BIOPHYSICAL STREAM SURVEY OF FOURTEEN SOCKEYE STREAMS TRIBUTARY TO THE BABINE-NILKITKWA LAKES

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Northern Operations Branch

Pacific Region

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ACKNOWLEDGEMENTS

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INTRODUCTION

The Babine-Nilkitkwa Lake system is located on the central interior plateau of British Columbia and drains via the Skeena River at Prince Rupert (Figure 1). The watershed encompasses approximately 10,000 sq km (4,000 sq mi) and includes a number of lakes and tributary streams (Smith, 1973). This system is very rich in natural resources of which the most predominant are timber, minerals and fish.

The forest resources of this area are managed by B. C. Forest Service within the Babine Public Sustained Field Unit. White spruce and lodgepole pine are the primary timber species and these are believed capable of providing a continuous harvest of 356,000 cunets annually (B. C. Forest Service).

Granby Mining Company Ltd. and Noranda Mines (Bell Copper Division) both conduct active open-pit copper extraction within the watershed. The mines, located on McDonald Island and Newman Peninsula respectively, currently extract nearly 9 million tons of ore average 0.5 percent copper annually (Smith, 1973).

The fisheries resource of Babine-Nilkitkwa Lakes include substantial numbers of both commercial and recreational important fishes. In recent years, the Babine-Nilkitkwa area has contributed in excess of 90% of the total Skeena sockeye stock (Table I).

TABLE I. PERCENT CONTRIBUTION OF BABINE-NILKITKWA AREA TO THE TOTAL SKEENA RIVER SOCKEYE PRODUCTION *

YEAR	TOTAL BABINE ESCAPEMENT	TOTAL SKEENA ESCAPEMENT	PERCENT CONTRIBUTION
1974	706,700	721,450	98
1973	789,500	824,400	96
1972	662,900	698,800	95
1971	797,100	823,100	97
1970	642,000	676,500	95

* (data from the Skeena Management Committee)

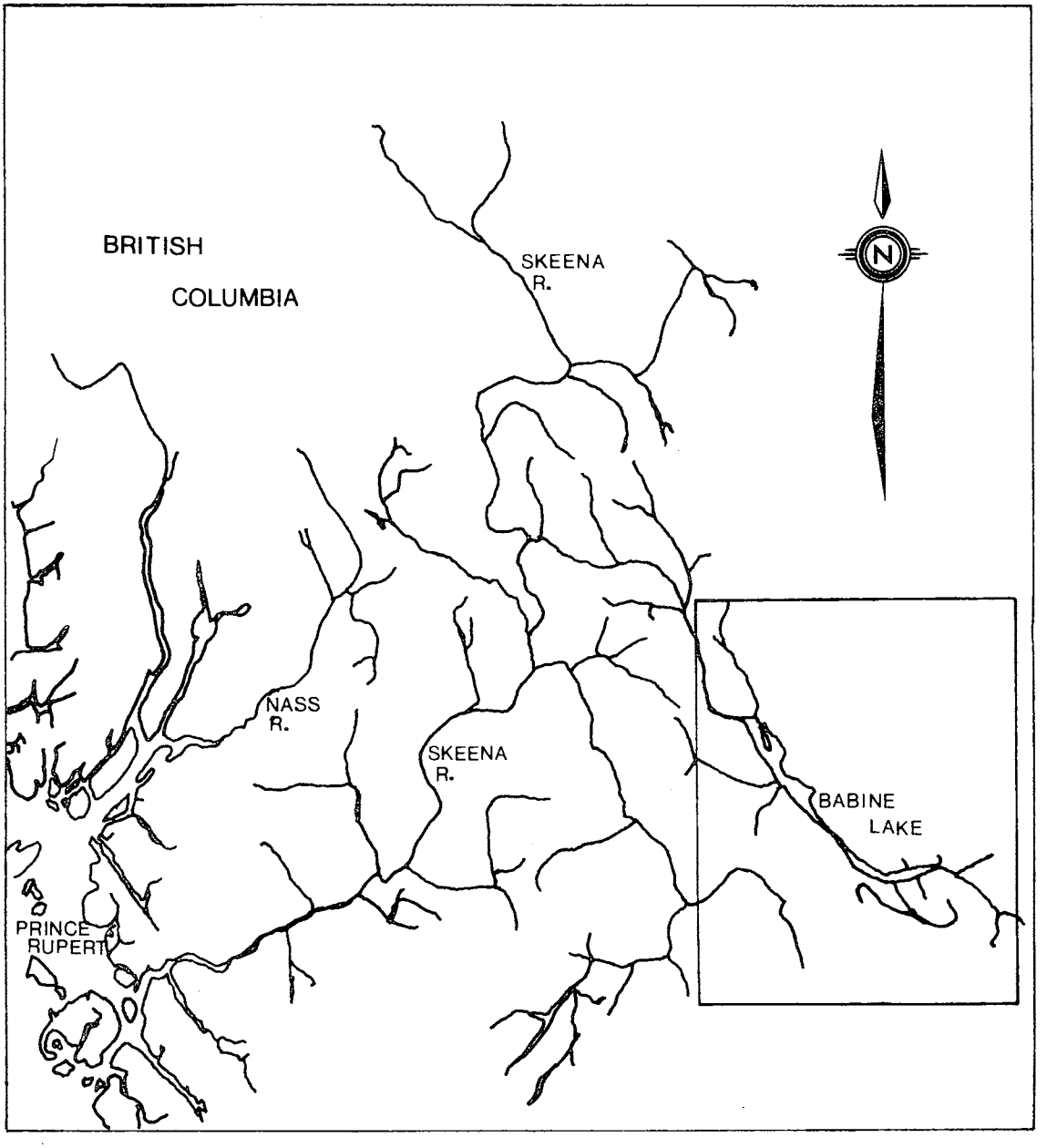


Figure 1. Location of Babine-Nilkitkwa Lake in the Skeena River Drainage

Most of the spawning occurs at the outlet of the Upper and Lower Babine Rivers, the Nilkitkwa region and tributaries to the main region of Babine Lake. Some beach spawning also occurs in the main lake region.

In the Babine-Nilkitkwa system, the Fisheries Service has embarked on sockeye enhancement projects at Fulton River and Pinkut Creek. These facilities have been quite successful but do not account totally for the large escapement to the Babine-Nilkitkwa system (Table II).

TABLE II. COMPARISON OF FULTON AND PINKUT TO TOTAL BABINE SOCKEYE PRODUCTION

SYSTEM	5 YR. AVERAGE 1970-1974	% CONTRIBUTION
Fulton	221,840	31%
Pinkut	61,080	8%
Total Babine Escapement	719,640	-

There are other systems surrounding the lakes that should be considered and it is for these systems that this biophysical stream inventory was initiated (Figure 2).

OBJECTIVES

This stream inventory was designed to:

1) employ a biophysical method of aquatic systems inventory to fourteen sockeye streams tributary to the Babine-Nilkitkwa Lakes.
2) experiment with methodology based on an almost totally low-level aerial inventory.
3) provide Fisheries Service personnel with a better data base.

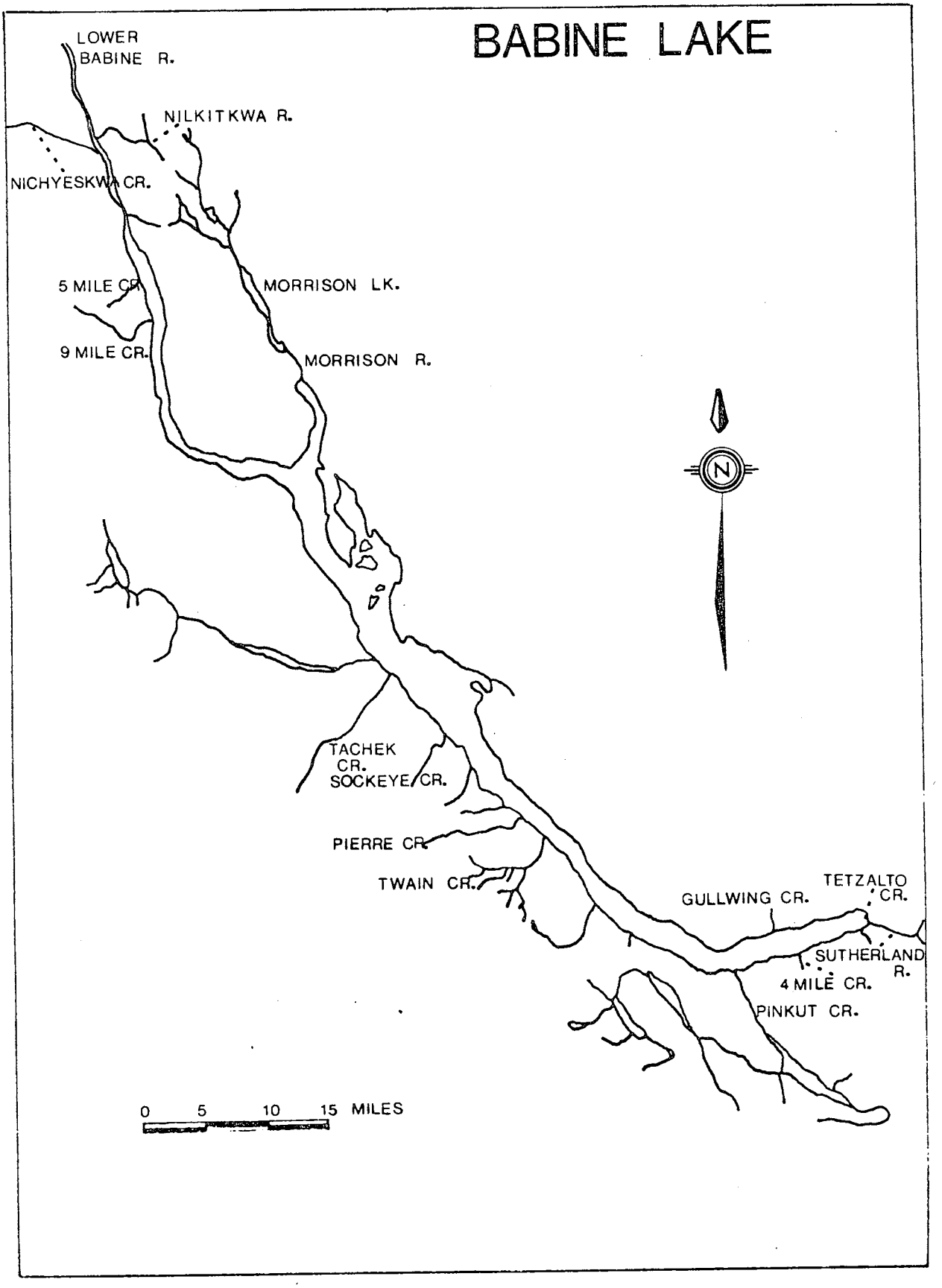


Figure 2. Stream Locations on the Babine-Nilkitkwa Area

FIELD PROCEDURE

During the fall of 1974, sockeye producing creeks surrounding the Babine-Nilkitkwa Lakes were surveyed by Fisheries Service personnel to provide a biophysical type inventory in this area. The technique used in this inventory was adapted from the surveys of the Tsitika and Nahmint watersheds by Bond et. al. (1975). The area was flown utilizing a Bell 206B helicopter.

The streams were divided into sections at the discretion of the observer and numbered on a corresponding map. Stream parameters such as gravel substrate, channel width, obstructions, bank composition, riparian vegetation, secondary flood channels and presence of fish were noted on a data sheet (Figure 3). The location of meadows, lakes, and obstructions plus any other pertinent comments were noted on the map. In selected sites where the helicopter was able to land, stream temperatures and the presence of juveniles were noted.

S T R E A M D A T A

STREAM SECTION_____

GRAVEL DESCRIPTION: define % composition

bedrock
boulder & cobble
large gravel
small gravel
sand

channel dry compared to wetted
dry_____ft.
wet_____ft.

BANK CANOPY:

% composition

Canopy type:
brush
deciduous
deciduous-conifer mix
conifer mature
conifer immature

Amount of cover
trace_____
intermittent_____
continuous_____

BANK COMPOSITION: (where possible % composition

bedrock
boulder & cobble
gravel
sand
clay

Map
- slump locations
- slide locations

FISH HABITAT:

Discuss & indicate on maps-
swamps
weed beds
back channels
side channels

ADULTS OBSERVED:

	Presence	Est. Number
Sockeye		
Chinook		
Coho		
Pink		
Chum		

(Locate extent of migration on map & key spawning distribution)

OBSTRUCTION: (mark on map)

Cascade_____ Passable_____
Waterfall_____ Non-passable_____
Logjam_____
Other_____

Fig. 3 Example of Stream Data Sheet

SUMMARY OF OBSERVATIONS

Conservation District #8

FIVE MILE CREEK

Location - flows easterly into Babine Lake, near north end.

Drainage Area - 2,640 acres (1,068.4 hectares) Length - 4.68 mi. (7.49 km.)

