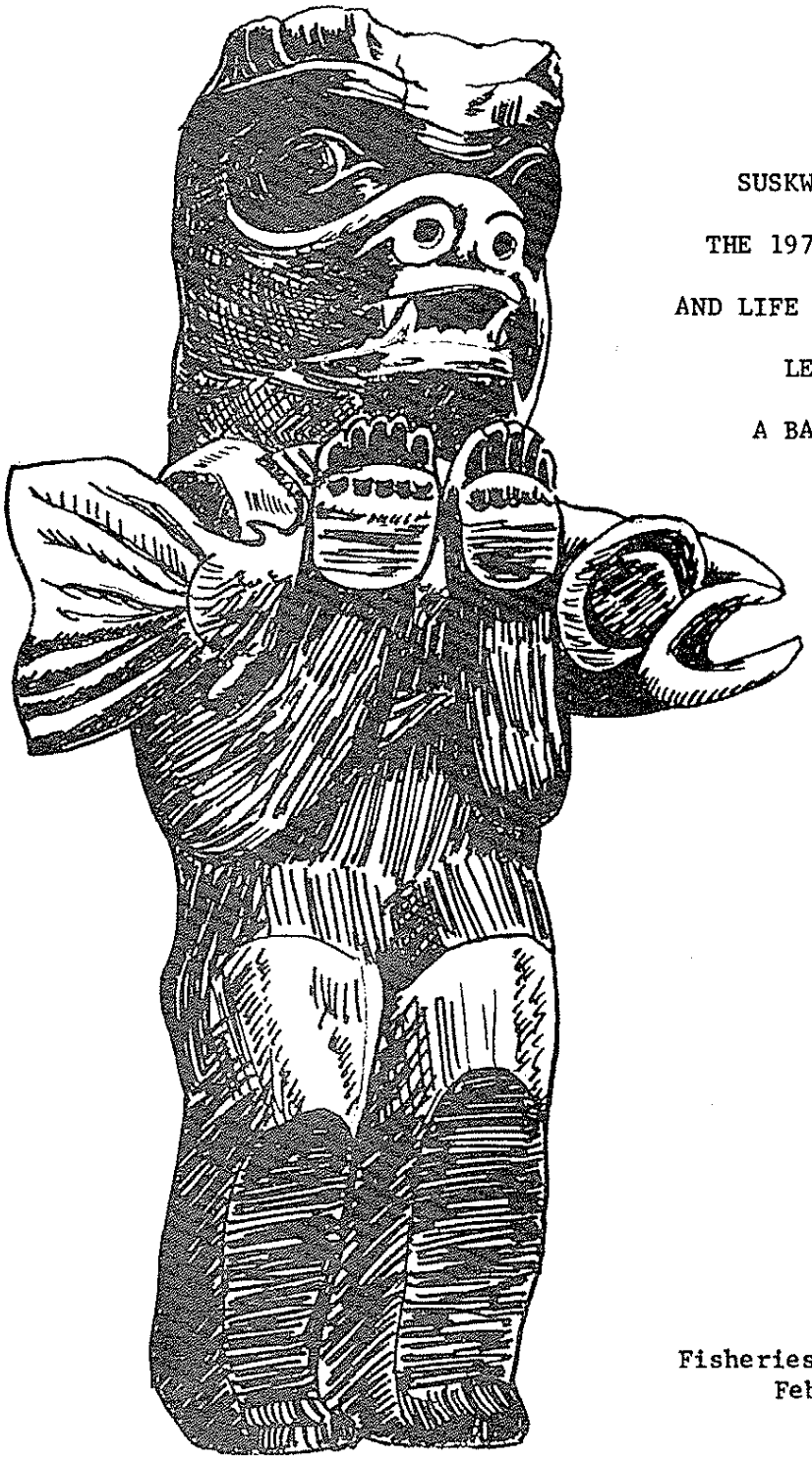
Lough

Skeena Region

British Columbia Fish & Wildlife Branch



SUSKWA RIVER STEELHEAD TROUT:

THE 1977 INVENTORY, CREEL SURVEY

AND LIFE HISTORY CHARACTERISTICS STUDY

LEADING TO THE REMOVAL OF

A BARRIER ON HAROLD-PRICE CREEK

By

W.E. CHUDYK

SK 15

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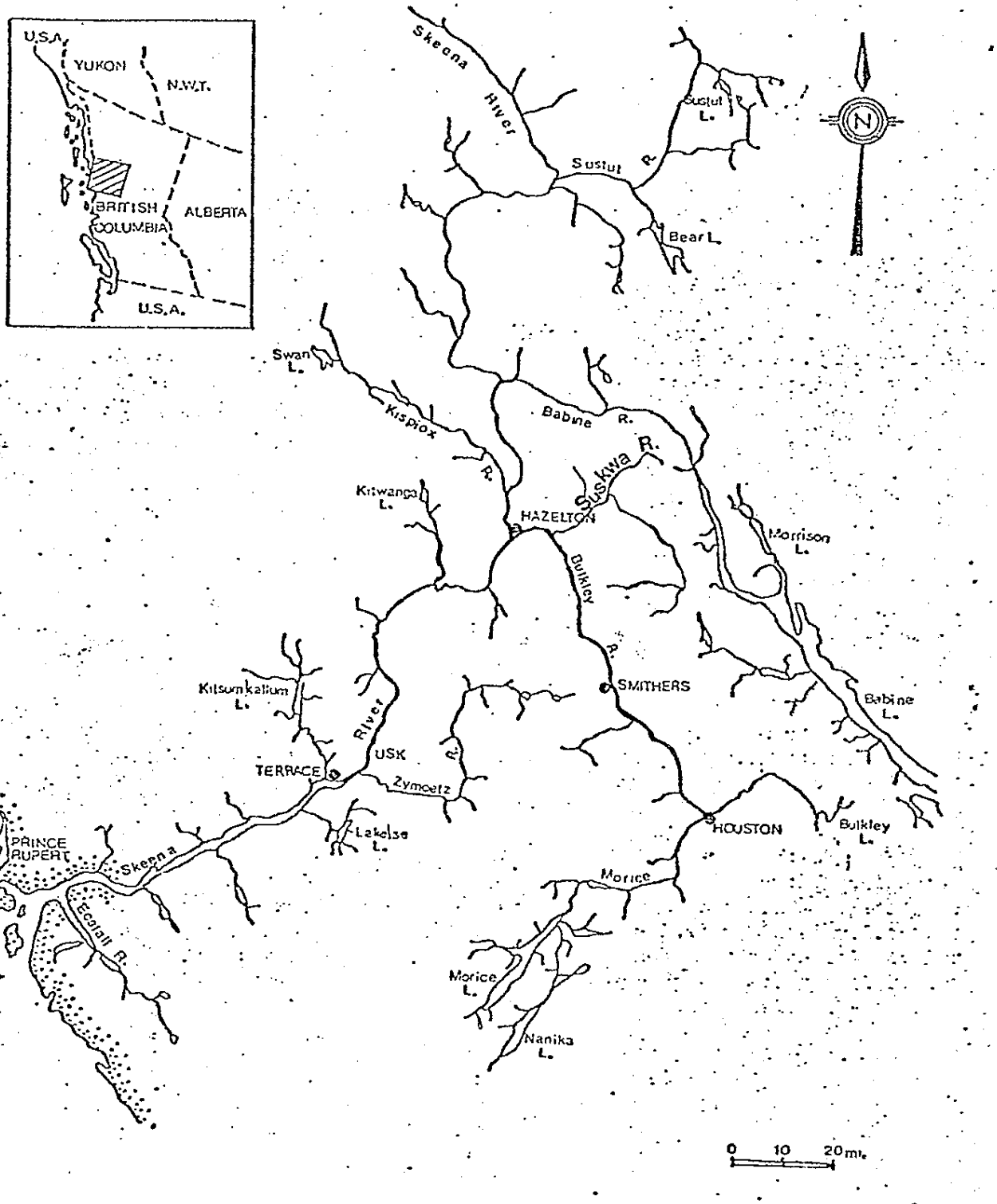

Fig. 1. The Skeena River and main tributaries.

