
Reconnaissance Level Fish and Fish Habitat Inventory in the Bulkley T.S.A.

(Working Unit #11 - Zymoetz)

Volume 1

Reconnaissance Level Fish & Fish Habitat Inventory in the Bulkley TSA Working Unit #11 – Zymoetz (Volume 1)

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Pacific Inland Resources Smithers, BC Triton Environmental Consultants Ltd Richmond, BC 1998



TRITON
Environmental Consultants Ltd.

Reconnaissance Level Fish and Fish Habitat Inventory in the Bulkley T.S.A.

(Working Unit #11 - Zymoetz)

Prepared for:

Pacific Inland Resources (FRBC)

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EXECUTIVE SUMMARY

Triton Environmental Consultants Ltd. was retained by Pacific Inland Resources (PIR) in partnership with the Ministry of Environment, Lands and Parks (MELP) in Smithers to conduct reconnaissance level fish and fish habitat inventories in the Bulkley Forest District. This report summarizes the historical fisheries data collected by SKR Consultants Ltd and the field data collected by Triton survey crews in working unit 11. The historical information indicates the presence of the following species in this working unit:

- coho (*Oncorhynchus kisutch*)
- sockeye (*O. nerka*)
- pink (*O. gorbuscha*)
- steelhead and rainbow trout (*O. mykiss*)
- mountain whitefish (*Prosopium williamsoni*)
- peamouth chub (*Mylocheilus caurinus*)
- longnose sucker (*Catostomus catostomus*)
- cutthroat trout (*O. clarkii*)
- prickly sculpin (*Cottus asper*)
- northern squawfish (*P. oregonensis*)
- Dolly Varden (*Salvelinus malma*)

A total of 306 sites were sampled between July 25 and October 2 1996 and July 7 and September 20 1997. Fifteen sites were classified as "Not A Creek" due to the lack of a defined channel. Fish were captured by electrofishing at 112 sites, the species sampled include Dolly Varden, rainbow trout, cutthroat trout, bull trout (*S. confluentus*), coho and an unidentified sculpin species. A total of 50 sites were classified as S5 or S6, the basis for the non fish bearing status is summarized. The report also includes recommendations for resampling in reaches where fish use is likely but no fish were caught.

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1.0 INTRODUCTION

1.1 Background

Pacific Inland Resources Ltd, retained Triton Environmental Consultants Ltd. (Triton) to conduct a reconnaissance level fish and fish habitat inventory in 14 watersheds located in the Bulkley Forest District. Existing information on fish distribution within the watersheds under investigation, was collected by SKR Consultants Ltd, in Smithers, B.C. Data from provincial and federal government sources such as the Stream Information Summary System (SISS) and the Fisheries Information Summary System (FISS) were researched for information. Stream classification is now required under the Forest Practices Code (FPC) of British Columbia Act (Bill 40 - 1994) and the associated Operational Planning Regulation enacted in June 1995, and is used to determine the required width of appropriate riparian management areas. This report summarizes historical and field data collected for working unit 11 (see Figure 1). The historical records indicate the presence of the following species in the study area:

- coho
- sockeye
- pink
- steelhead and rainbow trout
- mountain whitefish
- peamouth chub
- longnose sucker
- cutthroat trout
- prickly sculpin
- northern squawfish
- Dolly Varden

1.2 Objectives

Triton's goals were to describe fish distributions and habitat characteristics, and to provide stream classifications according to the Forest Practices Code. Fish and fish habitat operational inventories consist of:

- reconnaissance-level surveys aimed at characterizing fish habitat and distribution;
- identification of fish and fish habitat values that require special designation under the Forest Practices Code (e.g. sensitive areas); and
- new, reinterpreted, or augmented data to meet Forest Practices Code requirements for classification of areas (e.g. fish stream classification).

2.0 STUDY AREA

2.1 Location

The Bulkley Forest District is located in north central BC and contains several major tributaries to the Babine and Bulkley Rivers. The 1: 20 000 TRIM sheets covering unit 11 are: 93 L 062, 93 L 071, 93 L 072, 93 L 073, 93 L 074, 93 L 082, 93 L 083, 93 L 084. This large working unit covers roughly 1000 km² and comprises 12.7% of the study area. The upper Zymoetz River, which has been classified as (Fisheries Class I waters) defines the boundary of this working area. Historical fisheries information for this unit covers the mainstem of the Zymoetz, from the Bulkley forest district boundary up to and including the headwaters, Dennis and Aldrich Lakes. Fish presence has also been documented in some of the tributaries to the Zymoetz River, including the unnamed creeks draining into the south side of the upper Zymoetz near Dennis and Aldrich Lakes, (440-9447-000) and (440-9648-000), Silvern Creek (up to and including Silvern Lake), Passby Creek (lower 5km), Hankin Creek (up to and including Hankin Lake), Sandstone Creek (up to and including Sandstone Lake), Coal Creek up to and including Louise Lake, unnamed creek (440-6382-000) and Red Canyon Creek (Saimoto 1996). The streams inventoried in this working unit include:

- Coal Creek (440-7411-000)
- Henderson Creek (440-9871-000)
- Mulwain Creek (440-6382-000)
- Passby Creek (440-8930-000)
- Red Canyon Creek (440-6208-000)
- Sandstone Creek (440-7670-000)
- Serb Creek (460-8150-000)
- Silvern Creek (440-90553-000)
- White Swan Creek (440-9871-263)

2.2 Access

Road access exists for the lower reaches for some of the streams draining into the northern shores of Aldrich, Dennis and McDonell Lakes and the Zymoetz River downstream to Sandstone Creek (Saimoto 1996). Lower Serb Creek and the tributaries draining into the southern shores of Dennis and McDonell lakes are also accessible by road. The uppermost reaches of Serb Creek, Red Canyon Creek, Mulwain Creek and some of the large unnamed tributaries to the Zymoetz require helicopter access. Road access was available for some of the Mulwain Creek system, however the upper reaches of most of the Mulwain were accessed by helicopter.

2.3 Resource Use

Logging is the dominant resource activity in this working unit and a number of forest recreation sites are found off of the McDonnell F.S.R. Mineral deposits have also been noted in the Mulwain system.

3.0 METHODS

3.1 Physical

Prior to the start of the field program 1:20,000 TRIM maps were used to estimate the location of reach breaks, as needed to identify potential sampling sites. The locations of these reach breaks were subsequently confirmed or modified during the field studies.

The survey was conducted by a ten person field crew working in five teams in 1996, and an eight person field crew working in four teams in 1997. Sites at the top of the watershed were sampled first to determine fish presence whenever possible. DFO/MELP Stream Inventory Survey forms were filled out for each site (Department of Fisheries and Oceans and Ministry of Environment, 1989). Channel widths were measured with meter sticks, hip chains and measuring tapes or were visually estimated where wading conditions were dangerous. Water depth was measured with a meter stick. Stream classification, whether fish bearing or non fish bearing, requires the measurement of a minimum of six channel widths. Stream gradients were measured with a Suunto clinometer. In order to allow for future verification of sampling sites, all sampling sites were permanently marked with unique flagging tape (blue and white striped) and the GPS locations of all sites were noted.

Photos were taken at each site to document field data and conditions. Canon Sure Shot A1 Prima AS-1 cameras were used for this purpose. The camera is equipped with a 32 mm lens. Photos were usually taken of both the upstream and downstream view of the stream and any characteristic features such as beaver dams, falls and cascades were documented. Photos were often taken of fish captured at the site. The film used was 200 ISO. All of the fish, feature and site photos are included with the sub basin description in the results and discussion section. A summary of photodocumentation in Unit 11 is provided in Appendix 2

The report maps were generated using 1:20,000 scale TRIM base maps provided by MELP. Using ARC Info, these files were projected into UTM and coverages were created from the field sampling and stream classification data.

3.2 Biological

Triton obtained fish sampling permits from the appropriate DFO and MELP offices. Fish presence/absence was determined by electrofishing and/or minnow trapping and occasionally angling. Electrofishing was conducted, where possible, at all sites where fish presence had not been determined upstream or habitat characteristics were sufficiently different from other sites. A minimum area of approximately 100 m² was sampled to ascertain fish presence. The effort, (shocking time and distance shocked) was recorded for each sample site. A variety of electroshocker models were used in this study including:

- Smithroot 12 B POW
- Smithroot Type VII
- Smithroot 15 A
- Coffelt Mark 10

The electroshockers were usually set at 60HZ at 6MS, however adjustments were made where appropriate. Salt was not used at any of the sample sites. The fork length of each fish collected was then measured and, whenever necessary, voucher specimens were collected and stored in a 10% formaldehyde solution in plastic bags. These specimens were delivered to the Smithers office of BC Environment. Where necessary, the Field Key to Freshwater Fishes of British Columbia (RIC Manual 1993) was used to identify fish to species. Additionally, bull trout were distinguished from Dolly Varden by a branchiostegal ray count and /or the Bull Trout and Dolly Varden LDF Identification Formula (Haas and McPhail 1991).

The data collected from existing sources and during the field program were used to determine the riparian class as defined under the *Forest Practices Code*. **Table 1** shows the FPC definition of each riparian class. Draft procedures are also outlined in the guidebook to determine the riparian management areas (RMA) for lakes (L1 - L4), wetlands (W1 - W5) and fisheries sensitive zones.

4.0 STREAM FLOW AND WATER QUALITY

4.1 Stream Flow

There are no Water Survey of Canada (WSC) gauging stations located within the boundaries of Unit 11.

4.2 Water Quality

As agreed with the Ministry Representative, water samples were not collected for chemical analyses. The parameters that were measured for each site, however, pH

temperature and conductivity. Conductivity was measured with a handheld Hanna TDS Tester #3 and a Hanna Conductivity TDS #3. The pH was measured with a handheld Hanna pH meter 3#, an Oakton pH Tester #2 and a Hanna HI9024 Microcomputer pH meter, low pH Regents Accutron" Water Test System.. Water temperature was measured with a Weksler general purpose thermometer. Turbidity was determined subjectively and it was stipulated by the ministry representative during the quality assurance phase of the project that the depth of the deepest pool would be the default value in the database when the water was clear to the bottom.

Table 2 summarizes the pH, temperature and conductivity measurements collected in this inventory.. Water temperatures during this period ranged between 1 and 20°C, with an average value of 7.87°C . The pH values ranged from 5.9 to 8.8, with an average pH of 7.52. The conductivity ranged from 10 to 210 (umhos/cm) with an average value of 60.40.

5.0 RESULTS AND DISCUSSION

The survey took place between July 25 and October 2 1996 and July 7 and September 20 1997. A total of 306 sites were sampled and only 15 sites were classified as "Not a creek" due the absence of a defined channel. Fish were caught at a total of 112 sites and a total of 50 reaches were classified as non fish bearing S5 or S6. A number of reaches in this survey were classified as non fish bearing due to the absence of resident populations of fish, above barriers identified by survey crews. A summary of the barrier data collected in unit 11 is provided in **Table 3**. The summary information for all sites in working unit 11 is listed in **Table 4**. This table is organized alphabetically, by sub-basin and includes fish data, stream classifications and methods of sampling. The stream cards and accompanying photos are also in alphabetical sub basin order and the appropriate cards and photos appear in this report after each sub-basin description. A summary of non fish bearing classifications established in this working unit are listed in **Table 5** and a summary of the sites for which future sampling is recommended is provided in **Table 6**. A summary of wildlife and wildlife signs observed in unit 11 is provided in **Table 7**. Individual fish data for this working unit have been summarized in Appendix 1. Fish catch data were compiled for all records that contained a discrete size measurement. These data were summarized and plotted in histograms by species, the results are presented in Figures 2a through 2g.

5.1 Coal Creek (440-7411-000) (93 L 082)

5.1.1 Sensitive Habitats and Barriers

The mainstem of Coal Creek is 14.1 km in length and flows southwest from Louise Lake. Coal Creek is characterized by low gradient, periodic confinement and is fed by 33 tributaries. Reaches 1 and 2 have low gradient, are confined and separated by a 2 meter falls, above which fish were caught. Reach 3 is less confined, has low gradient and drains fish bearing Louise Lake, which is reach 4 of this system. Reach 5 is unconfined, and flows through a large wetland. Many of the tributaries to this system contain a number of small lakes, ponds and wetlands which provide additional rearing habitat. The Coal Creek system was sampled at 28 locations, including reaches 1, 3 and 5 of the mainstem and the unnamed tributaries to Louise Lake. The upper reaches of a number of the tributaries as well as reach 5 of the mainstem, are associated with large wetlands that have been identified as fisheries sensitive zones.

5.1.2 Fish Summary Tables and Stream Classification

The historical records indicate the presence of steelhead, coho, cutthroat and rainbow trout at the mouth. Steelhead are also indicated 1.8 km from the mouth while steelhead, coho, Dolly Varden and cutthroat are indicated 2.4 km from the mouth. Dolly Varden, steelhead and rainbow trout have also been documented in Louise Lake, which is reach 4 of Coal Creek. Rainbow trout were caught by electrofishing in reach 1 and cutthroat trout were caught by electrofishing in reach 5. Cutthroat trout were caught by electrofishing in two tributaries to reach one, one tributary to reach 2, two tributaries to reach 3 and in one tributary to reach 5. Dolly Varden were captured by electrofishing in reach 3 and in a tributary to reach 4. Fish were typically caught in the lower reaches of these tributaries, as many have steeper gradient in the upper reaches. This appears to be a highly productive system, with abundant rearing and spawning opportunities. The presence of steelhead in reaches 1 and 4 of Coal Creek makes this system particularly important and perhaps sensitive to development.

The mainstem of Coal Creek was classified as an S2 in reach 1, based on an average channel width of 7.4 meters and the presence of rainbow trout in the sampling area. It was classified as S4 in reaches 3 and 5, based on the presence of fish in the sampling areas and average channel widths of 1.35 and 1.03 meters respectively. The tributaries are S3 and S4 sized streams, with only 13 small reaches classified as non fish bearing based on steep gradient.

Location: E96, Unit 11, 600m SW of Louise Lake.

Stream (Gaz.): Coal Creek

Watershed Code: 440-7411-000-000-000-000-000-000-000-0

Map #: 93 L 082 Reach Length (km): 2.5 MA Date: 22-Jul-97 Time: 9:30 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 5845 60791 Length surveyed (m): 200.0 AE Survey Crew: JLVEM \ \ \ \ \ \ Photos: E-9-12,13,14 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 1.3 MS
 Av. Wet. Width (m): 1.2 MS
 Av. Max Riffle Depth (cm): 5 MS
 Av. Max Pool Depth (cm): 43 MS
 Gradient (%): 1.0 CL
 Pool: 10 Riffle: 10 Run: 80 Other: 0
 % Side Channel: 10-40 GE
 % Debris Area: 5-15 GE
 % Stable: 0 GE

Specific Data

2.2	1.8	1.2	1.3	0.7	0.9
2.0	1.7	1.0	1.1	0.5	1.2
5	7	4	5	5	
40	50	60	39	24	

Obstructions

Cover

Cover Total %: 20 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
30	0	0	10	30	30

Crown Closure %: 0 Aspect: W

Bed Material

Fines	Clay, silt, sand (<2mm):	90	90
Gravels	Small (2-16mm):	10	3
	Large (16-64mm):		7
	Sm. cobble (64-128mm):		0
Larges	Lge cobble (128-256mm):	0	0
	Blder cobble (>256mm):		0
Bedrock		0	0

D90 (cm): 0 Compaction: Medium

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	DV	2	50-80	J	R			EL

Comments

C1: S4
 C2: LS = 1%, RS = 1%
 C3: No fisheries sensitive zones noted.
 C4: The electroshocking effort, using a Smithroot 12 B POW model, set at 1-5-500V, was 319 seconds over 100 meters.
 C5: No additional bank texture information.
 C6: DO was not measured, the water was clear to the bottom. The mean air temperature on this day was 13.8.C.
 C7: This creek flows through a meadow and has moderately compacted clay substrate, deep pools and undercut banks. Good rearing habitat noted at this site.

Discharge

Wetted Width (m): 1.6 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.38 F
 Discharge (m3/s): 0.05 F

Banks

Height (m): 0.2
 % Unstable: 0

Fines Gravels Larges Bedrock

Confinement: UC
 Valley: Channel Ratio 10+
 Stage: H Flood Signs Ht(m): 0.7
 Bars (%): 0 pH: 8.5 Braided: Y
 Water Temp. (°C): 8.5 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 90

Reach Symbol

(Fish) DV

1	D	1.0	9100
---	---	-----	------

(Width, Valley: Channel, Slope) (Bed Material)



Photo #: E-9-12, 22-Jul-97
Site #: E96, Looking upstream at the channel, with willow



Photo #: E-9-13, 22-Jul-97
Site #: E96, Looking downstream at the channel

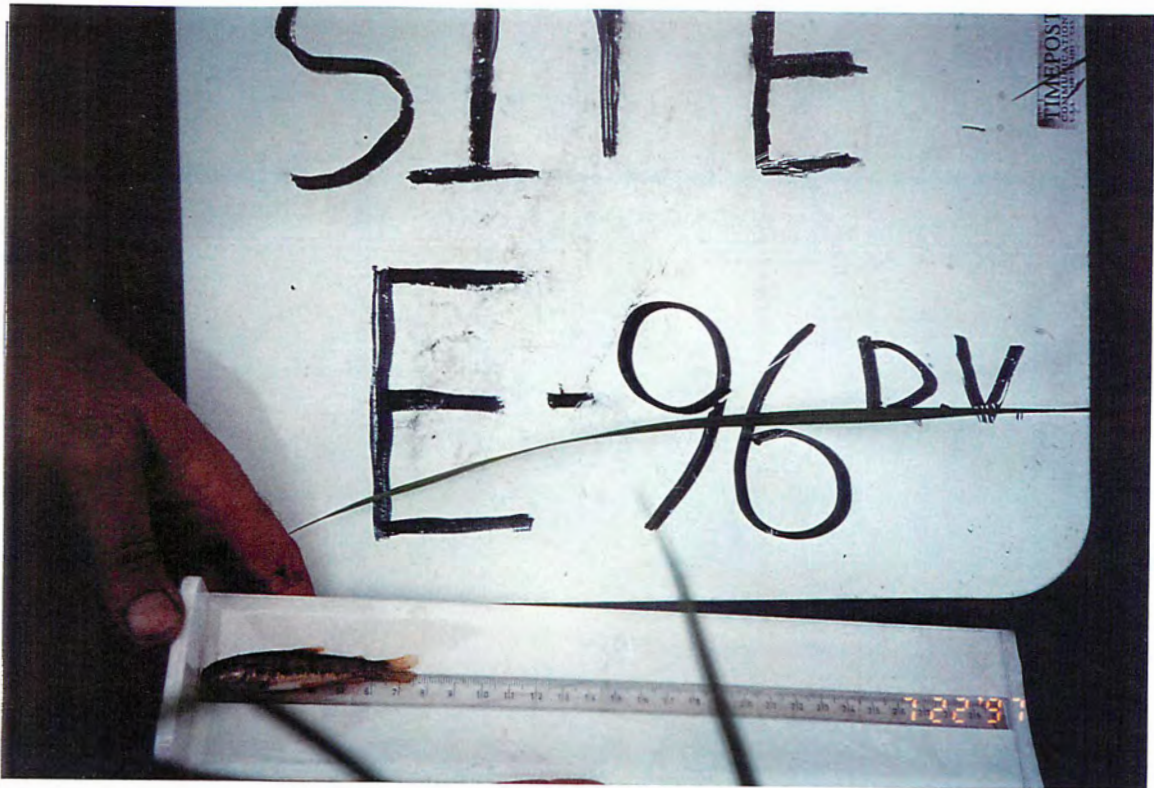


Photo #: E-9-14, 22-Jul-97
Site #: E96, Measuring DV on the fish board

Location: KARLA 36, Unit 11, mainstem site, see C5.

Stream (Gaz.): Coal Creek

Watershed Code: 440-7411-000-000-000-000-000-000-000-0

Map #: 93 L 082 Reach Length (km): 4.4 MA Date: 24-Sep-96 Time: 13:50 Agency: TEC Access: V2 Fish Card: N Field Historical
 U.T.M.: 9 5802 60753 Length surveyed (m): 225.0 GE Survey Crew: JP\KG\ \ \ \ \ \ \ \ Photos: K-4-1,2 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 7.4 MS
 Av. Wet. Width (m): 5.9 MS
 Av. Max Riffle Depth (cm): 12 MS
 Av. Max Pool Depth (cm): 28 MS
 Gradient (%): 6.0 CL
 Pool: 20 Riffle: 40 Run: 25 Other: 15
 % Side Channel: 0-10 GE
 % Debris Area: 5-15 GE
 % Stable: 40 GE

Specific Data

7.2	7.8	8.3	6.9	6.7	7.5
5.8	6.4	7.1	4.6	5.1	6.2
9	11	14	10	14	
20	32	37	16	33	

Obstructions

C	Height (m)	Type	Location

Bed Material

	Fines	Clay, silt, sand (<2mm):	10	10
Gravels		Small (2-16mm):	30	15
		Large (16-64mm):		15
Larges		Sm. cobble (64-128mm):		10
		Lge cobble (128-256mm):	50	15
Bedrock		Blder cobble (>256mm):		25
			10	10

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	RB	2	90-112	J	R			EL

Comments

- C1: S2
- C2: LS = 10%, RS = 24%
- C3: No fisheries sensitive zones were noted at this site.
- C4: The electroshocking effort, using a Smithroot 15 A model was 190 seconds over 177 square meters. Shocking was limited at this site because the shocker was frequently cutting out. A large puncture was noted in the fuel line.
- C5: Lat N 54 49' 09.6", Long W 127 45' 05.5"
- C6: No additional bank texture information.
- C7: DO, pH were not measured at this site. The pH meter was not working at this site. The mean air temperature on this day was 5.5°C
- C8: Some great rearing and spawning habitat were observed at this site.
- C9: The air temperature at this site was 7.C.

Cover

Cover Total %: 35 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnbk
20	15	30	5	20	10

Crown Closure %: 10 Aspect: E

Banks

Height (m): 0.4
 % Unstable: 15

Fines Gravels Larges Bedrock

Confinement: FC
 Valley : Channel Ratio | 2-5
 Stage: L Flood Signs Ht(m): 0.7
 Bars (%): 10 pH: Braided: Y
 Water Temp. (°C): 4.0 O2 (ppm):
 Turb. (cm): 37 Cond. (µmhos): 50

Discharge

Wetted Width (m): 6.1 MS
 Mean Depth (m): 0.2 MS
 Mean Velocity (m/s): 0.56 F
 Discharge (m3/s): 0.51 F

Reach Symbol

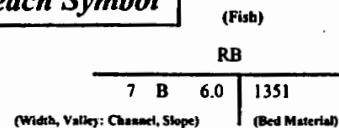




Photo #: K-4-1, 1996/09/24
Site #: K36, Looking upstream, Coal C.



Photo #: K-4-2, 1996/09/24
Site #: K36, Looking downstream, Coal C.



Photo #: Z-18-7, 13-Aug-97
Site #: Z138, Looking downstream at the channel



Photo #: Z-18-8, 13-Aug-97
Site #: Z138, Looking upstream at the channel



Photo #: Z-18-9, 13-Aug-97
Site #: Z138, Measuring fish with the meterstick



Photo #: Z-18-10, 13-Aug-97
Site #: Z138, Measuring fish with the meterstick



Location: Z139, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 039-0200-000-000-000-000-000-000-000-

Map #: 93 L 082 Reach Length (km): 3.0 MA Date: 13-Aug-97 Time: 13:56 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 579628.6075693 Length surveyed (m): 100.0 GE Survey Crew: JP \ KG \ \ \ \ \ \ \ \ Photos: Z-18-11,12,13 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 2.7 MS
 Av. Wet. Width (m): 3.6 MS
 Av. Max Riffle Depth (cm): 5 MS
 Av. Max Pool Depth (cm): 40 MS
 Gradient (%): 6.0 CL
 Pool: 25 Riffle: 45 Run: 30 Other: 0
 % Side Channel: 0-10 GE
 % Debris Area: >15 GE
 % Stable: 60 GE

Specific Data

2.7	3.7	2.0	2.5	2.8	2.4
2.0	2.4	11.8	2.1	1.5	2.0
7	5	3	5		
63	44	33	20	42	

Obstructions

C	Height (m)	Type	Location
	0	C	0.6

Bed Material

	Clay, silt, sand (<2mm):		
Fines		20	20
Gravels	Small (2-16mm):	40	15
	Large (16-64mm):		25
	Sm. cobble (64-128mm):		25
Larges	Lge cobble (128-256mm):	40	15
	Blder cobble (>256mm):		0
Bedrock		0	0

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	CT	20	35-110	J	R			EL
	DV	12	60-130	NA				EL

Comments

- C1: S3
- C2: LS=1%, RS=1%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 500V, was 258 seconds over 100 meters.
- C5: No additional bank texture information.
- C6: DO and water temperature was not measured at this site, the water was clear to the bottom. The air temperature at this site was 28.5 C.
- C7: This is great rearing and spawning habitat; some nice deep pools and LOD cover.

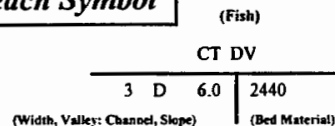
Cover

Cover Total %: 45 GE
 Pool LOD Bldr In Veg O Veg Ctbk
 25 30 0 0 30 15
 Crown Closure %: 60 Aspect: E

Discharge

Wetted Width (m): 1.9 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.18 F
 Discharge (m3/s): 0.03 F

Reach Symbol



Banks

Height (m): 0.3
 % Unstable: 0
 Fines Gravels Larges Bedrock
 Confinement: UC
 Valley : Channel Ratio 10+
 Stage: M Flood Signs Ht(m):
 Bars (%): 25 pH: 7.0 Braided: Y
 Water Temp. (°C): 02 (ppm):
 Turb. (cm): Cond. (µmhos): 90



Photo #: Z-18-11, 13-Aug-97
Site #: Z139, Looking downstream at the channel



Photo #: Z-18-12, 13-Aug-97
Site #: Z139, Looking upstream at the channel



Photo #: Z-18-13, 13-Aug-97

Site #: Z139, Indicating the size range of fish caught at this site

Location: Z140, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 032-4100-000-000-000-000-000-000-000-000-

Map #: 93 L 082 Reach Length (km): 1.0 MA Date: 13-Aug-97 Time: 14:57 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 578742.6073241 Length surveyed (m): 200.0 GE Survey Crew: JP\KG \ \ \ \ \ \ \ \ Photos: Z-18-14,15,16,17 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 2.0 MS
 Av. Wet. Width (m): 2.1 MS
 N Av. Max Riffle Depth (cm): 0 MS
 Av. Max Pool Depth (cm): 32 MS
 Gradient (%): 1.0 CL
 Pool: 0 Riffle: 0 Run: 100 Other: 0
 % Side Channel: 0 GE
 % Debris Area: >15 GE
 % Stable: 10 GE

Specific Data

2.1	2.2	2.4	2.0	1.4	2.1
2.1	2.7	2.4	1.7	1.4	2.2
35	28				

Cover

Cover Total %: 40 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
5	15	0	20	30	30

 Crown Closure %: 0 Aspect: SE

Bed Material

Fines	Clay, silt, sand (<2mm):	100	100
Gravels	Small (2-16mm):	0	0
	Large (16-64mm):		0
	Sm. cobble (64-128mm):		0
	Lge cobble (128-256mm):	0	0
Larges	Blder cobble (>256mm):		0
	Bedrock	0	0

C7: D90 (cm): 0 Compaction: Low

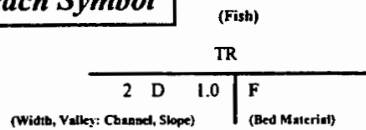
Discharge

N Wetted Width (m):
 N Mean Depth (m):
 N Mean Velocity (m/s):
 N Discharge (m3/s):

Banks

Height (m): 0.1
 % Unstable: 5
 Fines Gravels Larges Bedrock
 Confinement: UC
 Valley: Channel Ratio 10+
 Stage: M Flood Signs Ht(m): 0.2
 Bars (%): 0 pH: 6.9 Braided: N
 Water Temp. (°C): 20.0 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 40

Reach Symbol



Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	TR		100	J				VO

Comments

- C1: S3. Riffles were not observed.
- C2: LS=0%, RS=0%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 600V and H, 4, 600V, was 287 seconds over 100 meters.
- C5: No additional bank texture information.
- C6: DO was not measured at this site, the water was clear to bottom. The air temperature at this site was 29 C.
- C7: Although there are few pools in the sampling area, the runs are deep enough to provide cover for fish. Most of the woody debris observed here is comprised of leaf litter and small twigs.
- C8: A toad and many small frogs were observed at the site.



Photo #: Z-18-14, 13-Aug-97
Site #: Z140, Looking at a toad caught in a nearby meadow



Photo #: Z-18-15, 13-Aug-97
Site #: Z140, Looking upstream at the channel



Photo #: Z-18-16, 13-Aug-97
Site #: Z140, Looking downstream at the channel



Photo #: Z-18-17, 13-Aug-97
Site #: Z140, Looking at a small frog caught at the site



Location: E101, Unit 11, 1.8km North of Louise Lk.

