

BASE DATA VOLUME 3
FISH STUDY

1972-73

MACKENZIE HIGHWAY
Mile 300 to 550

DEPARTMENT OF PUBLIC WORKS
EDMONTON, CANADA

January 1974

PART 2

E.F. SLANEY & COMPANY LIMITED

MILE: 403.1 NAME:
CHAINAGE: INTENSIVE STUDY STREAM

PHOTO NOS:
M26K168-11, 12, 13, 14
M26E115-16

A. GENERAL DATA

000025

Method of Survey: Ground survey at R/W

Length of Stream Surveyed: 500' at R/W

Drainage Area Classification: Low relief spruce forest above R/W. Swamp below R/W. (Drainage area - 5.0 sq. miles).

Distance of R/W from Mackenzie: Approximately 2 miles

Creek Entrance into Mackenzie: None

Accessibility for Fish at Mackenzie Entrance: Nil

Channel Types: Poor to well defined at R/W

Bottom Type (General): Rock, gravel and boulders

Duration of Flow: Flowing September 28, 1973. November 24, 1973 - 4 inches of slow flowing water under ice at R/W. Probably frozen to bottom in mid-winter.

B. DESCRIPTION: - DISTURBANCES

Mile 403.1 is wide and shallow with a slow flow over a gravel bottom. At the R/W the flow is unrestricted, but below the R/W some debris has accumulated from R/W clearing, causing the formation of several channels. Grasses and sedges grow along the creekside.

The stream was sampled frequently during the study periods. This stream is representative of the smaller drainages of this region.

C. SAMPLE LOCATION DATA

LOCATION DATA	Date:	May 4	May 31	June 3	June 8
	Location:	CNT	CNT	CNT	CNT
	Depth (ft.):	Frozen	0.9	1.0	.5
	Width (ft.):	6	4	2	5.5
	Bottom Type (%):	Ice	60% Gra. 40% Bould.	75% Peat 25% Gra.	75% Rock 25% Debris
	Colour:	Tea	Tea	Tea	Tea
TEMPERATURE	Air ($^{\circ}\text{C}$):	11.0	12.2	17.5	22.0
	Water ($^{\circ}\text{C}$):	0.3	9.8	5.0	9.5
WATER ANALYSIS	Vel. (fps):	--	1.6	--	0.3
	Disc. (cfs):	--	5.8	1.5	0.9
	Secchi (cm):	Clear	Clear	Clear	Clear
	D.O. (ppm):	14.5	11.2	9	8.9
	Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):	38@0.3	90.5@9.8	160@5.0	185@9.5
	pH:	7.5	7.5	7.5	7.5
	Alkalinity (grains/gal):	3	9	7	6

C. SAMPLE LOCATION DATA (cont'd)

LOCATION DATA	Date:	June 26	June 30	July 3	July 7	Aug.17
	Location:	CNT	CNT	CNT	CNT	CNT
	Depth (ft.):	.5	0.8	0.7	0.6	0.9
	Width (ft.):	4	12.3	10.1	8	12
	Bottom Type (%):	80% Rock 20% Gra.	75% Rock 25% Org.	100% Bould. Gravel	90% Rock 10% Gra.	SAME SAME
	Colour:	Tea	Tea	Tea	Tea	Tea
TEMPERATURE	Air ($^{\circ}\text{C}$):	13.0	10.0	21.0	9.0	5.0
	Water ($^{\circ}\text{C}$):	9.5	6.0	11.0	7.5	4.4
WATER ANALYSIS	Vel. (fps):	.5	0.5	1.3	0.03	0.4
	Disc. (cfs):	1.2	4.5	8.2	0.1	3.8
	Secchi (cm):	Clear	Clear	Clear	Clear	Clear
	D.O. (ppm):	9	9.5	11.2	11.9	12
	Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):	225@9.5 .0	169@6 .0	194@11 .0	177@7.5	219@4.4
	pH:	7.5	7.5	7.6	7.6	7.4
	Alkalinity (grains/gal):	9	8	8	7	10

C. SAMPLE LOCATION DATA (cont'd)

LOCATION
DATA

Date:

September 28

Location:

CNT

Depth (ft.):

0.6

Width (ft.):

8

Bottom Type (%):

Same
Same

Colour:

Light tea

TEMPERATURE

Air ($^{\circ}\text{C}$):

10.0

Water ($^{\circ}\text{C}$):

0.5

WATER
ANALYSIS

Vel. (fps):

0.13

Disc. (cfs):

0.5

Secchi (cm):

0.6

D.O. (ppm):

Clear

Conductivity
($\mu\text{mhos @ }^{\circ}\text{C}$):

21500.5

PH:

8.0

Alkalinity
(grains/gal):

10

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
May 4	Beach seine	Nil	Nil	Nil
May 31	E.F./seine	Nil	Nil	Nil
June 3	E.F./seine	Nil	Nil	Nil
June 8	E.F./seine	Nil	Nil	Nil
June 26	E.F./seine	Nil	Nil	Nil
June 30	E.F./seine	Nil	Nil	Nil
July 3	E.F./seine	Nil	Nil	Nil
July 7	--	--	--	--
August 17	E.F./seine	Nil	Nil	Nil
September 28	E.F./seine	Nil	Nil	Nil

E. FISH POTENTIAL

An intensive study stream, M403.1 was sampled ten times May 1st to September 28th with no fish observed. This is probably due to the presence of bog areas below the R/W and no apparent access to the Mackenzie.

F. POTENTIAL HIGHWAY IMPACTS

None evident. Banks are low and flat. Vegetative cover is present on 95-100% of adjacent ground.

G. RECOMMENDATIONS

Follow general construction guidelines.

MTLE: 406.4 NAME:
CHAINAGE: INTENSIVE STUDY STREAM

PHOTO NOS:

M26K168-9, 10, 20, 21
M26K170-0, 1

A. GENERAL DATA

Method of Survey: Ground survey at R/W

Length of Stream Surveyed: 300' at R/W

Drainage Area Classification: Drains a lake and flows through low and high relief spruce, pond and marsh. (Drainage area - approx. 10.5 sq. miles).

Distance of R/W from Mackenzie: Approximately 2 miles

Creek Entrance into Mackenzie: None

Accessibility for Fish at Mackenzie Entrance: Nil

Channel Types: Well defined

Bottom Type (General): Gravel and organic

Duration of Flow: Stream flowing on September 28, 1973. November 24, 1973 - 10 inches of fast flowing water under ice at R/W. Probably frozen to bottom in mid-winter.

B. DESCRIPTION: - DISTURBANCES

This very narrow creek contains long riffle areas with interspersed pools, high organic banks and a gravel substrate changing to organics and debris at mid R/W. R/W debris is obstructing the stream. Otherwise the creek is free flowing with logs and other natural debris strewn across the banks but not impeding the flow.

A tracked vehicle was driven through the stream upsetting the bottom substrate and crushing the banks, but no long term disturbance is evident.

M406.4 was chosen as an intensive study stream because of its size, accessibility and lake origin.

C. SAMPLE LOCATION DATA

LOCATION DATA	Date:	May 31	June 3	June 8	June 26
	Location:	R/W	R/W	R/W	R/W
	Depth (ft.):	.5	1	0.9	0.8
	Width (ft.):	3	3	3	2
	Bottom Type (%):	75% Rock 25% Debris	80% Gra. 20% Org.	75% Rock 25% Debris	95% Rock
TEMPERATURE	Colour:	Tea	Tea	Tea	Tea
	Air ($^{\circ}\text{C}$):	14.0	17.5	20.4	13.0
	Water ($^{\circ}\text{C}$):	6.0	8.5	9.8	10.0
WATER ANALYSIS	Vel. (fps):	1.8	1.0	0.6	1.4
	Disc. (cfs):	2.7	2.9	1.5	2.2
	Secchi (cm):	Clear	Clear	Clear	Clear
	D.O. (ppm):	11.2	11	13.7	11.6
	Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):	130@6.0	135@8.5	165@9.8	185@10.0
	pH:	8	8	8	8.6
	Alkalinity (grains/gal):	9	6	6	9

C. SAMPLE LOCATION DATA (cont'd)

LOCATION DATA	Date:	June 30	July 3	July 7	August 17
	Location:	R/W	R/W	R/W	R/W
	Depth (ft.):	1.0	0.7	0.9	0.6
	Width (ft.):	3.33	3.6	3.75	4.2
	Bottom Type (%):	75% Bould. 25% Debris	50% Gra. 50% Debris	85% Rock 15% Debris	85% Rock 15% Debris
	Colour:	Tea	Tea	Tea	Tea
TEMPERATURE	Air ($^{\circ}\text{C}$):	9.0	13.0	9.5	5.7
	Water ($^{\circ}\text{C}$):	9.0	10.0	9.0	4.7
WATER ANALYSIS	Vel. (fps):	1.2	0.9	1.0	0.5
	Disc. (cfs):	4.0	2.2	3.4	1.3
	Secchi (cm):	Clear	Clear	Clear	Clear
	D.O. (ppm):	10	11.4	11.4	12.6
	Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):	122@9.0	148@10.0	144@9.0	120@4.7
	pH:	7.7	7.8	8.5	8.2
	Alkalinity (grains/gal):	8	7	7	9

C. SAMPLE LOCATION DATA (cont'd)

LOCATION
DATA

Date: September 28

Location: R/W

Depth (ft.): 0.6

Width (ft.): 3.33

Bottom Type (%):
75% Rock
25% Debris

Colour: Tea

TEMPERATURE

Air ($^{\circ}\text{C}$): 1.0Water ($^{\circ}\text{C}$): 0.5WATER
ANALYSIS

Vel. (fps): 0.3

Disc. (cfs): 7.3

Secchi (cm): Clear

D.O. (ppm): 14.0

Conductivity
($\mu\text{mhos @ }^{\circ}\text{C}$): 140@0.5

PH: 8.75

Alkalinity
(grains/gal):

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
May 31	E.F./seine	Longnose sucker - 1	Imm.	260
		- 2	Imm.	275
		- 3	Imm.	280
		- 4	Imm.	293
		- 5	Spawning	277
June 3	E.F./seine	Longnose sucker - 7	--	--
		Cyprinid - 1	--	100
June 8	E.F./seine	--	--	--
June 26	E.F./seine	--	--	--
June 30	E.F./seine	Longnose sucker - 1	Spawning	275
		- 2	Spawning	296
		- 3	Imm.	305
		- 4	Imm.	304
		- 5	Imm.	282
		- 6	Imm.	332
		- 7	Imm.	282
		- 8	Imm.	329
		- 9	Imm.	304
		- 10	Imm.	274
		- 11	Pre-spawning	279
		- 12	Spawning	281
July 3	E.F./seine -fry net	Longnose sucker - 4	--	--
		Fry - 1	--	Obs.
July 7	E.F./seine	Longnose sucker - 1	Spent	338
		Grayling - 1	--	--
		Fry - 1	--	--
August 17	E.F./seine Observed	Grayling	Imm.	15
September 28	E.F./seine	Grayling -1	Imm	70
		-2	Imm.	70
		-3	Imm.	65
		-4	Imm.	59
		-5	Imm.	63
		-6	Imm.	61
		Lake Chub -1		41
		-2		41
		-3		42

E. FISH POTENTIAL

The fishery potential of the creek at M406.4 is high -- of nine samplings only two failed to produce fish. The high fish use is probably due to the presence of a large lake (at M403-404) as well as two smaller ones. The bottom type is suitable for spawning, and the water is clear.

F. POTENTIAL HIGHWAY IMPACTS

Because of its small size, this creek is particularly susceptible to debris blockage.

G. RECOMMENDATIONS

Install fish culvert in winter.

Minimize disturbance of riparian vegetation.

Care should be taken to make certain organic debris or road fill is not deposited into the creek.

Clear present debris accumulations.

MILE: 407.5 NAME:
CHAINAGE:

PHOTO NOS:
M26E120-2
M26K168-1, 2, 3, 4, 5,
6, 16, 17, 18
M26K175-16
M26K177-19A
M26K181-14A
M26K189-12A

A. GENERAL DATA

Method of Survey: Ground survey at R/W

Length of Stream Surveyed: 300' at R/W

Drainage Area Classification: Drains pond, marsh and low relief spruce stands.
(Drainage area - 8.0 sq. miles).

Distance of R/W from Mackenzie: Approx. 2 miles

Creek Entrance into Mackenzie: None

Accessibility for Fish at Mackenzie Entrance: Nil

Channel Types: Well defined

Bottom Type (General): Mud and boulders

Duration of Flow: Still flowing September 28, 1973. March survey indicated icing to bottom.

B. DESCRIPTION: - DISTURBANCES

This is a murky, brown creek, 6 feet wide and 1.5 feet deep, with a muddy bottom and occasional boulders. It is well defined by high banks and has a moderate velocity (2.2 fps) and discharge (19.8 cfs). The winter road crossing which remains in the creek, and other debris from the R/W, have disrupted the flow, creating pools and faster flow areas. The winter road may be a migration barrier, as fish have been found below the R/W and not above. On either side of the R/W icing has caused a build-up of silt and debris.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date:	May 31	August 17
Location:	R/W	R/W
Depth (ft.):	1.5	1.3
Width (ft.):	6	11.6
Bottom Type (%):	85% Mud 15% Boulder	75% Boulder 25% Silt
Colour:	Muddy brown	Clear

TEMPERATURE

Air ($^{\circ}\text{C}$):	15.0	6.0
Water ($^{\circ}\text{C}$):	8.0	8.2

WATER
ANALYSIS

Vel. (fps):	2.2	1.7
Disc. (cfs):	19.8	8.7
Secchi (cm):	30	Clear
D.O. (ppm):	10	11.5
Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):	185@8.0	300@8.2
pH:	8.0	8.75
Alkalinity (grains/gal):	7	14

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date:

September 28

Location:

R/W

Depth (ft.):

0.5

Width (ft.):

7

Bottom Type (%):

75% Boulder
25% Silt

Colour:

Clear

TEMPERATURE

Air ($^{\circ}\text{C}$):

10.0

Water ($^{\circ}\text{C}$):

2.0

WATER
ANALYSIS

Vel. (fps):

2.1

Disc. (cfs):

7.8

Secchi (cm):

Clear

D.O. (ppm):

13.6

Conductivity
($\mu\text{mhos } 0^{\circ}\text{C}$):

255@2.0

PH:

8.75

Alkalinity
(grains/gal):

15

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
May 31	E.F./seine	Longnose sucker		
		1	Imm.	328
		2	Pre-spawn	292
		3	Pre-spawn	276
		4	Pre-spawn	282
		5	Imm.	193
		Grayling		
		1	Imm.	195
		2	Imm.	239
		3	Imm.	250
		4	Spent	249
		5	Imm.	265
		6	Imm.	235
August 17	E.F./seine (Stampede last 30 ft.)	Nil		
September 28	E.F./seine	Grayling		
		1	Imm.	90
		2	Imm.	70
		3	Imm.	70
		4	Imm.	65
		5	Imm.	63
		Slimy sculpin		
		1		68
		2		90
		3		84

E. FISH POTENTIAL

The stream at M407.5 has a moderate fishery potential as evidenced by captures on two occasions out of three. Although the shocker was not functioning on August 17, the size distribution of fish captured, including fry appearing in the fall, indicates a good spawning area.

F. POTENTIAL HIGHWAY IMPACTS

The highly turbid condition of the water during spring runoff indicates high amounts of silt in the drainage. While silt may have only a minimal effect on adult grayling or suckers, it can have far reaching detrimental effects on the eggs and fry. Care should therefore be taken to ensure that siltation is minimal.

G. RECOMMENDATIONS

Minimize further siltation and riparian vegetation removal.

MILE: 411.6 NAME: River Between Two Mountains PHOTO NOS:
CHAINAGE:

167.

A. GENERAL DATA

Method of Survey: Aerial and ground survey

Length of Stream Surveyed: From mouth to 5 miles upstream. In 1972 Fisheries Service surveyed 25 miles of the river.

Drainage Area Classification: Drains bog, marsh and low relief spruce forest east of McConnell Range and upper and lower Mackenzie terraces (primarily spruce forest). (Drainage area - 1,727 sq. miles).

Distance of R/W from Mackenzie: 3/4 mile

Creek Entrance into Mackenzie: Good

Accessibility for Fish at Mackenzie Entrance: Good

Channel Types: Well defined throughout length, few meanders

Bottom Type (General): Gravel and boulders

Duration of Flow: Has been frozen solid in February and March

B. DESCRIPTION: - DISTURBANCES

River Between Two Mountains has moderate flow after freshet, and relatively clear water with a slight tea or rust colour. The channel is well defined, with generally low banks (10 feet or less high), occasionally reaching 35 to 40 feet. Periodic riffles and pools are prevalent throughout the river's length and the substrate is boulders and gravel. The drainage has a total length of 93 miles which is roughly bisected by Fish Lake. No significant disturbances were observed in the area surveyed.

A domestic fishery on Fish Lake yields lake trout, yellow walleye, northern pike, Arctic grayling and various whitefish species, while the river mouth supports a sport fishery for Arctic grayling.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date:	June 26	July 28	Sept. 2
Location:	12 miles upstream	Same	Same
Depth (ft.):			
Width (ft.):			
Bottom Type (%):	40% Gravel 60% Bould.	40% Gravel 60% Bould.	30% Gravel 70% Bould.
Colour:	Dark rust	Light rust	Light rust

TEMPERATURE

Air (°C):	19.0	31.0	12.0
Water (°C):	16.0	21.0	12.0

WATER
ANALYSIS

Vel. (fps):

Disc. (cfs):

Secchi (cm):

D.O. (ppm):

Conductivity
(μ mhos @ °C):

pH:

Alkalinity
(grains/gal):

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date: Sept. 28

Location: R/W

Depth (ft.): Estimated - 5

Width (ft.): Estimated - 120

Bottom Type (%): 80% Boulder
20% Gravel

Colour: Light rust

TEMPERATURE

Air ($^{\circ}\text{C}$): 15.0

Water ($^{\circ}\text{C}$): 6.0

WATER
ANALYSIS

Vel. (fps): 1.6

Disc. (cfs): 952

Secchi (cm): Greater than 360

D.O. (ppm): 12.3

Conductivity
($\mu\text{mhos @ }^{\circ}\text{C}$): 13306.0

PH: 8.0

Alkalinity
(grains/gal): 5

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 26	Angling	Grayling	Mature	

Interdisciplinary Systems Ltd. (Gas Arctic Study) in 1972 found Arctic grayling and northern pike in the river and observed slimy sculpins.

Fisheries Service Sampling on June 26, 1971 and June 6, 1972 identified grayling in the river.

E. FISH POTENTIAL

The fishery potential of this river is rated high. The good Mackenzie entrance, clear water, lake drainage, river size and spawning conditions all contribute. Of the fish found in this river, only the whitefish species are fall spawners. However, due to the size of the river it should be assumed that other all and winter spawners such as inconnu and burbot may be present as well.

F. POTENTIAL HIGHWAY IMPACTS

Formation of migration barriers due to velocity increments by constricting existing channels with berms or cofferdams.

Overfishing by construction personnel during peak migration periods.

G. RECOMMENDATIONS

Spawning indicates that bridge installation should be done during the winter months - specifically from December to February. If more than three months are required for construction, the winter period should be reserved for those facets of construction which would involve stream disturbance, for example, pier and abutment construction.

Maintain, wherever possible the integrity of the main river channel.

In addition, the normal safeguards with regard to preservation of bank vegetation should be observed.

H. DATA SOURCES

This river was not officially surveyed by F.F. Slaney & Company Limited. The report is based primarily on data compiled from the following sources:

1. Dryden, R.L., B.G. Sutherland and J.N. Stein. 1973. An evaluation of the fish resources of the Mackenzie River Valley as related to pipeline development. Volume II. Information Canada.
2. Hatfield, C.T., J.N. Stein, M.R. Falk, C.S. Jessop and D.N. Shepherd. 1972. Fish Resources of the Mackenzie River Valley. Interim Report I, Volume II. Information Canada.
3. Shotton, R. 1973. Fish Survey. 1972. Base Data Report for the Environment Protection Board. Inter-Disciplinary Systems Ltd. Winnipeg.
4. March survey of icing conditions by F.F. Slaney & Company Limited.

MILE: 411.9 NAME:
CHAINAGE:

PHOTO NOS:

172.

M26E108-15

A. GENERAL DATA

Method of Survey: Ground survey at CNT

Length of Stream Surveyed: 450' at CNT

Drainage Area Classification: Drains low relief spruce forest. (Drainage area - 1.0 sq. miles).

Distance of R/W from Mackenzie: Approx. .75 mile

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Poor

Channel Types: Well defined

Bottom Type (General): Mud

Duration of Flow: Still flowing September 28, 1973. March survey indicates icing to bottom.

B. DESCRIPTION: - DISTURBANCES

M411.9 is a clear running creek with a mud substrate and well defined channel between organic banks. At the CNT, however, the flow is braided along a silted channel.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date:	May 31
Location:	CNT
Depth (ft.):	0.9
Width (ft.):	3
Bottom Type (%):	100% Mud
Colour:	Tea

TEMPERATURE

Air ($^{\circ}\text{C}$):	18.4
Water ($^{\circ}\text{C}$):	10.0

WATER
ANALYSIS

Vel. (fps):	1.8
Disc. (cfs):	4.8
Secchi (cm):	Clear
D.O. (ppm):	10.5
Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):	130@10.0
pH:	7.8
Alkalinity (grains/gal):	7.0

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
May 31	E.F./seine	Longnose sucker	Imm.	70
		Grayling		
		1	Imm.	62
		2	Imm.	54
		3	Imm.	59

E. FISH POTENTIAL

Low turbidity, a definite entrance to the Mackenzie, a low velocity and the presence of fish indicate a moderate fisheries potential.

F. POTENTIAL HIGHWAY IMPACTS

Possibility of some silt deposition.

G. RECOMMENDATIONS

Additional siltation from crossing disturbance should be minimized.

Follow general construction guidelines.

MILE: 412.8 NAME:
CHAINAGE:

PHOTO NOS:

M26IC109-11

A. GENERAL DATA

Method of Survey: Ground survey at R/W

Length of Stream Surveyed: 200' at R/W

Drainage Area Classification: Creek originates in an area of low relief spruce.
(Drainage area - 2.4 sq. miles).