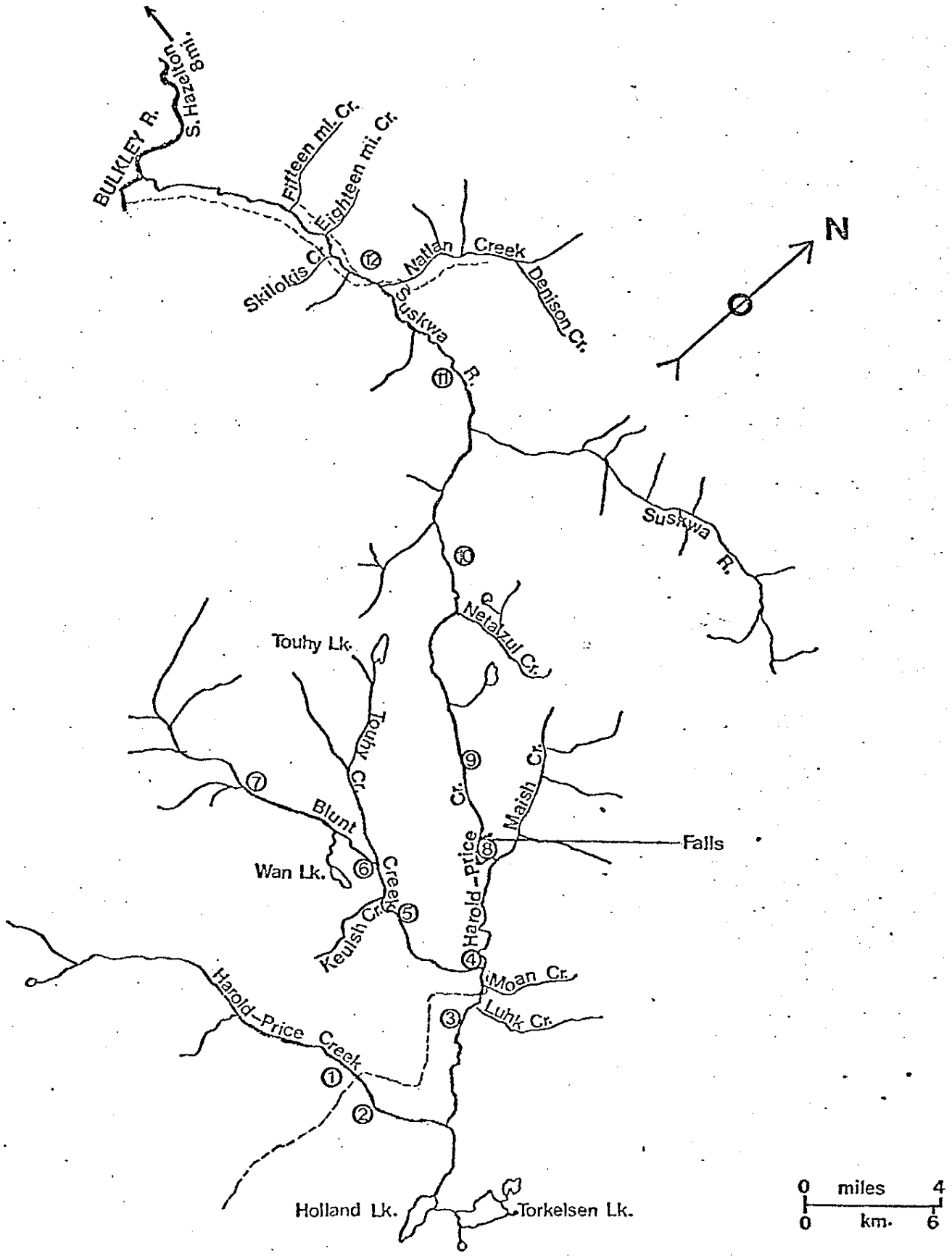

Fig. 2 Suskwa River and tributaries with fish sample sites circled

DESCRIPTION OF THE STUDY AREA AND THE STEELHEAD FISHERY

The Suskwa River, located 55°14'N. by 127°25' W., drains an area of approximately 1869 sq. km. Harold-Price Creek is the major tributary, in fact it should more aptly be named the Suskwa proper as it contributes 90% of the total Suskwa flow. The mean annual discharge for the Suskwa is 20,048 l .s. The Suskwa River and Harold-Price Creek are on average ideal rainbow trout systems that have moderate gradient (2%), distinct banks with a full range of bottom gravels (2 cm.-40 cm.). (Varney and Truelson, 1975).

Chinook, coho and pink salmon co-inhabit with steelhead trout in the Suskwa River. Cutthroat trout, native rainbow trout, Dolly Varden char and Rocky Mountain whitefish are resident game fish. Suskwa steelhead are summer fish which enter the system in late August or early September. The main angler effort is concentrated from mid September to the end of October. Steelhead angler catch data (Steelhead Harvest Analysis, 1972 to 1977) show that in an average year 96 anglers kill 59 steelhead and release 13 (Table 1). Most Suskwa anglers are local residents, although other B.C. residents, Non Resident Canadians and Non Canadians are active participants in the fishery.

Table 1. Estimated number of anglers, steelhead caught and released and angler success from Steelhead Harvest Analysis 1972-1976.

Year	Number of Anglers	Number of Steelhead Caught	Number of Steelhead Released	Catch/ Day
1972-73	53	36	3	.250
1973-74	99	63	16	.258
1974-75	123	96	19	.317
1975-76	36	38	8	.102
1976-77	167	63	17	.154
Total	478	296	63	
Average	96	59	13	.216

The Suskwa has a reputation for harbouring large steelhead akin to the trophy-sized fish of Kispiox and Babine Rivers.

The Suskwa watershed is used by a variety of interests ranging from industrial to recreational. Industrial interests include mining and logging, both of which activities provide access roads used by recreationists.

The major access is from Highway 16, ten kilometers east of New Hazelton via a B.C. Forest Service development road which crosses the Bulkley River at the confluence and continues up the Suskwa Valley. The Suskwa itself is bridged at 5 km. and 13 km. upstream from the Bulkley river bridge. A second access has been constructed into the upper Harold-Price Creek watershed to Blunt Creek from the Babine Lake Road at Chapman Lake. The new logging road will provide access to the Harold Price falls.

METHODS

The 1977 aspect of the Suskwa River project began in July and continued until freeze-up in November. Two Fish and Wildlife assistants, a member of the Headquarters engineering section and two Smithers management biologists were involved in the program. The techniques employed are described as follows:

1) The Suskwa watershed was inventoried using foot, helicopter, motorcycles, rubber rafts and four wheel drive vehicle to transport an inventory crew into remote areas (Fig. 2) to observe and collect data on fish abundance and species present.

   Fish were sampled either with "Gees" traps or by angling with small flies. The inventory area was divided into two sections using the Harold-Price falls as the dividor. The crew was charged with a dual task above the falls - (1) to ascertain whether the falls are a total barrier, and (2) to flag likely areas for future steelhead colonization. Below the falls steelhead spawning and rainbow rearing habitat assessment was most important.

2) The inventory crew switched to a casual creel survey and an adult steelhead tagging program during the sport fishery beginning in late August. The creel survey was used as a crude estimator of steelhead harvest, pre-enhancement. It was hoped that the crew, through creel survey and angling experience on other Skeena tributaries, could forecast the availability of adult Suskwa steelhead for future stock enhancement.

Scale samples were collected and lengths, weights, and sex determined from both crew and sports angler-caught steelhead. Dennison, Mark II tagging guns were used to implant FD-67 Floy international orange coloured spaghetti tags to adult steelhead caught and released by the crew. All tags were applied obliquely to the back just below the dorsal fin of the adult fish as described in Pinsent (1971). It was hoped that tagged fish would be recovered in the angler fishery or observed in the upper river during the inventory work. Juvenile steelhead (rainbow) trout were collected by trapping and angling. Lengths were recorded and a number of scales from each fish were placed between two microscope slides and taped securely. Adult and juvenile scales were analysed using the techniques described in Narver and Withler (1974).

3. Test dynamite blasts were done on the upper segment of the three step falls on Harold-Price Creek to check the fragmentability of the rock and to record the effect of various dynamiting techniques (Hjorth, 1977). Further blasts were applied to the log jam immediately above the Harold-Price falls (Photograph T). In the spring of 1978 before freshet an attempt will be made to reduce the lower falls thus allowing anadromous fish passage to upper Harold-Price Creek.

Since upper Harold-Price creek colonization with steelhead and any future assessmentof angler benefits are still in the planning stages they will be presented in the "Future Works" section of this report.

RESULTS

INVENTORY

Anadromous fish species were not found above the Harold-Price Creek falls. One hundred ninety-eight cutthroat trout and 188 Dolly Varden char were sampled above the falls while seven cutthroat, 28 Dolly Varden char and 52 rainbow trout were collected below the falls (Table 2). Most of the samples were taken by fly fishing, a technique that proved superior to trapping in late July and August. All species sampled ranged in size from 70 to 380 mm. although smaller (45 mm.) fish were observed in log jam areas. The approximate location of each successful sampling area is circled on Figure 2.

CREEL SURVEY AND TAGGING

Of thirty fresh, adult steelhead caught in the lower ten miles of the Suskwa River, 23 were tagged and released (Fig. 3). Spaghetti tags numbered 278 - 288, 302, 304 - 311, 326 - 328, were applied to the steelhead (Table 3). Tagged steelhead were not observed during inventory drifts or helicopter flights. A single tag, number 306, was recovered one mile downstream from its initial tag site.

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Table 2. Numbers, size and species of fish sampled in areas indexed (Fig. 2) Suskwa River 1977.

Date	Figure 2 Index Number	Number	Species	Size Range (mm.)	Method of Capture	Comment
July 26	1	27	CT.	110-350	fly	
		13	D.V.		fly	
July 26	2	40	CT.	70-135	Gee trap	
		99	D.V.	75-150	Gee trap	
July 27	3	8	C.T.	70-135	fly	
		44	C.T.	105-220	fly	
		15	C.T.	220-350	fly	
		73	D.V.	75-160	Gee trap	
					fly	
July 15	4	27	C.T.	150-220	fly	
July 14	5	12	C.T.	200-325	fly	observed man fish 45-100 in log jams
		1	D.V.	143		
July 13	6	8	C.T.	250-325	fly	observed man small fish a the mouth of Touhy Cr.
		2	D.V.	80 - 110		
July 12	7	4	C.T.	250-350	fly	
July 16	8	13	C.T.	150-215	fly	
July 19	9	1	C.T.	170	fly	
		10	D.V.	320	fly	
		14	R.B.	200-380	fly	
July 20	10	6	C.T.	140-180	fly	
		17	D.V.	300-350	fly	
		29	R.B.	110-380	fly	
July 21	11	1	D.V.	323	fly	
Aug. 2	12	3	D.V.	130-150	fly	
		9	R.B.	110-140		

Table 3. Number, tag, age, length and sex of steelhead trout caught at sites circled on Figure 3, Suskwa River, 1977.

Cummulative Steelhead	Site Index	Age	Tag Number	Sex	Length mm.
1	3	-	278	M	851
2	1	-	279	F	864
3	2	-	-	M	610
4	2	-	280	M	610
5	2	4.3+	281	M	965
6	2	4.2+	282	M	737
7	6	4.2+	283	F	889
8	5	4.2+	284	M	838
9	5	4.3+	285	F	838
10	5	4.3+	286	M	864
11	5	4.3+	287	F	889
12	5	4.2+	288	F	838
13	7	4.3+	-	F	813
14	7	4.3+	-	F	838
15	3	4.3+	-	F	762
16	3	-	302	M	927
17	2	4.2+	304	F	787
18	4	4.3+	305	F	864
19	7	4.2+	306	F	660
20	7	4.3S1+	307	M	940
21	7	4.2+	308	F	610
22	5	4.2+	309	M	737
23	5	5.2+	310	F	737
24	5	4.2+	311	M	686
25	2	4.2+	-	M	845
26	2	4.2+	-	M	686
27	2	4.2+	-	M	711
28	5	5.2+	326	M	787
29	8	4.2+	327	M	686
30	8	4.2+	328	F	622
31	Bulkley	4.2+	-	F	838

