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MORRIS, M.
MORICE RIVER STREAM SURVEY

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MORICE RIVER
STREAM SURVEY

AUGUST 1975

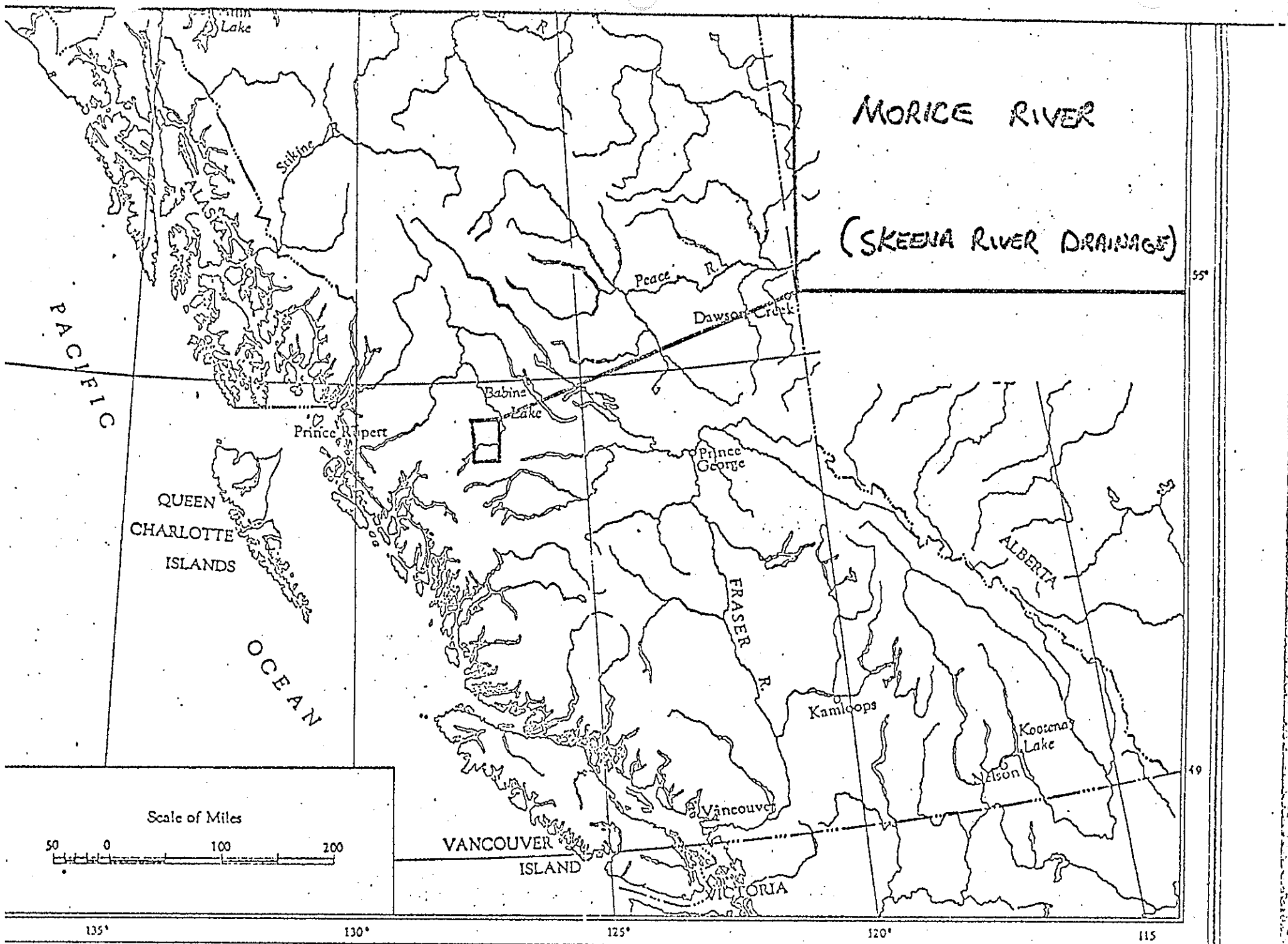
REPORT AND FIELD WORK BY:

M. MORRIS

B. ECCLES

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MORICE RIVER

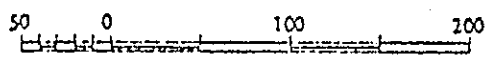
(SKEENA RIVER DRAINAGE)

PACIFIC

QUEEN
CHARLOTTE
ISLANDS

OCEAN

Scale of Miles



VANCOUVER
ISLAND

Vancouver

VICTORIA

FRASER
R.

Kamloops

Kootenay
Lake

Nelson

Prince
George

Babine
Lake

Prince
Rupert

Peace
R.

Dawson
Creek

ALBERTA

120°

125°

130°

135°

115

55°

49

INTRODUCTION

The Morice River is a lake headed system that enters the Bulkley River approximately four miles north of Houston, British Columbia. Map coverage of its 1600 square mile drainage includes National Topographic Series 93 - L - 2,3,4,6,7; and Air Photo Flight Lines B.C. 1008 #53-#57, #107-#114; B.C. 5302 #122 B.C. 7327 #192-#195; B.C. 7361 #076-#078; B.C. 7362 #057-#278.

The main stem runs forty-five miles from Morice Lake to its confluence with the Bulkley. Tributaries that enter along its course are typically lake or swamp headed.

Land forms are divided into two sections. Below Owen Creek the soil composition is based on Pleistocene and Pre-Pleistocene gravel deposits. Above here there is mainly a bed rock base overlain with a mixture of sand and gravel (Morice River file).

Access to the Morice River is gained by river boat travel or along the all weather B.C.F.S. development road. Pull-offs and boat launching is available at mile 17.5, 27.5 and at the lake head. Garbage cans and toilet facilities are also located at the latter two locations.

Methods

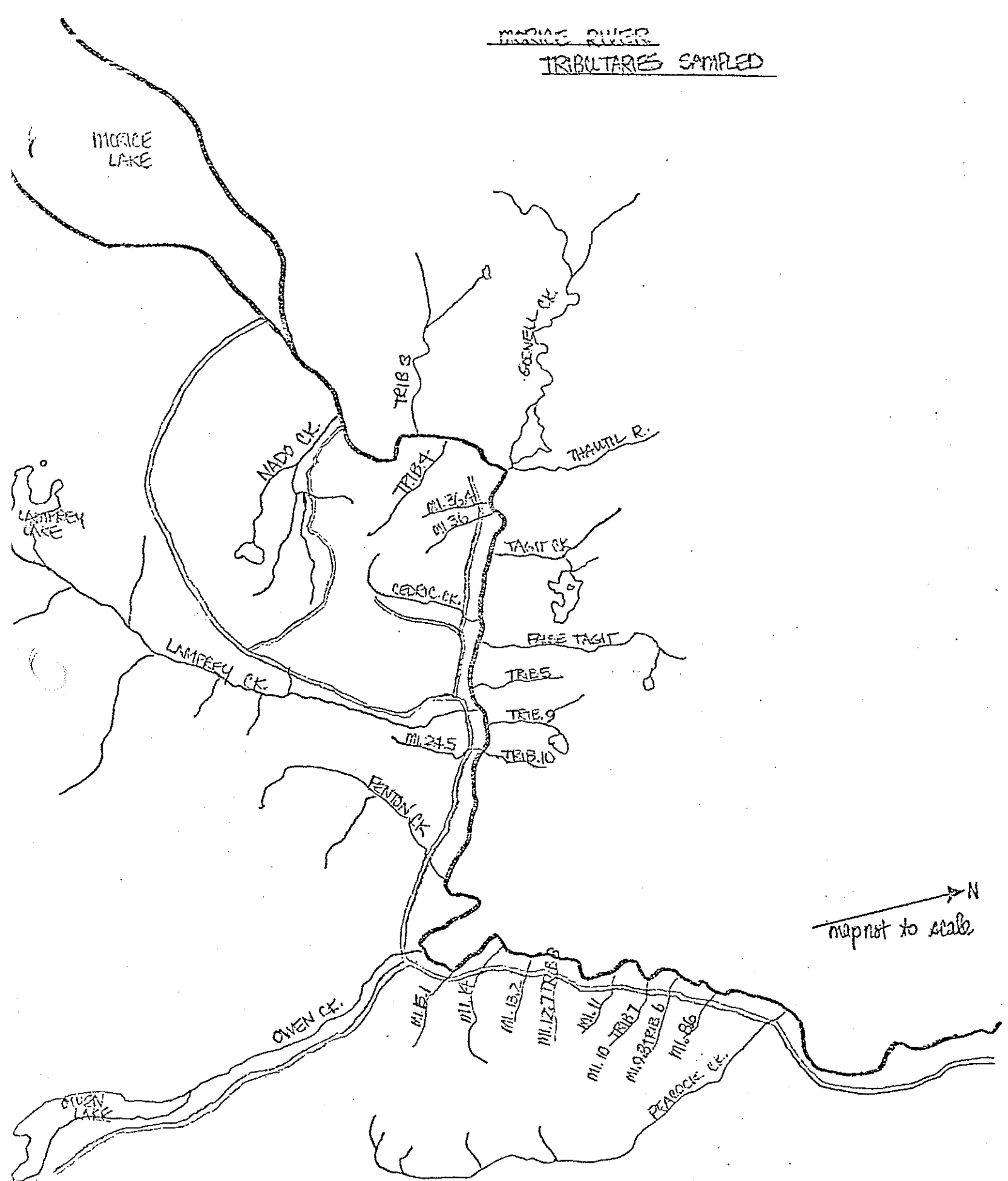
A survey investigating the fish and especially the Steelhead values of the small feeder creeks of the Morice River, was conducted from August 6 - 15, 1975. The survey utilized two methods to gain access. B.C.F.S. development roads were used along the south side of the river. The creeks on the north side of the Morice were reaches via river boat. From the access points the creeks were then walked until a typical length was found. The information collected along walk was then broken into two parts. The biological data including fish species present, invertebrates, instream and bank vegetation, spawning and rearing habitats and wildlife sign noted. Next, general comments on bank stabilities, barriers, and land use were taken. The sampling equipment carried on all walks were as follows: clinometer, compass, pH and oxygen kits, thermometers and hand lines for fishing. An electroshocker and beach seine were used on all creeks with good access.