Distance of R/W from Mackenzie: Approx. $\frac{1}{2}$ mile

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Poor

Channel Types: Well defined

Bottom Type (General): Mud, silt, gravel and rock

Duration of Flow: Still flowing September 28, 1973

B. DESCRIPTION: - DISTURBANCES

M412.8 is characterized by a shallow turbid flow over rock and gravel substrates. A high silt load is characteristic both above and below the R/W hence any increased siltation due to the remains of the winter road is difficult to ascertain. A wide channel with very shallow flow below the R/W indicates large volume changes in this creek.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date:	May 31	June 27	July 3
Location:	R/W	R/W	R/W
Depth (ft.):	0.3	0.25	0.2
Width (ft.):	15	12	9.5
Bottom Type (%):	80% Gra. 20% Silt	30% Rock 70% Silt	5% Debris 95% Rock & Gra.
Colour:	Murky Tea	Turbid Tea	Tea

TEMPERATURE

Air ($^{\circ}\text{C}$):	12.0	11.0
Water ($^{\circ}\text{C}$):	5.0	6.0

WATER
ANALYSIS

Vel. (fps):	1.0	1.2	0.85
Disc. (cfs):	4.4	4.2	1.3
Secchi (cm):	13	5	
D.O. (ppm):	13	13.1	
Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):	270@5.0	300@6.0	
pH:	8.7	8.5	
Alkalinity (grains/gal):	13	14	

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date:	September 28
Location:	R/W
Depth (ft.):	0.25
Width (ft.):	11
Bottom Type (%):	60% Rock 20% Silt 20% Organic
Colour:	Clear

TEMPERATURE

Air ($^{\circ}\text{C}$):	
Water ($^{\circ}\text{C}$):	0.5

WATER
ANALYSIS

Vel. (fps):	0.53
Disc. (cfs):	1.5
Secchi (cm):	Clear
D.O. (ppm):	14.0
Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):	279@0.5
PH:	8.75
Alkalinity (grains/gal):	14

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
May 31	E.F./seine	Nil	Nil	Nil
June 27	E.F./seine	Nil	Nil	Nil
July 3	--	--	--	--
September 28	E.F./seine	Grayling	Imm.	50

E. FISH POTENTIAL

As a result of a poor entrance to the Mackenzie, extremely shallow water and turbidity, M412.8 should be considered to be a low fishery potential stream.

F. POTENTIAL HIGHWAY IMPACTS

Siltation both above and below the R/W indicates the possibility of further silting as a result of construction.

G. RECOMMENDATIONS

Follow general construction guidelines.

Remove winter bridge debris with care to avoid siltation.

MILE: 419.5 NAME:
CHAINAGE:

PHOTO NOS:

M26E141-12
M26E120-4

A. GENERAL DATA

Method of Survey: Ground survey at R/W - aerial to entrance into Mackenzie

Length of Stream Surveyed: From R/W to Mackenzie

Drainage Area Classification: Stream origin on flank of mountain drains low relief spruce and bog. (Drainage area - approx. 1 sq. mile).

Distance of R/W from Mackenzie: Approx. 0.75 mile

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Poor

Channel Types: Braided at R/W - well defined below R/W

Bottom Type (General): Rock and gravel through gorge mainly organic at R/W

Duration of Flow: Still flowing September 28, 1973. March survey indicates icing to bottom.

B. DESCRIPTION: - DISTURBANCES

Mile 419.5 is a slow moving, shallow, narrow creek of spring origin draining a low relief spruce area. At the R/W, where winter road debris still exists, the flow alternates between diffuse and confined.

A deep gorge confines the creek until it nears the Mackenzie where it descends a steep gradient into the Mackenzie. Flow into the Mackenzie is a very shallow trickle through large boulders and sand.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date:	May 31	August 17
Location:	R/W	R/W
Depth (ft.):	1.0	
Width (ft.):	2.6	
Bottom Type (%):	70% Organic 30% Debris	
Colour:	Tea	

TEMPERATURE

Air ($^{\circ}\text{C}$):	19.0	8.0
Water ($^{\circ}\text{C}$):	7.1	6.0

WATER
ANALYSIS

Vel. (fps):	0.7	
Disc. (cfs):	1.8	
Secchi (cm):	Clear	Clear
D.O. (ppm):	8.2	7.2
Conductivity ($\mu\text{mhos @ } ^{\circ}\text{C}$):	182@7.1	251@6.0
pH:	7.2	7.8
Alkalinity (grains/gal):	10	13

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
May 31	E.F./seine	Nil	Nil	Nil

E. FISH POTENTIAL

Mile 419.5 has been rated as having a low fish potential due to the formidable gradient from the Mackenzie throughout the gorge which cuts through the adjacent river terrace. While the bottom substrates in the gorge have possible spawning potential, any potentials would be markedly reduced by scouring and silting during spring runoff. The creek drains an area of bog with no apparent access to ponds or lakes, hence feeding and nursery areas are extremely limited. The flow is most probably ephemeral but this must be verified.

F. POTENTIAL HIGHWAY IMPACTS

The highway R/W will cross creek 419.5 in an extensive bog area. The gradient at the R/W is low, the banks mainly of an organic nature and according to previous geoterrain analysis have low levels of ground ice. All three characteristics would tend to limit potential siltation problems during culvert installation. No serious impacts were apparent.

G. RECOMMENDATIONS:

Follow general construction guidelines.

MILE: 422.7 NAME:
CHAINAGE:

PHOTO NOS:

M26E141-14, 17
M26K206-25
M26E119-4

A. GENERAL DATA

Method of Survey: Ground survey at R/W

Length of Stream Surveyed: 300' at R/W

Drainage Area Classification: Drains low relief spruce forest. (Drainage area - 29.0 sq. miles).

Distance of R/W from Mackenzie: Approx. $\frac{1}{2}$ mile

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Good

Channel Types: Well defined

Bottom Type (General): Gravel, boulders, organic.

Duration of Flow: Still flowing September 28, 1973. November 24 - slow flow (3" deep) under ice at R/W. Probably frozen to bottom in winter.

B. DESCRIPTION: -- DISTURBANCES

Mile 422.7 is well contained in a deep gorge from the R/W to the Mackenzie. The creek has gravel bottom, clear, tea colored water, and alternating riffles and pools.

Debris from the CNT crossing has accumulated in the channel and may act as a barrier to fish migration.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date:	May 31	August 18
Location:	R/W	R/W
Depth (ft.):	0.9	
Width (ft.):	3	
Bottom Type (%):	40% Gra. 50% Bould. 10% Org.	
Colour:	Tea	

TEMPERATURE

Air ($^{\circ}\text{C}$):	14.0	7.2
Water ($^{\circ}\text{C}$):	6.0	6.1

WATER
ANALYSIS

Vel. (fps):	2.3	
Disc. (cfs):	6.3	
Secchi (cm):	Clear	Clear
D.O. (ppm):	13	12.1
Conductivity (umhos @ $^{\circ}\text{C}$):	190@6.0	227@6.1
pH:	8	8.1
Alkalinity (grains/gal):	10	14

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date: September 28

Location: R/W

Depth (ft.): 0.5

Width (ft.): 7.5

Bottom Type (%): 100% Bould.

Colour: Light Tea

TEMPERATURE

Air ($^{\circ}\text{C}$): 2.5Water ($^{\circ}\text{C}$): 2.0WATER
ANALYSIS

Vel. (fps): 1.2

Disc. (cfs): 4.4

Secchi (cm): Clear

D.O. (ppm): 13.4

Conductivity
($\mu\text{mhos @ }^{\circ}\text{C}$): 190@2.0

PH: 8.75

Alkalinity
(grains/gal): 12

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
May 31	E.F./seine	Slimy sculpin 1		75
		2		60
August 17	Observation	Grayling		
September 28	E.F./seine	Grayling 1	Imm.	60
		2	Imm.	65
		3	Imm.	65
		4	Imm.	65
		5	Imm.	60
		6	Imm.	60
		Slimy sculpin 1	Mature	110
		2		90
		3		80
		4		90
		5		80
		6		95
		7		85
		8		75
		9		70
		10		50

E. FISH POTENTIAL

The stream has a high fishery potential.

F. POTENTIAL HIGHWAY IMPACTS

Previous geoterrain analysis indicated that the surrounding glaciolacustrine plain of silt and clay is highly susceptible to slumping and erosion. Both creek banks at the R/W are steep and could contribute soil or debris erosion into the channel.

G. RECOMMENDATIONS

Avoid additional siltation or deposition of debris in the creek channel.

Install fish culvert during winter.

Regulate removal of stream bank vegetation.

MILE: 424.3 NAME:
CHAINAGE:

PHOTO NOS:

186.

A. GENERAL DATA

Method of Survey: Ground survey at CNT - R/W

Length of Stream Surveyed: 300' at CNT

Drainage Area Classification: Drains a lake, ponds and marsh through low relief spruce stands. (Drainage area - 1.7 sq. miles).

Distance of R/W from Mackenzie: Definite entrance

Creek Entrance into Mackenzie: Poor

Accessibility for Fish at Mackenzie Entrance: Poor

Channel Types: Poorly defined

Bottom Type (General): Grass

Duration of Flow: Minimal flow September 28, 1973

B. DESCRIPTION: - DISTURBANCES

Mile 424.3 is a slow trickle originating in a lake, pond, marsh system with mainly open water above the CNT and a series of marshes below. Flow is both surface and subterranean and passes under debris at the winter road.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date: May 31
Location: CNT
Depth (ft.): 0.2
Width (ft.): 3
Bottom Type (%): 100% organic
Colour: Tea

TEMPERATURE

Air ($^{\circ}\text{C}$): 18.5
Water ($^{\circ}\text{C}$): 6.5

WATER
ANALYSIS

Vel. (fps): 0.5
Disc. (cfs): 0.4
Secchi (cm): Clear
D.O. (ppm): 8.2
Conductivity
($\mu\text{mhos @ }^{\circ}\text{C}$): 9006.5
pH: 7.2
Alkalinity
(grains/gal): 5

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
May 31	E.F./seine	Nil	Nil	Nil

E. FISH POTENTIAL

The fishery potential is minimal due to the extremely shallow flow, bog and marsh drainage, poor entrance from the Mackenzie and grassy bottom type.

F. POTENTIAL HIGHWAY IMPACTS

None evident.

G. RECOMMENDATIONS

Follow general construction guidelines.

MILE: 426.5 NAME:
CHAINAGE:

PHOTO NOS:

A. GENERAL DATA

Method of Survey: Ground survey at CNT

Length of Stream Surveyed: 200' at CNT

Drainage Area Classification: Lakes and marsh area above R/W, low relief
spruce stands and bog below R/W. (Drainage area - 0.5 sq. miles).

Distance of R/W from Mackenzie: Approx. $\frac{1}{4}$ mile

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Good

Channel Types: Well defined

Bottom Type (General): Boulders, gravel and debris

Duration of Flow: Still flowing September 29, 1973

B. DESCRIPTION: - DISTURBANCES

An excellent boulder and gravel bottom, clear tea coloured water and well defined organic banks are characteristic of M426.5. The depth of this creek is deceptive since the water flows between the rocks and an accurate cross-section was difficult to measure. The entrance from the Mackenzie River is passable by fish. (Lake chub were caught). An extensive debris jam at the winter road is present in the R/W. The creek flows through a gully, between sloping moss covered hills. Stream banks are covered by thick riparian vegetation.

C. SAMPLE LOCATION DATA

LOCATION DATA	Date:	June 27	September 29
	Location:	R/W	CNT
	Depth (ft.):	0.3	0.4
	Width (ft.):	4.9	6
	Bottom Type (%):	75% boulder & gravel 25% organic	60% boulder 20% organic 20% sand & gravel
	Colour:	Tea	
TEMPERATURE	Air ($^{\circ}\text{C}$):	13.0	
	Water ($^{\circ}\text{C}$):	14.0	4.5
WATER ANALYSIS	Vel. (fps):	1.1	1.7
	Disc. (cfs):	1.3	4.2
	Secchi (cm):	Clear	Clear
	D.O. (ppm):	10.2	12.8
	Conductivity (umhos @ $^{\circ}\text{C}$):	170@14.0	164@4.5
	pH:	7.9	8.75
	Alkalinity (grains/gal):	9	8

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
September 29	E.F./no Seine			
	a) Below R/W in pool	Longnose sucker	Imm	81
		Lake Chub -1		45
		-2		55
		-3		53
		-4		41
		-5		41
		-6		42
		-7		40
		-8		37
		-9		39
		-10		34
		-11		38
		-12		40
		-13		42
		-14		39
		-15		34
		-16		35
		-17		40
		-18		41
		-19		41
		-20		35
	b) 100' above R/W	Lake Chub -21		53
		-22		41
		-23		41
		-24		43
		-25		37
		-26		35
		-27		43
		-28		41
		-29		33
		-30		55

D. FISH DATA (cont'd)

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 27	E.F./Seine	Lake Chub	--	--

E. FISH POTENTIAL

The presence of fish, clear water, a good gravel and boulder bottom and easy access for fish from the Mackenzie into the creek indicates a moderate fishing potential.

F. POTENTIAL HIGHWAY IMPACTS

Previous geoterrain analysis indicates that this area lies in a glaciolacustrine plain of silt and clay, making it highly susceptible to erosion and heavy silting.

The steep sided gully has a high potential for erosion and slumping of the embankments. This problem, compounded with the channel degradation caused by the winter bridge could damage downstream gravel beds by heavy siltation. Caution should also be taken to minimize removal of riparian vegetation at the R/W and to ensure such debris is disposed of well away from the creek channel.

G. RECOMMENDATIONS

Install culvert during winter.

Remove remains of winter road to restore normal channel flow.

Control slumping and erosion of the slopes leading into the creek.

Regulate removal of vegetation near the creek banks.

MILE: 427.5 NAME:
CHAINAGE:

PHOTO NOS:

A. GENERAL DATA

Method of Survey: Ground survey at CNT

Length of Stream Surveyed: 200' at CNT

Drainage Area Classification: Drains lakes and marsh area above R/W,
and low relief spruce stands and bog below. (Drainage area - 0.5 sq. miles).

Distance of R/W from Mackenzie: Approx. $\frac{1}{4}$ mile

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Good

Channel Types: Well defined

Bottom Type (General): Boulders and debris

Duration of Flow: Reduced to trickle September 28, 1973

B. DESCRIPTION: -- DISTURBANCES

Mile 427.5 apparently joins with 426.5 just before it exits into the Mackenzie. It is quite similar in appearance to 426.5. Long riffle areas with occasional pools created by natural debris occur along the channel route. The flow is well contained by organic banks in a sloping gully.

The remains of the winter road form a jam which may obstruct fish migration.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date: May 31
Location: CNT
Depth (ft.): 1.2
Width (ft.): 4.5
Bottom Type (%): 80% Boulder
20% Debris
Colour: Tea

TEMPERATURE

Air ($^{\circ}\text{C}$): 13.0
Water ($^{\circ}\text{C}$): 6.0

WATER
ANALYSIS

Vel. (fps): 3.9
Disc. (cfs): 20.8
Secchi (cm): Clear
D.O. (ppm): 9.4
Conductivity
($\mu\text{mhos @ }^{\circ}\text{C}$): 150@6.0
pH: 8
Alkalinity
(grains/gal): 7

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
May 31	E.F./seine	Slimy Sculpin	--	--

E. FISH POTENTIAL

On the basis of fish in the stream, a predominantly boulder bottom and clear, fast moving water of adequate depth, M427.5 has a moderate fisheries potential. However, the winter road debris may obstruct migratory passage.

F. POTENTIAL HIGHWAY IMPACTS

Previous geoterrain analysis indicates that M427.5 is in a glaciolacustrine plain predominantly of silt and clay, which compounded with the steeply sloping gully could cause serious erosion and slumping problems.

G. RECOMMENDATIONS

Control slumping and erosion of embankment leading to the creek.

Minimize removal of bankside vegetation.

Redirect silt flows from gully, if they occur, away from channel by earth barricades or ditches.

MILE: 428.2 NAME:
CHAINAGE:

PHOTO NOS:

196.

A. GENERAL DATA

Method of Survey: Ground survey at CNT

Length of Stream Surveyed: 300' at R/W

Drainage Area Classification: Drains lakes, marsh and low relief spruce stands. (Drainage area - 1.2 sq. miles).

Distance of R/W from Mackenzie: Approx. $\frac{1}{4}$ mile

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Good

Channel Types: Well defined

Bottom Type (General): Gravel and silt

Duration of Flow: Minimal flow September 28, 1973

B. DESCRIPTION: - DISTURBANCES

M428.2 is a narrow, well defined creek flowing from a lake-marsh complex above the R/W at Mile 429 through a steep gully into the Mackenzie. Sedges and grasses predominate in the marsh areas above the crossing site and at the R/W. Creek substrates are mainly gravel and silt and the gully descends at a steep gradient into the Mackenzie.

Remains of the winter road have caused an increase in channel depth and heavy downstream siltation.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date: June 1

Location: CNT

Depth (ft.): 0.5

Width (ft.): 3

Bottom Type (%): Approx. 100% gravel

Colour: Tea

TEMPERATURE

Air ($^{\circ}\text{C}$): 16.0

Water ($^{\circ}\text{C}$): 11.5

WATER
ANALYSIS

Vel. (fps): 1.8

Disc. (cfs): 2.7

Secchi (cm): Clear

D.O. (ppm): --

Conductivity
($\mu\text{mhos @ }^{\circ}\text{C}$): 130@11.5

PH: 7.75

Alkalinity
(grains/gal): --

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 1	E.F./Seine	Nil	--	--

E. FISH POTENTIAL

While the large lake and marsh complex may contain potential spawning and nursery areas, any fishery potential would be greatly reduced by the steep gradient of the gully section to the Mackenzie. Gravelly spawning sites in the gully would be disturbed by scouring and siltation during spring runoffs. Creek 428.2 is rated at low fish potential.

F. POTENTIAL HIGHWAY IMPACTS

None evident.

G. RECOMMENDATIONS

Follow general construction guidelines.

MILE: 430.0 NAME: Smith Creek
CHAINAGE: INTENSIVE STUDY STREAM

PHOTO NOS:
M26K120-9, 11
M26K170-4-11
M26K186-2-6
M26E114-3

A. GENERAL DATA

Method of Survey: Ground survey at different points along creek channel

Length of Stream Surveyed: From falls to mouth by air

Drainage Area Classification: Drains mountains, low relief forested areas and bog. (Drainage area - 51.0 sq. miles).

Distance of R/W from Mackenzie: Approx. 1 mile

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Good

Channel Types: Well defined

Bottom Type (General): Gravel, boulders, debris and silt

Duration of Flow: Still flowing Sept. 28, 1973. November 24 - open water to one mile above R/W, some ice bridges. Probably flows all year.

B. DESCRIPTION: - DISTURBANCES

Smith Creek drains an area of approx. 51.0 sq. miles, two-thirds being mountainous terrain (McConnell Range) with no major lake sources and one-third glaciolacustrine bench with bogs and lakes. The channel is well defined within a meandering gully, and carries a heavy sediment load through large riffled areas of rock and gravel. A high escarpment (180') at the proposed crossing site with exposed sand and gravel could pose serious problems to stream flow and fish passage.

Surveys in March/73 were conducted to ascertain ice conditions on Smith Creek. The creek was frozen solid from $\frac{1}{2}$ mile above the R/W while open water and sub ice flow were observed below the R/W. These open ice conditions are apparently a result of mineral hot springs $\frac{1}{2}$ mile above the crossing site. Water samples taken during March at the R/W gave conductivity readings as high as 1480 μ mhos @ 8°C and alkalinity reading of 14 grains/gallon. Natives of Wrigley reported that Smith Creek was not extremely productive for fishing except in the spring when pike are the main catch.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date:	June 1	June 2	June 3	June 3
Location:	$\frac{1}{4}$ mile below R/W	CNT	$\frac{1}{4}$ mile below R/W	At mouth
Depth (ft.):	1.0	1.4	1.0	1.9
Width (ft.):	25	25	21.6	15
Bottom Type (%):	50% Gra. 50% Debris	60% Gra 20% Bould. 20% Silt	90% Bould. 10% Sand	80% Gra. 10% Bould. 10% Silt
Colour:	Murky Tea	Murky Tea	Tea	Tea

TEMPERATURE

Air ($^{\circ}$ C):	13.5	--	12.0
Water ($^{\circ}$ C):	9.0	8.5	8.5

WATER
ANALYSIS

Vel. (fps):	2.3	2.6	0.6
Disc. (cfs):	57.5	89.3	13.2
Secchi (cm):	40.8	35	Clear
D.O. (ppm):	12	10.8	--
Conductivity (μ mhos @ $^{\circ}$ C):	325@9.0	240@8.5	210@8.5
PH:	8.5	7.25	8.75
Alkalinity (grains/gal):	14	15	23

C. SAMPLE LOCATION DATA

LOCATION DATA	Date:	June 3	June 9	June 27	July 3
	Location:	Waterfalls	R/W	R/W	$\frac{1}{4}$ mile below R/W
	Depth (ft.):		0.5	2	0.8
	Width (ft.):		22.0	18	8.6
	Bottom Type (%):	60% Rock 20% Gra. 20% Bould.	100% Rock	90% Rock 10% Gra.	100% Gra. & Bould.
	Colour:	Tea	Tea	Murky Tea	Tea
TEMPERATURE	Air ($^{\circ}\text{C}$):	14	15.5	16.5	17
	Water ($^{\circ}\text{C}$):	7.5	8.8	12.0	17.5
WATER ANALYSIS	Vel. (fps):		1.3	4.1	2.2
	Disc. (cfs):		14.5	147.6	15.5
	Secchi (cm):	Clear	Clear	29	Clear
	D.O. (ppm):	14	11.8	10.8	9.4
	Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):	205@7.5	480@8.8	320@12.0	450@17.5
	PH:	8.6	8.6	9	8.75
	Alkalinity (grains/gal):	11	12	12	12

C. SAMPLE LOCATION DATA

LOCATION DATA	Date:	August 18	Sept. 28	Oct. 1
	Location:	$\frac{1}{4}$ mile below R/W	$\frac{1}{4}$ mile below R/W	winter road crossing
	Depth (ft.):	0.6	0.66	
	Width (ft.):	12.7	9.8	
	Bottom Type (%):	50% Gravel 50% Bould.	100% Rock (Algal growth on rocks)	
	Colour:	Light Tea	Very light Tea	
TEMPERATURE	Air ($^{\circ}\text{C}$):	7	12	
	Water ($^{\circ}\text{C}$):	9.1	4.5	
WATER ANALYSIS	Vel. (fps):	1.6	2.31	
	Disc. (cfs):	12.7	14.9	
	Secchi (cm):	Clear	Clear	Clear
	D.O. (ppm):	11.4	12.6	
	Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):	620 @ 9.1	600 @ 4.5	
	PH:	8.75	8.75	
	Alkalinity (grains/gal):	7	14	

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 1	E.F./seine	Flathead chub	Imm.	19.8
		Lake chub	Imm.	61.6
		Northern pike	Imm.	252
June 2	E.F./seine	Longnose dace	Imm.	75
		Spottail shiner	Imm.	37
		Slimy sculpin		
		- 1	Imm.	38
June 3	E.F./seine	- 2	Imm.	37
		Burbot - 1	Imm.	150
		- 2	Imm.	140
		Arctic cisco		
		- 1	Imm.	100
		- 2	Imm.	100
		- 3	Imm.	90
		Trout perch		
		- 1	Imm.	80
		- 2	Imm.	85
		- 3	Imm.	80
		Grayling	Imm.	200
		Lake chub		
		- 1	Imm.	80
		- 2	Imm.	26
		- 3	Imm.	80
		- 4	Imm.	70
		Peamouth	Imm.	30
June 3	E.F./seine	Grayling		
		- 1	Imm.	120
		- 2	Imm.	125
June 9	E.F./seine	Longnose sucker	Imm.	78
		Flathead chub		
		- 1	Imm.	72
		- 2	Imm.	45
		Spottail shiner	Imm.	60
		Slimy sculpin	Imm.	36
June 27	E.F./seine	Longnose sucker		
		- 1	Spent	219
		- 2	Imm.	90
		Burbot	Spent	255
		Longnose dace		
		- 1	Imm.	138
		- 2	Imm.	121
		- 3	Imm.	111
		Cyprinid (unknown species)		
		- 1	Imm.	46
		- 2	Imm.	53

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 27 (cont'd.)		Cyprinid (unknown species) Continued		
		- 3	Imm.	46
		- 4	Imm.	50
		- 5	Imm.	55
		- 6	Imm.	57
		- 7	Imm.	36
		- 8	Imm.	40
		- 9	Imm.	57
		- 10	Imm.	57
		Remaining 21	All Imm.	Max. 65 Min. 33 Av. 47
July 3	E.F./seine	Nil	Nil	Nil
August 18	E.F./seine	Grayling	Imm.	71
Sept. 28	E.F./seine	Grayling		
		- 1	Imm.	84
		- 2	Imm.	63
		- 3	Imm.	58
		Slimy sculpin		
		- 1		64
		- 2		58
Oct. 1	E.F./seine	Grayling		
		- 1		77
		- 2		79
		- 3		68
		- 4		68
		- 5		100
		Burbot		
		- 1		165
		- 2		165
		- 3		355
		Northern Pike		
		- 1		344
		Slimy sculpin		
		- 1		58
		- 2		58
		- 3		60
		- 4		56
		- 5		52
		- 6		47
		- 7		45

E. FISH POTENTIAL

Both electrofishing and beach seining techniques produced high catch frequencies at the five sample sites above and below the intended river crossing site. The predominant species identified were pike, burbot, longnose sucker, flathead chub, lake chub, and slimy sculpin. High species diversity, relatively high catch frequencies, large potential spawning areas, as well as possible winter refuges in sub ice winter flow would categorize Smith Creek as having a high fish potential.

