A CREEL SURVEY OF THE LAKELSE LAKE CUTTHROAT SPORT FISHERY

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By

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INTRODUCTION

The sport fishery for cutthroat trout (Salmo clarki) in the Lakelse watershed has long been of major importance to recreationists in North western British Columbia and particularly to residents of Terrace and Kitimat.

The sport fishery is traditionally divided (as influenced primarily by fish movements) into two zones. During April and May, large numbers of cutthroat move into Lakelse River to spawn and feed on emerging salmon fry (Bilton, 1954; and Bilton and Shepard, 1955). Aspects of this spring cutthroat fishery were first discussed by the above authors and more recently by Imbleau (M.S. 1978). The fishery shifts to Lakelse Lake during the summer months and it is upon this fishery that this report focuses.

The angler interview and creel data herein described and analyzed were collected by a B.C. Fish and Wildlife crew during June, July and August of 1979.

DESCRIPTION OF STUDY AREA

Lakelse Lake, 54 3O'N., 128 49'W., is located on the eastern margin of the Coast Range Mountains, approximately 9.7 kilometers south of the city of Terrace (Fig. 1). The lake covers an area of 1416 ha. (3500 acres) and has a mean depth of 8.6m (28.2 feet). There is evidence to suggest that the lake is on the verge of becoming eutrophic (Cleugh, et al, 1978).