Mean Escapement (1964 - 73) - sockeye - 154

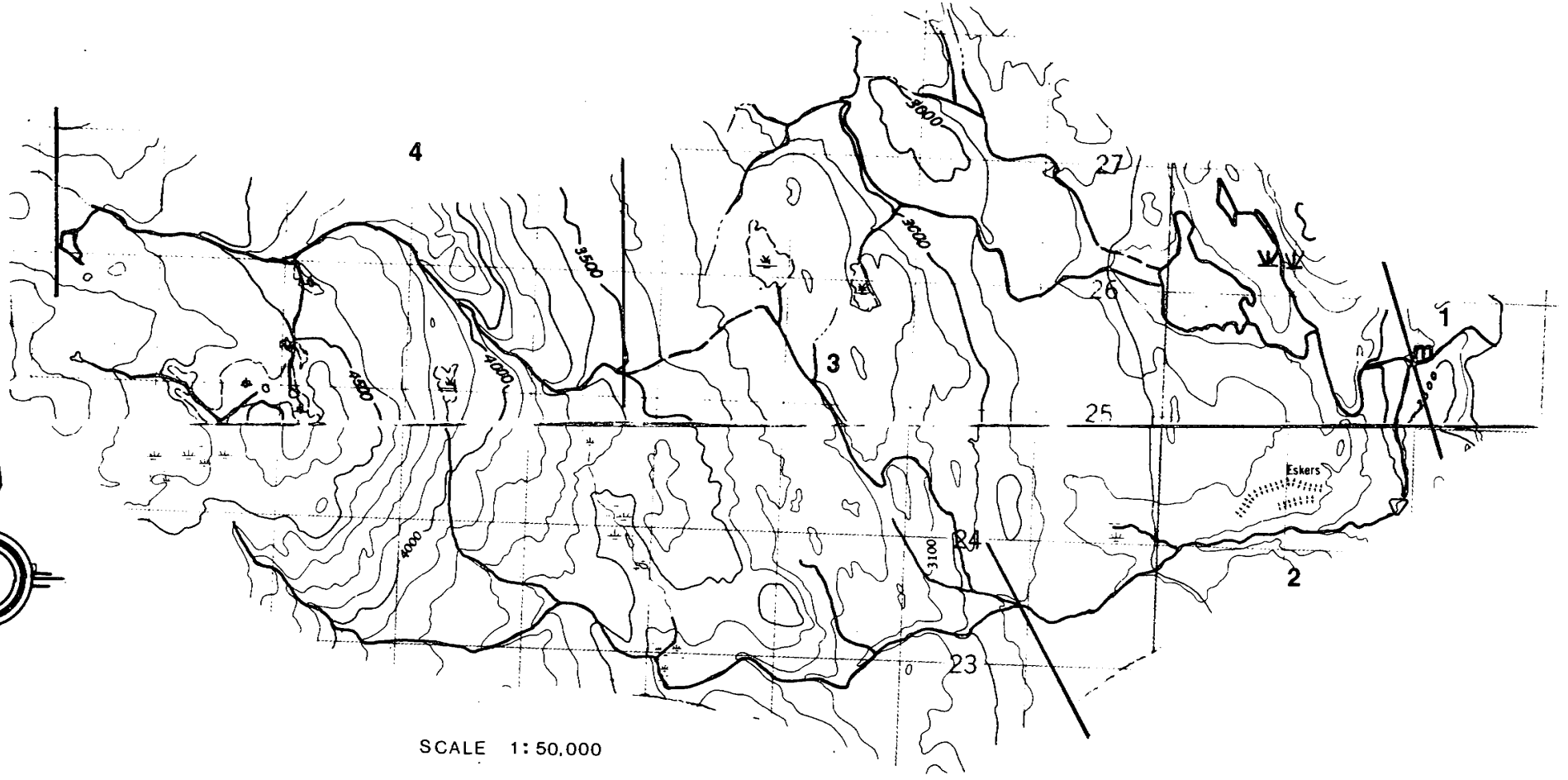
Species Timing - O(spawning) - (adult upstream migration) X (egg and rearing)

Species	J	F	M	A	M	J	J	A	S	O	N	D
Sockeye	X	X	X	X	X			-	O	O	X	X

General Comments:

- fish not observed in entire area.
- Section 1 is limit of migration.
- debris problems in burned area of Section 3.
- bird and bear predation light.
- years of low flow the migration cannot pass due to gravel bars at mouth of stream.
- misc. lake areas = 86.4 acres, 35.0 hectares.

FIVE MILE CREEK



SCALE 1:50,000

LEGEND

BEAVER DAM	▽	MIGRATION END	M
CANYON	○	SLIDE/SLUMP	→
CASCADE/RAPIDS	□	SWAMP	Ψ
LOG JAM or DEBRIS	+	WATERFALL	I

Stream Section Survey Data
October, 1974

PARAMETER	SECTION 1	SECTION 2	SECTION 3	SECTION 4
substrate	small gravel	10% cobble, 60% small gravel 30% large gravel	boulder-cobble and large gravel	boulder-cobble and large gravel
channel width				
wetted	9'	9'	9'	9'
dry	12'	11'	10'	10'
gradient	11.84%	4.06%	8.36%	14.20%
obstructions	debris	beaver dams	debris	debris
bank interface	gravel sand	gravel sand	gravel sand	gravel sand
riparian vegetation	60% brush, 30% deciduous, 10% conifer mature	40% brush, 30% deciduous, 20% mature conifer, 10% immature conifer	60% deciduous brush 40% mature conifer	30% deciduous brush 70% mature conifer
amount of cover	intermittent tree/ continuous brush	intermittent tree and brush	intermittent tree/ continuous brush	continuous conifer
secondary flood channels	possible	possible	none	none
comments	marsh areas and side-channels	swamp and marshy areas	all riffle area	confined to bottom of draw
section length	0.32 mi. 0.51 km.	1.4 mi. 2.24 km.	1.36 mi. 2.15 km.	1.6 mi. 2.56 km.

Conservation District #8

FOUR MILE CREEK

54° 125° S.E.

Location - flows northerly into south end of Babine Lake.

Drainage Area - 1,844 acres / 746.3 hectares

Length - 4.16 mi. / 6.66 km.

Mean Escapement (1964 - 73) - sockeye - 5,783

Species Timing - O(spawning) - (adult upstream migration) X (egg incubation and rearing)

Species	J	F	M	A	M	J	J	A	S	O	N	D
Sockeye	X	X	X	X	X			X	O	O	X	X

General Comments:

- water temperature 43°F @ 1145 hrs.
- broad flood plain at estuary.
- medium predation by birds and bears.
- Section 3 is extent of migration.
- misc. lake areas = 0

FOUR MILE CREEK

Stream Section Survey Data

October, 1974

PARAMETER	SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5
substrate	40% large gravel, 40% small gravel, 20% sand	20% boulder & cobble, 40% large gravel, 40% small gravel	bedrock and large gravel	20% bedrock, 80% boulder & gravel	small gravel and sand
channel width wetted dry	 9' 24'	 8' 22'	 10' -	 6' 10'	 5' -
gradient	23.67%	7.89%	10.15%	3.95%	4.73%
obstructions	none	none	cascades and 50' falls		
bank interface	gravel, sand, clay	bedrock, boulder, and cobble	overburden on bedrock	30% bedrock, 70% gravel, sand, clay	sand and clay
riparian vegetation	deciduous brush 80%, 20% immature conifer	40% deciduous brush, 60% mature conifer	20% deciduous heavy brush, 80% mature conifer	20% deciduous heavy brush, 80% mature conifer	10% deciduous brush, 30% mature conifer, 60% immature conifer
amount of cover	continuous	continuous	continuous	continuous	continuous
secondary flood channels	present	present	none		
comments	small side-channels	small side-channels	end of migration at cascade and waterfalls		
section length	0.32 mi. 0.51 km.	0.96 mi. 1.54 km.	1.12 mi. 1.79 km.	0.96 mi. 1.54 km.	0.80 mi. 1.28 km.

Conservation District #8

MORRISON CREEK

55° 126° S.E. (Hatchery Creek)

Location - flows south into Babine Lake from Morrison Lake.

Drainage Area - 12,330 acres
499.0 hectares

Length - 21.88 mi.
35.02 km.

Mean Escapement (1964 - 73) - 12,965 sockeye
0 - 300 coho

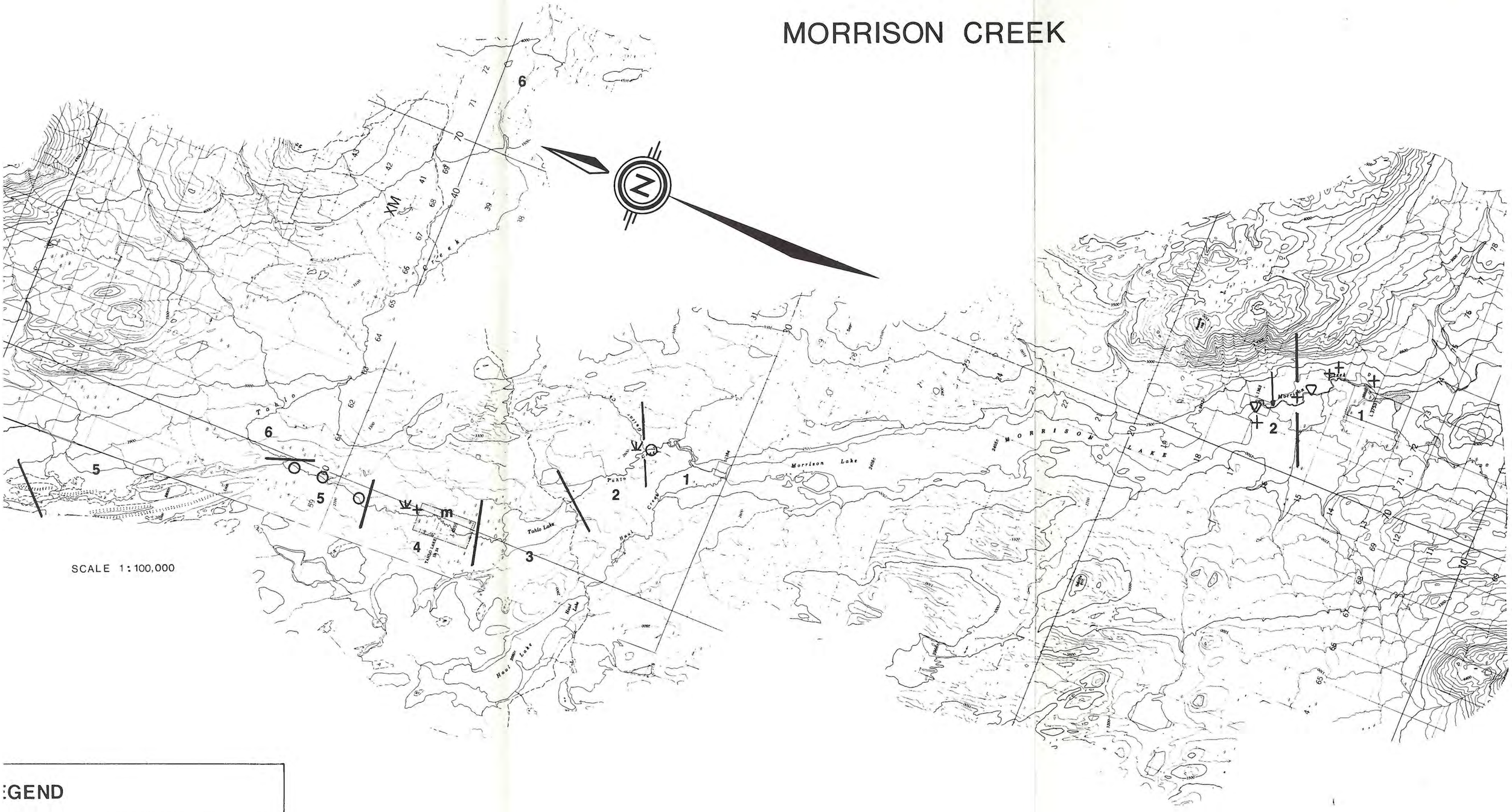
Species Timing - O(spawning) - (adult upstream migration) X
(egg incubation and rearing)

Species	J	F	M	A	M	J	J	A	S	O	N	D
Sockeye	X	X	X	X	X			O	O	O	O	X
Coho	X	X	X	X	X	X	X	X	O	O	O	X

General Comments:

- estuary composed of channelized mud and sand, weed, and deciduous cover.
- water temperature 59.5°F @ 1400 hrs.
- some bear and bird predation.
- mention of a run of chinook in 1933.
- misc. lake areas = 851.2 acres, 344.5 hectares.
- Tahlo Lake = 297.6 acres, 120.4 hectares.
- Morrison Lake = 2,524.8 acres, 1,021.8 hectares.
- total, all lakes areas = 3,673.6 acres, 1,486.7 hectares.

MORRISON CREEK



LEGEND

▽	MIGRATION END	M	
○	SLIDE/SLUMP	→	
□	SWAMP	Ψ	
+	WATERFALL	I	

Stream Section Survey Data

September, 1974

PARAMETERS	(Morrison) SECTION 1	(Morrison) SECTION 2	(Tahlo) SECTION 1	(Tahlo) SECTION 2	(Tahlo) SECTION 3	(Tahlo) SECTION 4	(Tahlo) SECTION 5	(Tahlo) SECTION 6
substrate	60% cobble 40% small gravel	5% boulder & cobble, 95% large and small gravel	30% boulder & cobble, 30% large gravel, 40% sand	10% boulder & cobble, 60% large and small gravel, 30% sand and mud	30% small gravel, 70% sand and mud	10% boulder & cobble, 80% large and small gravel, 10% sand	90% boulder & cobble, 10% large gravel	10% boulder & cobble, 85% large gravel, 5% small gravel
channel width								
wetted	23'	19'	33'	15'	17'	10'	10'	10'
dry	30'	45'	40'	17'	18'	15'	10'	15'
gradient	0%	2.96%	1.97%	0%	0%	1.89%	0.66%	0.65%
obstructions	log jams, beaver dam	log jams, beaver dam	log jams, beaver dam	beaver dams		log jams, beaver dam	log jam	log jam
bank interface	20% boulder and cobble 40% gravel 40% sand	80% gravel 20% sand	60% gravel 40% clay	10% bedrock 40% gravel 20% clay	50% gravel and sand, 50% clay	heavy glacial till	bedrock in canyons, 100% gravel and and	20% boulder & cobble, 80% gravel
riparian vegetation	80% deciduous brush, 20% mature conifer	90% deciduous brush, 10% mature conifer, some large cottonwoods	70% deciduous brush, 30% mature conifer	95% deciduous brush, 5% immature conifer	90% deciduous brush, 10% mature conifer	95% brush, 5% mature conifer	20% brush, 10% deciduous, 35% mature conifer, 35% immature conifer	40% deciduous brush, 60% mature conifer
amount of cover	continuous brush, intermittent tree	continuous brush, intermittent tree	continuous brush, intermittent tree	continuous brush	continuous brush, intermittent tree	intermittent brush	continuous brush, intermittent tree	continuous brush

PARAMETERS	SECTION 1	SECTION 2	SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5	SECTION 6
secondary flood channels				numerous	present	present		
comments	6,100 sockeye adult 20 coho fry	1,000 adult sockeye	1,200 adult	adult sockey present	150 adult sockeye, all meandering stream	possible enhancement site	some exposed bars uncovered	merchantable timber in this section, many exposed bars
section length	0.4 mi. 0.64 km.	0.64 mi. 1.02 km.	0.96 mi. 1.54 km.	0.96 mi. 1.54 km.	0.48 mi. 0.77 km.	1.0 mi. 1.6 km.	5.76 mi. 9.22 km.	11.68 mi. 18.69 km.