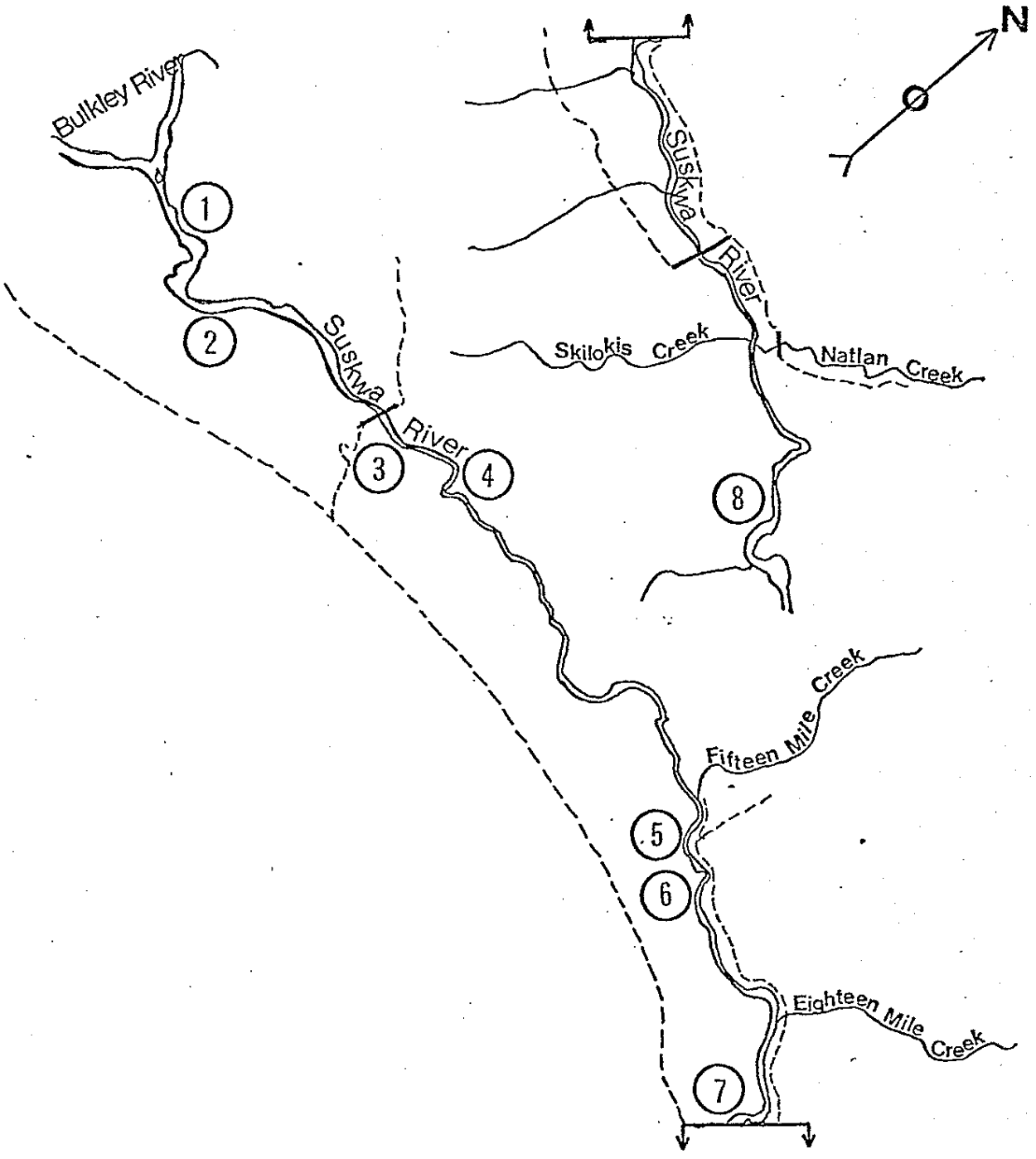


Fig.3 Lower Suskwa River with steelhead tagging sites circled

Most anglers interviewed were experienced steelheaders from either local areas or from Alberta that had fished the Suskwa for two to four years with poor success. An example of the success experienced in 1977 was, angling from dawn to dusk for two weeks without a strike.

LIFE HISTORY OF SUSKWA RIVER STEELHEAD

Adults

For a sample of 26 Suskwa River steelhead collected in 1977; four age groups for maiden fish and one for repeat spawners were identified (Table 4). The dominant age groups were 4.2+ (58 percent) and 4.3+ (27 percent).

Table 4. Steelhead trout age groups, Suskwa River, 1977

Age Group	Number Steelhead	M	F	Percent Total
4.2+	15	8	7	58
4.3+	7	3	4	27
4.3S1+	1	1	-	4
4.2+	2	1	1	7
5.3+	1	-	1	4
5	26	13	13	100

Adult Suskwa steelhead sampled in 1977 had spent four (89 percent) or five (11 percent) winters in freshwater before migrating to sea. Most of the steelhead sampled has spent .2+ (68 percent) years in the ocean although many had three (32 percent) years of ocean life.

Unfortunately the adult steelhead sample size was not large enough to derive meaningful relationships from sex-length-weight data.

Smolt Age-Size Relationships

During the summer of 1977, 110 rainbow trout were collected from which lengths were recorded and scale samples taken. The linear regression of fork length on scale radius of these fish was $y = 19.41 + 3.34$ and was used to estimate smolt lengths from measurements of freshwater radius for the 26 adult steelhead scales collected in 1977 (Appendix 2). The ages of the trout (juvenile steelhead) ranged from 0+ to 5+ and fork lengths ranged from 52 mm to 350 mm. Fish aged 0+ averaged 62 mm., 1+ fish averaged 87 mm., 2+ fish averaged 130 mm., 3+ fish averaged 166 mm., 4+ fish averaged 239 mm., 5+ fish averaged 319 mm. Since the majority of Suskwa steelhead appear to smolt in their fifth year (age 4+) (Table 4) it was not unexpected that there would be few 4+ or 5+ juveniles in the sample (Table 5).

Table 5. Age and size (fork length in mm.) of a sample of juvenile rainbow trout from Suskwa River, summer, 1977.

Age	Sample Period July 19 to August 23 Mean (mm)	Range (mm)	n
0	62	52-74	4
1	87	76-109	19
2	130	106-157	45
3	166	135-202	34
4	239	216-267	6
5	319	288-350	2

Back calculated average smolt lengths for three steelhead age groups ranged from 166 mm. to 220 mm. (Table 6). Estimated smolt lengths for adults of age 4 ranged from 166 to 220 mm. and averaged 192 mm. Age 4+ juveniles averaged 239 mm. However, since these fish were captured between mid summer and fall, it could be assumed that these fish were larger than their age counterparts that smolted in the spring due to 1-2 months extra growth.

Table 6. Means and ranges of estimated fork lengths (mm.) at time of formation of last freshwater annulus for Suskwa River steelhead trout sampled, summer 1977, according to age and year class (sexes combined; repeat spawners excluded).

Year Class	Age Group	n	Mean length at smolting (Range) mm.
1971	4.2+	16	188 166 - 220
1970	4.3+	6	202 176 - 220
1970	5.2+	2	213 206 - 220
1969	5.3+	1	210

Age 3+ juveniles captured in August near the end of the growing season averaged 166 mm. If these fish were to smolt the following spring at age 4 they would be comparable in size to the estimated smolt lengths of age 4. steelhead averaging 192 mm.

The adult steelhead sample is not large enough to produce an accurate back calculated smolt length. However, estimated smolt lengths of 188 mm. and 202 mm. for 4.2+ and 4.3+ adults may be used as rough indicators for true smolt length.

BARRIER MODIFICATION OF SUSKWA RIVER (HAROLD-PRICE) FALLS

The upper step of the three stage falls was successfully modified to allow anadromous fish passage. Unfortunately the first step requires some work before anadromous fish passage will be a realty. A channel was dynamited through the log jam immediately above the upper step of the falls (Photo T).

COLONIZATION

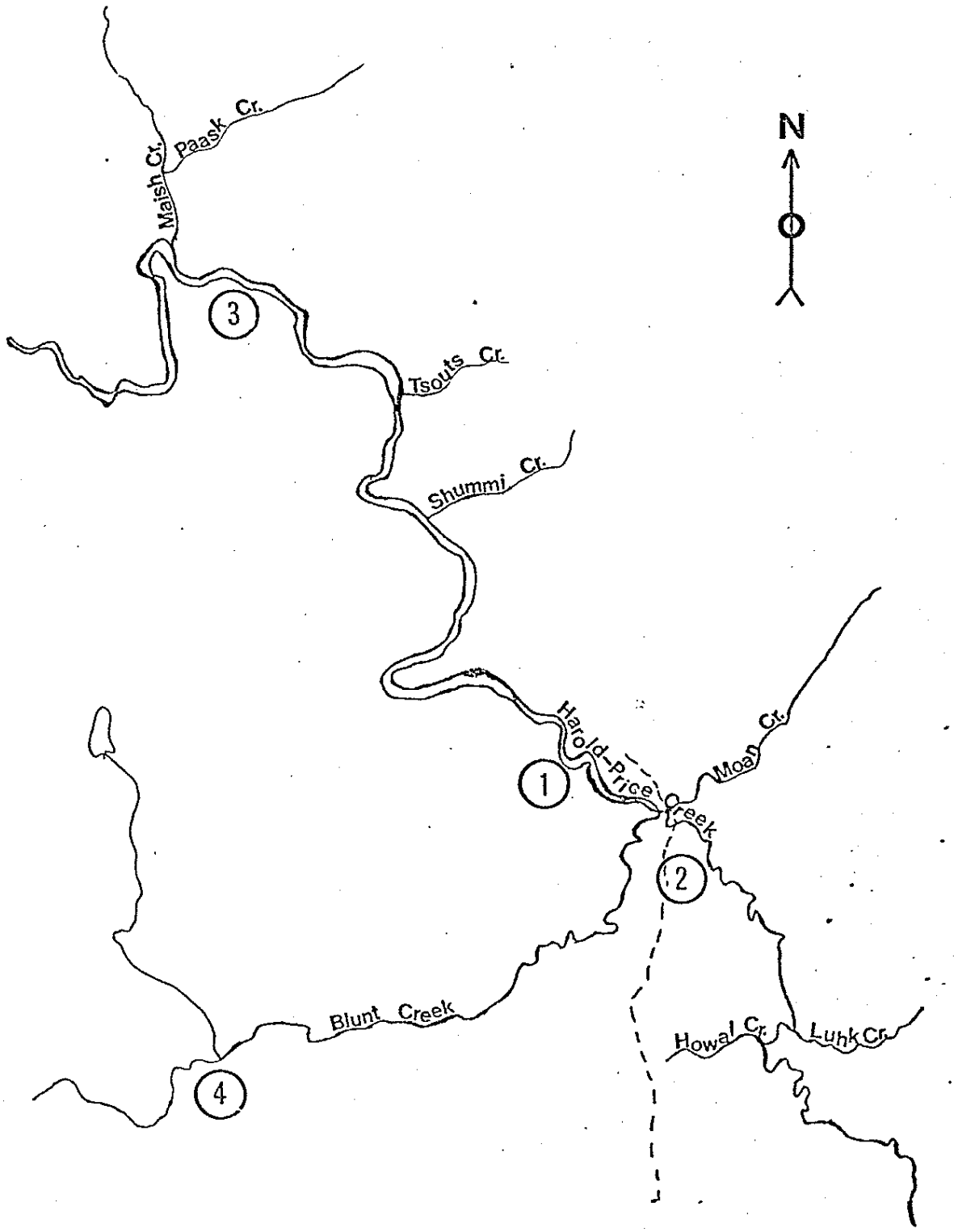
During the inventory of the upper Harold-Price watershed four sites with enhancement potential (steelhead colonization) were selected (Fig. 4).