F. POTENTIAL HIGHWAY IMPACTS

Previous geoterrain surveys indicate that Smith Creek flows through a high impact glaciolacustrine plain. Very poor drainage and high ground ice content of the surrounding plain indicate heavy potential erosion. The high escarpments at the R/W could pose serious problems through land slides, heavy siltation and possible fish obstructions. Smith Creek normally has a very high sediment load. Any further addition of sediments may cause pronounced siltation of potential spawning areas below the R/W.

G. RECOMMENDATIONS

Location proposed crossing site away from steep bank escarpments.

Minimize riparian vegetation removal to maintain bank stability.

Minimal gravel disturbance or removal.

Diversion of any resulting siltation away from the creek channel.

MILE: 436.5 NAME: Hodgson Creek
CHAINAGE:

PHOTO NOS:

206.

M26K120-7, 8

A. GENERAL DATA

Method of Survey: Ground survey

Length of Stream Surveyed: Area adjacent to R/W

Drainage Area Classification: Originates in the Franklin Range and flows through low relief spruce on the Mackenzie terrace. It flows through a wide gorge for several miles above the Mackenzie. (Drainage area - 106 sq. miles).

Distance of R/W from Mackenzie: 1 mile

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Good

Channel Types: Well defined, meandering

Bottom Type (General): Rock and gravel

Duration of Flow: Still flowing September 29, 1973. March, 1973 - open water to one mile upstream.

B. DESCRIPTION: - DISTURBANCES

Hodgson Creek originates in the limestone formations of the McConnell Range northeast of Wrigley, and flows down through the glaciolacustrine plain south of Mt. Gaudet. It has substrates mainly of rock and gravel, and carries a low silt load. Hodgson Creek serves as an important domestic fishery for Wrigley natives.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date:	Summer/73	September 29
Location:	Undefined	Above R/W approx 6 miles
Depth (ft.):		0.85
Width (ft.):		30
Bottom Type (%):		30% boulder 60% gravel and silt
Colour:		Light brown

TEMPERATURE

Air ($^{\circ}\text{C}$):	
Water ($^{\circ}\text{C}$):	4.0

WATER
ANALYSIS

Vel. (fps):		1.1
Disc. (cfs):		27.5
Secchi (cm):		Approx. 75
D.O. (ppm):		12.8
Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):	175-480	250 @ 4.0
PH:	6.6-8.3	8.75

Alkalinity (grains/gal):	Above data from Northern Engineering Services Ltd.
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11

Data collected
by F.F. Slaney

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
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Northern Engineering Services Ltd. found the following species complement- Arctic grayling, round whitefish, walleye, lake chub, longnose sucker, slimy sculpin.

E. FISH POTENTIAL

Hodgson, with its predominantly rock and gravel bottom and meandering channel with numerous pools and riffles, has a high fishery potential. Upstream runs of the grayling, round whitefish, walleye and longnose sucker to the summer feeding grounds can be expected. It is a major spawning stream for grayling, but is also utilized by round whitefish, lake chub and slimy sculpin.

F. POTENTIAL HIGHWAY IMPACTS

The area adjacent Hodgson Creek is high impact, with a distinct possibility of solifluction and/or erosion and consequent siltation and debris deposition occurring.

G. RECOMMENDATIONS

Construction design should incorporate contingency structures to avert major debris and soil input into this river.

MILE: 443.0 NAME:
CHAINAGE:

PHOTO NOS:

209.

M26K120-6

A. GENERAL DATA

Method of Survey: Ground survey on R/W

Length of Stream Surveyed: 150 Ft.

Drainage Area Classification: Originates in small lake north of R/W and flows through low relief spruce forest and bog below R/W. (Drainage area - approximately 0.5 sq. miles).

Distance of R/W from Mackenzie: 1.5 miles

Creek Entrance into Mackenzie: None

Accessibility for Fish at Mackenzie Entrance: Nil

Channel Types: Well defined

Bottom Type (General): Organic

Duration of Flow: Still flowing September 29, 1973

B. DESCRIPTION: - DISTURBANCES

The stream at M443.0 is small, clear and slow moving with defined, unstable organic banks (grass at the R/W). It drains a lake, then flows across the CNT line into a series of smaller lakes. Drainage to the Mackenzie may occur, but only during periods of high water.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date: June 1

Location: R/W

Depth (ft.): 0.9

Width (ft.): 4.0

Bottom Type (%): 100% organic

Colour: Tea

TEMPERATURE

Air ($^{\circ}\text{C}$): 13.8

Water ($^{\circ}\text{C}$): 14.5

WATER
ANALYSIS

Vel. (fps): 0.86

Disc. (cfs): 3.08

Secchi (cm): Clear

D.O. (ppm): 5.0 - 8.0

Conductivity
($\mu\text{mhos @ }^{\circ}\text{C}$): 125 @ 14.5

PH: 7.0

Alkalinity
(grains/gal): 4

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 1	E.F./seine	Nil		

E. FISH POTENTIAL

The bottom type, depth, marsh area around the lakes and the absence of an entrance to the Mackenzie indicate a minimal fishery potential.

F. POTENTIAL HIGHWAY IMPACTS

None evident.

G. RECOMMENDATIONS

Follow general construction guidelines.

MILE: 454.2 NAME:
CHAINAGE:

PHOTO NOS:

212.

A. GENERAL DATA

Method of Survey: Aerial and ground survey

Length of Stream Surveyed: 200' at R/W

Drainage Area Classification: Drains low relief area of conifers and deciduous trees. (Drainage area - approximately 4.5 sq. miles).

Distance of R/W from Mackenzie: Approx. 4.5 sq. miles

Creek Entrance into Mackenzie: None

Accessibility for Fish at Mackenzie Entrance: Nil

Channel Types: Poorly defined

Bottom Type (General): Silt and debris

Duration of Flow: No flow after August 21, 1973

B. DESCRIPTION: -- DISTURBANCES

This slow moving stream has silt and debris substrates. The flow is confined by mud banks and the water is extremely turbid. Three winter road crossings are evident and have created pools in the channel.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date:	June 2	June 9
Location:	Aerial	R/W
Depth (ft.):		1.0
Width (ft.):	3.0	4.6
Bottom Type (%):		25% Mud 75% Debris
Colour:		Muddy tea

TEMPERATURE

Air ($^{\circ}\text{C}$):	24.0	15.5
Water ($^{\circ}\text{C}$):		9.5

WATER
ANALYSIS

Vel. (fps):		1.0
Disc. (cfs):		4.3
Secchi (cm):		3
D.O. (ppm):		12
Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):		11109.5
PH:		6.9
Alkalinity (grains/gal):		10

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 9	E.F./no seine	Nil		

E. FISH POTENTIAL

Silt and mud bottom, intermittent flow, absence of a Mackenzie entrance and high degree of turbidity and numerous debris jams indicate minimal fishery potential.

F. POTENTIAL HIGHWAY IMPACTS

Erosion at winter road crossings indicate that banks are unstable. Culvert installation could increase siltation.

G. RECOMMENDATIONS

Follow general construction guidelines.

MILE: 454.6 NAME: Ochre River
CHAINAGE:

PHOTO NOS:

M26E124A-2

A. GENERAL DATA

Method of Survey: Ground survey at R/W

Length of Stream Surveyed: 3 miles - aerial survey

Drainage Area Classification: Drains low lying area to west of Franklin Mountains. (Drainage area - 711 sq. miles).

Distance of R/W from Mackenzie: Approx. 0.5 miles

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Good

Channel Types: Braided channel within well defined banks

Bottom Type (General): Boulder, rock and gravel

Duration of Flow: Still flowing October 1, 1973. November 24 - 2 inches flow. Flow under ice in channel south of sandbar. North channel dry. March survey - frozen to bottom.

B. DESCRIPTION: -- DISTURBANCES

The Ochre, during high water forms a single meandering channel draining the Franklin Mountains and associated lowland areas to the east. A braided channel forms at the lower reaches during periods of low water. Preliminary river surveys have estimated up to 317,000 sq. yards of potential spawning gravel, however, most of the river bottom is comprised of large boulders. The water is very turbid and flows through periodic large riffled and shallow pool areas.

Preliminary surficial geology reports have indicated an area of extreme impact at the crossing site due to a predominant soil composition of silt and clay which is highly susceptible to slumping, minor solifluction and fluvial erosion.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date:	June 28	July 5	August 18
Location:	R/W	200 yds. E. of R/W.	200 yds. E. of R/W.
Depth (ft.):	approx. 8	approx. 5	approx. 4
Width (ft.):	approx. 250	approx. 80	approx. 60
Bottom Type (%):	95% Bould. 5% Sand	85% Bould. 15% Sand	50% Bould. 25% Sand 25% Gravel
Colour:	Murky tea	Murky tea	

TEMPERATURE

Air ($^{\circ}\text{C}$):	10.0	15.0	16.7
Water ($^{\circ}\text{C}$):	8.5	15.0	10.3

WATER
ANALYSIS

Vel. (fps):	7.1	8.8	7.0
Disc. (cfs):	14,120	3520	1680
Secchi (cm):	14	50	96
D.O. (ppm):	11.8	9.4	11.1
Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):	105 @ 8.5	170 @ 15.0	200 @ 10.3
PH:	7.75	7.75	8.75
Alkalinity (grains/gal):	5	6	7

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 28	E.F./no seine	Nil	Imm.	
July 5	Beach seine	Grayling 1 -	Imm.	37
		2 -	Imm.	39
		3 -	Imm.	44
		4 -	Imm.	37
		5 -	Imm.	38
		6 -	Imm.	39
		7 -	Imm.	38
		8 -	Imm.	40
		Lake Chub 1 -	Imm.	82
		2 -	Imm.	58
August 18	Beach Seine	Grayling 1 -	Imm.	75
		2 -	Imm.	83
		3 -	Imm.	83
		4 -	Imm.	84
		5 -	Imm.	56
Sept. 29	E.F./seine	Grayling	Imm.	71
		Burbot	Imm.	160
		Longnose Sucker	Imm.	32
		Cyprinid	Imm.	37
		R. Whitefish	Imm.	105
		S. Shiner	Imm.	79
Oct. 1	Beach Seine	Slimy Sculpin 1-	Imm.	30
		2-	Imm.	23
		3-	Imm.	27
	E.F./seine	Grayling 1 -	Imm.	92
		2 -	Imm.	73
		3 -	Imm.	62
		4 -	Imm.	65
		5 -	Imm.	62

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
Oct. 1 (cont'd)	E.F./seine	Lake Chub 1 -		63
		2 -		62
		3 -		47
		4 -		45
		5 -		43
		6 -		88
		7 -		74
		8 -		55
		Longnose Sucker		85

E. FISH POTENTIAL

Studies by the Fisheries Service as well as our data indicate the use of Ochre River for spawning and nursery areas by both longnose sucker and lake chub. Immature Arctic grayling comprised the greatest percentage of fish sampled which suggests important grayling spawning and nursery areas in the Ochre River. No adult grayling were recorded and were therefore assumed to have ascended the river prior to sampling. Round whitefish, white sucker, trout perch and slimy sculpin have also been identified during a 1972 survey conducted for the Gas Arctic Study Limited. According to the Fisheries Service, the movement of fall spawners into the river may be limited by shallow water conditions and reduced flow at the mouth of the river in late September and October. The fishery potential is high.

F. POTENTIAL HIGHWAY IMPACTS

High to extreme impact. The scarps are composed of silt and clay and are highly susceptible to slumping, minor solifluction and fluvial erosion. Even though the Ochre River has a high suspended sediment load any further increase may prove to be very deleterious to egg and fry survival. Therefore, bank and substrate degradation are of prime concern and should be minimized at all times. Prime spawning areas are not abundant, hence any gravel removal from the river should be minimized so as to conserve the limited spawning substrates.

G. RECOMMENDATIONS

Minimize bank and substrate degradation.

Install bridge pilings and approaches in winter to minimize siltation.

Schedule construction between the winter months of December and February to allow for fall spawning migrations and egg deposition. Construction during these months would then limit any impact to the relatively small downstream area (increased siltation) and the site of bridge installation. A possible upstream scouring may occur during spring runoff as a result of substrate removal at the crossing site.

Regulate blasting to avoid disturbance of high fish densities near the crossing sites.

Store fuels and lubricating oils well away from the river channel.

MILE: 457.6 NAME:
CHAINAGE:

PHOTO NOS:

220.

A. GENERAL DATA

Method of Survey: Ground survey at CNT

Length of Stream Surveyed: 100' at CNT

Drainage Area Classification: Drains low relief aspen-spruce on lower and upper terraces. (Drainage area - 1.8 sq. miles).

Distance of R/W from Mackenzie: Approx. .25 mile

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Poor

Channel Types: Well defined

Bottom Type (General): Silt

Duration of Flow: Flowing as a trickle September 29, 1973

B. DESCRIPTION: - DISTURBANCES

M457.6 has an extremely muddy bottom at the CNT line, and the creek is mostly obscured by fallen trees, debris and a three-foot fall below the CNT. The flow trickles between rocks down a 20-foot gradient before entering the Mackenzie. The entrance to the Mackenzie was extremely shallow and almost dry on September 29, 1973. Flow is probably intermittent.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date:	June 1	June 28	July 5	Sept. 29
Location:	CNT	CNT	CNT	CNT (Aerial)
Depth (ft.):	0.2	0.2	0.06	0.2
Width (ft.):	4.0	3	4	3
Bottom Type (%):	100% silt	90% silt 10% debris	100% silt	
Colour:	Murky Tea	Muddy	Murky Tea	

TEMPERATURE

Air ($^{\circ}\text{C}$):	20.0
Water ($^{\circ}\text{C}$):	4.5

WATER
ANALYSIS

Vel. (fps):	1.2	1.6	0.9	Less than 1
Disc. (cfs):	0.8	1.0	0.2	
Secchi (cm):	4			
D.O. (ppm):	15			
Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):	80 @ 4.5			
PH:	6.7			
Alkalinity (grains/gal):	7			

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
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No fish sampling was done

E. FISH POTENTIAL

The inaccessibility to fish from the Mackenzie, silty bottom, murky water and several migration blocks give this small stream a low fishery potential.

F. POTENTIAL HIGHWAY IMPACTS

None evident.

G. RECOMMENDATIONS

Follow general construction guidelines.

MILE: 459.8 NAME: Whitesand Creek
CHAINAGE:

PHOTO NOS:

223.

M26K194-0
M26K204-6A, 7A
M26K205-31, 32

A. GENERAL DATA

Method of Survey: Ground survey

Length of Stream Surveyed: R/W area

Drainage Area Classification: Originates in Franklin Mountains, and flows through a wide gorge in the Mackenzie terraces. Primarily low relief spruce terrace. (Drainage area - approximately 112 sq. miles).

Distance of R/W from Mackenzie: 0.5 miles

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Good

Channel Types: Well defined, slightly meandering

Bottom Type (General): Boulders and rocks

Duration of Flow: March/73 - frozen to bottom at R/W. Still flowing Sept. 29.
November 25 - 14 inches of water flowing under ice.

B. DESCRIPTION: - DISTURBANCES

Whitesand Creek is a slightly meandering, well defined stream originating in the McConnell Range and flowing through a fairly stable alluvial terrace. The water is slightly silty, while the substrate is primarily boulders and rocks. No major disturbances were noted in the immediate area.

A domestic fishery is conducted by the residents of Wrigley at the mouth of the creek.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date:	Summer/73	September 29/73
Location:	Undefined	R/W
Depth (ft.):		1.5
Width (ft.):		45.0
Bottom Type (%):		100% boulder and rock
Colour:		Murky brown

TEMPERATURE

Air ($^{\circ}\text{C}$):	6.5
Water ($^{\circ}\text{C}$):	5.0

WATER
ANALYSIS

Vel. (fps):	
Disc. (cfs):	
Secchi (cm):	approx. 90
D.O. (ppm):	12.5
Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):	175-480 228 @ 5.0
PH:	6.6-8.3 9
Alkalinity (grains/gal):	Above data from Northern Engineering Services Ltd. 13 Data collected by F.F. Slaney

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
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Northern Engineering Services lists the following species as being present in Whitesand Creek -- grayling, round whitefish, lake chub, longnose sucker and slimy sculpin.

E. FISH POTENTIAL

Four factors contribute to Whitesand Creek having a high fish potential: The boulder and rock bottom, good entrance to the Mackenzie, mountain origin and relatively clear water. With regard to fish runs most of the species present overwinter in the Mackenzie, migrating into the creek in the spring. The stream has a good spawning potential for grayling. The lower reaches are utilized by lake chub, suckers and sculpins.

F. POTENTIAL HIGHWAY IMPACTS

None evident.

G. RECOMMENDATIONS

Coordinate construction in or near the river, with periods of low fishery utilization, i.e. December to April.

FILE: 461.1 NAME:
CHAINAGE:

PHOTO NOS:

226.

A. GENERAL DATA

Method of Survey: Aerial survey

Length of Stream Surveyed: R/W to mouth

Drainage Area Classification: Drains lakes and bog through low relief spruce and deciduous forest. (Drainage area - 0.8 sq. miles).

Distance of R/W from Mackenzie: $\frac{1}{2}$ mile

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Poor - entrance to Mackenzie is very shallow and rocky.

Channel Types: Well defined

Bottom Type (General): 80% mud-silt

Duration of Flow: Still flowing September 29, 1973. Mackenzie entrance - very shallow trickle.

B. DESCRIPTION: - DISTURBANCES

This very small, well defined stream has mud substrate and drains several lakes 3 to 4 miles upstream from the R/W. The entrance to the Mackenzie is very shallow and rocky. Flow was limited to a trickle between the rocks.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date: June 28

Location: Aerial survey

Depth (ft.): Approximately 0.2

Width (ft.): 2.0

Bottom Type (%): 80% mud-silt

Colour: Muddy brown

TEMPERATURE

Air ($^{\circ}\text{C}$):

Water ($^{\circ}\text{C}$):

WATER
ANALYSIS

Vel. (fps):

Disc. (cfs):

Secchi (cm):

D.O. (ppm):

Conductivity
($\mu\text{mhos @ }^{\circ}\text{C}$):

PH:

Alkalinity
(grains/gal):

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
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None taken

E. FISH POTENTIAL

The poor entrance to the Mackenzie, shallow water, muddy substrate and turbid water of the stream indicate a minimal fishery potential.

F. POTENTIAL HIGHWAY IMPACTS

None evident.

G. RECOMMENDATIONS

Follow general construction guidelines.

MILE: 461.7 NAME:
CHAINAGE:

PHOTO NOS:

229.

M26K195-18A, 29A
M26K199-35
M26K205-35, 36
M26E120-12, 15

A. GENERAL DATA

Method of Survey: Ground survey at CNT & R/W

Length of Stream Surveyed: 500' at R/W

Drainage Area Classification: Lakes to low relief spruce forest on upper and lower terrace. (Drainage area - 5.9 sq. miles).

Distance of R/W from Mackenzie: Approx. 0.25 miles

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Poor

Channel Types: Well defined

Bottom Type (General): Rock, gravel and sand

Duration of Flow: Still flowing September 29, 1973. November 25 - channel frozen to bottom at R/W. March survey also showed icing to the bottom.

B. DESCRIPTION: - DISTURBANCES

Murky, tea-coloured water, a fine gravel bottom, and a well contained flow characterize M461.7. Winter bridge debris has accumulated on the east side of the R/W and a log jam on the west side, creating silt deposits downstream. Large boulders and debris provide possible fish barriers.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date:	June 1	Sept. 29
Location:	CNT & R/W	R/W - Winter road
Depth (ft.):	0.9	0.4
Width (ft.):	8.0	5.0
Bottom Type (%):	60% rock 40% gravel and sand	70% rock 30% gravel and sand
Colour:	Murky tea	

TEMPERATURE

Air ($^{\circ}\text{C}$):	21.0	7.5
Water ($^{\circ}\text{C}$):	12.0	2.0

WATER
ANALYSIS

Vel. (fps):	2.2	0.23
Disc. (cfs):	14.8	0.52
Secchi (cm):	91.4	Clear
D.O. (ppm):	10.6	13.6
Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):	105 @ 12.0	220 @ 2.0
PH:	8	8.75
Alkalinity (grains/gal):	4	11

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 1	E.F./seine	Grayling		
September 29	E.F./seine	Nil		

E. FISH POTENTIAL

A gravel bottom, deep murky water, and a relatively stable flow are all conducive to fish utilization. M461.7 was rated as having a moderate fish potential. The winter bridge may be a migratory barrier as sampling at the R/W yielded fish on the lower side only.