Stream (Gaz.): Unnamed

Watershed Code: 039-5200-000-000-000-000-000-000-000-000-

Map #: 93 L 082 Reach Length (km): 2.0 MA Date: 22-Jul-97 Time: 13:24 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9.5849 60814 Length surveyed (m): 100.0 GE Survey Crew: JL VEM \ \ \ \ \ \ \ \ Photos: E-9-24,25, E-10-1,2 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 1.6 MS
 Av. Wet. Width (m): 1.0 MS
 Av. Max Riffle Depth (cm): 5 MS
 Av. Max Pool Depth (cm): 6 MS
 Gradient (%): 4.0 CL
 Pool: 50 Riffle: 30 Run: 20 Other: 0
 % Side Channel: 0 GE
 % Debris Area: 0-5 GE
 % Stable: 0 GE

Specific Data

1.3	1.5	1.6	2.2	1.9	1.2
1.4	1.3	1.1	0.9	0.8	0.3
3	6	8	7	1	6
2	1	4	1	21	

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
CT		1	130	J	R			EL

Comments

- C1: S3
- C2: LS = 1%, RS = 4%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model, set at 1-5-300V, was 256 seconds over 100 meters.
- C5: No additional bank texture information.
- C6: DO was not measured, the water was clear to the bottom. The mean air temperature on this day was 13.8.C.
- C7: This reach has some good spawning and rearing habitat, a lot of cutbank and overstream vegetation cover was noted.

Cover

Cover Total %: 60 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
60	5	0	0	10	25

 Crown Closure %: 15 Aspect: S

Bed Material

Fines	Clay, silt, sand (<2mm):	20	20
Gravels	Small (2-16mm):	30	15
	Large (16-64mm):		15
Larges	Sm. cobble (64-128mm):		20
	Lge cobble (128-256mm):	50	15
	Blder cobble (>256mm):		15
Bedrock		0	0

D90 (cm): 30 Compaction: Medium

Discharge

Wetted Width (m): 1.4 MS
 Mean Depth (m): 0.3 MS
 Mean Velocity (m/s): 0.20 F
 Discharge (m³/s): 0.06 F

Banks

Height (m): 0.2
 % Unstable: 10
 Fines Gravels Larges Bedrock
 Confinement: OC
 Valley : Channel Ratio 5-10
 Stage: M Flood Signs Ht(m): 0.4
 Bars (%): 0 pH: 8.2 Braided: N
 Water Temp. (°C): 9.0 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 90

Reach Symbol

(Fish)
 CT

2	C	4.0	2350
---	---	-----	------

 (Width, Valley: Channel, Slope) (Bed Material)



Photo #: E-9-24, 22-Jul-97

Site #: E101, Looking upstream at the channel, with riparian cover



Photo #: E-9-25, 22-Jul-97

Site #: E101, Looking downstream at the channel, with riparian cover



Photo #: E-10-1, 22-Jul-97
Site #: E101, Looking downstream at the channel

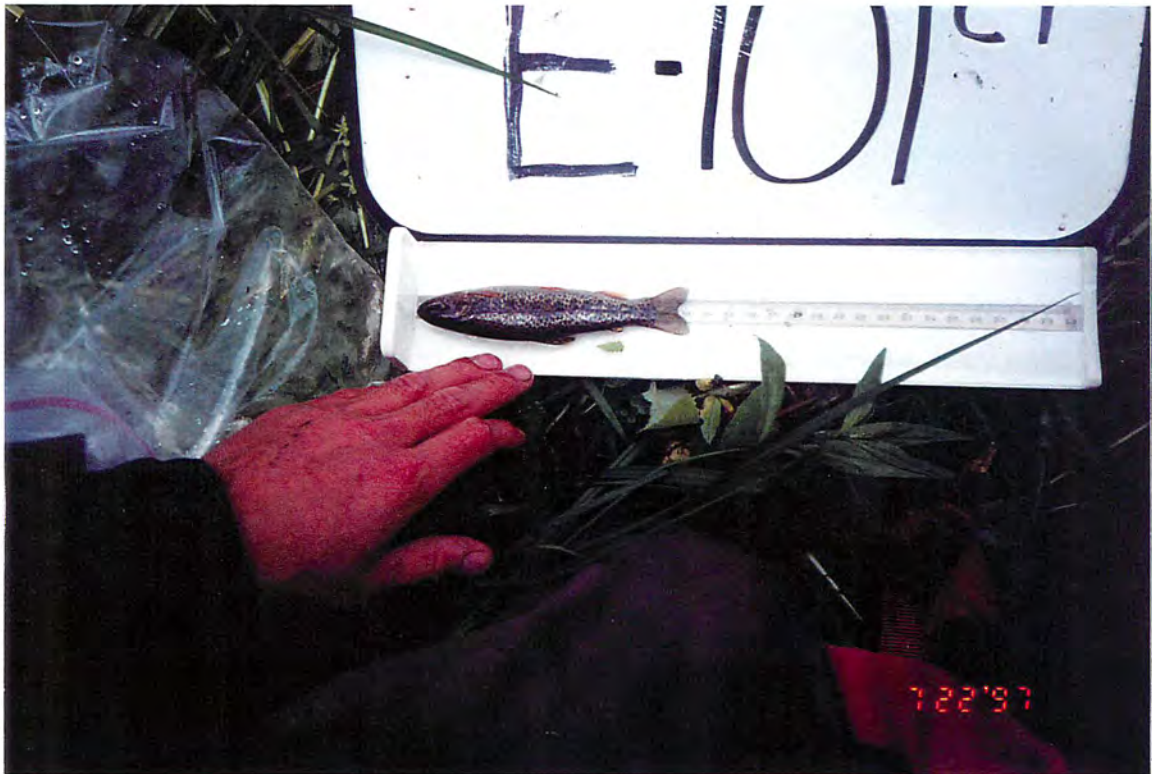


Photo #: E-10-2, 22-Jul-97
Site #: E101, Measuring fish on the fish board



Location: E104, Unit 11, North of Coal Creek.

Stream (Gaz.): Unnamed

Watershed Code: 039-3000-000-000-000-000-000-000-000-

Map #: 93 L 082

Reach Length (km): 1.6 MA

1.6 MA

MA

Date: 23-Jul-97

Time: 8:45

Agency: TEC

Access: H

Fish Card: N

Field Historical

U.T.M.: 9 5825 60798

Length surveyed (m): 200.0 AE

200.0 AE

Survey Crew: JL\EM\ \ \ \ \ \

Photos: E-10-8,9

Air Photos:

Channel Characteristics

Av. Chan. Width (m): 1.6 MS
 Av. Wet. Width (m): 1.5 MS
 N Av. Max Riffle Depth (cm): 0 GE
 N Av. Max Pool Depth (cm): 0 GE
 Gradient (%): 1.0 CL
 Pool: 0 Riffle: 0 Run: 100 Other: 0
 % Side Channel: 0-10 GE
 % Debris Area: 5-15 GE
 % Stable: 0 GE

Specific Data

1.3	2.0	1.8	2.0	1.7	1.0
1.1	2.0	1.9	1.8	1.5	0.8

Bed Material

Fines	Clay, silt, sand (<2mm):	100	100
Gravels	Small (2-16mm):	0	0
	Large (16-64mm):	0	0
Larges	Sm. cobble (64-128mm):	0	0
	Lge cobble (128-256mm):	0	0
Bedrock	Blder cobble (>256mm):	0	0
		0	0

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
C4	NF			NA				EL

Comments

- C1: S3
- C2: LS = 1%, RS = 1%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort was not recorded at this site.
- C5: No additional bank texture information.
- C6: DO was not measured, the mean air temperature on this day was 11.1.C.
- C7: This reach runs through a sedge meadow and could provide rearing habitat.

Cover

Cover Total %: 20 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
10	0	0	50	10	30

Crown Closure %: 0 Aspect: SW

Discharge

Wetted Width (m): 1.9 MS
 Mean Depth (m): 0.6 MS
 Mean Velocity (m/s): 0.07 F
 Discharge (m³/s): 0.06 F

Banks

Height (m): 0.1

% Unstable: 0

Fines Gravels Larges Bedrock

Confinement: UC

Valley : Channel Ratio 10+

Stage: M Flood Signs Ht(m):

Bars (%): 0 pH: 8.5 Braided: N

Water Temp. (°C): 10.0 02 (ppm):

Turb. (cm): 50 Cond. (µmhos): 100

Reach Symbol

(Fish)

(RB) (DV)

2 D 1.0 F

(Width, Valley: Channel, Slope)

(Bed Material)

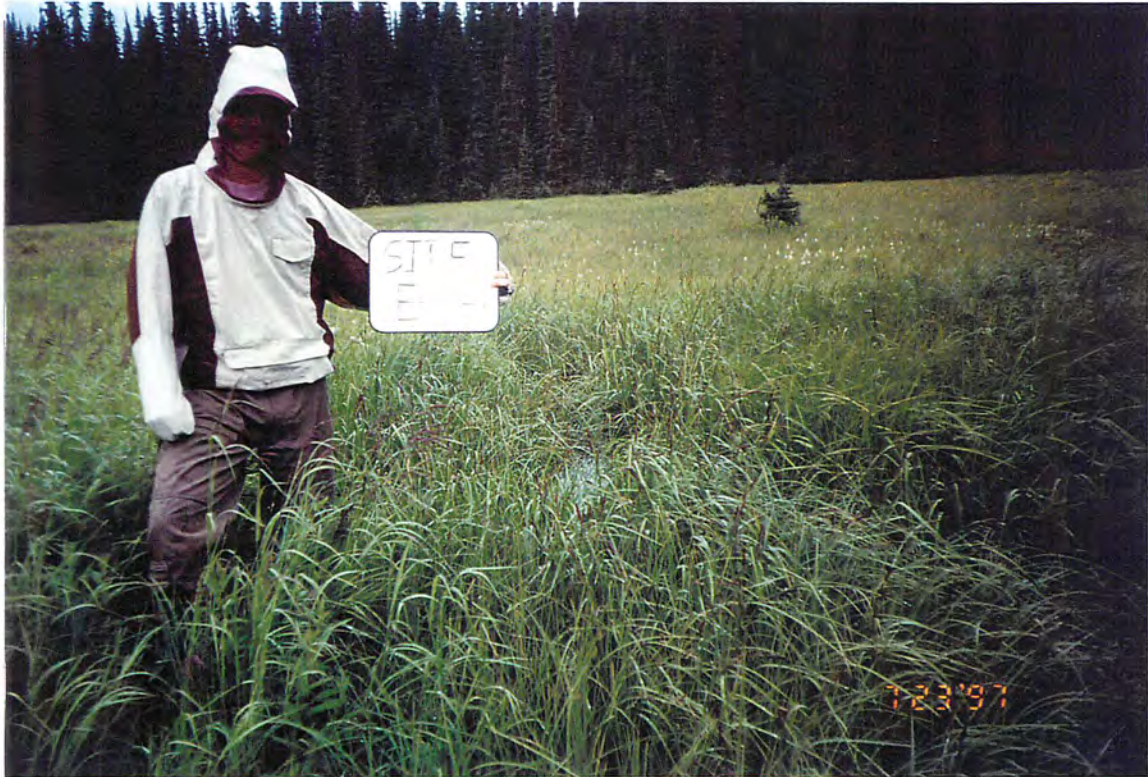


Photo #: E-10-8, 23-Jul-97

Site #: E104, Looking upstream at the channel, with sedges



Photo #: E-10-9, 23-Jul-97

Site #: E104, Looking downstream at the channel, with sedges



Photo #: E-10-10, 23-Jul-97
Site #: E105, Looking upstream at the channel



Photo #: E-10-11, 23-Jul-97
Site #: E105, Looking downstream at the channel

Location: E106, Unit 11, S of Coal Creek.

Stream (Gaz.): Unnamed

Watershed Code: 039-2000-000-000-000-000-000-000-000-000-

Map #: Reach Length (km): Date: Time: Agency: Access: Fish Card: Field Historical
 U.T.M.: Length surveyed (m): Survey Crew: JL\EM\ \ \ \ \ \ \ \ \ \ \ Photos: Air Photos:

Channel Characteristics

Av. Chan. Width (m):
 Av. Wet. Width (m):
 Av. Max Riffle Depth (cm):
 Av. Max Pool Depth (cm):
 Gradient (%):
 Pool: Riffle: Run: Other:
 % Side Channel:
 % Debris Area:
 % Stable:

Specific Data

0.9	1.0	0.8	1.0	0.8	0.3
0.7	0.8	0.6	0.8	0.6	0.2
2	2	5	4	3	
16	24	25	18	20	

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Comments

- C1: S4
- C2: LS = 10%, RS = 6%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model, was not recorded at this site.
- C5: No additional bank texture information.
- C6: DO was not measured, the water was clear to the bottom. The mean air temperature on this day was 11.1 C.
- C7: This reach flows through a wooded area, the substrate consists of fines and is covered in spongy mosses in some spots. This creek also has some subterranean flow in some areas.

Bed Material

	Fines	Clay, silt, sand (<2mm):	100	100
Gravels		Small (2-16mm):	0	0
		Large (16-64mm):		0
Larges		Sm. cobble (64-128mm):	0	0
		Lge cobble (128-256mm):	0	0
		Blder cobble (>256mm):	0	0
Bedrock			0	0

Cover

Cover Total %:

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
20	15	0	5	40	20

 Crown Closure %: Aspect:

D90 (cm): Compaction: Low

Discharge

Wetted Width (m):
 Mean Depth (m):
 Mean Velocity (m/s):
 Discharge (m3/s):

Banks

Height (m):
 % Unstable:
 Fines Gravels Larges Bedrock
 Confinement:
 Valley: Channel Ratio
 Stage: Flood Signs Ht(m):
 Bars (%): pH: Braided:
 Water Temp. (°C): O2 (ppm):
 Turb. (cm): Cond. (µmhos):

Reach Symbol

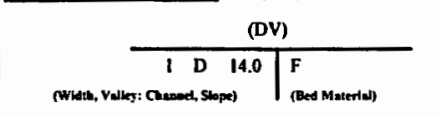




Photo #: E-10-12, 23-Jul-97

Site #: E106, Looking upstream at the channel with dense vegetation



Photo #: E-10-13, 23-Jul-97

Site #: E106, Looking downstream at the channel, with dense vegetation

Location: E107, Unit 11, North of Coal Cr.

Stream (Gaz.): Unnamed

Watershed Code: 039-2400-000-000-000-000-000-000-000-000-

Map #: 93 L 082 Reach Length (km): 1.7 MA Date: 23-Jul-97 Time: 11:30 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 5820 60780 Length surveyed (m): 100.0 GE Survey Crew: EMUL \ \ \ \ \ \ \ \ Photos: E-10-14,15 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 0.5 MS
 Av. Wet. Width (m): 0.5 MS
 Av. Max Riffle Depth (cm): 4 MS
 Av. Max Pool Depth (cm): 15 MS
 Gradient (%): 6.0 CL
 Pool: 20 Riffle: 30 Run: 50 Other: 0
 % Side Channel: 0 GE
 % Debris Area: >15 GE
 % Stable: 0 GE

Specific Data

0.4	0.6	0.6	0.7	0.4	0.5
0.5	0.5	0.8	0.6	0.3	0.4
4	3	3	4	4	
13	15	20	17	11	

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Bed Material

	Fines	Clay, silt, sand (<2mm):	20	20
Gravels	Small (2-16mm):		40	20
	Large (16-64mm):			20
Larges	Sm. cobble (64-128mm):			30
	Lge cobble (128-256mm):		40	10
	Blder cobble (>256mm):			0
Bedrock			0	0

Comments

- C1: S4
- C2: LS = 7%. RS = 7%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model, was not recorded at this site.
- C5: Fines and larges make up the bank texture at this site.
- C6: DO was not measured, the water was clear to the bottom. The mean air temperature on this day was 11.1.C.
- C7: This reach runs through a wooded area, LOD provides most of the cover for fish at this site.

Cover

Cover Total % : 15 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
5	30	20	0	20	25

Crown Closure % : 40 Aspect : S

Banks

Height (m): 0.2
 % Unstable: 0
 Fines Gravels Larges Bedrock

Discharge

Wetted Width (m): 0.5 MS
 Mean Depth (m): 0.0 MS
 Mean Velocity (m/s): 0.25 F
 Discharge (m3/s): 0.00 F

Confinement: UC
 Valley : Channel Ratio 10+
 Stage: H Flood Signs Ht(m): 0.4
 Bars (%): 0 pH: 8.4 Braided: N
 Water Temp. (°C): 8.0 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 90

Reach Symbol

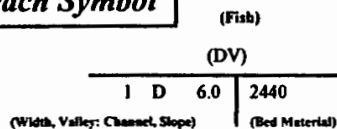




Photo #: E-10-14, 23-Jul-97
Site #: E107, Looking downstream at the channel



Photo #: E-10-15, 23-Jul-97
Site #: E107, Looking upstream at the channel



Location: E108, Unit 11, East of Coal Creek.

Stream (Gaz.): Unnamed

Watershed Code: 038-8500-000-000-000-000-000-000-000-

Map #: 93 L 082 Reach Length (km): 2.0 MA Date: 23-Jul-97 Time: 13:30 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 5820 60750 Length surveyed (m): 100.0 GE Survey Crew: EM VL \ \ \ \ \ \ \ \ Photos: E-10-16,17,18 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 1.3 MS
 Av. Wet. Width (m): 1.4 MS
 Av. Max Riffle Depth (cm): 5 MS
 Av. Max Pool Depth (cm): 21 MS
 Gradient (%): 2.0 CL
 Pool: 20 Riffle: 20 Run: 50 Other: 10
 % Side Channel: 0-10 GE
 % Debris Area: 0-5 GE
 % Stable: 0 GE

Specific Data

1.4	1.2	1.4	1.0	1.3	1.2
1.4	1.4	1.6	1.2	1.6	1.4
4	6	7	3	4	
25	20	22	19	18	

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
DV		2	60-80	J	R			EL

Comments

- C1: S4
- C2: LS = 32%, RS = 17%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model, set at 1-5-400V, was 150 seconds over 100 meters.
- C5: Fines and larges make up the bank texture at this site.
- C6: DO was not measured, the water was clear to the bottom. The mean air temperature at this site was 11.1.C.
- C7: This reach has a lot of overstream vegetation and cutbank cover. The banks are lined with horsetails and ferns.

Cover

Cover Total %: 30 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
10	20	10	0	30	30

Crown Closure %: 20 Aspect: W

Bed Material

	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	30	15
	Large (16-64mm):		15
Larges	Sm. cobble (64-128mm):		25
	Lge cobble (128-256mm):	60	25
	Blder cobble (>256mm):		10
Bedrock		0	0

D90 (cm): 25 Compaction: Medium

Discharge

Wetted Width (m): 1.5 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.14 F
 Discharge (m³/s): 0.02 F

Banks

Height (m): 0.4
 % Unstable: 0

Fines Gravels Larges Bedrock

Confinement: OC
 Valley : Channel Ratio 5-10
 Stage: H Flood Signs Ht(m):
 Bars (%): 0 pH: 8.4 Braided: N
 Water Temp. (°C): 8.0 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 100

Reach Symbol

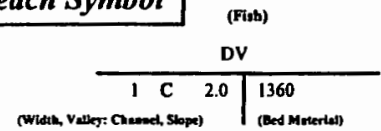




Photo #: E-10-16, 23-Jul-97

Site #: E108, Looking upstream at the channel, with dogwood, fern and Ribes sp.



Photo #: E-10-17, 23-Jul-97

Site #: E108, Looking downstream at the channel



Photo #: E-10-18, 23-Jul-97
Site #: E108, Measuring fish on the fish board



Location: E109, Unit 11, West of Coal Creek.

Stream (Gaz.): Unnamed

Watershed Code: 038-8800-000-000-000-000-000-000-000-000-

Map #: 93 L 082 Reach Length (km): 2.2 MA Date: 23-Jul-97 Time: 14:40 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 5793 60748 Length surveyed (m): 100.0 GE Survey Crew: JL VEM \ \ \ \ \ \ Photos: E-10-19,20,21 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 3.3 MS
 Av. Wet. Width (m): 3.3 MS
 Av. Max Riffle Depth (cm): 0 MS
 C7 Av. Max Pool Depth (cm): 107 MS
 Gradient (%): 1.0 CL
 Pool: 0 Riffle: 0 Run: 90 Other: 10
 % Side Channel: 0-10 GE
 % Debris Area: 5-15 GE
 % Stable: 0 GE

Specific Data

4.0	3.0	3.5	2.5	3.5	3.0
4.0	3.0	3.5	2.5	3.5	3.0
100	100	120			

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				VO

Comments

- C1: S3
- C2: LS = 1%, RS = 1%
- C3: This reach contains a number of beaver dams and runs through a sedge meadow.
- C4: This site was not electrofished, as the deep water and fine substrate in the sampling area made it unsafe for wading.
- C5: No additional bank texture information.
- C6: DO was not measured, the water was clear to the bottom. The mean air temperature in this day was 11.1 C.
- C7: This site could provide rearing habitat, a second water temperature of 14 C. was obtained at this site.
- C8: A salamander was observed at this site.

Cover

Cover Total %: 10 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
40	0	0	30	0	30

Crown Closure %: 0 Aspect: E

Bed Material

Fines	Clay, silt, sand (<2mm)	100	100
Gravels	Small (2-16mm):	0	0
	Large (16-64mm):		0
Larges	Sm. cobble (64-128mm):		0
	Lge cobble (128-256mm):	0	0
Bedrock	Blder cobble (>256mm):		0
		0	0

D90 (cm): 0 Compaction: Low

Discharge

Wetted Width (m): 2.0 MS
 Mean Depth (m): 1.0 MS
 Mean Velocity (m/s): 0.04 F
 Discharge (m3/s): 0.06 F

Banks

Height (m): 0.1
 % Unstable: 0
 Fines Gravels Larges Bedrock

Confinement: UC
 Valley: Channel Ratio 10+
 Stage: H Flood Signs Ht(m):
 Bars (%): 0 pH: 8.0 Braided: N
 Water Temp. (°C): 9.0 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 70

Reach Symbol

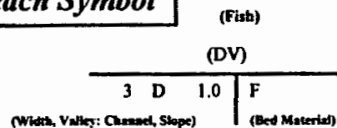




Photo #: E-10-19, 23-Jul-97
Site #: E109, A salamander caught at the site



Photo #: E-10-20, 23-Jul-97
Site #: E109, Looking downstream at the channel, with sedges



Photo #: E-10-21, 23-Jul-97

Site #: E109, Looking upstream at the channel, with sedges



Location: E110, Unit 11, West of Coal Creek.

Stream (Gaz.): Unnamed

Watershed Code: 038-8800-000-000-000-000-000-000-000-

Map #: 93 L 082

Reach Length (km): 0.5 MA

Date: 23-Jul-97

Time: 15:15

Agency: TEC

Access: H

Fish Card: N

Field Historical

U.T.M.: 9 5781 60753

Length surveyed (m): 100.0 GE

Survey Crew: JL\EM\ \ \ \ \ \

Photos: E-10-22,23

Air Photos:

Channel Characteristics

Specific Data

Av. Chan. Width (m): 1.8 MS
 Av. Wet. Width (m): 1.7 MS
 Av. Max Riffle Depth (cm): 0 MS
 Av. Max Pool Depth (cm): 30 MS
 Gradient (%): 1.0 CL
 Pool: 10 Riffle: 0 Run: 90 Other: 0
 % Side Channel: 0 GE
 % Debris Area: >15 GE
 % Stable: 0 GE

1.3	2.0	1.6	2.4	1.7	1.5
1.2	2.0	1.6	2.4	1.7	1.5
40	30	20			

Bed Material

Fines	Clay, silt, sand (<2mm):	100	100
Gravels	Small (2-16mm):	0	0
	Large (16-64mm):		0
Larges	Sm. cobble (64-128mm):		0
	Lge cobble (128-256mm):	0	0
Bedrock	Blder cobble (>256mm):		0

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Comments

- C1: S3
- C2: LS = 1%, RS = 1%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model, set at 1-5-400V, was 150 seconds over 100 meters.
- C5: No additional bank texture information.
- C6: DO was not measured, the water was clear to the bottom. The mean air temperature on this day was 11.1.C.
- C7: This is slow flowing slightly wide channel, with instream vegetation providing most of the cover for fish in the sampling area. This reach could provide rearing habitat.
- C8: A salamander was observed at this site.

Cover

Cover Total %: 60 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
0	20	0	0	70	10

Crown Closure %: 10 Aspect: N

Discharge

Wetted Width (m): 1.1 MS
 Mean Depth (m): 0.4 MS
 Mean Velocity (m/s): 0.01 F
 Discharge (m3/s): 0.00 F

Banks

Height (m): 0.1
 % Unstable: 0
 Fines Gravels Larges Bedrock

Confinement: UC
 Valley : Channel Ratio 10+
 Stage: M Flood Signs Ht(m):
 Bars (%): 0 pH: 8.0 Braided: N
 Water Temp. (°C): 9.0 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 60

Reach Symbol

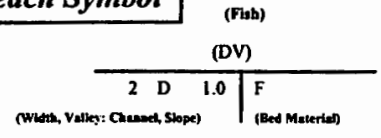




Photo #: E-10-22, 23-Jul-97
Site #: E110, Looking downstream at the channel



Photo #: E-10-23, 23-Jul-97
Site #: E110, Looking upstream at the channel



Location: E95, Unit 11, 300m South of Louise Lake.

Stream (Gaz.): Unnamed

Watershed Code: 039-4600-000-000-000-000-000-000-000-

Map #: 93 L 082 Reach Length (km): 1.8 MA Date: 22-Jul-97 Time: 8:45 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 5843 60788 Length surveyed (m): 200.0 AE Survey Crew: JL\EM\ \ \ \ \ \ \ \ Photos: E-9-9,10,11 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 1.1 MS
 Av. Wet. Width (m): 1.0 MS
 Av. Max Riffle Depth (cm): 4 MS
 Av. Max Pool Depth (cm): 21 MS
 Gradient (%): 3.0 CL
 Pool: 15 Riffle: 25 Run: 60 Other: 0
 % Side Channel: 0-10 GE
 % Debris Area: 5-15 GE
 % Stable: 10 GE

Specific Data

0.8	1.2	1.3	1.0	1.1	1.0
0.6	1.3	0.9	0.9	1.2	0.9
3	2	3	3	7	
25	20	21	19	22	

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	CT	5	70-100	J				EL

Comments

- C1: S4
- C2: LS = 40%, RS = 2%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model, set at 1-5-500V, was 337 seconds over 100 meters.
- C5: No additional bank texture information.
- C6: DO was not measured, the water was clear to the bottom. The mean air temperature on this day was 13.8.C.
- C7: This creek flows through a cutblock. A large amount of instream debris and silt was noted. LOD cover is abundant in this reach.

Cover

Cover Total %: 15 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
15	35	0	0	15	35

 Crown Closure %: 0 Aspect: W

Bed Material

Fines	Clay, silt, sand (<2mm):	50	50
Gravels	Small (2-16mm):	50	25
	Large (16-64mm):		25
Larges	Sm. cobble (64-128mm):	0	0
	Lge cobble (128-256mm):	0	0
Bedrock	Blder cobble (>256mm):	0	0
		0	0

D90 (cm): 5 Compaction: Medium

Discharge

Wetted Width (m): 0.8 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.17 F
 Discharge (m3/s): 0.01 F

Banks

Height (m): 0.2
 % Unstable: 10
 Fines Gravels Larges Bedrock

Reach Symbol

(Fish)
 CT
 1 D 3.0 5500
 (Width, Valley: Channel, Slope) (Bed Material)

Confinement: UC

Valley: Channel Ratio 10+
 Stage: M Flood Signs Ht(m): 0.3
 Bars (%): 0 pH: 8.4 Braided: Y
 Water Temp. (°C): 8.0 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 100



Photo #: E-9-9, 22-Jul-97
Site #: E95, Looking upstream at the channel



Photo #: E-9-10, 22-Jul-97
Site #: E95, Looking downstream at the channel



Photo #: E-9-11, 22-Jul-97
Site #: E95, Measuring CT on the fish board



Location: KARLA 31, Unit 11, 2.4 km W of Sandstone Creek, see C5

Stream (Gaz.): Unnamed

Watershed Code: 038-9900-000-000-000-000-000-000-000-000-

Map #: 93 L 082 Reach Length (km): 1.1 MA Date: 23-Sep-96 Time: 17:10 Agency: TEC Access: V2 Fish Card: N Field Historical
 U.T.M.: 9 5805 60751 Length surveyed (m): 100.0 GE Survey Crew: JP/KG \ \ \ \ \ \ \ \ \ \ Photos: K-3-14,15 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 1.4 MS
 Av. Wet. Width (m): 1.1 MS
 Av. Max Riffle Depth (cm): 4 MS
 Av. Max Pool Depth (cm): 26 MS
 Gradient (%): 10.0 CL
 Pool: 50 Riffle: 10 Run: 35 Other: 5
 % Side Channel: >40 GE
 % Debris Area: >15 GE
 % Stable: 70 GE

Specific Data

0.8	1.1	1.8	1.8	1.6	1.5
0.7	0.8	1.4	1.4	1.3	0.8
3	5	3			
27	25	26	24		

Obstructions

C	Height (m)	Type	Location

Bed Material

Fines	Clay, silt, sand (<2mm):	100	100
Gravels	Small (2-16mm):	0	0
	Large (16-64mm):		
Larges	Sm. cobble (64-128mm):		
	Lge cobble (128-256mm):	0	0
	Blder cobble (>256mm):		
Bedrock		0	0

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Comments

- C1: S4
- C2: LS = 1%, RS = 18%
- C3: No fisheries sensitive zones were noted at this site.
- C4: The electroshocking effort, using a 12 B POW model, was 300 seconds over 100 meters.
- C5: Lat N 54 59' 02.0", Long W 127 44' 47.6"
- C6: No additional bank texture information.
- C7: DO was not measured at this site. The mean air temperature on this day was 3.8°C
- C8: This site does not contain suitable habitat for fish. However, this stream is attached to a lake that could be minnow trapped in the future.