Site 1 - Directly below and for 3 km. downstream of the second Chapman Lake mainline bridge on Harold-Price Creek.

Site 2 - Above the second Chapman Lake mainline crossing of Harold-Price Creek.

Site 3 - Directly above the Harold-Price Creek falls.

Site 4 - The confluence of Blunt and Touhy Creeks.



*Sites are numbered in order of enhancement potential.

Fig.4 Upper Suskwa River with potential steelhead colonization sites circled

SUMMARY

1. Anadromous fish species were not found above the Suskwa-Harold-Price falls. Although Cutthroat and Dolly Varden char were abundant above the falls rainbow trout were totally absent.

2. Twenty-three adult steelhead were tagged and released from a sample of 30 fish. Tag number 306 was recovered one mile downstream from its initial tag site.

3. In the Suskwa River steelhead life history study four age groups were identified. The dominant age groups were 4.2+ (58 percent) and 4.3+ (27 percent).

4. Adult Suskwa steelhead sampled in 1977 had spent four (89 percent) or five (11 percent) winters in freshwater before migrating to sea.

5. Most of the steelhead sampled had spent .2+ (68 percent) years in the ocean while a few had .3+ (32 percent) years of ocean life.

6. Lengthswere collected from 110 rainbow trout. The linear regression of fork length on scale radius of these fish was $\hat{y} = 19.41 + 3.34X$.

S. P. HATLEVIK

7. The back calculated average smolt lengths for three steelhead age groups ranged from 166 mm. to 220 mm.

8. One step of the three step Suskwa-Harold-Price falls was successfully modified to allow anadromous fish passage. The upper falls log jam area was changed to accommodate anadromous fish.

9. Four potential steelhead enhancement sites were flagged in the upper Harold-Price Creek area.

FUTURE WORK

1. The remaining barrier falls will be modified in the early spring of 1978. Hopefully a series of dynamite blasts will change the lower falls to allow easy passage of anadromous steelhead. The log jam above the upper falls will be further modified using strategically placed dynamite charges to improve potential up river migration of future steelhead.

2. Lower Suskwa River adult steelhead will be collected in 1978, tagged with electronic tracking devices and released. The tracking of Suskwa adult steelhead will hopefully provide information on the whereabouts of over-wintering and spawning steelhead. Adult steelhead collections just prior to spawning will be necessary as brood stock for colonizing upper (above the falls) Harold-Price Creek.

3. To insure early colonization of the upper falls area on Harold-Price Creek either mature steelhead or eyed eggs should be relocated to one or two of the flagged potential enhancement areas.

4. An intensive Creel survey should be conducted in the angler fishery to show whether or not improved creel returns are in evidence as a result of the Suskwa program.

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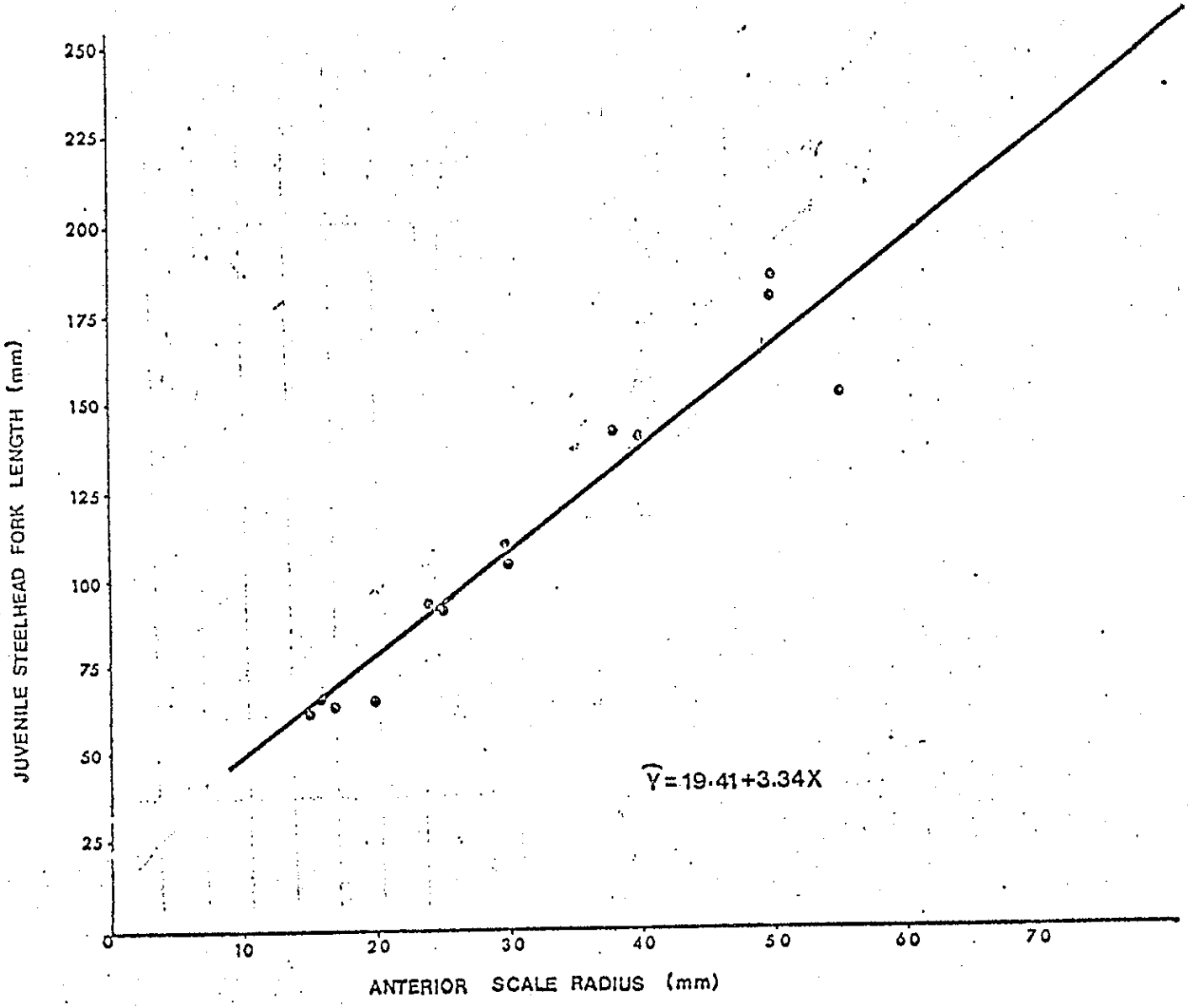
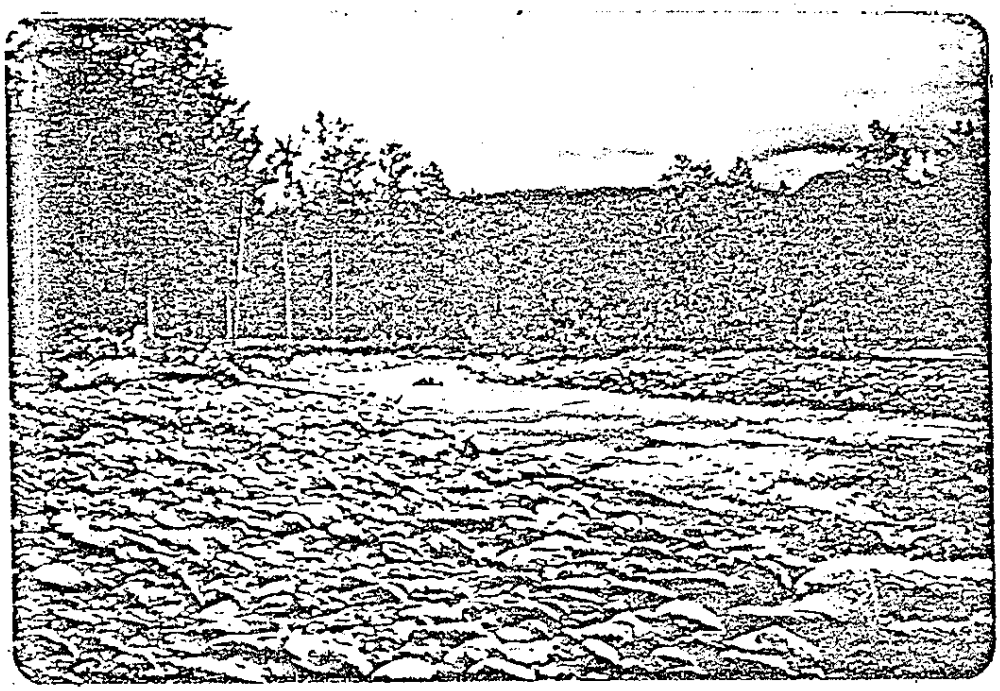


