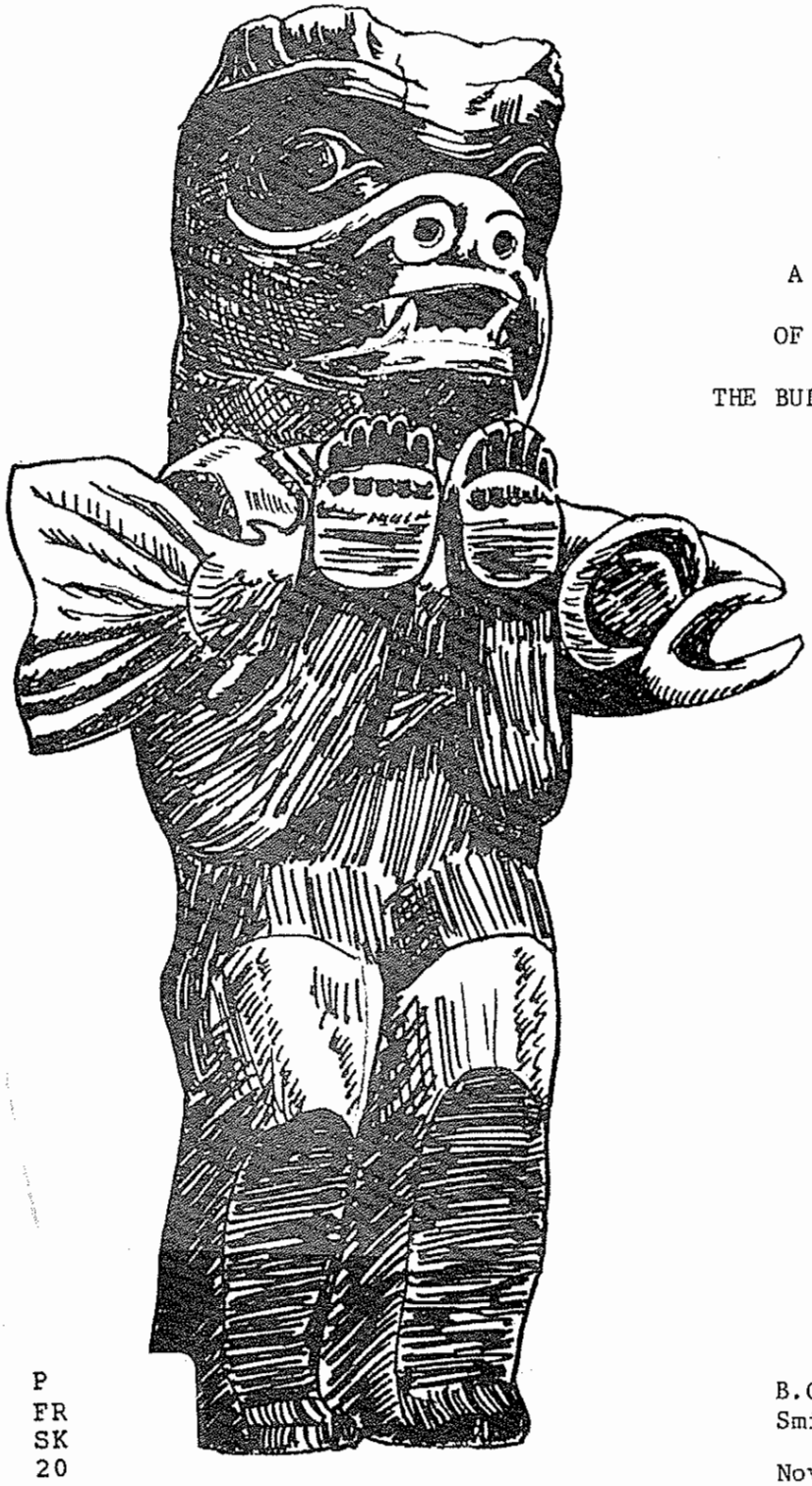
Skeena Region

British Columbia Fish & Wildlife Branch



TOBOGGAN CREEK:

A REPORT ON THE RESULTS

OF FIELD WORK UNDERTAKEN BY

THE BULKLEY VALLEY STEELHEAD CLUB,

AUGUST - OCTOBER, 1978

BY

S.P. Hatlevik

B.C. Fish and Wildlife Branch
Smithers, B. C.

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SUMMARY

In 1978 the Bulkley Valley Steelhead Society obtained a $1,000 grant under the Salmonid Enhancement Program to construct and operate a counting fence and fish trap on Toboggan Creek. From September 1 to October 27, a total of 164 pinks, 817 coho and 8 steelhead were counted on their spawning migration. The project was a great success and it is recommended that it be continued in 1979.

INTRODUCTION

In 1978 a group of anglers, primarily from Smithers, got together and formed the Bulkley Valley Steelhead Society. After several meetings and consultation with the Provincial Fish and Wildlife Branch they decided to undertake a project on Toboggan Creek near Smithers (Figure 1). The proposal consisted of the construction, installation, and monitoring of a fence and upstream fish trap to enumerate the spawning migrations of steelhead and salmon.

In July, 1978 the club received a $1,000 grant under the Salmonid Enhancement Program to proceed with the project. Materials were purchased, construction began, and by September 1 the fence and fish trap were installed and in operation.

The purpose of this report is twofold:

1. To document the results of the 1978 Toboggan Creek project.

2. To present a brief description and provide a reference of the past and present work pertinent to the watershed.

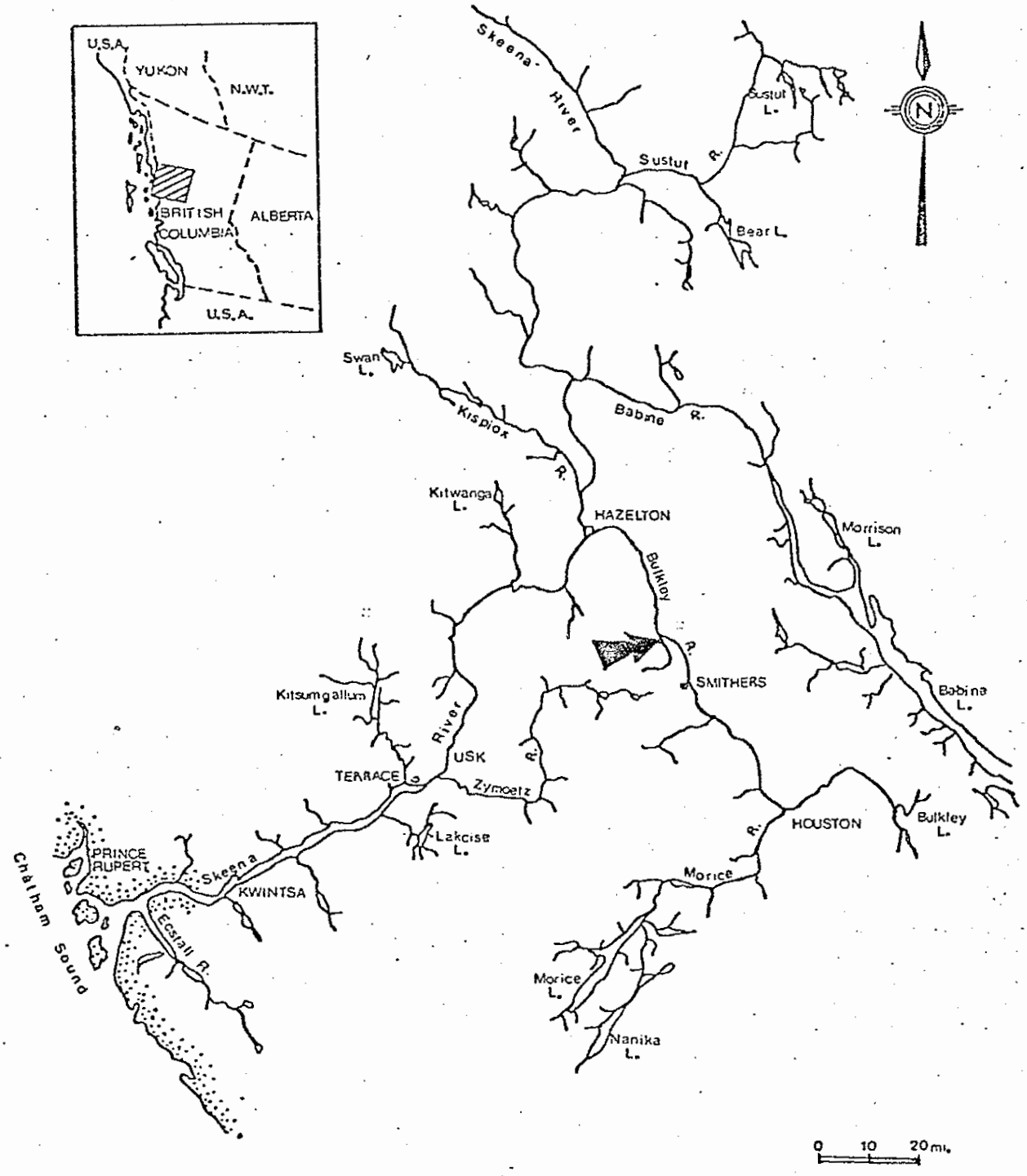


Figure 1. Location of the Toboggan Creek Project

Background History

In the spring of 1978, sections of Toboggan Creek were walked in an effort to locate and count spawning steelhead. As a result of this, and information obtained from other sources, a map has been drawn (Figure 2). It shows the location of the fence, spawning areas, beaver dams, and sample points.

There has been quite a lot of work done within the Toboggan Creek watershed:

1. Since 1951 the Department of Fisheries and the Environment has kept records of salmon spawning escapements (Table 1).

2. In 1974 the B.C. Provincial Museum netted Toboggan Lake for fish samples.

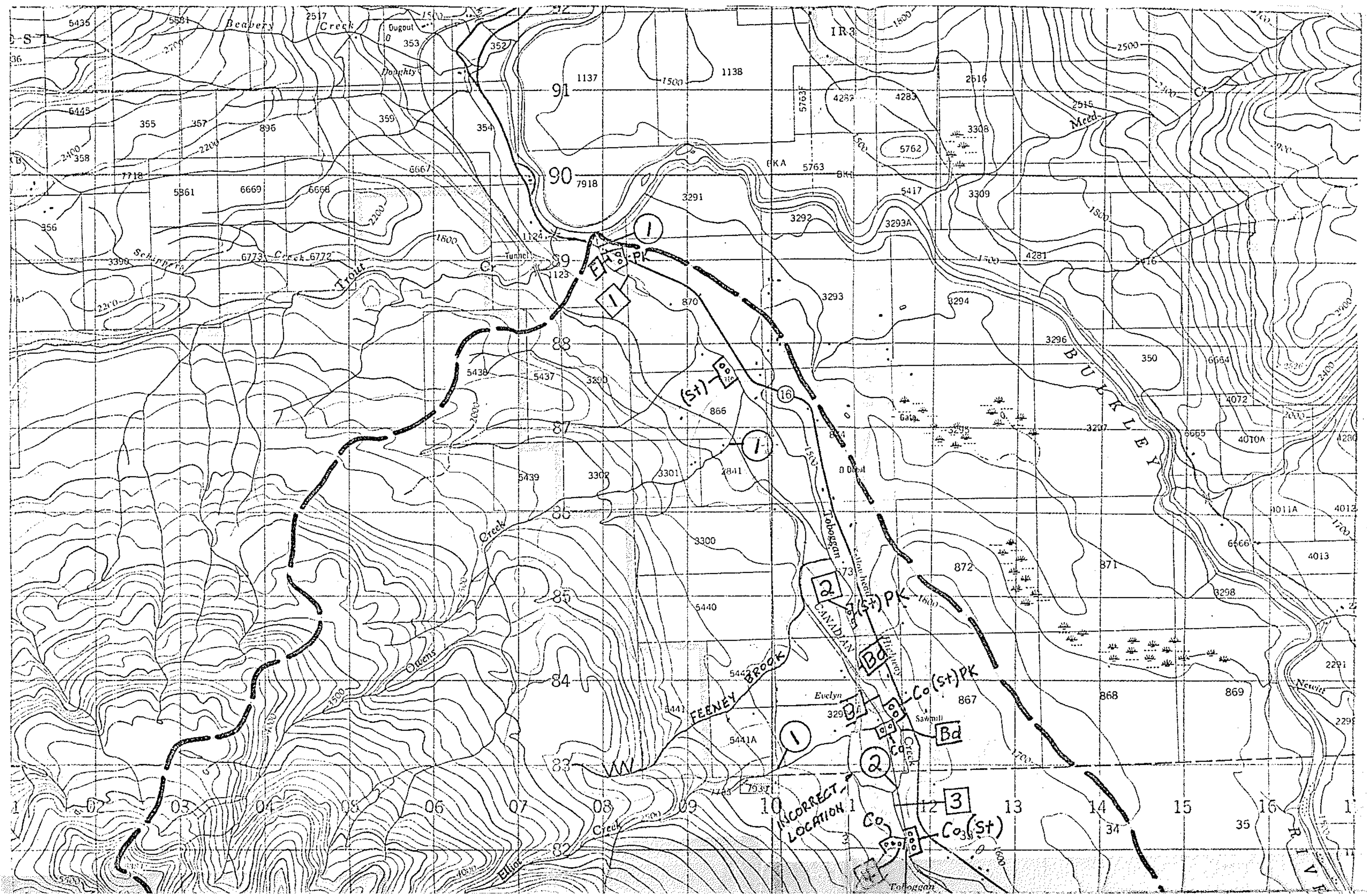
3. In 1975 the Resource Analysis Branch did some stream survey work on Toboggan Creek and tributaries. Electroshocking and point sample sites have been denoted on Figure 2.