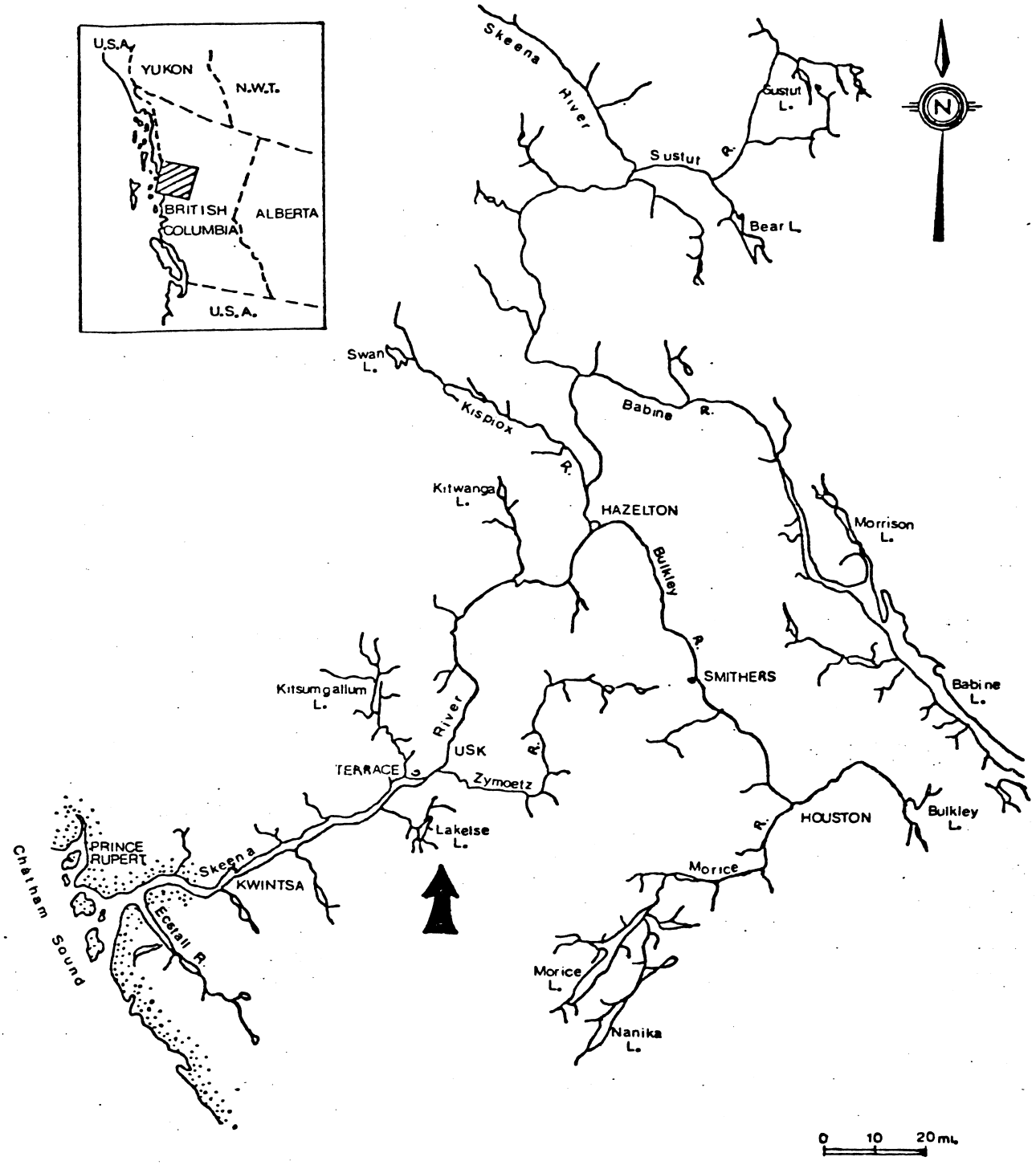


Fig. 1. The Skeena River and main tributaries.

The lake has thirteen small inlet streams, of which Williams Creek is the largest, plus a number of hot springs on the eastern shore. The lake is drained via Lakelse River which flows approximately 19km in a northwesterly direction to its confluence with the Skeena River.

Lakelse Lake and environs are heavily used commercially and recreationally. There are two commercial resorts, a seaplane base, a large Provincial Park and approximately 200 private residences. There is extensive logging activity within the watershed. The results of a socio-economic study conducted in 1973 show that 88 percent, 82 percent, and 54 percent of Terrace, Kitimat and Prince Rupert households, respectively, visited Lakelse Lake for recreational purposes (Sinclair, 1974).

Resident fish species within the watershed include cutthroat trout, rainbow trout (Salmo gairdneri), Dolly Varden char (Salvelinus malma) and mountain whitefish (Prosopium williamsoni). Other species include squawfish (Ptychocheilus oregonese), peamouth chub (Mylocheilus caurinum), large-scale suckers (Catostomus macrocheilus), redside shiners (Richardsonius balteatus), threespine stickleback (Gasterosteus aculeatus), prickly sculpin (Cottus asper), and river lamprey (Lampetra ayresi). Anadromous species include all five Pacific salmon: pink (Oncorhyncus gorbuscha), coho (0. kisutch), chinook (0. tshawytscha), chum (0. keta), and sockeye (0. nerka); plus steelhead (sea-going rainbow) trout.

Catch limits in effect during the time of survey were eight fish daily and sixteen in possession.

METHODS

Creel census data were obtained from Lakelse Lake anglers between June 1 and August 23, 1979. Anglers were interviewed by two Fish and Wildlife personnel who covered the entire lake by boat from sunrise to sunset. Binoculars were used to detect anglers on the shoreline. Anglers were interviewed in their boats and on shore. Those that had fished less than 15 minutes were interviewed at a later time. A record was kept of place of residence, time spent fishing, time of interview, tackle used, number of each species landed (nearly all anglers killed their catch) and whether the interview was conducted on shore or on the lake.

Scales were taken from each fish between the dorsal and anal fins above or below the lateral line. The length, sex and any noticeable characteristics were recorded. In the lab, scale samples were arranged in groups of homogeneous lengths of 50mm intervals and representative subsamples comprising approximately 45% of each group were selected for aging. The scales were cleaned with detergent and placed between microscope slides and coded as to fish length and sex. They were then projected onto a Microfiche 1600 screen (magnified X48) and read by two individuals with disagreements settled by a third person.

RESULTS

Angler Effort and Success

A total of 460 angling parties comprised of 949 anglers were interviewed by creel census personnel on Lakelse Lake from June 1 to August 23, 1979. During this period, anglers fished 65 (77%) of the 84 possible days for a total of 1383 angler—hours (Table 1). The total catch was 526 fish of which 517 (98%) were cutthroat, 5 (1%) were Dolly Varden and 4 (1%) were rainbow trout.

The average success rate for the cutthroat fishery was .37 fish per angler-hour.

Table 1. Weekly catch statistics for anglers on Lakelse Lake between June 3 and August 23, 1979.