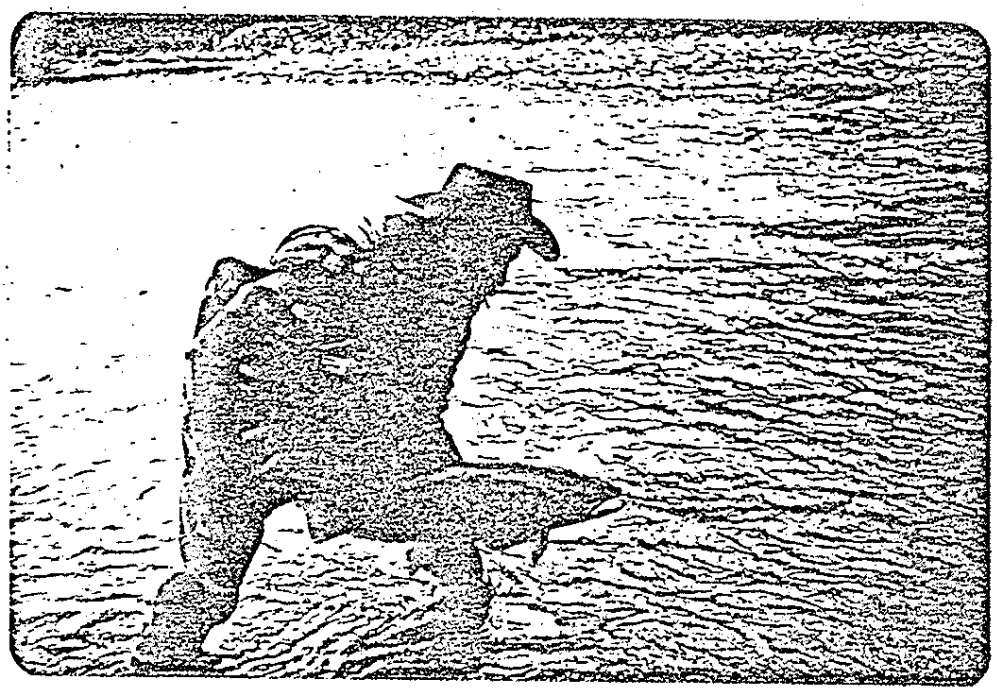
Appendix 2. Relationship of scale radius and fork length of juvenile steelhead in the Suskwa River.

PHOTO - A



(Fig. 3 - site 1)

PHOTO - B

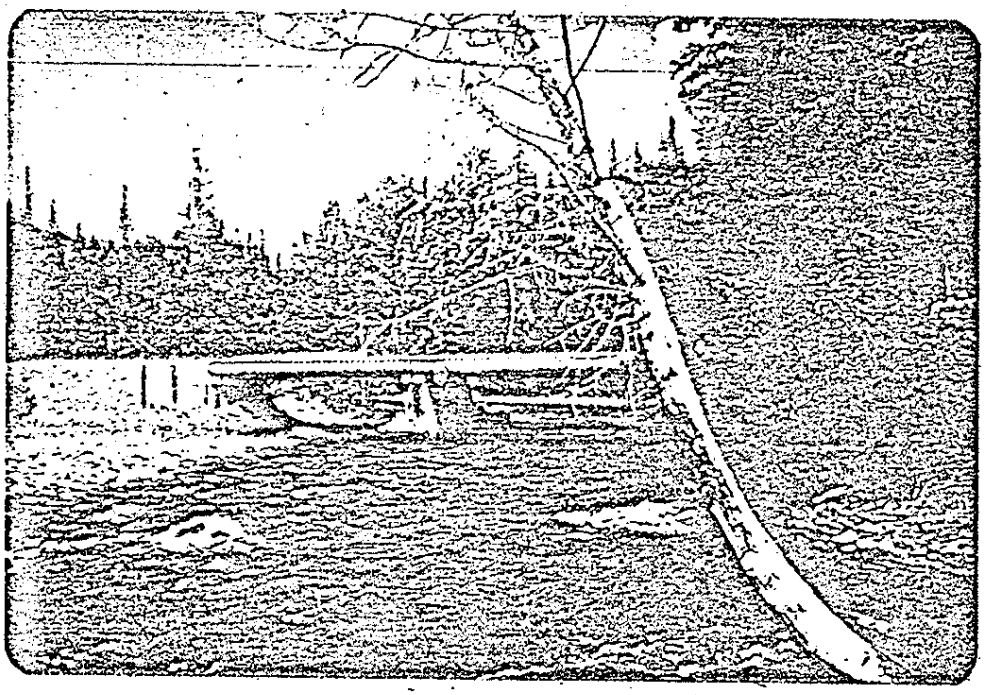


(Fig. 3 - site 2)

"The Meat Hole"

a male steelhead tagged and released

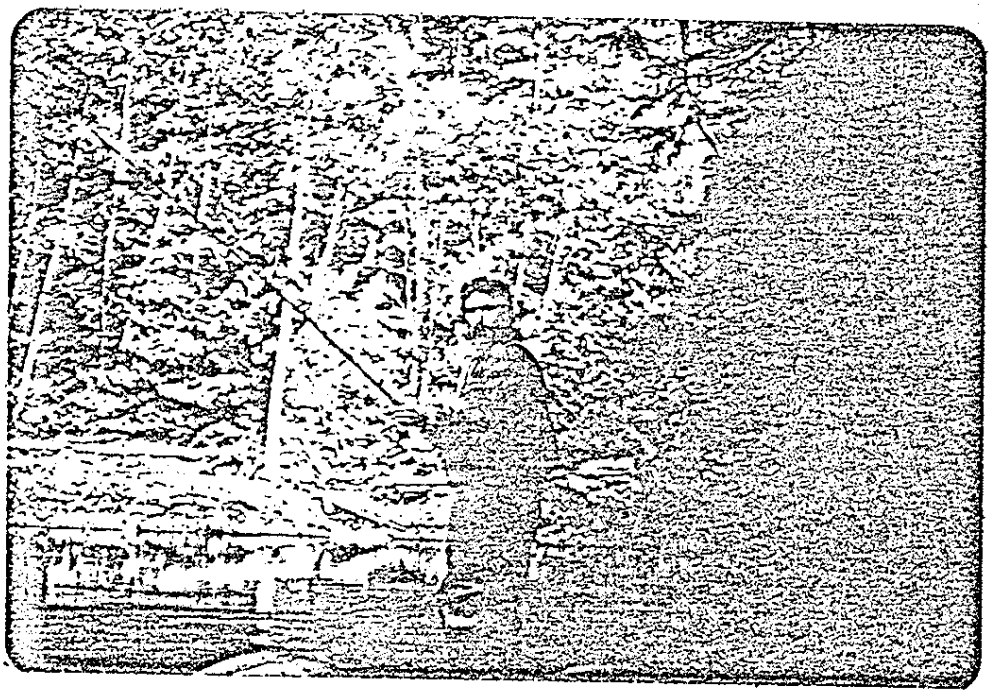
PHOTO - C



(Fig. 3 - site 3)

Three Mile Bridge

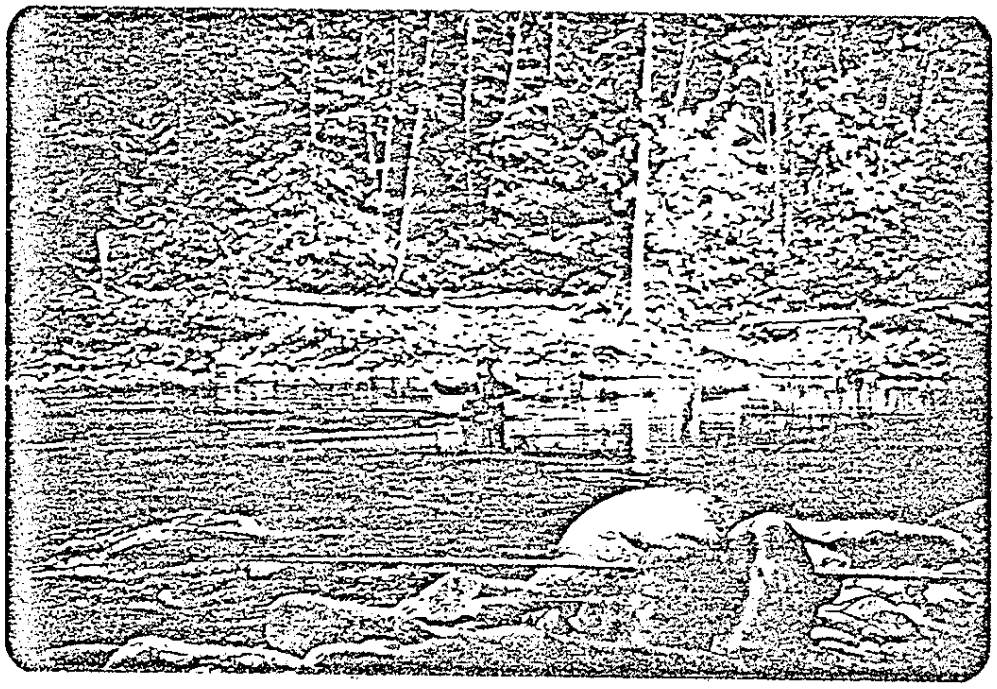
PHOTO - D



(Fig. 3 - site 4)

G. Wadley a Fish and Wildlife assistant at four mile.

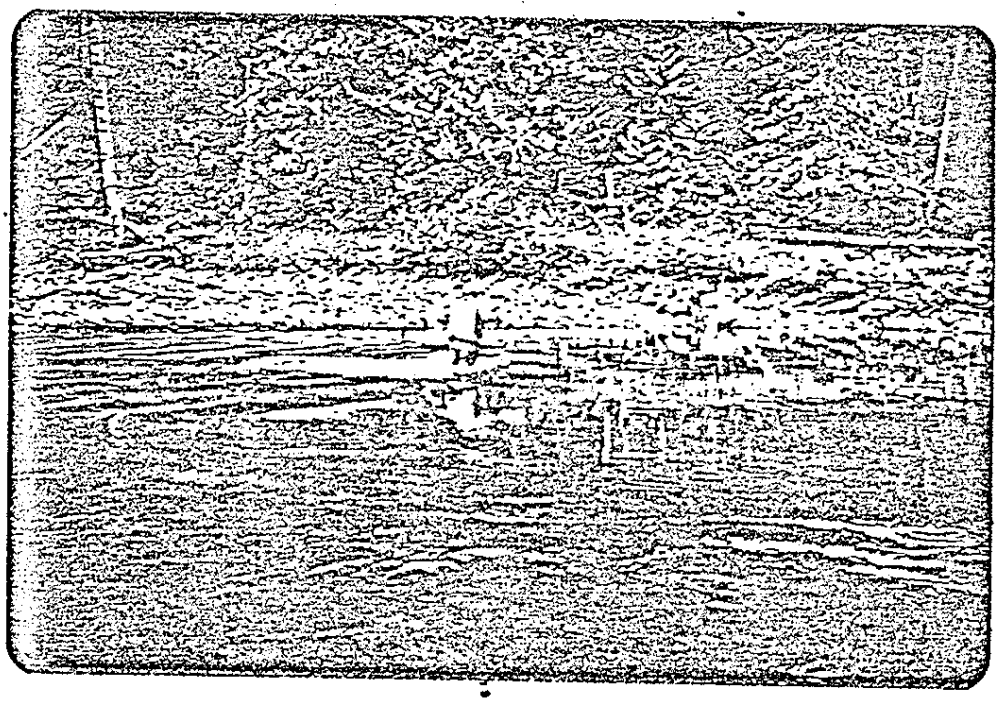
PHOTO - E



(Fig. 3 - site 4)