4. In May, 1978 the Water Rights Branch installed staff gauges at four locations (see Figure 2) where they have been metering flows in order to establish relationships between gauge heights and stream discharges.

5. Ross Neuman and Chuck Newcombe (Habitat Protection Section - Fish and Wildlife Branch) are using Toboggan Creek as a model for a study concerning stream flows and fish habitat requirements.

6. In late September 1978, Dave Tredger and Ron Ptolemy (Habitat Improvement Section - Fish and Wildlife Branch) evaluated the fish habitat of Toboggan Creek and tributaries.

7. In the fall of 1978, a crew was hired by the Department of Fisheries and the Environment to keep beaver dams open during the coho migration.


BULKLEY
RIVER
Toboggan
CANADIAN
Highway
Yellowhead
FEENEY BROOK
Owens
Creek
Trout
Schappert
Beavery
Dugout
Doughty
Tunnel
Evelyn
Sawmill
Elliot
Newitt
Meed
IR 3
INCORRECT LOCATION
(St) PK
Co (St) PK
Co (St)
Bd
PK

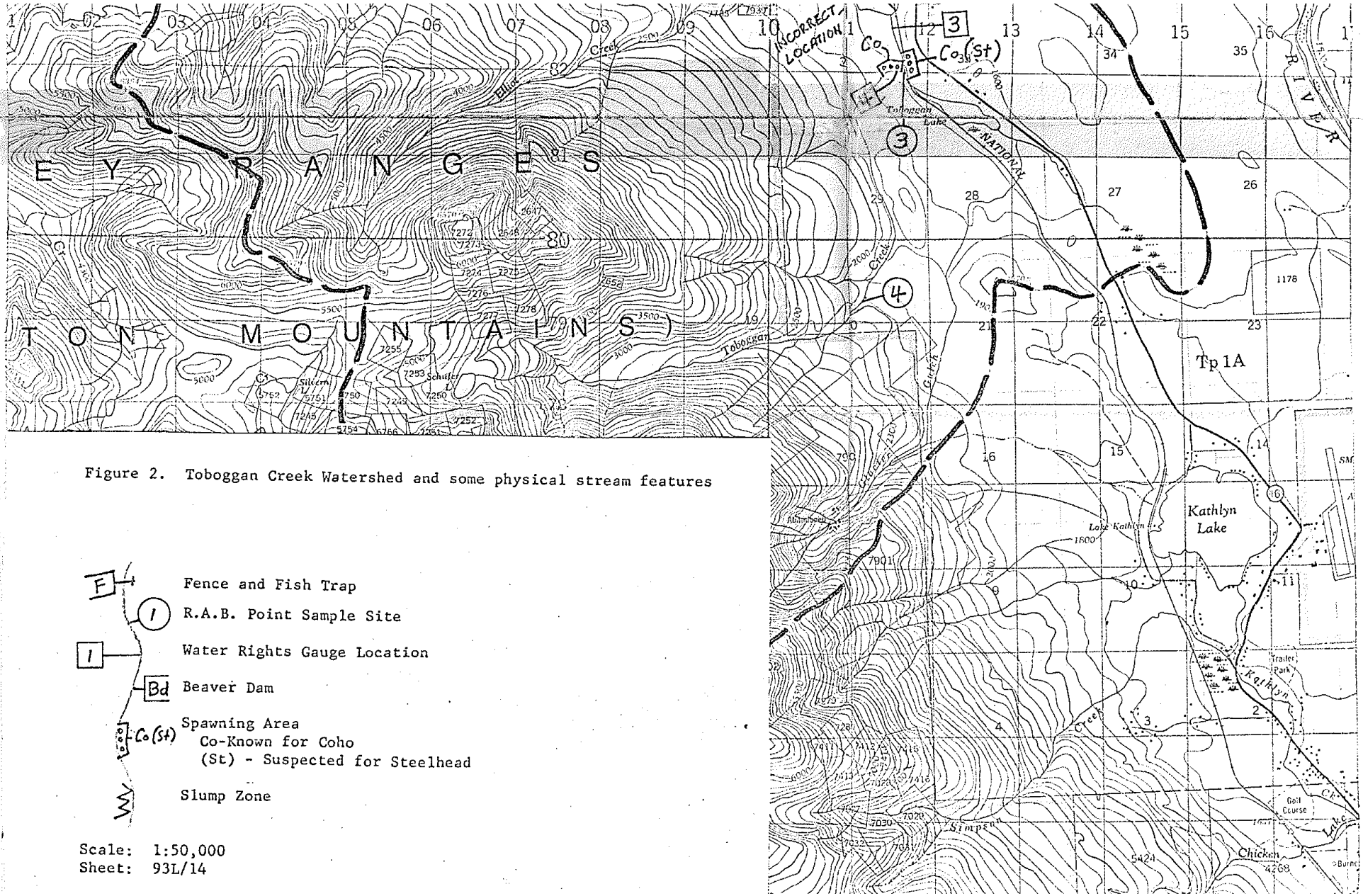


Figure 2. Toboggan Creek Watershed and some physical stream features

F — Fence and Fish Trap

1 — R.A.B. Point Sample Site

1 — Water Rights Gauge Location

Bd — Beaver Dam

Co (St) — Spawning Area
Co-Known for Coho
(St) - Suspected for Steelhead

Slump Zone

Scale: 1:50,000
Sheet: 93L/14

SPAWNING ESCAPEMENT RECORD FOR: TOBOGGAN CREEK

YEAR	SOCKEYE	CHINOOK	COHO	CHUM	PINK	STEELHEAD
1947						
48						
49						
50						
51			1100			
52			750			
53			650			
54			600			
55			700			
56			750			
57			200			
58			400			
59			25		750	
60			200			
61			200			
62			1500		400	
63			450		1000	
64			250		300	
65			500			
66			200			
67			150			
68			200			
69			400			
70			1000			
71			1700		1000	
72			2000		100	
73			2000		1800	
74			500			
75			100			
76			300			
77			1010			
78						
79						
80						
81						
82						
83						
84						
85						
Arrival						
Start			Oct. 1		Aug. 15	
Peak			Oct. 20		Aug. 25	
End			Oct. 31		Aug. 31	

REMARKS:

Table 1. Annual Spawning Escapement Records for Toboggan Creek. Taken from records compiled by the Department of Fisheries and the Environment.

Description of Toboggan Creek Watershed

Toboggan Creek is 17 kilometers in length and drains an area of approximately 112 square kilometers. Beginning from Schufer Lake, just north of Hudson Bay Mountain, it flows generally north-eastward to join its major tributary, Glacier Gulch Creek. Most of this section has a steep gradient, a narrow confined channel and poor fish habitat. Vegetation in the upper elevations is alpine forest changing to hemlock - balsam further down. The last four kilometers of this stretch have a lower gradient and much better fish habitat.