Physical data and observations of all the surveyed creeks are summarized on tables with remarks about each reach discussed and listed by reach numbers (See map for reach locations). Lamprey Creek and Nado Creek which were studied in more detail, are written up separately from the other tributaries with maps, tables and discussion.

Acknowledgments

1. B.C. Forest Service Houston Ross Johnson. The Forest Service has recent 20 chain air photo coverage of much of the upper Morice Area.
2. Northwood Mills, Houston

MORICE RIVER
TRIBUTARIES SAMPLED



Reach 1 and 2 Tributary 1 and 2

These reaches were located near the end of Morice River road where it crosses Tributary 1 and 2. (Mile 36.4) The creeks were small (1 c/s) and only about 50 m apart and were therefore quite similar. Productivity of the creeks was limited by their size and lack of spawning gravel; the fish found there probably being of a resident population. The nearly closed canopy and instream branches and logs suggests potential habitat for cutthroat as well as the Dolly Varden found. (Figs. 1 and 2).

Reach 3 and 4 Cedric Creek

The lower reach on Cedric (reach 3) was located at the Morice River road crossing at mile 32.5. It was very productive for rainbow with fish being shocked both above and below the road culverts. The road crossing was well built with 4 culverts (3 wooden and 1 metal) making the stream passable to fish at all flow levels (Fig. 3). Surprisingly, no fish were shocked on the upper reach of Cedric. Though habitat appeared similar to the downstream reach. Possibly there is a barrier between the reaches though none was observed. The stream in the upper sections runs beside a burned logging cut without a fringe strip. Access to this reach is at mile 3 of spur road from mile 31 of main road.

Reach 5 Tributary 3

This stream on the west side of the river was surveyed using a river boat for access. Productivity of the stream was low probably due to small size rather than a lack of spawning gravel. There was some rearing habitat. (Fig. 4).

Tributary 4

This stream on the east side of the river, was small and swampy. There was excellent coho rearing habitat at the mouth where water was still and the bottom was muddy.

Reach 6 Side Channel of Mainstem, North Side between Tributary 4 and Gosnell Creek

Many coho fry were rearing in this area all in still water of back channels. Swifter sections where water flowed in from the main river had a stony bottom and other characteristics the same as the mainstem. The importance of these side channels for rearing habitat is increased by the lack of rearing areas in the mainstem.

Reach 7 Side channel of Mainstem, North Side, Upstream of False Tagit Creek

This section of side channel had excellent spawning gravel. Several redds were seen here, one with eggs. The side channels from the braiding of the mainstem have excellent spawning and rearing areas, and are probably very heavily used by the fish populations because of the lack of usable tributaries and the swiftness of the main channel.

Reach 8 False Tagit Creek

The steep gradient of this stream caused the water to flow in a series of cascades. (Fig. 5). Coho were rearing in pools between the riffle, and were probably progeny of mainstem spawners.

Reach 9 Tributary 5

This tributary was located across and slightly downstream from Cedric Creek. Observation was conducted upstream from side channel of the mainstem. Swampy terrain and low gradient provided excellent rearing habitat for coho. More than forty fry were observed in a ten meter flat section. There was fresh moose sign in the area. (Fig. 6)

Reach 10 Peacock Creek

Peacock Creek was sampled 100 meters above and below road crossing at mile 5 on the main road to Morice Lake. The wood stove culvert, in the mid section of reach proves to be a barrier to upstream fish movement. The outflow cascades 2 meters over angular boulders into a small plunge pool (Fig. 7). Populations of Dolly Varden, rainbow and whitefish were found below and only Dolly Varden located above culvert. Shocking was very effective in this tributary, with fish being attracted from distances greater than 2 meters. People squatting downstream from reach section, have ponded a small length of the stream, but this obstruction does not appear to affect fish movement.

Reach 11 Tributary at Mile 8.6

The reach on this tributary included a 50 meter section above and below culvert. Water flow was less than 1 c.f.s. and no fish were electroshocked. Beyond road allowance, willow and alder provided a 100% canopy closure along the creek.

Tributary 6 and 7

These tributaries at mile 9.8 and 10.0 held similar characteristics. Both had culvert barriers and flows of less than 1 c.f.s. No fish were observed or electroshocked in either system.

Reach 12 Tributary at Mile 11.0

The reach on this tributary extended from road crossing downstream to the confluence with the Morice River. The culvert at the road crossing forms a barrier due to presence of a debris packed outflow, long sloping log apron and 1.5 meter fall onto angular substrate.

Tributary 8

This reach was located 50 meters above and below culvert on main road. The creek was very small (less than 1 c.f.s.) and no fish were seen.

Reach 13 Tributary at Mile 13.2

The reach section on this creek was established 100 meters above and below road crossing. The culvert at roadway appears to be passable to larger fish, but absence of rainbow fry and smolts above road crossing may suggest some problem with culvert design. The numbers of rainbow smolts found in lower end of reach indicate that the fish have moved out of the mainstem to rear.

Reach 14 Tributary at Mile 14.0

This reach was sampled 75 meters above and below road crossing. Water flow was less than 1 c.f.s. and held little habitat other than for coho fry rearing near confluence with main river. The culvert was considered to pose a problem to upstream movement, since cement apron on inlet side was very steep and smooth.

Reach 15 Tributary at Mile 15.1

This tributary was observed 100 meters above and below wood stove culvert on main road. The creek at this point flowed through stable terrain vegetated with willow and alder. The culvert was considered adequate to allow fish movement in medium and high flows, but again due to steepness of cement apron at inflow, movement in low flows would be impossible.

Reach 16 Fanton Creek

This creek was electroshocked above and below culvert at mile 19. A definite barrier to fish movement had been created through aspect and design of culvert. The steep gradient, long smooth flow, and outflow fall would prevent fish movement. (Fig. 10)

Reach 17 Tributary at Mile 24.5

This creek was surveyed from road crossing downstream 75 meters. At this point the flow was very stable. Good culvert placement provides for peak flows and unhindered fish movement. (Fig. 11)

Reach 18 Trapper Cabin Creek Tributary 9

This tributary was situated on the north side of the Morice River, opposite Lamprey Creek. Observations and sampling was conducted from its confluence, upstream 300 meters. Many small coho fry (less than 3 cm) were observed which suggests that spawning does take place in lower sections of the creek. (Fig. 12)

Reach 19 Tributary 10

This tributary was surveyed from its mouth upstream to a series of 0.5 meter cascades. Beaver activity throughout this section was very noticeable. Many large cottonwoods have been brought down in the creek's estuary, but as yet do not pose a blockage.

10

Tributaries 11, 12 and 13

These tributaries were found to be none productive in terms of fisheries. Tributary 11 was located in swampy terrain with only seepage entering main river. Tributary 12 was completely ponded by 2 meter beaver dam. (Fig. 13). Tributary 13 was a day channel running through steep rocky terrain.

MORICE RIVER TABLE # 1 PHYSICAL DATA REACHES 1 - 19

REACH	DATE 1975	WETTED WIDTH	BED WIDTH	DEPTH	GRADIENT	WATER TEMPERATURE	pH	OXYGEN
1	Aug 6	1.5 m	2 m	0.2 m	2½%	8.9°C	6.8	11 ppm
2	Aug 6	1.5 m	2.5 m	0.2 m	2½%	9.5°C	6.85	11 ppm
3	Aug 6	2 m	4 m	0.2 m	2%	9.5°C	6.7	11 ppm
4	Aug 6	2 m	4 m	0.2 m	1%	9.5°C	-	-
5	Aug 7	1 m	2 m	0.2 m	3%	8.9°C	6.65	11 ppm
6	Aug 7	15 m	18 m	0.75 m	1½%	11.1°C	6.9	10 ppm
7	Aug 7	10 m	12 m	0.5 m	1½%	11.1°C	6.9	10 ppm
8	Aug 7	2 m	3 m	0.3 m	5%	10.6°C	7.5	11 ppm
9	Aug 7	2 m	2-6 m	0.25 m	1%	12.2°C	7.0	10 ppm
10	Aug 12	6 m	11 m	0.35 m	3%	10.0°C	7.5	12 ppm
11	Aug 12	1.5 m	2 m	0.1 m	1½%	7.8°C	8.0	12 ppm
12	Aug 12	3 m	5 m	0.25 m	4%	10.0°C	-	-
13	Aug 12	1.5 m	4 m	0.2 m	5%	10.0°C	7.5	11 ppm
14	Aug 12	0.5 m	2 m	0.1 m	4%	11.7°C	8.2	-
15	Aug 12	2 m	4 m	0.2 m	3%	11.1°C	8.2	11 ppm
16	Aug 12	3 m	7 m	0.2 m	3%	10.6°C	8.0	11 ppm
17	Aug 12	2 m	5 m	0.4 m	2%	11.1°C	7.2	11 ppm
18	Aug 15	1.5 m	5 m	0.2 m	3%	11.1°C	7.5	11 ppm
19	Aug 15	1.5 m	3 m	0.2 m	2½%	11.1°C	7.4	9 ppm