Cover

Cover Total %: 35 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
20	30	0	0	40	10

Crown Closure %: 35 Aspect: W

N D90 (cm): 0 Compaction: Low

Discharge

Wetted Width (m): 0.8 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.31 F
 Discharge (m3/s): 0.02 F

Banks

Height (m): 0.2
 % Unstable: 0
 Fines Gravels Larges Bedrock
 Confinement: UC
 Valley: Channel Ratio 10+
 Stage: L Flood Signs H(m): 0
 Bars (%): 0 pH: 7.6 Braided: Y
 Water Temp. (°C): 6.0 O2 (ppm):
 Turb. (cm): 27 Cond. (µmhos): 60

Reach Symbol

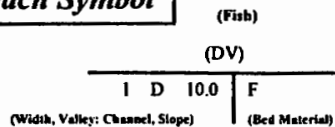




Photo #: K-3-14, 1996/09/23
Site #: K31, Looking upstream.



Photo #: K-3-15, 1996/09/23
Site #: K31, Looking downstream.



Location: KARLA 33, Unit 11, see C5.

Stream (Gaz.): Unnamed

Watershed Code: 038-8500-000-000-000-000-000-000-000-000-

Map #: 93 L 082 Reach Length (km): 1.7 MA Date: 24-Sep-96 Time: 11:38 Agency: TEC Access: V2 Fish Card: N Field Historical
 U.T.M.: 9 5809 60746 Length surveyed (m): 250.0 GE Survey Crew: JP KG \ \ \ \ \ \ \ \ Photos: K-3-18,19 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 1.7 MS
 Av. Wet. Width (m): 1.6 MS
 Av. Max Riffle Depth (cm): 3 MS
 Av. Max Pool Depth (cm): 18 MS
 Gradient (%): 4.0 CL
 Pool: 40 Riffle: 20 Run: 20 Other: 20
 % Side Channel: GE
 % Debris Area: >15 GE
 % Stable: 40 GE

Specific Data

1.1	1.2	1.4	2.1	2.2	2.3
1.3	1.1	1.3	1.9	1.8	2.0
2	4	4	5	2	
20	16	18	19	18	

Obstructions

C	Height (m)	Type	Location

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Comments

- C1: S3
- C2: LS = 42%, RS = 10%
- C3: No fisheries sensitive zones were noted at this site.
- C4: The electroshocking effort, using a Smithroot 15 A model, was 449 seconds over 110 meters. This stream is attached to a lake which could be minnow trapped in the future.
- C5: Lat N 54 48' 44.1", Long W 127 42' 25.3"
- C6: No additional bank texture information.
- C7: DO was not measured at this site. The mean air temperature on this day was 5.5°C
- C8: Some good rearing cover was found at this site. A large amount of organic debris was noted in the channel.
- C9: The air temperature at this site was 7 degrees celcius.

Cover

Cover Total %: 30 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnbk
25	15	5	0	20	35

Crown Closure %: 10 Aspect: W

Bed Material

Fines	Clay, silt, sand (<2mm):	50	50
Gravels	Small (2-16mm):	30	15
	Large (16-64mm):		15
Larges	Sm. cobble (64-128mm):		10
	Lge cobble (128-256mm):	20	5
	Blder cobble (>256mm):		5
Bedrock		0	0

D90 (cm): 58 Compaction: Medium

Discharge

Wetted Width (m): 1.5 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.30 F
 Discharge (m3/s): 0.03 F

Banks

Height (m): 0.2
 % Unstable: 25
 Fines Gravels Larges Bedrock
 Confinement: FC
 Valley : Channel Ratio 2-5
 Stage: L Flood Signs Ht(m): 0.5
 Bars (%): 10 pH: 7.3 Braided: N
 Water Temp. (°C): 3.0 O2 (ppm):
 Turb. (cm): 20 Cond. (µmhos): 60

Reach Symbol

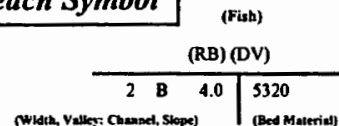




Photo #: K-3-18, 1996/09/24
Site #: K33, Looking upstream.



Photo #: K-3-19, 1996/09/24
Site #: K33, Looking downstream.



Photo #: K-3-20, 1996/09/24
Site #: K34, Looking upstream.



Photo #: K-3-21, 1996/09/24
Site #: K34, Looking downstream.

Location: KARLA 35, Unit 11, see C5.

Stream (Gaz.): Unnamed

Watershed Code: 039-1300-000-000-000-000-000-000-000-

Map #: 93 L 082 Reach Length (km): 1.4 MA Date: 24-Sep-96 Time: 13:00 Agency: TEC Access: V2 Fish Card: N Field Historical
 U.T.M.: 9 5808 60761 Length surveyed (m): 180.0 GE Survey Crew: JP\KG\ \ \ \ \ \ \ \ Photos: K-3-22,23,24 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 0.9 MS
 Av. Wet. Width (m): 0.8 MS
 Av. Max Riffle Depth (cm): 4 MS
 Av. Max Pool Depth (cm): 17 MS
 Gradient (%): 4.0 CL
 Pool: 20 Riffle: 25 Run: 35 Other: 20
 % Side Channel: GE
 % Debris Area: >15 GE
 % Stable: 40 GE

Specific Data

1.0	0.8	0.6	1.1	1.2	0.7
1.0	0.7	0.5	1.0	1.0	0.5
2	4	3	5	5	
9	10	11	32	22	

Obstructions

C	Height (m)	Type	Location

Bed Material

Fines	Clay, silt, sand (<2mm):	50	50
Gravels	Small (2-16mm):	40	25
	Large (16-64mm):		15
Larges	Sm. cobble (64-128mm):		5
	Lge cobble (128-256mm):	10	5
	Bldr cobble (>256mm):		0
Bedrock		0	0

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Comments

- C1: S4
- C2: LS = 15%, RS = 35%
- C3: No fisheries sensitive zones were noted at this site.
- C4: The electroshocking effort, using a Smithroot 15 A model, was 129 seconds over 100 meters.
- C5: Lat N 54 49' 33.5", Long W 127 44' 30.8"
- C6: No additional bank texture information.
- C7: DO, pH, were not measured at this site. The pH meter was not functioning at this site. The mean air temperature on this day was 5.5°C
- C8: Some good rearing habitat was observed at this site. However, high instream summer temperatures, due to the removal of riparian cover by logging, could limit the distribution of fish in this reach.
- C9: The air temperature at this site was 9.C.

Cover

Cover Total %: 35 GE

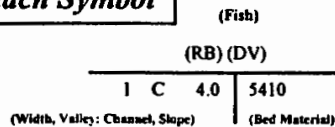
Pool	LOD	Bldr	In Veg	O Veg	Ctnk
20	20	0	0	30	30

Crown Closure %: 5 Aspect: W

Discharge

Wetted Width (m): 1.0 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.13 F
 Discharge (m³/s): 0.01 F

Reach Symbol



Banks

Height (m): 0.1
 % Unstable: 30

Fines Gravels Larges Bedrock

Confinement: OC
 Valley : Channel Ratio 5-10
 Stage: L Flood Signs Ht(m): 0.3
 Bars (%): 0 pH: Braided: N
 Water Temp. (°C): 5.0 O2 (ppm):
 Turb. (cm): 32 Cond. (µmhos): 60



Photo #: K-3-22, 1996/09/24
Site #: K35, Looking upstream.



Photo #: K-3-23, 1996/09/24
Site #: K35, Looking downstream.



Photo #: K-3-24, 1996/09/24

Site #: K35, Looking downstream through clearcut.



Photo #: K-4-3, 1996/09/24
Site #: K37, Looking downstream.



Photo #: K-4-4, 1996/09/24
Site #: K37, Looking upstream.

Location: Y262, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 039-1800-000-000-000-000-000-000-000-

Map #: 93 L 082 Reach Length (km): 1.7 MA Date: 14-Sep-97 Time: 8:41 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 581244.6078175 Length surveyed (m): 100.0 GE Survey Crew: JP\FC \ \ \ \ \ \ \ Photos: Y-31-18,19 Air Photos:

Channel Characteristics

Specific Data

Av. Chan. Width (m): 0.6 MS
 Av. Wet. Width (m): 0.5 MS
 Av. Max Riffle Depth (cm): 1 MS
 Av. Max Pool Depth (cm): 14 MS
 Gradient (%): 6.0 CL
 Pool: 15 Riffle: 10 Run: 75 Other: 0
 % Side Channel: 0-10 GE
 % Debris Area: >15 GE
 % Stable: 40 GE

0.4	0.3	0.8	0.6	0.8	0.7
0.4	0.3	0.8	0.7	0.5	0.4
1	1	1			
16	22	9	10		

Bed Material

Fines	Clay, silt, sand (<2mm):	70	70
Gravels	Small (2-16mm):	20	10
	Large (16-64mm):		10
	Sm. cobble (64-128mm):		10
Larges	Lge cobble (128-256mm):	10	0
	Blder cobble (>256mm):		0
Bedrock		0	0

D90 (cm): 11 Compaction: Low

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Comments

- C1: S6
- C2: LS = 10%, RS = 26%
- C3: No fisheries sensitive zones present in the sampling area.
- C4: The electroshocking effort, using a Smithroot 12 B POW model, set at I-5-500V, was 114 seconds over 200m.
- C5: No additional bank texture information.
- C6: DO was not measured, the water was clear to the bottom. The air temperature at this site was 4.5.C.
- C7: This reach has marginal fish habitat and is almost dry downstream of the sampling area. A section of steep gradient was also noted downstream, which is probably a barrier to fish migration given the small size of this creek. About 20% of the flow is either subterranean or almost subterranean.

Cover

Cover Total %: 60 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnbk
0	30	0	20	50	0

Crown Closure %: 10 Aspect: S

Discharge

Wetted Width (m): 0.2 MS
 Mean Depth (m): 0.0 MS
 Mean Velocity (m/s): 0.07 F
 Discharge (m3/s): 0.00 F

Reach Symbol

(Fish)

NF

1 D 6.0 7210

(Width, Valley: Channel, Slope)

(Bed Material)

Banks

Height (m): 0.1
 % Unstable: 0

Fines Gravels Larges Bedrock

Confinement: UC

Valley : Channel Ratio 10+

Stage: L Flood Signs H(m): 0

Bars (%): 0 pH: 7.5 Braided: N

Water Temp. (°C): 7.5 O2 (ppm):

Turb. (cm): Cond. (µmhos): 90

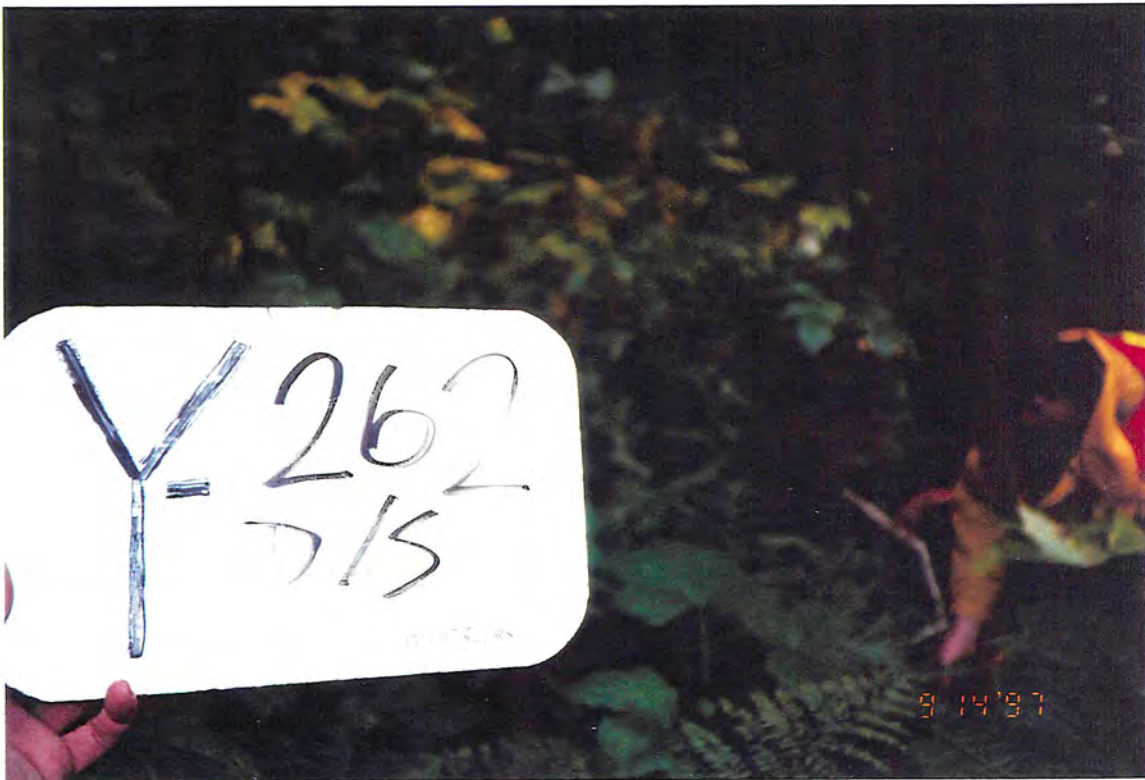


Photo #: Y-31-18, 14/09/97
Site #: Y262, Looking upstream at the channel



Photo #: Y-31-19, 14/09/97
Site #: Y262, Looking downstream at the channel

Location: Y263, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 039-3000-000-000-000-000-000-000-000-

Map #: 93 L 082 Reach Length (km): 1.8 MA Date: 14-Sep-97 Time: 9:26 Agency: TEC Access: II Fish Card: N Field Historical
 U.T.M.: 9 582384.6078593 Length surveyed (m): 100.0 GE Survey Crew: JP\FC \ \ \ \ \ \ \ \ \ \ Photos: Y-31-20,21,22,23 Air Photos:

Channel Characteristics

Specific Data

Av. Chan. Width (m): 2.3 MS
 Av. Wet. Width (m): 1.4 MS
 Av. Max Riffle Depth (cm): 5 MS
 Av. Max Pool Depth (cm): 35 MS
 Gradient (%): 3.0 CL
 Pool: 15 Riffle: 20 Run: 65 Other: 0
 % Side Channel: 0-10 GE
 % Debris Area: 5-15 GE
 % Stable: 30 GE

1.6	2.0	2.2	2.1	1.6	4.0
0.6	1.0	1.3	1.7	1.2	2.8
8	6	4	4	5	
39	42	35	27	33	

Obstructions

Bed Material

Fines	Clay, silt, sand (<2mm):	20	20
Gravels	Small (2-16mm):	30	10
	Large (16-64mm):		20
	Sm. cobble (64-128mm):		35
Larges	Lge cobble (128-256mm):	50	10
	Blder cobble (>256mm):		5
Bedrock		0	0

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	CT	7	38-115	J				EL

Comments

- C1: S3
- C2: LS = 10%, RS = 15%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model, set at I-5-400V, was 74 seconds over 150 meters. Fry and larger juveniles were caught at this site.
- C5: No additional bank texture information.
- C6: DO was not measured, the water was clear to the bottom. The air temperature at this site was 6.C.
- C7: This stream has some good rearing habitat in the form of cutbanks, boulders, instream and overstream vegetation. Spawning habitat is limited.

Cover

Cover Total %: 35 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
15	5	5	15	35	25

Crown Closure %: 0 Aspect: S

D90 (cm): 17 Compaction: High

Discharge

Wetted Width (m): 0.6 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.51 F
 Discharge (m3/s): 0.02 F

Banks

Height (m): 0.3
 % Unstable: 0

Fines Gravels Larges Bedrock

Confinement: UC
 Valley: Channel Ratio 10+
 Stage: M Flood Signs Ht(m): 0.6
 Bars (%): 5 pH: 7.7 Braided: N
 Water Temp. (°C): 8.0 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 120

Reach Symbol

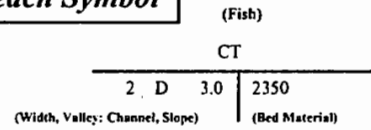




Photo #: Y-31-20, 14/09/97
Site #: Y263, Measuring fish on the fish board



Photo #: Y-31-21, 14/09/97
Site #: Y263, Measuring fish on the fish board



Photo #: Y-31-22, 14/09/97
Site #: Y263, Looking upstream at the channel



Photo #: Y-31-23, 14/09/97
Site #: Y263, Looking downstream at the channel



Location: Y264, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 039-4100-000-000-000-000-000-000-000-000-

Map #: 93 L 082 Reach Length (km): 1.3 MW Date: 14-Sep-97 Time: 10:15 Agency: TEC Access: 11 Fish Card: N Field Historical
 U.T.M.: 9 584465.6077530 Length surveyed (m): 100.0 GE Survey Crew: JP\FC\ \ \ \ \ \ \ \ \ \ \ Photos: Y-31-24,25 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 1.4 MS
 Av. Wet. Width (m): 1.2 MS
 Av. Max Riffle Depth (cm): 3 MS
 Av. Max Pool Depth (cm): 19 MS
 Gradient (%): 4.0 CL
 Pool: 10 Riffle: 10 Run: 80 Other: 0
 % Side Channel: 0-10 GE
 % Debris Area: >15 GE
 % Stable: 60 GE

Specific Data

1.0	2.1	0.9	1.4	0.9	2.0
0.9	2.0	0.7	1.2	0.9	1.3
3	3	2			
15	15	23	24		

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Comments

- C1: S4
- C2: LS=45%, RS = 30%
- C3: No fisheries sensitive zones were noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model, set at I-5-500V, was 77 seconds over 150 meters.
- C5: No additional bank texture information.
- C6: DO was not measured, the water was clear to the bottom. The air temperature at this site was 4.C.
- C7: This reach has some good rearing habitat, including lots of cutbank and LOD cover. The high levels of silt and large cobble diminish spawning habitat quality at this site.

Cover

Cover Total %: 25 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
15	30	0	5	15	35

Crown Closure %: 40 Aspect: NW

Bed Material

Fines	Clay, silt, sand (<2mm):	60	60
Gravels	Small (2-16mm):	20	10
	Large (16-64mm):		10
Larges	Sm. cobble (64-128mm):		10
	Lge cobble (128-256mm):	20	10
	Bldr cobble (>256mm):		0
Bedrock		0	0

D90 (cm): 20 Compaction: Medium

Discharge

Wetted Width (m): 0.3 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.05 F
 Discharge (m3/s): 0.00 F

Banks

Height (m): 0.2
 % Unstable: 0

Fines Gravels Larges Bedrock

Confinement: OC
 Valley: Channel Ratio 5-10
 Stage: M Flood Signs H(m): 0.3
 Bars (%): 0 pH: 7.5 Braided: N
 Water Temp. (°C): 8.5 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 80

Reach Symbol

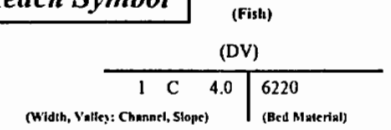




Photo #: Y-31-24, 14/09/97
Site #: Y264, Looking upstream at the channel



Photo #: Y-31-25, 14/09/97
Site #: Y264, Looking downstream at the channel



Photo #: K-2-25, 1996/09/22
Site #: K25, Looking upstream toward culvert.



Photo #: K-3-1, 1996/09/22
Site #: K25, Looking downstream from culvert.

Location: E100, Unit 11, North of Louise Lake.

Stream (Gaz.): Unnamed

Watershed Code: 039-7500-000-000-000-000-000-000-000-000-

Map #: 93 L 082 Reach Length (km): 0.9 MA Date: 22-Jul-97 Time: 12:30 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 5855 60820 Length surveyed (m): 100.0 GE Survey Crew: JL \EM\ \ \ \ \ \ \ \ \ \ \ Photos: E-9-22,23 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 1.0 MS
 Av. Wet. Width (m): 1.0 MS
 Av. Max Riffle Depth (cm): 5 MS
 Av. Max Pool Depth (cm): 28 MS
 Gradient (%): 10.0 GE
 Pool: 20 Riffle: 20 Run: 60 Other: 0
 % Side Channel: 0-10 GE
 % Debris Area: 5-15 GE
 % Stable: 0 GE

Specific Data

0.8	0.9	1.2	1.2	0.9	1.0
0.7	0.9	1.3	1.4	1.1	0.8
5	4	7	4	3	
45	22	25	20	30	

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	CT	1	110	J	R			EL

Comments

- C1: S4
- C2: LS = 1%, RS = 1%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model, set at 1-5-300V, was 150 seconds over 50 meters.
- C5: Fines and larges make up the bank texture at this site.
- C6: DO was not measured, the water was clear to the bottom. The mean air temperature on this day was 13.8.C.
- C7: This creek has a lot of LOD, cutbank and overstream vegetation cover.

Cover

Cover Total %: 20 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
15	30	0	0	25	30

Crown Closure %: 60 Aspect: S

Bed Material

	Fines	Clay, silt, sand (<2mm):	90	90
Gravels	Small (2-16mm):		10	5
	Large (16-64mm):			5
	Sm. cobble (64-128mm):			0
Larges	Lge cobble (128-256mm):		0	0
	Blder cobble (>256mm):			0
Bedrock			0	0

D90 (cm): 3 Compaction: Medium

Discharge

Wetted Width (m): 1.1 MS
 Mean Depth (m): 0.0 MS
 Mean Velocity (m/s): 0.29 F
 Discharge (m³/s): 0.01 F

Banks

Height (m): 0.4
 % Unstable: 0
 Fines Gravels Larges Bedrock

Confinement: UC
 Valley: Channel Ratio 10+
 Stage: M Flood Signs Ht(m): 0.6
 Bars (%): 0 pH: 8.3 Braided: N
 Water Temp. (°C): 8.0 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 80

Reach Symbol

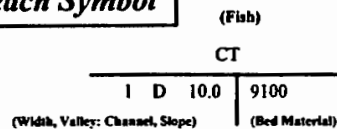




Photo #: E-9-22, 22-Jul-97
Site #: E100, Looking upstream at the channel



Photo #: E-9-23, 22-Jul-97
Site #: E100, Looking downstream at the channel

Location: E102, Unit 11, SE of Louise Lake.

Stream (Gaz.): Unnamed

Watershed Code: 440-7411-809-000-000-000-000-000-000-0

Map #: 93 L 082 Reach Length (km): 1.3 MA Date: 22-Jul-97 Time: 14:30 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9.5868 60793 Length surveyed (m): 100.0 GE Survey Crew: EM VL \ \ \ \ \ \ \ \ Photos: E-10-3,4,5 Air Photos:

Channel Characteristics

C1 Av. Chan. Width (m): 0.9 MS
 C1 Av. Wet. Width (m): 0.9 MS
 Av. Max Riffle Depth (cm): 3 MS
 Av. Max Pool Depth (cm): 21 MS
 Gradient (%): 4.0 CL
 Pool: 20 Riffle: 10 Run: 60 Other: 10
 % Side Channel: 0 GE
 % Debris Area: >15 GE
 % Stable: 0 GE

Specific Data

0.8	0.2	0.8	0.6	0.8	1.3
1.0	1.3	1.0	0.2	0.6	1.1
4	3	2	4		
20	25	20	19		

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
C4	DV	1	80	J	R			EL

Comments

- C1: S4. Additional channel and wetted widths of 1.5m and 1.3m respectively, were obtained at this site.
- C2: The side slopes were not measured.
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model, was 200 seconds over 50 meters. Shockable habitat was limited in the sampling area, as the flow was subterranean in several places.
- C5: No additional bank texture information.
- C6: DO was not measured, the water was clear to the bottom. The mean air temperature on this day was 13.8.C.
- C7: Siltation was noted in this reach, which does have some decent rearing habitat.

Cover

Cover Total %: 60 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
10	60	0	0	10	20

Crown Closure %: 40 Aspect: N

Bed Material

Fines	Clay, silt, sand (<2mm):	100	100
Gravels	Small (2-16mm):	0	0
	Large (16-64mm):		0
Larges	Sm. cobble (64-128mm):		0
	Lge cobble (128-256mm):	0	0
Bedrock	Blder cobble (>256mm):		0
		0	0

D90 (cm): 0 Compaction: Low

Discharge

Wetted Width (m): 1.0 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.09 F
 Discharge (m3/s): 0.01 F

Banks

Height (m): 0.3
 % Unstable: 30

Fines Gravels Larges Bedrock

Confinement: UC

Valley: Channel Ratio 10+

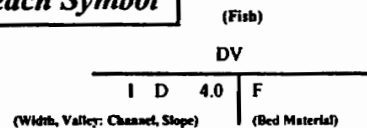
Stage: M Flood Signs Ht(m): 0.5

Bars (%): 0 pH: 8.1 Braided: N

Water Temp. (°C): 9.0 O2 (ppm):

Turb. (cm): Cond. (µmhos): 90

Reach Symbol



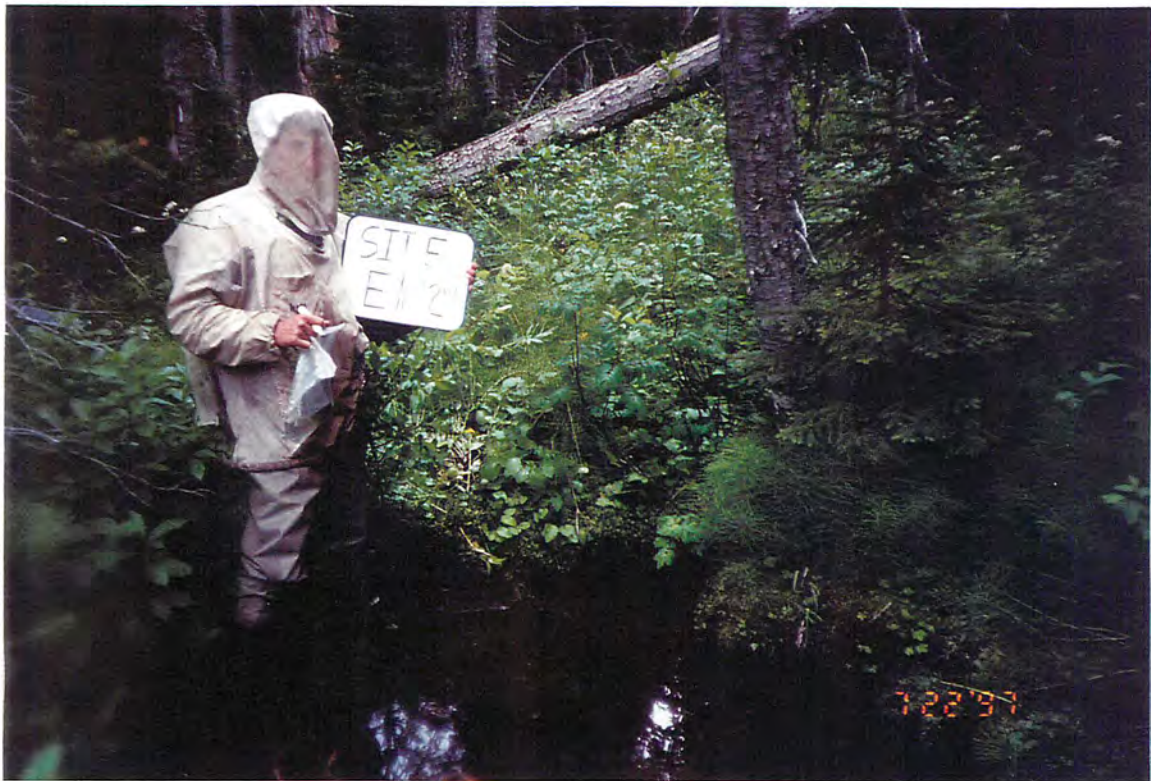


Photo #: E-10-3, 22-Jul-97
Site #: E102, Looking upstream at the channel



Photo #: E-10-4, 22-Jul-97
Site #: E102, Looking downstream at the channel

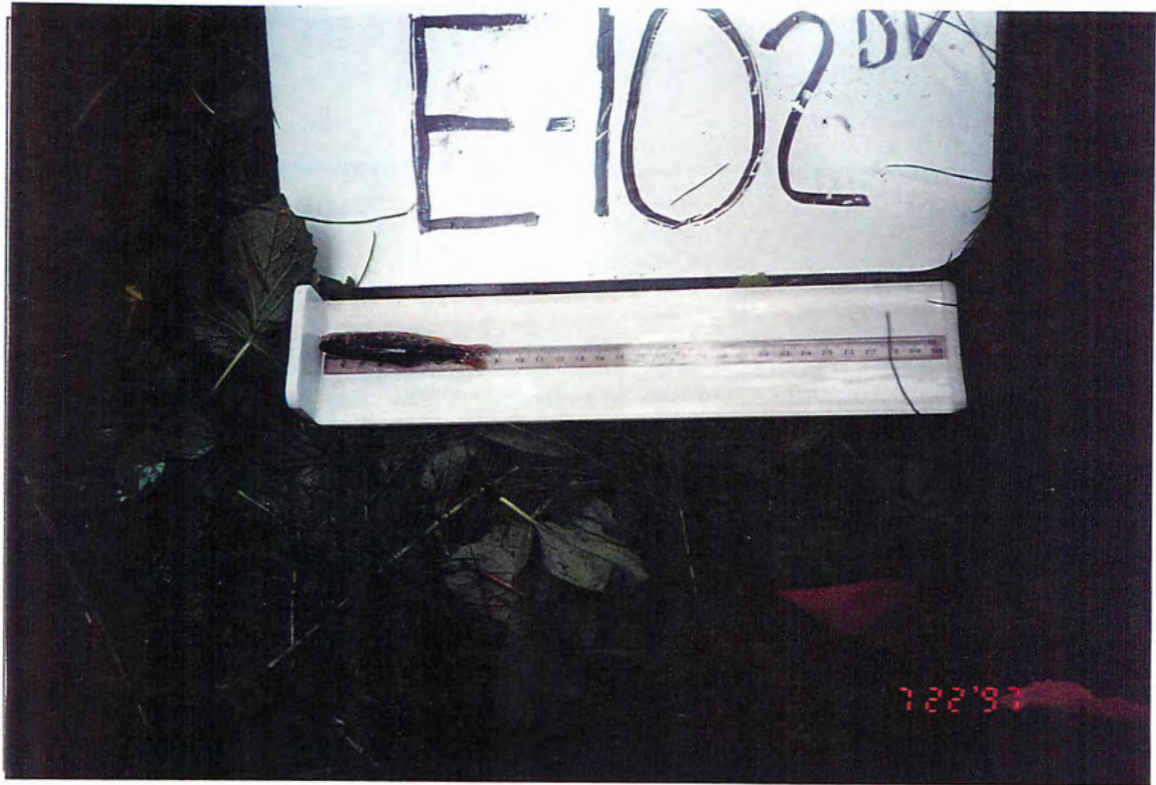


Photo #: E-10-5, 22-Jul-97
Site #: E102, Measuring fish on the fish board

Location: E103, Unit 11, East of Louise Lk.