DATE		ANGLER HOURS	NO. OF CUTTHROAT CAUGHT	CUTTHROAT CATCH/HOUR	NO. OF RAINBOW CAUGHT	NO. OF DOLLY VARDEN CAUGHT	TOTAL CATCH/HOUR ALL SPECIES
June	3—9	19	12	.65			.65
	10—16	101	69	.69	1		.70
	17-23	89	53	.59			.59
	24—30	259	77	.30		2	.31
July	1—7	339	176	.52	2	2	.53
	8-14	244	72	.30	1		.30
	15—21	112	18	.16			.16
	22—28	96	24	.25			.25
Aug	29—4	63	12	.19		1	.37
	5—11	21	2	.10			.10
	12—18	10	2	.20			.20
	19—23	30	0	—			
TOTALS		1383	517	X=.37	4	5	X=.38

Angling was most productive during the first 3 weeks of the season with a success rate of .64 fish per hour. Fishing pressure was greatest from June 24 to July 14 when the effort (by interview) totalled 842 angler-hours, which was 61% of the total effort over the 12 week period of record. The catch during this same period was 325 cutthroat; 63% of the total cutthroat harvest. Almost all cutthroat caught were killed. It was noted that this 3 week period of greatest fishing intensity and catch coincided with the mayfly hatch (pers. obs.).

The success rate was .55 fish per angler. Of the 460 angling parties, 61% were unsuccessful; 31% caught 1—4 fish and 7.5% caught more than 5 fish.

ANGLER DISTRIBUTION AND TACKLE PREFERENCE

As can be expected, angling by boat was the method most often used by the vast majority of the 949 anglers. A total of 844 anglers (89%) utilized boats while 105 people (11%) angled from the shoreline (Table 2). The shoreline anglers were quite unsuccessful and accounted for only 9 fish (2%) with a catch per hour of .06 fish. The boat anglers caught 517 fish with a success rate of .42 fish per angler—hour.

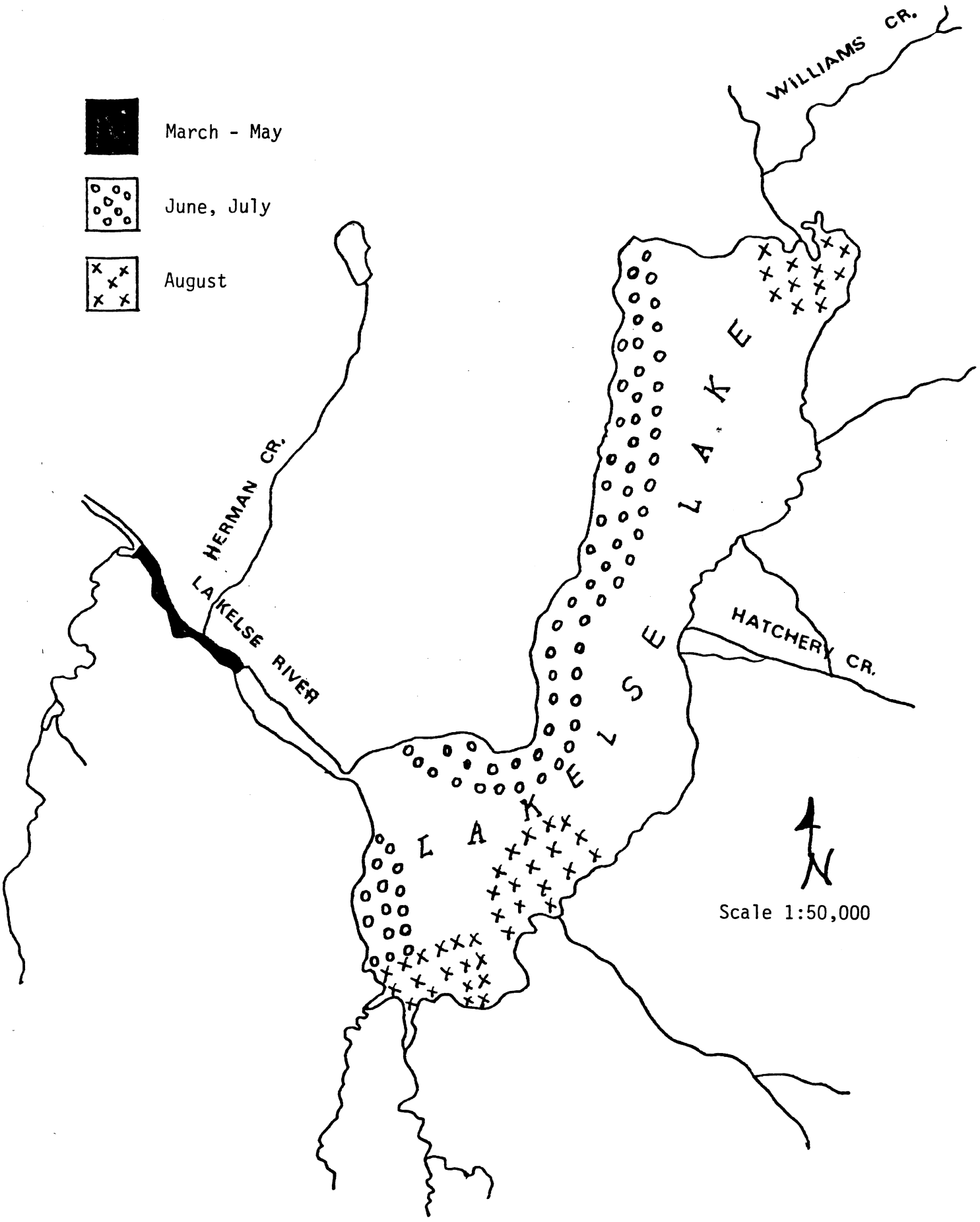
Generally it was noted that at about the end of June anglers seemed to be concentrated along the west side of the lake while at the end of July, when salmon were quite abundant, people began fishing off the mouths of inlet creeks, particularly Scully and Williams Creek, (Fig. 2).