TABLE # 2 CONTINUED

REACH	BANK MATERIALS	STREAMSIDE VEGETATION	LAND USE	BANK STABILITY	SUBSTRATE	GRAVEL COMPACTION	BAR DEVELOPMENT
7	alluvial sand and silt	as in reach 6	none	stable	20% rubble 25% large gravel 30% small gravel 25% sand/mud	loose	some
8	bedrock outcrops and gravelly soil	mature spruce fir forest	none	stable	20% small gravel 10% bedrock 10% boulder 20% rubbles 30% large gravel 10% sand	loose	little
9	silt and clay	sedges willows hardhack	none	stable	5% rubbles 30% large gravel 20% small gravel 25% sand 20% silt/mud	loose	none
10	loose sand and gravel	alder willow cottonwood cow parsnip	squatter's house 100 m downstream from road	unstable	10% boulder 30% large rubble 20% small rubble 20% large gravel 10% small gravel 10% sand/silt	loose	some
11	loose sand and gravel;	alder, willow	none	stable	5% rubbles 10% large gravel 60% small gravel 25% sand/silt	loose	little
12	loose sand and gravel	alder spruce forest	old bridge near mouth	unstable	angular mainly rubble & boulder few small patches of gravel	---	some
13	loose sand and gravel	alder cottonwood spruce - pine forest	none	stable	10% boulder 25% large rubble 25% small rubble 15% large gravel 15% small gravel	---	little

TABLE # 2 CONTINUED

REACH	BANK MATERIALS	STREAMSIDE VEGETATION	LAND USE	BANK STABILITY	SUBSTRATE	GRAVEL COMPACTION	BAR DEVELOPMENT
14	sand and gravel	alder, fireweed, horsetails	none	stable	60% boulder 20% rubbles 10% gravels 10% sand/silt	---	little
15	silty soil over clay, sand and gravel	cottonwood, alder, willow, spruce	none	stable	20% boulder 25% large rubble 25% small rubble 20% gravel 10% sand/silt	---	little
16	gravelly soil	willow, alder, cottonwood	none	fairly stable	10% boulder 20% large rubble 30% small rubble 10% large gravel 10% small gravel 20% sand/silt	loose	some
17	gravel and sand	alder, spruce, cottonwood	none	stable	20% large rubble 20% small rubble 20% large gravel 30% small gravel 10% sand/silt	loose	some
18	river terrace of gravel and sand some bedrock outcrops	alder spruce forest	none	stable	35% boulder 15% large rubble 20% small rubble 10% large gravel 15% small gravel 5% sand/silt	loose	little
19	sandy soil over gravel	alder, red osier dogwood, willow, spruce cottonwood	none	stable	5% boulder 20% large rubble 25% small rubble 20% large gravel 20% small gravel 10% sand/silt	loose	some

TABLE # 3 WATER CHARACTERISTICS AND FISHERIES

EACH	RUN/ POOL/ RIFFLE	WATER CLARITY	CROSS SECTION	SIDE & BACK CHANNELS	SAMPLING METHODS	FISH OBSERVED	SIZES	BARRIERS	ROOTED AQUATIC AND INVERTEBRATES
	20%/40%/40%/trickle	slight humic stain	regular gradial banks	few	electro-shock	1 Dolly Varden	16 cm	culvert at road crossing	mossy substrate slime layer in still water
	20%/25%/45%	slight humic stain	regular	few	electro-shock	none	--	potential barrier at culvert	as in reach 1
	20%/20%/60%	tea colour	regular, some braiding	some	electro-shock	5 rainbow	11 cm 11.5 12 12.5 & 13	fish above and below culvert	---
	0%/40%/60%	humic stain	regular gradial banks	some	electro-shock	none	--	--	many caddis fly larvae
	0%/40%/60%	slight humic stain	regular	few	electro-shock	1 coho fry	3.7 cm	--	filamentous algae
	0%/80%/20%	slightly milky	regular flat banks	many	electro-shock, angled	40 coho fry none	3.5 cm each	--	--
	70%/10%/20%	slightly milky	regular flat banks	many	electro-shock, angled	none, but several redds seen	--	--	--
	0%/10%/90%	clear	regular 1 m vertical banks	few	electro-shock	4 coho fry	3.5 cm each	possibly steep gradient	slimy substrate
	30%/60%/10%	humic stain	undercut banks (see diag.)	some	observation	abundant coho fry	3.5 cm each	--	water plant:
	0%/20%/80%	clear	regular gradial banks	few	electro-shock	1 whitefish 6 Dolly Varden	25 cm 6-12 cm	culvert at road crossing	--

TABLE # 3 CONTINUED

REACH	RUN/POOL/ RIFFLE	WATER CLARITY	CROSS SECTION	SIDE & BACK CHANNELS	SAMPLING METHODS	FISH OBSERVED	SIZES	BARRIERS	ROOTED AQUATIC AND INVERTEBRATES
11	0%/20%/80% trickle	clear	regular	none	electro- shock	1 cutthroat below culvert 2 Dolly Varden above culvert	15 cm 10, 17 cm	none	---
12	0%/10%/90%	clear	regular steep banks	few	observation	none	---	blocked road culvert	---
13	10%/30%/60%	clear	regular gradual banks	few	electro- shock	3 Dolly Varden 2 rainbow 1 Dolly Varden	8.5 9 13.5 11, 12 13 cm	possibly the road culvert at low water green algae	filamentous
14	0%/20%/80%	clear	regular	few	observation	3 coho fry	3.5 cm	possibly the road culvert	---
15	0%/30%/70%	clear	regular	few	electro- shock	3 rainbows 1 Dolly Varden 2 rainbows 1 Dolly Varden	7 7.5 12.5 10.5 9, 11.5 14 cm	possibly the road culvert at low water green algae	filamentous
16	0%/30%/70%	clear	regular steep banks	few	electro- shock	2 Dolly Varden 6 rainbows	8, 11 cm 12, 12.5, 19 cm	possibly the moss green long & Steep algae, caddi road culvert fly larvae	
17	20%/40%/40%	dark humic stain	regular flat banks	few	electro- shock	4 coho fry 2 Dolly Varden 1 rainbow	4 cm each 6, 15 cm 9 cm	none	slimy bottom
18	0%/40%/60% trickle	clear	regular	few	observation	many coho fry	4-7 cm	none	moss, algae mayflies
19	0%/50%/50%	clear	regular	few	observation	many coho fry	4-7 cm	none	mosses stoneflies mayflies

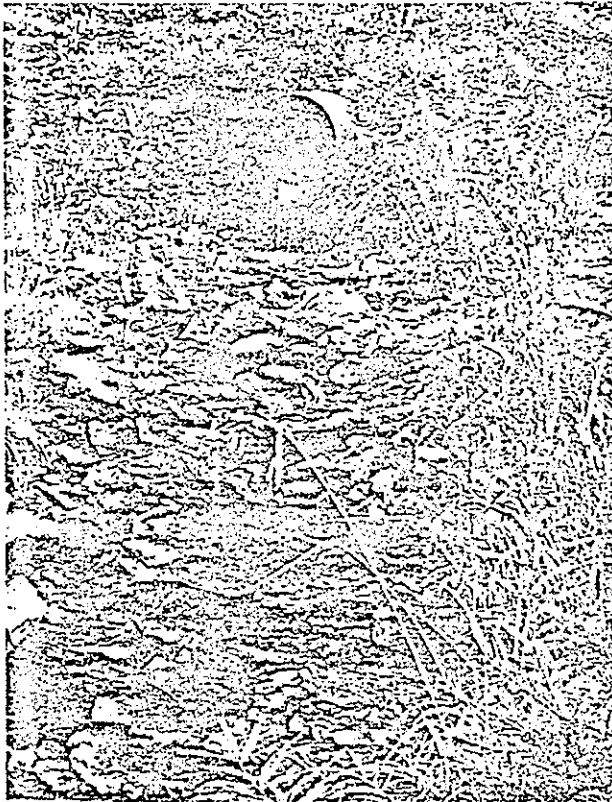


Fig. 1

Tributary 1, note barrier.
Dolly Varden from pool below
culvert.

Fig. 2

Tributary 2, downstream from road
crossing.

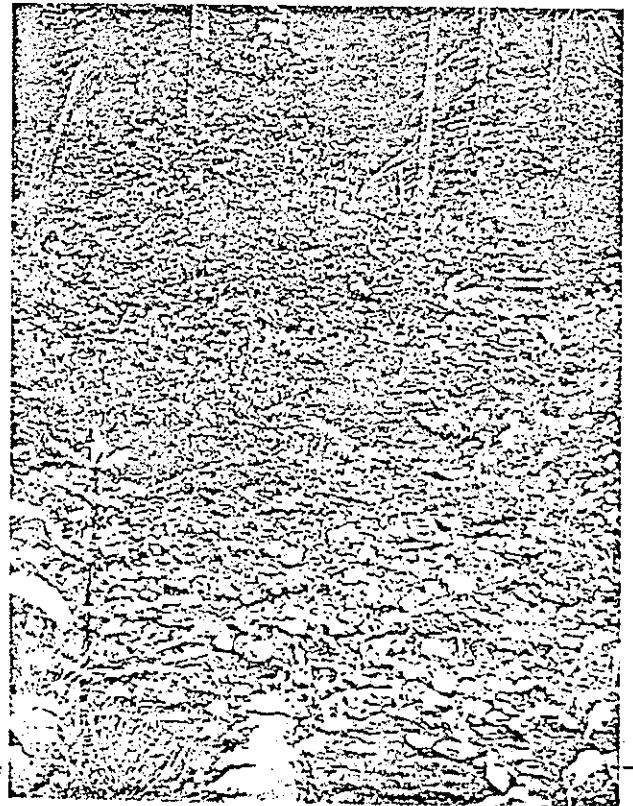




Fig. 3

Culverts at Cedric Creek.

Fig. 4

Tributary 3, note unstable banks.