F. POTENTIAL HIGHWAY IMPACTS

The possibility of construction damage to this creek is moderate. The removal of vegetation from the escarpments on either side of the creek could lead to erosion and slumping.

G. RECOMMENDATIONS

Control slumping and erosion of the escarpments on either side of the creek.

Install culverts in winter and insure fish passage.

Remove winter bridge debris.

FILE: 463.4 NAME:
CHAINAGE:

PHOTO NOS:

A. GENERAL DATA

Method of Survey: Ground survey at R/W. Aerial survey from R/W to mouth.

Length of Stream Surveyed: 200' at R/W

Drainage Area Classification: Drains lake through low relief spruce forest of upper and lower terraces. (Drainage area - 1.2 sq. miles).

Distance of R/W from Mackenzie: Approx. 0.5 miles

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Poor

Channel Types: Well defined

Bottom Type (General): Silt

Duration of Flow: September 29, 1973 - dry at R/W, but shallow trickle into Mackenzie.

B. DESCRIPTION: - DISTURBANCES

Earth banks confine this stream within a gorge along much of its course. Three-foot level drops occur on either side of the R/W. The silt substrate contributes to the murky, turbid appearance of the tea coloured water. The small volume of water at the entrance inhibits fish accessibility. Utilization of the connecting lake complex by fish from the Mackenzie would be greatly hampered by the steep grade through the gorge.

C. SAMPLE LOCATION DATA

LOCATION DATA	Date:	June 2	June 28	July 5
	Location:	R/W	Aerial	Aerial
	Depth (ft.):	1.0	0.3	
	Width (ft.):	2.0	3	Flow nil at R/W
	Bottom Type (%):	90% silt	75% silt	
	Colour:	Murky tea		
TEMPERATURE	Air ($^{\circ}\text{C}$):	14.0		
	Water ($^{\circ}\text{C}$):	7.0		
WATER ANALYSIS	Vel. (fps):	0.7		
	Disc. (cfs):	1.4		
	Secchi (cm):	30.5		
	D.O. (ppm):	10		
	Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):	102 @ 7.0		
	PH:	7.8		
	Alkalinity (grains/gal):	5		

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 2	E.F./seine	Nil		

E. FISH POTENTIAL

Due to the low volume of flow, the silted substrate and the poor entrance from the Mackenzie the fish potential at M463.4 is minimal.

F. POTENTIAL HIGHWAY IMPACTS

There is a possibility of further siltation at the R/W if banks are disturbed excessively.

G. RECOMMENDATIONS

Install culvert in winter to prevent excessive siltation.

Protect bankside vegetation to ensure bank stability.

MILE: 463.8 NAME:
CHAINAGE:

PHOTO NOS:

A. GENERAL DATA

Method of Survey: Ground survey at R/W. Aerial survey from R/W to mouth.

Length of Stream Surveyed: 200' at R/W

Drainage Area Classification: Drains lakes and low relief spruce forest above R/W on upper terrace, low relief deciduous and spruce forest below R/W. (Drainage area - 1.5 sq. miles).

Distance of R/W from Mackenzie: Approx. .5 miles

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Poor

Channel Types: Well defined

Bottom Type (General): Silt and debris

Duration of Flow: September 29, 1973 - standing water at R/W.
Mackenzie entrance dry.

B. DESCRIPTION: -- DISTURBANCES

M463.8 originates in a lake, flows through a gorge to a point just above the R/W, and then across the lower Mackenzie terrace. The entrance to the Mackenzie has a steep gradient and minimal flow. The water appears tea coloured and quite turbid, and substrate is generally silt. Debris accumulations are scattered along the channel and cause a three foot vertical drop on the low side of the R/W.

C. SAMPLE LOCATION DATA

LOCATION DATA	Date:	June 2	June 28	July 5
	Location:	R/W	R/W	Aerial
	Depth (ft.):	1	.4	
	Width (ft.):	3	3	
	Bottom Type (%):	90% silt 10% organic	95% silt 5% debris	No data taken
	Colour:	Silty tea	Tea	
TEMPERATURE	Air ($^{\circ}\text{C}$):	20.0	9.0	
	Water ($^{\circ}\text{C}$):	6.0	5.0	
WATER ANALYSIS	Vel. (fps):	0.5	0.5	
	Disc. (cfs):	1.4	0.6	
	Secchi (cm):	10	Clear	
	D.O. (ppm):	10.8	12.8	
	Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):	9506.0	11205.0	
	PH:	7.8	7.8	
	Alkalinity (grains/gal):	5	6	

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 2	Drive/Seine	Nil		

E. FISH POTENTIAL

The fish potential is minimal. The poor entrance into the Mackenzie, silty bottom and level drops along the channel all contribute to the absence of fish.

F. POTENTIAL HIGHWAY IMPACTS

None evident.

G. RECOMMENDATIONS

Follow general construction guidelines.

MILE: 465.3 NAME:
CHAINAGE:

PHOTO NOS:

A. GENERAL DATA

Method of Survey: Ground survey at CNT - R/W

Length of Stream Surveyed: 300' at R/W

Drainage Area Classification: Drains low relief spruce forest above R/W on upper and lower terraces, deciduous on intermediate bluff. (Drainage area - 2.7 sq. miles).

Distance of R/W from Mackenzie: Approx. 0.5 miles

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Poor

Channel Types: Well defined

Bottom Type (General): Boulder, gravel, silt and debris

Duration of Flow: September 29, 1973 - standing water at R/W

B. DESCRIPTION: - DISTURBANCES

The banks of Mile 465.3 support heavy vegetation. Substrate is predominantly gravel. At the R/W, the winter road bridge obstructs the stream and causes shallow, diffuse flow with erosion and siltation. The exit into the Mackenzie has a 12' drop down a steep gradient. Fish passage may be difficult during low flows.

C. SAMPLE LOCATION DATA

LOCATION DATA	Date:	June 2	June 28	July 5
	Location:	CNT	R/W	R/W
	Depth (ft.):	0.9	0.8	.1
	Width (ft.):	3.5	3	2.5
	Bottom Type (%):	80% silt 20% gravel	75% boulder & gravel 25% debris	75% boulder & gravel 25% debris
	Colour:	Muddy tea	---	---
TEMPERATURE	Air ($^{\circ}\text{C}$):	21.8	10.0	
	Water ($^{\circ}\text{C}$):	12.0	6.5	
WATER ANALYSIS	Vel. (fps):	1.1	0.4	1.3
	Disc. (cfs):	3.4	1.0	0.1
	Secchi (cm):	7.5	---	
	D.O. (ppm):	10	12.2	
	Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):	150 @ 12.0	240 @ 6.5	
	PH:	8.5	8.6	
	Alkalinity (grains/gal):	7	12	

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 2	Drive/Seine	Nil		
June 28	E.F./Seine	Nil		

E. FISH POTENTIAL

The fisheries potential appears minimal. The small volume of water and steep gradient at the mouth probably make the entrance impassible to fish. Although the bottom substrate of gravel is conducive to fish spawning, a large amount of debris which has accumulated at the winter road may be a migratory barrier.

F. POTENTIAL HIGHWAY IMPACTS

The possibility of disturbing this creek by construction is low. The primary danger appears at the winter road where steep earth banks approximately 4½ feet high may be pushed into the creek channel.

G. RECOMMENDATIONS

Caution should be taken not to dump these earth banks into the stream channel.

Install culvert in winter to minimize siltation.

Remove winter road debris from the creek.

MILE: 466.0 NAME:
CHAINAGE:

PHOTO NOS:
M26K194-32

A. GENERAL DATA

Method of Survey: Ground survey on R/W

Length of Stream Surveyed: 200' at R/W

Drainage Area Classification: Low relief spruce forest above and below
R/W on upper and lower Mackenzie terraces. (Drainage area - 2.3 sq. miles).

Distance of R/W from Mackenzie: 0.5 miles

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Poor

Channel Types: Well defined

Bottom Type (General): Silt and sand

Duration of Flow: Still flowing September 29, 1973 - standing water
at R/W. Mackenzie entrance dry. November 25, 1973 - channel frozen
to bottom at R/W.

B. DESCRIPTION: - DISTURBANCES

M466.0 drains both the upper and lower Mackenzie terraces, has a
predominantly silt and sand substrate and is a murky tea colour.
The low flow and steep gradient into the Mackenzie combine to limit
accessibility for fish.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date: June 2
Location: R/W - CNT
Depth (ft.): 0.5
Width (ft.): 2.5
Bottom Type (%): 70% silt
30% sand
Colour: Murky tea

TEMPERATURE

Air ($^{\circ}\text{C}$): 23.5
Water ($^{\circ}\text{C}$): 8.0

WATER
ANALYSIS

Vel. (fps): 1.5
Disc. (cfs): 1.9
Secchi (cm): 90
D.O. (ppm): 10.3
Conductivity
($\mu\text{mhos @ }^{\circ}\text{C}$): 170 @ 8.0
pH: 8.5
Alkalinity
(grains/gal): 8

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 2	E.F./Seine	Nil		

E. FISH POTENTIAL

The potential for fish in M466.0 is minimal due to the poor entrance from the Mackenzie, poor bottom substrate, and the low volume of water.

F. POTENTIAL HIGHWAY IMPACTS

None evident.

G. RECOMMENDATIONS

Follow general construction guidelines.

MILE: 466.6 NAME:
CHAINAGE:

PHOTO NOS:

A. GENERAL DATA

Method of Survey: Aerial survey

Length of Stream Surveyed: 100' at R/W

Drainage Area Classification: Drains low relief spruce forest both sides
R/W on upper and lower terraces. (Drainage area - 0.7 sq. miles).

Distance of R/W from Mackenzie: $\frac{1}{2}$ mile

Creek Entrance into Mackenzie: None

Accessibility for Fish at Mackenzie Entrance: None

Channel Types: Well defined

Bottom Type (General): Organic

Duration of Flow: Dry September 29, 1973

B. DESCRIPTION: - DISTURBANCES

This small ephemeral creek has a primarily organic substrate at the R/W. No surface connection to the Mackenzie was visible. Debris accumulations above and below the R/W probably block all fish passage.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date: June 2, 1973

Location: R/W

Depth (ft.): Approximately 0.5 ft.

Width (ft.): Approximately 3.0 ft.

Bottom Type (%): 20% silt, 20% debris, 60% organic

Colour: Clear to bottom

TEMPERATURE

Air ($^{\circ}\text{C}$): 24.0

Water ($^{\circ}\text{C}$):

WATER
ANALYSIS

Vel. (fps):

Disc. (cfs):

Secchi (cm):

D.O. (ppm):

Conductivity
($\mu\text{mhos @ }^{\circ}\text{C}$):

pH:

Alkalinity/
(grains/gal):

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
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No fish sampling attempted

E. FISH POTENTIAL

The lack of an entrance to the Mackenzie, the predominantly organic bottom and very shallow water all contribute to a minimal fisheries potential.

F. POTENTIAL HIGHWAY IMPACTS

None evident.

G. RECOMMENDATIONS

Winter installation of culvert to prevent detrimental siltation.

MILE: 469.0 NAME:

CHAINAGE:

INTENSIVE STUDY STREAM

PHOTO NOS:

M26K186-9-18

A. GENERAL DATA

Method of Survey: Aerial and ground survey at R/W and mouth

Length of Stream Surveyed: 2 miles by air

Drainage Area Classification: Drains mountains and low relief spruce forest on upper and lower Mackenzie terrace. (Drainage area - 17.6 sq. miles).

Distance of R/W from Mackenzie: Approx. 1/8 mile

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Good

Channel Types: Well defined

Bottom Type (General): Boulder, gravel, silt and sand

Duration of Flow: Still flowing Oct. 1, 1973. November 25 - rotten ice above R/W with some open stretches of flowing water near the R/W. March survey - open water was present.

B. DESCRIPTION: - DISTURBANCES

Mile 469.0 is a relatively clear stream with a moderate flow. It is confined between vegetated banks and has mainly boulder and gravel substrates. Gradient, flow and entrance to the Mackenzie favour a variety of fish species. This was an intensive study stream.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date:	June 2	June 5	June 5
Location:	CNT	$\frac{1}{2}$ M. above R/W	R/W
Depth (ft.):	.7	.8	1.1
Width (ft.):	20	12.6	16.2
Bottom Type (%):	80% boulder 20% gravel	50% boulder 25% gravel 25% sand&silt	50% boulder 30% gravel 20% silt
Colour:	Murky Tea	Tea	Murky Tea

TEMPERATURE

Air ($^{\circ}$ C):	16	23	21
Water ($^{\circ}$ C):	5.0	10.0	10.0

WATER
ANALYSIS

Vel. (fps):	0.8	1.4	1.5
Disc. (cfs):	11.2	14.0	26.2
Secchi (cm):	45	Clear	18
D.O. (ppm):	13	12	12
Conductivity (μ mhos @ $^{\circ}$ C):	350@5.0	240@10.0	405@10.0
PH:	7.5	8.0	8.5
Alkalinity (grains/gal):	9	7.5	9

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date: June 10

June 28

July 5

Location: R/W

CNT

mouth-winter road

Depth (ft.):

0.9

0.6

Width (ft.):

20

21

Bottom Type (%): 70% boulder
30% gravel95% boulder
5% sand80% boulder
20% gravel&silt

Colour:

Murky Tea

Silty

TEMPERATURE

Air ($^{\circ}\text{C}$):

11

21

Water ($^{\circ}\text{C}$):

8.0

12.0

WATER
ANALYSIS

Vel. (fps):

1.1

2.1

Disc. (cfs):

19.8

27.3

Secchi (cm):

21

20

D.O. (ppm):

10.6

11

Conductivity
($\mu\text{mhos @ }^{\circ}\text{C}$):

365@8.0

490@12.0

PH:

8.0

8.75

Alkalinity
(grains/gal):

11

10

C. SAMPLE LOCATION DATA

251

LOCATION
DATA

Date:	Aug. 21	Sept. 29	Oct.1
Location:	mouth	mouth	CNT - R/W
Depth (ft.):	1.0	0.55	NO
Width (ft.):	15.9	20	CHEMISTRY
Bottom Type (%)	90% boulder 10% silt	100% boulder	
Colour:	Tea	Murky Brown	

TEMPERATURE

Air (°C):	13	7
Water (°C):	8.0	2.0

WATER
ANALYSIS

Vel. (fps):	1.4	0.9
Disc. (cfs):	22.3	12.9
Secchi (cm):	23	
D.O. (ppm):	10.2	13.3
Conductivity (umhos @ °C):	400@8.0	429@2.0
PH:	8.0	8.75
Alkalinity (grains/gal):	10	10

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 2	E.F./Seine	Longnose dace	Imm	60
		Spottail shiner	Imm	42
		Slimy sculpin		
		1	Imm	58
		2	Imm	42
		3	Imm	58
		4	Imm	50
		5	Imm	28
		6	Imm	24
		Grayling		
		1	Spent	283
		2	Imm	230
		3	Imm	239
		4	Imm	144
		5	Imm	223
		6	Imm	258
		7	Imm	86
		Longnose sucker		
		1	Imm	299
		2	Imm	299
		3	Imm	287
		4	Imm	244
		5	Imm	86
		Spottail shiner		
		1	Imm	65
June 5a	E.F./Seine	Longnose sucker	Imm	181
		Slimy sculpin		
		1	Imm	49
		2	Imm	42
		3	Imm	50
		4	Imm	52
		5	Imm	50
		Lake chub		
		1	Spent	116
		2	Imm	76
June 5b	E.F./Seine	Longnose sucker		
		1	Imm	118
		2	Imm	58
		3	Imm	58
		4	Imm	65
		5	Imm	68
		6	Imm	63
		7	Imm	55
		8	Imm	60
		9	Imm	67
		10	Imm	54

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 5b (cont'd)	E.F./seine	Burbot		
			1 Imm	162
			2 Imm	64
			3 Imm	78
			4 Imm	67
			5 Imm	75
		Slimy sculpin		
			1 Spent	86
			2 Imm	49
			3 Imm	55
			4 Imm	46
			5 Imm	51
			6 Imm	41
			7 Imm	59
			8 Imm	44
			9 Imm	46
			10 Imm	48
		Grayling		
			1 Imm	78
			2 Imm	82
			3 Imm	68
			4 Imm	63
		Cyprinids		
			1 Imm	83
			2 Imm	60
			3 Imm	55
			4 Imm	50
			5 Imm	55
			6 Imm	63
			7 Imm	69
			8 Imm	51
			9 Imm	49
			10 Imm	51
		Humpback Whitefish		
			1 Imm	
			2 Imm	
June 10	E.F./Seine	Longnose sucker		
			1 Imm	115
			2 Imm	96
			3 Imm	61
			4 Imm	93
			5 Imm	71
			6 Imm	65
			7 Imm	64
			8 Imm	57
			9 Imm	56
			10 Imm	51
			11 Imm	67
			12 Imm	66

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 10 (cont'd)	E.F./Seine	Grayling	Imm	67
		Lake chub		
		1	Imm	58
		2		53
		3		57
		4		49
		5		53
		6		57
		7		70
		8		58
		9		51
		10		61
		11		66
		12		57
		13		59
		14		37
		15		49
		16		70
		17		48
		18		55
		19		60
		20		55
		21		61
		22		63
		23		55
		24		54
		25		66
		26		46
		27		45
		28		68
		29		59
		30		66
June 10	E.F./Seine	Slimy sculpin		
		1		50
		2		72
		3		39
		4		40
		Burbot		
		1		85
		2		138
		3		86
		Cyprinid		
		1		61
		2		80
June 28	E.F./Seine	Grayling		
		1		304
		2		310
		3		272
		4		225

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 28 (cont'd)	E.F./Seine	Whitefish sp.(Unidentified)		170
		Slimy sculpin		
		1	Imm	43
		2	Imm	46
		3	Imm	27
July 5	E.F./Seine	4	Imm	25
		Grayling 1	Spent	270
		2	Spent	225
		3	Spent	210
		4	Pre-spawn	200
		Burbot	Imm	72
		Longnose sucker	Imm	52
		Slimy sculpin	Imm	61
		Grayling 1	Spent	281
		2		169
August 21	E.F./Seine	3	Imm	130
		4	Imm	174
		5	Spent	280
		6	Imm	199
		7	Imm	56
		8	Imm	45
		9	Imm	66
		10	Imm	67
		11	Imm	69
		12	Imm	64
		13	Imm	101
		14	Imm	66
		15	Imm	150
		16	Imm	62
		17	Imm	61
		18	Imm	71
		19	Imm	55
		20	Imm	69
		21	Imm	90
		22	Imm	62
		23	Imm	80
		24	Imm	58
		25	Imm	59
		26	Imm	60
		Longnose sucker		
		1	Imm	97
		2		245
		3		396
		4		205

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)	
Sept. 29	E.F./Seine	Grayling	1	Imm	150
			2	Imm	150
			3	Imm	137
			4	Imm	120
			5	Imm	87
			6	Imm	84
			7	Imm	80
			8	Imm	83
			9	Imm	58
			10	Imm	78
			11	Imm	62
			12	Imm	66
		Burbot	1		210
			2		200
			3		105
		Longnose sucker	1		170
			2		125
		Slimy sculpin			44
		Oct. 1	E.F./Seine	Grayling	1
2	Imm				158
3	Imm				98
4	Imm				92
5	Imm				88
6	Imm				84
7	Imm				81
Slimy sculpin	1				96
	2				94
	3				78
	4				64
	5				60
	6				57
	7				52
	8				47
	9				104
	10				82
	11				55
Sculpin spp. (Unknown)	1				79
	2				41

E. FISH POTENTIAL

The high abundance of fish and the high diversity indicate high fishery potential. The suitability of the stream is due to good entrance from the Mackenzie, rock and gravel bottom, relatively clear water, low velocity, well shaded areas and its origin in a well drained mountainous area.

F. POTENTIAL HIGHWAY IMPACTS

A geoterrain survey indicates that Mile 469.0 crossing lies primarily on a stable, well drained alluvial terrace with little or no ground ice. Erosion of the bank opposite the culvert discharge could alter stream flow and also result in siltation. Erosion and silt or debris deposition from construction activities could affect this productive stream.

G. RECOMMENDATIONS

Install culvert in winter and insure fish migration passage.

Regulate removal of debris from banks to ensure stability.

Reinforce bank opposite culvert discharge to control erosion.

MILE: 470.0 NAME:
CHAIRAGE:

PHOTO NOS:

A. GENERAL DATA

Method of Survey: Aerial survey

Length of Stream Surveyed: 200'

Drainage Area Classification: Drains low relief spruce on terrace with deciduous stands on bluffs. (Drainage area - 2.5 sq. miles).

Distance of R/W from Mackenzie: 0.1 miles

Creek Entrance into Mackenzie: Definite

Accessibility for Fish at Mackenzie Entrance: Poor

Channel Types: Well defined

Bottom Type (General): Gravel and debris

Duration of Flow: Dry Oct. 1, 1973

B. DESCRIPTION: - DISTURBANCES

The stream at Mile 470 is well defined, flowing through a steep gully which cuts the bluff between the lower and upper river terraces. The water is clear, and the substrate is gravel. Debris have accumulated from the winter road. Shallow water and a heavy concentration of sand and silt at the exit to the Mackenzie limit access.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date: June 2

Location: CNT line

Depth (ft.): 0.2

Width (ft.): 2

Bottom Type (%): 90% gravel,
10% debris

Colour: Clear

TEMPERATURE

Air ($^{\circ}\text{C}$): 21

Water ($^{\circ}\text{C}$):

WATER
ANALYSIS

Vel. (fps):

Disc. (cfs):

Secchi (cm): Clear

D.O. (ppm):

Conductivity
($\mu\text{mhos @ }^{\circ}\text{C}$):

PH:

Alkalinity
(grains/gal):

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
	NO	DATA	TAKEN	

E. FISH POTENTIAL

The shallow entrance from the Mackenzie, steep gradient, channel size and low flow rate indicate minimal fishery potential.

F. POTENTIAL HIGHWAY IMPACTS

Siltation may result from erosion of the steep banks.

G. RECOMMENDATIONS

Control bank erosion.

Remove debris from channel and restore normal flow.

MILE: 470.3 NAME:
CHAINAGE:

PHOTO NOS:

A. GENERAL DATA

Method of Survey: Ground survey at CNT - winter road

Length of Stream Surveyed: 200' to mouth

Drainage Area Classification: Drains low relief spruce forest.
(Drainage area - 0.5 sq. miles).