Stream (Gaz.): Unnamed

Watershed Code: 039-6700-000-000-000-000-000-000-000-000-

Map #: 93 L 082 Reach Length (km): 2.3 MA Date: 22-Jul-97 Time: 15:41 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 5864 60798 Length surveyed (m): 100.0 GE Survey Crew: JL\EM\ \ \ \ \ \ \ \ Photos: E-10-6,7 Air Photos:

Channel Characteristics

Specific Data

Av. Chan. Width (m): 1.1 MS
 Av. Wet. Width (m): 0.8 MS
 Av. Max Riffle Depth (cm): 7 MS
 Av. Max Pool Depth (cm): 16 MS
 Gradient (%): 7.0 CL
 Pool: 30 Riffle: 30 Run: 40 Other: 0
 % Side Channel: 0 GE
 % Debris Area: 5-15 GE
 % Stable: 0 GE

0.7	1.2	0.8	1.6	1.4	1.1
1.0	1.1	0.6	0.4	0.5	1.1
5	6	7	11		
16	20	14	12		

Obstructions

Bed Material

Fines	Clay, silt, sand (<2mm):	20	20
Gravels	Small (2-16mm):	40	20
	Large (16-64mm):		20
Larges	Sm. cobble (64-128mm):		20
	Lge cobble (128-256mm):	40	20
	Blder cobble (>256mm):		0
Bedrock		0	0

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
C4	NF			NA				EL

Comments

- C1: S4
- C2: The side slopes were not measured.
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model, was over 50 meters, seconds not recorded.
- C5: No additional bank texture information.
- C6: DO was not measured, the water was clear to the bottom. The mean air temperature on this day was 13.8.C.
- C7: Abundant rearing habitat was noted in this reach. The amount of fines in the substrate increase toward the swamp.

Cover

Cover Total %: 60 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
30	30	0	0	30	10

Crown Closure %: 30 Aspect: N

Banks

Height (m): 0.4
 % Unstable: 0

Fines Gravels Larges Bedrock

Confinement: UC
 Valley: Channel Ratio 10+
 Stage: L Flood Signs Ht(m): 0.5
 Bars (%): 0 pH: 8.1 Braided: N
 Water Temp. (°C): 9.0 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 90

Discharge

Wetted Width (m): 1.0 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.15 F
 Discharge (m3/s): 0.01 F

Reach Symbol

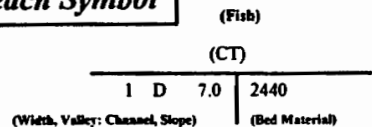




Photo #: E-10-6, 22-Jul-97
Site #: E103, Looking upstream at the channel



Photo #: E-10-7, 22-Jul-97
Site #: E103, Looking downstream at the channel



Location: E98, Unit 11, NE of Louise Lk.

Stream (Gaz.): Unnamed

Watershed Code: 039-7400-000-000-000-000-000-000-000-000-

Map #: 93 L 082 Reach Length (km): 1.2 MA Date: 22-Jul-97 Time: 11:00 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 5865 60805 Length surveyed (m): 200.0 AE Survey Crew: JL VEM \ \ \ \ \ \ \ \ Photos: E-9-17,18 Air Photos:

Channel Characteristics

C1 Av. Chan. Width (m): 0.2 MS
 Av. Wet. Width (m): 0.2 MS
 Av. Max Riffle Depth (cm): 2 MS
 Av. Max Pool Depth (cm): 12 MS
 Gradient (%): 3.0 CL
 Pool: 5 Riffle: 5 Run: 90 Other: 0
 % Side Channel: 0-10 GE
 % Debris Area: 5-15 GE
 % Stable: 0 GE

Specific Data

0.2	0.1	0.1	0.3	0.2	0.2
0.2	0.1	0.1	0.3	0.2	0.2
1	1	2	2	2	
13	11	10	14	10	

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				VO

Comments

- C1 S4
- C2 LS = 1%, RS = 1%
- C3 No fisheries sensitive zones noted.
- C4 No habitat was available to shock.
- C5 No additional bank texture information.
- C6 DO was not measured, the water was clear to the bottom. The mean air temperature on this day was 13.8.C.
- C7 Very poor fish habitat was observed at this site, fish use is very unlikely.

Cover

Cover Total % : 2 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
0	0	0	100	0	0

Crown Closure % : 0 Aspect : SW

Bed Material

Fines	Clay, silt, sand (<2mm):	100	100
Gravels	Small (2-16mm):	0	0
	Large (16-64mm):		0
Larges	Sm. cobble (64-128mm):		0
	Lge cobble (128-256mm):	0	0
	Blder cobble (>256mm):		0
Bedrock		0	0

D90 (cm): 0 Compaction: Medium

Discharge

Wetted Width (m): 0.4 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.01 F
 Discharge (m3/s): 0.00 F

Banks

Height (m): 0.1

% Unstable: 0

Fines Gravels Larges Bedrock

Confinement: UC

Valley : Channel Ratio 10+

Stage: L Flood Signs Ht(m): 0.15

Bars (%): 0 pH: 8.3 Braided: Y

Water Temp. (°C): 9.0 02 (ppm):

Turb. (cm): Cond. (µmhos): 30

Reach Symbol

(Fish)

(DV)

2 D 3.0 F

(Width, Valley: Channel, Slope)

(Bed Material)



Photo #: E-9-17, 22-Jul-97
Site #: E98, Looking upstream at the channel, with sedges

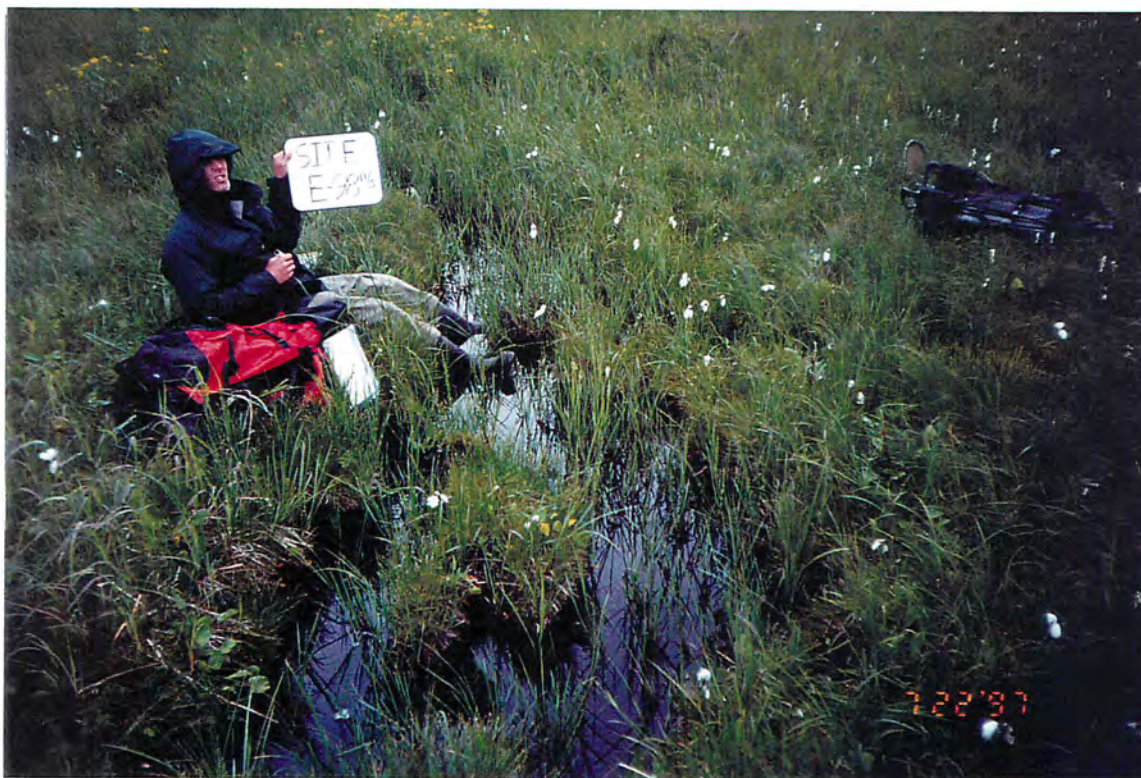


Photo #: E-9-18, 22-Jul-97
Site #: E98, Looking downstream at the channel, with sedges



Location: E99, Unit 11, North of Louise Lk.

Stream (Gaz.): Unnamed

Watershed Code: 039-7400-000-000-000-000-000-000-000-

Map #: 93 L 082 Reach Length (km): 2.0 MA Date: 22-Jul-97 Time: 12:00 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 5863 60799 Length surveyed (m): 800.0 GE Survey Crew: JL VEM \ \ \ \ \ \ Photos: E-9-19,20,21 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 1.0 MS
 Av. Wet. Width (m): 0.9 MS
 Av. Max Riffle Depth (cm): 6 MS
 Av. Max Pool Depth (cm): 27 MS
 Gradient (%): 1.5 CL
 Pool: 15 Riffle: 15 Run: 60 Other: 10
 % Side Channel: 0-10 GE
 % Debris Area: 0-5 GE
 % Stable: 0 GE

Specific Data

0.9	1.3	1.0	1.1	0.7	1.2
0.7	1.2	0.9	0.9	0.6	1.1
7	6	7	5	3	
30	27	32	18	29	

Bed Material

Fines	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	30	15
	Large (16-64mm):		15
	Sm. cobble (64-128mm):		30
Larges	Lge cobble (128-256mm):	60	20
	Blder cobble (>256mm):		10
Bedrock		0	0

D90 (cm): 25 Compaction: Medium

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	CT	2	60-100	J				EL

Comments

- C1: S4
- C2: LS = 10%, RS = 10%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at 1-5-300V, was 62 seconds over 20 meters.
- C5: Fines and larges make up the bank texture at this site.
- C6: DO was not measured, the water was clear to the bottom. The mean air temperature on this day was 13.8.C.
- C7: The first reach flows through a grassy meadow, while the second flows through a more wooded area. Cascades, roughly 10-25cm in height, comprised 10% of the flow at this site.

Cover

Cover Total %: 20 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
15	20	15	0	30	20

Crown Closure %: 0 Aspect: W

Discharge

Wetted Width (m): 1.0 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.27 F
 Discharge (m3/s): 0.02 F

Banks

Height (m): 0.2
 % Unstable: 0
 Fines Gravels Larges Bedrock

Confinement: UC
 Valley: Channel Ratio 10+

Stage: H Flood Signs Ht(m): 0.4

Bars (%): 0 pH: 8.2 Braided: N

Water Temp. (°C): 11.0 O2 (ppm):

Turb. (cm): Cond. (µmhos): 80

Reach Symbol

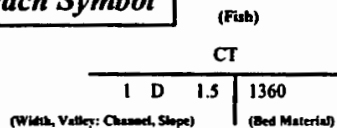




Photo #: E-9-19, 22-Jul-97
Site #: E99, Looking upstream at the channel



Photo #: E-9-20, 22-Jul-97
Site #: E99, Looking downstream at the channel



Photo #: E-9-21, 22-Jul-97
Site #: E99, Measuring TR on the fish board

5.2 Henderson Creek (440-9871-000) (93 L 074)

5.2.1 Sensitive Habitats and Barriers

The mainstem of Henderson Creek is 5.9 km in length is fed by 3 tributaries. Reach 1 of this stream has low to moderate, steadily increasing gradient and is unconfined. Reach 2 has varied gradient and is quite confined, while reach 3 has steep, impassable gradient, a falls and is quite confined. A mine is located near the channel in reach 1. The TRIM sheet indicates steep gradient in reach 2, however, the gradient was only 10% in the sample site located in reach 2 and some good rearing habitat was identified. Fish distribution is most likely limited in this system to reach 3. No sensitive habitats were identified by field crews working in this stream. Henderson Creek was sampled in reaches 1 and 2 of the mainstem, and in 2 tributaries, Sloan Creek and White Swan Creek.

5.2.2 Fish Summary Tables and Stream Classification

No historical information exists for Henderson Creek however, it flows into Aldrich Lake, which is known to support steelhead, rainbow trout, mountain whitefish, Dolly Varden, sockeye, coho, longnose sucker and peamouth chub. No fish were caught in this system, which was sampled in both 1996 and 1997. Henderson Creek has been classified as an S2 in reach 1 based on an average channel width of 12.5 meters and the presence of boulder and cobble cover in the sampling area. It may be significant to note that reach 1 was totally dry at the time of sampling in 1996. Sloan Creek, a tributary to reach 1 of Henderson, was classified as an S5 in reach 2, based on steep gradient and a lack of suitable fish habitat in the sampling area, due in part to low flows. White Swan, another tributary to reach 1 of Henderson Creek will be discussed in a later section, but was classified as an S3 in reaches 1 and 2. The two unsampled tributaries have been classified as non fish bearing due to extreme gradient.

DFO/MoELP Stream Survey Form

Site Number: KARLA 75

Reach No.: 2

Henderson Cr.



TRITON
Environmental Consultants Ltd.

Location: KARLA 75, Unit 11, 1.4km North of Aldrich Lake, see C5.

Stream (Gaz.): Henderson Sloan Cr.

Watershed Code: 440-9648-000-000-000-000-000-000-000-0

Map #: 93 L 074 Reach Length (km): 0.9 MA Date: 28-Sep-96 Time: 17:17 Agency: TEC Access: V2 Fish Card: N Field Historical
 U.T.M.: 9.6049 .60703 Length surveyed (m): 150.0 GE Survey Crew: JP\KG\ \ \ \ \ \ \ \ Photos: K-7-18,19 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 12.5 T
 Av. Wet. Width (m): 0.0 T
 N Av. Max Riffle Depth (cm): 0 GE
 N Av. Max Pool Depth (cm): 0 GE
 Gradient (%): 4.0 CL
 N Pool: 0 Riffle: 0 Run: 0 Other: 0
 N % Side Channel:
 N % Debris Area: >15 GE
 % Stable: 70 GE

Specific Data

7.6 8.0 12.4 18.0 12.1 16.8

Bed Material

Fines	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	30	10
	Large (16-64mm):		20
Larges	Sm. cobble (64-128mm):		15
	Lge cobble (128-256mm):	60	20
Bedrock	Blder cobble (>256mm):		25
	Bedrock	0	0

Obstructions

C	Height (m)	Type	Location

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				NA

Comments

- C1: S2
- C2: The side slopes were not measured at this site.
- C3: No fisheries sensitive zones were noted at this site.
- C4: This dry site was not electrofished.
- C5: Lat N 54 46' 10.4", Long W 127 22' 13.1"
- C6: No additional bank texture information.
- C7: Water quality could not be evaluated at this site. The mean air temperature on this day was 10.5°C
- C8: This site could provide rearing habitat, with extensive boulder cover, if water were present in the channel.

Cover

Cover Total %: 50 GE
 Pool LOD Bldr In Veg O Veg Ctnk
 20 35 5 0 15 25
 Crown Closure %: 15 Aspect: SE

Discharge

N Wetted Width (m):
 N Mean Depth (m):
 N Mean Velocity (m/s):
 N Discharge (m3/s):

Banks

Height (m): 0.4
 % Unstable: 10
 Fines Gravels Larges Bedrock
 Confinement: UC
 Valley: Channel Ratio 10+
 Stage: Dry N Flood Signs Ht(m): 0
 N Bars (%): 10 pH: Braided: Y
 N Water Temp. (°C): 02 (ppm):
 Turb. (cm): Cond. (µmhos):

Reach Symbol

(Fish)
 (RB) (DV)
 13 D 4.0 | 1360
 (Width, Valley: Channel, Slope) | (Bed Material)



Photo #: K-7-18, 1996/09/28
Site #: K75, Looking upstream in dry channel.



Photo #: K-7-19, 1996/09/28
Site #: K75, Looking downstream in dry channel.



Location: Y261, Unit 11

Stream (Gaz.): Henderson Creek

Watershed Code: 440-9871-000-000-000-000-000-000-000-0

Map #: 93 L 074 Reach Length (km): 0.9 MW Date: 13-Sep-97 Time: 15:13 Agency: TEC Access: V4 Fish Card: N Field Historical
 U.T.M.: 9 605233.6070932 Length surveyed (m): 200.0 GE Survey Crew: JP VFC \ \ \ \ \ \ \ Photos: Y-31-16,17 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 10.0 MS
 Av. Wet. Width (m): 2.7 MS
 Av. Max Riffle Depth (cm): 12 MS
 Av. Max Pool Depth (cm): 51 MS
 Gradient (%): 10.0 CL
 Pool: 20 Riffle: 30 Run: 40 Other: 10
 % Side Channel: 0 GE
 % Debris Area: 5-15 GE
 % Stable: 20 GE

Specific Data

11.7	10.6	8.6	8.5	12.8	7.7
1.7	1.9	4.0	3.3	2.7	2.3
13	12	12	11		
56	38	36	55	72	

Bed Material

Fines	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	30	15
	Large (16-64mm):		15
	Sm. cobble (64-128mm):		20
Larges	Lge cobble (128-256mm):	60	20
	Bllder cobble (>256mm):		20
Bedrock		0	0

D90 (cm): 56 Compaction: High

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Comments

- C1: S2
- C2: LS = 120%, RS = 70%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model, set at I-5-500V, was 180 seconds over 100 meters.
- C5: Gravels, larges and bedrock make up the bank texture at this site.
- C6: DO was not measured, the water was clear to the bottom. The air temperature at this site was 12.C.
- C7: Good habitat, including a lot of boulder, pool and LOD cover was observed above the road crossing. Spawning habitat is limited as the substrate is dominated by larges. There are a number of log jams above the road, that have deep plunge pools, but that may be barriers to fish migration upstream. Cascades make up 10% of the flow at this site. The gradient increases below the road.

Cover

Cover Total %: 30 GE

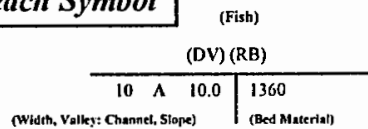
Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
25	25	50	0	0	0

Crown Closure %: 15 Aspect: SW

Discharge

Wetted Width (m): 1.3 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.72 F
 Discharge (m3/s): 0.07 F

Reach Symbol



Banks

Height (m): 0.4
 % Unstable: 70
 Fines Gravels Larges Bedrock

Confinement: CO
 Valley : Channel Ratio 0-2
 Stage: M Flood Signs Ht(m): 0.5
 Bars (%): 20 pH: 6.9 Braided: N
 Water Temp. (°C): 8.0 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 30



Photo #: Y-31-16, 13/09/97
Site #: Y261, Looking upstream at the channel



Photo #: Y-31-17, 13/09/97
Site #: Y261, Looking downstream at the channel, note debris jam

Location: Y260, Unit 11

Stream (Gaz.): Sloan Creek

Watershed Code: 440-9871-442-000-000-000-000-000-000-000-0

Map #: 93 L 074 Reach Length (km): 3.4 MW Date: 13-Sep-97 Time: 14:33 Agency: TEC Access: V4 Fish Card: N Field Historical
 U.T.M.: 9.6052 .60712 Length surveyed (m): 100.0 GE Survey Crew: JP\VC\ \ \ \ \ \ \ \ Photos: Y-31-14,15 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 5.2 MS
 Av. Wet. Width (m): 0.6 MS
 Av. Max Riffle Depth (cm): 3 MS
 Av. Max Pool Depth (cm): 25 MS
 Gradient (%): 21.5 CL
 Pool: 20 Riffle: 20 Run: 20 Other: 40
 % Side Channel: >40 GE
 % Debris Area: 0-5 GE
 % Stable: 10 GE

Specific Data

4.2	5.5	4.0	6.0	6.2	5.3
0.0	0.0	0.0	1.4	0.7	1.3
3	2	2	3	4	
16	22	26	26	37	

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Bed Material

	Fines	Clay, silt, sand (<2mm):	10	10
Gravels		Small (2-16mm):	30	15
		Large (16-64mm):		15
		Sm. cobble (64-128mm):		15
Larges		Lge cobble (128-256mm):	60	20
		Bllder cobble (>256mm):		25
Bedrock			0	0

Comments

- C1: S5
- C2: LS = 85%, RS = 35%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at I-5-500V, was 24 seconds over 100 meters. All available habitat was shocked at this site, which was mostly dry at the time of sampling.
- C5: Fines, gravels and larges make up the bank texture at this site.
- C6: DO was not measured, the water was clear to the bottom.
- C7: This stream is dry at the road crossing and only 50 m of flowing water was noted above the road. This reach is quite steep, is intermittently dry and is not likely to be used by fish. Future sampling at different flow levels is recommended.

Cover

Cover Total %: 10 GE
 Pool LOD Bldr In Veg O Veg Ctbnk
 10 20 60 0 10 0
 Crown Closure %: 60 Aspect: W

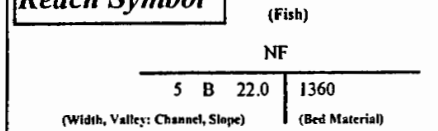
Discharge

Wetted Width (m): 0.5 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.32 F
 Discharge (m3/s): 0.01 F

Banks

Height (m): 0.2
 % Unstable: 20
 Fines Gravels Larges Bedrock
 Confinement: FC
 Valley : Channel Ratio 2-5
 Stage: L Flood Signs H(m): 0.8
 Bars (%): 75 pII: 6.8 Braided: N
 Water Temp. (°C): 8.0 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 40

Reach Symbol



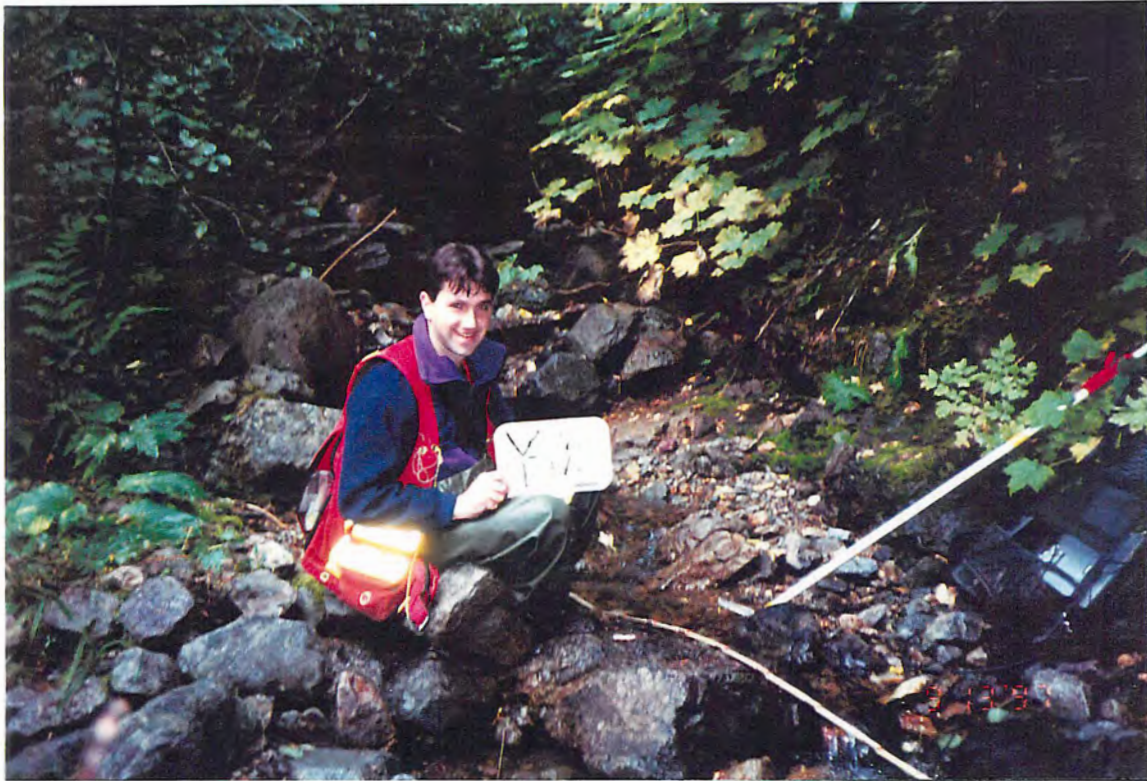


Photo #: Y-31-14, 13/09/97
Site #: Y260, Looking upstream at the channel



Photo #: Y-31-15, 13/09/97
Site #: Y260, Looking downstream at the channel

5.3 Mulwain Creek (440-6382-000) (93 L 071, 93 L 081, 103I090, 103I100)

5.3.1 Sensitive Habitats and Barriers

Mulwain Creek is 25.9 km in length and is fed by 56 tributaries. The mainstem has low gradient and moderate flow in reach 1, providing great spawning habitat. Barriers were noted on several tributaries to Mulwain Creek, which typically delineate the upper limits of fish distribution on those tributaries (see Table 3). For example a 12 meter cascade was identified at Z178, located on 103I090. Fish were not caught above this barrier. A set of falls below site Z176 on 103I 100 delineate the upper limits of fish distribution in the large tributary to the upper Mulwain. Reach 1 of Mulwain Creek has canyon like confinement but low gradient. Reach 2 is less confined and has low gradient. Reaches 3 and 4 comprise the headwaters, located in a plateau. Reach 4 is the large lake feeding this system. Mulwain Creek was sampled at 37 locations, including reaches 2 and 3 of the mainstem.

5.3.2 Fish Summary tables and Stream Classification

Rainbow trout are historically present at 14.4 km from the confluence with the Zymoetz River and were caught by electrofishing in reaches 2 and 3 of the mainstem and in 2 tributaries in this inventory. Dolly Varden were caught by electrofishing or observed at 19 sites located on tributaries.

Mulwain Creek was classified as an S2 in reach 2, based on an average channel width of 13.98 meters and the presence of fish in the sampling area, and as an S3 in reach 3 based on an average channel width of 1.95 meters and the presence of fish in the sampling area. The tributaries to this stream range in size from S2 to S4, with the upper reaches of some tributaries classified as non fish bearing due to the presence of barriers or steep gradient.



Location: E126, Unit 11, Mulwain mainstem, reach 3.

Stream (Gaz.): Mulwain Creek

Watershed Code: 440-6382-012-000-000-000-000-000-000-0

Map #: 1031 090 Reach Length (km): 0.8 MA Date: 26-Jul-97 Time: 10:30 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 5585 60839 Length surveyed (m): 100.0 GE Survey Crew: JL \EM \ \ \ \ \ \ \ \ Photos: E-12-7,8,9 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 1.9 MS
 Av. Wet. Width (m): 1.8 MS
 Av. Max Riffle Depth (cm): 9 MS
 Av. Max Pool Depth (cm): 47 MS
 Gradient (%): 2.0 CL
 Pool: 30 Riffle: 20 Run: 50 Other: 0
 % Side Channel: 10-40 GE
 % Debris Area: 0-5 GE
 % Stable: 10 GE

Specific Data

2.2	1.6	1.9	1.5	2.5	2.0
2.3	1.6	1.8	1.7	1.5	1.8
10	7	9	11	7	
60	45	40	40	50	

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	RB	2	70-95	J	R			EL

Comments

- C1: S3
- C2: LS = 10%, RS = 45%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model, set at I-5-300V, was 155 seconds over 40 meters.
- C5: No additional bank texture information.
- C6: DO was not measured, the water was clear to the bottom. The mean air temperature on this day was 13.1.C.
- C7: This creek flows through a meadow and several unwatered side channels. Some good deep pool and cutbank cover was observed at this site. Spawning gravels were also noted.