Conservation District #8

NICHYESKWA CREEK

55° 126° S.W.

Location - flows east into Babine River, north of Nilkitkwa River.

Drainage Area - 20,676 acres
8,367.6 hectares

Length - 16.08 mi.
25.73 km.

Mean Escapement (1965 - 1974) - Pinks - 0-200
- Coho - 0-300
- Chinook - 0-100

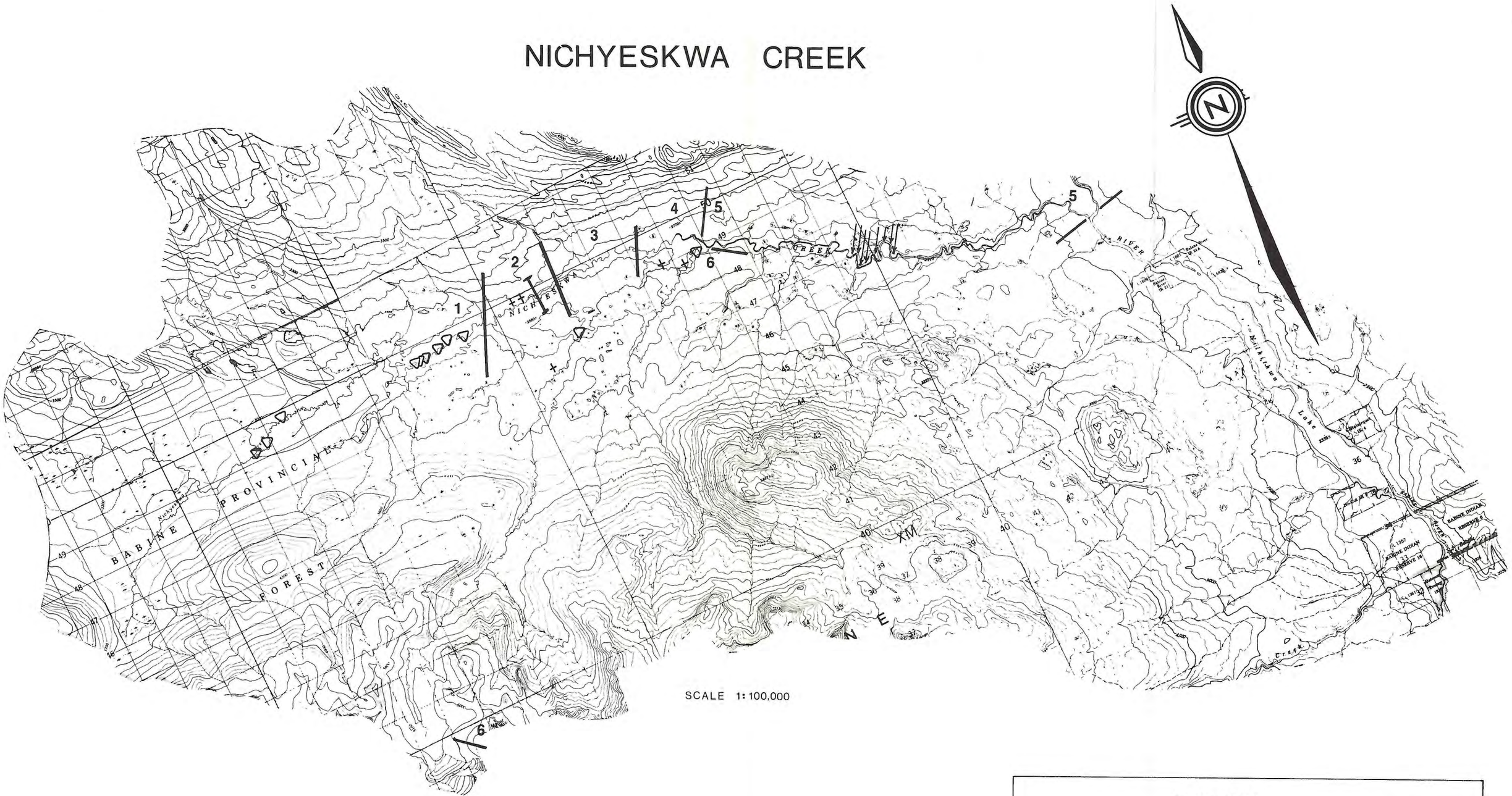
Species Timing - O(spawning) - (adult upstream migration) X
(egg incubation and rearing)

Species	J	F	M	A	M	J	J	A	S	O	N	D
Coho	X	X	X	X	X	X	X	X	O	O	O	X
Pink	X	X	X	X	X			O	O	X	X	X
Chinook	X	X	X	X	X			O	O	X	X	X

General Comments:

- water temperature 46°F @ 1000 hrs.
- birds and bear predation light.
- misc. lake areas = 147.2 acres, 59.6 hectares.
- Nilkitkwa Lake = 876.8 acres, 354.8 hectares.
- total, all lake areas = 1,024 acres, 414.4 hectares.

NICHYESKWA CREEK



SCALE 1: 100,000

LEGEND

BEAVER DAM	▽	MIGRATION END	M
CANYON	○	SLIDE/SLUMP	→
CASCADE/RAPIDS	□	SWAMP	⩛
LOG JAM or DEBRIS	+	WATERFALL	I

Stream Survey Section Data

October, 1974

PARAMETER	SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5	SECTION 6
substrate	100%sand, clay and small gravel	20% boulder and cobble, 80% sand and small gravel	60% boulder and cobble, 25% sand, 15% large and small gravel	20% large gravel, gravel, 80% sand, clay and small gravel	75% boulder, cobble and large gravel, 15% sand and small gravel	50% small gravel, 50% silt and sand
channel width wetted dry	20'	30'	45' 75'	45' 75'	100' 150'	25' 50'
gradient	1.25%	2.63%	0%	2.37%	1.50%	8.07%
obstructions	beaver dams	cascade, waterfall, logjams		small waterfalls		numerous log jams, beaver dams
bank interface	100% clay	10% bedrock, 90% gravel and sand	90% bedrock, 10% gravel		10% bedrock, 40% gravel 50% sand and clay	some gravel, 75% sand and clay
riparian vegetation	80% brush, 20% deciduous -conifer mix	40% deciduous -conifer mix, 60% mature conifer	50% deciduous -conifer mix	10% brush, 90% mature conifer	20% deciduous -conifer mix, 80% mature conifer	65% deciduous brush, 35% mature and immature conifer
amount of cover	very intermittent	almost continuous	intermittent	continuous	almost continuous	intermittent conifer, continuous brush
secondary flood	few	few		some	few	few
comments	section 1 mostly swamp					upstream section swamps
section length	4.56 mi. 7.3 km.	0.72 mi. 1.15km.	0.8 mi. 1.28 km.	0.8 mi. 1.28 km.	3.8 mi. 6.08 km.	5.4 mi. 8.64 km.

Conservation District #8

NILKITKWA RIVER

55° 126° S.W.

Location - flows south into Babine River, north of Nilkitkwa Lake.

Drainage Area - 17,250 acres
6,981.1 hectares

Length - 42.25 mi.
67.60 km.

Mean Escapement (1964 - 73) 0 - 400 sockeye
0 - 400 coho

Species Timing - 0(spawning) - (adult upstream migration) X
(egg incubation and rearing)

Species	J	F	M	A	M	J	J	A	S	O	N	D
Sockeye	X	X	X	X	X		-	0	0	0	X	X
Coho	X	X	X	X	X	X	X	-	0	0	0	X

General Comments:

- water temperature 48°F @ 1205 hrs.
- system has had a siltation problem in past records.
- mention of chinook on grounds in 1972 - 61 - 60.
- predation by birds and bears light.
- misc. lake areas = 428.8 acres, 173.5 hectares.

NILKITKWA RIVER

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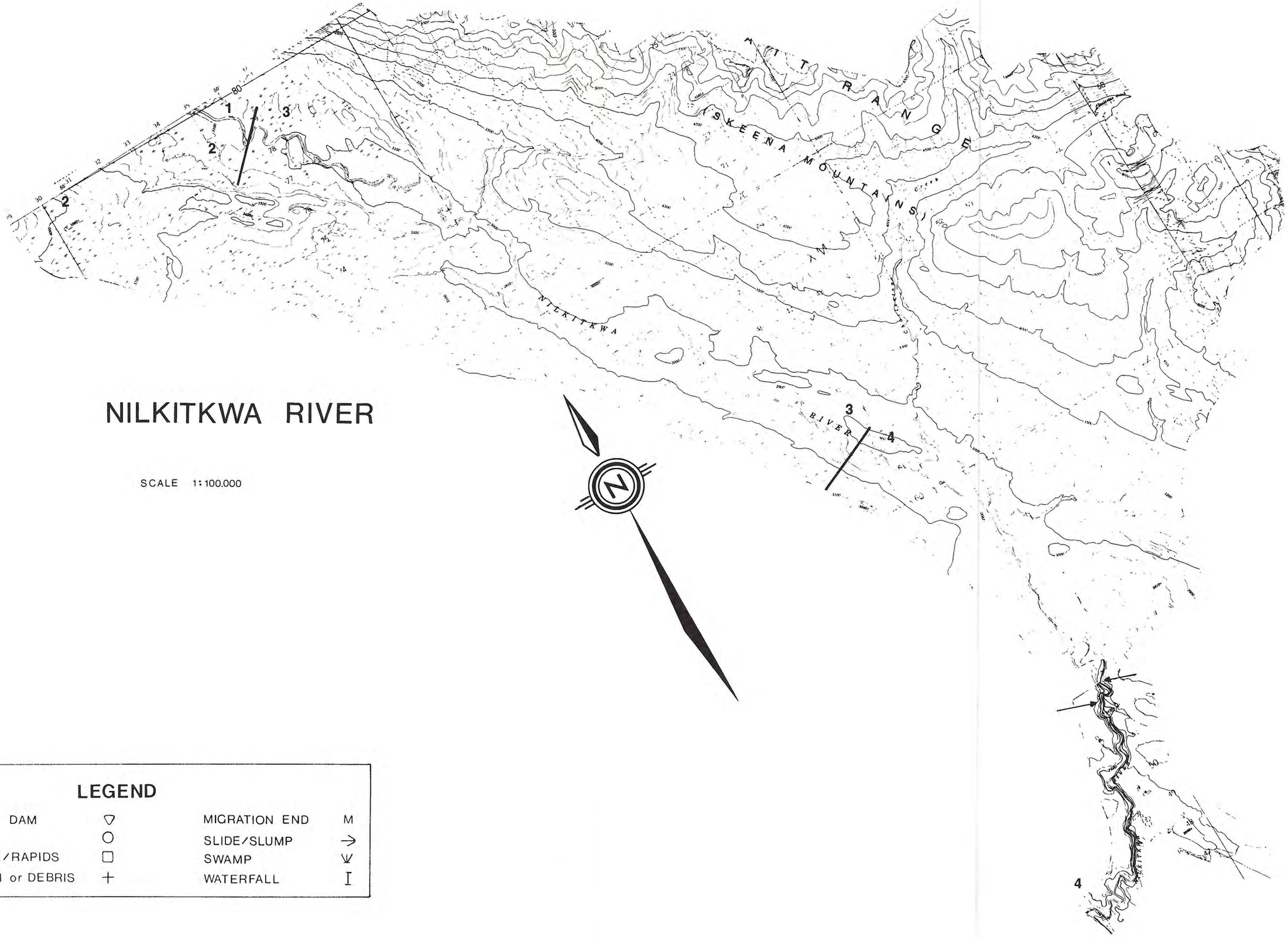


LEGEND

BEAVER DAM	▽	MIGRATION END	M
CANYON	○	SLIDE/SLUMP	→
CASCADE/RAPIDS	□	SWAMP	Ψ
LOG JAM or DEBRIS	+	WATERFALL	I

Stream Section Survey Data

October, 1974

PARAMETER	SECTION 1	SECTION 2	SECTION 3	SECTION 4
substrate	20% cobble, 80% small gravel and sand	50% large gravel, 50% small gravel and sand	75% boulder and cobble, 25% large gravel	bedrock, boulders and cobble, large gravel
channel width				
wetted	20'	40'	50'	75'
dry		60'	75'	125'
gradient	not available			
obstructions	beaver dams and log jams			
bank interface	10% bedrock, 10% boulders and cobble, 80% gravel and sand	100% gravel	bedrock, boulder and cobble, gravel	bedrock, boulder and cobble, sand. One problem area of clay near mouth
riparian vegetation	80% brush, 20% deciduous conifer mix	90% brush, sedge grass meadows, some immature conifer	50% brush, 50% immature conifer	brush and mature conifer
amount of cover	intermittent deciduous conifer mix, continuous brush	intermittent brush	intermittent conifer, continuous brush	continuous brush, intermittent conifer
secondary flood channels	present	numerous	numerous swamps	
comments	2 adult sockeye seen	continuous riffle water had heavy glacial color		
section length	16.57 mi. 26.52 km.	11.84 mi. 18.94 km.	7.44 mi. 11.9 km.	6.4 mi. 10.24 km.