Distance of R/W from Mackenzie: Approx. 200 feet

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Poor

Channel Types: Well defined

Bottom Type (General): Gravel and debris

Duration of Flow: Still flowing Aug. 21, 1973. Dry Oct. 1, 1973

B. DESCRIPTION: - DISTURBANCES

Mile 470.3 flows through a partially eroded gully in the upper and lower Mackenzie terraces. The south facing slopes are mainly deciduous, while those with a northern exposure are spruce covered. The stream is small and slow even during spring runoff, and dries during September.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date: June 2

Location: CNT

Depth (ft.): 0.3

Width (ft.): 2

Bottom Type (%): 90% gravel
10% debris

Colour:

TEMPERATURE Air ($^{\circ}\text{C}$): 21

Water ($^{\circ}\text{C}$): 7.5

WATER
ANALYSIS

Vel. (fps): 2.5

Disc. (cfs): 1.6

Secchi (cm): 45

D.O. (ppm): 7.1

Conductivity
($\mu\text{mhos @ }^{\circ}\text{C}$): 175@7.5

PH: 8.1

Alkalinity
(grains/gal): 5

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
	NO	DATA	TAKEN	

E. FISH POTENTIAL

The shallow, steep gradient into the Mackenzie, ephemeral flow and the heavy debris accumulations indicate minimal fishery potential.

F. POTENTIAL HIGHWAY IMPACTS

Existing gully erosion suggests further slumping, siltation and debris accumulation could result from construction.

G. RECOMMENDATIONS

Control bank erosion.

Follow general construction guidelines.

FILE: 471.4 NAME: Rainbow Creek
CHAINAGE:

PHOTO NOS:

264.

M26K121-8
M26K122-11, 13
M26K186-19
M26E136-19

A. GENERAL DATA

Method of Survey: Ground and aerial

Length of Stream Surveyed: 400 yards on ground, 3 miles up from Mackenzie by air.

Drainage Area Classification: Originates in McConnell Range and flows through low relief spruce forest in the Mackenzie terrace. (Drainage area - 20.0 sq. miles).

Distance of R/W from Mackenzie: 0.2 mile

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Good

Channel Types: Generally well defined but braided sections in last mile above Mackenzie.

Bottom Type (General): Boulder and gravel

Duration of Flow: March 1973 survey - patches of open water through the braided section. Still flowing October 1, 1973. November 25 - fast flow in southernmost channel (10 inches of water) at R/W.

B. DESCRIPTION: - DISTURBANCES

Rainbow Creek is a primarily well defined creek with some braiding during low water periods. The substrate is mainly boulder and gravel with extensive riffle areas. The high turbidity indicates possible siltation where stream velocity decreases. No domestic fisheries are known near Rainbow Creek.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date:	June 2	Oct. 1
Location:	CNT line	CNT line
Depth (ft.):	0.5	0.9
Width (ft.):	Approx. 58	Approx. 35
Bottom Type (%):	60% boulder 40% gravel	100% boulder and gravel
Colour:	Murky Brown	Murky Brown

TEMPERATURE

Air ($^{\circ}\text{C}$):	21.0	8.5
Water ($^{\circ}\text{C}$):	9.0	2.5

WATER
ANALYSIS

Vel. (fps):	2.2	
Disc. (cfs):	63.8	
Secchi (cm):	25	Est. 90 - 120
D.O. (ppm):	12.0	12.8
Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):	1100 @ 9.0	1200 @ 2.5
PH:	8.0	8.75
Alkalinity (grains/gal):	10	11

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 2	E.F./seine	Longnose sucker		

E. FISH POTENTIAL

The extensive riffle areas, good entrance to the Mackenzie, high flow, bottom substrate and presence of fish all suggest a high fishery potential. The braided sections extending approximately one mile upstream may provide a spawning area for several species.

F. POTENTIAL HIGHWAY IMPACTS

Few impacts are expected from the highway bridge but the location and type of temporary span are concerns. A bridged, temporary crossing, upstream of the braided section is preferred.

G. RECOMMENDATIONS

Follow general construction guidelines.

FILE: 473.2 NAME:
CHAINAGE:

PHOTO NOS:

267.

M26K194-1
M26K195-8a, 9a

A. GENERAL DATA

Method of Survey: Aerial. Ground surveys at R/W and winter road.

Length of Stream Surveyed: 200' at winter road

Drainage Area Classification: Drains low relief spruce forest. (Drainage area - 37.0 sq. miles).

Distance of R/W from Mackenzie: Approx. 1/3 mile

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Poor

Channel Types: Well defined

Bottom Type (General): Silt and debris mainly, some gravel

Duration of Flow: Still flowing August 21, 1973. October 1 - standing water at R/W, trickle through rocks at mouth.

B. DESCRIPTION: - DISTURBANCES

Silt depositions are apparent throughout the watercourse. A number of debris jams, concentrated near the right of way, have caused vertical drops, and erosion of terrace banks.

C. SAMPLE LOCATION DATA

LOCATION DATA	Date:	June 2	June 28	July 6
	Location:	Winter road	Winter road	R/W
	Depth (ft.):	0.5	0.7	0.6
	Width (ft.):	5	6.5	5
	Bottom Type (%):	60% silt 40% debris	75% mud and silt	70% rock 30% silt
	Colour:			
TEMPERATURE	Air ($^{\circ}\text{C}$):	24.5		12.3
	Water ($^{\circ}\text{C}$):	6.5		6.0
WATER ANALYSIS	Vel. (fps):	0.6	0.7	0.5
	Disc. (cfs):	1.5	2.9	1.5
	Secchi (cm):	10		30
	D.O. (ppm):	14		12.2
	Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):	60 @ 6.5		60 @ 6.0
	PH:	7.25		7.75
	Alkalinity (grains/gal):	4		3

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
July 6	E.F./seine	Nil		

E. FISH POTENTIAL

A poor bottom type, minimal flow, and high gradient into the Mackenzie indicate a low fishery potential.

F. POTENTIAL HIGHWAY IMPACTS

Normal culvert installation would maintain present values.

G. RECOMMENDATIONS

Follow general construction guidelines.

MILE: 479.4 NAME:
CHAINAGE:

PHOTO NOS:

A. GENERAL DATA

Method of Survey: Ground survey at R/W

Length of Stream Surveyed: 400'

Drainage Area Classification: Drains low relief spruce and deciduous stands above R/W - stream cuts gorge in terrace above R/W. (Drainage area - 47.0 sq. miles).

Distance of R/W from Mackenzie: 1 mile

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Good

Channel Types: Well defined

Bottom Type (General): Boulder

Duration of Flow: Still flowing Oct. 1, 1973. November 25 - water flowing at R/W. (6 inches deep).

B. DESCRIPTION: - DISTURBANCES

The creek at Mile 479.4 is a clear, wide stream which is contained within a gorge with boulder substrate and numerous riffle areas with intermittent pools. No significant disturbances were observed.

C. SAMPLE LOCATION DATA

LOCATION DATA	Date:	June 2	Aug. 21	Oct. 1
	Location:	R/W - CNT	R/W -CNT	R/W - CNT
	Depth (ft.):	1.0	0.7	.66
	Width (ft.):	30	23.8	20
	Bottom Type (%):	90% boulder 10% silt	90% boulder 10% silt	90% rock 10% silt
	Colour:			Light tea
TEMPERATURE	Air ($^{\circ}\text{C}$):	23.5		10.0
	Water ($^{\circ}\text{C}$):	14.5	10.3	1.5
WATER ANALYSIS	Vel. (fps):		1.2	1.3
	Disc. (cfs):		19	16.6
	Secchi (cm):	10.5	Clear	Clear
	D.O. (ppm):	9.5	10.9	13.8
	Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):	132 @ 14.5	211@10.3	155 @ 1.5
	PH:	8.5	8.75	8.75
	Alkalinity (grains/gal):	7	11	9

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 2	E.F./seine	Longnose sucker		
			1	195
			2	280
			3	320
			4	330
			5	300
			6	325
			7	215
			8	170
			9	298
			10	200
			11	198
Aug. 21	E.F./seine	Grayling		238
		Slimy sculpin	mature	52.4
		Longnose sucker		
				63
			Grayling	
			1	232
			2 - immature	80
			Lake chub	
			1	114
			2	97
			3	64
			4	45
Oct. 1	Above CNT	Burbot		284
		Slimy sculpin		
			1	91
			Grayling	
			1	77
			2	72
			Lake chub	
			1 - mature	112
			2	77
			3	70
			4	56
			5	54
			6	48
			7	43

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
Oct. 1	E.F./seine above CNT	Slimy sculpin		
				44
				52
				49
				51
				46
				45
				39
				42
				39
				36
				49
				36
	Below CNT	Longnose sucker		
		1	- immature	26
		2		225
		Grayling		
		1		84
		2		62
		Lake chub		
				64
				57
				58
				43
				48
				53
				46
				48
				52
				47
				40

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
Oct. 1 (cont'd)		8		48
		9		52
		10		47
		11		40

E. FISH POTENTIAL

This creek has high fishery potential. Fish samplings yielded relatively high catches. Longnose sucker and lake chub appear to be the dominant species. The stream has constant flow, good entrance from the Mackenzie, clear water, some shaded areas, substrates suitable for spawning and little debris.

F. POTENTIAL HIGHWAY IMPACTS

None evident.

G. RECOMMENDATIONS

Install culvert in winter and provide fish passage.
Regulate removal of bank vegetation.

MILE: 481.0 NAME:
CHAINAGE:

PHOTO NOS:

A. GENERAL DATA

Method of Survey: Ground survey at CNT - R/W

Length of Stream Surveyed: 200' at CNT - R/W

Drainage Area Classification: Drains low relief forest of aspen and spruce. (Drainage area - 4.9 sq. miles).

Distance of R/W from Mackenzie: Approx. 0.25 miles.

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Poor (Oct. 1 - trickle through rocks)

Channel Types: Well defined

Bottom Type (General): Silt and gravel

Duration of Flow: Still flowing Oct. 1, 1973

B. DESCRIPTION: - DISTURBANCES

The stream is well contained in a slight gully with vegetation to the water's edge. Substrates include silt and gravel alternating over a short section. A vertical drop downstream of the R/W may obstruct fish migration. The stream exits to the Mackenzie down a shallow, steep gradient.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date:	June 5	June 28	July 6
Location:	CNT - R/W (near mouth)	CNT - R/W	Aerial
Depth (ft.):	0.8	0.9	NO
Width (ft.):	5	5.5	
Bottom Type (%):	20% silt 80% gravel	75% silt 25% debris	DATA
Colour:	Tea	Tea	TAKEN

TEMPERATURE

Air ($^{\circ}\text{C}$):	20.5	10
Water ($^{\circ}\text{C}$):	8.5	6.0

WATER
ANALYSIS

Vel. (fps):	1.1	1.1
Disc. (cfs):	4.4	5.4
Secchi (cm):	45	21
D.O. (ppm):	12	11.2
Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):	99 @ 8.5	75 @ 6.0
PH:	7.7	7.5
Alkalinity (grains/gal):	4	4

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 5	E.F./Seine	Nil		
June 28	E.F./Seine	Nil		
July 6	No data taken			

E. FISH POTENTIAL

The minimal flow, steep, shallow entrance from the Mackenzie, and accumulation of debris indicate minimal fishery potential.

F. POTENTIAL HIGHWAY IMPACTS

None evident.

G. RECOMMENDATIONS

Follow general construction guidelines.

MILE: 481.2 NAME:
CHAINAGE:

PHOTO NOS:

278.

M26K194-4

A. GENERAL DATA

Method of Survey: Aerial and ground surveys

Length of Stream Surveyed: 200 feet

Drainage Area Classification: Drains low relief spruce and deciduous stands on upper and lower Mackenzie terraces. (Drainage area - 0.5 sq. miles).

Distance of R/W from Mackenzie: 0.25 miles

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Poor (Dry Aug. 20)

Channel Types: Well defined banks

Bottom Type (General): Peat and boulders

Duration of Flow: Flowing Aug. 20th. No flow Oct. 2 (standing water at R/W).

B. DESCRIPTION: - DISTURBANCES

Mile 481.2 is a small, probably intermittent stream with well defined banks and a primarily organic substrate. Considerable woody debris has accumulated in and along the creek, with jams on both sides of the R/W.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date: June 4

Location: R/W - CNT

Depth (ft.): 0.5

Width (ft.): 4.0

Bottom Type (%): 80% organic
20% boulders

Colour:

TEMPERATURE

Air ($^{\circ}\text{C}$): 23.0

Water ($^{\circ}\text{C}$): 8.5

WATER
ANALYSIS

Vel. (fps): 0.68

Disc. (cfs): 1.4

Secchi (cm): 17.5

D.O. (ppm): 10.0

Conductivity
($\mu\text{mhos @ }^{\circ}\text{C}$): 150@8.5

PH: 7.5

Alkalinity
(grains/gal): 6

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 4	E.F./seine	NIL		

E. FISH POTENTIAL

The short duration of flow, considerable debris accumulations and primarily organic bottom result in a minimal fishery potential.

F. POTENTIAL HIGHWAY IMPACTS

Further debris accumulation may occur.

G. RECOMMENDATIONS

Follow general construction guidelines.

MILE: 481.8 NAME:
CHAINAGE:

PHOTO NOS:

A. GENERAL DATA

Method of Survey: Ground survey at CNT - R/W

Length of Stream Surveyed: 200' at CNT - R/W

Drainage Area Classification: Drains low relief spruce and deciduous forest and marsh below R/W. (Drainage area - 1.2 sq. miles).

Distance of R/W from Mackenzie: Approx. $\frac{1}{4}$ mile

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Poor (Oct. 1 - trickle through rocks at mouth).

Channel Types: Well defined

Bottom Type (General): Organic

Duration of Flow: Still flowing August 20, 1973. October 1 - standing water at R/W.

B. DESCRIPTION: - DISTURBANCES

The stream has intermittent flows, subject to precipitation, is confined by vegetated banks and has mainly organic substrates. The steeply sloped entrance probably obstructs fish access.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date: June 5

Location: CNT - R/W

Depth (ft.): 0.4

Width (ft.): 2.5

Bottom Type (%): 30% silt
70% peat

Colour: Tea

TEMPERATURE

Air ($^{\circ}\text{C}$): 15.5

Water ($^{\circ}\text{C}$): 4.0

WATER
ANALYSIS

Vel. (fps): 1.1

Disc. (cfs): 1.1

Secchi (cm): 22.5

D.O. (ppm): 12

Conductivity
($\mu\text{mhos @ }^{\circ}\text{C}$): 165 @ 4.0

PH: 7.4

Alkalinity
(grains/gal): 8

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 5	E.F./seine	Nil		

E. FISH POTENTIAL

Mile 481.8 has minimal fishery potential. A steep gradient into the Mackenzie, inadequate bottom substrate and a shallow intermittent flow make the stream unsuitable for fish.

F. POTENTIAL HIGHWAY IMPACTS

None evident.

G. RECOMMENDATIONS

Follow general construction guidelines.

MILE: 482.8 NAME:
CHAINAGE:

PHOTO NOS:

A. GENERAL DATA

Method of Survey: Aerial survey

Length of Stream Surveyed: $\frac{1}{2}$ mile

Drainage Area Classification: Drains pond and marsh above R/W with surface flow through grasses and willows from the R/W to the mouth. (Drainage area - 1.0 sq. miles).

Distance of R/W from Mackenzie: Approx. $\frac{1}{4}$ mile

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Poor - (Oct. 1 - small trickle through rocks).

Channel Types: Poorly defined channel

Bottom Type (General): Silt

Duration of Flow: Still flowing October 1, 1973

B. DESCRIPTION: - DISTURBANCES

All data indicates Mile 482.8 is an intermittent bog drainage flowing only during periods of high water. Flow over organic terrain with no distinct channel indicates a relatively recent origin due to high surface runoff in the surrounding drainage area.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date:

NO

Location:

DATA

Depth (ft.):

Width (ft.):

TAKEN

Bottom Type (%):

Colour:

TEMPERATURE

Air ($^{\circ}\text{C}$):Water ($^{\circ}\text{C}$):WATER
ANALYSIS

Vel. (fps):

Disc. (cfs):

Secchi (cm):

D.O. (ppm):

Conductivity
($\mu\text{mhos @ }^{\circ}\text{C}$):

PH:

Alkalinity
(grains/gal):

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
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No Data Taken

E. FISH POTENTIAL

The low, shallow flow, marsh drainage and shallow entrance to the Mackenzie indicate a minimal fishery potential.

F. POTENTIAL HIGHWAY IMPACTS

The poorly defined character of the stream and low flow could create minor siltation problems, but these would probably be restricted to the R/W area.

G. RECOMMENDATIONS

Follow general construction guidelines.

MILE: 484.1 NAME:
CHAINAGE:

PHOTO NOS:

A. GENERAL DATA

Method of Survey: Ground survey at R/W

Length of Stream Surveyed: 200' at R/W

Drainage Area Classification: Drains low relief spruce forest. (Drainage area - 0.5 sq. miles).

Distance of R/W from Mackenzie: Approx. $\frac{1}{2}$ mile

Creek Entrance into Mackenzie: Nil

Accessibility for Fish at Mackenzie Entrance: Nil

Channel Types: Poorly defined

Bottom Type (General): Silt

Duration of Flow: No flow Aug. 20, 1973 or Oct. 1, 1973

B. DESCRIPTION: - DISTURBANCES

The stream at Mile 484.1 probably functions only during the initial spring runoff period or during periods of very high precipitation. It was almost dry in early June, flowing through small channels along the trees. By mid-August, no flow was visible.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date:

NO

Location:

Depth (ft.):

Width (ft.):

DATA

Bottom Type (%):

TAKEN

Colour:

TEMPERATURE

Air ($^{\circ}\text{C}$):Water ($^{\circ}\text{C}$):WATER
ANALYSIS

Vel. (fps):

Disc. (cfs):

Secchi (cm):

D.O. (ppm):

Conductivity
($\mu\text{mhos @ }^{\circ}\text{C}$):

PH:

Alkalinity
(grains/gal):

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
	No	Data	Taken	

E. FISH POTENTIAL

The fishery potential is minimal because of this stream's extremely low flow and the lack of a Mackenzie entrance.

F. POTENTIAL HIGHWAY IMPACTS

None evident.

G. RECOMMENDATIONS

Follow general construction guidelines.

MILE: 484.2 NAME:
CHAINAGE:

PHOTO NOS:
M26K194-5

A. GENERAL DATA

Method of Survey: Ground survey

Length of Stream Surveyed: 200 feet

Drainage Area Classification: Drains low relief spruce and deciduous on
Lower Mackenzie Terrace. (Drainage area - 0.5 sq. miles).

Distance of R/W from Mackenzie: 0.25 miles

Creek Entrance into Mackenzie: Nil

Accessibility for Fish at Mackenzie Entrance: Nil

Channel Types: Poorly defined flow among trees above R/W, well defined ditch
at R/W

Bottom Type (General): Silt

Duration of Flow: Dry Aug. 20, 1973

B. DESCRIPTION: - DISTURBANCES

This is a small drainage with intermittent flow, silt substrate and no entrance to the Mackenzie. No obvious obstructions or debris accumulations occur in the channel below the R/W.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date: June 5

Location: R/W

Depth (ft.): 0.1

Width (ft.): 3.0

Bottom Type (%): 100% silt

Colour:

TEMPERATURE

Air ($^{\circ}\text{C}$):Water ($^{\circ}\text{C}$):WATER
ANALYSIS

Vel. (fps):

Disc. (cfs):

Secchi (cm):

D.O. (ppm):

Conductivity
($\mu\text{mhos @ }^{\circ}\text{C}$):

PH:

Alkalinity
(grains/gal):

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
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No fish sampled due to nature of drainage

E. FISH POTENTIAL

This stream has minimal fishery potential because of intermittent drainage, poorly defined channel and no visible entrance to the Mackenzie.

F. POTENTIAL HIGHWAY IMPACTS

None evident.

G. RECOMMENDATIONS

Follow general construction guidelines.

MILE: 485.8 NAME:
CHAINAGE:

PHOTO NOS:

M26K194-6

A. GENERAL DATA

Method of Survey: Ground survey at R/W

Length of Stream Surveyed: 300 Ft.

Drainage Area Classification: Drains low relief spruce, mainly on lower Mackenzie terrace. (Drainage area - 4.0 sq. miles).

Distance of R/W from Mackenzie: Approx. $\frac{1}{4}$ mile

Creek Entrance into Mackenzie: Nil

Accessibility for Fish at Mackenzie Entrance: Nil

Channel Types: Well defined

Bottom Type (General): Silt and organic debris

Duration of Flow: Dry August 20, 1973

B. DESCRIPTION: - DISTURBANCES

This drainage flows only during high water. Considerable amounts of debris have accumulated in the channel, at the airstrip and downstream.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date: June 3

Location: R/W - north end of airstrip

Depth (ft.): 1.0

Width (ft.): 3.0

Bottom Type (%): 70% silt
30% organic

Colour: Light Tea

TEMPERATURE Air ($^{\circ}\text{C}$): 13.0

Water ($^{\circ}\text{C}$): 10.0

WATER
ANALYSIS

Vel. (fps): 1.1

Disc. (cfs): 3.2

Secchi (cm): Clear

D.O. (ppm): 8.2

Conductivity
($\mu\text{mhos @ }^{\circ}\text{C}$): 138 @ 10.0

PH: 7.75

Alkalinity
(grains/gal): 7

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 3	E.F./seine	Nil		

E. FISH POTENTIAL

The intermittent nature of this stream, the low flow, lack of entrance to the Mackenzie and debris block on the lower side of the R/W indicate a minimal fishery potential.

F. POTENTIAL HIGHWAY IMPACTS

None evident.

G. RECOMMENDATIONS

Remove debris within R/W to restore creek channel.

MILE: 486.3 NAME:
CHAINAGE:

PHOTO NOS:

296.

M26K194-7

A. GENERAL DATA

Method of Survey: Ground survey at CNT

Length of Stream Surveyed: 200' at CNT

Drainage Area Classification: Drains ponds and low relief spruce forest on terrace. (Drainage area - 14.1 sq. miles).

Distance of R/W from Mackenzie: Approx. 0.25 mile

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Fair

Channel Types: Well defined

Bottom Type (General): Boulder, gravel and debris

Duration of Flow: Still flowing October 2, 1973

B. DESCRIPTION: - DISTURBANCES

The water is clear, the substrate is primarily boulder and banks are covered in heavy vegetation. Debris from winter road has created a large pool on the east side of the CNT line. Downstream the creek is well defined and flows over riffles of boulder and gravel into the Mackenzie. Flow is diffuse and shallow at the entrance.