Table 2. Angler distribution, effort and catch from boat and shore on Lakelse Lake, June 3 – August 23, 1979.

	NUMBER OF ANGLERS				ANGLING HOURS				NUMBER OF FISH CAUGHT[1]			
	June	July	Aug.	Total	June	July	Aug.	Total	June	July	Aug.	Total
Boat Angling	308	441	95	844	414	729	99	1242	213	290	14	517
Shore Angling	48	47	10	105	54	77	10	141	1	7	1	9
TOTALS	356	488	105	949	468	806	109	1383	214	297	15	526

[1] Includes Cutthroat, Rainbow, and Dolly Varden.

Figure 2. Lakelse Lake showing distribution of fishing effort from March to August.



Anglers using lures accounted for 44% of the total angling effort while bait anglers accounted for 30%. Flies accounted for 26% of the angler effort (Table 3). Lure and bait anglers each accounted for 34% of the catch while those using flies caught 32%. Fly fishermen were the most successful with an average of .47 fish per angler hour. Bait fishermen were second with .42 fish per hour while lure anglers were a distant third with a success rate of .29. In may instances anglers used a combination of tackle types simultaneously, i.e. trolling a fly with a worm attached to a hook or a roe-baited spinner. The most commonly used bait was worms. Other types of bait noted were roe, weiners, steak-meat, bacon, and fish—flesh.

Table 3. Angling Intensity on Lakelse Lake, June 3 — August 23, 1979.

DATE	TOTAL ANGLER HOURS	ANGLER HOURS		
		LURE	BAIT	FLY
June 3-9	18	14	3	3
10-16	101	26	48	27
17-23	89	33	41	15
24-30	259	124	48	86
July 1-7	339	174	57	109
8-14	244	75	98	71
15-21	112	56	30	25
22-28	97	40	49	8
Aug.29-4	63	34	23	6
5-11	21	12	4	5
12-18	10	4	6	-
19-23	30	12	15	2
TOTALS	1383	604	422	357
% OF TOTALS		44	30	26

ANGLER ORIGIN

Of the 949 anglers interviewed, 130 (14%) were Lakelse Lake Community residents, 403 (42%) were from Terrace and 130 (14%) were Kitimat residents (Table 4). A total of 88% of all anglers interviewed were B.C. residents.

CUTTHROAT TROUT LIFE HISTORY

Of the total sample of 517 cutthroat trout, a sub-sample of 216 were aged. The fish ranged in size from 18 cm to 45.5 cm and in age between 3 years and 8 years. Fish aged 4 and 5 were the most common, accounting for 28.7% and 44%, respectively, of the sub-sample (Table 5).

Information taken from 470 usable scale envelopes indicated that 70.4% of the angler-caught cutthroat were between 25.1 and 35.1 cm long (Figure 3). Of those fish which could be positively sexed, 140 were males, 263 were females and the sex ratio was 1:1.88.