Conservation District #8

NINE MILE CREEK

Location - flows into Babine Lake from the west at the north end of Babine Lake.

Drainage Area - 2,504 acres
1,013.4 hectares

Length - 8.24 mi.
13.18 km.

Mean Escapement - (1964 - 73) - sockeye 1,001
- coho present
- pinks present

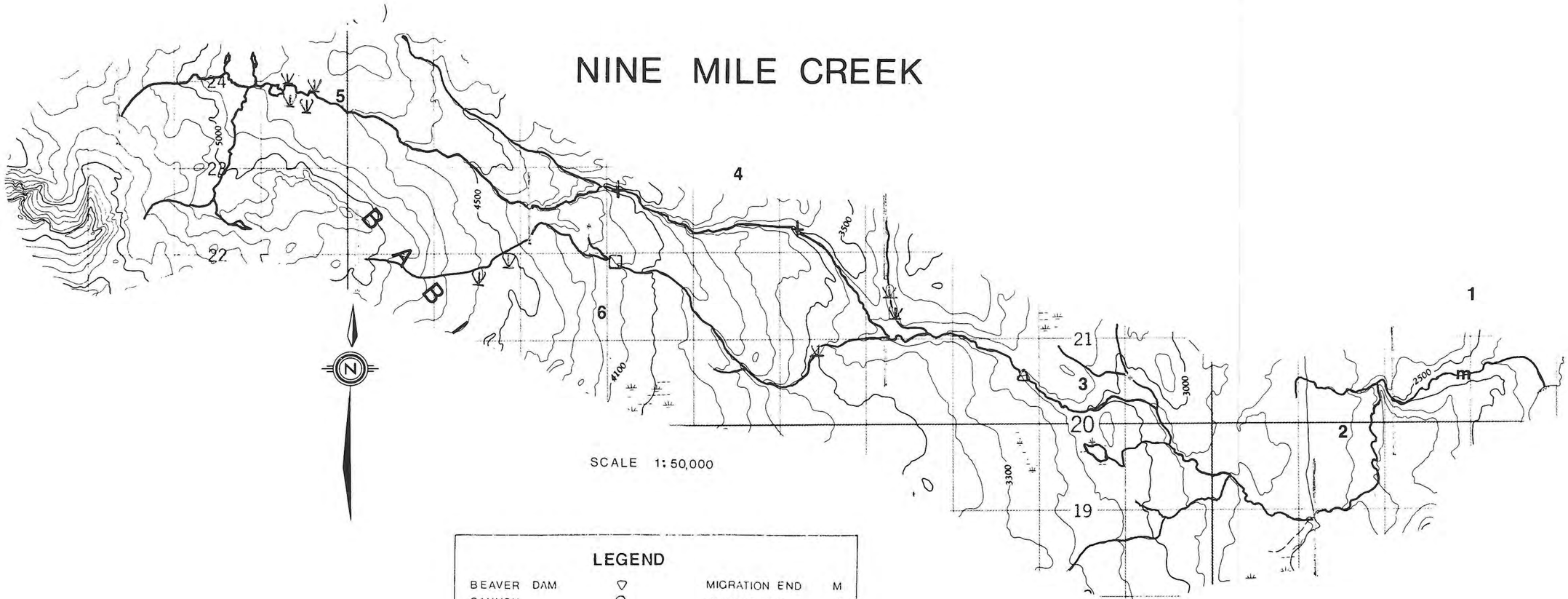
Species Timing - O(spawning) - (adult upstream migration) X
(egg incubation and rearing)

Species	J	F	M	A	M	J	J	A	S	O	N	D
Sockeye	X	X	X	X	X		-	O	O	O	X	X
Coho	X	X	X	X	X	X	X	X	O	O	X	X
Pink	X	X	X	X	X					O	X	X

General Comments:

- valley is of flat nature with rolling hills and no flood plain.
- upper reaches has bench areas with the stream in a draw.
- lake and mountain swamp fed.
- Section 3 has beaver dam that has created backing of stream.
- Sections 4 and 5 have some clay-sand slump sites.
- predation by birds and bears light.
- estuary may close to migration at low lake levels.
- 50 adult sockeye observed in Section 1.
- misc. lake areas = 6.40 acres, 2.59 hectares.

NINE MILE CREEK



SCALE 1: 50,000

LEGEND

BEAVER DAM	▽	MIGRATION END	M
CANYON	○	SLIDE/SLUMP	→
CASCADE/RAPIDS	□	SWAMP	Ψ
LOG JAM or DEBRIS	+	WATERFALL	I

Stream Section Survey Data

October, 1974

PARAMETER	SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5	SECTION 6
substrate	90% small gravel 10% sand	small gravel boulder & cobble	large and small gravel	bedrock, sand, boulder, gravel	bedrock boulder, gravel	
channel width wetted dry	 9' 25'	 15' 20'	 13' 23'	 11' 15'	 9' 11'	
gradient	3.95%	10.15%	5.15%	14.20%	9.97%	15.22%
obstructions	debris	non-passable cascade & water- fall	debris and beaver dam	debris	cascades and waterfalls	cascade
bank interface	10% cobble 70% gravel, sand 20% clay	lower end 100% bedrock, upper end 70% gravel and 20% sand, 10% clay	gravel and sand	bedrock boulder and cobble gravel	bedrock gravel sand and clay	90% gravel, sand, clay 10% bedrock
riparian vege- tation	90% deciduous brush, 10% mature conifer	20% brush, 80% deciduous conifer mix	20-80% deciduous conifer mix	30% deciduous brush, 70% mature conifer	10% brush 90% mature conifer	10% brush 90% mature conifer
amount of cover	intermittant trees continuous brush	intermittant trees continuous brush	intermittant trees continuous brush	even stands of merchantable tim- ber	continuous trees	continuous
secondary flood channels	at mouth	none	none	around debris	none	none
section length	0.48 mi. 0.77 km.	0.56 mi. 0.90 km.	1.84 mi. 2.94 km.	1.60 mi. 2.56 km.	1.52 mi. 2.43 km.	2.24 mi. 3.58 km.

Conservation District #8

PIERRE CREEK

54° 125° N.W. (Tilticna)

Location - flows into Babine Lake from the east; south of Wright Bay.

Drainage Area - 3,804 acres / 1,539.4 hectares

Length - 8.72 mi. / 13.96 km.

Mean Escapement (1964 - 73) - Sockeye - 27,995
- Coho - 75

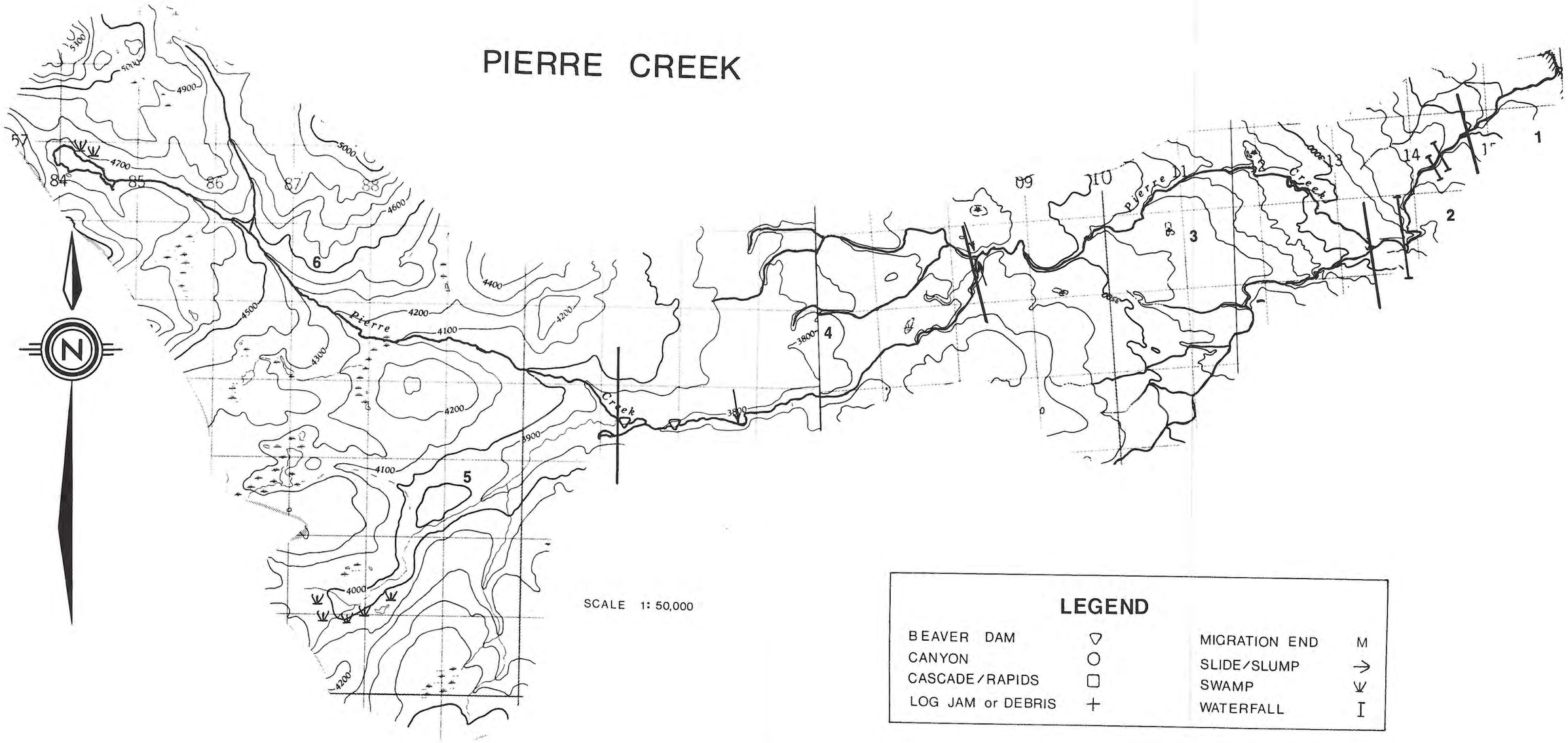
Species Timing - O(spawning) - (adult upstream migration) X
(egg incubation and rearing)

Species	J	F	M	A	M	J	J	A	S	O	N	D
Sockeye	X	X	X	X	X			-	O	O	X	X
Coho	X	X	X	X	X	X	X	X	O	O	O	X

General Comments:

- estuary area is braided fan with side channels.
- has some steep canyon areas.
- fed by lakes and swamps.
- bench country in upper reaches.
- past problems with windfalls and log jams.
- predators - bear and eagles.
- misc. lake areas = 44.8 acres, 18.1 hectares

PIERRE CREEK



SCALE 1: 50,000

LEGEND

BEAVER DAM	▽	MIGRATION END	M
CANYON	○	SLIDE/SLUMP	→
CASCADE/RAPIDS	□	SWAMP	Ψ
LOG JAM or DEBRIS	+	WATERFALL	I

Stream Section Survey Data

October, 1974

PARAMETER	SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5	SECTION 6
substrate	bedrock & boulder, gravel and sand	bedrock, cobble, gravel	bedrock/cobble, gravel	bedrock, cobble	cobble, gravel	cobble, gravel
channel width						
wetted	20'	20'	20'	12'	10'	6'
dry	60'	20'	20'	12'	20'	15'
gradient	0%	10.76%	2.15%	9.02%	2.37%	5.92%
obstructions	none	cascade & waterfalls	numerous	none	beaver dams	none
bank interface	sand, clay, bedrock	bedrock	bedrock	bedrock and cobble, clay	bedrock, gravel, clay	boulder, gravel, clay
riparian vegetation	80% mature coniferous and brush, 20% deciduous	90% immature coniferous, 20% deciduous	80% mature coniferous, 20% deciduous	90% immature coniferous, 10% brush deciduous	90% mature coniferous, 10% brush deciduous	90% coniferous, 10% brush
amount of cover	intermittent	continuous	continuous	continuous	intermittent	intermittent
secondary flood channels	possible	possible	none	none	none	none
comments	small back & side channels presently dry, 450 sockeye adults observed	none passable falls (40')	bench country		broad area with open meadows on each side of creek	meadows and swamps, bench area, lake temp. 52.5°F (1515 hr) 5" - 6" rainbow in lake
section length	0.24 mi. 0.38 km.	0.88 mi. 1.41 km.	1.76 mi. 2.82 km.	1.68 mi. 2.69 km.	1.60 mi. 2.56 km.	2.56 mi. 4.10 km.

Conservation District #8

PINKUT CREEK

54° 125° S.E. (15 Mile Creek

Location - flows north into Babine Lake, north of Taltapin Lake.

Drainage Area - 32,160 acres
13,015.2 hectares

Length - 27.68 mi.
44.3 km.