At the Glacier Gulch Creek junction, Toboggan Creek changes direction and flows north-westerward into the Bulkley River about 20 kilometers north of Smithers. Vegetation is lodgepole pine and spruce along with cottonwood, aspen, and willows. The creek has a low gradient and meanders along a wide, flat valley bottom. It contains many log jams, windfalls, and beaver dams - some which are continually obstructing the creek. In many places, dense streamside vegetation makes walking the creek very difficult. Substrate composition is generally about 50% fines (sand, silt and clay); 30% gravels (up to 10 cm in size); and 20% larges (greater than 10 cm.). Gravel patches utilized by spawning salmon are often found in close proximity to tributary creeks.

Toboggan Creek has somewhat unstable flows and can quickly change from low and clear water to become high and coloured. Feeney Brook, a small tributary just north of Elliot Creek, flows through a land failure and is a major contributer of silt to the mainstem.

Access to Toboggan Creek is quite good. Highway 16 follows fairly close to the right (east) bank with many side roads leading from it towards the creek. For the most part the Canadian National Railway lies along the left (west) bank. The land adjacent to the mainstem valley bottom is used primarily for agriculture.

Toboggan Creek, along with Toboggan Lake, contains populations of rainbow trout, cutthroat trout, mountain whitefish, Dolly Varden, lampreys, kokanee, coho salmon, pink salmon and steelhead.

METHODS

Members of the Bulkley Valley Steelhead Society voluntarily checked the fence three times daily. A record was kept of fish counts by species and sex. The water level was recorded (from a staff gauge installed inside the fish trap) as was the water temperature. During each check, leaves and debris were cleaned from the fence and trap. A note was usually made of any dead fish caught up in the fence. Two journals were kept: one for fish counts, temperature and gauge height readings (see figure 3); and a waterproof notebook for more detailed observations.

As previously mentioned, the fence and trap were in operation by September 1. The location was about 300 meters upstream from the Highway 16 road crossing and was readily accessible by a dirt road. Originally, the fence was constructed with chain-link fencing braded with upright T-bars (see photos 1 and 2). On September 10 however, high water pushed the fence over and it was "out" for four days (see photo 3). It seemed apparent this would happen every time high flows occurred. Also, it was tedious to extricate leaves and debris from the chain-link material. Consequently the fence was replaced with a series of 2 X 4 wooden frame panels containing removable wooden dowels (see photo 4).

BULKLEY VALLEY STEELHEAD SOCIETY

Toboggan Creek Project

DATE	TIME	NAME	Pinks M	Pinks F	Coho M	Coho F	Steelhead M	Steelhead F	Other Species	Water Temp (°C)	Gauge Height	Remarks

Figure 3. Daily Record Sheet for Toboggan Creek Project.