Table 5. AGE-LENGTH RELATIONSHIPS OF CUTTHROAT TROUT FROM LAKELSE LAKE

June 1 – August 23, 1979 (n=216)

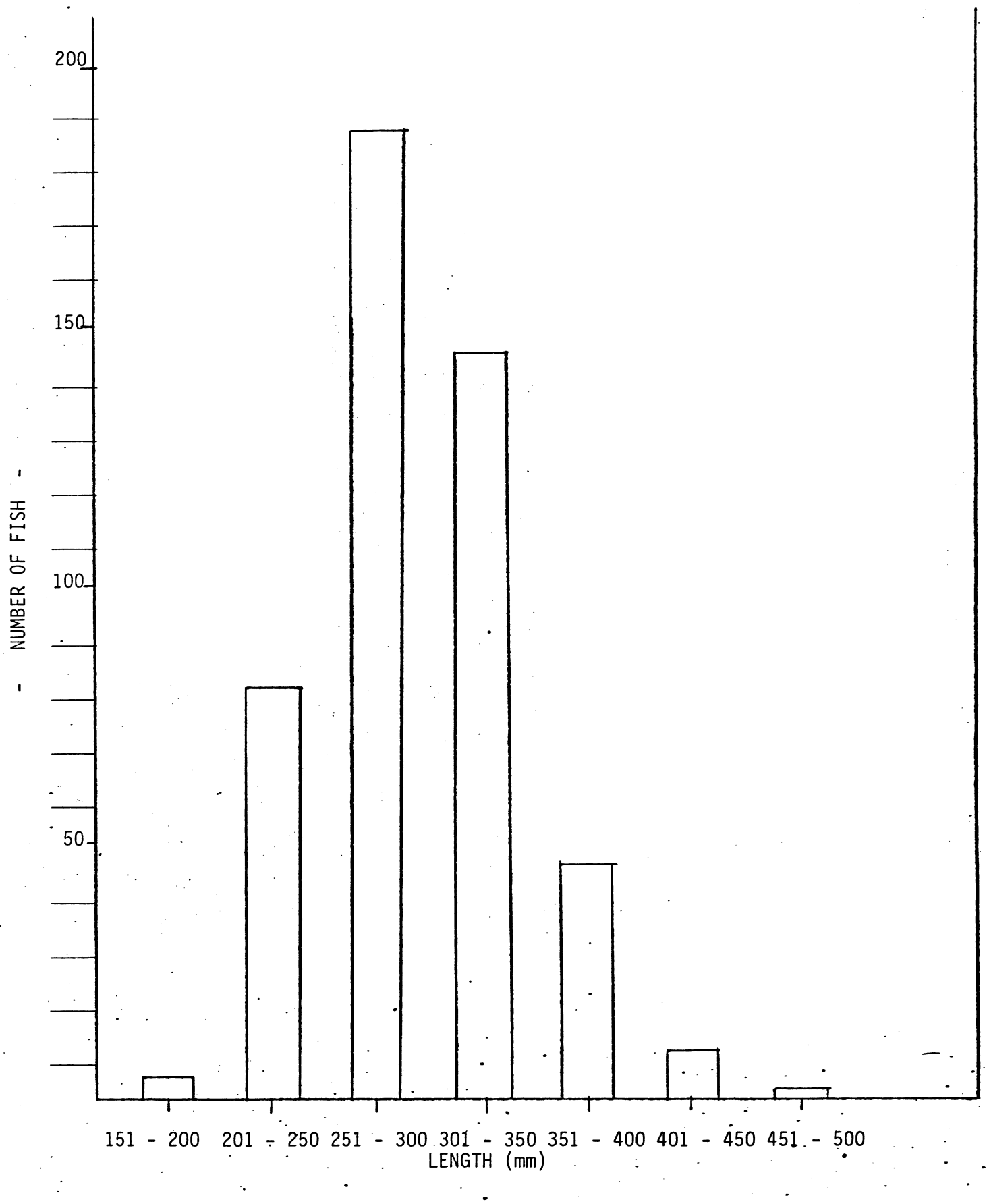
	AGE (YEARS)						
	3	4	5	6	7	8	TOTAL
Number	6	62	95	41	8	4	216
% of Total	2.8	28.7	44.0	19.0	3.7	1.8	100
Min. Length (mm)	200	180	230	280	340	420	
Max. Length (mm)	240	345	350	40	455	450	
Mean Length (mm)	212	251	300	347	416	434	