C. SAMPLE LOCATION DATA

LOCATION DATA	Date:	June 3	June 28	July 6
	Location:	CNT	CNT	CNT
	Depth (ft.):	1.2	1.0	0.8
	Width (ft.):	10	10	8.2
	Bottom Type (%):	40% boulder 60% gravel	85% boulder 15% gravel	80% rock 20% gravel
	Colour:	Tea	Tea	Tea
TEMPERATURE	Air ($^{\circ}\text{C}$):	14.0	16.5	
	Water ($^{\circ}\text{C}$):	12.0	11.0	
WATER ANALYSIS	Vel. (fps):	1.2	3.0	6.4
	Disc. (cfs):	16.4	30	42.9
	Secchi (cm):	7.5	Clear	
	D.O. (ppm):	9.2	11	
	Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):	105 @ 12.0	160 @ 11.0	
	PH:	7.75	7.75	
	Alkalinity (grains/gal):	5	6	

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date:	Aug. 20	Oct. 2
Location:	CNT	CNT
Depth (ft.):	0.5	.65
Width (ft.):	9	9.0
Bottom Type (%):	75% boulder 25% gravel	75% rock & gravel 25% organic
Colour:	Tea	Light Tea

TEMPERATURE

Air ($^{\circ}\text{C}$):	13.0	0.5
Water ($^{\circ}\text{C}$):	9.1	1.0

WATER
ANALYSIS

Vel. (fps):	1.2	.58
Disc. (cfs):	5.4	3.4
Secchi (cm):	Clear	Clear
D.O. (ppm):	11.2	13.9
Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):	170 @ 9.1	125 @ 1.0
PH:	7.75	8.5
Alkalinity (grains/gal):	7	7

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 3	E.F./seine	Grayling	1 Imm.	216
			2 Imm.	57
			3 Imm.	86
		Longnose sucker	Imm.	99.
		Slimy sculpin	1 Imm.	70
			2 Imm.	70
June 28	E.F./and observation	5 Grayling	Fry	
		4 Longnose suckers		
		Numerous fingerlings (not speciated)		
August 20	E.F./and observation	Grayling		152
		Sculpin		64
October 2	E.F./seine	Longnose sucker	1 Imm.	72
			2 Imm.	53
			3 Imm.	46
		Lake chub	1	73
			2	39
			3	34
			4	34

E. FISH POTENTIAL

The relatively clear flow, gravel and rock substrate and presence of longnose sucker and grayling fry indicate good spawning conditions. Upstream areas may provide good feeding and nursery areas. The fishery potential is high.

F. POTENTIAL HIGHWAY IMPACTS

Debris accumulations from the winter road or from natural windfalls may block fish passage. The stream may also be subject to siltation, particularly just below the R/W.

G. RECOMMENDATIONS

Minimize siltation and phase construction during periods of low fish utilization of the creek.

MILE: 490.5 NAME:
CHAINAGE:

PHOTO NOS:
M26K194-9

A. GENERAL DATA

Method of Survey: Aerial survey

Length of Stream Surveyed: From Mackenzie to CNT

Drainage Area Classification: Flows from low hills onto plain covered by low relief forest of spruce and deciduous. (Drainage area - 8.0 sq. miles).

Distance of R/W from Mackenzie: Approx. $\frac{1}{4}$ mile

Creek Entrance into Mackenzie: No entrance

Accessibility for Fish at Mackenzie Entrance: Nil

Channel Types: Poorly defined, slightly meandering

Bottom Type (General): Moss - mainly organic

Duration of Flow: Dry as of August 20, 1973

B. DESCRIPTION: - DISTURBANCES

Mile 490.5 originates in the low hills east of the R/W, meandering slightly across the terrace. The flow is small and of short duration. No entrance to the Mackenzie is apparent during normal water levels.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date: June 3

Location: Aerial

Depth (ft.):

Width (ft.): NO

Bottom Type (%):

Colour:

DATA

TEMPERATURE

Air ($^{\circ}\text{C}$):Water ($^{\circ}\text{C}$):WATER
ANALYSIS

TAKEN

Vel. (fps):

Disc. (cfs):

Secchi (cm):

D.O. (ppm):

Conductivity
($\mu\text{mhos @ }^{\circ}\text{C}$):

PH:

Alkalinity
(grains/gal):

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
	NO	DATA	TAKEN	

E. FISH POTENTIAL

Fish potential is minimal since the stream is unsuitable for fish.

F. POTENTIAL HIGHWAY IMPACTS

None evident.

G. RECOMMENDATIONS

Follow general construction guidelines.

MILE: 492.0 NAME: Blackwater River
CHAINAGE:

PHOTO NOS:
M26K196-21A,23A,32A,34A
M26K199-16
M26K202-29,32,33
M26K203-29A
M26K208-13A-15A,22A
M26E136-12,14

A. GENERAL DATA

Method of Survey: Ground survey above CNT crossing

Length of Stream Surveyed: 2-3 miles from mouth

Drainage Area Classification: Originates in Blackwater Lake and flows through Franklin Mountains and spruce covered terraces. (Drainage area - 5,932 sq. miles)

Distance of R/W from Mackenzie: 0.25 miles

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Good

Channel Types: Well defined

Bottom Type (General): Boulder and rock

Duration of Flow: Probably all year. November 25 - stretches of open water

B. DESCRIPTION: - DISTURBANCES

One of the larger rivers draining into the Mackenzie, the Blackwater originates in Blackwater Lake on the east side of the Franklin Mountains. Fisheries Service reports excellent spawning potential from the mouth to Blackwater Lake. Humpback whitefish frequent the lake but no major whitefish migrations up the river have been reported. No major disturbances were observed on the area surveyed. There are no known domestic fisheries.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date:	Summer 1973	Oct. 1
Location:	UNDEFINED	Above CNT crossing
Depth (ft.):		
Width (ft.):		Est'd 300'
Bottom Type (%):		100 boulder and rock
Colour:		Dark tea

TEMPERATURE

Air ($^{\circ}\text{C}$):	11
Water ($^{\circ}\text{C}$):	7.0

WATER
ANALYSIS

Vel. (fps):	4.7
Disc. (cfs):	
Secchi (cm):	4.0
D.O. (ppm):	11.8
Conductivity (umhos @ $^{\circ}\text{C}$):	230 - 280 242 @ 7.0
PH:	7.9 - 8.3 8.75
Alkalinity (grains/gal):	6

Survey by Northern
Engineering Services

Survey by F.F.
Slaney.

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
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Previous surveys conducted by Northern Engineering Services, Fisheries Service and Inter-disciplinary Systems Ltd. indicate the presence of the following species: Arctic grayling, round whitefish, lake chub, spottail shiner, longnose sucker and slimy sculpin.

E. FISH POTENTIAL

The fishery potential of Blackwater River is high. Six species of fish were found and major spawning grounds for grayling were noted in the upper reaches. Similarly, round whitefish are suspected of using the area, as suggested by the presence of fry. Upstream runs of most species for feeding can be expected in the spring. Fisheries Service, in their 1972 report, also found humpback whitefish and northern pike at the outlet of Blackwater Lake.

F. POTENTIAL HIGHWAY IMPACTS

Bridge construction suggests two specific problems which should be examined. The first involves the formation of a velocity barrier due to the construction of dykes or cofferdams. The second disturbance and siltation resulting from extensive approach construction on the south side of the river.

G. RECOMMENDATIONS

Prior to cofferdam and bridge piling installation hydrology studies should be initiated to identify major river channels which should be maintained as much as possible in their natural states.

Construction must be phased with periods of minimal fish use.

Gravel rearrangements should be minimal.

MILE: 492.5 NAME:
CHAINAGE:

PHOTO NOS:

307.

M26K194-10
M26K196-21A
M26K199-14, 15
M26K208-14A

A. GENERAL DATA

Method of Survey: Aerial and ground survey at mouth

Length of Stream Surveyed: 300' at mouth

Drainage Area Classification: Drains bog and slough above CNT. (Drainage area - approximately 1.0 sq. miles).

Distance of R/W from Mackenzie: Approx. 1 mile

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Poor

Channel Types: Both poor and well defined sections

Bottom Type (General): Organic

Duration of Flow: No flow August 20, 1973 (Checked October 2)

B. DESCRIPTION: - DISTURBANCES

This stream originates in a slough just above the CNT line, and then trickles over grass and willow substrates. The water was clear, the velocity and discharge were negligible. The creek was dried up by August 20, 1973. The flow crosses a wide sandbar before entering the Mackenzie.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date:	June 3	June 5
Location:	Mouth	Aerial
Depth (ft.):	5 - 6	.1 - 3
Width (ft.):	20	1 - 20
Bottom Type (%):	90% mud 10% organic	100% organic
Colour:		

TEMPERATURE

Air ($^{\circ}\text{C}$):	19.5	18.0
Water ($^{\circ}\text{C}$):	16.5	

WATER
ANALYSIS

Vel. (fps):	0	.01 - 2.5
Disc. (cfs):	negligible	< 1
Secchi (cm):	46	
D.O. (ppm):	3.9	
Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):	268 @ 16.5	
PH:	7.5	
Alkalinity (grains/gal):	10	

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 3	E.F./no seine	Nil		
June 5		No fish sampling done		

E. FISH POTENTIAL

The fish potential here is low. Although the water is deep enough to support fish which may have been trapped at high water, the fish would ultimately die when the channel dries.

F. POTENTIAL HIGHWAY IMPACTS

None evident.

G. RECOMMENDATIONS

Follow general construction guidelines.

MILE: 495.1 NAME:
CHAINAGE:

PHOTO NOS:

A. GENERAL DATA

Method of Survey: Aerial and ground survey at R/W

Length of Stream Surveyed: 50' at R/W

Drainage Area Classification: Drains marsh and swamp. (Drainage area - 0.3 sq. miles).

Distance of R/W from Mackenzie: Approx. 0.5 miles

Creek Entrance into Mackenzie: Nil

Accessibility for Fish at Mackenzie Entrance: Nil

Channel Types: Poorly defined

Bottom Type (General): Peat and organic

Duration of Flow: Still flowing June 5, 1973

B. DESCRIPTION: - DISTURBANCES

Mile 495.1 is a muskeg drainage with peat and organic substrate from one marsh above the R/W to another below. No entrance to the Mackenzie River was observed. Discharge at R/W was less than one cubic foot per second.

C. SAMPLE LOCATION DATA

Chemical data was not collected due to the creek's inaccessibility.

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
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No Data Taken

E. FISH POTENTIAL

The lack of an entrance to the Mackenzie, poor bottom type, marsh drainage, and low flow result in a minimal fishery potential.

F. POTENTIAL HIGHWAY IMPACTS

None evident.

G. RECOMMENDATIONS

Follow general construction guidelines.

MILE: 496.8 NAME:
CHAINAGE:

PHOTO NOS:
M26E139-7

A. GENERAL DATA

Method of Survey: Aerial survey

Length of Stream Surveyed: Mackenzie to R/W

Drainage Area Classification: Drains bog and marsh on low terrace.
(Drainage area - 13.7 sq. miles).

Distance of R/W from Mackenzie: Approx. 2.5 miles

Creek Entrance into Mackenzie: Definite creek bed present, but water connection probably present only during very high water.

Accessibility for Fish at Mackenzie Entrance: Doubtful

Channel Types: Poorly defined surface flow

Bottom Type (General): Organic

Duration of Flow: Still flowing August 20, 1973

B. DESCRIPTION: - DISTURBANCES

The stream located on the spruce covered terrace north of Blackwater River drains a marsh and bog area. The bottom substrate is probably organic. No entrance to the Mackenzie is apparent. High water channels would be steep and inaccessible to fish.

C. SAMPLE LOCATION DATA

Chemical data was not collected due to the creek's inaccessibility.

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
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No Data Taken

E. FISH POTENTIAL

Due to the questionable accessibility to the creek from the Mackenzie, the organic bottom substrate, and the marsh drainage, the potential for fish of this stream is rated as minimal.

F. POTENTIAL HIGHWAY IMPACTS

None evident.

G. RECOMMENDATIONS

Follow general construction guidelines.

NILE: 498.5 NAME:
CHAINAGE:

PHOTO NOS:

314.

M26E121-12, 13, 14, 15
M26K196-19A

A. GENERAL DATA

Method of Survey: Ground survey at R/W

Length of Stream Surveyed: 50' at R/W

Drainage Area Classification: Drains low relief spruce stands into a marsh and pond complex above R/W. (Drainage area - 22.0 sq. miles).

Distance of R/W from Mackenzie: Approx. 4 miles

Creek Entrance into Mackenzie: Definite creek bed present, but water connection probably present only during very high water.

Accessibility for Fish at Mackenzie Entrance: Doubtful

Channel Types: Poorly defined

Bottom Type (General): Organic, peat and grasses

Duration of Flow: Still flowing October 2, 1973. November 25 - 6 feet of water flowing slowly at the R/W.

B. DESCRIPTION: - DISTURBANCES

This wide slough flows between marsh areas and is contained by organic banks. Substrates are organic materials including grasses, sedges and peat. A dry channel apparently connects to the Mackenzie but no flow occurred during the sampling period.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date: June 3

Location: R/W

Depth (ft.): 4 - 6

Width (ft.): 30

Bottom Type (%): 100% Organic

Colour: Tea

TEMPERATURE

Air ($^{\circ}\text{C}$): 20.0Water ($^{\circ}\text{C}$): 19.5WATER
ANALYSIS

Vel. (fps): Not assessed

Disc. (cfs): Not assessed

Secchi (cm): 300

D.O. (ppm): 4.5

Conductivity 132 @ 19.5
($\mu\text{mhos @ }^{\circ}\text{C}$):

PH: 7

Alkalinity
(grains/gal): 5

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 3	E.F./no seine	Nil		

The depth and width of the marsh made sampling extremely difficult. Shocking was done in spots along the bank.

E. FISH POTENTIAL

The questionable entrance to the Mackenzie and organic bottom substrate indicates a low fishery potential. Marsh frequenting species such as suckers, pike and sticklebacks may inhabit and overwinter in deeper areas of this complex.

F. POTENTIAL HIGHWAY IMPACTS

None evident.

G. RECOMMENDATIONS

Follow general construction guidelines.

MILE: 504.5 NAME:
CHAINAGE:

PHOTO NOS:
M26E134-3
M26K196-16A
M26K202-25,26

A. GENERAL DATA

Method of Survey: Ground survey at CNT - R/W

Length of Stream Surveyed: 200' at R/W

Drainage Area Classification: Drains a lake through marsh.
(Drainage area - 16.7 sq. miles)

Distance of R/W from Mackenzie: Approx. 4 miles

Creek Entrance into Mackenzie: Nil

Accessibility for Fish at Mackenzie Entrance: Nil

Channel Types: Poorly defined

Bottom Type (General): Mainly organic

Duration of Flow: Still flowing Oct. 2, 1973

B. DESCRIPTION: - DISTURBANCES

This diffuse marsh drains the marsh-bog area on the west side of the R/W before flowing into a lake. The lake itself exits at the south end, from where the channel becomes poorly defined, running through a marsh-pond system. There does not seem to be any clear entrance to the Mackenzie, except perhaps during periods of very high water.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date:	June 3	June 4	Oct. 2
Location:	CNT - R/W	CNT - R/W	CNT - R/W
Depth (ft.):	1 - 6	1 - 6	same
Width (ft.):	150	200	same
Bottom Type (%):	90% organic	75% peat 25% wood	100% organic
Colour:	Tea	Tea	

TEMPERATURE

Air ($^{\circ}\text{C}$):	20.0	13.0	16.0
Water ($^{\circ}\text{C}$):	18.0	13.0	6.0

WATER
ANALYSIS

Vel. (fps):	1.9	2	<1
Disc. (cfs):	1012.5	1400	negligible
Secchi (cm):	180	Clear	Clear
D.O. (ppm):	7.3	6	4
Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):	170 @ 18.0	160 @ 13.0	160 @ 6.0
PH:	7	7.5	7.25
Alkalinity (grains/gal):	6	6	7

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 3	E.F./seine	Lake Chub 1	IMM	65
		2	IMM	42
June 5	Observation	unknown		
		Cyprinid		
		24 Longnose suckers		

NOTE: the 24 longnose suckers were in spawning colors.

Oct. 2	E.F./no seine	Brook Stickleback	IMM	12-25
		Approx. 25		

E. FISH POTENTIAL:

Successful catches on 3 successive samplings indicate that the lake below the R/W carries a species complement of at least 3 species. - brook stickleback, longnose sucker and a cyprinid. The presence of suckers in spawning colors and sickleback fry suggest the lake has good spawning and nursery potential. On the basis of this data, the fishery potential appears to be moderate.

F. POTENTIAL HIGHWAY IMPACTS:

A survey of the surficial geology of the area indicates a poorly drained high impact area.

G. RECOMMENDATIONS:

Debris from construction of former winter roads should be removed to prevent further accumulations downstream.

MILE: 509.8 NAME:
CHAINAGE:

PHOTO NOS:

M26E126-8, 9, 10, 11
M26E139-6
M26E142-9
M26K196-14A
M26K199-2

A. GENERAL DATA

Method of Survey: Ground survey at winter road crossing

Length of Stream Surveyed: 200' at winter road crossing

Drainage Area Classification: Drains low relief forest mostly spruce, deciduous stands in the creek valley, fir stands on the south side of the creek. (Drainage area - 4.8 sq. miles).

Distance of R/W from Mackenzie: Approx. 1.5 miles

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Poor - shallow

Channel Types: Well defined

Bottom Type (General): Primarily boulders with some gravel

Duration of Flow: Still flowing October 2, 1973

B. DESCRIPTION: - DISTURBANCES

The creek is contained within a gorge and has shallow flow over gravel and boulder substrate. A dam of winter road debris has created a large pond at the R/W and a vertical drop which would obstruct fish passage. The entrance from the Mackenzie is shallow and rocky.

On October 2, 1973 the large pond had surface ice thicker than one inch.

C. SAMPLE LOCATION DATA

LOCATION DATA	Date:	June 4	July 6	Aug. 20
	Location:	R/W	R/W	R/W
	Depth (ft.):	.7	.25	.3
	Width (ft.):	6.5	6.1	6
	Bottom Type (%):	90% gravel	80% gravel	30% boulder 70% gravel
	Colour:			Tea
TEMPERATURE	Air ($^{\circ}\text{C}$):	12.0		11.2
	Water ($^{\circ}\text{C}$):	7.0		6.5
WATER ANALYSIS	Vel. (fps):	1.5	.5	.6
	Disc. (cfs):	6.5	.8	1.1
	Secchi (cm):	180		Clear
	D.O. (ppm):	9.2		11.7
	Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):	125 @ 7.0		205 @ 6.5
	PH:	8		8.5
	Alkalinity (grains/gal):			12

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date: October 2

Location: R/W winter road

Depth (ft.): .31

Width (ft.): 5.0

Bottom Type (%): 90% gravel
10% silt

Colour: Tea

TEMPERATURE

Air ($^{\circ}\text{C}$): 15.0Water ($^{\circ}\text{C}$): 3.0WATER
ANALYSIS

Vel. (fps): .47

Disc. (cfs): .73

Secchi (cm): Clear

D.O. (ppm): 15.1

Conductivity
($\mu\text{mhos @ }^{\circ}\text{C}$): 433@3.0

PH: 8.5

Alkalinity
(grains/gal): 13

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 4	E.F./seine	Grayling		
		1	Immature	185
		2	Immature	205
		3	Immature	190
July 6	Fly fishing	Nil		
October 2	E.F./no seine			
	At R/W	Nil		
	Below R/W	Nil		

E. FISH POTENTIAL

Duration of flow, bottom substrate and entrance to the Mackenzie suggests a moderate fishery potential. Spawning may occur up to the debris jam.

F. POTENTIAL HIGHWAY IMPACTS

Surficial geology reports state that the stream borders on a high impact area subject to siltation and/or debris deposition from slides or solifluction flows.

G. RECOMMENDATIONS

Control erosion of adjacent stream banks.

Remove winter road debris and fill from stream channel.

Follow general construction guidelines.

MILE: 511.1 NAME:
CHAINAGE:

PHOTO NOS:

324.

M26E131-17
M26E124-28

A. GENERAL DATA

Method of Survey: Ground survey at mouth

Length of Stream Surveyed: From the R/W to Mackenzie by air

Drainage Area Classification: Drains low relief spruce forest and flows through a gully near the edge of the Mackenzie terrace. Deciduous stands on embankment. (Drainage area - 2.1 sq. miles).

Distance of R/W from Mackenzie: 0.25 sq. miles

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Poor

Channel Types: Well defined

Bottom Type (General): Rocks and gravel

Duration of Flow: Slight trickle on July 6, 1973. Almost dry at mouth.

B. DESCRIPTION: - DISTURBANCES

This very small drainage originates on the Mackenzie terrace and has ephemeral flow. No obvious disturbances are evident. The Mackenzie entrance comprises a number of diffuse trickles with grass and willow substrate.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date: June 29 July 6

Location: At mouth Aerial

Depth (ft.): .1

Width (ft.): 1.7

Bottom Type (%): 90% rock 10% gravel

Colour: Tea

TEMPERATURE Air ($^{\circ}\text{C}$): 22.0Water ($^{\circ}\text{C}$): 10.0WATER
ANALYSIS

Vel. (fps): 15

Disc. (cfs): 2.55

Secchi (cm): Clear

D.O. (ppm): 11.4

Conductivity
($\mu\text{mhos @ }^{\circ}\text{C}$): 220 @ 10.0

PH: 8.25

Alkalinity
(grains/gal): 11

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
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No fish sampling done due to depth of stream.

E. FISH POTENTIAL

Duration of flow, depth and gradient into the Mackenzie are all factors which contribute to a minimal fishery potential.

F. POTENTIAL HIGHWAY IMPACTS

None evident.

G. RECOMMENDATIONS

Follow general construction guidelines.

MILE: 511.8 NAME: STEEP CREEK
CHAINAGE:

PHOTO NOS:

M26K201-12A, 13A, 14A
M26E124A-27, 29

A. GENERAL DATA

Method of Survey: Ground survey at R/W and CNT line

Length of Stream Surveyed: Approx. 1 mile

Drainage Area Classification: Steep Creek originates in McConnell Range of Franklin Mountains, then flows onto the river terrace and through a wide gorge to the Mackenzie. Mainly low relief spruce and deciduous stands on slopes of gorge. (Drainage area - approximately 50 sq. miles).

Distance of R/W from Mackenzie: Approx. 1 mile

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Good

Channel Types: Braided sections throughout length

Bottom Type (General): Boulders and gravel

Duration of Flow: Probably year-round, flowing October 2, 1973, November 25, 1973; 12 inches of fast flowing water observed in south channel at R/W. Flowing water has been reported in January.