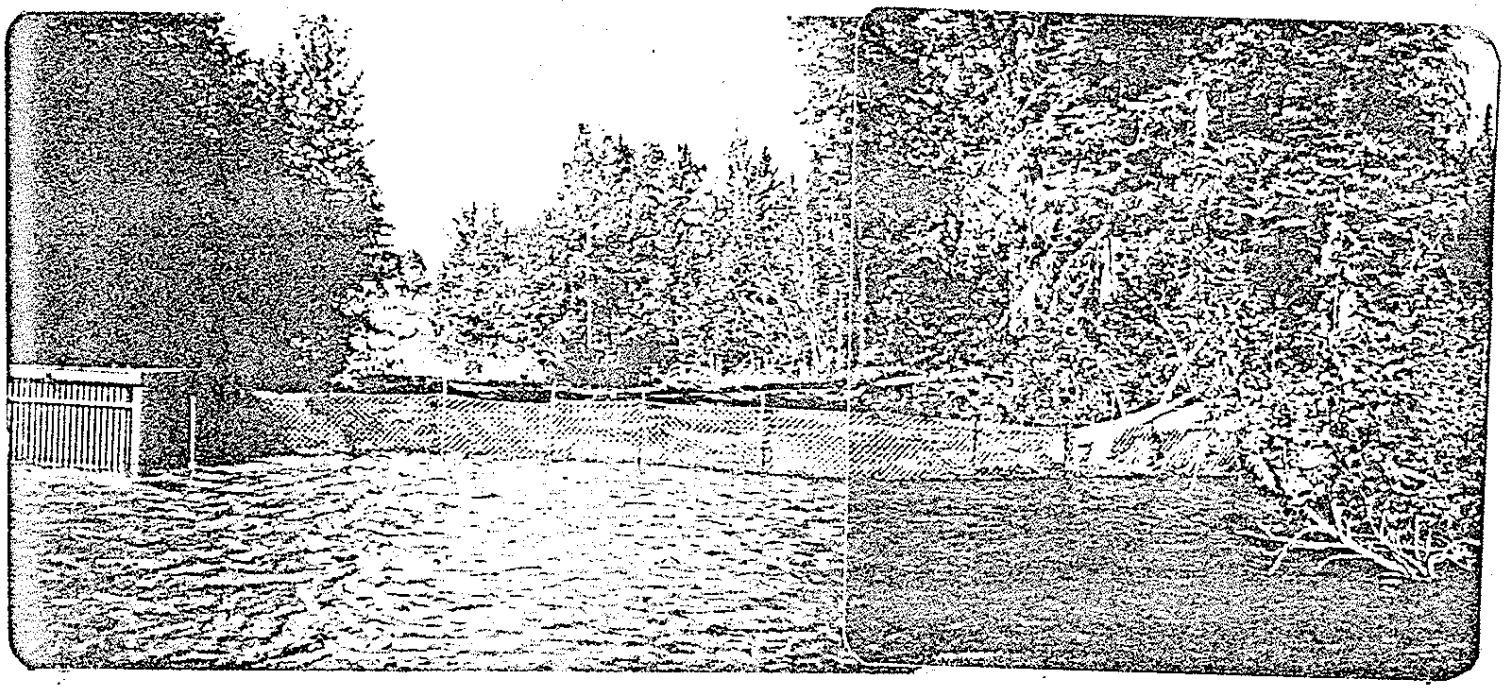


Photo 1. The original fence and fish trap installed in Toboggan Creek on September 1, 1978 (looking downstream). Note the spawning pink salmon in the lower portion of the photograph.

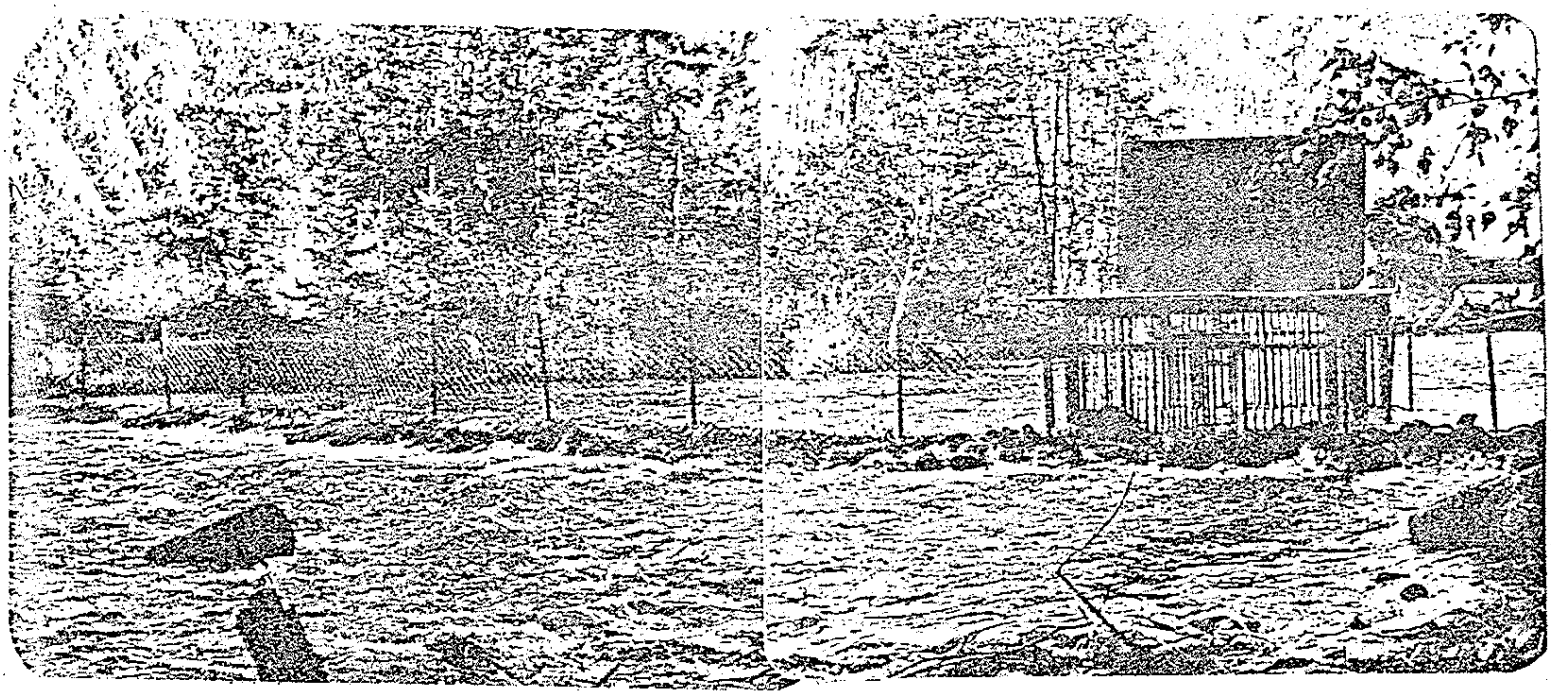


Photo 2. An upstream view of the original structure installed in Toboggan Creek on September 1, 1978. Note the "falls" created by rocks and sandbags used to anchor the bottom of the fence.