Mean Escapement (1964 - 73) - sockeye - 48,593
- coho - 0- 250

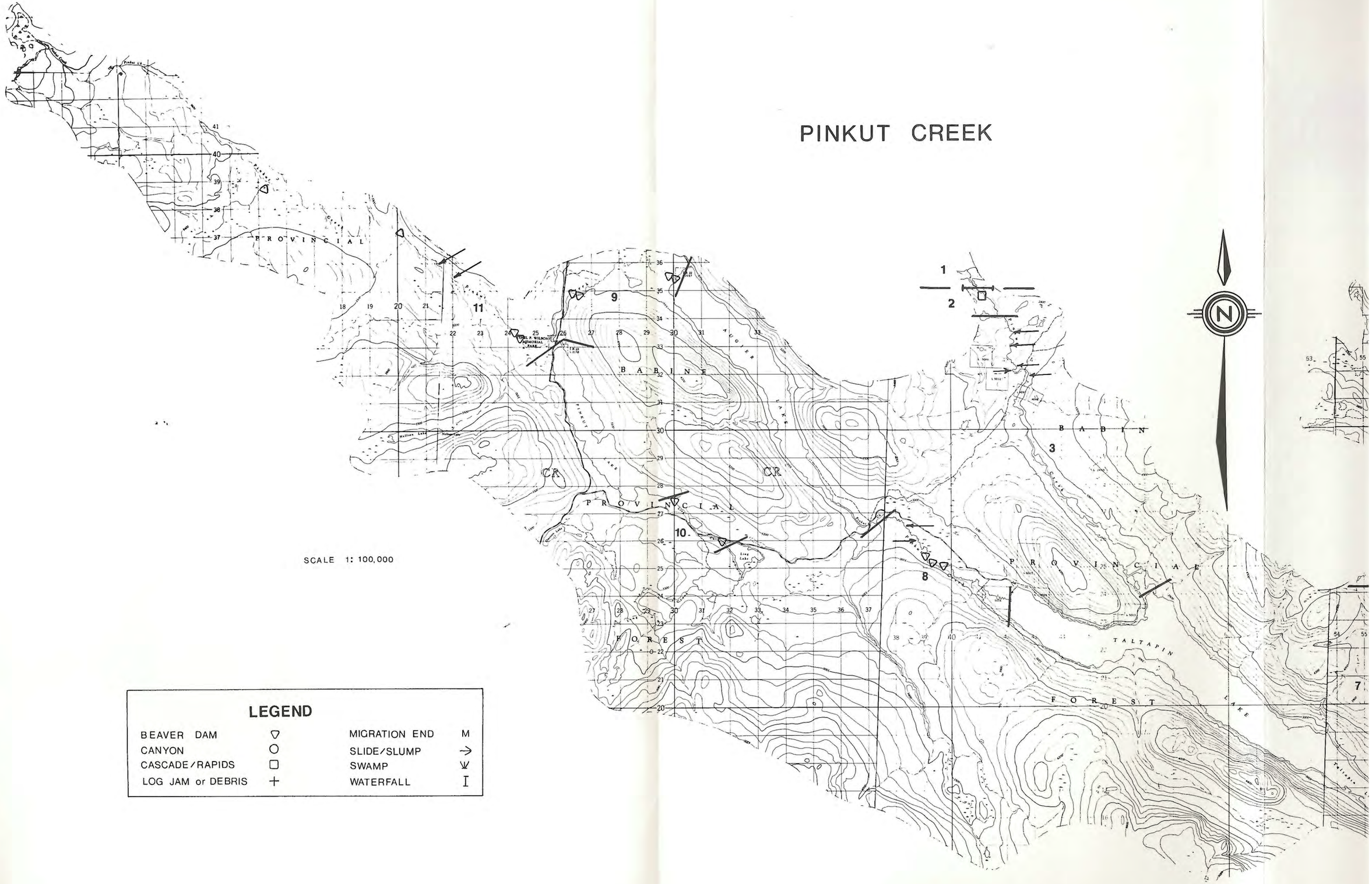
Species Timing - 0(spawning) - (adult upstream migration) X
(egg incubation and rearing)

Species	J	F	M	A	M	J	J	A	S	O	N	D
Sockeye	X	X	X	X	X		0	0	0	X	X	X
Coho	X	X	X	X	X	X	X	X	0	0	0	X

General Comments:

- water temperature near outlet of Taltapin Lake 56°F @1420 hrs.
- light predation by birds.
- Pinkut artificial spawning channels in production fall of 1968.
- misc. lake areas = 547.2 acres, 221.5 hectares
- Henrietta Lake = 96.0 acres, 38.9 hectares
- Hannay Lake = 105.6 acres, 42.7 hectares
- Helene Lake = 297.6 acres, 120.4 hectares
- Taltapin Lake = 4,172.8 acres, 1,688.7 hectares
- Taltapin Arm = 297.6 acres, 120.4 hectares
- Ling Lake = 118.4 acres, 47.9 hectares
- Division Lake = 54.4 acres, 22.0 hectares
- Pinkut Lake = 1,148.8 acres, 464.9 hectares
- Augier Lake = 1,795.2 acres, 726.5 hectares
- Nellian Lake = 108.8 acres, 44.0 hectares
- total all lakes = 8,742.8 acres, 3,538.1 hectares

PINKUT CREEK



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LEGEND

BEAVER DAM	▽	MIGRATION END	M
CANYON	○	SLIDE/SLUMP	→
CASCADE/RAPIDS	□	SWAMP	Ψ
LOG JAM or DEBRIS	+	WATERFALL	I

PINKUT CREEK

0,000

RATION END M
DE/SLUMP →
AMP Ψ
ERFALL I

Stream Section Survey Data

October, 1974

PARAMETER	SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5	SECTION 6	SECTION 7	SECTION 8	SECTION 9	SECTION 10	SECTION 11
substrate	boulder & cobble large & small gravel	bedrock boulder & cobble, large gravel	cobble, large & small gravel	mud or silt	small gravel	50% boulder and cobble, 50% small gravel	small gravel	sand	sand and mud	sand and mud	sand and mud in upper reaches
channel width wetted	70'	30'	40'	8'	5'	4'	5'	8'	12'	5'	7'
dry			50'		3'		7'				
gradient	3.16%	7.89%	1.51%	1.15%	1.42%	3.64%	7.01%	1.05%	0%	0%	1.43%
obstruction		cascade & waterfall		beaver dams		waterfall		debris, beaver dams	beaver dams	beaver dams	beaver dams
bank interface	cobble, gravel, sand, clay	bedrock	cobble, gravel, sand, clay	sand or clay	small gravel & some clay	boulder & cobble & gravel	bedrock, gravel & sand	sand and clay	sand and clay	sand and clay	
riparian vegetation	50% deciduous brush, 50% mature conifer	50% deciduous brush, 50% mature conifer	10% deciduous brush, 40% mature conifer, 50% immature conifer	brush	brush, 100% mature & immature conifer	brush, 100% mature & immature conifer	brush	brush, mature conifer	brush, immature & mature conifer	brush, some conifers, mature & immature	brush and mature conifers
amount of cover		continuous	continuous	continuous	continuous	continuous		intermittent	intermittent conifer, continuous brush	intermittent conifers, continuous brush	continuous

PARAMETERS	SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5	SECTION 6	SECTION 7	SECTION 8	SECTION 9	SECTION 10	SECTION 11
secondary flood channels	artificial							numerous			
comments	7-10,000 adult sockeye	adult sockeye present	control flow dam at outlet of Taltapin Lake, adult sockeye present due to air lift	swamps & weed beds throughout creek area, trees well back from creek	3 clay slumps in area		lower end of section swamp and meadow, several old selective logging sites	road along this area	50% of area swamps, road crosses stream twice		swamps & meadows in most of section
section length	0.6 mi. 0.96 km.	0.24 mi. 0.38 km.	3.76 mi. 6.02 km.	4.96 mi. 7.94 km.	4.0 mi. 6.4 km.	2.08 mi. 3.33 km.	2.16 mi. 3.46 km.	1.8 mi. 2.88 km.	2.0 mi. 3.2 km.	0.8 mi. 1.28 km.	5.28 mi. 8.45 km.

Conservation District #8

GULLWING CREEK

54° 125° S.E. (Six Mile or Wiggins)

Location - flows southerly into the east end of Babine Lake.

Drainage Area - 3,492 acres
1,413.2 hectares

Length - 4.48 mi.
7.16 km.

Mean Escapement (1964 - 73) - sockeye - 1,155

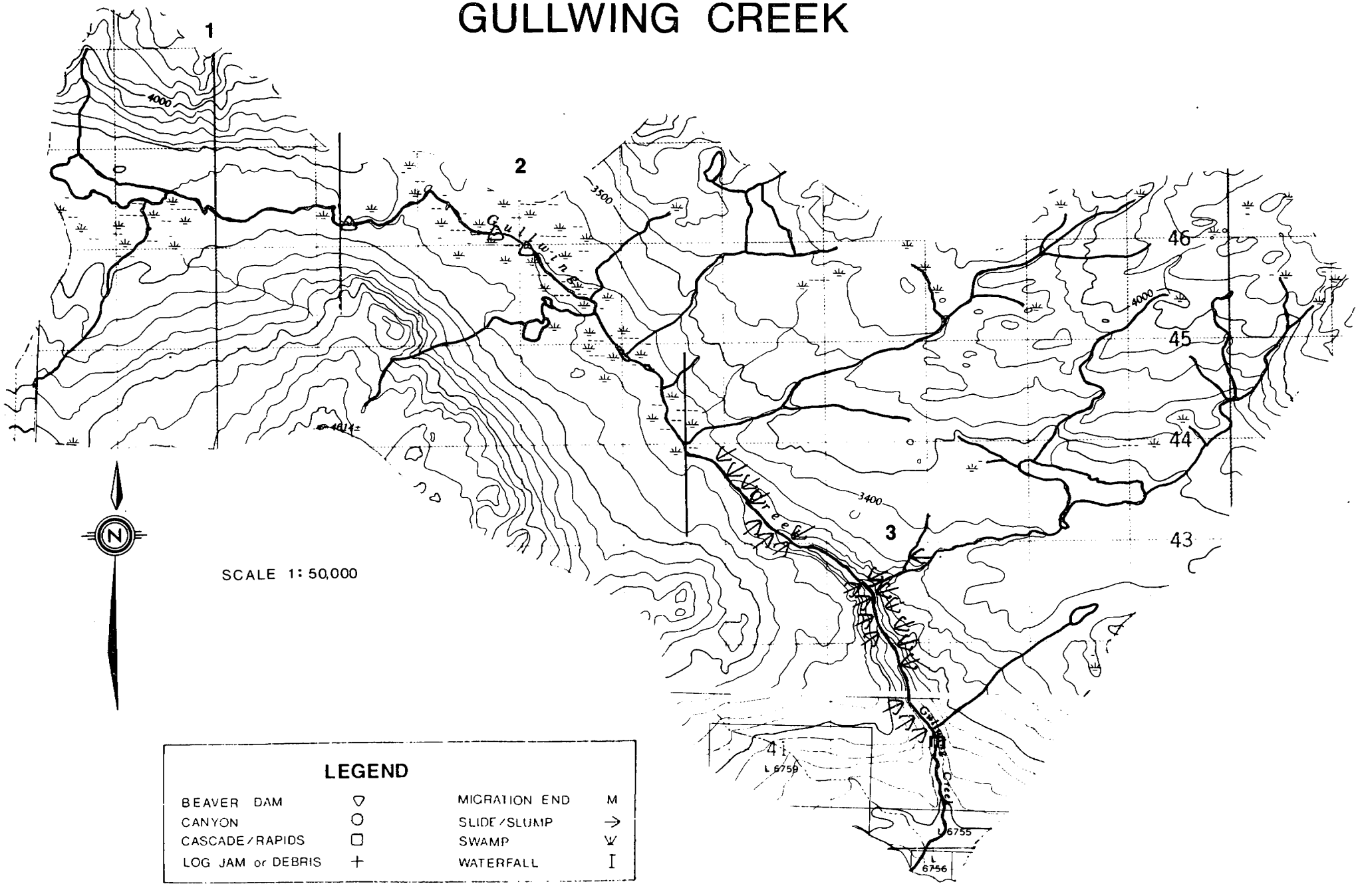
Species Timing - O(spawning) - (adult upstream migration) X
(egg incubation and rearing)

Species	J	F	M	A	M	J	J	A	S	O	N	D
Sockeye	X	X	X	X	X	-	O	O	O	X	X	

General Comments:

- temperature 45°F @ 1112 hrs. near mouth.
- 30 adult sockeye observed in Section 3.
- distribution from mouth to one mile.
- some predation by birds and bears.
- some past low flow problems.
- misc. lake areas = 275.2 acres, 111.4 hectares.

GULLWING CREEK



Stream Section Survey Data

September, 1974

PARAMETER	SECTION 1	SECTION 2	SECTION 3
substrate	mud and sand	90% boulder and cobble and large gravel, 10% small gravel	boulder and cobble large gravel
channel width			
wetted	8'	7'	9'
dry	10'	10'	25'
gradient	1.39%	10.15%	8.88%
obstructions	4 beaver dams		passable to canyon
bank interface	sand and clay	bedrock and clay	gravel, sand and clay
riparian vegetation	10% brush, 90% immature conifer	20% brush, 10% cottonwood, 70% immature conifer	70 - 40% immature conifer, 30 - 60% cottonwood, brush
amount of cover	intermittent	continuous	continuous
secondary flood channels		small channels	wide flood plain and channelization
comments	benchland, section backed up by beaver dams	swamp, meadow and canyon area	
section length	2.72 mi. 4.35 km.	1.12 mi. 1.79 km.	0.64 mi. 1.02 km.

Conservation District #8

SOCKEYE CREEK

Location - flows easterly into Babine Lake south of Port Arthur.

Drainage Area - 1,728 acres (699.3 hectares) Length - 6.6 mi. (10.56 km.)