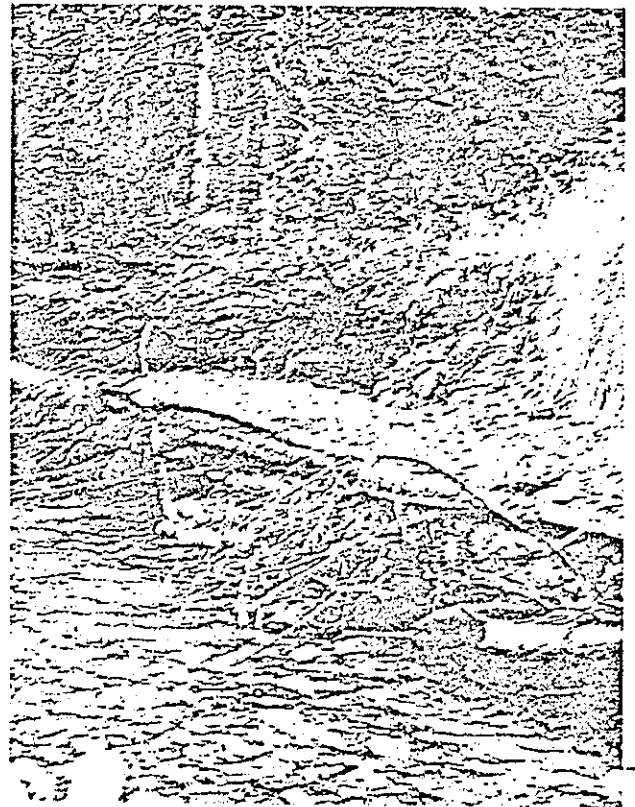




Fig. 5

False Tagit Creek.



Fig. 6

Side channel to Tributary 5



Fig. 7

Peacock Creek. Note barrier at culvert.

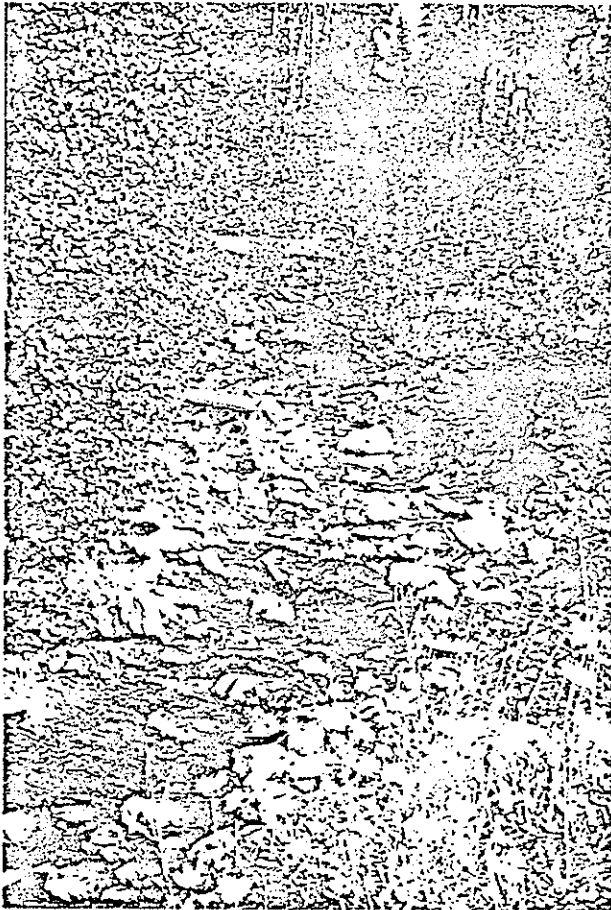


Fig. 8

Tributary at mile 13.2 above
culvert.

Fig. 9

Tributary at mile 15.1

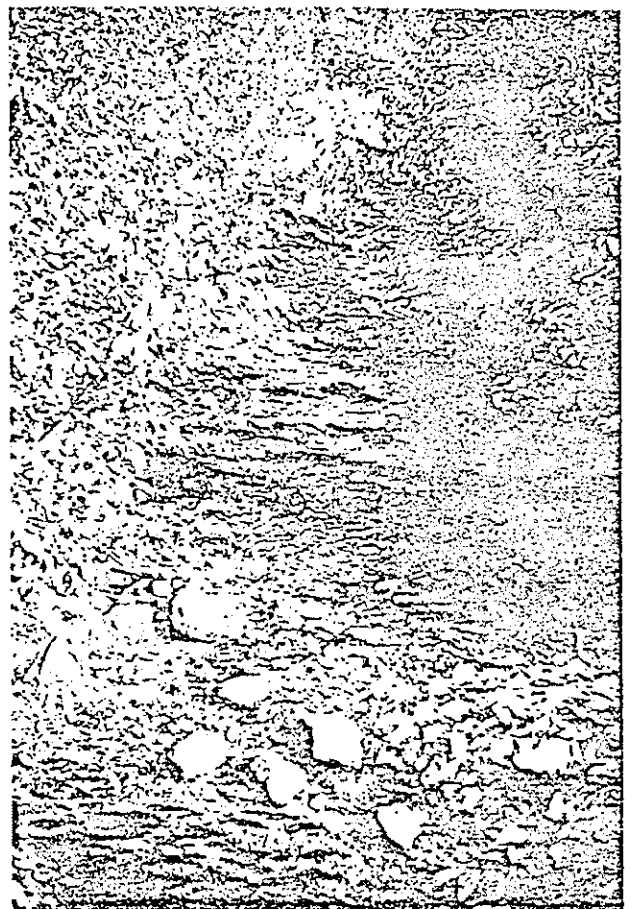




Fig. 10

Fenton Creek downstream
from road.

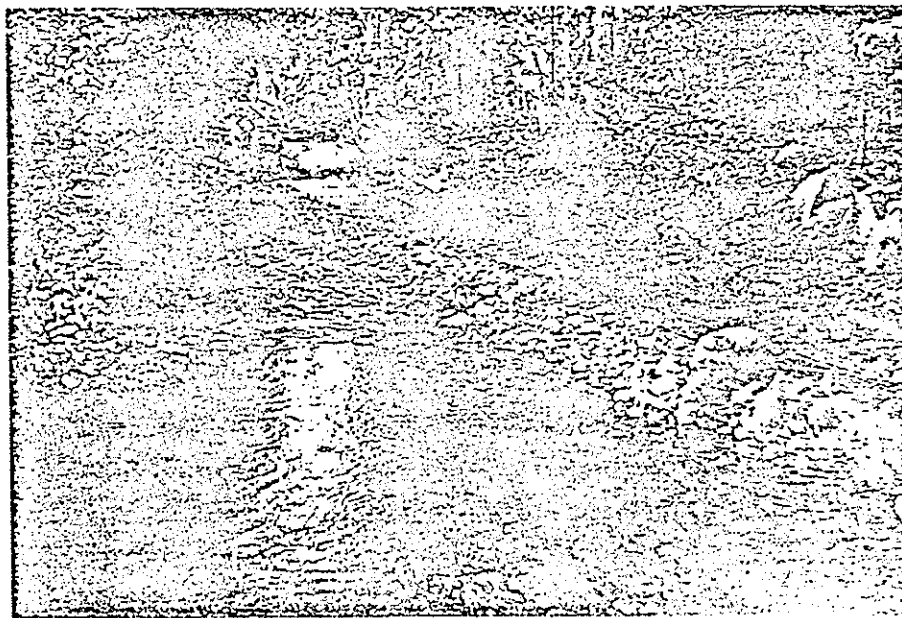


Fig. 11

Tributary at mile 24.5. Picture shows sampled reach below culvert.

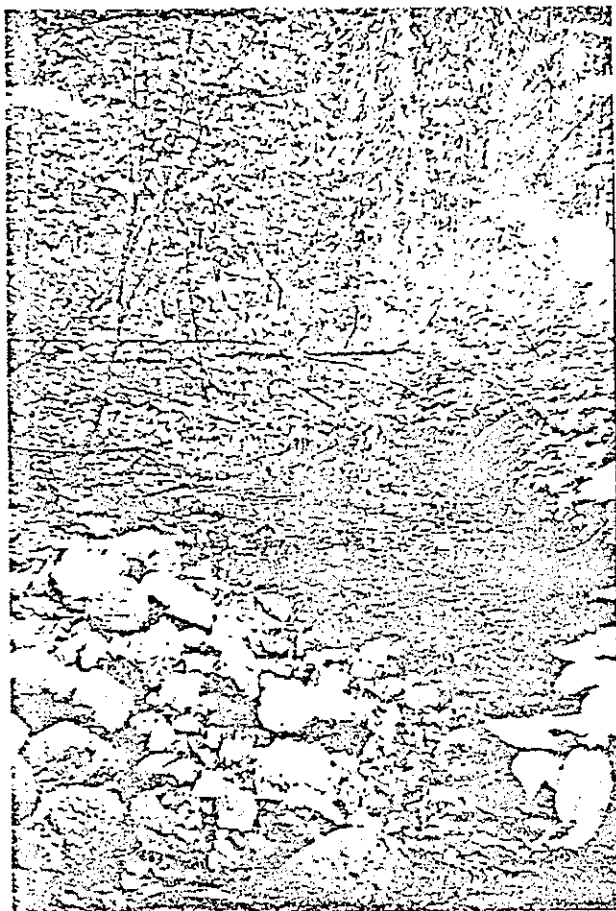
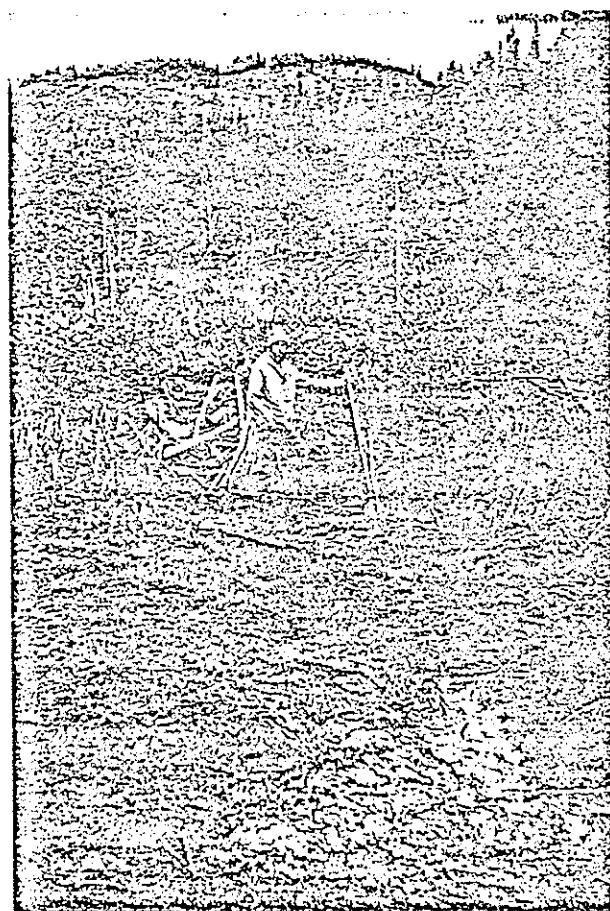


Fig. 12

Trapper Cabin Creek 100 meters
from mouth.