TABLE 4. WEEKLY TOTALS BY RESIDENCE OF LAKELSE LAKE ANGLERS

June 3 – August 23, 1979

DATE	LAKELSE LAKE	TERRACE	KITIMAT	OTHER B.C. RESIDENTS	OTHER	TOTAL	% OF TOTAL
June 3-9	3	4	0	3	3	13	1.4
10-16	9	41	13	14	2	79	8.3
17-23	20	31	3	15	7	76	8.0
24-30	35	76	38	10	23	182	19.2
July 1-7	19	70	34	53	36	212	22.3
8-14	5	57	16	31	20	129	13.6
15-21	6	43	6	12	7	74	7.8
22-28	5	37	6	7	11	66	7.0
Aug.29-4	17	18	6	11	2	54	5.7
5-11	5	11	3	6	-	25	2.6
12-18	2	4	3	2	-	11	1.2
19-23	4	11	2	10	1	28	3.0
TOTALS	130	403	130	174	112	949	100.0
% OF TOTAL	13.7	42.5	13.7	18.3	11.8		100.0

Figure 3. — Length — Frequency Distribution of Angler Caught Cutthroat from Lakelse Lake June 1 - August 23, 1981. (n=470)



DISCUSSION & CONCLUSIONS

In the early 1950's the Fisheries Research Board of Canada conducted creel-census studies on Lakelse Lake in connection with investigations on the ecology of the sockeye salmon. A great deal was learned of the life history of the Lakelse cutthroat and of the factors affecting the success of angling. It was concluded that the fishery was then not severe enough to bring about any noticeable depletion in the cutthroat population, but that increased development in northwestern B.C. might result in increased exploitation and an eventual decline in angler catches (Bilton and Shepard, 1955). In examining the present status of the Lakelse Lake cutthroat fishery, it is interesting to compare the results of the 1979 census to the information collected in the early 1950's.

During 1950—1954, the Lakelse Lake cutthroat fishery, annually accounted for an average effort of 943 hours for a catch of 1080 cutthroat, or 1.14 fish per angler hour (Bilton and Shepard, 1955). The 1979 creel census data indicated a total of 1383 hours fished with 517 cutthroat caught for an average of 0.37 fish per angler hour.

Inbleau (M.S. 1978) conducted a creel census on the Lakelse River cutthroat fishery from April 2 to May 24, 1978. His data showed a total fishing effort of 2982 angler hours with a catch of 891 cutthroat for an average catch per angler hour of 0.30. During 1950—54, river anglers expended an annual average of 984 angler hours for 934 fish resulting in an average catch per angler hour of 0.94 cutthroat (Bilton and Shepard, 1955).

From these data it is apparent that angler success on both Lakelse River and Lakelse Lake has declined significantly in the 25 years since the initial survey.

As. in the 1950's it appears that cutthroat angling in the river is slightly less productive than in the lake. However, many river anglers are after other species, such as steelhead, and may catch cutthroat incidently while nearly all of the lake anglers are fishing primarily for cutthroat.

A comparison of mean lengths of each age class between the 1950's studies and recent works shows that mean lengths of each age group do not appear to vary greatly between the different studies (Table 6).

Table 6. A comparison of percentage compositions and mean lengths of different ages from the Lakelse River and Lake cutthroat fishery in 1950—1953 (Bilton and Shepard), 1978 (Imbleau), and 1979.

	AGE (Years)					
	3	4	5	6	7	8
1950 – 1953[1] River & Lake combined (n=4678)[2]	% 11	44	37	7	-	-
mean length (mm)	213	266	297	336	-	-
1978 River (n=210)	% 10	29	49	9	2	1
mean length (mm)	225	271	313	339	350	475
1979 Lake (n=216)	% 3	29	44	19	4	2
mean length (mm)	212	251	300	347	416	434

[1]Ages adjusted +1 year. Imbleau (M.S. 1978) compared cutthroat age length relationships between 1978 and the 1950's and concluded that scale readers in the earlier study failed to detect the first year of growth.

[2]It is suspected that n=4678 represents an estimation value rather than the actual number of scales read.