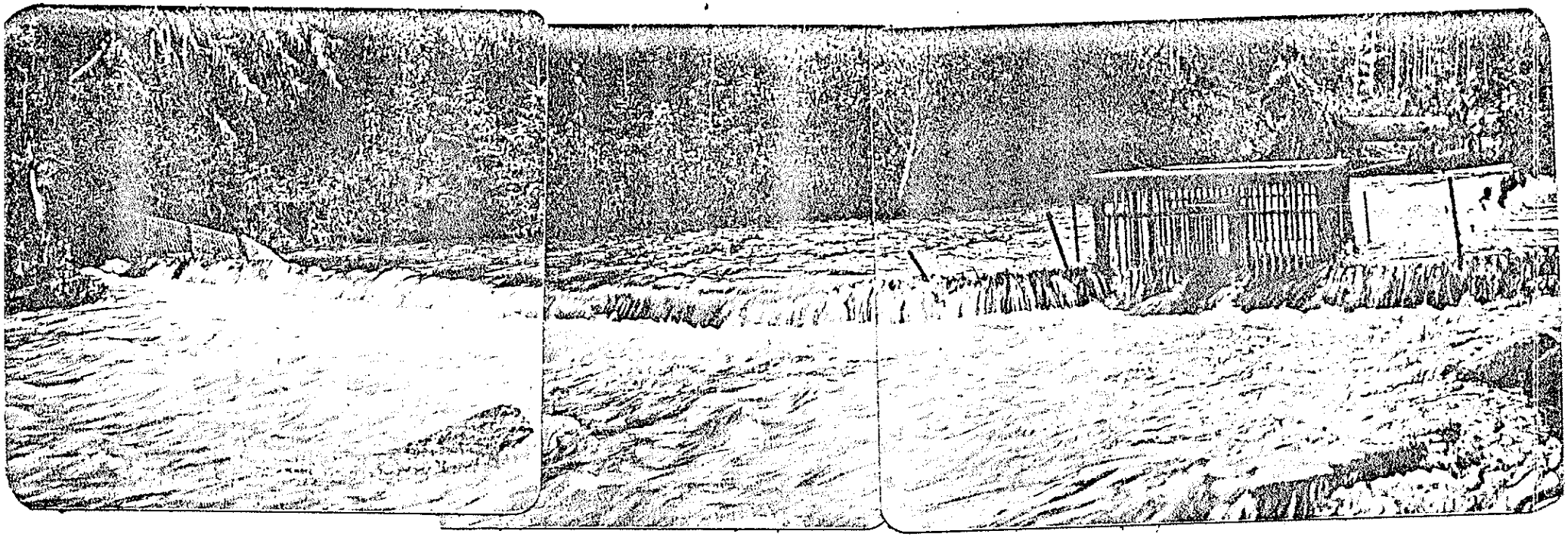


Photo 3. The original chain link fence pushed over by high stream flows on September 10, 1978.

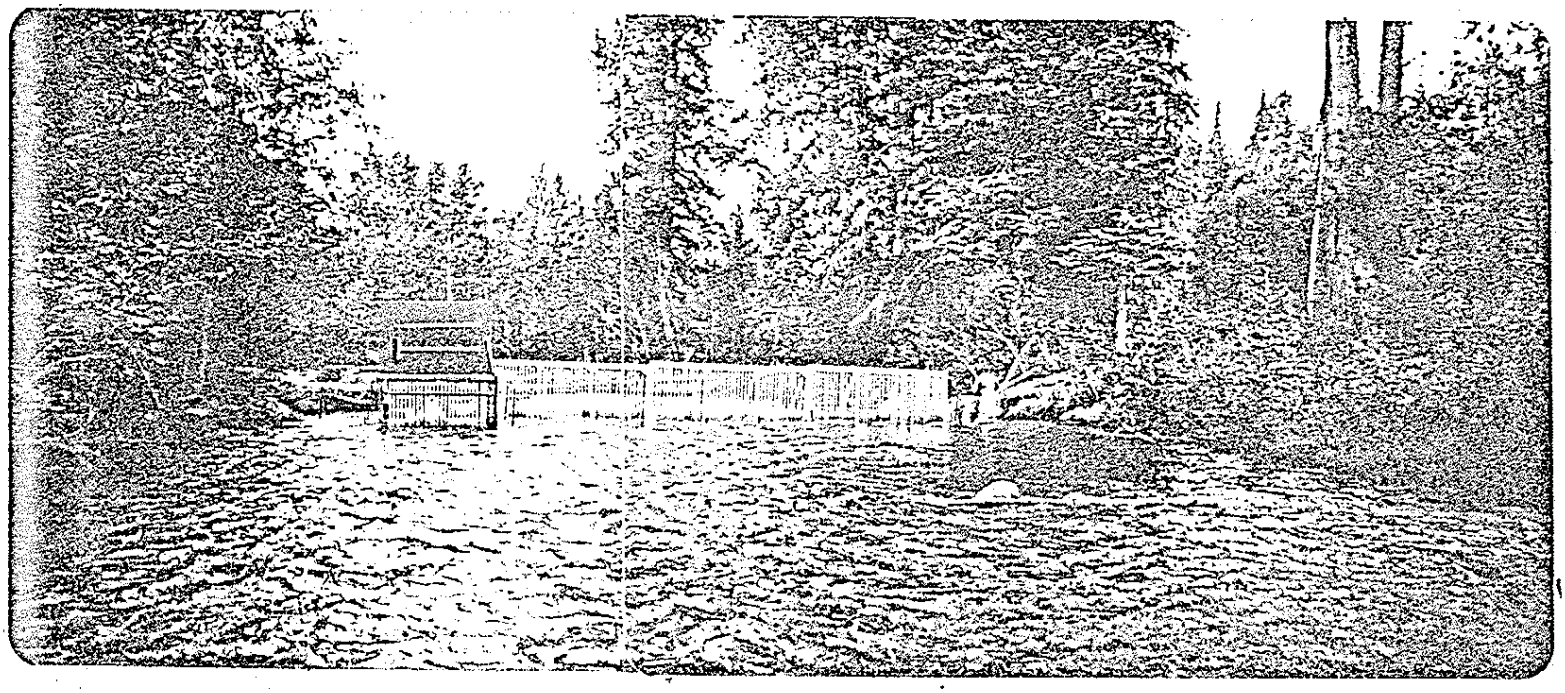


Photo 4. Wooden panel fence installed in Toboggan Creek on September 14 to replace the earlier chain-link structure (looking downstream). A fourth panel was added to the right side on September 21.

Although more expensive, this proved to be much stronger and easier to keep clean than the original chain-link effort.

By October 27 the coho migration appeared to be finished. The dowels were pulled and a work party was scheduled to remove the rest of the fence and trap later. However, extremely high flows occurred a few days later and part of the fence was washed away. When the remains were pulled on November 4 it was evident that most of the structure would have to be rebuilt.

RESULTS

A summary of daily fish counts is presented in Table 2. A total of 164 pink salmon were counted through the fence from September 1 to the last day of record, September 16. Of this total 109 were males, 55 were females and the sex ratio was 1 female to 1.98 males. Pink salmon were observed spawning in the following areas:

1. Both above and below the counting fence.

2. About one kilometer above Feeney Brook.

3. In the vicinity of Elliot Creek.

The above spawning areas, as well as those used by coho and steelhead, have been depicted in Figure 2.