Fig. 13

Beaver dam blocking Tributary 12.



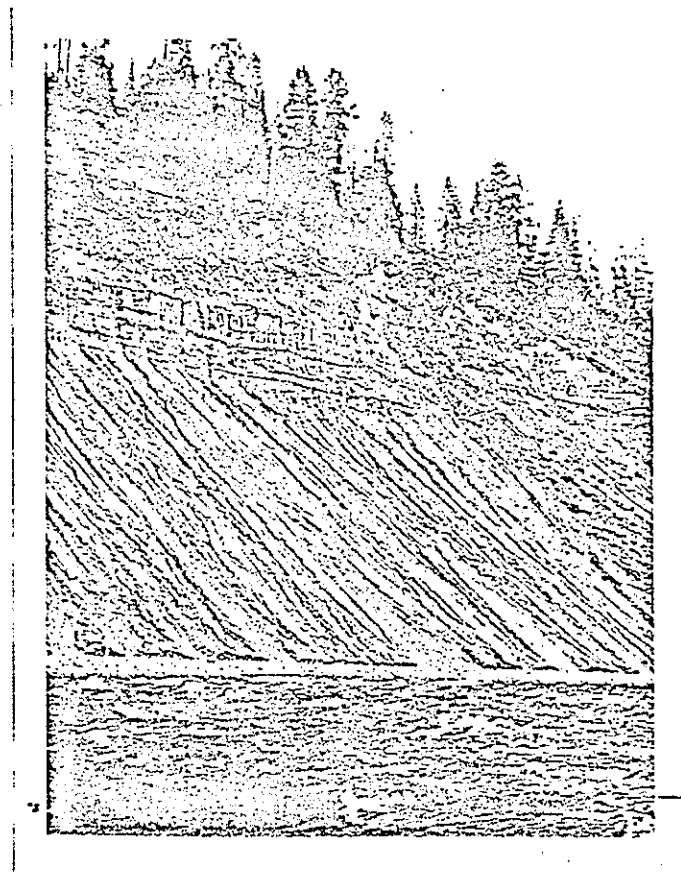
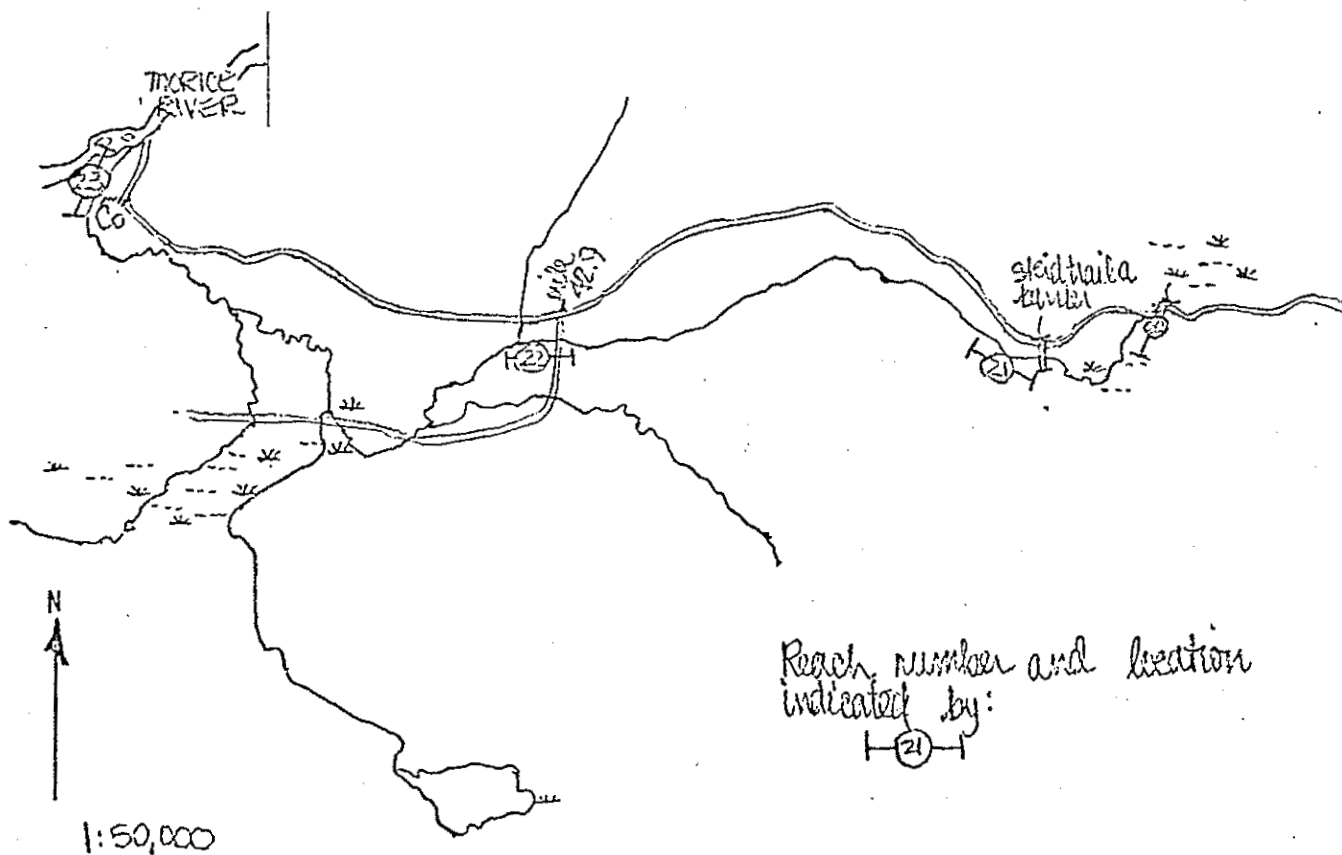


Fig. 14

Bank instability above mile 34 on the main river.

MAP 2 NAIXO CREEK
REACH LOCATIONS



NADO CREEK

Nado Creek was studied as a complete system, with detailed physical and biological information collected from main creek and tributaries.

Reach 20

Reach 20, at the source of the drainage, was located above and below road crossing, at mile 39.8. This section of creek drained the swampy lowland above Collins Lake. No fish were observed or electroshocked in this head water area. The metal culvert, at road crossing, is adequate to handle all creek flows as well as allowing upstream fish movement. (Fig. 15).

Reach 21

This section of creek, adjacent to mile 40.5 was very disturbed by land clearing and by a skid trail through the creek. The water flow was backed up and filtered through the instream debris (Fig. 16). Material from land clearing below road crossing obstruction, was adding silt. Substrate at this point was covered with as much as 1.5 cm of fine sand and soil.

Reach 22

The area studied at this section extended from new log bridge crossing at mile 43.8 downstream 0.4 miles. Bridge crossing appears to be adequate to handle creek flows, and poses no problem to fish movement. Silt from road allowance was creating a slight clouding problem, but it is felt that

this condition will stabilize once the road settles.

Reach 23

This reach was established from Nado's confluence with the Morice River to $\frac{1}{2}$ mile upstream. This area was in a state of natural breakdown. Many trees and shrubs bordered along the creek were dead or dying. Water quality was very low with long stretches of stagnant water. Many algae forms both brown and green created murky conditions. All instream material was coated with a thick slimy layer.

Tributaries to Nado Creek

All tributaries of this system were unproductive. Drainage patterns were all very similar, being either surface flows or seepage channels from small swamp areas. Flows were never greater than 1 c.f.s. and they held little potential for spawning or rearing, due to their small size.

Overall Productivity

Nado Creek was considered to be a nonproductive, almost dead system. Two theories that may give some indication to why this is ^{so} are as follows:

1. The condition of the lower mile of creek with its low habitat quality may deter fish entry. The few coho fry that were found within the first 50 meters of creek, are suspected to be fish that have moved out of the main Morice River flow.

2. Lack of spawning habitat and diffuse flows in swampy sections was considered to be the other problem. Slow flows, thick algae layers and an organic bottom would not permit productive spawning. Sites above the swampy terrain may be unreachable due to undirect flow through low lying areas.