Mean Escapement (1965 - 74) - sockeye - 1,576

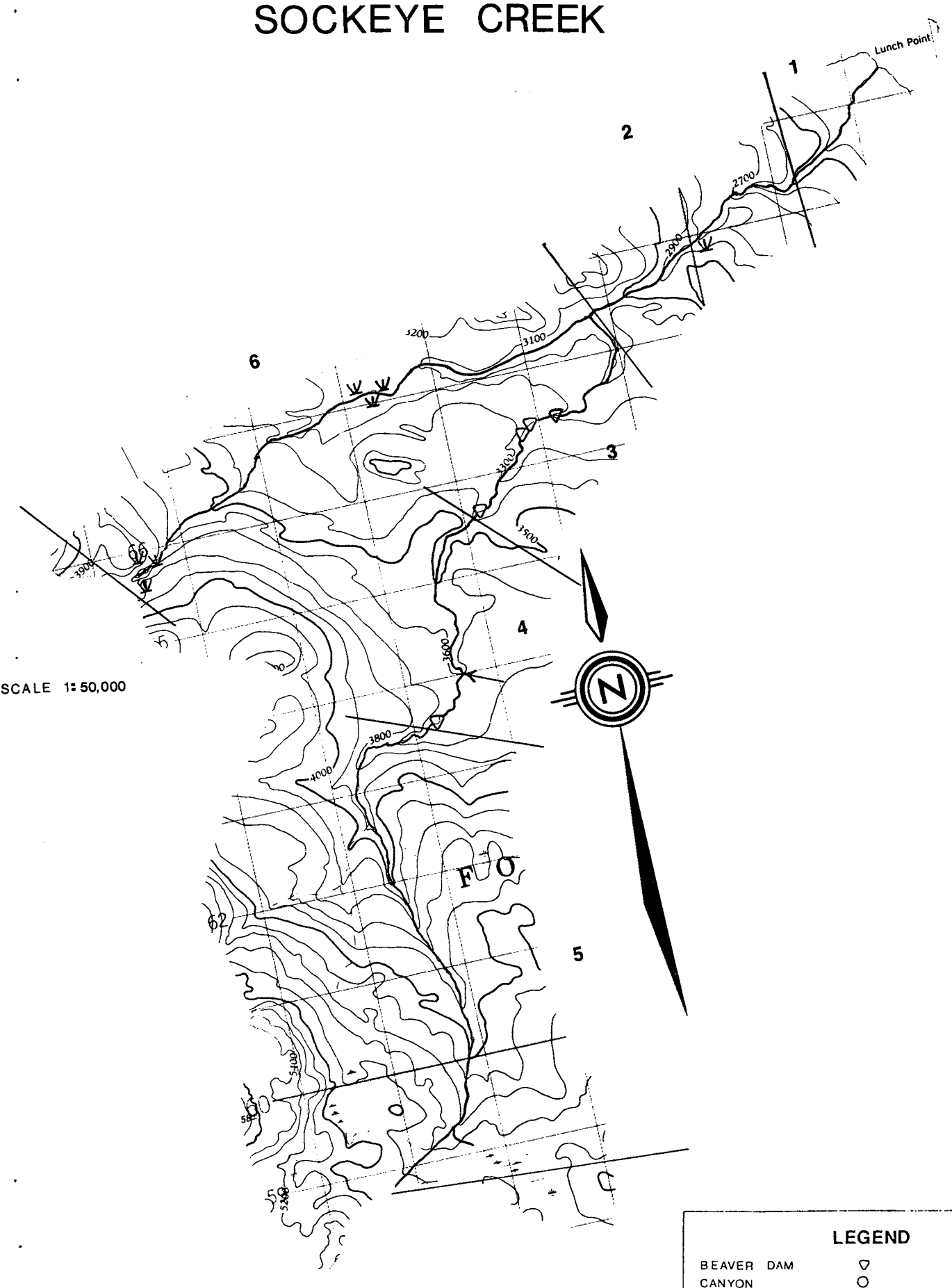
Species Timing - O(spawning) - (adult upstream migration) X (egg incubation and rearing)

Species	J	F	M	A	M	J	J	A	S	O	N	D
Sockeye	X	X	X	X	X	-	O	O	X	X	X	

General Comments:

- water temperature @ 1344 hrs. - 49°F.
- some predation by birds and bears.
- stream was dry in 1961, '56, '52.
- misc. lake areas = 0

SOCKEYE CREEK



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LEGEND

BEAVER DAM	▽	MIGRATION END	M
CANYON	○	SLIDE/SLUMP	→
CASCADE/RAPIDS	□	SWAMP	⩛
LOG JAM or DEBRIS	+	WATERFALL	I

Stream Section Survey Data

PARAMETER	SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5	SECTION 6
substrate	10% boulder, cobble 20% large gravel 70% small gravel dead trees	bedrock, boulder & cobble large gravel small gravel downed spruce	boulder & cobble large gravel small gravel debris	large gravel areas of small gravel and sand	bedrock boulder & cobble large gravel	cobble and large gravel
channel width						
wetted	7'	10'	10'	8'	7'	6'
dry	60'	16'	20'	33'	40'	12'
gradient	4.73%	14.20%	10.52%	5.68%	12.91%	6.90%
obstructions			waterfalls & cascades between waterfalls	waterfall		
bank interface	broad flood	bedrock	bedrock	gravel and some bedrock and clay	bedrock	boulder and cobble gravel and sand
riparian vegetation	brush, 10% mature conifer, cottonwoods and dead spruce	10% brush 45% cottonwood	50% deciduous brush, 50% immature conifer	20-70% deciduous & 30-80% immature conifer	30% mature conifers, brush and dead conifers	low bank and brush, mature conifer
amount of cover	intermittent conifer continuous brush	continuous brush and intermittent conifer	continuous	continuous	continuous	intermittent
section length	0.40 mi. 0.64 km.	0.80 mi. 1.28 km.	0.72 mi. 1.15 km.	1.0 mi. 1.6 km.	1.76 mi. 2.82 km.	1.92 mi. 3.07 km.

PARAMETER	SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5	SECTION 6
secondary flood channels		small swamp area	riffles only	present	meadows & small swamp	small swamp and meadows
comments	broad flood plain		canyon, cascades, riffles	clay slump area & flood plain	continuous riffles	no merchantable timber near creek on old burn

Conservation District #8

SUTHERLAND RIVER AND GRIZZLY CREEK

54° 125° S.E.

(Beaver River & Shass Creek)

Location - flows northwest into southwest end of Babine Lake

Drainage Area - 27,564 acres (11,155.2 hectares) Length - 27.04 mi. (43,26 km.)

Mean Escapement (1964 - 73) - 6,135 sockeye
- 0 - 100 coho

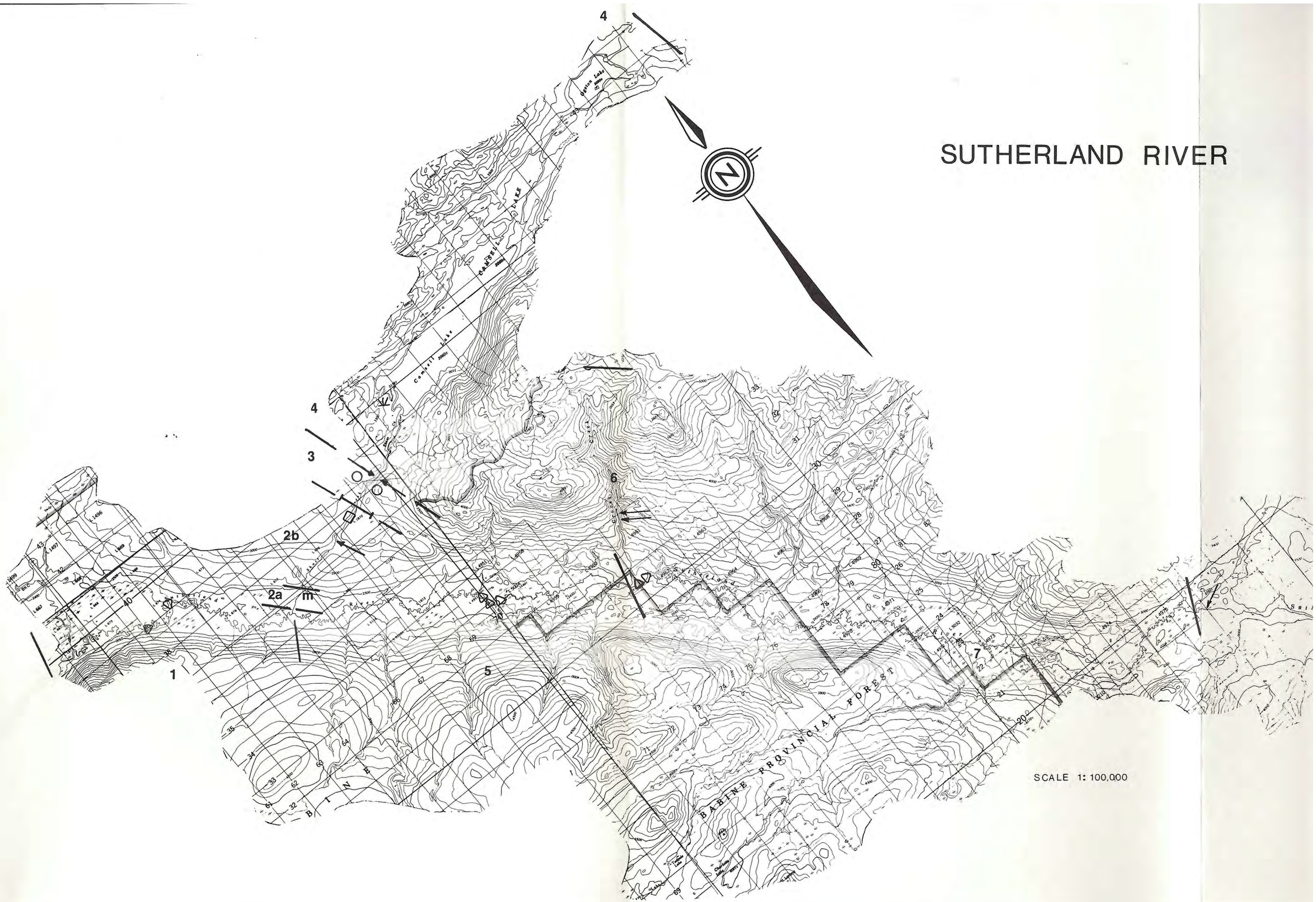
Species Timing - O(spawning) - (adult upstream migration) X (egg incubation and rearing)

Species	J	F	M	A	M	J	J	A	S	O	N	D
Sockeye	X	X	X	X	X			O	O	X	X	X
Coho	X	X	X	X	X	X	X	X	O	O	O	X

General Comments:

- predation by birds and bears heavy.
- misc. lake areas = 124.8 acres, 50.5 hectares
- Charlotte Lake = 76.8 acres, 31.1 hectares
- Leech Lake = 73.6 acres 29.8 hectares
- Tadpole Lake = 12.8 acres, 5.2 hectares
- Ogston Lake = 272.0 acres, 110.1 hectares
- Camsell Lake = 1,756.8 acres, 711.0 hectares
- Sutherland Lake = 9.6 acres, 3.9 hectares
- total all lakes = 2,326.4 acres, 941.5 hectares

SUTHERLAND RIVER



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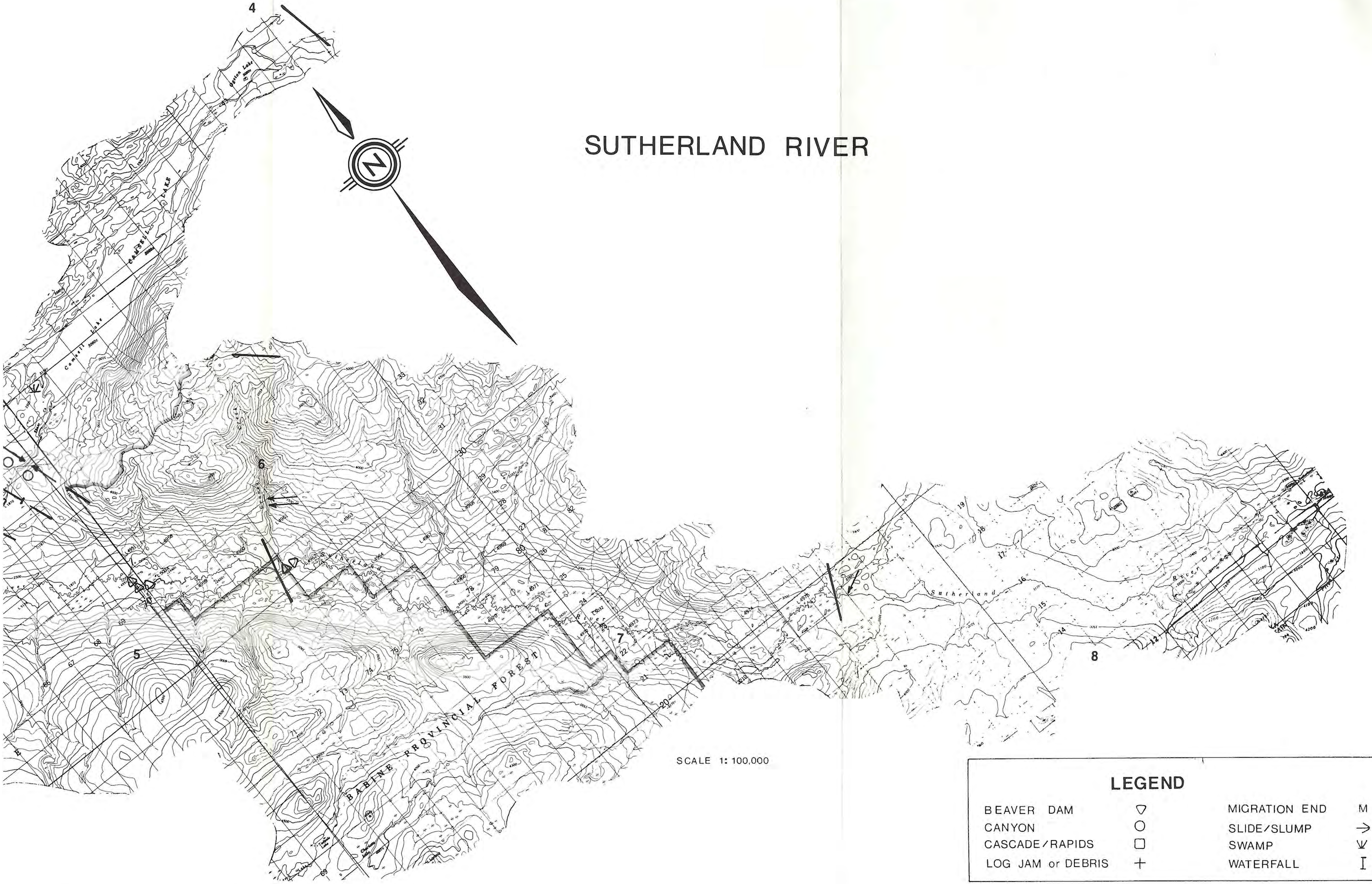
SUTHERLAND RIVER