B. DESCRIPTION: - DISTURBANCES

Steep Creek, a mountain fed river, drains a low relief spruce and deciduous forest. Braided channels through boulders and gravel are characteristic of the lower reaches of the stream. No significant disturbances are apparent.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date:	June 4	October 2
Location:	R/W	CNT line
Depth (ft.):	Est. 1.3	1.1
Width (ft.):	35.0	29.0
Bottom Type (%):	90% Boulder 10% Gravel	95% Boulder 5% Silt
Colour:	Murky Tea	Gray - Green

TEMPERATURE

Air ($^{\circ}\text{C}$):	15.0	16.0
Water ($^{\circ}\text{C}$):	8.9	4.0

WATER
ANALYSIS

Vel. (fps):		1.6
Disc. (cfs):		51.4
Secchi (cm):	45	Clear
D.O. (ppm):	11.9	12.8
Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):	275@8.9	450@4.0
PH:	8.75	9.0
Alkalinity (grains/gal):	9	13

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 4	*E.F./seine	Grayling		

- * Stream was sampled once by F.F. Slaney Fisheries Crew. Data collected by P. McCart for Northern Engineering Co. indicates the presence of grayling, pike, burbot, and slimy sculpin.

E. FISH POTENTIAL

The size, duration of flow, good entrance to the Mackenzie and many braided channels suitable for spawning, indicate a high fishery potential.

F. POTENTIAL HIGHWAY IMPACTS

Two major sources of impact are apparent at the crossing. First, siltation, particularly during spring runoff, may result from construction of an extensive approach on the south side of the river. Second, increased velocities may develop from restricted maximum channel width and presence of pier structures in the channel during spring runoff.

G. RECOMMENDATIONS

Coffer dams and earth berms used in construction of piers or the temporary crossings should adequately insure fish migration passage by providing water velocities less than 5 ft/sec and obstruction-free channels.

MILE: 514.3 NAME:
CHAINAGE:

PHOTO NOS:

330.

M26E126-6
M26K196-11A
M26E142-8

A. GENERAL DATA

Method of Survey: Ground surveys at R/W and mouth. Also an aerial survey from the R/W to the Mackenzie.

Length of Stream Surveyed: Approx. $\frac{1}{2}$ mile

Drainage Area Classification: Drains marsh and pond area above R/W.
(Drainage area - 4.9 sq. miles).

Distance of R/W from Mackenzie: Approx. 1 mile

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Poor - entrance dry October 2, 1973

Channel Types: Well defined

Bottom Type (General): Mostly organic at R/W, boulders and rocks below R/W

Duration of Flow: Still flowing at R/W October 2, 1973

B. DESCRIPTION: - DISTURBANCES

Mile 415.3 drains a pond and marsh complex east of the R/W. The substrate is organic upstream of the R/W and rock and gravel with numerous pool and riffle zones below. Occasional slides in the steep-sided gorge indicate unstable banks. Near the Mackenzie entrance the stream splits into two channels, both with shallow, diffuse flows.

C. SAMPLE LOCATION DATA

LOCATION DATA	Date:	June 4	June 10	June 29
	Location:	Winter Road	Winter Road	R/W
	Depth (ft.):	2		1
	Width (ft.):	6		4
	Bottom Type (%):	75% debris 25% silt		75% silt 25% organic
	Colour:	Tea		Tea
TEMPERATURE	Air ($^{\circ}\text{C}$):	15.5		20.5
	Water ($^{\circ}\text{C}$):	8.5		12.5
WATER ANALYSIS	Vel. (fps):	minimal		.6
	Disc. (cfs):	2		2.4
	Secchi (cm):	Clear		Clear
	D.O. (ppm):	9		8.8
	Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):	200 @ 8.5		215 @ 12.5
	PH:	7.6		7.9
	Alkalinity (grains/gal):	4		9

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date:	July 6	August 20
Location:	Aerial	Mouth
Depth (ft.):		2.5
Width (ft.):		5
Bottom Type (%):	NO	90% rock 10% gravel
Colour:	DATA	Tea
	TAKEN	

TEMPERATURE

Air ($^{\circ}\text{C}$):	11.0
Water ($^{\circ}\text{C}$):	9.3

WATER
ANALYSIS

Vel. (fps):	
Disc. (cfs):	
Secchi (cm):	Clear
D.O. (ppm):	11
Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):	297 @ 9.3
PH:	8.75
Alkalinity (grains/gal):	13

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 4	E.F./seine	Nil		
June 10	E.F./seine	Nil		

E. FISH POTENTIAL

The bog drainage, very poor entrance to the Mackenzie and the possibility of blockages by slides reduce the fishery potential to low.

F. POTENTIAL HIGHWAY IMPACTS

None evident.

G. RECOMMENDATIONS

Follow general construction guidelines.

MILE: 515.7 NAME:
CHAINAGE:

PHOTO NOS:

A. GENERAL DATA

Method of Survey: Aerial

Length of Stream Surveyed: 1 mile

Drainage Area Classification: Low relief spruce and deciduous forest.
(Drainage area - 1.2 sq. miles).

Distance of R/W from Mackenzie: 1 mile

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Poor (Dry July 6)

Channel Types: Well defined

Bottom Type (General): Rock, gravel and mud

Duration of Flow: July 6, 1973 - no flow - standing water at CNT line.

B. DESCRIPTION: - DISTURBANCES

The small stream at Mile 515.7 is well defined, draining a low relief spruce and deciduous terrace and flowing through a small gorge to the Mackenzie. The bottom is composed mainly of rock, with some gravel and silt. There is frequent debris throughout the channel, and the gradient into the Mackenzie is steep and shallow.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date: June 29 July 6

Location: Aerial Aerial

Depth (ft.):

Width (ft.):

Bottom Type (%) 80% Rock
20% Gravel & Silt No

Colour: Data

TEMPERATURE

Air ($^{\circ}\text{C}$): TakenWater ($^{\circ}\text{C}$):WATER
ANALYSIS

Vel. (fps):

Disc. (cfs):

Secchi (cm):

D.O. (ppm):

Conductivity
($\mu\text{mhos @ }^{\circ}\text{C}$):

PH:

Alkalinity
(grains/gal):

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
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No Sampling Done

E. FISH POTENTIAL

The duration of flow, entrance to the Mackenzie and steep gradient through the gorge result in a minimal fishery potential.

F. POTENTIAL HIGHWAY IMPACTS

None evident.

G. RECOMMENDATIONS

Removal of winter road debris on R/W.

Follow general construction guidelines.

MILE: 516.1 NAME:
CHAINAGE:

PHOTO NOS:

A. GENERAL DATA

Method of Survey: Aerial & ground

Length of Stream Surveyed: 150 ft. on ground, 2 miles by air

Drainage Area Classification: Low relief spruce and deciduous stands.
(Drainage area - 4.0 sq. miles).

Distance of R/W from Mackenzie: 1 mile

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Poor

Channel Types: Well defined

Bottom Type (General): Boulders and gravel

Duration of Flow: Dry middle of September

B. DESCRIPTION: - DISTURBANCES

Mile 516.1 is a well contained stream which has its origin on a low relief spruce and deciduous terrace. The channel contains considerable debris, particularly on the R/W, at the winter road crossing.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date:	June 4	June 29	July 6
Location:	R/W	R/W	R/W
Depth (ft.):	1.0	0.5	
Width (ft.):	3	8	
Bottom Type (%)	50 % Silt 50 % Organic	100 % Boulder & Gravel	Not sampled due to excessive shallowness
Colour:	Tea	Tea	

TEMPERATURE

Air ($^{\circ}\text{C}$):	19.0	10.0
Water ($^{\circ}\text{C}$):	5.5	7.0

WATER
ANALYSIS

Vel. (fps):		
Disc. (cfs):	1.2	0.3 1.2
Secchi (cm):	Clear	Clear
D.O. (ppm):	13.0	11.9
Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):	210 @ 5.5	225 @ 7.0
PH:	8.5	8.75
Alkalinity (grains/gal):	5	11

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 4	E.F./seine Above R/W	Nil		
June 29	E.F./seine Below R/W	Nil		
	Fry net Below R/W	Nil		

E. FISH POTENTIAL

Fishery potential is rated minimal based on the entrance to the Mackenzie, the duration of flow and the amount of debris in the creek bed.

F. POTENTIAL HIGHWAY IMPACTS

None evident.

G. RECOMMENDATIONS

Follow general construction guidelines.

MILE: 516.6 NAME:
CHAINAGE:

PHOTO NOS:

340.

M26K196-10A

A. GENERAL DATA

Method of Survey: Ground survey at CNT

Length of Stream Surveyed: 50' at CNT

Drainage Area Classification: Drains low relief spruce and deciduous plain, forms a slough and then flows across R/W in a meandering trickle to the Mackenzie. (Drainage area - approximately 1 sq. mile).

Distance of R/W from Mackenzie: 1 mile

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Poor

Channel Types: Well defined

Bottom Type (General): Organic

Duration of Flow: Flowing August 19, 1973. Dry October 2.

B. DESCRIPTION: - DISTURBANCES

This ephemeral stream drains a low relief forest and flows through a shallow channel with moss and silt bottom. The entrance has shallow flow and steep gradient. A small slump on the east bank has caused siltation.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date: June 4

Location: CNT

Depth (ft.): .4

Width (ft.): 5

Bottom Type (%): 90% organic
10% silt

Colour:

TEMPERATURE

Air ($^{\circ}\text{C}$): 21.0

Water ($^{\circ}\text{C}$): 8.2

WATER
ANALYSIS

Vel. (fps): 1.2

Disc. (cfs): 2.4

Secchi (cm): Clear

D.O. (ppm): 11.8

Conductivity
($\mu\text{mhos @ }^{\circ}\text{C}$): 105 @ 8.2

PH: 7

Alkalinity
(grains/gal): 4

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 4	E.F./no seine	Nil		

E. FISH POTENTIAL

Due to the poor bottom type, shallow flow and inaccessibility of the creek to fish from the Mackenzie, Mile 516.6 has a minimal fishery potential.

F. POTENTIAL HIGHWAY IMPACTS

The small slump located on the east side of the CNT line suggests that further disturbance could cause siltation and debris deposition.

G. RECOMMENDATIONS

Follow general construction guidelines.

MILE: 516.8 NAME:
CHAINAGE:

PHOTO NOS:

343.

M26E139-3, 4
M26K196-10A

A. GENERAL DATA

Method of Survey: Ground survey at CNT

Length of Stream Surveyed: 200' at CNT

Drainage Area Classification: Drains low relief spruce area then flows through a slight ravine below R/W. (Drainage area - approximately 1 sq. mile).

Distance of R/W from Mackenzie: 1 mile

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Poor

Channel Types: Well defined

Bottom Type (General): Silt

Duration of Flow: Still flowing August 19, 1973. Minimal flow in October 3, 1973.

B. DESCRIPTION: - DISTURBANCES

The flow of Mile 516.8 begins in a low relief spruce forest, then follows a series of pools and riffles through a shallow gorge to the Mackenzie. The winter road bridge obstructs the flow and has caused some erosion.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date:	June 4	August 20
Location:	CNT	CNT
Depth (ft.):	.7	
Width (ft.):	3	
Bottom Type (%):	80% organic 20% silt	100% silt
Colour:		

TEMPERATURE

Air ($^{\circ}\text{C}$):	21.5	
Water ($^{\circ}\text{C}$):	13.0	5.0

WATER
ANALYSIS

Vel. (fps):		
Disc. (cfs):		
Secchi (cm):	Clear	Clear
D.O. (ppm):	8.8	11.7
Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):	80 @ 13.0	105 @ 5.0
PH:	7.5	7.5
Alkalinity (grains/gal):	4	7

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 4	E.F./seine	Nil		

E. FISH POTENTIAL

The fishery potential at Mile 516.8 is low. The predominant organic and silt substrate is poorly suited for spawning. The Mackenzie entrance is shallow.

F. POTENTIAL HIGHWAY IMPACTS

None evident.

G. RECOMMENDATIONS

Follow general construction guidelines.

MILE: 517.1 NAME:
CHAINAGE:

PHOTO NOS:

346.

M26K196-16A

A. GENERAL DATA

Method of Survey: Aerial survey

Length of Stream Surveyed: 3 miles

Drainage Area Classification: Drains a low relief spruce forest, occasionally becomes diffuse in boggy areas. (Drainage area - approximately 1.5 sq. miles).

Distance of R/W from Mackenzie: Approx. $\frac{1}{2}$ mile

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Poor, shallow flow

Channel Types: Fairly well defined

Bottom Type (General): Organic and gravel

Duration of Flow: Still flowing August 19, 1973. Dry October 2.

B. DESCRIPTION: - DISTURBANCES

Mile 517.1 is a characteristically shallow trickle through a low relief spruce forest. The channel is heavily laden with debris, has mud and silt substrate and a shallow entrance to the Mackenzie.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date: June 4

Location: Aerial

Depth (ft.): .5

Width (ft.): 2

Bottom Type (%): 50% Gravel
30% Organic
20% Silt

Colour:

TEMPERATURE

Air ($^{\circ}\text{C}$): 22.0Water ($^{\circ}\text{C}$):WATER
ANALYSIS

Vel. (fps):

Disc. (cfs):

Secchi (cm):

D.O. (ppm):

Conductivity
($\mu\text{mhos @ }^{\circ}\text{C}$):

PH:

Alkalinity
(grains/gal):

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
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No Fish Sampling Attempted

E. FISH POTENTIAL

The fish potential at Mile 517.1 appears low since the shallow water makes the creek entrance impassable for fish. Much debris blocks the channel.

F. POTENTIAL HIGHWAY IMPACTS

None evident.

G. RECOMMENDATIONS

Follow general construction guidelines.

MILE: 517.7 NAME:
CHAINAGE:

PHOTO NOS:

A. GENERAL DATA

Method of Survey: Aerial and ground survey at R/W

Length of Stream Surveyed: 300' ground survey at R/W

Drainage Area Classification: Drains a small lake before traversing a low relief spruce plain. (Drainage area - 0.6 sq. miles).

Distance of R/W from Mackenzie: 1 mile

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Poor

Channel Types: Poorly defined by vegetation

Bottom Type (General): Peat and silt

Duration of Flow: Still flowing August 19, 1973. Dry October 2.

B. DESCRIPTION: - DISTURBANCES

Mile 517.7 is ephemeral and flows over peat and silt substrate. The low gradient produces slow water velocities and a very shallow, diffuse entrance into the Mackenzie. The stream flows through about 15 feet of debris at the R/W.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date: June 4

Location: CNT

Depth (ft.): 1.5

Width (ft.): 2

Bottom Type (%): 80% Peat
20% Silt

Colour:

TEMPERATURE

Air ($^{\circ}\text{C}$):Water ($^{\circ}\text{C}$):WATER
ANALYSIS

Vel. (fps): .5

Disc. (cfs): 1.5

Secchi (cm):

D.O. (ppm):

Conductivity
($\mu\text{mhos @ }^{\circ}\text{C}$):

PH:

Alkalinity
(grains/gal):

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 4	Observation	Nil		

E. FISH POTENTIAL

The poor entrance to the Mackenzie, the organic substrate and the diffuse channel indicate low fishery potential.

F. POTENTIAL HIGHWAY IMPACTS

None evident.

G. RECOMMENDATIONS

Follow general construction guidelines.

MILE: 517.9 NAME:
CHAINAGE:

PHOTO NOS:

352.

A. GENERAL DATA

Method of Survey: Ground survey at R/W

Length of Stream Surveyed: 300' at R/W

Drainage Area Classification: Drains a small bog lake about 150 yards above R/W, then flows through a low relief spruce forest. (Drainage area - 1.2 sq. miles).

Distance of R/W from Mackenzie: 1 mile

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Poor, shallow flow

Channel Types: Well defined at R/W

Bottom Type (General): Mainly gravel with some organic and silt present

Duration of Flow: Still flowing August 20, 1973. Dry October 2.

B. DESCRIPTION: - DISTURBANCES

This ephemeral stream has limited flow over gravel substrates. Two channels are evident between the R/W and the Mackenzie with each flowing through a shallow gully. No disturbances were noted.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date: June 4

Location: CNT

Depth (ft.): .5

Width (ft.): 4

Bottom Type (%): 50% Gravel
20% Peat
30% Silt

Colour: Tea

TEMPERATURE

Air ($^{\circ}\text{C}$): 22.0

Water ($^{\circ}\text{C}$):

WATER
ANALYSIS

Vel. (fps): 2

Disc. (cfs): 4

Secchi (cm): Clear

D.O. (ppm):

Conductivity
($\mu\text{mhos @ }^{\circ}\text{C}$):

PH:

Alkalinity
(grains/gal):

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 4	E.F./seine	Nil		

E. FISH POTENTIAL

The shallow flow and poor entrance of this creek to the Mackenzie as well as the abundance of peat and silt indicate low fishery potential.

F. POTENTIAL HIGHWAY IMPACTS

None evident.

G. RECOMMENDATIONS

Follow general construction guidelines.

MILE: 519.8 NAME:
CHAINAGE:

PHOTO NOS:

A. GENERAL DATA

Method of Survey: Ground surveys at CNT and at the R/W

Length of Stream Surveyed: 150 ft. on ground, R/W to mouth by air

Drainage Area Classification: Low relief forest drainage consisting of spruce and alder. (Drainage area - 8.4 sq. miles).

Distance of R/W from Mackenzie: Approx. 0.5 miles

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Poor, just a riffle over rock

Channel Types: Well defined in gorge

Bottom Type (General): Gravel and boulder

Duration of Flow: Still flowing October 2nd, 1973

B. DESCRIPTION: - DISTURBANCES

After draining an area of low relief spruce and alder, the creek follows a gorge to the Mackenzie. Both banks support spruce with some deciduous trees. The shallow creek flows over a wide gravel area. The Mackenzie entrance has a diffuse and rapid flow over gravel. Slumping is evident on the scarps above the Mackenzie.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date:	June 10	July 6	August 19	October 2
Location:	CNT	R/W	Seismic Line	Winter Road
Depth (ft.):		.6	.5	Above road 1.0 Below road 0.2
Width (ft.):		6.8	6.9	8.0
Bottom Type (%):	60% gra. 40% boul.	80% rock 20% gravel	95% rock and gravel	60% rock 40% boulder
Colour:				Light Tea

TEMPERATURE

Air ($^{\circ}\text{C}$):				13.0
Water ($^{\circ}\text{C}$):			7.0	2.5

WATER
ANALYSIS

Vel. (fps):	1.5	.1	.5	< 0.5
Disc. (cfs):	2.0	.3	1.7	
Secchi (cm):	Clear		Clear	Clear
D.O. (ppm):			11.8	13.4
Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):			272@7.0	260@2.5
PH:			8.9	8.75
Alkalinity (grains/gal):			12	12

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 10	E.F./Seine - observed while shocking	Sculpin		
Oct. 2	E.F./Seine			
	Above R/W	Nil		
	Below R/W	Nil		

E. FISH POTENTIAL

Even though the gravel substrate and clear water are conducive to fish use, the fisheries potential remains low due to the shallow channel and the poor entrance from the Mackenzie.

F. POTENTIAL HIGHWAY IMPACTS

Extensive siltation at the winter crossing, steep banks and evidence of occasional slumping suggest that care must be taken to avoid further siltation and debris deposition.

G. RECOMMENDATIONS

Control slumping and siltation at crossing site.

MILE: 521.0 NAME: Saline River
CHAINAGE:

PHOTO NOS:

A. GENERAL DATA

Method of Survey: Aerial and ground survey

Length of Stream Surveyed: R/W to mouth

Drainage Area Classification: Originates in McConnell Range and flows through a shallow valley in a low relief spruce forest. (Drainage area - 115.0 sq. miles).

Distance of R/W from Mackenzie: 0.75 mile

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Good

Channel Types: Poor to well defined, shallow meanders

Bottom Type (General): Boulder and rock

Duration of Flow: Still flowing November 25th. Rotten ice at R/W

B. DESCRIPTION: - DISTURBANCES

A relatively diverse species complement and high fishery potential typify such major drainages. The water is highly conductive due to the concentration of sodium and chloride ions. No significant disturbances are evident. There are no known domestic fisheries.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date: Summer 72 or 73

October 2/73

Location: UNDEFINED

R/W

Depth (ft.):

0.85

Width (ft.):

40

Bottom Type (%):

100 Rock and
Boulder

Colour:

Clear

TEMPERATURE

Air ($^{\circ}\text{C}$):

13.0

Water ($^{\circ}\text{C}$):

2.5

WATER
ANALYSIS

Vel. (fps):

2.6

Disc. (cfs):

87.4

Secchi (cm):

Clear

D.O. (ppm):

12.7

Conductivity
($\mu\text{mhos @ }^{\circ}\text{C}$): 330-1950

1400@2.5

PH: 8.3-8.5

9.0

Alkalinity
(grains/gal):Data from
Northern Engineering
Services.

12

Chemistry done
by F.F. Slaney.

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
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Since the F.F. Slaney fisheries crew did no fish sampling in the Saline River due to Fisheries Permit regulations, evaluation of the fish resource capabilities are based on data collected by other study groups.

Northern Engineering Services found the following species present - grayling, lake chub, flathead chub, spottail shiner, longnose sucker, slimy sculpin, spoonhead sculpin and some fry of Prosopium species. Inter-disciplinary Systems Limited, of Winnipeg found several of the above species plus northern pike.

E. FISH POTENTIAL

Although no data is available on relative abundance of fish species, the species diversity, size of the drainage area, access to the Mackenzie, bottom substrate, et cetera, all indicate a high fishery potential. The river shows good spawning potential, particularly for grayling and slimy sculpins. Upstream runs of most species can be expected in the spring.

F. POTENTIAL HIGHWAY IMPACTS

Surveys of the surficial geology indicate the possibility of slumping, solifluction and gully erosion on either side of the river at the crossing site, though the northern bank appears slightly more stable. Further, the encroachment of the approach fills into the stream channel could cause velocity increases that may act as migration barriers.

G. RECOMMENDATIONS

Follow general construction guidelines.

Avoid velocity barriers and siltation.

Schedule construction of temporary crossing cribs or abutments during periods of least fishery activity.

MILE: 523.8 NAME:
CHAINAGE:

PHOTO NOS:

A. GENERAL DATA

Method of Survey: Aerial survey

Length of Stream Surveyed: From the R/W to Mackenzie

Drainage Area Classification: Drains both high and low relief spruce stands. (Drainage area - 3.6 sq. miles).

Distance of R/W from Mackenzie: Approx. 1.5 miles

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Poor, minimal flow

Channel Types: Well defined

Bottom Type (General): Boulder

Duration of Flow: Still flowing October 1, 1973

B. DESCRIPTION: - DISTURBANCES

Mile 523.8 is a small clear stream in a narrow channel originating in high and low relief spruce forests. Near the Mackenzie the creek enters a gully and flows down a steep gradient. Heavy erosion occurs above the entrance causing much siltation. Accumulations of litter and debris are common throughout the channel.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date: June 4 June 24 July 6

Location: Aerial Aerial Aerial

Depth (ft.):

Width (ft.):

Bottom Type (%): 80% Gravel
20% Debris

Colour: Clear

TEMPERATURE

Air ($^{\circ}\text{C}$):Water ($^{\circ}\text{C}$):WATER
ANALYSIS

Vel. (fps):

Disc. (cfs):

Secchi (cm):

D.O. (ppm):

Conductivity
($\mu\text{mhos @ }^{\circ}\text{C}$):

PH:

Alkalinity
(grains/gal):

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
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No fish sampling done due to lack of accessibility.