TABLE # 4 PHYSICAL DATA, NADO CREEK

REACH	DATE 1975	WETTED WIDTH	BED WIDTH	DEPTH	GRADIENT	WATER TEMPERATURE	pH	OXYGEN
20	Aug 9	2.5 m	4 m	0.2 m	1½%	12.9°C	5.5	9 ppm
21	Aug 9	2.5 m	4 m	0.25 m	2%	12.9°C	--	--
22	Aug 9	2 m	3 m	0.3 m	2%	--	7.1	--
23	Aug 9	2 m	2.5 m	0.4 m	1%	11.1°C	6.65	9 ppm

TABLE # 5 BANKS AND SUBSTRATE, NADO CREEK

REACH	BANK MATERIALS	STREAMSIDE VEGETATION	LAND USE	BANK STABILITY	SUBSTRATE	GRAVEL COMPACTION	BAR DEVELOPM
20	clayey soil over gravel - sand	swamp type understory spruce forest	none	stable	20% boulder 15% large rubble 15% small rubble 40% large gravel 25% small gravel 3% sand/silt	loose	some
21	gravel - sand	spruce forest cow parsnip	none	stable	angular, silty, humic stain	compact	some
22	clay soil and sand	alder, willow spruce forest	logging proposed	stable	5% boulder 10% large rubble 25% small rubble 20% large gravel 20% small gravel 20% sand/silt	loose	some
23	soil over loose gravel	horsetail blacktwinberry Sitka spruce	none	stable	5% rubbles 5% large gravel 10% small gravel 20% sand 60% mud/clay some clay banks	---	some muddy

TABLE # 6 WATER CHARACTERISTICS AND FISHERIES, NADO CREEK

REACH	RUN/POOL/ RIFFLE	WATER CLARITY	CROSS SECTION	SIDE & BACK CHANNELS	SAMPLING METHODS	FISH OBSERVED	SIZES	BARRIERS	ROOTED AQU/ AND INVERTEBRAT
20	10%/10%/80%	dark humic stain, water foamy	regular gradial banks	few	electro- shock	none	---	none	instream grasses and sedges nematode wr whirlagig beetle
21	0%/50%/50%	humic stain	regular	some	electro- shock	none	---	cat road crossing	slime on bottom
22	20%/30%/50%	humic stain	regular	some	observation	none	---	none	---
23	55%/40%/5%	humic stain	regular	many	observation	coho fry near mouth	3.5 m	none	algae covered mosses

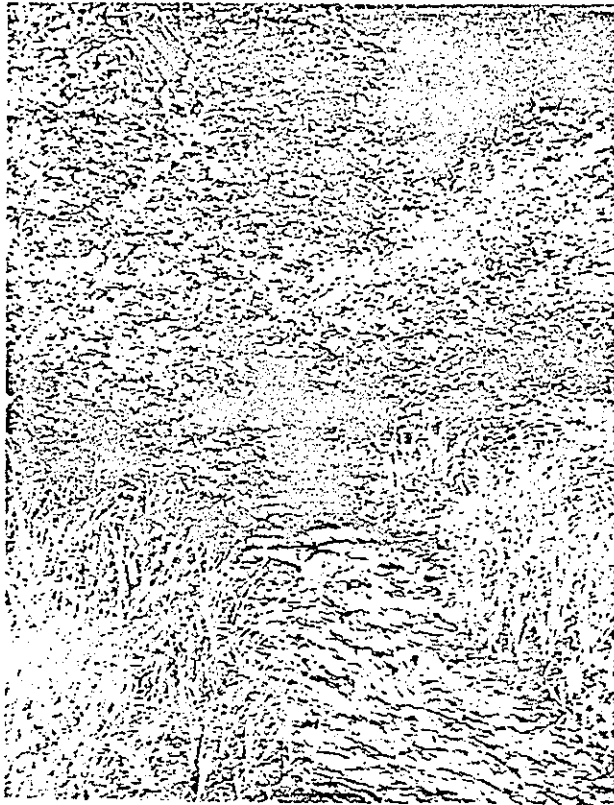


Fig. 15

Nado Creek. Reach near bog
headwaters (Reach 20).

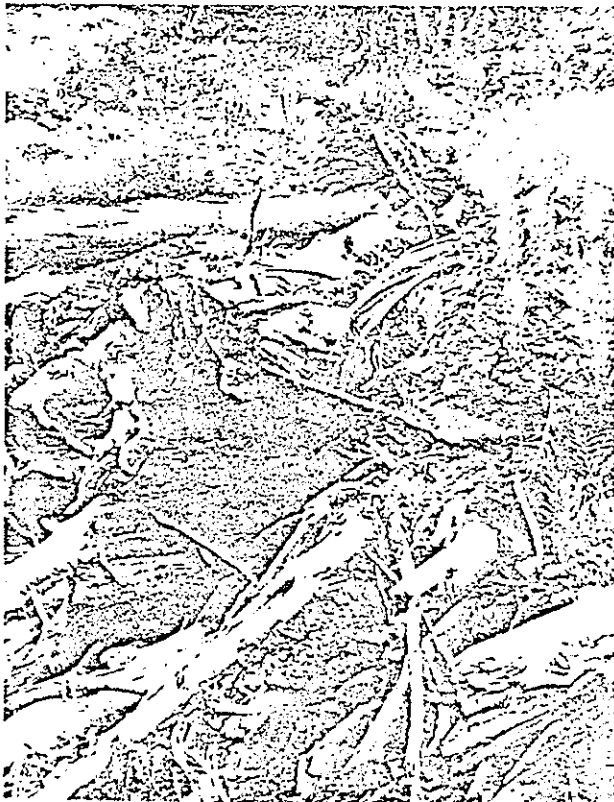


Fig. 16

Nado Creek, blockage by
skid trail across creek
mile 40.5 (Reach 21).