Bed Material

Fines	Clay, silt, sand (<2mm):	0	0
Gravels	Small (2-16mm):	30	15
	Large (16-64mm):		15
	Sm. cobble (64-128mm):		30
Larges	Lge cobble (128-256mm):	70	25
	Bldr cobble (>256mm):		15
Bedrock		0	0

Cover

Cover Total %: 20 GE
 Pool LOD Bldr In Veg O Veg Ctbk
 30 10 10 10 20 20
 Crown Closure %: 5 Aspect: E

D90 (cm): 30 Compaction: Medium

Discharge

Wetted Width (m): 0.8 MS
 Mean Depth (m): 0.3 MS
 Mean Velocity (m/s): 0.19 F
 Discharge (m3/s): 0.03 F

Banks

Height (m): 0.1
 % Unstable: 0
 Fines Gravels Larges Bedrock
 Confinement: UC
 Valley: Channel Ratio 10+
 Stage: H Flood Signs Ht(m): 0.4
 Bars (%): 20 pH: 7.5 Braided: Y
 Water Temp. (°C): 8.0 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 20

Reach Symbol

(Fish)
 RB
 2 D 2.0 0370
 (Width, Valley: Channel, Slope) (Bed Material)



Photo #: E-12-7, 26-Jul-97
Site #: E126, Measuring fish on the fish board



Photo #: E-12-8, 26-Jul-97
Site #: E126, Looking upstream at the channel



Photo #: E-12-9, 26-Jul-97

Site #: E126, Looking downstream at the channel



Location: W118, Unit 11

Stream (Gaz.): Mulwain Creek

Watershed Code: 440-6382-012-000-000-000-000-000-000-0

Map #: 1031 090 Reach Length (km): 7.0 MA Date: 26-Jul-97 Time: 10:30 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9.5633 60817 Length surveyed (m): 300.0 GE Survey Crew: KA VP \ \ \ \ \ \ \ \ Photos: W-13-7,8,8A Air Photos:

Channel Characteristics

Av. Chan. Width (m): 14.0 MS
 Av. Wet. Width (m): 10.7 MS
 Av. Max Riffle Depth (cm): 12 MS
 Av. Max Pool Depth (cm): 67 MS
 Gradient (%): 2.0 CL
 Pool: 20 Riffle: 30 Run: 50 Other: 0
 % Side Channel: 0 GE
 % Debris Area: 0.5 GE
 % Stable: 30 GE

Specific Data

14.4	14.2	14.7	12.0	16.0	12.6
14.1	14.0	13.0	9.6	6.5	7.2
14	13	12	9	12	15
24	47	30	120	80	100

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	RB	1	110	J	R			EL

Comments

- C1: S2.
- C2: LS=5%, RS=2%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at 600V, was 541 seconds over 250 meters.
- C5: The right bank varies from 2% slope at the bottom to a 40% slope at the top where it is bedrock.
- C6: DO was not measured at this site, the water was clear to bottom. The mean air temperature on this day was 13.1 C.
- C7: This is a great stream with habitat for all life stages. It has perfect spawning substrate associated with pools and long runs. The rearing habitat consists of cutbanks, pools, boulders, etc. The substrate is varied.

Cover

Cover Total %: 40 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
25	10	30	0	10	25

 Crown Closure %: 5 Aspect: S

Bed Material

Fines	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	30	10
	Large (16-64mm):		20
Larges	Sm. cobble (64-128mm):		20
	Lge cobble (128-256mm):	50	20
	Blder cobble (>256mm):		10
Bedrock		10	10

D90 (cm): 44 Compaction: Medium

Discharge

Wetted Width (m): 6.6 MS
 Mean Depth (m): 0.3 MS
 Mean Velocity (m/s): 0.76 F
 Discharge (m3/s): 1.13 F

Banks

Height (m): 0.1
 % Unstable: 30
 Fines Gravels Larges Bedrock

Confinement: OC
 Valley: Channel Ratio 5-10
 Stage: M Flood Signs Ht(m): 1
 Bars (%): 20 pH: 7.4 Braided: N
 Water Temp. (°C): 9.0 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 40

Reach Symbol

(Fish)
 RB
 14 C 2.0 | 1351
 (Width, Valley: Channel, Slope) | (Bed Material)



Location: W119, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 065-4300-000-000-000-000-000-000-000-000-

Map #: 1031 090 Reach Length (km): 1.6 MA Date: 26-Jul-97 Time: 11:50 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 5636 60812 Length surveyed (m): 150.0 GE Survey Crew: KA UP \ \ \ \ \ \ \ \ Photos: W-13-9,10,11,12 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 4.1 MS
 Av. Wet. Width (m): 3.3 MS
 CI Av. Max Riffle Depth (cm): 9 MS
 Av. Max Pool Depth (cm): 46 MS
 Gradient (%): 2.0 CL
 Pool: 30 Riffle: 30 Run: 40 Other: 0
 % Side Channel: 0 GE
 % Debris Area: 5-15 GE
 % Stable: 60 GE

Specific Data

2.3	5.0	4.1	3.8	4.2	5.0
3.0	3.1	3.1	2.5	3.3	5.0
6	5	6	19	10	12
26	63	60	57	34	39

Obstructions

C	Height (m)	Type	Location
	12	C	1.6

Bed Material

	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	40	20
	Large (16-64mm):		20
Larges	Sm. cobble (64-128mm):		20
	Lge cobble (128-256mm):	50	20
	Blder cobble (>256mm):		10
Bedrock		0	0

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	RB	6	40-111	J	R			EL

Comments

- C1: S3. One additional measurement of 4.0 was taken for riffle depth.
- C2: LS=4%, RS=10%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at 800V, was 542 seconds over 100 meters.
- C5: No additional bank texture information.
- C6: DO was not measured at this site, the water was clear to bottom. The mean air temperature on this day was 13.1 C.
- C7: This is a beautiful stream with habitat for rearing and spawning. Beautiful pool-riffle-run complexes. The LOD and cutbanks provide excellent cover for fish. This stream is probably used for rearing RB hatched in the Mulwain mainstem.

Cover

Cover Total %: 50 GE

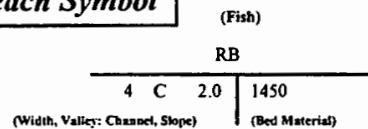
Pool	LOD	Bldr	In Veg	O Veg	Ctnk
25	25	10	0	10	30

 Crown Closure %: 10 Aspect: S

Discharge

Wetted Width (m): 2.8 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.55 F
 Discharge (m³/s): 0.12 F

Reach Symbol



Banks

Height (m): 0.1
 % Unstable: 50
 Fines Gravels Larges Bedrock
 Confinement: OC
 Valley: Channel Ratio 5-10
 Stage: M Flood Signs H(m): 0.5
 Bars (%): 20 pH: 8.0 Braided: N
 Water Temp. (°C): 7.0 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 50



Photo #: W-13-9, 26-Jul-97

Site #: W119, Looking upstream, note abundance of LOD



Photo #: W-13-10, 26-Jul-97

Site #: W119, Looking downstream, note abundance of LOD



Photo #: W-13-11, 26-Jul-97
Site #: W119, RB flipping off photoboard

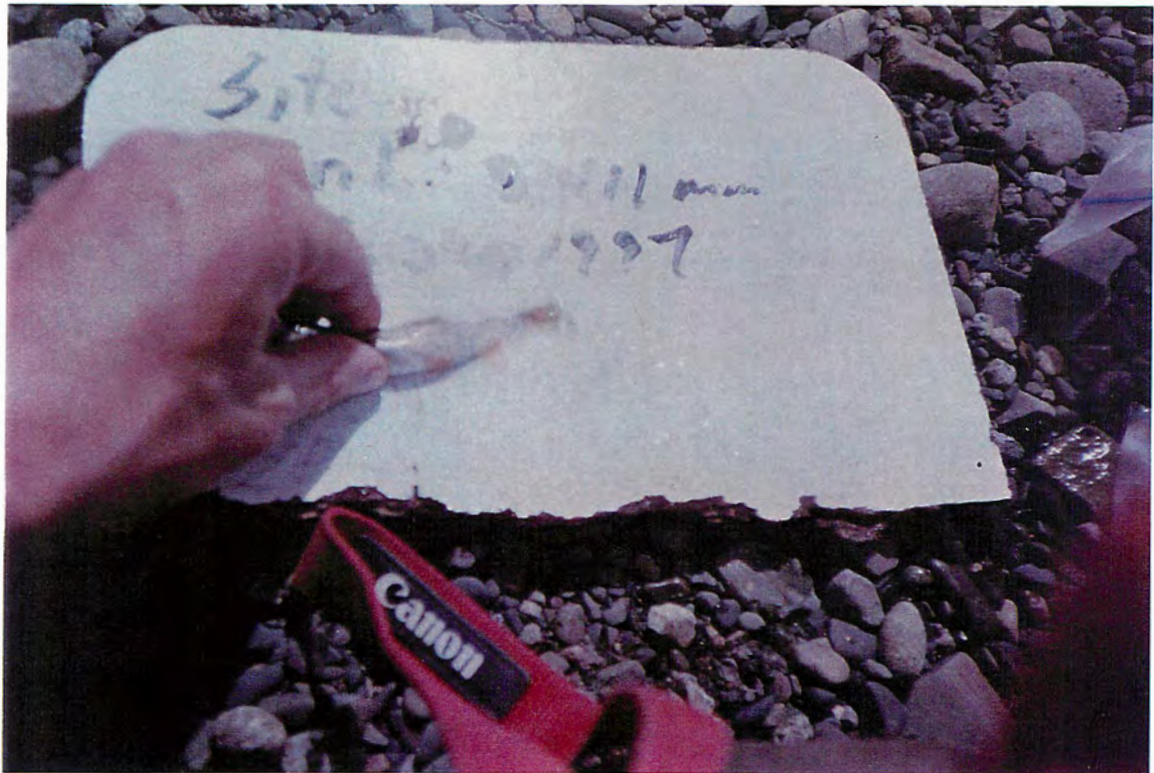


Photo #: W-13-12, 26-Jul-97
Site #: W119, RB on photoboard



Location: W120, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 065-4200-000-000-000-000-000-000-000-

Map #: 1031 090

Reach Length (km): 1.1 MA

Date: 26-Jul-97

Time: 13:00

Agency: TEC

Access: H

Fish Card: N

Field Historical

U.T.M.: 9 5636 60809

Length surveyed (m): 100.0 GE

Survey Crew: KA UP \ \ \ \ \ \ \ \

Photos: W-13-13,14,15,16

Air Photos:

Channel Characteristics

Av. Chan. Width (m): 2.5 MS
 Av. Wet. Width (m): 1.6 MS
 Av. Max Riffle Depth (cm): 6 MS
 Av. Max Pool Depth (cm): 28 MS
 Gradient (%): 2.0 CL
 Pool: 30 Riffle: 30 Run: 40 Other: 0
 % Side Channel: 0-10 GE
 % Debris Area: 5-15 GE
 % Stable: 40 GE

Specific Data

2.8	3.0	1.8	3.7	2.0	1.6
1.5	2.3	1.4	1.7	1.6	1.4
4	5	6	7	3	8
42	21	21	27	24	36

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	DV	14	60-100	J	R			EL

Comments

- C1: S3.
- C2: LS=5%, RS=5%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at 800V, was 123 seconds over 70 meters.
- C5: No additional bank texture information.
- C6: DO was not measured at this site, the water was clear to bottom. The mean air temperature on this day was 13.1 C.
- C7: There is good rearing habitat here. Lots of LOD creating step-pools, favourable substrate and lots of vegetation cover. There is also spawning habitat.

Cover

Cover Total %: 30 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
25	25	0	0	20	30

Crown Closure %: 15 Aspect: SE

Bed Material

	Clay, silt, sand (<2mm):	20	20
Gravels	Small (2-16mm):	50	20
	Large (16-64mm):		30
Larges	Sm. cobble (64-128mm):		15
	Lge cobble (128-256mm):	30	10
	Blder cobble (>256mm):		5
Bedrock		0	0

D90 (cm): 22 Compaction: Medium

Discharge

Wetted Width (m): 1.7 MS
 Mean Depth (m): 0.3 MS
 Mean Velocity (m/s): 0.10 F
 Discharge (m3/s): 0.04 F

Banks

Height (m): 0.1
 % Unstable: 50

Fines Gravels Larges Bedrock

Confinement: OC
 Valley : Channel Ratio 5-10
 Stage: M Flood Signs H(m): 0.5
 Bars (%): 5 pH: 7.8 Braided: N
 Water Temp. (°C): 7.0 02 (ppm):
 Turb. (cm): Cond. (µmhos): 30

Reach Symbol

(Fish)

DV

3 C 2.0 | 2530

(Width, Valley: Channel, Slope) (Bed Material)

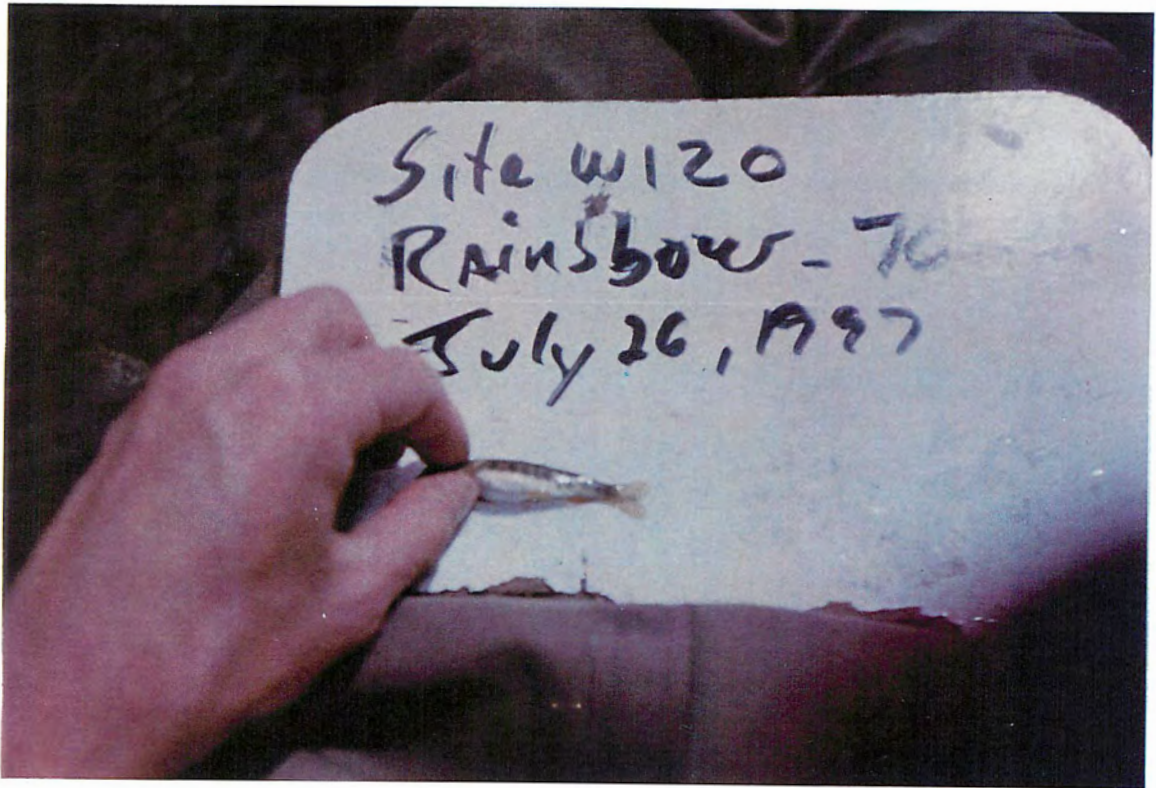


Photo #: W-13-13, 26-Jul-97
Site #: W120, RB 70mm on photoboard

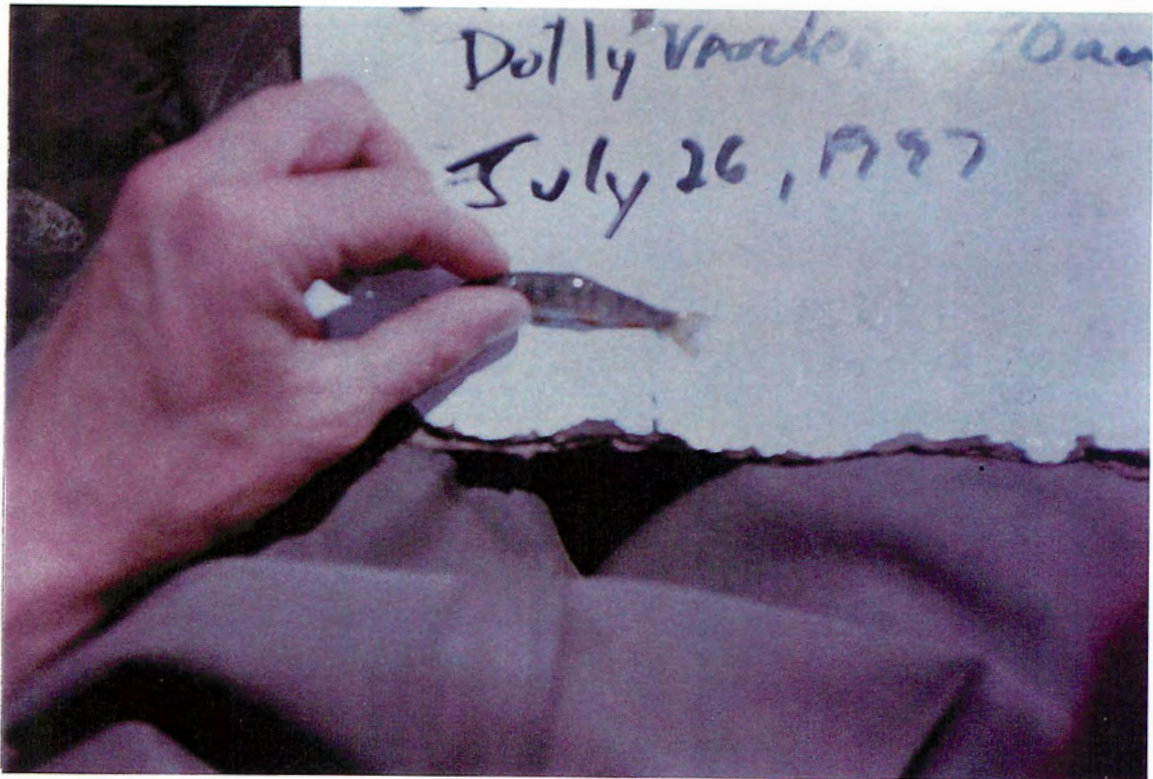


Photo #: W-13-14, 26-Jul-97
Site #: W120, DV 70mm on photoboard



Photo #: W-13-15, 26-Jul-97
Site #: W120, Looking upstream, note LOD and plunge pools



Photo #: W-13-16, 26-Jul-97
Site #: W120, Looking downstream, note LOD and plunge pools

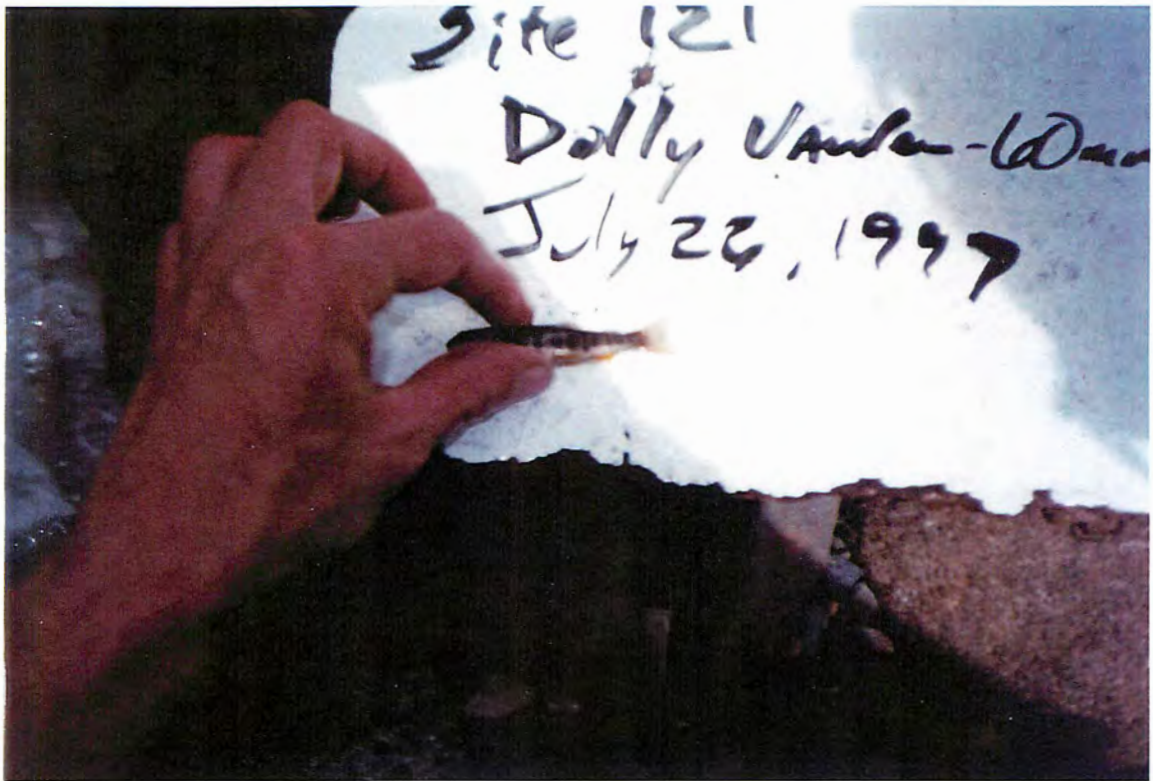


Photo #: W-13-17, 26-Jul-97
Site #: W121, DV, 70mm on photoboard



Photo #: W-13-18, 26-Jul-97
Site #: W121, Looking upstream at the channel



Photo #: W-13-19, 26-Jul-97

Site #: W121, Looking downstream at the channel

Location: Y90, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 038-0400-000-000-000-000-000-000-000-000-

Map #: 93 L 081 Reach Length (km): 1.8 MA Date: 26-Jul-97 Time: 9:05 Agency: TEC Access: II Fish Card: N Field Historical
 U.T.M.: 9 .56774 .607705 Length surveyed (m): 100.0 GE Survey Crew: JP\SJ \ \ \ \ \ \ \ \ Photos: Y-11-19,20,21,22,23 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 4.3 MS
 Av. Wet. Width (m): 2.0 MS
 Av. Max Riffle Depth (cm): 8 MS
 Av. Max Pool Depth (cm): 34 MS
 Gradient (%): 15.0 CL
 Pool: 30 | Riffle: 20 | Run: 30 | Other: 20
 % Side Channel: 0 GE
 % Debris Area: >15 GE
 % Stable: 40 GE

Specific Data

	3.7	4.8	4.3	4.6	4.0	4.3
	1.9	1.6	2.2	1.2	3.3	2.1
	9	10	8	9	7	8
	45	25	37	33	35	30

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	DV	4	45-90	J				EL

Comments

- C1: S3.
- C2: The side slopes were not measured.
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 300V, was 137 seconds over 100 meters.
- C5: No additional bank texture information.
- C6: DO was not measured at this site, the water was clear to bottom. The mean air temperature on this day was 13.1 C.
- C7: This reach has step-pool habitat with fish distributed throughout. Potential spawning habitat exists at this site. Cascades over rocks and LOD comprise 20% of the flow. Minerals were noted in the rocks at this site.

Cover

Cover Total %: 50 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
30	20	40	0	5	5

Crown Closure %: 5 Aspect: N

Bed Material

Fines	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	30	10
	Large (16-64mm):		20
	Sm. cobble (64-128mm):		15
Larges	Lge cobble (128-256mm):	50	15
	Blder cobble (>256mm):		20
Bedrock		10	10

D90 (cm): Compaction: High

Discharge

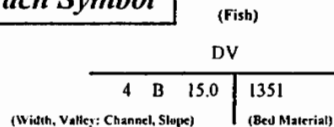
Wetted Width (m): 1.4 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.63 F
 Discharge (m3/s): 0.07 F

Banks

Height (m): 0.2
 % Unstable: 30
 Fines Gravels Larges Bedrock

Confinement: CO
 Valley: Channel Ratio 2-5
 Stage: M Flood Signs II(m): 0.5
 Bars (%): 10 pH: 6.4 Braided: N
 Water Temp. (°C): 8.5 02 (ppm):
 Turb. (cm): Cond. (µmhos): 200

Reach Symbol



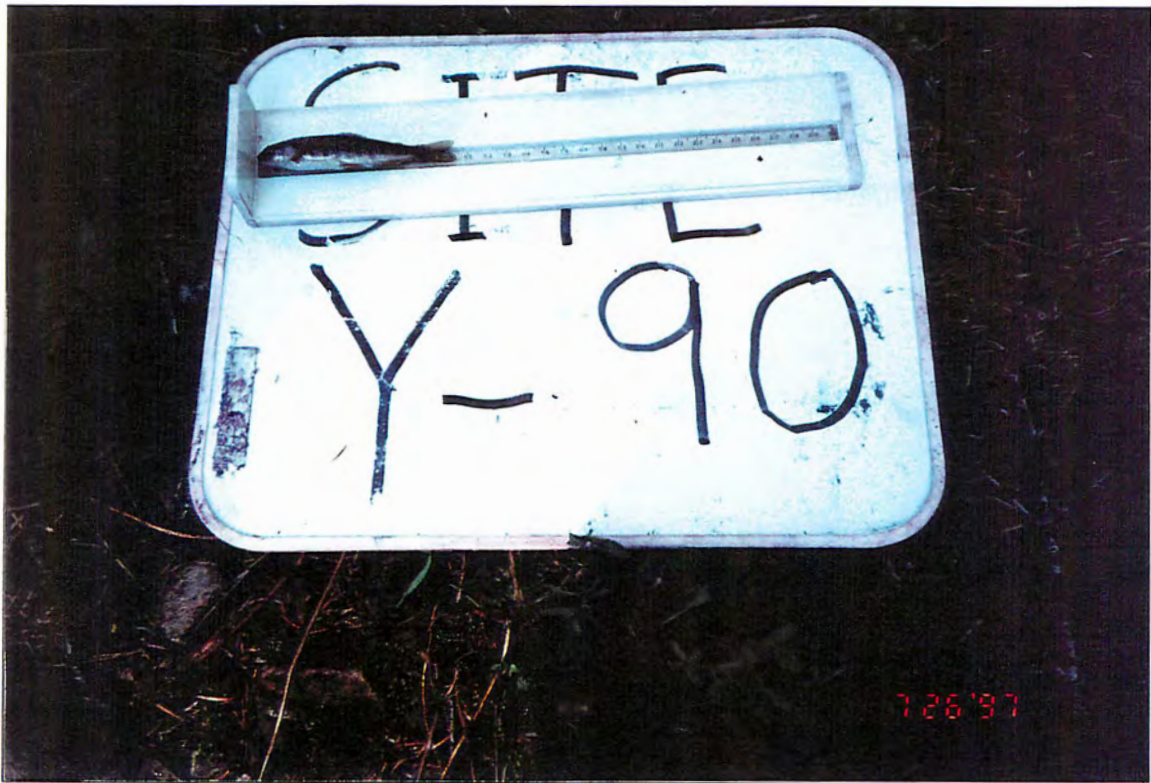


Photo #: Y-11-19, 26/07/97
Site #: Y90, Measuring Dolly Varden on the fishboard



Photo #: Y-11-20, 26/07/97
Site #: Y90, Measuring Dolly Varden on the fishboard



Photo #: Y-11-23, 26/07/97

Site #: Y90, Looking upstream at the channel, note cascade over LOD

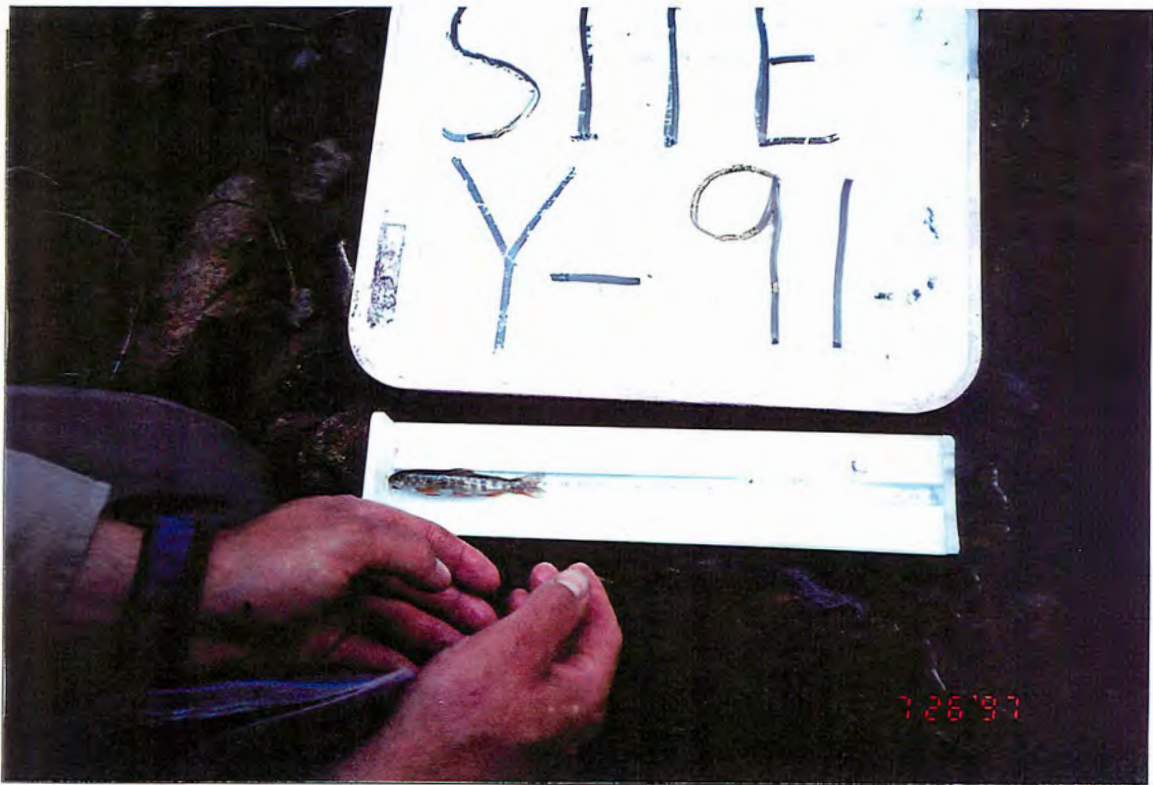


Photo #: Y-11-24, 26/07/97
Site #: Y91, Measuring Dolly Varden on the fishboard



Photo #: Y-11-25, 26/07/97
Site #: Y91, Looking downstream at the channel, note steep rightbank



Photo #: Y-12-1, 26/07/97
Site #: Y91, Looking upstream at the channel



Photo #: Y-12-2, 26/07/97
Site #: Y91, Looking downstream at the channel, note slumping banks



Location: Y92, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 038-0700-000-000-000-000-000-000-000-000-

Map #: 93 L 081 Reach Length (km): 0.9 MW Date: 26-Jul-97 Time: 11:45 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 5679 60772 Length surveyed (m): 200.0 GE Survey Crew: JP\SJ \ \ \ \ \ \ \ Photos: Y-12-3,4,5 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 7.8 MS
 Av. Wet. Width (m): 5.0 MS
 Av. Max Riffle Depth (cm): 19 MS
 Av. Max Pool Depth (cm): 48 MS
 Gradient (%): 11.0 CL
 Pool: 25 Riffle: 10 Run: 35 Other: 30
 % Side Channel: 0-10 GE
 % Debris Area: 5-15 GE
 % Stable: 15 GE

Specific Data

5.5	5.5	8.5	11.0	9.0	7.5
3.5	3.9	7.5	8.0	2.6	4.3
30	18	19	22	14	11
57	53	66	44	37	32

Bed Material

Fines	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	20	10
	Large (16-64mm):		10
	Sm. cobble (64-128mm):		10
Larges	Lge cobble (128-256mm):	70	10
	Blder cobble (>256mm):		50
Bedrock		0	0

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	DV	2	125-130	A				EL
	DV	2	80-90	NA				VO

Comments

- C1: S2.
- C2: LS=15%, RS=36%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at 1, 5, 300V, was 70 seconds over 100 meters.
- C5: No additional bank texture information.
- C6: DO was not measured at this site, the water was clear to bottom. The mean air temperature on this day was 13.1 C.
- C7: This reach has great boulder and deep pool cover. Cascades over boulders make up 30% of the flow.