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Stream Section Survey Data

October, 1974

PARAMETER	(Sutherland) SECTION 1	(Grizzly) SECTION 2A	(Grizzly) SECTION 2B	(Grizzly) SECTION 3	(Grizzly) SECTION 4	(Sutherland) SECTION 5	(Gravel) SECTION 6	(Sutherland) SECTION 7	(Sutherland) SECTION 8
substrate	sand and clay	small gravel	bedrock	small gravel	silt and mud	silt and mud	small gravel and sand	small gravel and sand	small gravel & sand
channel width									
wetted	30'	9'	10'		25'	25'	20'	20'	7'
dry	33'	25'	15'		35'	40'	30'	25'	12'
gradient	1.35%	0%	3.79%	11.84%	0.38%	0%	19.73%	0.92%	2.19%
obstructions	logjams & debris	waterfall	cascade, waterfall		logjam	beaver dams and debris		beaver dams	
bank interface	sand and clay	gravel, sand and clay	bedrock	bedrock, gravel, clay	clay and mud	sand and silt	gravel, sand and clay	gravel, sand and clay	bedrock, gravel, sand & clay
riparian vegetation	heavy brush, intermittent deciduous on N. side, 80% mature conifer on S. side	mature conifer, 30-70% deciduous conifer mix, deciduous brush, cottonwood along stream	10% deciduous, 90% mature conifer	20% deciduous, 80% mature conifer	brush	30% deciduous, 35% mature conifer, 35% immature conifer	10% deciduous brush, 45% mature conifer, 45% immature conifer	20-70% deciduous, 30-80% immature conifer	mature & immature conifer
amount of cover	intermittent brush, continuous mature conifer	intermittent conifer, continuous deciduous	continuous mature conifer	continuous mature conifer	continuous brush	intermittent conifer	continuous conifer	intermittent deciduous and conifer	intermittent conifer

PARAMETER	(Sutherland) SECTION 1	(Grizzly) SECTION 2A	(Grizzly) SECTION 2B	(Grizzly) SECTION 3	(Grizzly) SECTION 4	(Sutherland) SECTION 5	(Gravel) SECTION 6	(Sutherland) SECTION 7	(Sutherland) SECTION 8
secondary flood channels	numerous	present						present	
comments	meandering pools, 50 adult sockeye, numerous logjams	100 adult sockeye, waterfalls	cascade, waterfall	2 clay slump areas	swampy meadow, logjam at mouth of Comsell Lake	swampy meadows, beaver dams	sand and clay slump	beaver dams	numerous swamps & meadows, logging activity at top end
section length	2.8 mi. 4.48 km.	0.32 mi. 0.51 km.	1.0 mi. 1.6 km.	0.48 mi. 0.77 km.	5.04 mi. 8.06 km.	3.6 mi. 5.76 km.	2.4 mi. 3.84 km.	6.2 mi. 9.92 km.	5.2 mi. 8.32 km.

Conservation District #8

TACHEK CREEK

54° 126° N.E.

Location - flows northeast into Babine Lake, east of Fulton Lake.

Drainage Area - 3,260 acres / 1,319.3 hectares

Length - 12.08 mi. / 19.32 km.

Mean Escapement (1964 - 73) - sockeye - 1,280

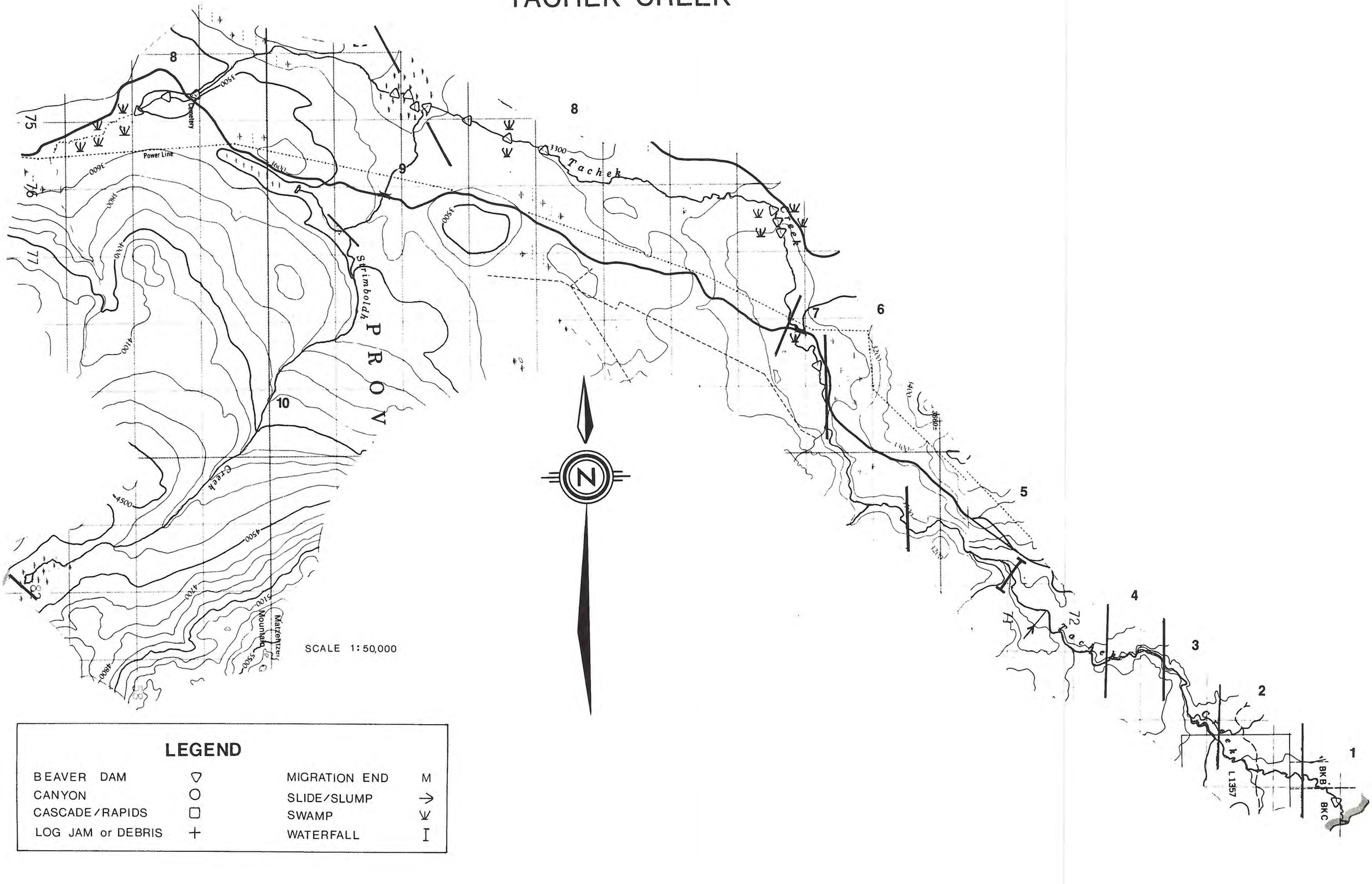
Species Timing - 0(spawning) - (adult upstream migration) X (egg incubation and rearing).

Species	J	F	M	A	M	J	J	A	S	O	N	D
Sockeye	X	X	X	X	X	-	0	0	0	X	X	

General Comments:

- estuary flood plain about 300 yards wide.
- broad rolling countryside.
- small lake and swamp feed.
- light predation by birds and bears.
- misc. lake areas = 0

TACHEK CREEK



LEGEND

BEAVER DAM	▽	MIGRATION END	M
CANYON	○	SLIDE/SLUMP	→
CASCADE/RAPIDS	□	SWAMP	Ψ
LOG JAM or DEBRIS	+	WATERFALL	I

Stream Section Survey Data

October, 1974

PARAMETERS	SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5	SECTION 6	SECTION 7	SECTION 8	SECTION 9	SECTION 10
substrate	small gravel, sand	large gravel, small gravel, sand	large gravel, small gravel, sand	bedrock, gravel, sand	bedrock, gravel	bedrock, cobble, gravel	cobble, gravel, sand	gravel, sand	small gravel, sand	boulder, large gravel
channel width										
wetted	15'	12'	10'	7'	7'	15'	8'	10'	8'	6'
dry	30'	20'	20'	30'	24'	30'	50'	20'	24'	20'
gradient	0%	1.96%	3.95%	4.73%	7.89%	0%	0%	1.97%	2.63%	6.23%
pool/riffle ratio	7:1	5:1	6:1	5:1	1:1	1:1	-	-	1:1	-
obstruction	beaver dams	none	none	none	cascade & waterfalls	waterfalls, beaver dams	none	beaver dams	none	none
bank interface	sand, clay	gravel, sand	gravel, sand	bedrock, boulder, gravel	bedrock, clay	bedrock, cobble, sand, clay	boulder, cobble, sand	gravel, sand, clay	gravel, sand	bedrock, sand & clay
riparian vegetation	80% deciduous & brush, 20% immature coniferous	90% deciduous, 10% immature coniferous	50% deciduous & brush, 50% mature coniferous	80% deciduous & brush, 20% immature coniferous	deciduous, coniferous	40% deciduous, 30% immature, 30% mature conifer	70% mature coniferous, 30% immature coniferous	70% deciduous brush, 30% immature coniferous	50% brush, 50% immature and mature coniferous	brush, immature coniferous
amount of cover	continuous	continuous	continuous	continuous	continuous	continuous	continuous	continuous	continuous	intermittent

PARAMETERS	SECTION 1	SECTION 2	SECTION 3	SECTION 4	SECTION 5	SECTION 6	SECTION 7	SECTION 8	SECTION 9	SECTION 10
secondary flood channels	present	none	none	none	none	none	none	none	none	none
comments	passable obstructions, 75 adult sockeye	- sockeye spawning, - temperature 47.5°C (1100 hrs.)				broad valley	swampy backed from 6	swampy flood plain 200 yds. wide	swampy	swampy at top
section length	0.64 mi. 1.02 km.	0.48 mi. 0.77 km.	0.40 mi. 0.64 km.	0.48 mi. 0.77 km.	0.8 mi. 1.28 km.	0.96 mi. 1.54 km.	0.72 mi. 1.15 km.	3.84 mi. 6.14 km.	0.72 mi. 1.15 km.	3.04 mi. 4.86 km.

Conservation District #8

TETZALTO CREEK

54° 125° S.E. (Monica)

Location - flows northerly into Babine Lake at south end of lake.

Drainage Area - 1,020 acres
412.8 hectares

Length - 4.0 mi.
6.41 km.

Escapement (1964 - 73) - 0 - 350 sockeye

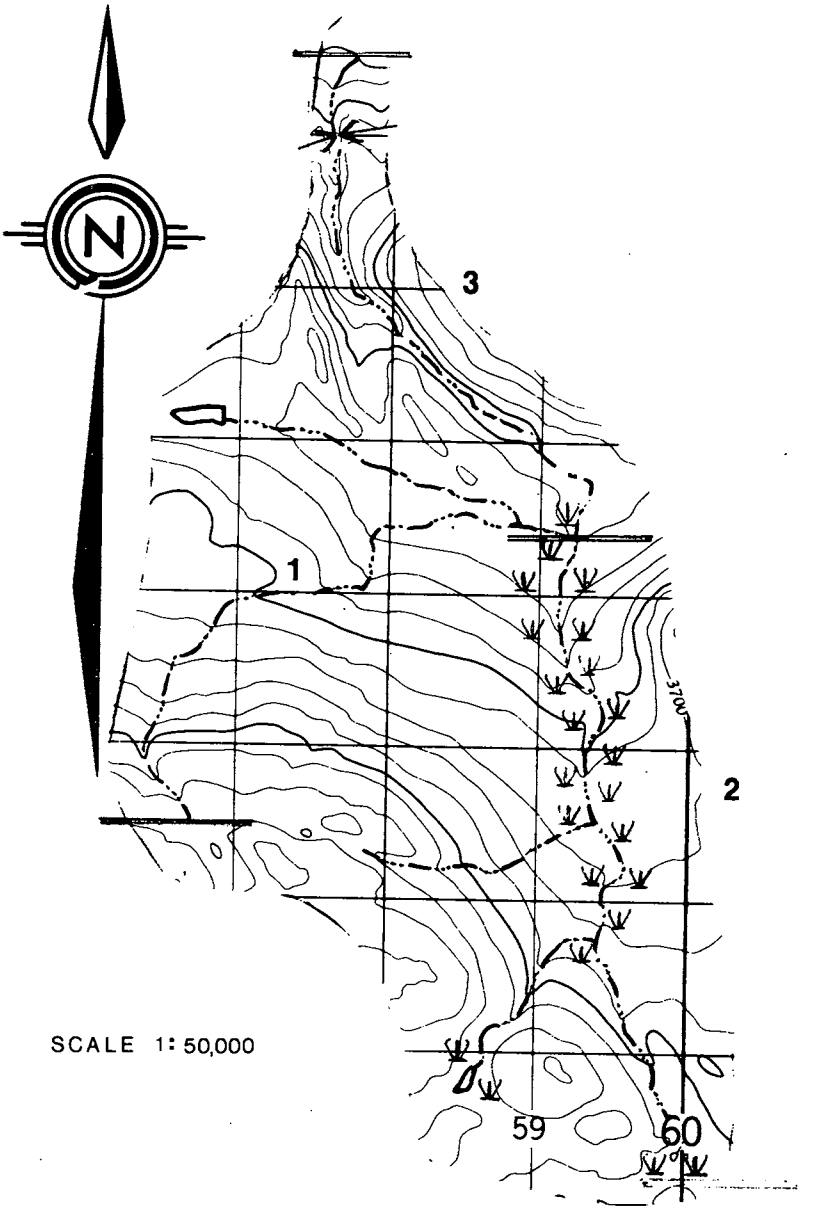
Species Timing - O(spawning) - (adult upstream migration) X
(egg incubation and rearing)

Species	J	F	M	A	M	J	J	A	S	O	N	D
Sockeye	X	X	X	X	X			O	O	X	X	X

General Comments:

- system historically appears to have a severe low flow problem.
- predation by birds and bears light.
- misc. lake areas = 12.8 acres, 5.2 hectares.

