4.1 | 2.3 to 6.7 | 17 |
| | .3 | 6.1 | 3.0 to 7.8 | 13 |
| | .4 | - | - | - |
| <u>Lengths - Cm.</u> | | | | |
| Male | .2 | 72.2 | 66 to 80 | 29 |
| | .3 | 89.9 | 79 to 98 | 13 |
| | .4 | 105.8 | 99 to 112.5 | 2 |
| Female | .2 | 72.1 | 61 to 83 | 23 |
| | .3 | 81.8 | 71 to 91.4 | 12 |
| | .4 | - | - | - |

DISCUSSION

Because only 125 samples could be obtained over the two-year period, it is very doubtful that the fourteen age groups identified represent the total span of life histories within the Kitimat steelhead population. In a five-year study of Petersburg Creek, Alaska (a stream of much smaller proportions but similar in other respects), Jones (1977) identified 42 age groups in a sample of 1,407 steelhead.

The only freshwater ages among the Kitimat sample were 3. (60%) and 4. (40%). In 1971, Jones (1977) identified 27 per cent of his Petersburg sample as being two-year smolts, with 57 per cent threes and only 16 per cent fours. In subsequent years, however, Jones noted a marked decline in two year smolts and greater numbers (proportions) of fours. He suspected the decline was attributable to deteriorating environmental conditions and lack of good rearing area which was reflected in slower growing steelhead. Since this Kitimat River watershed has been extensively logged over the past two decades, it is reasonable to assume a similar shift in smolt ages in Kitimat River, and partially explains the lack of any two-year fish.

The relatively high percentage (32) of repeat spawners in the Kitimat sample bears mentioning since it is characteristic of short-run, spring migrant steelhead populations, which was noted by Withler (1966).

Withler (1966) observed a repeat spawning incidence of 31.3 per cent in Cheakamus River into which, like the Kitimat, fish do not migrate until April. Similarly, a 38 per cent incidence of repeat spawners (average over five years) is reported from Petersburg Creek (Jones, 1977).

RECOMMENDATIONS

It is recommended that studies of the Kitimat steelhead run be continued. Life history information is far from complete. All of the data compiled in this report came exclusively from anglers' catches and due to the nature of the fishery data collection from this source alone is very inefficient. However, the only other alternative is the construction of a weir and fish trapping facilities on the river at a time of year when run off is at or approaching peak levels - a virtual impossibility. Consequently, it is recommended that enforcement staff continue to collect samples and information from Kitimat anglers when and where feasible.

SUMMARY

1. During the months of April and May, 1977 a steelhead catch sampling program was conducted on Kitimat River. Scale samples, lengths and weights were collected from anglers' catches for a life history analysis of the Kitimat River steelhead population.
2. Within the sample of 125 steelhead scales collected over a period of two years, 110 were readable for total age determination. Of 14 age groups identified, 6 were first-time spawners, and 8 were repeat spawners.
3. Dominant age groups among the sample (n= 110) were 3.2 (27%), 4.2 (16%), 3.2S1 (14%), 3.3 (10%) and 4.3 (14%). The most frequently observed age group for repeat spawners was 3.2S1 (14% of total sample, 50% of repeat spawners). Repeat spawners comprised 32 per cent of the total sample (n = 125).
4. Freshwater ages among 110 scale samples were 60 per cent 3. and 40 per cent 4. Of 85 first-time spawners, 63 per cent were of ocean age .2, 35 per cent were of ocean age .3. Among two-ocean fish, males outnumbered females but the opposite was observed among three-ocean fish.

5. Of 40 repeat spawners (n = 125), 32 were returning for a second time, 7 for a third time, and one for a fourth time. Females outnumbered males 4:1.

6. Weights of male steelhead at ocean age .2, .3, and .4 averaged 4.1, 8.0, and 12.7 kg. respectively. Females at ocean age .2 and .3 averaged 4.1 and 6.1 kg. respectively.

7. It was recommended that studies of Kitimat River steelhead continue in an effort to upgrade and complete the life history picture.

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