Cover

Cover Total %: 70 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
30	20	50	0	0	0

Crown Closure %: 0 Aspect: S

D90 (cm): 80 Compaction: High

Discharge

Wetted Width (m): 0.9 MS
 Mean Depth (m): 0.2 MS
 Mean Velocity (m/s): 0.82 F
 Discharge (m3/s): 0.11 F

Banks

Height (m): 0.3

% Unstable: 10

Fines Gravels Larges Bedrock

Confinement: OC
 Valley: Channel Ratio 5-10
 Stage: M Flood Signs Ht(m): 0.9
 Bars (%): 15 pH: 6.2 Braided: Y
 Water Temp. (°C): 8.5 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 60

Reach Symbol

(Fish)

DV

8 C 11.0 | 1270

(Width, Valley: Channel, Slope)

(Bed Material)



Photo #: Y-12-3, 26/07/97
Site #: Y92, Looking upstream at the channel



Photo #: Y-12-4, 26/07/97
Site #: Y92, Measuring Dolly Varden on the fishboard



Photo #: Y-12-5, 26/07/97

Site #: Y92, Looking downstream at the channel, note boulder cover

Location: Y93, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 038-1800-000-000-000-000-000-000-000-000-

Map #: 93 L 081 Reach Length (km): 1.9 MW Date: 26-Jul-97 Time: 13:17 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 56646 607785 Length surveyed (m): 100.0 GE Survey Crew: JP \ SJ \ \ \ \ \ \ \ \ Photos: Y-12-6,7 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 3.4 MS 1.4 3.4 4.5 3.6 3.6 4.0
 Av. Wet. Width (m): 1.8 MS 0.8 1.5 1.9 3.1 1.6 1.7
 Av. Max Riffle Depth (cm): 6 MS 5 9 4 6 6 4
 Av. Max Pool Depth (cm): 18 MS 22 12 11 16 28 19
 Gradient (%): 25.0 GE
 Pool: 15 Riffle: 20 Run: 25 Other: 40
 % Side Channel: 0 GE
 % Debris Area: >15 GE
 % Stable: 30 GE

Specific Data

1.4	3.4	4.5	3.6	3.6	4.0
0.8	1.5	1.9	3.1	1.6	1.7
5	9	4	6	6	4
22	12	11	16	28	19

Obstructions

Cover Cover Total %: 30 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
20	35	40	0	5	0

Crown Closure %: 5 Aspect: N

Bed Material

Fines	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	40	20
	Large (16-64mm):		20
	Sm. cobble (64-128mm):		15
Larges	Lge cobble (128-256mm):	40	15
	Blder cobble (>256mm):		10
Bedrock		10	10

D90 (cm): Compaction: High

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Comments

C1: S5.
 C2: LS=45%, RS=55%
 C3: No fisheries sensitive zones noted.
 C4: The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 300V, was 148 seconds over 100 meters.
 C5: No additional bank texture information.
 C6: DO was not measured at this site, the water was clear to bottom. The mean air temperature on this day was 13.1 C.
 C7: This is a very steep reach with many cascades, which comprise 40% of the flow at this site.

Discharge

Wetted Width (m): 0.4 MS
 Mean Depth (m): 0.0 MS
 Mean Velocity (m/s): 0.49 F
 Discharge (m3/s): 0.15 F

Banks Height (m): 0.1
 % Unstable: 45
 Fines Gravels Larges Bedrock

Reach Symbol (Fish) NF

3 C 25.0 | 1441
 (Width, Valley: Channel, Slope) (Bed Material)

Confinement: OC
 Valley: Channel Ratio 5-10
 Stage: M Flood Signs H1(m): 1
 Bars (%): 15 pH: 6.3 Braided: Y
 Water Temp. (°C): 10.0 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 20



Photo #: Y-12-6, 26/07/97
Site #: Y93, Looking upstream at the channel



Photo #: Y-12-7, 26/07/97
Site #: Y93, Looking downstream at the channel, note steep gravel bank

Location: Y94, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 038-2000-000-000-000-000-000-000-000-

Map #: 93 L 081 Reach Length (km): 3.1 | MW Date: 26-Jul-97 Time: 14:20 Agency: IEC Access: 11 Fish Card: N Field Historical
 U.T.M.: 9 56645 607836 Length surveyed (m): 300.0 | GE Survey Crew: SJUP \ \ \ \ \ \ \ Photos: Y-12-8,9,10,11 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 11.2 | MS
 Av. Wet. Width (m): 6.0 | MS
 Av. Max Riffle Depth (cm): 21 | MS
 Av. Max Pool Depth (cm): 57 | MS
 Gradient (%): 5.0 | CL
 Pool: 20 Riffle: 30 Run: 30 Other: 20
 % Side Channel: 10-40 | GE
 % Debris Area: 5-15 | GE
 % Stable: 0 | GE

Specific Data

8.0	9.0	11.3	20.9	11.0	7.1
5.0	6.8	6.0	7.0	6.1	5.1
17	10	23	32	21	
35	70	68	43	70	

Obstructions

Cover Cover Total %: 40 | GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
30	20	40	0	0	10

Crown Closure %: 0 Aspect: SE

Bed Material

Fines	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	30	10
	Large (16-64mm):		20
Larges	Sm. cobble (64-128mm):	20	
	Lge cobble (128-256mm):	60	25
Bedrock	Blder cobble (>256mm):		15
		0	0

D90 (cm): 65 Compaction: High

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	DV	7	90-125	J	R			EL

Comments

- C1: S2.
- C2: LS=20%, RS=10%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at 145 seconds over 100 meters.
- C5: No additional bank texture information.
- C6: DO was not measured at this site, the water was clear to bottom. The mean air temperature on this day was 13.1 C.
- C7: This stream has excellent rearing habitat with patches of spawning gravel. Cascades comprise 20% of the flow.

Discharge

Wetted Width (m): 4.3 | MS
 Mean Depth (m): 0.2 | MS
 Mean Velocity (m/s): 0.79 | F
 Discharge (m³/s): 0.51 | F

Banks Height (m): 0.1
 % Unstable: 40

Fines Gravels Larges Bedrock

Confinement: UC
 Valley: Channel Ratio 10+
 Stage: M Flood Signs Ht(m): 1.3
 Bars (%): 40 pH: 5.9 Braided: Y
 Water Temp. (°C): 8.0 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 50

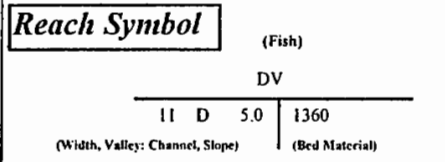




Photo #: Y-12-8, 26/07/97
Site #: Y94, Looking downstream at the channel



Photo #: Y-12-9, 26/07/97
Site #: Y94, Looking upstream at the channel



Photo #: Y-12-10, 26/07/97
Site #: Y94, Measuring Dolly Varden on the fishboard



Photo #: Y-12-11, 26/07/97
Site #: Y94, Measuring Dolly Varden on the fishboard



Photo #: Z-16-12, 12-Aug-97
Site #: Z125, Looking upstream at the channel



Photo #: Z-16-13, 12-Aug-97
Site #: Z125, Looking downstream at the channel



Photo #: Z-23-1A, 22-Aug-97
Site #: Z125, Measuring fish with the meterstick



Photo #: Z-16-14, 12-Aug-97

Site #: Z126, Looking upstream at the channel, note the large number of boulders



Photo #: Z-16-15, 12-Aug-97

Site #: Z126, Looking downstream at the channel



Photo #: Z-16-16, 12-Aug-97
Site #: Z127, Looking upstream at the channel



Photo #: Z-16-17, 12-Aug-97
Site #: Z127, Looking downstream at the channel

Location: Z128, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 037-4100-000-000-000-000-000-000-000-000-

Map #: 93 L 081 Reach Length (km): 1.2 MW Date: 12-Sep-97 Time: 12:44 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 566124.6078145 Length surveyed (m): 100.0 GE Survey Crew: JP KG \ \ \ \ \ \ \ \ Photos: Z-16-18,19,20,21,22,23 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 4.9 MS
 Av. Wet. Width (m): 2.6 MS
 Av. Max Riffle Depth (cm): 8 MS
 Av. Max Pool Depth (cm): 31 MS
 Gradient (%): 12.0 CL
 Pool: 40 Riffle: 15 Run: 40 Other: 5
 % Side Channel: 0-10 GE
 % Debris Area: 5-15 GE
 % Stable: 20 GE

Specific Data

3.6	3.8	6.0	6.8	5.4	4.0
1.1	3.1	2.2	3.0	2.6	3.5
12	4	7	8		
17	25	11	58	43	

Obstructions

C	Height (m)	Type	Location
	1	X	0.0
	3	C	0.0

Bed Material

Fines	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	30	10
	Large (16-64mm):		20
Larges	Sm. cobble (64-128mm):		10
	Lge cobble (128-256mm):	40	15
	Blder cobble (>256mm):		15
Bedrock		20	20

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	DV	1	35	F	R			EL
	DV	1	170	A	S			EL
	DV	3	53-110	J	R			EL

Comments

- C1: S3
- C2: LS=54%, RS=35%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 600V, was 225 seconds over 100 meters.
- C5: No additional bank texture information.
- C6: DO was not measured at this site, the water was clear to bottom. The air temperature at this site was 18 C.
- C7: This stream has some good rearing and spawning habitat.

Cover

Cover Total %: 35 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
30	15	35	5	5	10

 Crown Closure %: 5 Aspect: NE

Discharge

Wetted Width (m): 1.6 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.22 F
 Discharge (m³/s): 0.03 F

Banks

Height (m): 0.6
 % Unstable: 25
 Fines Gravels Larges Bedrock
 Confinement: FC
 Valley: Channel Ratio 2-5
 Stage: L Flood Signs Ht(m): 0.7
 Bars (%): 20 pH: 7.4 Braided: Y
 Water Temp. (°C): 12.0 02 (ppm):
 Turb. (cm): Cond. (µmhos): 30

Reach Symbol

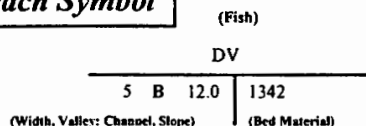




Photo #: Z-16-18, 12-Aug-97
Site #: Z128, Looking upstream at the channel



Photo #: Z-16-19, 12-Aug-97
Site #: Z128, Looking downstream at the channel



Photo #: Z-16-20, 12-Aug-97
Site #: Z128, Measuring fish with the meterstick



Photo #: Z-16-21, 12-Aug-97
Site #: Z128, Looking across stream at cascade, which is not a barrier



Photo #: Z-16-22, 12-Aug-97
Site #: Z128, Measuring fish with the meterstick



Photo #: Z-16-23, 12-Aug-97
Site #: Z128, Measuring fish with the meterstick

Location: Z129, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 037-4100-000-000-000-000-000-000-000-000-

Map #: 93 L 081 Reach Length (km): 1.3 MA Date: 12-Aug-97 Time: 13:54 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 5659 60782 Length surveyed (m): 100.0 GE Survey Crew: JP\KG \ \ \ \ \ \ \ Photos: Z-17-1,2,3 Air Photos:

Channel Characteristics

C1 Av. Chan. Width (m): 1.2 MS
 C1 Av. Wet. Width (m): 0.5 MS
 Av. Max Riffle Depth (cm): 2 MS
 Av. Max Pool Depth (cm): 16 MS
 Gradient (%): 28.0 CL
 Pool: 20 Riffle: 50 Run: 10 Other: 20
 % Side Channel: 0 GE
 % Debris Area: >15 GE
 % Stable: 90 GE

Specific Data

1.1	1.0	1.1	0.7	1.4	1.7
1.0	1.0	0.8	0.4	0.0	0.0
2	2	2			
13	12	7	8	18	40

Obstructions

C	Height (m)	Type	Location
		F	

Bed Material

Fines	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	50	20
	Large (16-64mm):		30
Larges	Sm. cobble (64-128mm):		10
	Lge cobble (128-256mm):	30	10
	Bllder cobble (>256mm):		10
Bedrock		10	10

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				NA

Comments

- C1: S6. One additional measurement was taken for both channel and wetted widths; 1.7 and 0.4.
- C2: LS=7%, RS=31%
- C3: No fisheries sensitive zones noted.
- C4: Too little flow was available for electroshocking at this site.
- C5: No additional bank texture information.
- C6: DO was not measured at this site, the water was clear to bottom. The air temperature at this site was 22 C.
- C7: This is a very small stream with no suitable rearing, spawning or overwintering habitat and no access to Mulwain Creek due to the presence of a falls at the mouth.

Cover

Cover Total %: 20 GE

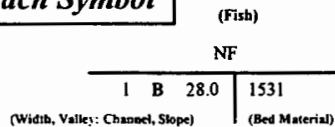
Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
0	30	5	5	50	10

 Crown Closure %: 50 Aspect: NE

Discharge

Wetted Width (m): 0.7 MS
 Mean Depth (m): 0.0 MS
 Mean Velocity (m/s): 0.07 F
 Discharge (m3/s): 0.04 F

Reach Symbol



Banks

Height (m): 0.1
 % Unstable: 0
 Fines Gravels Larges Bedrock
 Confinement: FC
 Valley : Channel Ratio 2-5
 Stage: L Flood Signs Ht(m): 0.2
 Bars (%): 0 pH: 6.9 Braided: N
 Water Temp. (°C): 10.0 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 20



Photo #: Z-17-1, 12-Aug-97

Site #: Z129, Looking upstream at the channel, flowing over steep bedrock



Photo #: Z-17-2, 12-Aug-97

Site #: Z129, Looking downstream at the channel, note the mosses on the substrate



Location: Z80, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 037-5300-000-000-000-000-000-000-000-000-

Map #: 93 L 081 Reach Length (km): 0.8 MA Date: 26-Jul-97 Time: 8:37 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9.565193.6081553 Length surveyed (m): 150.0 GE Survey Crew: DD VKG \ \ \ \ \ \ Photos: Z-10-15,16,17,18 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 1.8 MS
 Av. Wet. Width (m): 1.3 MS
 Av. Max Riffle Depth (cm): 8 MS
 Av. Max Pool Depth (cm): 28 MS
 Gradient (%): 1.5 CL
 Pool: 20 Riffle: 15 Run: 60 Other: 5
 % Side Channel: 0-10 GE
 % Debris Area: >15 GE
 %Stable: 60 GE

Specific Data

2.1	1.7	1.4	1.6	1.4	2.3
1.5	1.3	1.3	1.0	1.0	1.6
11	7	4	8	8	
24	39	21	28	26	

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	DV	11	45-80	J	R			EL

Comments

- C1: S3.
- C2: LS= 0%, RS= 0%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at H, 6, 400V, was 328 seconds over 100 meters.
- C5: No additional bank texture information.
- C6: DO was not measured at this site, the water was clear to bottom. The mean air temperature on this day was 13.1 C.
- C7: There is some nice rearing cover in this stream. The spawning habitat is limited by the high percentage of fines. Cascades were noted.

Cover

Cover Total %: 35 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
20	40	0	5	10	25

Crown Closure %: 35 Aspect: SW

Bed Material

Fines	Clay, silt, sand (<2mm):	40	40
Gravels	Small (2-16mm):	50	25
	Large (16-64mm):		25
Larges	Sm. cobble (64-128mm):	10	0
	Lge cobble (128-256mm):		0
Bedrock	Blder cobble (>256mm):	0	0

D90 (cm): 10 Compaction: Low

Discharge

Wetted Width (m): 1.0 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.47 F
 Discharge (m3/s): 0.04 F

Banks

Height (m): 0.1
 % Unstable: 0

Fines Gravels Larges Bedrock

Confinement: UC

Valley : Channel Ratio 10+

Stage: M Flood Signs H(m): 0.4

Bars (%): 5 pH: 7.6 Braided: Y

Water Temp. (°C): 6.0 O2 (ppm):

Turb. (cm): Cond. (µmhos): 140

Reach Symbol

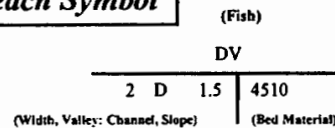




Photo #: Z-10-15, 26-Jul-97
Site #: Z80, Looking downstream at the channel



Photo #: Z-10-16, 26-Jul-97
Site #: Z80, Looking upstream at the channel, note the down wood across the channel



Photo #: Z-10-17, 26-Jul-97
Site #: Z80, Measuring fish with the meterstick



Photo #: Z-10-18, 26-Jul-97
Site #: Z80, Measuring fish with the meterstick

Location: Z81, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 037-5700-000-000-000-000-000-000-000-

Map #: 93 L 081

Reach Length (km): 0.3 MA

Date: 26-Jul-97 Time: 9:52

Agency: TEC

Access: H

Fish Card: N

Field Historical

U.T.M.: 9 565783.6082049

Length surveyed (m): 200.0 GE

Survey Crew: DD\KG\ \ \ \ \ \ \ \ \ \ \

Photos: Z-10-19,20,21,22,23

Air Photos:

Channel Characteristics

CI Av. Chan. Width (m): 4.9 MS
 CI Av. Wet. Width (m): 3.6 MS
 Av. Max Riffle Depth (cm): 19 MS
 Av. Max Pool Depth (cm): 34 MS
 Gradient (%): 6.0 CL
 Pool: 25 Riffle: 35 Run: 30 Other: 10
 % Side Channel: 10-40 GE
 % Debris Area: >15 GE
 %Stable: 30 GE

Specific Data

4.9	5.0	4.7	4.1	4.6	5.0
0.4	3.2	3.9	2.9	3.6	4.4
20	11	22	23		
28	43	29	44	25	

Obstructions

C	Height (m)	Type	Location
	2	C	2.8

Bed Material

	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	40	15
	Large (16-64mm):		25
Larges	Sm. cobble (64-128mm):		15
	Lge cobble (128-256mm):	50	15
Bedrock	Blder cobble (>256mm):		20
		0	0

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	DV	4	105-140	A				EL
	DV	3	60-75	J	R			EL

Comments

- C1: S3. Three additional measurements were taken for both the channel and wetted widths; 9.5 and 6.0, 13.0 and 4.4, 9.4 and 7.4.
- C2: LS=26%, RS=4%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at H, 6, 400V, was 402 seconds over 175 meters.
- C5: No additional bank texture information.
- C6: DO was not measured at this site, the water was clear to bottom. The air temperature at this site was 9. C.
- C7: Some excellent LOD cover at this site, as well as a number of plunge pools. Step pool habitat was noted. The channel shows signs of blowout.

Cover

Cover Total % : 35 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
25	30	30	0	5	10

Crown Closure % : 1 Aspect : W

Discharge

Wetted Width (m) : 3.2 MS
 Mean Depth (m) : 0.2 MS
 Mean Velocity (m/s) : 0.44 F
 Discharge (m³/s) : 0.21 F

Banks

Height (m): 0.2
 % Unstable: 60
 Fines Gravels Larges Bedrock
 Confinement: OC
 Valley : Channel Ratio 5-10
 Stage: M Flood Signs H(m):
 Bars (%): 20 pH: 7.6 Braided: Y
 Water Temp. (°C): 6.0 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 70

Reach Symbol

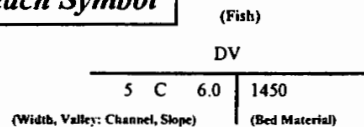




Photo #: Z-10-19, 26-Jul-97
Site #: Z81, Looking upstream at a cascade



Photo #: Z-10-20, 26-Jul-97
Site #: Z81, Measuring fish with the meterstick



Photo #: Z-10-22, 26-Jul-97
Site #: Z81, Looking upstream at the channel



Photo #: Z-10-23, 26-Jul-97
Site #: Z81, Looking downstream at the channel, note the abundant LOD



Location: Z82, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 065-3900-000-000-000-000-000-000-000-000-

Map #: 93 L 081

Reach Length (km): 3.6 MA

Date: 26-Jul-97

Time: 10:45

Agency: TEC

Access: H

Fish Card: N

Field Historical

U.T.M.: 9.565783.6082049

Length surveyed (m): 200.0 GE

Survey Crew: DD\KG \ \ \ \ \ \

Photos: -24,25,Z-11,1,2,3,4,8,9,10

Air Photos:

Channel Characteristics

Av. Chan. Width (m): 7.0 MS
 Av. Wet. Width (m): 4.6 MS
 Av. Max Riffle Depth (cm): 11 MS
 Av. Max Pool Depth (cm): 60 MS
 Gradient (%): 2.0 CL
 Pool: 10 Riffle: 40 Run: 40 Other: 10
 % Side Channel: GE
 % Debris Area: 20 GE
 % Stable: 20 GE

Specific Data

6.0	6.9	7.4	6.5	8.4	7.1
4.2	4.2	5.0	4.9	4.7	4.8
10	8	12	14	10	
38	45	42	50	125	

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	DV	7	54-110	J	R			EL
	DV	3	110-150	A	R			EL

Comments

- C1: S2
- C2: LS=10%, RS=10%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at H, 6, 400V & 500V, was 479 seconds over 200 meters.
- C5: No additional bank texture information.
- C6: DO was not measured at this site, the water was clear to bottom. The mean air temperature on this day was 13.1 C.
- C7: Most of the pools are lined with spawning sized gravels. The LOD creates many deep plunge pools. This is excellent rearing habitat. A deep run also makes up part of the cover habitat. A falls photo was taken.