Wading the tail of a run at four mile

PHOTO - F



(Fig. - site 4)

good bouldered rearing area

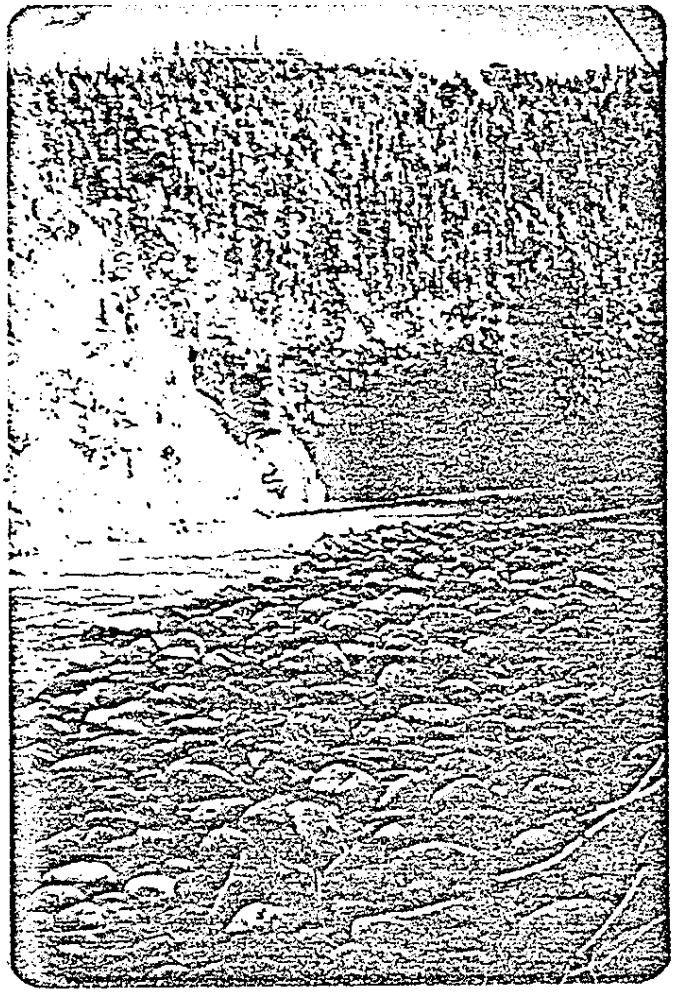
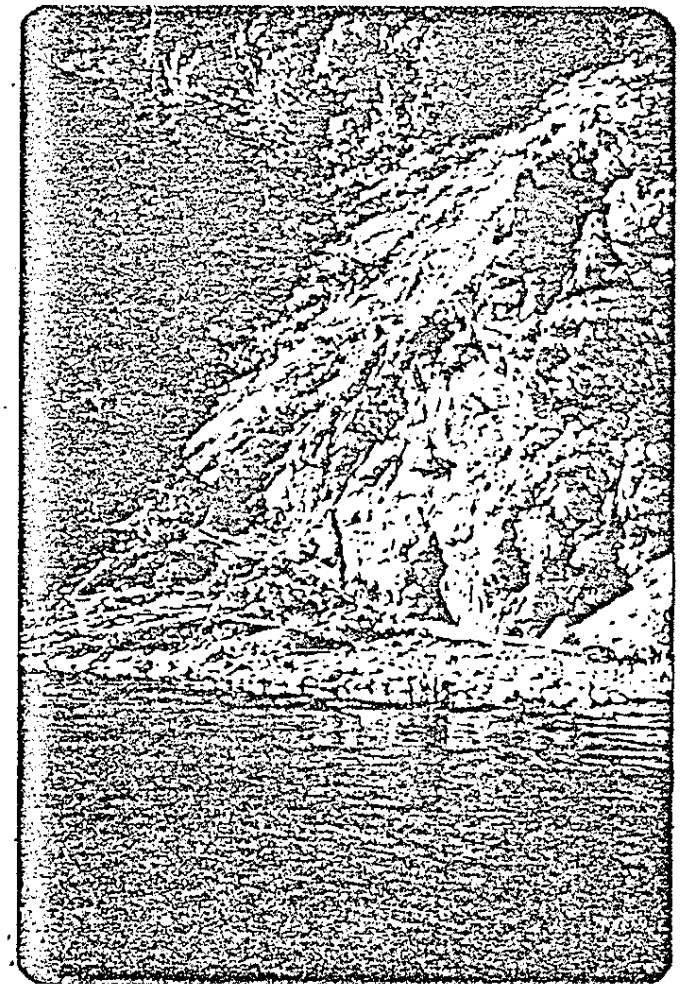


PHOTO - G

(Fig. 3 - site 4)

bouldered stream side

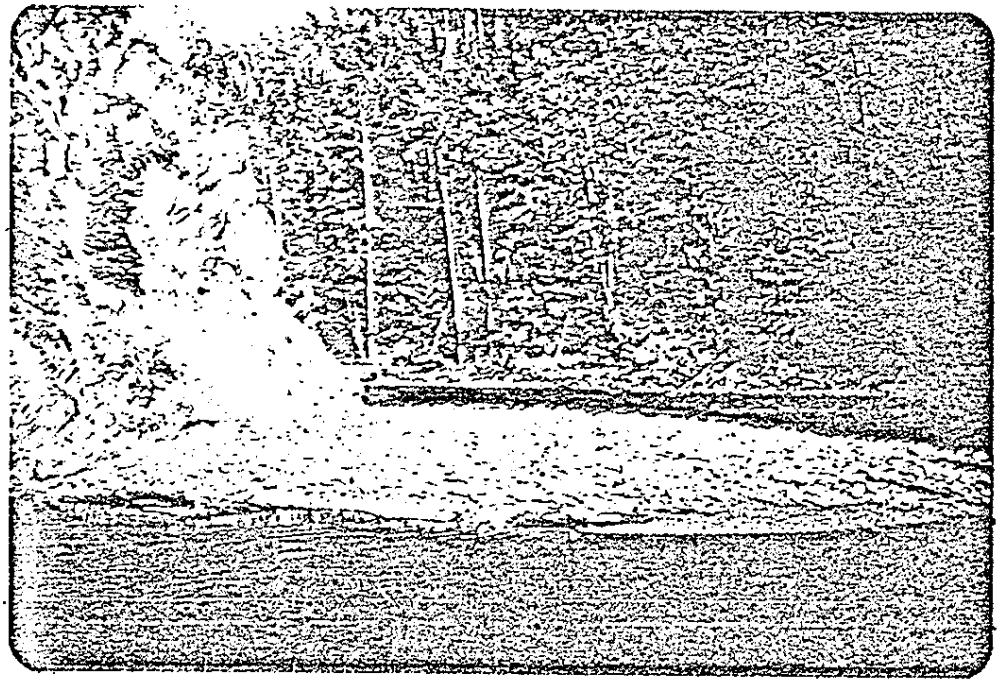
PHOTO - H



(Fig. 3 - site 4)