E. FISH POTENTIAL

The steep, debris-clogged channel, heavily silted entrance and shallow flow suggests a minimal fishery potential.

F. POTENTIAL HIGHWAY IMPACTS

None evident.

G. RECOMMENDATIONS

Follow general construction guidelines.

MILE: 526.9 NAME:
CHAINAGE:

PHOTO NOS:

A. GENERAL DATA

Method of Survey: Ground survey at CNT

Length of Stream Surveyed: 200' at CNT

Drainage Area Classification: Drains predominantly low relief spruce in hills above the R/W. (Drainage area - 1.2 sq. miles).

Distance of R/W from Mackenzie: 0.5 miles

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Poor

Channel Types: Well channelled at CNT

Bottom Type (General): Rocks, gravel and sand

Duration of Flow: Still flowing October 2, 1973

B. DESCRIPTION: - DISTURBANCES

The water is clear and free running above the CNT line. Numerous debris jams interrupt flow at the CNT and in the lower reaches of the creek. The entrance from the Mackenzie is steep, shallow and diffused.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date:	June 29	October 2
Location:	CNT	60' above CNT
Depth (ft.):	.4	.18
Width (ft.):	4.1	3.0
Bottom Type (%):	50% Gravel 50% Sand	80% Gravel 20% Organic
Colour:	Tea	Tea

TEMPERATURE

Air ($^{\circ}\text{C}$):	8.0
Water ($^{\circ}\text{C}$):	2.0

WATER
ANALYSIS

Vel. (fps):	.7	.80
Disc. (cfs):	1.2	.43
Secchi (cm):		Clear
D.O. (ppm):		13.7
Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):		170@2.0
PH:		8.5
Alkalinity (grains/gal):		8

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
October 2	E.F./seine			
	Above road	Nil		
	Below road	Nil		

E. FISH POTENTIAL

Piles of debris throughout the channel and the steepness of the gradient are the prime factors contributing to the minimal fisheries potential of this stream.

F. POTENTIAL HIGHWAY IMPACTS

None evident.

G. RECOMMENDATIONS

Follow general construction guidelines.

MILE: 528.3 NAME:
CHAINAGE:

PHOTO NOS:

M26K196-1A, 2A
M26K201-26A, 27A

A. GENERAL DATA

Method of Survey: Ground survey at R/W

Length of Stream Surveyed: 150' at R/W

Drainage Area Classification: Drains low-high relief spruce area just north of Mt. Clark. (Drainage area - 16.3 sq. miles).

Distance of R/W from Mackenzie: 0.5 miles

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Good

Channel Types: Well defined

Bottom Type (General): Rock and gravel

Duration of Flow: Still flowing September 30, 1973

B. DESCRIPTION: - DISTURBANCES

The stream at Mile 528.3 is well defined, flowing through a deep gorge. The bottom substrate is 100% rock and gravel, with alternating pool and riffle areas. The one major obstruction occurs at the winter road crossing, where the water flows over a log pile, creating two vertical drops of approximately 18 inches each.

C. SAMPLE LOCATION DATA

LOCATION DATA	Date:	June 4	July 6	Aug. 19
	Location:	CNT	Mouth	Mouth
	Depth (ft.):	.8	.5	.6
	Width (ft.):	10	18.7	13.6
	Bottom Type (%):	40% gravel 60% boulder	95% boulder 5% silt	15% gravel 80% rock 5% boulder
	Colour:	Tea	Tea	Tea
TEMPERATURE	Air ($^{\circ}\text{C}$):	19.0		
	Water ($^{\circ}\text{C}$):	12.5		8.6
WATER ANALYSIS	Vel. (fps):	2.5	1.5	5
	Disc. (cfs):	20	14	40.8
	Secchi (cm):	Clear		Clear
	D.O. (ppm):	14		10.6
	Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):	220@12.5		169@8.6
	PH:	8		8.75
	Alkalinity (grains/gal):	7		9

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date: September 30

Location: R/W

Depth (ft.): .8

Width (ft.): 15.0

Bottom Type (%): 100% rock and gravel

Colour:

TEMPERATURE

Air ($^{\circ}\text{C}$): 10.0

Water ($^{\circ}\text{C}$): 3.0

WATER
ANALYSIS

Vel. (fps): 1.8

Disc. (cfs): 21.6

Secchi (cm): Clear

D.O. (ppm): 13.2

Conductivity
($\mu\text{mhos @ }^{\circ}\text{C}$): 175 @ 3.0

PH: 8.75

Alkalinity
(grains/gal): 8

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 4	E.F./seine	Longnose Dace	Imm.	141
		Grayling	1 - Imm.	145
			2 - Imm.	99
September 30	E.F./seine	Lake Chub	Imm.	71
		Northern Pike	Imm.	192
		Grayling	1 --	120
			2 --	87
			3 --	84
			4 --	83
			5 --	80
			6 --	78
			7 --	66
			8 --	62
			9 --	58

E. FISH POTENTIAL

The fish potential of this stream is high. A predominant rock and gravel bottom and good channel access as well as a relatively constant rate of flow contribute to a high stream potential. Immature forms of grayling caught on September 30th suggest good spawning capabilities for that species. The latter were found just below the winter road crossing, and since no sampling was done above the blockage it is not known whether fish exist above this point. It is likely, however, that spawners passed the block during the high water period to reach the spawning grounds.

F. POTENTIAL HIGHWAY IMPACTS

Due to steep banks, siltation and debris deposition could occur, blocking the channel or destroying the bottom substrate.

G. RECOMMENDATIONS

Remove winter road debris.

Contingency plans to avert increments in suspended sediment loads.

MILE: 533.7 NAME: Little Smith Creek
CHAINAGE:

PHOTO NOS:

371.

A. GENERAL DATA

Method of Survey: Ground survey

Length of Stream Surveyed: R/W area

Drainage Area Classification: Originates at base of Mt. Clark, flowing through McConnell Range to Mackenzie terrace (mainly low relief spruce). (Drainage area - approximately 144 sq. miles).

Distance of R/W from Mackenzie: Approx. 1.5 miles

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Good

Channel Types: Well defined, meandering

Bottom Type (General): Rock, gravel and sand

Duration of Flow: March survey - frozen over. Probably flows all year long.

B. DESCRIPTION: - DISTURBANCES

The Little Smith, one of the larger rivers in the study section, follows a defined, generally meandering course through a small valley cut in a plain above the Mackenzie. The valley is wide with shallow banks. Some meanders have cut right to the valley walls. No significant disturbances are visible.

Northern Engineering Services found a pH range of 8.0 - 8.3 and a conductivity of 195 - 275. No domestic fisheries exist.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date: September 30

Location: R/W - North Channel

Depth (ft.): 0.9

Width (ft.): 30

Bottom Type (%): 75% rock
25% sand

Colour: Clear

TEMPERATURE

Air ($^{\circ}\text{C}$): 10.0Water ($^{\circ}\text{C}$): 4.5WATER
ANALYSIS

Vel. (fps): 2.2

Disc. (cfs): 59.6

Secchi (cm): Clear

D.O. (ppm): 12.6

Conductivity
($\mu\text{mhos @ }^{\circ}\text{C}$): 185 @ 4.5

PH: 8.75

Alkalinity
(grains/gal): 8

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
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No fish were sampled by F.F. Slaney in accord with previous agreements.

Northern Engineering Services Ltd. in their sampling program, observed the following eight species: grayling, round whitefish, pike, lake chub, flathead chub, longnose sucker, slimy sculpin and Salvelinus species.

E. FISH POTENTIAL

All data indicate a high fishery potential for this stream. Upstream runs of most of the above species to summer feeding areas can be expected. The river is important to grayling for spawning, as well as longnose sucker and lake chub.

F. POTENTIAL HIGHWAY IMPACTS

Both increases in siltation and water velocity may occur near the bridge site during spring runoff. Siltation could result during approach construction (particularly on the south side where fill will be placed or through surface runoff). Faster water velocities would result from reduced maximum channel width and near the midstream. The pier would be on a bar which is dry at low water.

G. RECOMMENDATIONS

Encroachment into active channel should be avoided by scheduling pier and span erection during low water periods.

MILE: 546.2 NAME:
CHAINAGE:

PHOTO NOS:

374.

M26K194-27
M26K202-8

A. GENERAL DATA

Method of Survey: Ground survey on R/W

Length of Stream Surveyed: 200' at R/W

Drainage Area Classification: Originates in Cleaver Lake, flowing through low relief spruce forest and marsh. Empties into Big Smith River at R/W. (Drainage area - 28.0 sq. miles).

Distance of R/W from Mackenzie: 3.0 miles

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Good

Channel Types: Mostly well defined, but poorly defined in some areas

Bottom Type (General): Sand, silt and organic

Duration of Flow: Still flowing September 30, 1973

B. DESCRIPTION: - DISTURBANCES

The drainage parallels the R/W between Mile 544.0 and Mile 545.0 and links Cleaver Lake to Big Smith Creek. It flows through a gradually sloping area of spruce forest and marshy zones. The channel is divided in the more heavily wooded areas. The bottom substrate seems to be primarily silt and sand, with some organic debris in the forested areas. No major migration obstructions are evident.

C. SAMPLE LOCATION DATA

LOCATION DATA	Date:	June 9	Aug. 19	Sept. 30
	Location:	CNT-R/W	CNT-R/W	R/W
	Depth (ft.):	2.5	1.1	.88
	Width (ft.):	25	10	5.0
	Bottom Type (%):	80% sand 20% gravel	15% gravel 45% organic 40% silt	70% sand 30% organic
	Colour:	Tea	Tea	
TEMPERATURE	Air ($^{\circ}\text{C}$):	16.0	11.9	
	Water ($^{\circ}\text{C}$):	16.0	8.3	4.0
WATER ANALYSIS	Vel. (fps):	1.7	.4	.72
	Disc. (cfs):	104.3	4.4	3.2
	Secchi (cm):	150	Clear	Clear
	D.O. (ppm):	7.9	11.6	12.8
	Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):	195 @ 16.0	760 @ 8.3	240 @ 4.0
	PH:	7.5	8.25	8.0
	Alkalinity (grains/gal):	6	13	6

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 9	E.F./seine	Nil	--	--
Sept. 30	E.F./seine	Grayling		
		1	Imm.	74
		2	Imm.	70
		3	Imm.	56

E. FISH POTENTIAL

The catch frequency during the sampling period suggests a moderate fishery potential. Although grayling was the only species captured, the system may well support other species which are often found in lake-marsh habitats: pike, sticklebacks, lake chub and other cyprinids.

F. POTENTIAL HIGHWAY IMPACTS

Because the R/W parallels this stream for several hundred yards rather than crossing it at one point, there is a high possibility for impact. The system seems particularly susceptible to siltation of potential spawning areas.

G. RECOMMENDATIONS

Follow general construction guidelines. Leave an adequate vegetated buffer zone between creek and R/W where both lie in close proximity.

MILE: 546.3 NAME: Big Smith Creek
CHAINAGE: INTENSIVE STUDY STREAM

PHOTO NOS:

377.

A. GENERAL DATA

Method of Survey: Aerial and ground survey

Length of Stream Surveyed: R/W to mouth

Drainage Area Classification: Drainage originates in a bog and swamp area and flows through alternating low relief spruce forest and bog before falling into a steep canyon four miles from the Mackenzie. (Drainage area - 613 sq. miles).

Distance of R/W from Mackenzie: 4.0 miles

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Good

Channel Types: Single channel, non-mountain river flowing for 2 miles through a steep limestone canyon immediately below the R/W.

Bottom Type (General): Bedrock shale, rock and coarse gravel

Duration of Flow: Appears to flow year-round

B. DESCRIPTION: - DISTURBANCES

The unique canyon and associated waterfalls of Big Smith Creek offer one of the highest recreation potentials of all rivers in the 250 mile study area. While fish do occur above the falls, data is limited making an estimate of sport fishing potential difficult. Access for fish from the Mackenzie to the upper reaches of Big Smith is restricted by several falls in the canyon region. Recruitment of upper stream fish population probably occurs from associated marsh and lake complexes. The overfishing of stocks above the falls is a potential hazard. Previous studies by the Fisheries Service indicated that the stream sections below the falls serve as potential spawning and nursery areas for such species as grayling, chub and whitefish.

C. SAMPLE LOCATION DATA

LOCATION DATA	Date:	June 29	July 6	August 19	September 30
	Location:	R/W	R/W	R/W	R/W
	Depth (ft.):		1.1		1.0
	Width (ft.):		60		60
	Bottom Type (%):	90% Shale 10% Sand			100% Rock & Gravel
	Colour:	L. Tea	L. Tea	L. Tea	L. Tea
TEMPERATURE	Air ($^{\circ}\text{C}$):	13.0	16.4		10.0
	Water ($^{\circ}\text{C}$):	15.0	16.0	10.5	4.0
WATER ANALYSIS	Vel. (fps):		1.6		2.9
	Disc. (cfs):		105.6		174.0
	Secchi (cm):	Clear	Clear	Clear	Clear
	D.O. (ppm):		9.7	10.6	12.9
	Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):	790@15.0	720@16.0	200@10.5	290@4.0
	PH:	8.7	8.65	7.75	8.5
	Alkalinity (grains/gal):	8	8.0	4	4

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 29	E.F./seine	Grayling	Imm.	30
	Observed	9 Fry - Species unknown		
	Fly fishing and spin casting	Grayling		150
				386
July 6	50' Beach seine above R/W	Northern Pike		380
		Grayling	Imm.	60
August 19	Beach seine 50' above R/W			

E. FISH POTENTIAL

Big Smith Creek has a possible sport fishery potential. However, limited data on species complement, recruitment rates and current fish population precludes an accurate description of the fish support capabilities of such a river. The several water falls reduce this stream's overall fish potential.

Previous surveys by Inter-Disciplinary Systems Ltd. and Fisheries Service identified the following species in Big Smith Creek: Mountain whitefish, grayling pike, lake chub, slimy sculpin, longnose sucker and trout-perch. Most of these species were identified below the falls. All sampling by F.F. Slaney personnel was done above the falls.

F. POTENTIAL HIGHWAY IMPACTS

The suspected slow recruitment rate above the falls and extreme water clarity make Big Smith Creek highly susceptible to high increases in suspended sediment load. Fishing by construction personnel and/or tourists should be strictly regulated.

G. RECOMMENDATIONS

A possible park status on the lower reaches of Big Smith would be beneficial in regulating fish stocks and public use. All efforts should be made to minimize siltation due to bridge construction.

MILE: 548.9 NAME:
CHAINAGE:

PHOTO NOS:

M26K194-15,16
M26K202-3,4,5,6
M26E135-1,2,3,4

A. GENERAL DATA

Method of Survey: Aerial and ground surveys

Length of Stream Surveyed: R/W to Mackenzie

Drainage Area Classification: Originates in a series of lakes, marshes and low relief spruce forest above the R/W and flows into large lake above CNT before dropping into Mackenzie. (Drainage area - 8.0 sq. miles)

Distance of R/W from Mackenzie: 1 mile

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Poor

Channel Types: Poorly defined channel between two lakes at R/W

Bottom Type (General): Organic

Duration of Flow: Still flowing September 30, 1973

B. DESCRIPTION: - DISTURBANCES

This system of lakes and marshes create a poorly defined channel with organic substrate and suspended sphagnum moss near the surface. The entrance to the Mackenzie is steep. No disturbances are present.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date:	June 9	Aug. 19/Sept. 30
Location:	R/W	Aerial
Depth (ft.):	.6	Still flowing
Width (ft.):	5	
Bottom Type (%):	90% organic	
Colour:	Tea	

TEMPERATURE

Air ($^{\circ}\text{C}$):	17
Water ($^{\circ}\text{C}$):	18.0

WATER
ANALYSIS

Vel. (fps):	.8
Disc. (cfs):	2.3
Secchi (cm):	150
D.O. (ppm):	7.2
Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):	110@18.0
PH:	6.75
Alkalinity (grains/gal):	4

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 9	E.F./Seine	Nil		

E. FISH POTENTIAL

The steep and diffuse entrance from the Mackenzie indicates a low fish potential.

F. POTENTIAL HIGHWAY IMPACTS

None evident.

G. RECOMMENDATIONS

Follow general construction guidelines.

MILE: 551.4 NAME:
CHAINAGE:

PHOTO NOS:
M26K194-17,18,21,25,26

A. GENERAL DATA

Method of Survey: Ground survey on CNT. 100 yd. below R/W

Length of Stream Surveyed: 100' on ground, to Mackenzie by air

Drainage Area Classification: Drains low relief spruce and deciduous stands with numerous lakes and marshes above R/W. (Drainage area - 8.5 sq. miles)

Distance of R/W from Mackenzie: 1.5 miles

Creek Entrance into Mackenzie: Definite entrance

Accessibility for Fish at Mackenzie Entrance: Poor

Channel Types: Well defined

Bottom Type (General): Sand and silt

Duration of Flow: Still flowing Sept. 30, 1973

B. DESCRIPTION: - DISTURBANCES

The shallow stream flows through a steep-sided gully with numerous fallen trees and solifluction flows obstructing fish migration. Erosion of the unstable banks has produced silt substrates and a wide alluvial fan at the mouth.

C. SAMPLE LOCATION DATA

LOCATION
DATA

Date:	June 9	Aug. 19	Sept. 30
Location:	CNT	R/W	CNT
Depth (ft.):	.9	.6	.7
Width (ft.):	5	2.7	2.5
Bottom Type (%):	90% silt	75% sand 25% silt	70% sand and silt 30% organic
Colour:	tea	tea	

TEMPERATURE

Air ($^{\circ}\text{C}$):	12.0	9.0	7.0
Water ($^{\circ}\text{C}$):	11.0	9.0	2.0

WATER
ANALYSIS

Vel. (fps):	.9	1.3	1.1
Disc. (cfs):	4.2	2.0	1.9
Secchi (cm):	7.5	Clear	Clear
D.O. (ppm):	6.5	11.3	13.6
Conductivity ($\mu\text{mhos @ }^{\circ}\text{C}$):	115@11.0	103@9.0	70@2.0
PH:	8	7.5	7.5
Alkalinity (grains/cal):	6	5	4

D. FISH DATA

DATE	SAMPLE TECHNIQUE	SPECIES	MATURITY	LENGTH (mm)
June 9	E.F./Seine	Nil		

E. FISH POTENTIAL

Fishery potential is minimal since this highly silted and debris laden creek is probably unsuitable and impassible for fish.

F. POTENTIAL HIGHWAY IMPACTS

Further deterioration of this creek is unlikely from highway construction.

G. RECOMMENDATIONS

Follow general construction guidelines.

APPENDIX 203

1973 FISH SAMPLING PERMIT



Environment
Canada

Environnement
Canada

Fisheries

Pêches

Your file Votre dossier

716-32-6
Our file Notre dossier

May 10, 1973

Mr. D.H. Duncan
F.F. Slaney & Co.
402 West Pender Street
VANCOUVER 3, British Columbia

Dear Sir:

Permission is hereby granted, under Section 4 of the Fisheries Act, for the following persons:

Dr. C.D. Gordon, F.F. Slaney & Co., Vancouver
Mr. J.F. Maher
Mr. R. Young
Mr. W.E. Bengeyfield

to take fish from waters designated in Section 1 below in accordance with further conditions specified in Sections 2 to 8 inclusive.

Section 1 - Waters included in the Permit

- a. On the west side of the Mackenzie Valley, Northwest Territories:

Streams which cross the cleared right-of-way for the Mackenzie Highway between Fort Simpson and the crossing of the Mackenzie River near Burnt Island (being Mile 297 to 345 of the highway route).

- b. On the east side of the Mackenzie Valley, Northwest Territories:

Streams which cross the surveyed right-of-way for the Mackenzie Highway, and lakes lying within two miles of the right-of-way, between the Mackenzie River crossing and Big Smith Creek inclusive (being Mile 345 to 550 of the highway route).

Section 2 - Waters specifically excluded from sampling of fish

No fishing operations shall be undertaken in the following waters:

Martin River, Secret Creek (Mile 320), Willowlake River, River Between Two Mountains, Hodgson Creek, Whitesand Creek, Blackwater River, Steep Creek, Saline River and Little Smith Creek.

Section 3 - Means of Capture

Fish may be taken by seines, dip nets, minnow traps, drift nets and electrofishing apparatus. Streams in which the above techniques have not yielded fish may be sampled with gill nets. Lakes may be sampled with seines and gill nets. Streams which are proposed to be crossed by the highway using a culvert, and in which the above mentioned methods have not yielded fish, may be tested with high explosive 'Primacord' or equivalent, under the following conditions:

- a. Only locations in streams upstream from the surveyed highway route may be so tested.
- b. High explosive may be used only on the same day that seining or electrofishing the specific location has failed to catch fish.
- c. A detailed log shall be kept of each shot fired, recording location, size of charge, area of stream affected and result. This log shall be available for inspection by a Fishery Officer at any time the crew is working, and shall be filed with the program report required in Section 7 below.

Section 4 - Limitation on the number of fish killed

In streams generally, fishing shall be undertaken by methods normally not lethal to fish; and fish shall be returned to the water alive and unharmed. Fish killed incidentally may be retained as specimens. Methods normally lethal to fish shall only be used when the first methods have failed to catch fish. Up to five streams may be selected for intensive study. Specimens may be obtained from these streams for physiological studies. In lakes, fishing effort by gill net shall be limited to a total of 250 feet of gill net set for 24 hours per lake.

Section 5 - Fish not to be sold

Fish taken under this Permit are not to be sold and are not to enter commercial channels in any way.

Section 6 - Notification of Department

Prior to commencement of fishing, each field party is to report their presence in the field to a Fishery Officer. The Fisheries and Marine Service representative is Mr. G.T. Glazier, District Administrator, P.O. Box 2310, Yellowknife, Northwest Territories.

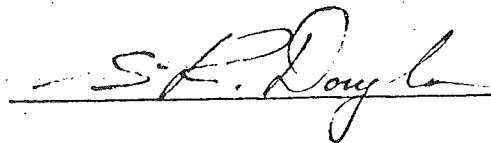
Section 7 - Report of the work

By accepting this Permit, the permittees agree to supply Fisheries and Marine Service, Department of the Environment, Winnipeg, Manitoba, with a progress report tabulating the capture data, together with a map marked to identify all sample stations, within one month of the expiry date of the Permit; and to supply the Department with a copy of the final report when it is prepared. The final report is to include:

- a. tabulated fisheries data, and
- b. biological interpretation of fisheries data.

Section 8 - Expiry of the Permit

This Permit expires on December 31, 1973.


Signature

Director, Fisheries and Marine Service
Operations, Central Region Title

May 10, 1973
Date