Cover

Cover Total %: 70 GE
 Pool LOD Bldr In Veg O Veg Ctbnk
 30 30 30 0 0 10
 Crown Closure %: 15 Aspect: SW

Bed Material

Fines	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	20	10
	Large (16-64mm):		10
Larges	Sm. cobble (64-128mm):		30
	Lge cobble (128-256mm):	70	30
	Blder cobble (>256mm):		10
Bedrock		0	0

D90 (cm): 36 Compaction: Medium

Discharge

Wetted Width (m): 3.3 MS
 Mean Depth (m): 0.3 MS
 Mean Velocity (m/s): 1.15 F
 Discharge (m3/s): 0.85 F

Banks

Height (m): 0.2
 % Unstable: 30
 Fines Gravels Larges Bedrock
 Confinement: UC
 Valley: Channel Ratio 10+
 Stage: M Flood Signs H(m): 0.8
 Bars (%): 10 pH: 7.6 Braided: Y
 Water Temp. (°C): 5.5 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 70

Reach Symbol

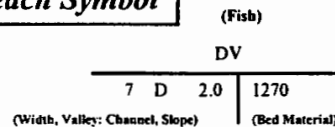




Photo #: Z-10-25, 26-Jul-97
Site #: Z82, Measuring fish with the meterstick

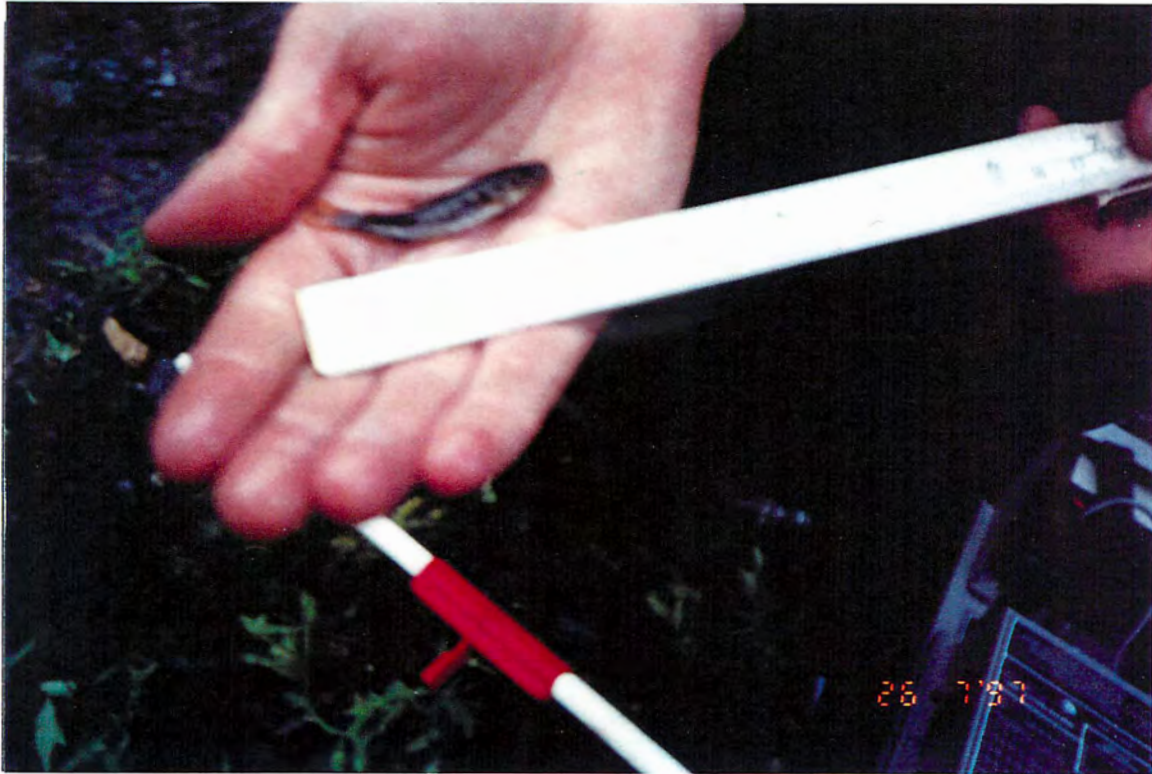


Photo #: Z-11-2, 26-Jul-97
Site #: Z82, Measuring fish with the meterstick



Photo #: Z-11-3, 26-Jul-97
Site #: Z82, Looking upstream at the channel

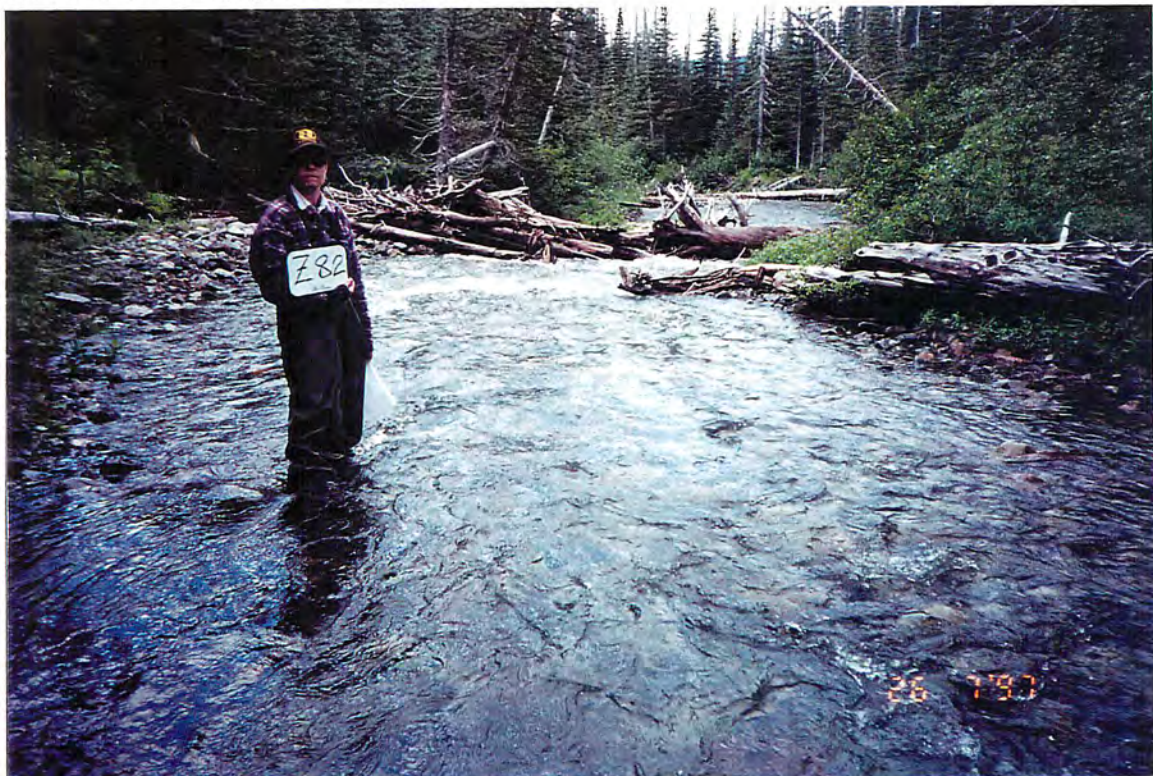


Photo #: Z-11-4, 26-Jul-97
Site #: Z82, Looking downstream at the channel, note the flood signs



Photo #: Z-11-8, 26-Jul-97

Site #: Z82, Looking upstream at a series of cascade and falls barriers



Photo #: Z-11-9, 26-Jul-97

Site #: Z82, Looking upstream at a series of cascade and falls barriers



Photo #: Z-11-10, 26-Jul-97

Site #: Z82, Looking upstream at a series of cascade and falls barriers



Photo #: Z-11-5, 26-Jul-97
Site #: Z83, Looking downstream at the channel



Photo #: Z-11-6, 26-Jul-97
Site #: Z83, Looking upstream at the channel



Photo #: Z-11-7, 26-Jul-97
Site #: Z83, Measuring fish with the meterstick



Photo #: Z-11-11, 26-Jul-97
Site #: Z84, Looking downstream at the channel



Photo #: Z-11-12, 26-Jul-97
Site #: Z84, Looking upstream at the channel



Location: Z85, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 037-5100-000-000-000-000-000-000-000-

Map #: 93 L 081 Reach Length (km): 1.1 MW Date: 26-Jul-97 Time: 14:02 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 564889.6079982 Length surveyed (m): 100.0 GE Survey Crew: DD KG \ \ \ \ \ \ Photos: Z-11-14,15,16,17,18 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 3.2 MS
 Av. Wet. Width (m): 1.6 MS
 Av. Max Riffle Depth (cm): 8 MS
 Av. Max Pool Depth (cm): 37 MS
 Gradient (%): 13.0 CL
 Pool: 15 Riffle: 40 Run: 40 Other: 5
 % Side Channel: 10-40 GE
 % Debris Area: >15 GE
 % Stable: 60 GE

Specific Data

3.0	2.6	2.5	2.9	4.9	3.3
1.6	1.2	1.3	1.8	1.9	2.0
8	7	11	10	5	
34	47	41	31	30	

Obstructions

C	Height (m)	Type	Location
	1	C	0.1
	1	C	0.1

Bed Material

Fines	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	40	15
	Large (16-64mm):		25
Larges	Sm. cobble (64-128mm):		25
	Lge cobble (128-256mm):	50	15
Bedrock	Blder cobble (>256mm):		10

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	DV	6	55-110	J	R			EL

Comments

- C1: S3
- C2: LS=35%, RS=36%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 600V, was 366 seconds over 175 meters.
- C5: No additional bank texture information.
- C6: DO was not measured at this site, the water was clear to bottom. The mean air temperature for this day was 13.1 C.
- C7: This site has some nice rearing habitat with some good pools and LOD cover. The channel also shows some signs of blowout.

Cover

Cover Total %: 45 GE

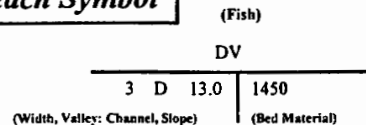
Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
20	30	25	0	5	20

 Crown Closure %: 15 Aspect: S

Discharge

Wetted Width (m): 1.2 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.42 F
 Discharge (m³/s): 0.04 F

Reach Symbol



Banks

Height (m): 0.1
 % Unstable: 20
 Fines Gravels Larges Bedrock
 Confinement: UC
 Valley : Channel Ratio 10+
 Stage: L Flood Signs Ht(m): 0.6
 Bars (%): 10 pH: 7.5 Braided: Y
 Water Temp. (°C): 10.0 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 20



Photo #: Z-11-14, 26-Jul-97
Site #: Z85, Measuring fish with the meterstick



Photo #: Z-11-15, 26-Jul-97
Site #: Z85, Measuring fish with the meterstick



Photo #: Z-11-17, 26-Jul-97
Site #: Z85, Looking upstream at the channel



Photo #: Z-11-18, 26-Jul-97
Site #: Z85, Looking downstream at the channel



Photo #: E-12-4, 26-Jul-97
Site #: E125, Measuring fish on the fish board



Photo #: E-12-5, 26-Jul-97
Site #: E125, Looking upstream at the channel

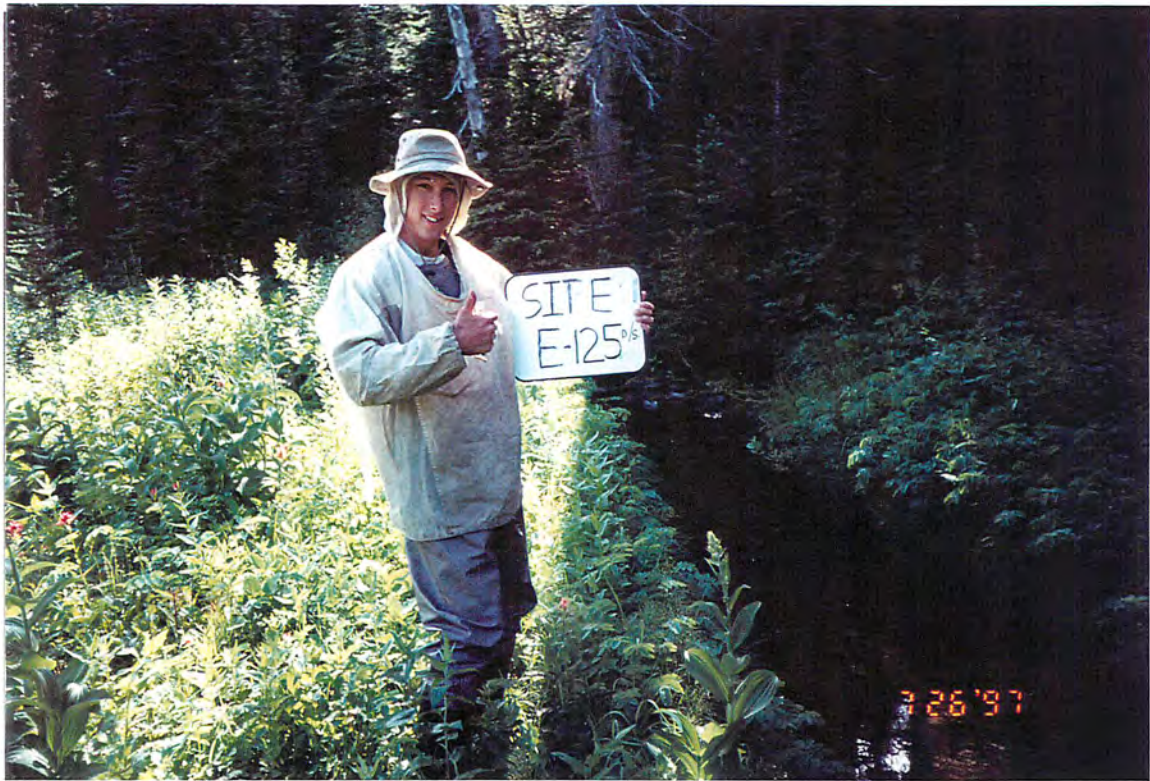


Photo #: E-12-6, 26-Jul-97

Site #: E125, Looking downstream at the channel

Location: E127, Unit 11, East of Mulwain Creek.

Stream (Gaz.): Unnamed

Watershed Code: 065-8800-000-000-000-000-000-000-000-000

Map #: 1031 090 Reach Length (km): 2.0 MA Date: 26-Jul-97 Time: 11:15 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9.5594 60837 Length surveyed (m): 100.0 GE Survey Crew: JL VEM \ \ \ \ \ \ Photos: E-12-10,11 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 1.1 MS
 Av. Wet. Width (m): 0.8 MS
 Av. Max Riffle Depth (cm): 0 GE
 Av. Max Pool Depth (cm): 0 GE
 Gradient (%): 8.0 CL
 Pool: Riffle: Run: Other:
 % Side Channel: 0 GE
 % Debris Area: 5-15 GE
 % Stable: 10 GE

Specific Data

1.3	1.0	1.2	0.6	0.9	1.3
1.2	0.8	0.9	0.6	0.4	0.9

Obstructions

Cover

Cover Total %: 60 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
0	10	0	80	0	10

Crown Closure %: 0 Aspect: SE

Bed Material

Fines	Clay, silt, sand (<2mm):	80	80
Gravels	Small (2-16mm):	10	5
	Large (16-64mm):		5
Larges	Sm. cobble (64-128mm):		10
	Lge cobble (128-256mm):	10	0
	Blder cobble (>256mm):		0
Bedrock		0	0

D90 (cm): 0 Compaction: Low

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Discharge

Wetted Width (m): 0.9 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.12 F
 Discharge (m³/s): 0.01 F

Banks

Height (m): 0.2
 % Unstable: 0

Fines Gravels Larges Bedrock

Confinement: UC
 Valley: Channel Ratio 10+
 Stage: M Flood Signs Ht(m): 0.1
 Bars (%): 0 pH: 7.5 Braided: N
 Water Temp. (°C): 8.0 O₂ (ppm):
 Turb. (cm): Cond. (µmhos): 20

Reach Symbol

(Fish)
 (DV) (RB)
 1 D 8.0 8110
 (Width, Valley: Channel, Slope) | (Bed Material)

Comments

C1: S4
 C2: LS = 21%, RS = 18%
 C3: No fisheries sensitive zones noted.
 C4: The electroshocking effort, using a Smithroot 12 B POW model set at 1-5-300V, was 150 seconds over 50 meters.
 C5: No additional bank texture information.
 C6: DO was not measured, the water was clear to the bottom. The mean air temperature on this day was 13.1.C.
 C7: This creek drains a spring 60m upstream of the confluence with Mulwain Creek. Instream vegetation provides most of the cover for fish at this site. In the upper reach the reach contains mostly fines, while the lower reach contains gravels and cobble.



Photo #: E-12-10, 26-Jul-97
Site #: E127, Looking upstream at the channel



Photo #: E-12-11, 26-Jul-97
Site #: E127, Looking downstream at the channel



Location: E128, Unit 11, North of Mulwain Creek.

Stream (Gaz.): Unnamed

Watershed Code: 065-9000-000-000-000-000-000-000-000-

Map #: 1031 090 Reach Length (km): 0.4 MA Date: 26-Jul-97 Time: 11:45 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 5593 60839 Length surveyed (m): 100.0 GE Survey Crew: J L V E M \ \ \ \ \ \ \ \ Photos: E-12-12,13 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 10.0 MS
 Av. Wet. Width (m): 3.4 MS
 Av. Max Riffle Depth (cm): 7 MS
 Av. Max Pool Depth (cm): 35 MS
 Gradient (%): 3.0 CL
 Pool: 10 Riffle: 60 Run: 30 Other: 0
 % Side Channel: 10-40 GE
 % Debris Area: 5-15 GE
 % Stable: 0 GE

Cover Cover Total %: 15 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
20	25	25	0	10	20

Crown Closure %: 5 Aspect: W

Specific Data

	6.0	7.0	14.0	12.0	10.0	11.0
	3.4	2.6	3.0	6.0	2.0	3.5
	10	5	7	4	8	
	32	40	35	29	37	

Bed Material

	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	20	10
	Large (16-64mm):		10
Larges	Sm. cobble (64-128mm):	70	30
	Bllder cobble (>256mm):		10
Bedrock		0	0

D90 (cm): 30 Compaction: Medium

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Discharge

Wetted Width (m): 3.2 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.18 F
 Discharge (m³/s): 0.04 F

Reach Symbol

(Fish) (DV) (RB)

10 D 3.0 | 1270

(Width, Valley: Channel, Slope) (Bed Material)

Banks Height (m): 0.3
 % Unstable: 0
 Fines Gravels Larges Bedrock

Confinement: UC
 Valley : Channel Ratio 10+
 Stage: M Flood Signs Ht(m): 1.5
 Bars (%): 60 pH: 7.5 Braided: Y
 Water Temp. (°C): O2 (ppm):
 Turb. (cm): Cond. (µmhos): 10

Comments

C1: S2
 C2: LS = 4%, RS = 4%
 C3: No fisheries sensitive zone noted.
 C4: The electroshocking effort, using a Smithroot 12 B POW model set at I-5-300V, was 233 seconds over 250 meters.
 C5: Fines and larges make up the bank texture at this site.
 C6: DO was not measured at this site, the water was clear to the bottom. The mean air temperature on this day was 13.1.C.
 C7: Signs of extreme flooding were noted at this site. Some great pool, LOD, boulder and cutbank cover was noted in the sampling area. The flood channels were dry and vegetated at the time of sampling.



Photo #: E-12-12, 26-Jul-97

Site #: E128, Looking upstream at the channel with cobble bars



Photo #: E-12-13, 26-Jul-97

Site #: E128, Looking downstream at the channel with cobble bars

Location: E129, Unit 11, North of Mulwain Cr.

Stream (Gaz.): Unnamed

Watershed Code: 065-6700-000-000-000-000-000-000-000-000-

Map #: 1031090 Reach Length (km): 1.0 MA Date: 26-Jul-97 Time: 13:00 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9.5811.60838 Length surveyed (m): 100.0 GE Survey Crew: EM UL \ \ \ \ \ \ \ \ Photos: E-12-14,15,16 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 4.3 MS
 Av. Wet. Width (m): 2.3 MS
 Av. Max Riffle Depth (cm): 4 MS
 Av. Max Pool Depth (cm): 41 MS
 Gradient (%): 4.0 CL
 Pool: 25 Riffle: 25 Run: 40 Other: 10
 % Side Channel: 0-10 GE
 % Debris Area: 0-5 GE
 % Stable: 5 GE

Specific Data

2.5	3.0	6.0	6.0	3.8	4.2
1.5	2.0	2.5	3.0	2.5	2.0
4	5	3	4	5	
29	30	50	35	50	50

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	DV	11	70-137	J	R			EL

Comments

- C1: S3, with a recommendation for an upgrade to an S2 based on the abundance of fish in this reach.
- C2: LS = 30%, RS = 45%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model, set at 1-5-300V, was 50 seconds over 20 meters. The shocking effort was reduced due to the obvious abundance of fish in this reach.
- C5: Fines and larges make up the bank texture at this site.
- C6: DO was not measured, the water was clear to the bottom. The mean air temperature on this day was 13.1 C.
- C7: LOD and plunge pools provide a large amount of habitat structure in this reach. Prominent flood signs and stable banks were noted in the sampling area.

Cover

Cover Total %: 20 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
25	25	15	0	10	25

 Crown Closure %: 20 Aspect: S

Bed Material

Fines	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	20	10
	Large (16-64mm):		10
Larges	Sm. cobble (64-128mm):		30
	Lge cobble (128-256mm):	70	30
	Blder cobble (>256mm):		10
Bedrock		0	0

D90 (cm): 25 Compaction: Medium

Discharge

Wetted Width (m): 2.5 MS
 Mean Depth (m): 0.4 MS
 Mean Velocity (m/s): 0.20 F
 Discharge (m³/s): 0.15 F

Banks

Height (m): 0.2
 % Unstable: 5
 Fines Gravels Larges Bedrock
 Confinement: OC
 Valley: Channel Ratio 5-10
 Stage: M Flood Signs Ht(m): 0.5
 Bars (%): 15 pH: 7.4 Braided: N
 Water Temp. (°C): O2 (ppm):
 Turb. (cm): Cond. (µmhos): 20

Reach Symbol

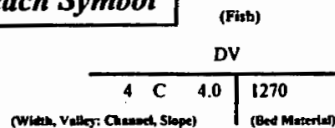




Photo #: E-12-14, 26-Jul-97
Site #: E129, Measuring fish on the fish board



Photo #: E-12-15, 26-Jul-97
Site #: E129, Looking upstream at the channel



Photo #: E-12-16, 26-Jul-97

Site #: E129, Looking downstream at the channel



Location: E130, Unit 11, South of Mulwain Cr.

Stream (Gaz.): Unnamed

Watershed Code: 065-6900-000-000-000-000-000-000-000-000-

Map #: 1031 090 Reach Length (km): 2.5 MA Date: 26-Jul-97 Time: 14:15 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 5606 60834 Length surveyed (m): 100.0 GE Survey Crew: JL VEM \ \ \ \ \ \ \ \ Photos: E-12-17,18 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 9.1 HC
 Av. Wet. Width (m): 6.1 HC
 Av. Max Riffle Depth (cm): 16 MS
 Av. Max Pool Depth (cm): 47 MS
 Gradient (%): 5.0 CL
 Pool: 20 Riffle: 70 Run: 10 Other: 0
 % Side Channel: 0 GE
 % Debris Area: 0.5 GE
 % Stable: 0 GE

Specific Data

6.2	10.4	9.4	11.6	7.8
3.7	5.4	6.9	9.0	5.7
17	15	20	14	13
50	45	60	41	37

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	DV	1	200	A				VO

Comments

- C1: S2
- C2: LS = 100%, RS = 100%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model, set at 1-5-300V, was 150 seconds over 100 meters.
- C5: Larges and bedrock make up the bank texture at this site.
- C6: DO was not measured, the water was clear to the bottom. The mean air temperature on this day was 13.1.C.
- C7: Huge boulders creating pools were observed in the sampling area. Ideal rearing habitat.

Cover Cover Total %: 15 GE

Pool	LOD	Bldr	In Veg	O Veg	Crbnk
30	20	25	0	15	10

Crown Closure %: 5 Aspect: N

Bed Material

	Fines	Clay, silt, sand (<2mm):	0	0
Gravels	Small (2-16mm):		10	5
	Large (16-64mm):			5
Larges	Sm. cobble (64-128mm):		80	30
	Bldr cobble (>256mm):			30
Bedrock			10	10

D90 (cm): Compaction: Medium

Discharge

Wetted Width (m): 5.0 MS
 Mean Depth (m): 0.2 MS
 Mean Velocity (m/s): 0.20 F
 Discharge (m3/s): 0.15 F

Banks

Height (m): 0.3
 % Unstable: 5
 Fines Gravels Larges Bedrock
 Confinement: FC
 Valley: Channel Ratio 2-5
 Stage: M Flood Signs Ht(m): 2
 Bars (%): 40 pH: 7.4 Braided: N
 Water Temp. (°C): O2 (ppm):
 Turb. (cm): Cond. (µmhos): 20

Reach Symbol

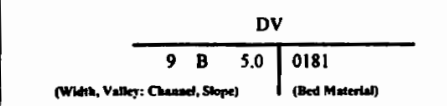




Photo #: E-12-17, 26-Jul-97

Site #: E130, Looking upstream at the channel with boulders and LOD



Photo #: E-12-18, 26-Jul-97

Site #: E130, Looking downstream at the channel, note bedrock sidewall



Location: E240, Unit 11, South of Mulwain Creek

Stream (Gaz.): Unnamed

Watershed Code: 066-0400-000-000-000-000-000-000-000-000

Map #: 1031 090 Reach Length (km): 1.0 MW Date: 22-Aug-97 Time: 14:00 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9.5625 .60784 Length surveyed (m): 200.0 GE Survey Crew: SJ\EM\ \ \ \ \ \ \ Photos: E-23-8,9 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 6.8 MS
 Av. Wet. Width (m): 1.6 MS
 Av. Max Riffle Depth (cm): 3 MS
 Av. Max Pool Depth (cm): 20 MS
 Gradient (%): 17.0 CL
 Pool: 10 Riffle: 30 Run: 50 Other: 10
 % Side Channel: 0 GE
 % Debris Area: 0.5 GE
 % Stable: 10 GE

Specific Data

4.9	6.7	7.2	6.4	8.1	7.2
1.8	1.2	0.7	1.7	1.9	2.1
2	3	2	3	4	
20	22	19	13	18	31

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Comments

- C5: Fines, larges and gravels make up the bank texture at this site.
- C6: DO was not measured, the water was clear to the bottom. The mean air temperature on this day was 16.8.C.
- C7: This reach has unstable banks and numerous logs in the channel. Cover is limited to plunge pools and LOD.
- C1: S2
- C2: LS = 100%, RS = 80%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model, set at 1-5-1000V, was 288 seconds over 100 meters.

Bed Material

Fines	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	50	25
	Large (16-64mm):		25
Larges	Sm. cobble (64-128mm):		15
	Lge cobble (128-256mm):	40	15
	Blder cobble (>256mm):		10
Bedrock		0	0

D90 (cm): 50 Compaction: Medium

Cover

Cover Total %: 15 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
20	25	30	0	5	20

 Crown Closure %: 10 Aspect: NW

Discharge

Wetted Width (m): 0.1 MS
 Mean Depth (m): 0.0 MS
 Mean Velocity (m/s): 1.13 F
 Discharge (m3/s): 0.00 F

Banks

Height (m): 0.4
 % Unstable: 40
 Fines Gravels Larges Bedrock
 Confinement: OC
 Valley: Channel Ratio 5-10
 Stage: L Flood Signs Ht(m): 0.6
 Bars (%): 60 pH: Braided: N
 Water Temp. (°C): 8.5 O2 (ppm):
 Turb. (cm): Cond. (µmhos):

Reach Symbol

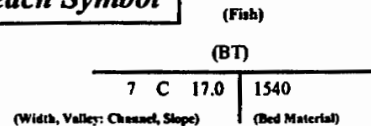




Photo #: E-23-8, 22-Aug-97
Site #: E240, Looking downstream at the channel



Photo #: E-23-9, 22-Aug-97
Site #: E240, Looking upstream at the channel



Photo #: E-23-10, 22-Aug-97

Site #: E241, Looking upstream at the channel, note the piled woody debris



Photo #: E-23-11, 22-Aug-97

Site #: E241, Looking downstream at the channel, note the right bank erosion



Photo #: E-23-12, 22-Aug-97

Site #: E241, Looking upstream at barriers on a tributary to Mulwain Creek

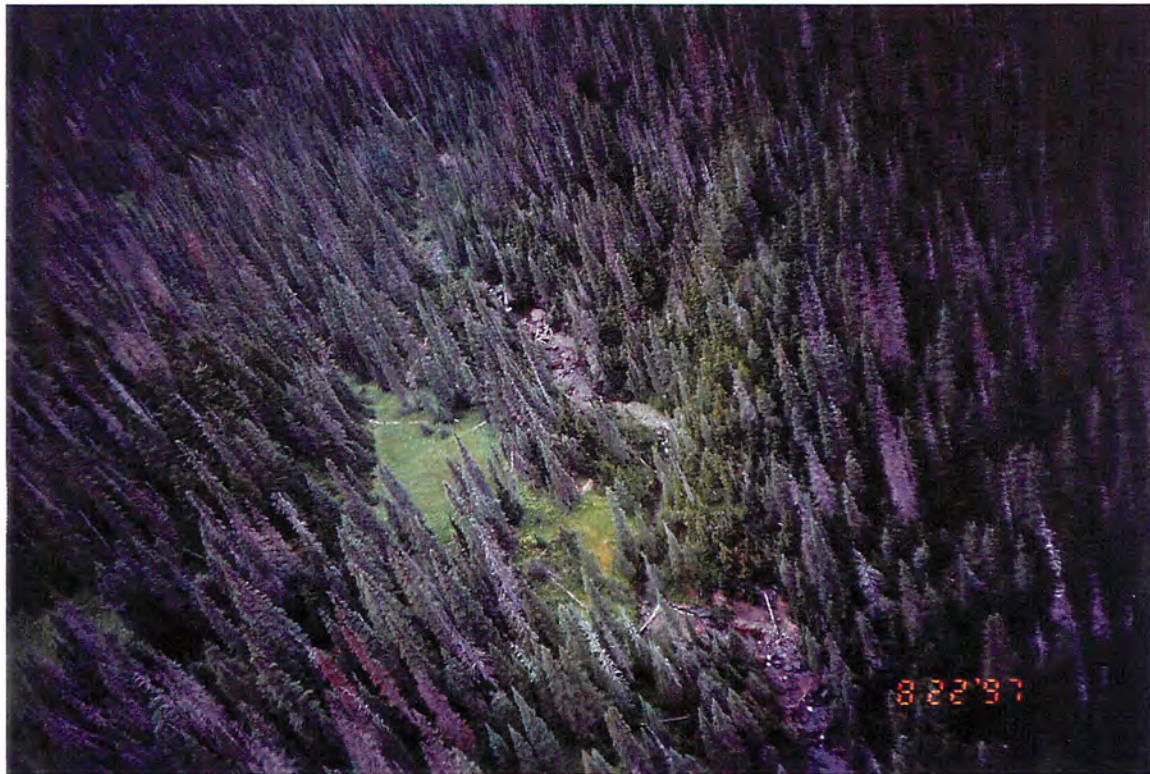


Photo #: E-23-13, 22-Aug-97

Site #: E241, Looking upstream at a barrier on a tributary to Mulwain Creek



Photo #: E-23-14, 22-Aug-97

Site #: E241, Looking upstream at a barrier on a tributary to Mulwain Creek

Location: E242, Unit 11, North of Mulwain Cr.

Stream (Gaz.): Unnamed

Watershed Code: 038-0700-000-000-000-000-000-000-000-000-

Map #: 93 L 081 Reach Length (km): 1.9 MA Date: 22-Aug-97 Time: 16:45 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9.5685 .60764 Length surveyed (m): 100.0 GE Survey Crew: SJ\EM \ \ \ \ \ \ \ \ \ \ Photos: E-23-15,16 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 5.0 MS
 Av. Wet. Width (m): 2.6 MS
 Av. Max Riffle Depth (cm): 6 MS
 Av. Max Pool Depth (cm): 34 MS
 Gradient (%): 16.0 CL
 Pool: 15 Riffle: 25 Run: 45 Other: 15
 % Side Channel: 0 GE
 % Debris Area: 15 GE
 % Stable: 25 GE

Specific Data

4.0	7.2	3.5	5.4	6.0	4.1
1.6	4.7	1.3	2.2	2.7	3.1
7	9	6	4	7	5
32	35	50	42	23	21

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Comments

- C1: S3
- C2: LS = 75%, RS = 70%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model, set at I-5-500V, was 408 seconds over 150 meters.
- C5: Gravels and larges make up the bank texture at this site.
- C6: DO was not measured, the water was clear to the bottom. The mean air temperature on this day was 16.8.C.
- C7: Step pools and short cascades, caused by boulders and fairly steep gradient, were noted in the sampling area. No barriers to fish migration into this reach were observed.