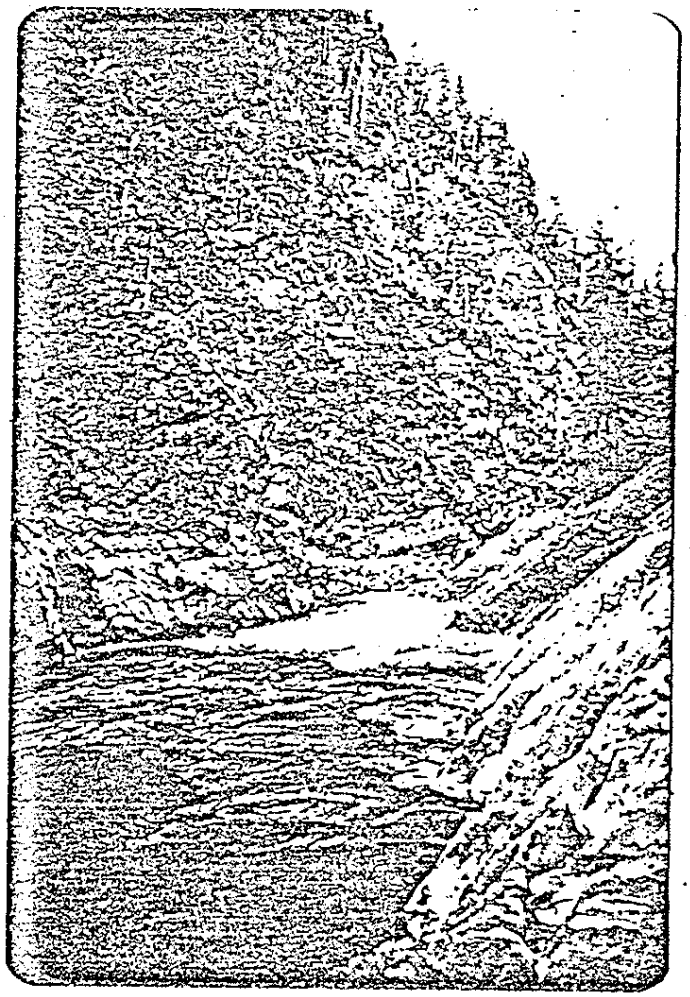
cutbank

PHOTO - I



Steelhead run four and a quarter mile

PHOTO - J

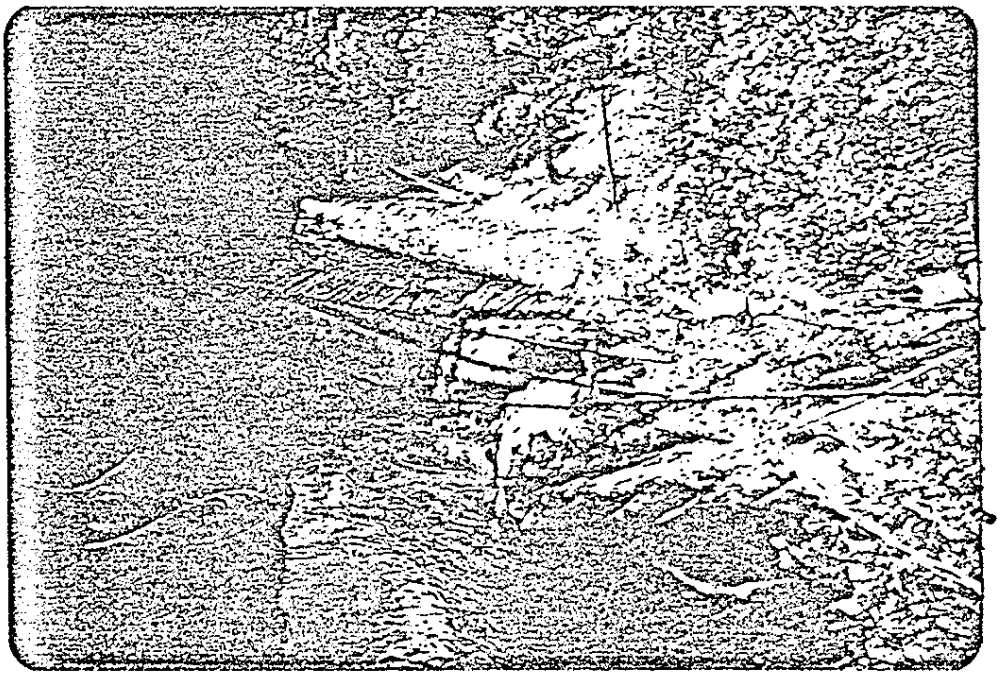


Canyon at four and three quarter mile

PHOTO - K

Canyon pool and hanging bridge

PHOTO - L



Canyon pool and hanging bridge

PHOTO - M

(Fig. 3 - site 5)

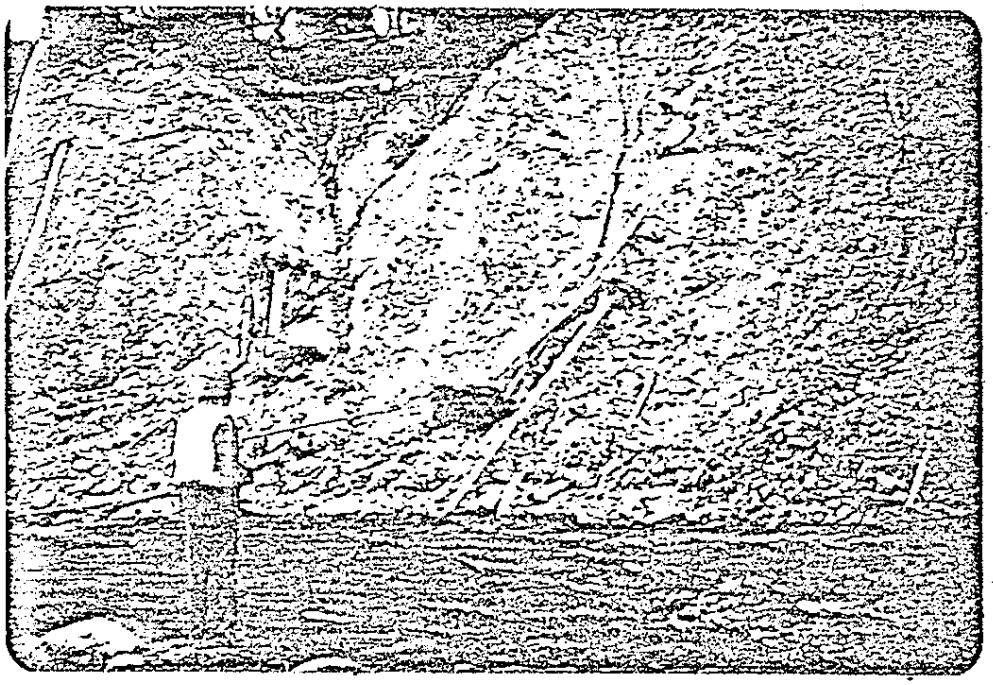
Five Mile

PHOTO - N

(Fig 3 - site 6)

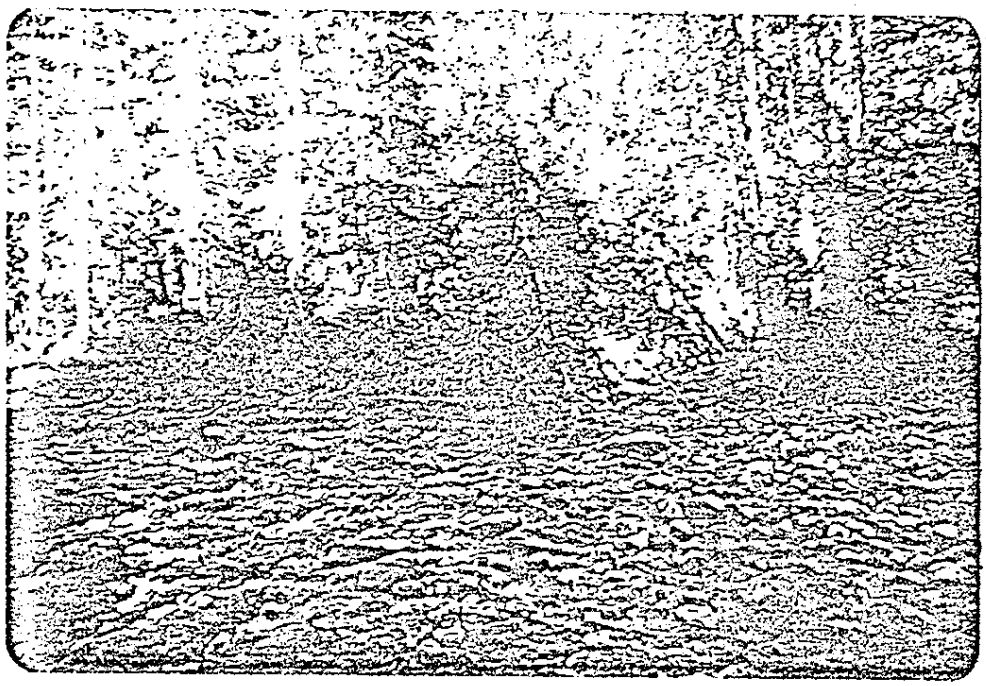
Six Mile Run

PHOTO - O



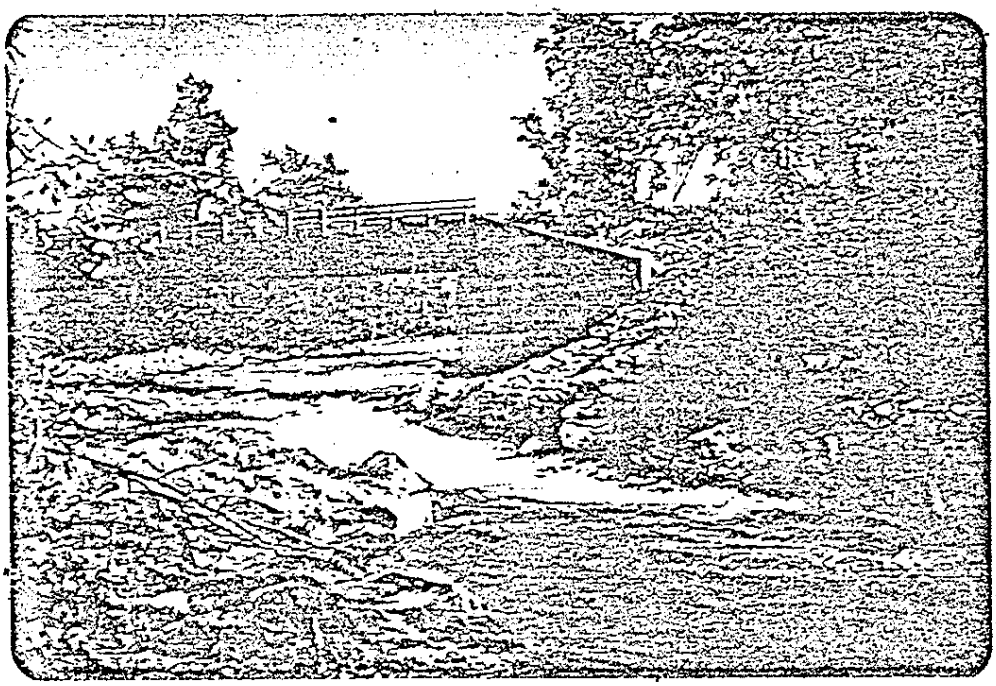
Cutbanks are a fresh source of boulders for rearing