LAMPREY CREEK
REACH LOCATIONS

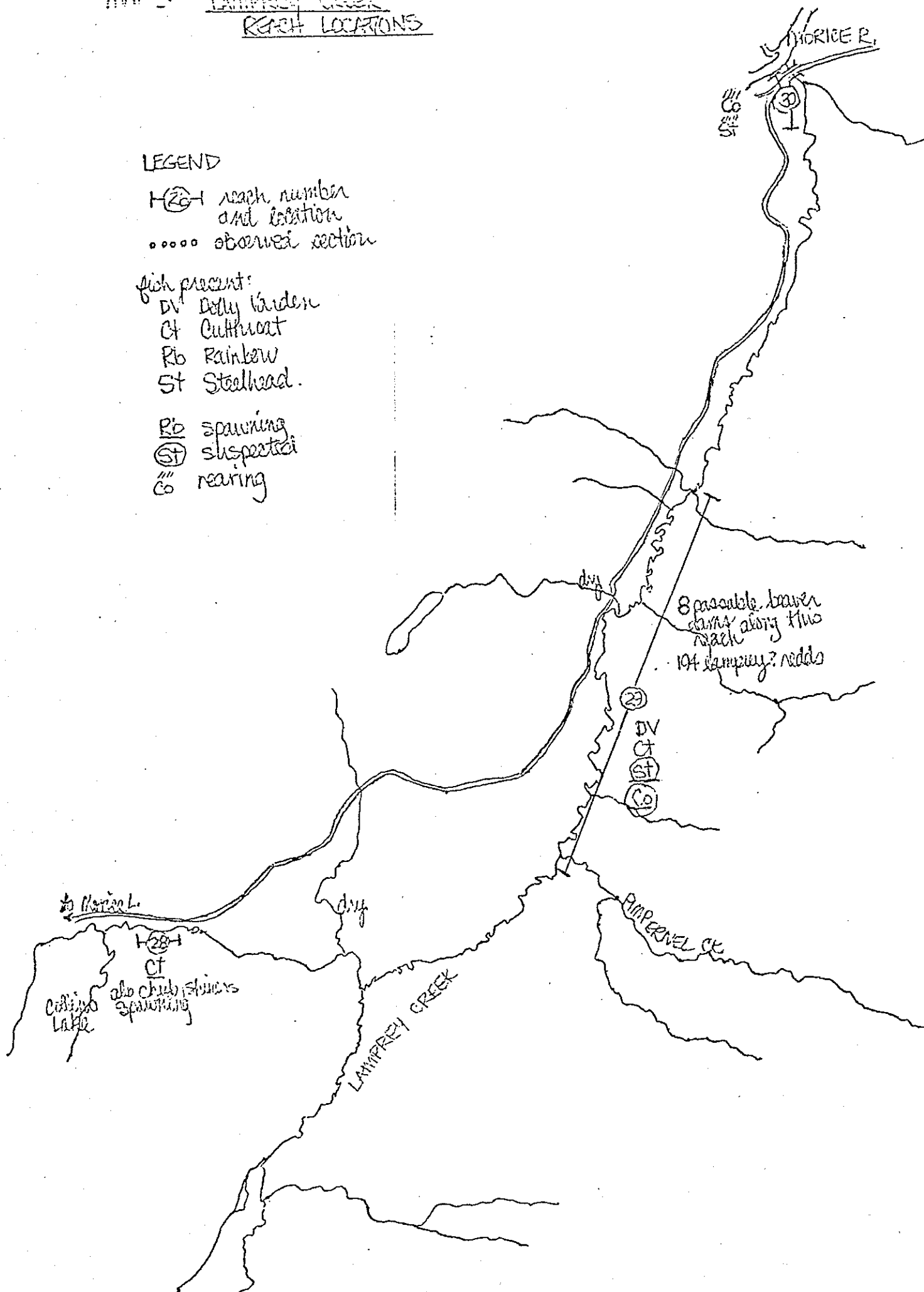
LEGEND

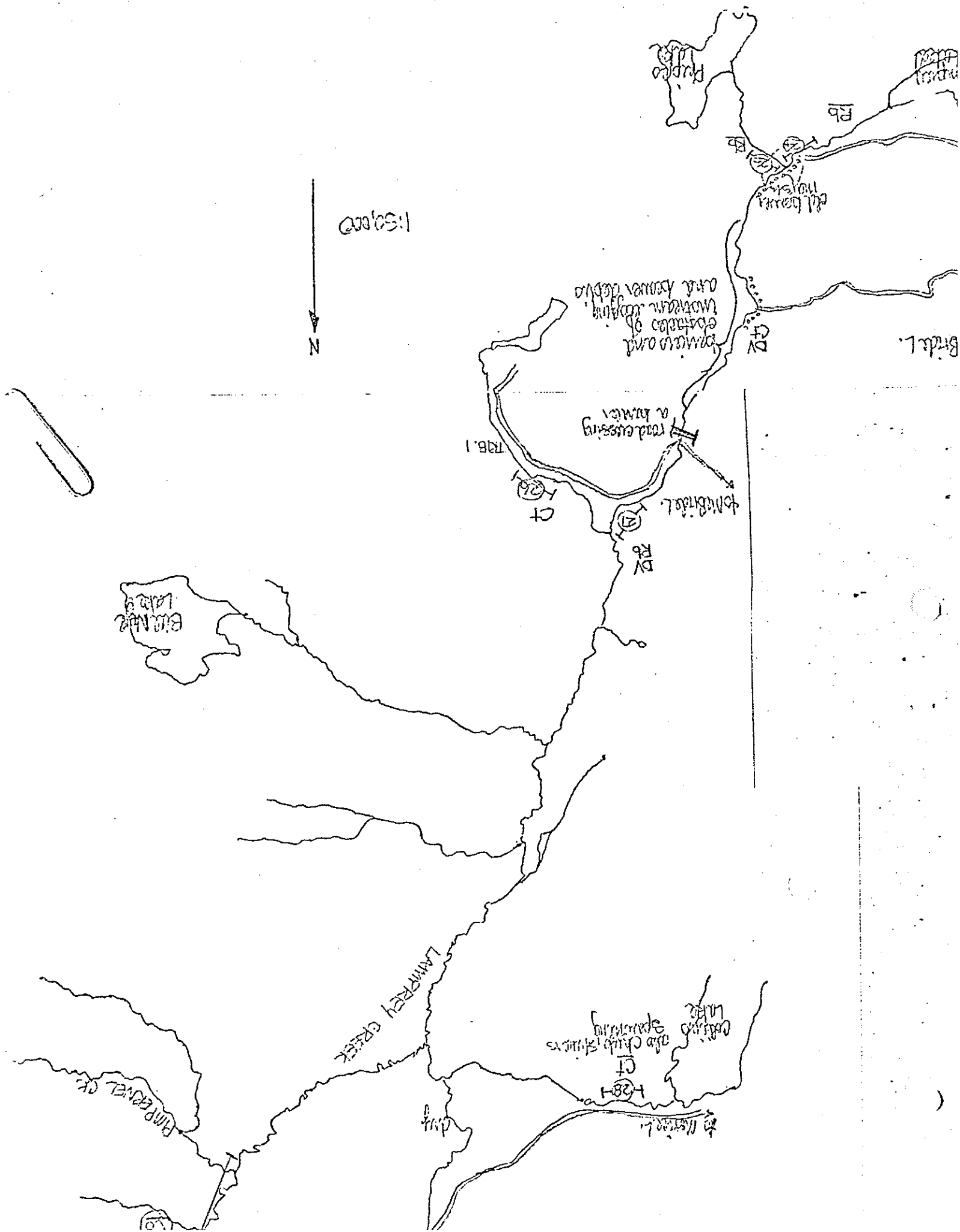
H20-1 reach number
and location
..... observed section

fish present:

DV Dolly Varden
CT Cutthroat
Rb Rainbow
St Steelhead.

Rb spawning
St suspected
Co rearing





LAMPREY CREEK

Lamprey Creek was studied in detail with physical and biological data being collected from as many tributaries and reaches on the mainstem as possible. (Most of the stream was low gradient and meandered through swampy terrain.) Some upper sections had a steep gradient and passed through closed canopy of alder and spruce forest.

Reach 24

Near lake outflow this reach was surrounded by patch logging. There was a lot of windfall and debris in the stream as a result of the logging which created potential barriers. Many fry were seen along the reach probably progeny of lake rainbows spawning in the outflow. (Fig. 17).

Access to the tributary to Phipps Lake was by hiking downstream $\frac{1}{2}$ mile from the end of the road to lake outflow. There is an old beaver marsh now grown in, that the stream winds through in a steep sided channel. Fish were observed above and below the marsh and old dam but were less numerous in the marsh channel itself. Between the lake and marsh, the substrate was mainly gravel sized and the stream banks were gradual. Within the marsh, the stream was confined to a narrow deep channel between silty banks, the bottom there often muddy and the gradient low.

Below the old dam about 500 meters downstream of Phipps Lake tributary, the stream had a steeper gradient again with moss covered rubble the main size of the substrate. Streamside vegetation in the marsh was sedges and willows whereas below and above the marsh, the vegetation was spruce forest with alder beside the creek.

Reach 25 Tributary to Phipps Lake

The stream was small and had cut 0.5 m vertical banks. Many small rainbow were observed in the creek, again possibly lake stock. There was excellent rearing habitat and good spawning area for its size.

Reach 26 Tributary 1 of Lamprey Creek

Access to Tributary 1 was by logging road. There were several cut and burned sections above the creek but a wide fringe strip was left between the logging and the creek. Habitat was excellent for cutthroat with closed canopy and logs instream.

Where the road to Tributary 1 crosses Lamprey Creek there is a barrier. The area is swampy and flat, the stream being crossed by log road through the water. The only way fish could pass this point is by crossing in the water which runs over the road. (Fig. 18)

Ross Johnson of B.C. Forest Service in Houston said he has seen steelhead caught in the pool below this road barrier (several years ago) indicating that steelhead

have travelled this far up Lamprey Creek. Electro-shocking the reach below the barrier turned up a possible rainbow fry. Observations of the creek upstream about a mile from the barrier showed that logging debris in that area had created many blockages of the stream. Fish were seen confined to pools between the barriers probably resident cutthroat and Dolly Varden.

Reach 27 Mainstem Lamprey Creek below Tributary 1

Below the old beaver dam, the creek was more favorable to fish populations. There was instream debris as a result of past beaver activity and the bottom was washed clean of silt by riffle sections. Canopy closure was 80% and there were many pools providing good holding and rearing habitat.

The section of Lamprey Creek between Tributary 1 and Collins Lake tributary is very swampy and beaverized. The stream meanders through open side hills of willow and sedge often ponding weedily behind beaver dams. The outflow stream of Bill Nye Lake joins the main creek along this section, and it too is marshy from the confluence with Lamprey upstream several miles. The habitat along this part of the stream is probably very similar to swampy areas observed upstream. Spawning areas are limited by siltiness resulting from beaver activity but rearing habitat is excellent. There are probably obstructions due to beaver debris in the stream.

Reach 28 Collins Lake Outflow

Collins Lake outflow was observed about 3/4 mile downstream from the lake. The stream had a closed canopy of alder and sufficient gravel to support some spawning. The lake populations of fish (including cutthroat trout, suckers, chinook and peamouth chub) use this stream for spawning. Some chub were seen along the reach most likely some of the lake fish. The water temperature was high and the oxygen concentration relatively low both due to the fact that the stream flows from a lake. The stream joining Collins outflow before Lamprey Creek drains a swamp and was dry at time of survey.

Reach 29 Mainstem Lamprey Creek from Pimpernel Creek
Downstream to 2 1/2 miles from Mouth

The mid section of Lamprey Creek was walked upstream from the road about 3 miles to Pimpernel Creek. Characteristics of the creek along this length were very similar. The stream meanders along its wide valley bottom much of which is open meadow or willow thicket. Old and recent beaver activity in this area is extreme. There are many beaver runs and channels and eight dams were counted along this stretch. The meandering has created 3 large log jams potential but not present barriers. The dams and log jams were considered passable because dead spawned out lampreys were seen above the most upstream dam observed near Pimpernel Creek. Gravel along the reach was

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excellent for spawning and 194 redds were counted - probably mostly lamprey redds. The stream also held excellent rearing potential with numerous side channels. Many tiny fry were seen - some certainly were long-nosed dace. Other fry may have been cutthroat, rainbow or coho on behavioral patterns. Small Dolly Varden were also seen. (Fig. 19). The outflow of Pimpnel Creek was located with some difficulty. It enters Lamprey Creek as a trickle over a 1 meter fall and there is extensive beaver disturbances near the mouth. Though the topographic map shows a fairly steep gradient upstream on the creek, the mouth is wide and swampy so the actual confluence with lamprey may be mainly by seepage. Fisheries potential of Pimpnel is thus very low.

Reach 30 at road crossing

Near the mouth of Lamprey Creek, the stream is mainly riffle and the bottom is covered with an algae mat. From air photo study, this type of habitat extends upstream about $2\frac{1}{2}$ miles to the wider valley bottom, habitat described in Reach 29. Spawning gravel is limited the substrate being mainly rubble sized. Though some coho and rainbow smolts were found rearing here, it seems the main importance of this section of creek is passage to upper sections. (Fig. 20).

Overall Productivity of Lamprey Creek

Productivity of this stream is high. The lower reaches are used primarily for a migration route and for rearing. Mid sections of the creek are the most important for spawning of anadromous fish. Above the Bill Nye Lake tributary there are barriers and obstructions to fish movement due to logging debris, road crossings and beaver activity. Upper reaches of the creek are important spawning areas for the lake populations.

TABLE # 7 PHYSICAL DATA, LAMPREY CREEK

REACH	DATE 1975	WETTED WIDTH	BED WIDTH	DEPTH	GRADIENT	WATER TEMPERATURE	pH	OXYGEN
24	Aug 10	2 m	3 m	0.2 m	2%	11.1°C	6.7	10 ppm
25	Aug 10	0.5 m	0.6 m	0.2 m	2%	9.5°C	6.8	10 ppm
26	Aug 10	0.75 m	1 m	0.2 m	1½%	8.9°C	6.6	10 ppm
27	Aug 10	2 m	3 m	0.35 m	1%	11.7°C	--	--
28	Aug 14	5 m	6 m	0.2 m	1%	15.1°C	6.8	8 ppm
29	Aug 13	4 m	8 m	0.45 m	1%	16.2°C	7.5	11 ppm
30	Aug 14	9 m	11 m	0.3 m	3%	14.4°C	7.2	10 ppm

air
temp.