TETZALTO CREEK



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LEGEND

BEAVER DAM	▽	MIGRATION END	M
CANYON	○	SLIDE/SLUMP	→
CASCADE/RAPIDS	□	SWAMP	⩛
LOG JAM or DEBRIS	+	WATERFALL	I

Stream Section Survey Data

October, 1974

PARAMETER	SECTION 1	SECTION 2	SECTION 3	SECTION 4
substrate	slow, very turbid	some bedrock and small gravel, sand or mud	60% boulder and cobble, 40% large and small gravel	cobble, large and small gravel
channel width wetted dry	2'	3' 6'	8' 10'	6' 12'
gradient	1.97%	10.76%	10.15%	23.67%
obstructions	none	none	none	outlet dry
bank interface		some bedrock and sand-clay or mud	overburden on bedrock	clay on top of bedrock
riparian vegetation	30% deciduous, 70% mature coniferous	1 - 30% deciduous brush, 99-70% mature conifer	30 - 60% deciduous, 70 - 40% immature conifer	50 - 90% deciduous brush, 20% mature conifer, 10 - 30% immature conifer
amount of cover	continuous	continuous	continuous	continuous
secondary flood channels		some in swamp area	in small swamp area	
comments	very small turbid, slow area	very little current	steep banks	brushy flood plain near mouth, creek dry at mouth
section length	0.96 mi. 1.54 km.	1.76 mi. 2.82 km.	1.12 mi. 1.79 km.	0.16 mi. 0.26 km.

Conservation District #8

TWAIN CREEK

54° 125° N.W.

Location - flows into Babine Lake from the east.

Drainage Area - 6,736 acres
2,726.1 hectares

Length - 11.76 mi.
18.82 km.

Mean Escapement (1964 - 73) - sockeye - 10,596

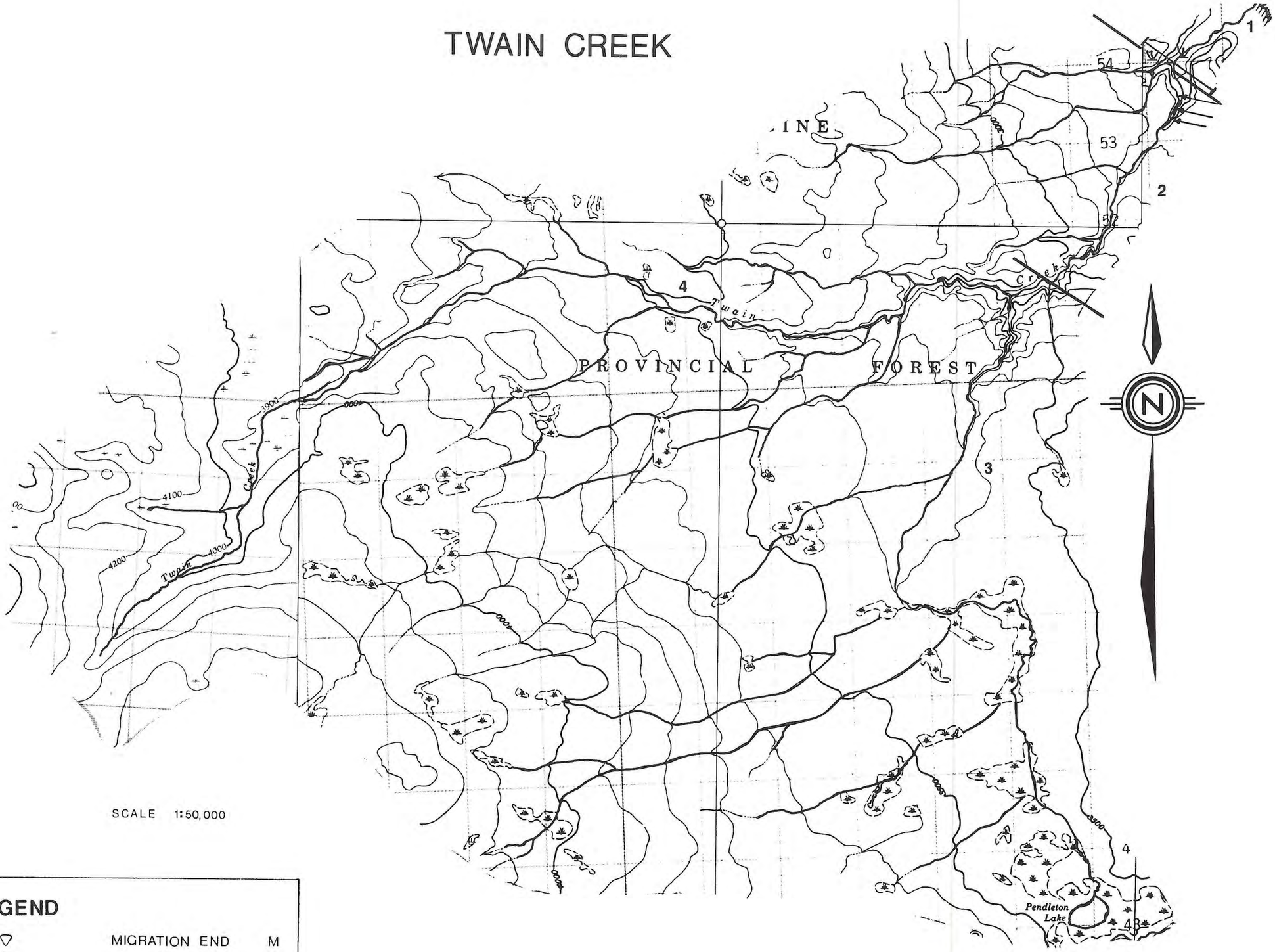
Species Timing - O(spawning) - (adult upstream migration) X
(egg incubation and rearing)

Species	J	F	M	A	M	J	J	A	S	O	N	D
Sockeye	X	X	X	X	X	-	O	O	O	X	X	

General Comments:

- estuary area is braided fan with numerous scale channels.
- becomes a steep canyoned creek.
- rolling bench country in upper reaches.
- fed by numerous swamps.
- predation by bear and birds - light to heavy.
- historical reference made to spawning on high bars being frozen in winter.
- misc. lake areas = 0
- Pendleton Lake = 28.8 acres, 11.7 hectares

TWAIN CREEK



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LEGEND

BEAVER DAM	▽	MIGRATION END	M
CANYON	○	SLIDE/SLUMP	→
CASCADE/RAPIDS	□	SWAMP	Ψ
LOG JAM or DEBRIS	+	WATERFALL	I

Stream Section Survey Data
October, 1974

PARAMETER	SECTION 1	SECTION 2	SECTION 3	SECTION 4
substrate	cobble, small gravel, sand	boulder/cobble large gravel	gravel	boulder/cobble
channel width				
wetted	12'	12'	3'	10'
dry	35'	35'	3'	10'
gradient	0%	8.46%	3.55%	2.72%
obstructions	none	waterfall 35'	none	none
bank interface	cobble, gravel	bedrock, clay	boulder, gravel	bedrock, boulder, cobble
riparian vegetation	80% deciduous 20% coniferous	80% coniferous 20% deciduous	coniferous	90% coniferous 10% deciduous
amount of cover	continuous	continuous	intermittent	continuous
secondary flood channels	possible	none	none	none
comments	water temp. 47.5°F (1600 hrs.)	waterfall is non-passable	meandering in meadow & swamps	meandering stream
		canyon area with potential clay slumps	tributaries not visable, probably dry	hard to follow as it disappears at times
section length	0.48 mi. 0.77 km.	1.12 mi. 1.79 km.	3.2 mi. 5.12 km.	6.96 mi. 11.14 km.

REFERENCES

Bond, K. W., M. J. Brownlee, T. W. Chamberlin and J. M. Lamb, 1975. Biophysical Stream Survey of the Upper Nahmint River and Nahmint Lake. Dept. of the Environment, Fisheries and Marine Service, Tech. Report Series PAC/T-75-3.

Bond, K. W., 1975. Biophysical Stream Survey of the Upper Tsiteka River. Department of the Environment, Fisheries and Marine Service, Tech. Report Series PAC/T-75-7.

APPENDIX

CLIMATE DATA - PINKUT CREEK

PARAMETER	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	ANNUAL
Mean Daily Maximum Temp. (°F)	10.2	27.4	39.1	47.5	60.0	67.7	69.9	67.3	56.3	46.9	34.9	21.5	45.7
	(4)*	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	
Mean Daily Minimum Temp. (°F)	-4.6	8.6	16.5	27.1	34.6	44.4	47.1	45.4	38.6	30.6	25.1	9.4	26.9
	(4)*	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	
Mean Daily Temperature (°F)	2.8	18.0	27.9	37.3	47.3	56.0	58.6	56.4	47.5	38.8	30.0	15.5	36.3
	(4)*	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	
Total Rainfall (inches)	0.09	T	0.07	0.57	0.82	1.81	1.91	1.29	2.00	0.95	1.05	0.07	10.63
	(3)*	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	
Total Snowfall (inches)	28.6	13.8	15.7	1.8	T	0.0	0.0	0.0	0.3	4.0	10.5	27.5	102.2
	(3)*	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	
Total Precipitation (inches)	2.95	1.38	1.64	0.76	0.82	1.81	1.91	1.29	2.01	1.35	2.10	2.82	20.85
	(3)*	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	
Greatest Precipitation in 24 hours (.01 in.) & Date													
Ext. & Yr.	130	70	80	55	37	155	120	92	72	50	90	75	
	(71)	(72)	(71)	(69)	(69)	(72)	(72)	(69)	(70)	(71)	(70)	(71)	
N. Yrs.	3	4	4	4	4	4	4	4	4	4	4	4	

*means no. of years data averaged over

CLIMATE DATA - TOPLEY LANDING

PARAMETER	JAN.	FEB.	MAR.	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	ANNUAL
Mean daily maximum temp. (°F)	12.5	28.9	37.8	46.1	57.8	65.6	69.2	66.4	57.2	45.9	33.7	20.3	45.1
	(7)*	(7)	(7)	(7)	(7)	(8)	(8)	(8)	(8)	(7)	(8)	(8)	
Mean daily minimum temp. (°F)	-3.6	10.4	17.2	25.6	34.0	42.7	45.9	45.1	37.8	30.5	22.8	7.0	26.3
	(7)*	(7)	(7)	(7)	(7)	(8)	(7)	(8)	(8)	(7)	(8)	(8)	
Mean daily temperature (°F)	4.5	19.7	27.5	35.9	46.0	54.2	57.4	55.8	47.5	38.2	28.3	13.6	36.7
	(7)*	(7)	(7)	(7)	(7)	(8)	(7)	(8)	(8)	(7)	(8)	(8)	
Total Rainfall (inches)	0.07	0.02	0.14	0.51	1.24	2.03	2.09	2.34	2.00	1.34	0.39	0.01	12.18
	(7)*	(7)	(7)	(7)	(7)	(8)	(8)	(8)	(8)	(7)	(8)	(7)	
Total Snowfall (inches)	27.1	14.4	10.1	2.9	0.2	0.0	0.0	0.0	0.1	4.6	17.7	27.6	104.7
	(7)*	(7)	(7)	(7)	(8)	(8)	(8)	(8)	(8)	(7)	(8)	(7)	
Total Precipitation (inches)	2.78	1.46	1.15	0.79	1.26	2.03	2.09	2.34	2.01	1.80	2.16	2.78	22.65
	(7)*	(7)	(7)	(7)	(7)	(8)	(8)	(8)	(8)	(7)	(8)	(7)	
Greatest Precipitation in 24 hours (.01 in.) & Date													
Ext. and Yr.	122	80	90	61	78	130	216	121	85	62	93	74	
	(66)	(66)	(72)	(69)	(69)	(72)	(70)	(66)	(72)	(72)	(66)	(71)	
N. Yrs.	7	7	7	7	7	8	8	8	8	7	8	7	

* means no. of years data averaged over

E R R A T A

page 2 - paragraph 2 ..... Sustained Field Unit should read

..... Sustained Yield Unit

paragraph 2 ..... 356,000 cunets should read

..... 356,000 cunits

page 42 reference number 2 should read...

.... BOND, K. W., M.J. Brownlee, T.W. Chamberlin & J.M. Lamb, 1975.