PHOTO - P



Six and one half mile near B.C. Forest Service Campsite

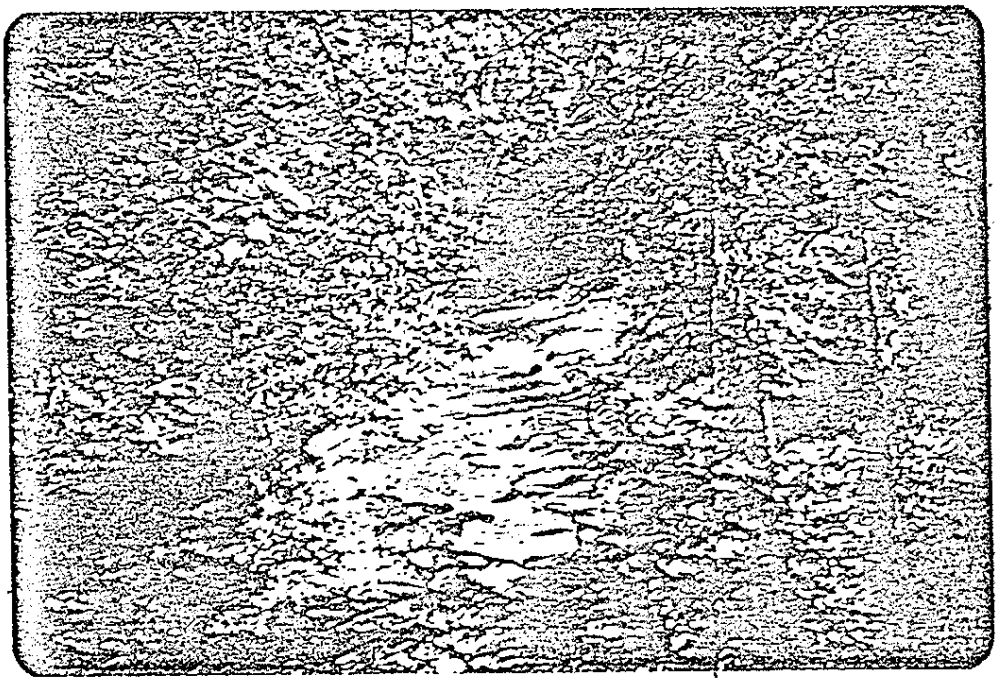
PHOTO - Q



Suskwa B.C. Forest Service,

forest development bridge at nine mile

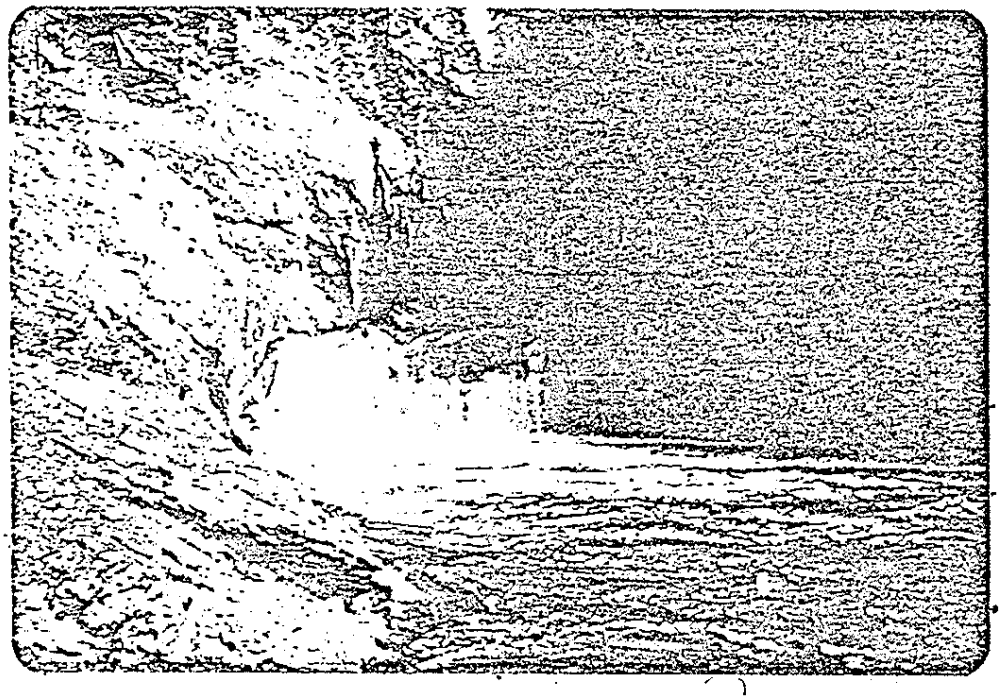
PHOTO - R



(Fig 3 - site 8)

Ten mile pool

PHOTO - S



(Fig. 2)

Harold-Rice Creek falls

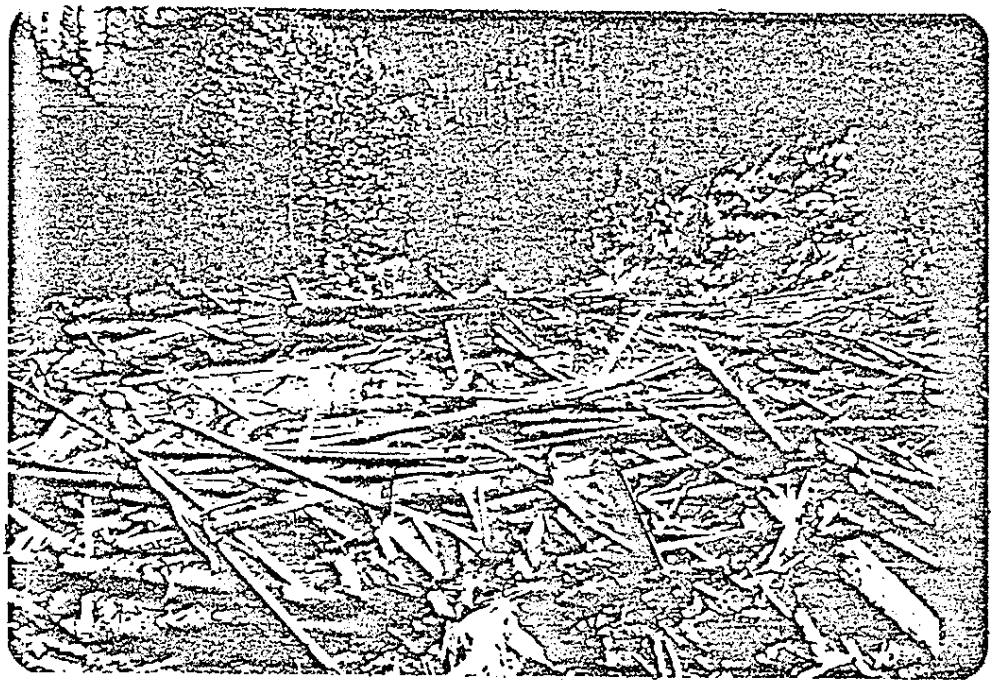
PHOTO - T

(Fig. 2)

Log jam top of Harold-Price Creek falls

shows open west side channel

PHOTO - U



(Fig. 2)

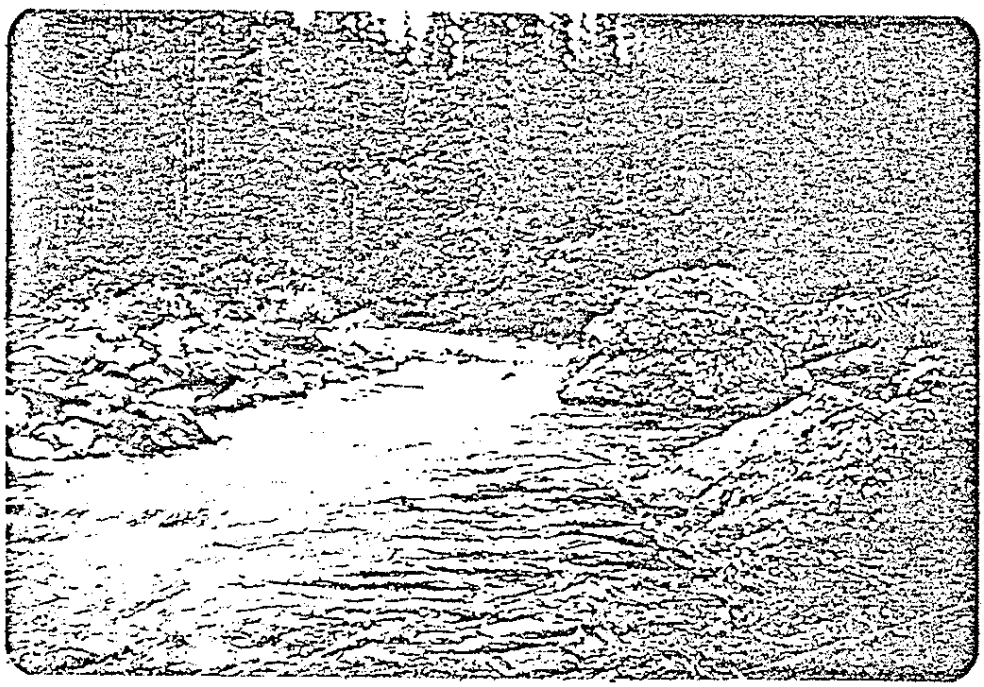
Harold-Price Creek looking upstream from the top of the falls

PHOTO - V

(Fig. 2 - site 2)

Upper Harold-Price Creek

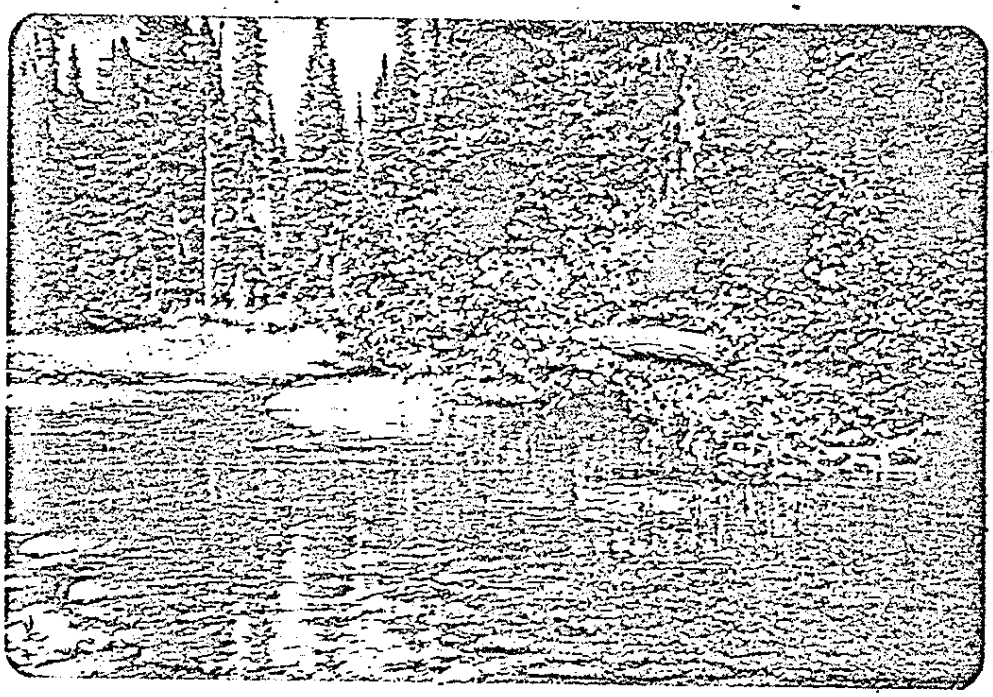
PHOTO - W



(Fig 2 - site 1)

Upper Harold-Price Creek above the bridge

PHOTO - X



(Fig. 2 - site 6)
or
(Fig. 4 - site 4)

Junction of Touhy Creek and Blunt Creek