TABLE # 8 BANKS AND SUBSTRATE, LAMPREY CREEK

REACH	BANK MATERIALS	STREAMSIDE VEGETATION	LAND USE	BANK STABILITY	SUBSTRATE	GRAVEL COMPACTION	BAR DEVELOPMENT
24	sand and gravel	spruce pine forest, fireweed, horsetail, some alder	patch logging	stable	30% large rubble 5% small rubble 25% large gravel 35% small gravel 20% sand 2% silt/mud	loose, bit silty	some
25	well developed soil over sand and gravel	spruce forest	none	stable	10% large rubble 20% small rubble 40% large gravel 20% small gravel 10% sand/silt	loose	little
26	soil over gravel	spruce forest alder beside stream	old logging on side hill	stable	10% large rubble 30% small rubble 20% large gravel 20% small gravel 20% sand/silt	loose	some
27	thick soil	alder, willow spruce forest	old logging	stable	5% rubble 15% large gravel 10% small gravel 40% sand 30% mud/silt	loose	some
28	soil	spruce forest alder over water	none	stable	5% large gravel 25% fine gravel 60% sand 10% silt/mud	loose	some
29	clay silt or sand gravel	cow parsnip willow, alder sedge meadow	none	fairly stable	2% boulder 8% rubble 30% large gravel 30% small gravel 30% sand/silt	loose	much
0	loose sand gravel	cottonwood, alder spruce forest	campsite at mouth	stable	2% boulder 20% large rubble 20% small rubble 15% large gravel 10% small gravel 15% sand/silt	loose	some

TABLE # 9 WATER CHARACTERISTICS AND FISHERIES, LAMPREY CREEK

REACH	RUN/POOL/ RIFFLE	WATER CLARITY	CROSS SECTION	SIDE & BACK CHANNELS	SAMPLING METHODS	FISH OBSERVED	SIZES	BARRIERS	ROOTED AQUATIC AND INVERTEBRATES
24	50%/30%/20%	slight humic stain	regular logs instream	some	electro- shock	15 rainbow	4.3, 5.2, 8 cm, others 3-5 cm	possible obstruction at bridge	caddis fly larvae leech, sedges green algae, mosses
25	0%/40%/60%	clear	regular steep banks 0.5 m	none	observation	many rainbow fry	all about 3.5 cm	none	---
26	0%/60%/40%	clear, slight stain	undercut banks	few	electro- shock	6 cutthroat	3-8 cm	none	---
27	0%/70%/30%	clear, slight brown	regular	few	electro- shock	3 Dolly Varden 1 rainbow	4, 8, 8 cm 4 cm	road crossing	slime on bottom
28	80%/10%/10%	clear	regular flat banks	few	observation	lake chub cutthroat	4-8 cm	none seen	sedges
29	0%/70%/30%	slight humic stain	regular often steep banks 1 m	some	observation	Dolly Varden rainbow fry? cutthroat long nosed dace	1 - 8 cm	many beaver dam obstacles	algae layer on bottom
30	0%/20%/80%	clear	regular	some	electro- shock	1 sculpin 7 coho fry & smolts 35 long nosed dace many lampreys 5 rainbow	12 cm 4.5-7 cm 4-8 cm 6-15 cm 9, 9, 9, 12 & 16 cm	none	algae layer on bottom



Fig. 17

Lamprey Creek, shock site on creek
near the lake. (Reach 24).



Fig. 18

Barrier at road crossing.
Lamprey Creek near tributary 1
confluence.

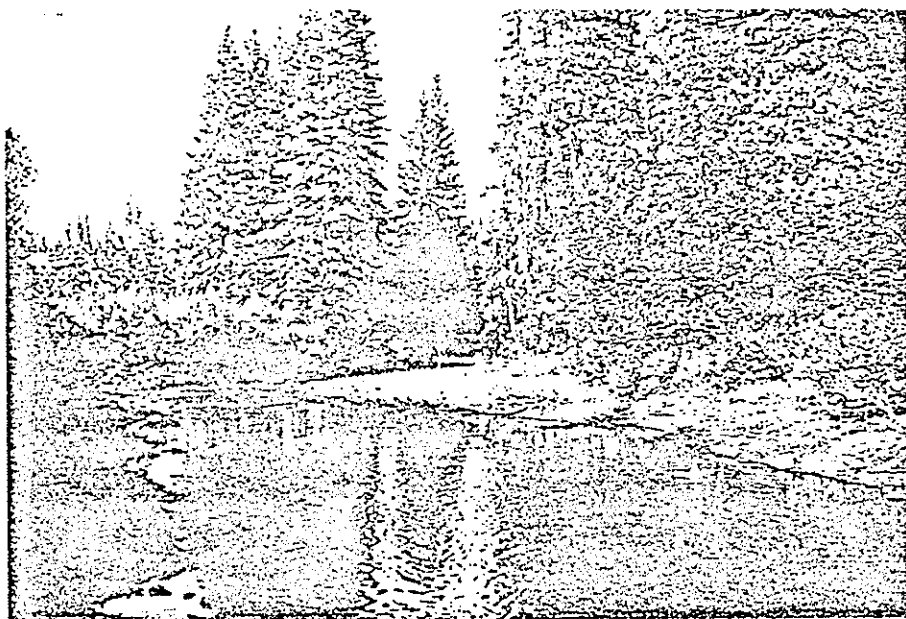


Fig. 19

Mid section of Lamprey Creek near confluence of Pimpernel Creek. looking downstream.



Fig. 20

Lamprey Creek mouth. (Reach 30).

OWEN CREEK

Owen Creek was surveyed as a potential site for an artificial spawning area for steelhead trout. (Pinsent 1969). In the report which includes physical and biological data, Pinsent states that Owen Creek is used for spawning by steelhead and cohos. 60% of the stream along its mid section has habitat very similar to the mid section of Lamprey Creek. The stream is low gradient and meanders through swampy terrain. There is braiding and extensive beaver activity.

Oxygen concentration along the stream ranges from 8 to 10 ppm and pH is from 7 to 7.4. Pinsent also decided that the creek was most suitable for spawning in the upper half, the lower reaches used mainly as a migration route. He found no fish near the mouth but sampled Dolly Varden, whitefish, rainbow smolts and many rearing coho fry near the mouth of Puport Creek. He later saw coho spawning near there. (Fig. 21)

More recent information was gathered as an update to the Pinsent report. Electroshocking at the bridge crossing August 14 and 15 (site 1 in Pinsent) produced the following:

9 coho fry	4 cm each
4 lampreys	4-12 cm
3 long nosed dace	4-6 cm

Also investigating Owen Creek at this time were the Federal Fisheries people, Bruce Shepherd and Jim Mitchell. They got two coho smolts (8-11 cm) in their overnight trap at site 1 on August 14. They observed the creek further upstream finding a large beaver dam (2 meters) about 1/2 mile from the road crossing. This may present a barrier to fish movement this fall. Rainbow smolts were seen at their trap at mile 1 and coho fry were observed to mile 19. In their conversation with a lodge owner at Owen Lake they found that coho and steelhead have been absent from the lake area for the past 4 years. This suggests there is an impassable barrier somewhere between mile 19 and the lake.



Fig. 21

Owen Creek. Compare this picture to the one in the Owen Creek report by Pinsent. Culverts are no longer a barrier since riprap was dumped below cement apron.

Conclusions

From the study of the tributaries of the Morice River, the following conclusions can be drawn:

1. Many of the tributaries of the Morice are very small. Their main importance to fisheries is that anadromous fish rear in the still water in the mouths of the creeks. The small tributaries also have resident populations of cutthroat and Dolly Varden.
2. The larger tributaries of the Morice (for example Peacock, Fenton, Cedric and Lamprey Creek) are important rearing if not spawning creeks for steelhead trout. Smolts were taken from each of these creeks.
3. Lamprey, Owen and Nado Creeks were surveyed in detail. Lamprey was found to be very productive with excellent spawning areas. The creek is accessible to fish up to near Bill Nye Creek tributary. Owen Creek is similar in habitat to Lamprey being mostly in swampy terrain. It is accessible to mile 19 at least though there is a new 2 meter beaver dam at mile 0.5. Nado Creek was found to be devoid of any fish except for a few coho fry rearing near the mouth. The reason for this absence of fish is unknown.
4. Because of the lack of spawning area in tributaries many steelhead must be mainstem spawners. Excellent spawning areas exist along the main river especially

in side channels.

Recommendations

1. Due to lack of time with the river boat, it was not possible to survey Houston-Tommy Creek or the several other small tributaries downstream of Owen on the west side of the river. Study of these streams would be needed to complete this survey.

2. Federal Fisheries has complete reports about the salmon and steelhead in the Morice as well as physical data on water flows and river levels. It is suggested that copies of their reports be obtained for the file here.

3. More carefully constructed road crossings are necessary on some small tributaries. Blockages of several streams were noted due to culverts and logging debris.

Bibliography and References

Background information on the Morice River came from the Morice River file in this office. In particular:

3. memo June 13, 1975 Dave Bustard

Morice River Tributaries - Morice Lake to Gosnell River.

4. memo June 8, 1975 A.E. Fletcher

Morice River Culvert Survey

7. Taylor, G. O. and R. W. Serodick Feeding Habits of some Salmonids in the upper Morice River Sept. 1968.

2. Excerpt from Kemano II Project Report

1. Dept. of Fisheries March 1964. Fisheries Problems Associated with the Development of Logging Plans within the Morice River Drainage System.

5. Pinsent, M. E., November 1969. A Report Regarding the Suitablility of Owen Creek as a Potential Site for the Construction of Artificial Spawning Facilities for Steelhead trout.

6. Short report The Bulkley & Morice Rivers.

Information on lake outflows came from lake files for Collins, McBride and Owen Lake.