In the 1950’s, 4 and 5 year old fish (ages adjusted +1) comprised 44% and 37% of the sport fish catch from Lakelse Lake and River combined (Bilton, 1954). Six year—old fish accounted for 7% of the catch, while no 7 or 8 year—old fish were recorded. Imbleau aged 210 cutthroat from the 1978 Lakelse River fishery and found that 29% were 4 years old; 49% were 5 years, and 12% were older than 5. From the 1979 Lakelse Lake sport fishery, it was found that 29% of the cutthroat were 4 years old, 44% were 5 years, while 25% were older than 5. From these data, it would seem that the older, larger sized fish are, if anything, slightly more abundant in recent angler catches than they were 25 years ago. This seems to contradict the supposition that the fishery is declining based on a reduction in the numbers of older and larger fish in angler catches. However, a brief examination of the River fishery in the 1950’s may provide a partial explanation. At that time the angling season did not open until May 1 and it was suspected that many of the larger, mature fish had already passed downstream to their spawning grounds near Coldwater Creek. Consequently, they would not be evident in angler catch statis—tics (Bilton & Shepard, 1955). As a result, the mean lengths and percentage composition of the older, larger fish would be understated and would not truly represent averages existent during that time. There is however, no apparent explanation for the lack of older fish in the lake fishery of the 1950’s.

The growth patterns of Lakelse Lake cutthroat, as revealed by scale examination, generally show 3 years of relatively slow growth followed by

more rapid growth for 1 to 2 years and then a successive decrease in growth. An explanation for the period of rapid growth could be that the cutthroat have attained a size which enables them to change from a planktiverous diet to a pisciverous one. Another explanation is that the fish have resided in less productive streams for 3 years and have experienced rapid growth upon becoming lake residents (Imbleau, 1978).

In summary, it is our opinion that the Lakelse Lake cutthroat fishery has managed to sustain itself in the face of 25 years of timber extraction throughout the drainage, urbanization, and an apparent trebling of fishing effort. Assuredly, success has declined, but the cutthroat population structure remains basically the same as it was in the earlier studies, and the total harvest, lake and river, of approximately 1400 fish is within 100 fish of the estimated annual harvest of the early 1950’s (Bilton and Shepard, 1955). More stringent angling restrictions may be necessary (some of which are in place as of this writing) to reflect the decline in success and increase in effort. They should be confined to the river fishery where spawning cutthroat are congregated and vulnerable, and where the fishery has evolved into a “quality” experience (fly fishing) as opposed to the “catch and kill” fishery of the lake.

SUMMARY

1. From June 1 to August 23, 1979, 949 anglers fished for a total of 1383 angler hours.

2. The total catch was 526 fish of which 517 (98%) were cutthroat. Other species caught were Dolly Varden and rainbow trout.

3. The average success rate for the cutthroat fishery was .37 fish per angler hour.

4. Angling was most productive during the first 3 weeks of the season with a success rate of .64 fish per angler hour.

5. Fishing pressure was greatest in the last week of June and fist two weeks of July with a total of 842 angler hours, accounting for 61% of the overall effort.

6. Approximately 61% of the 460 angling parties interviewed were unsuccessful. Only 8% caught more than 5 fish.

7. About 89% of the anglers utilized boats. Shoreline anglers were quite unsuccessful and accounted for only 2% (9 fish) of the total catch, with a success rate of .06 fish per angler hour.

8. Anglers using lures accounted for 44% of the total fishing effort; bait was used 30% of the time and flies 26%. Anglers using flies had the greatest success rate with an average catch of .42 fish per hour. Lure anglers averaged .29 fish per hour.

9. About 70% of all anglers interviewed were from the Lakelse-Terrace-Kitimat area. Nearly 88% were B.C. residents.

10. Cutthroat varied between 3 and 8 years of age and from 180mm to 455mm in length.

11. The bulk of the catch was made up of cutthroat of age 4 (29%) and 5 (44%).

12. The sex ratio was 1 male: 1.88 females.

13. A comparison of success rate between the 1950’s studies and the two recent ones indicates a marked decline in the cutthroat fishery. In the 1950’s the catch per angler hour averaged 1.14 and .94 for the Lake and River respectively. In recent studies, the average catch per angler hour was .37 and .30 for the Lake and River respectively.

14. Another analysis of the cutthroat fishery trend over the past 25 years, based on a comparison of average age — lengths, was inconclusive. Basically, the population structure has not changed.

15. Although success rates have declined since the 1950's, effort has trebled. In final analysis, the cutthroat trout population appears to be similar to that of 25 years ago; total harvest has not changed. New regulations should reflect the quality fishery on the river and the continued survival of the spawning population therein.

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