Altogether, 817 coho salmon were counted through the fence; beginning September 1 and ending October 23. The count was comprised of 488 males and 329 females with a sex ratio of 1 female to 1.48 males. The spawning areas were noted as follows:

1. From just slightly above the mouth of Elliot Creek downstream to the Evelyn Station road crossing.

2. In Elliott Creek, from the mouth upstream to about 50 meters beyond the C.N.R. railway crossing.

Table 2. 1978 Toboggan Creek Fence Counts - Daily Summaries

	Pinks				Coho				Steelhead			
	M	F	Total	Cum. Total	M	F	Total	Cum. Total	M	F	Total	Cum. Total
Sept. 1		1	1	1	2		2	2				
	14	11	25	26	1	1	2	4				
3	9	4	13	39	3	1	4	8				
4	9	4	13	52								
5	17	10	27	79								
6	14	3	17	96								
7	15	4	19	115								
8	4	5	9	124								
9	5	2	7	131								
10	14	10	24	155	3	2	5	13	2	3	5	5
11		1	1	156	9	9	18	31				
12	1		1	157								
13	2		2	159								
14	1		1	160								
15	2		2	162	2		2	33				
16	2		2	164								
17					1		1	34				
18					1	1	2	36				
19												
20					1		1	37				
21												
22												
23												
24					1		1	38				
25												
26												
27												
28					3	4	7	45				
29					6	3	9	54				
30					46	39	85	139		1	1	6
Oct. 1					98	76	174	313				
2					35	36	71	384				
3					51	19	70	454				
4					16	12	28	482				
5					3	4	7	489				
6					8	3	11	500				
7					22	10	32	532				
8					35	21	56	588				
9					6	9	15	603				
10					18	6	24	627				
11					2		2	629				

Table 2. (Cont'd.)

	Pinks				Coho				Steelhead			
	M	F	Total	Cum. Total	M	F	Total	Cum. Total	M	F	Total	Cum. Total
Oct. 12												
13					1		1	630				
14					23	6	29	659				
15					27	22	49	708				
16					21	18	39	747				
17					19	16	35	782	1	1	2	8
18					11	4	15	797				
19					13	5	18	815				
20						1	1	816				
21												
22												
23						1	1	817				
24												
25												
26												
27					DOWELLS WERE PULLED							

3. In both Toboggan Creek and Glacier Gulch Creek; fairly close to their junction.

Pre-spawning mortality was evident with 35 dead coho (4.3% of total run) recovered from the dowelling. Most of them were found "gilled" at the downstream end of the fish trap.

Only eight steelhead were recorded. This was not surprising as it is suspected that the steelhead migration into Toboggan Creek occurs in the spring.

As previously described, the fence was "out" for four days (September 10 - 14). Some fish may have migrated through without being enumerated.

Installation of the wooden fence raised the water level and decreased the velocity, creating a slow-moving pool along each bank. Apparently beavers found this a good prospect for a dam because they moved in near the end of September and began piling debris against the structure.

DISCUSSION

The Federal Fisheries spawning escapement records (Table 1) indicate pink salmon begin spawning on August 15. As the fence was not in operation until September 1, a major portion of the run was not recorded. The records also indicate that pinks finish spawning on August 31. This year the last pinks were counted through the fence on September 16 and spawning probably took place for at least a week afterward. It is interesting to note that calculations based on the annual spawning escapements indicate the average pink run over seven years was 764 fish while over 27 years the average coho escapement was 660 fish.

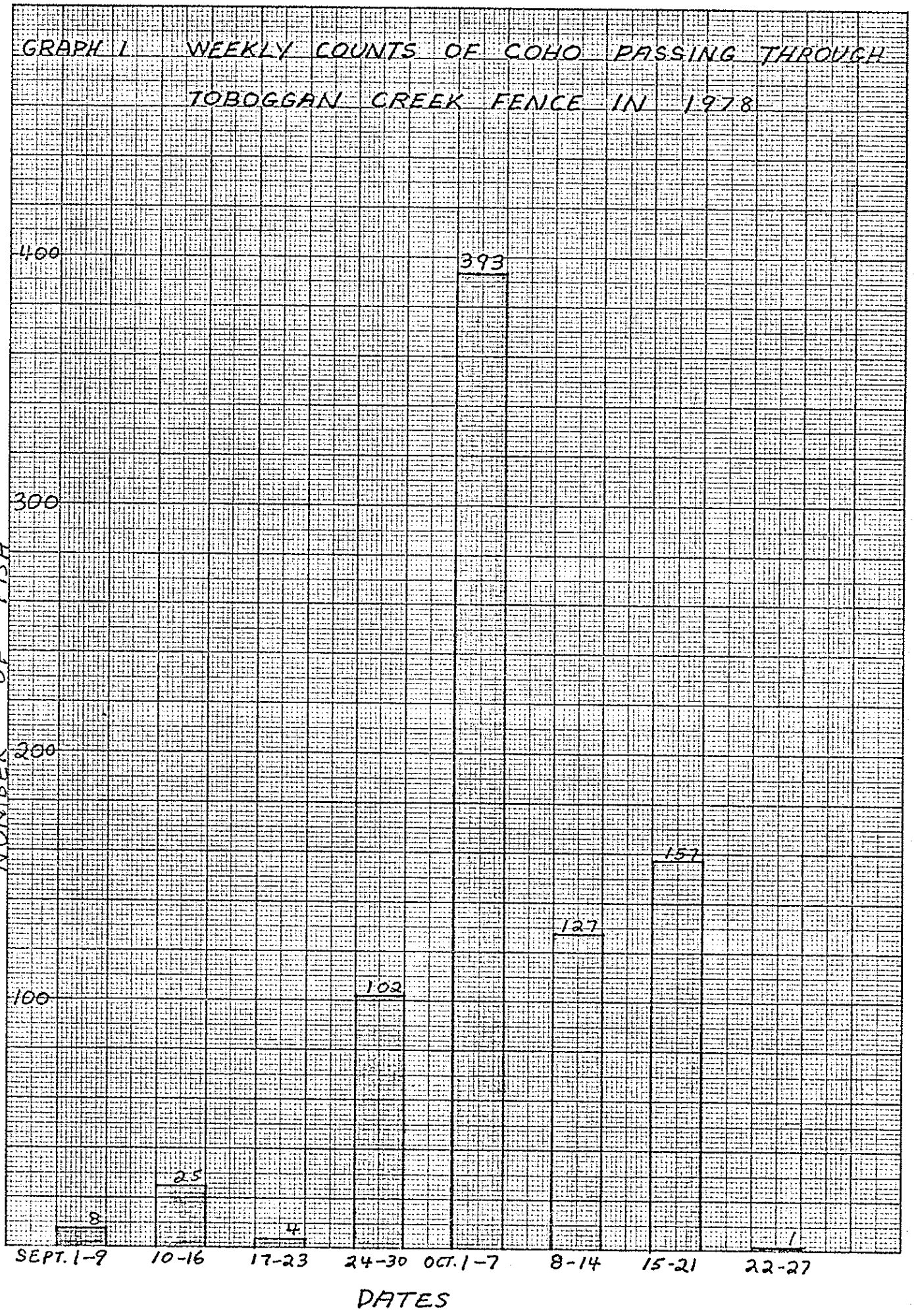
Two coho were recorded on the first day of operation so it is suspected that the migration had already started prior to the fence installation. However, only eight coho were recorded in the first nine days so it is thought that only a small number of fish were missed at the beginning of the run. During the time the fence was "out" due to high water (September 10 - 14) some coho may have been able to leap it and pass through unrecorded (see photo 3). However, 18 coho were removed from the fish trap on September 11 still following the easiest route, which of course led them into the trap. On September 15, the first impassable beaver dam (located just below the Evelyn Station road crossing) was inspected and found to be blocking an estimated 30 to 40 coho. This compares favourably with the total fence count of 33 coho to September 15 so it is reasoned that few unrecorded coho made it past the fence while it was "out".

An examination of the daily notes reveals that most of the coho mortality occurred during the first peak of migration (September 28 to October 6). At this time, the trap often became crowded in between checks. It is thought this forced the weaker fish to the downstream end where they became "gilled" in the dowelling. On October 6 plywood was placed in front of the dowelling. This seemed to reduce the rate of coho mortality. However, dead fish were still occasionally found in the fence dowels.

Graph 1 presents a weekly summary count of coho passing through the fence. The major peak of the migration occurred the first week of October. It is interesting to note that the migration came to an abrupt, rather than a tapering halt, about two weeks later on October 23.

Spawning coho were observed as late as November 3. This compares favourably with past escapement records which indicate the end of spawning to be about October 31.

The fact that the wooden fence created an environment attractive to beavers is a cause for concern. The debris build-up along the fence was not extensive, so it is suspected that only one beaver had moved in. However, if the site became colonized a group of beavers would undoubtedly hamper operations.



CONCLUSIONS

1. Overall the 1978 Toboggan Creek project was a great success and a valuable aid in fishery management.

2. Although more expensive, the second fence constructed of 2 X 4 lumber frame panels containing wooden dowels was better than the original chain-link fence supported by T-bars. It was much stronger and easier to keep clean of debris.

3. The total pink salmon count of 164 is only a portion of the 1978 pink migration because the fence was not installed soon enough to record the entire run.

4. Historical spawning records indicate pink salmon finish spawning about August 31 (Table 1). As pinks were recorded migrating through the fence on September 16 it seems apparent they spawn several weeks longer than had been suspected.

5. It is thought that a few coho may have been missed prior to the fence installation and also during the period when the fence was "out". However, it is felt that the unrecorded number is not significant and that the total count of 817 is indicative of the size of the 1978 coho migration.

6. It is suspected that the 4.3% coho mortality was caused by a combination of high flows, overcrowding, and unprotected dowelling at the downstream side of the trap.

7. The major portion of the steelhead spawning migration into Toboggan Creek does not occur between September 1 and October 27. It is thought the steelhead overwinter in the Bulkley River and ascend Toboggan Creek in the spring.

8. The wooden fence altered stream flows and attracted beavers creating a potentially serious problem. In addition to building a completely impassable dam they could have eaten the very expensive dowelling.

9. About November 2, extremely high flows irreparably damaged the fence and funds will have to be apportioned for materials to rebuild it.

RECOMMENDATIONS

1. The Toboggan Creek project should be continued in 1979. One of the primary steps in a fisheries management program is inventory and the project is helping to fulfill this need. As previously mentioned, the existing structure has been damaged beyond repair, and funds will have to be allocated to purchase the materials necessary for re-construction.

2. The fence should be installed for a period beginning in late March or early April to document the anticipated steelhead spawning migration.

3. It would be desirable to radio-tag a few steelhead at several locations in the Bulkley River nearby the mouth of Toboggan Creek. This would help to verify suspected overwintering sites in the river and to locate spawning areas in Toboggan Creek.

4. The fence and trap should be installed in the first week of August and remain operational until freeze-up, sometime around the middle of November. This would ensure a complete documentation of the salmon migrations.

5. The fish-trap should be checked more often than three times daily during peak migration periods. This would help prevent overcrowding and hopefully reduce pre-spawning mortality.

6. A rather demanding work schedule would be placed upon the Bulkley Valley Steelhead Society if the two previous recommendations were followed. Consequently the prospect of hiring someone to monitor the fence should be considered. In addition to reducing the Society's workload (but certainly not their degree of involvement) there would be many other advantages. Some of them are:

   a. The fence would be cleaned more often, reducing the risk of damage or loss due to high flows.

   b. There would be less liklihood of vandalism or poaching (the project is visible from Highway 16) with someone on the site.

   c. Abrupt changes, such as a sudden influx of fish, high flows, fence damage, and beaver activity would be noticed and acted upon immediately.

ACKNOWLEDGEMENTS

The Bulkley Valley Steelhead Society is to be commended for their initiative and co-operative spirit in tackling the project. Two members - Tom Jones and Egon Weger - deserve special mention. They were instrumental in the formation of the club and were largely responsible for getting the project off the ground and seeing it through to completion. Mike Whately of the Fish and Wildlife Branch is to be credited for providing encouragement and advice at every step along the way. Pacific Inland Resources provided some lumber at a very nominal cost. Special thanks, of course, are extended to the Salmonid Enhancement Program which provided the funds to make the project possible. Ruth Milne is thanked for typing the report.