Cover

Cover Total %: 15 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
40	10	30	0	10	10

 Crown Closure %: 5 Aspect: S

Bed Material

Fines	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	20	10
	Large (16-64mm):		10
Larges	Sm. cobble (64-128mm):		20
	Lge cobble (128-256mm):	60	20
	Bldr cobble (>256mm):		20
Bedrock		10	10

D90 (cm): Compaction: Medium

Discharge

Wetted Width (m): 0.4 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 1.01 F
 Discharge (m³/s): 0.03 F

Banks

Height (m): 0.4
 % Unstable: 5
 Fines Gravels Larges Bedrock
 Confinement: EN
 Valley: Channel Ratio 0-2
 Stage: M Flood Signs H(m): 1.1
 Bars (%): 40 pH: 7.4 Braided: N
 Water Temp. (°C): 9.5 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 70

Reach Symbol

(Fish)
 (DV)

5	A	16.0	1261
---	---	------	------

 (Width, Valley: Channel, Slope) (Bed Material)



Photo #: E-23-15, 22-Aug-97

Site #: E242, Looking upstream at the channel, note the small cascades and falls over LOD



Photo #: E-23-16, 22-Aug-97

Site #: E242, Looking downstream at the channel



Photo #: Z-22-9, 22-Aug-97
Site #: Z174, Looking downstream at the channel



Photo #: Z-22-10, 22-Aug-97
Site #: Z174, Looking upstream at the channel, note the large number of gravel and cobble bars

Location: Z175, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 065-6200-000-000-000-000-000-000-000-000-

Map #: 1031090 Reach Length (km): 2.2 MW Date: 22-Aug-97 Time: 13:24 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9.561329.6082831 Length surveyed (m): 100.0 GE Survey Crew: CF\KG \ \ \ \ \ \ \ \ Photos: Z-22-12,13,14,15 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 4.8 MS
 Av. Wet. Width (m): 2.1 MS
 Av. Max Riffle Depth (cm): 7 MS
 Av. Max Pool Depth (cm): 30 MS
 Gradient (%): 2.5 CL
 Pool: 20 Riffle: 35 Run: 45 Other: 0
 % Side Channel: 10-40 GE
 % Debris Area: >15 GE
 % Stable: 40 GE

Specific Data

4.9	5.2	4.7	5.1	4.6	4.5
3.2	1.8	2.0	1.6	2.3	1.5
6	10	6	7		
38	20	41	20		

Bed Material

Fines	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	40	15
	Large (16-64mm):		25
	Sm. cobble (64-128mm):		15
Larges	Lge cobble (128-256mm):	50	20
	Blder cobble (>256mm):		15
Bedrock		0	0

D90 (cm): 36 Compaction: High

Cover

Cover Total %: 35 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
20	30	35	0	5	10

Crown Closure %: 0 Aspect: E

Discharge

Wetted Width (m): 1.4 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.42 F
 Discharge (m³/s): 0.04 F

Reach Symbol

(Fish) DV

5	B	2.5	1450
---	---	-----	------

(Width, Valley: Channel, Slope) (Bed Material)

Banks

Height (m): 0.2
 % Unstable: 20
 Fines Gravels Larges Bedrock

Confinement: FC
 Valley: Channel Ratio 2-5
 Stage: L Flood Signs H(m): 0.6
 Bars (%): 30 pH: 7.4 Braided: Y
 Water Temp. (°C): 12.0 02 (ppm):
 Turb. (cm): Cond. (µmhos): 80

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	DV	9	55-117	J	R			EL
	DV	10		NA				VO

Comments

C1: S3
 C2: LS=39%, RS=44%
 C3: No fisheries sensitive zones noted.
 C4: The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 300V & 400V, was 201 seconds over 50 meters.
 C5: No additional bank texture information.
 C6: DO was not measured at this site, the water was clear to bottom. The air temperature at this site was 17 C.
 C7: This site has good rearing habitat, potential spawning habitat and overwintering habitat. Shocking was discontinued due to the obvious abundance of fish.



Photo #: Z-22-12, 22-Aug-97
Site #: Z175, Measuring fish with the meterstick



Photo #: Z-22-13, 22-Aug-97
Site #: Z175, Measuring fish with the meterstick



Photo #: Z-22-14, 22-Aug-97
Site #: Z175, Looking downstream at the channel



Photo #: Z-22-15, 22-Aug-97
Site #: Z175, Looking upstream at the channel, note the confinement



Location: Z176, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 065-5500-000-000-000-000-000-000-000-

Map #: 1031 100 Reach Length (km): 2.0 MW Date: 22-Aug-97 Time: 14:20 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9.560847.608661 Length surveyed (m): 200.0 GE Survey Crew: CF KG \ \ \ \ \ \ Photos: Z-22-15A,15B,16,17 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 5.6 HC
 Av. Wet Width (m): 3.0 HC
 Av. Max Riffle Depth (cm): 10 MS
 Av. Max Pool Depth (cm): 72 MS
 Gradient (%): 7.0 CL
 Pool: 35 Riffle: 20 Run: 40 Other: 5
 % Side Channel: 0-10 GE
 % Debris Area: 5-15 GE
 % Stable: 0 GE

Specific Data

5.3	6.3	5.7	5.0	4.7	6.6
2.7	4.1	3.3	1.9	2.7	3.3
13	7	8	10		
180	50	42	51	54	52

Bed Material

Fines	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	40	15
	Large (16-64mm):		25
Larges	Sm. cobble (64-128mm):		10
	Lge cobble (128-256mm):	30	10
Bedrock	Blder cobble (>256mm):		10
		20	20

D90 (cm): Compaction: Medium

Obstructions

C	Height (m)	Type	Location
		F	
		F	

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Comments

- C1: S5
- C2: LS=75%, RS=33%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 500V, was 445 seconds over 210 meters.
- C5: No additional bank texture information.
- C6: DO was not measured at this site, the water was clear to bottom. The air temperature at this site was 13 C.
- C7: This site has some deep pools and boulder cover, but the falls downstream are a barrier to fish migration.

Cover

Cover Total %: 50 GE

Pool	LOD	Bldr	In Veg	Q Veg	Ctnk
50	0	40	0	0	10

Crown Closure %: 1 Aspect: E

Discharge

Wetted Width (m): 1.8 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.32 F
 Discharge (m3/s): 0.04 F

Banks

Height (m): 0.8
 % Unstable: 5
 Fines Gravels Larges Bedrock

Confinement: CO
 Valley : Channel Ratio 2-5

Stage: L Flood Signs Ht(m): 1.1

Bars (%): 15 pH: 7.4 Braided: Y

Water Temp. (°C): 14.0 O2 (ppm):

Turb. (cm): Cond. (µmhos): 30

Reach Symbol

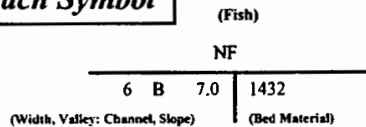




Photo #: Z-22-15A, 22-Aug-97
Site #: Z176, Looking upstream at a barrier

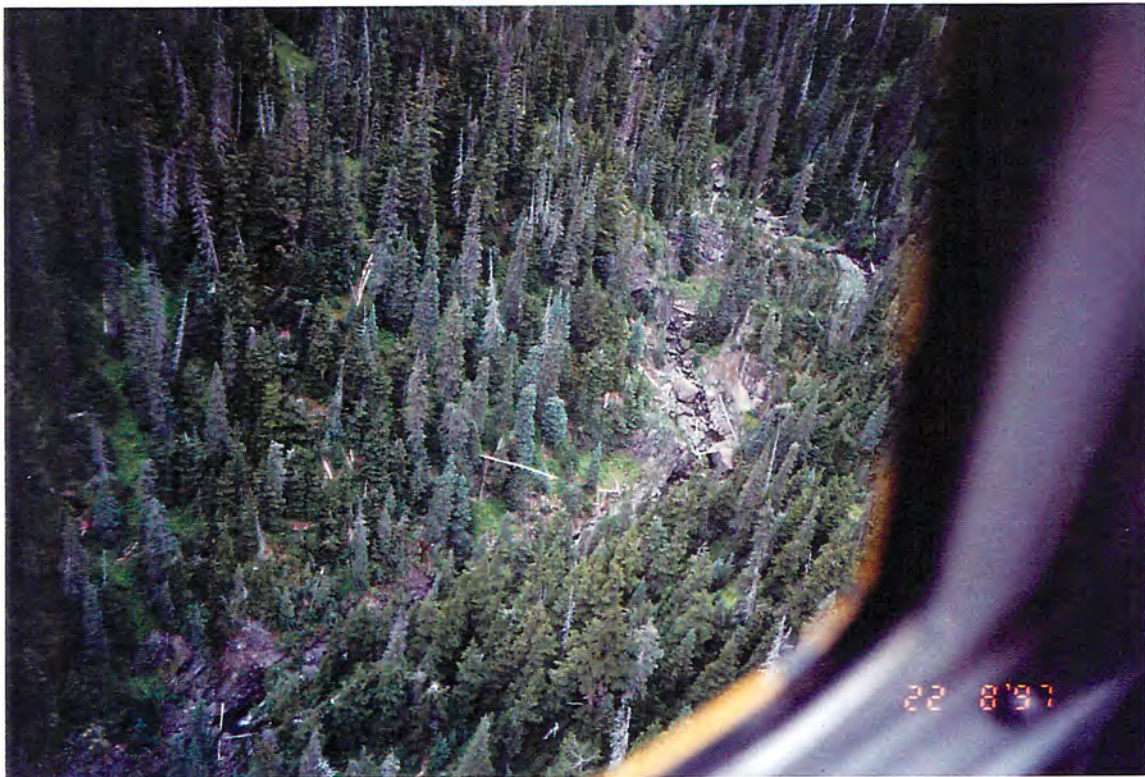


Photo #: Z-22-15B, 22-Aug-97
Site #: Z176, Looking upstream at a barrier



Photo #: Z-22-16, 22-Aug-97
Site #: Z176, Looking upstream at the channel



Photo #: Z-22-17, 22-Aug-97
Site #: Z176, Looking downstream at the channel



Photo #: Z-22-18, 22-Aug-97
Site #: Z177, Measuring fish with the meterstick



Photo #: Z-22-19, 22-Aug-97
Site #: Z177, Measuring fish with the meterstick



Photo #: Z-22-20, 22-Aug-97

Site #: Z177, Looking upstream at the channel, note the LOD



Photo #: Z-22-21, 22-Aug-97

Site #: Z177, Looking downstream at the channel



Photo #: Z-22-22, 22-Aug-97

Site #: Z178, Looking upstream at the channel, note the abundant LOD



Photo #: Z-22-23, 22-Aug-97

Site #: Z178, Looking downstream at the channel



Photo #: Z-23-1, 22-Aug-97

Site #: Z178, Looking upstream at a series of barriers



Photo #: W-13-7, 26-Jul-97
Site #: W118, Looking upstream at the channel



Photo #: W-13-8, 26-Jul-97
Site #: W118, Looking downstream at the channel, note cobble cover



Photo #: W-13-8A, 26-Jul-97
Site #: W118, RB 110mm on photoboard



Location: W116, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 065-5200-000-000-000-000-000-000-000-

Map #: 1031 090 Reach Length (km): 0.9 MW Date: 26-Jul-97 Time: 9:15 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9.5633 .60821 Length surveyed (m): 100.0 MA Survey Crew: KA UP \ \ \ \ \ \ Photos: W-13-1,2 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 2.1 MS
 Av. Wet. Width (m): 2.4 MS
 N Av. Max Riffle Depth (cm): 0 MS
 Av. Max Pool Depth (cm): 78 MS
 Gradient (%): 1.5 CL
 Pool: 20 Riffle: 0 Run: 80 Other: 0
 % Side Channel: 0-10 GE
 % Debris Area: 0-5 GE
 % Stable: 10 GE

Specific Data

1.6	2.4	1.5	3.7	2.2	1.3
1.8	2.6	1.8	4.0	2.5	1.5
130	36	70	36	117	

Cover

Cover Total %: 30 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
40	0	0	30	20	10

 Crown Closure %: 5 Aspect: SW

Bed Material

Fines	Clay, silt, sand (<2mm):	100	100
Gravels	Small (2-16mm):	0	0
	Large (16-64mm):		0
	Sm. cobble (64-128mm):		0
Larges	Lge cobble (128-256mm):	0	0
	Blder cobble (>256mm):		0
Bedrock		0	0

N D90 (cm): 0 Compaction: Low

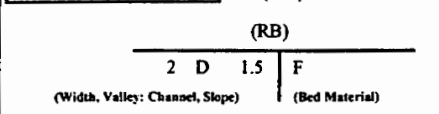
Discharge

N Wetted Width (m): GE
 N Mean Depth (m): GE
 N Mean Velocity (m/s): F
 N Discharge (m3/s): F

Banks

Height (m): 0.1
 % Unstable: 20
 Fines Gravels Larges Bedrock
 Confinement: UC
 Valley : Channel Ratio 10+
 Stage: H Flood Signs Ht(m): 0.2
 Bars (%): 0 pH: 7.1 Braided: N
 Water Temp. (°C): 7.0 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 20

Reach Symbol



Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Comments

- C1: S3.
- C2: The side slopes were not measured.
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at 1000V, was 221 seconds over 60 meters.
- C5: No additional bank texture information.
- C6: DO was not measured at this site, the water was clear to bottom. The mean air temperature on this day was 13.1 C.
- C7: This stream flows through a marsh/wetland area. The channel contains mostly standing water. Rearing habitat is limited. There is a cascade/chute obstruction downstream. There is also occasional subterranean flow.



Photo #: W-13-1, 26-Jul-97
Site #: W116, Looking upstream at the channel



Photo #: W-13-2, 26-Jul-97
Site #: W116, Looking downstream at the channel



Photo #: W-13-3, 26-Jul-97
Site #: W117, RB, 114mm on photoboard



Photo #: W-13-4, 26-Jul-97
Site #: W117, Looking upstream at barrier



Photo #: W-13-5, 26-Jul-97

Site #: W117, Looking upstream, note thick shrubs and ferns



Photo #: W-13-6, 26-Jul-97

Site #: W117, Looking downstream, note thick shrubs and ferns

5.4 Passby Creek (440-8930-000) (93 L 073, 93 L 083)

5.4.1 Sensitive Habitats and Barriers

The mainstem of Passby Creek is 16.6 km in length and is fed by 38 tributaries. Passby Creek is characterized by low gradient but is quite confined through most of its length. Reach 1 has low gradient, particularly near the mouth, and has steadily increasing confinement. Reach 2 also has low gradient and is quite confined. Reach 3 has moderate gradient and is somewhat confined. A large side channel roughly 720 m in length occurs in reach 1 and a 2 meter high beaverdam was noted in the historical information at reach 2. This side channel has been identified as a fisheries sensitive zone. A 6 meter falls was noted in reach 3 of unnamed tributary to Passby Creek (440-8913-613). However, reach 3 of this stream drains fish bearing Hankin Lake and does not limit fish distribution in this tributary. Fisheries sensitive zones were identified in reaches 1 and 3 of this system, which is 15.7 km in length. A wide flood zone was observed in reach 1 of the Passby mainstem, which suggests an S1 riparian management area would be appropriate for this reach. The Passby Creek system was sampled at 23 locations, including reaches 1 and 2 of the mainstem, and in a tributary to reach 1 draining Hankin Lake

5.4.2 Fish Summary Tables and Stream Classification

The historical information indicates the presence of coho, steelhead, cutthroat, Dolly Varden and rainbow trout at the mouth of Passby Creek, Dolly Varden at 1.8 km from the mouth and coho and rainbow trout at 4.7 km from the mouth. Fish were caught by electrofishing at 8 sites and the species sampled include Dolly Varden, cutthroat trout and coho. Trout were also visually observed in reach 1 of the mainstem and Dolly Varden were observed in a tributary. The mainstem of Passby Creek was classified as an S2 in reaches 1 and 2, based average channel widths of 18.4 meters and 5.1 meters respectively, and the presence of fish and fish habitat at both sites. An S1 classification may be likely downstream of K62 as the channel flows through a low gradient area and has a very wide flood zone (see K62 stream card).

The majority of the tributaries sampled were classified as S3, with some S4 and S2 classifications. One particularly large tributary to Passby Creek (440-8913-613) was sampled in 14 different locations. The historical records indicate that steelhead, coho, cutthroat, Dolly Varden, and rainbow trout are present in reach 3. Steelhead spawning was also indicated at the reach 1 and 2 break. Fish were caught by electrofishing at 4 of these sites and were visually observed at 1, the species sampled include cutthroat trout, Dolly Varden and rainbow trout. This stream was classified as an S2 in reaches 1 and 3 based on average channel widths of 8.62 meters and 5.95 meters respectively and the presence of fish in the sampling areas. Coho were captured in reach 1 and Dolly Varden and cutthroat trout were captured in reach 3. This tributary provides a variety of habitat types, as it includes two lakes, Hankin and Willow Lake. Spawning habitat was identified by survey crews in reach 3 and in 2 tributaries to reach 3.

Location: ARNE 27, Unit 11, upper Passby Cr., see C5. Stream (Gaz.): Passby Creek Watershed Code: 440-8930-000-000-000-000-000-000-000-000-0

Map #: 93 L 083 Reach Length (km): 9.6 MA Date: 23-Sep-96 Time: 11:49 Agency: TEC Access: H Fish Card: N Field Historical

U.T.M.: 9 6011 60802 Length surveyed (m): 1400.0 HC Survey Crew: AKL\HK \ \ \ \ \ \ Photos: A-3-6,7 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 5.1 T
 Av. Wet. Width (m): 3.5 T
 Av. Max Riffle Depth (cm): 16 MS
 Av. Max Pool Depth (cm): 44 MS
 Gradient (%): 3.5 CL
 Pool: 5 Riffle: 50 Run: 45 Other: 0
 % Side Channel: GE
 % Debris Area: 5 GE
 % Stable: 60 GE

Specific Data

3.2	3.6	6.2	4.1	4.0	9.5
1.5	2.5	3.7	2.7	3.1	7.4
20	18	15	12		
45	42				

Obstructions

C	Height (m)	Type	Location

Bed Material

Fines	Clay, silt, sand (<2mm):	0	0
Gravels	Small (2-16mm):	30	10
	Large (16-64mm):		20
	Sm. cobble (64-128mm):		25
Larges	Lge cobble (128-256mm):	70	35
	Blder cobble (>256mm):		10
Bedrock		0	0

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	DV	4	60-145	J	R			EL

Cover

Cover Total %: 40 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
0	10	40	0	40	10

Crown Closure %: 15 Aspect: NW

D90 (cm): 35 Compaction: Medium

Comments

- C1: S2
- C2: The side slopes were not measured at this site.
- C3: No fisheries sensitive zones were noted at this site.
- C4: The electroshocking effort, using a Smithroot 15 A model was 427 seconds over 300 square meters. The fish were pulled from the substrate.
- C5: Lat N 54 51' 31.2", Long W 127 25' 30"
- C6: No additional bank texture information. Some recent bank erosion was noted at this site. New trees have recently been introduced into the channel.
- C7: DO, pH and conductivity were not measured at this site. The water was clear to the bottom. The mean air temperature on this day was 3.8°C
- C8: Some good rearing, but limited spawning habitat was observed at this site. A spawning pair of Dolly Varden was seen 2528 m downstream of site A26.
- C9: Passby Creek was classified as an S2, well below the site at K62. No sharp changes in gradient were noted so a long reach was established. It is recommended that Passby Creek be sampled midway to the confluence and fairly close to the confluence.

Discharge

Wetted Width (m): 3.1 MS
 Mean Depth (m): 0.3 MS
 Mean Velocity (m/s): 0.29 F
 Discharge (m3/s): 0.20 F

Banks

Height (m): 0.4
 % Unstable: 30
 Fines Gravels Larges Bedrock

Confinement: UC
 Valley: Channel Ratio 10+
 Stage: L Flood Signs Ht(m): 0.5
 Bars (%): 4 pH: Braided: N
 Water Temp. (°C): 2.2 02 (ppm):
 Turb. (cm): 45 Cond. (µmhos):

Reach Symbol

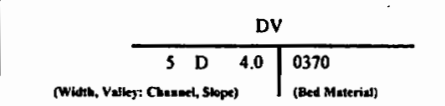




Photo #: A-3-6, 23-Sep-96
Site #: A27, Looking downstream.



Photo #: A-3-7, 23-Sep-96
Site #: A27, Looking upstream at gravel bar and small cascade.



Location: KARLA 62, Unit 11, 900m North of the Zymoetz River, see C5. Stream (Gaz.): Passby Creek Watershed Code: 440-8930-000-000-000-000-000-000-000-0

Map #: 93 L 073 Reach Length (km): 2.7 MA Date: 27-Sep-96 Time: 16:01 Agency: TEC Access: V2 Fish Card: N Field Historical

U.T.M.: 9 5962 607318 Length surveyed (m): 200.0 GE Survey Crew: JP \KG\ \ \ \ \ \ \ \ \ \ \ Photos: K-6-9,10,11,12 Air Photos:

Channel Characteristics

C1 Av. Chan. Width (m): 18.4 T
 Av. Wet. Width (m): 9.4 T
 Av. Max Riffle Depth (cm): 13 MS
 Av. Max Pool Depth (cm): 43 MS
 Gradient (%): 1.0 CL
 Pool: 20 Riffle: 30 Run: 50 Other: 0
 % Side Channel: 10-40 GE
 % Debris Area: 5-15 GE
 % Stable: 20 GE

Specific Data

14.1	14.8	10.4	11.5	21.2	38.4
8.5	12.8	6.1	10.3	14.3	4.7
11	21	10	11	13	
50	91	22	19	32	

Cover

Cover Total %: 40 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
25	25	10	0	30	10

Crown Closure %: 15 Aspect: SW

Bed Material

Fines	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	50	20
	Large (16-64mm):		30
Larges	Sm. cobble (64-128mm):		15
	Lge cobble (128-256mm):	40	15
Bedrock	Blder cobble (>256mm):		10

D90 (cm): 27 Compaction: Medium

Discharge

Wetted Width (m): 6.4 T
 Mean Depth (m): 0.2 MS
 Mean Velocity (m/s): 0.58 F
 Discharge (m3/s): 0.56 F

Reach Symbol

(Fish) (DV) RB

18	D	1.0	1540
----	---	-----	------

(Width, Valley: Channel, Slope) (Bed Material)

Banks

Height (m): 0.1
 % Unstable: 0
 Fines Gravels Larges Bedrock

Confinement: UC
 Valley : Channel Ratio 10+
 Stage: L Flood Signs Ht(m): 0.5
 Bars (%): 30 pH: 8.0 Braided: Y
 Water Temp. (°C): 6.0 02 (ppm):
 Turb. (cm): 91 Cond. (µmhos): 80

Obstructions

C	Height (m)	Type	Location

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
C4	RB	1	175	A				VO

Comments

C1: S2. Two of the channel widths taken at this site, (21.2m and 38.4m) indicate the wide flood zone of this creek.

C2: LS = 0%, RS = 0%

C3: No fisheries sensitive zones were noted at this site.

C4: The electroshocking effort, using a Smithroot 15A model was 409 seconds over 1350 square meters. The shocker was cutting out continually at this site, making it extremely difficult to fish effectively. Future sampling is recommended. A visual observation of a fish was made at this site. It was assumed to be rainbow trout because rainbows were caught at K63, a tributary to Passby Creek.

C5: Lat N 54 47' 47.6", Long W 127 30' 13.1"

C6: No additional bank texture information.

C7: DO was not measured at this site. The water was clear to the bottom. The mean air temperature on this day was 13.8°C

C8: Very nice spawning and rearing habitat was observed at this site. This is a terrific stream for fish. Exposed roots of bank vegetation provide some instream cover at this site.

C9: The air temperature at this site was 12.C.

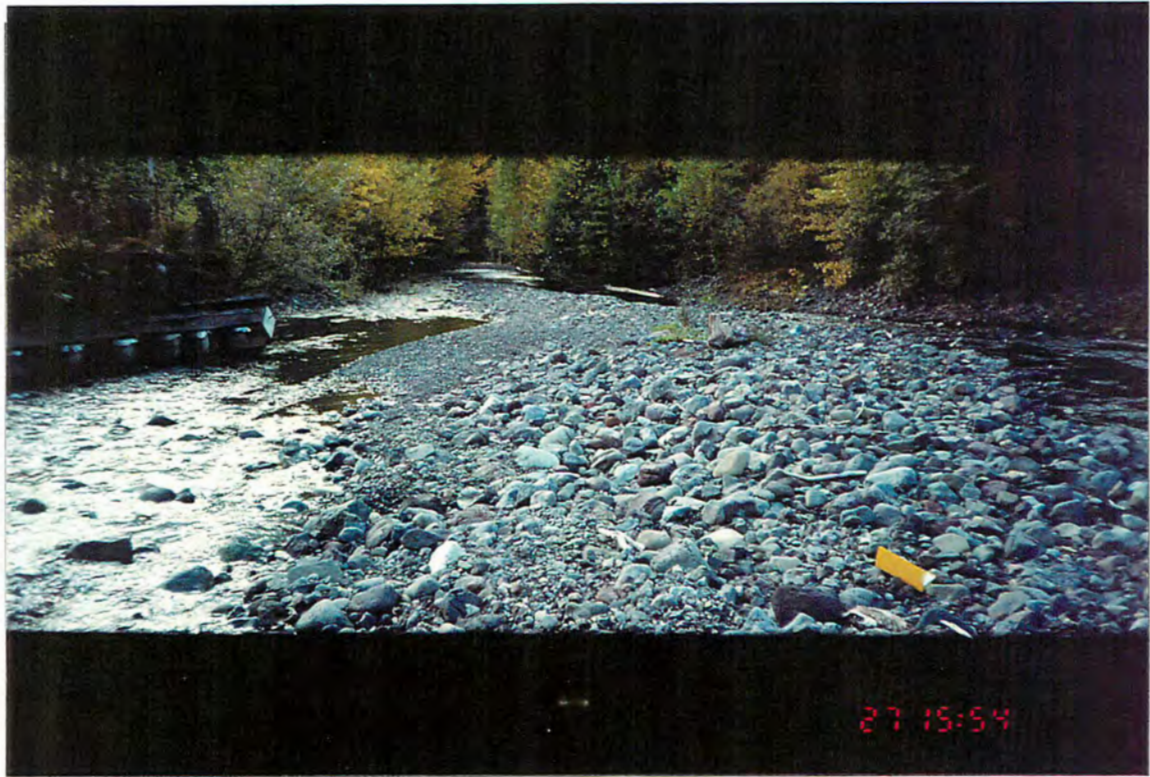


Photo #: K-6-9, 1996/09/27
Site #: K62, Looking downstream, large gravel bar.



Photo #: K-6-10, 1996/09/27
Site #: K62, Looking upstream toward bridge.

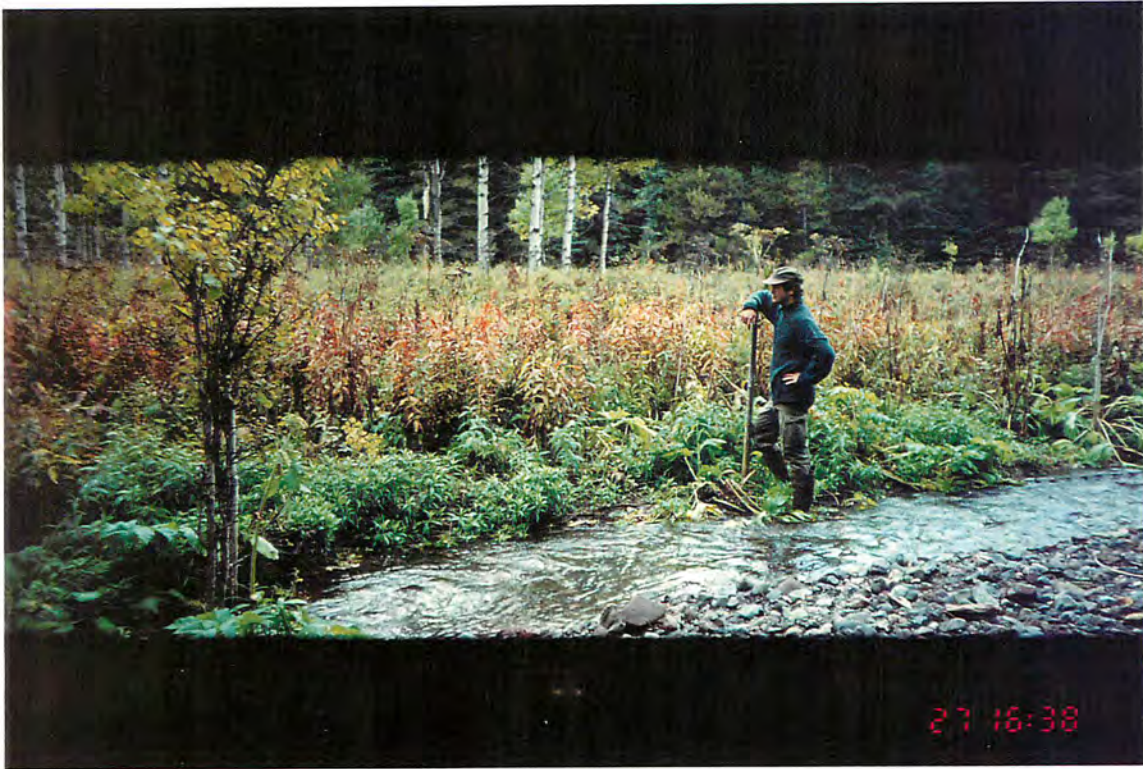


Photo #: K-6-11, 1996/09/27
Site #: K62, Looking cross-stream toward flood zone.



Photo #: K-6-12, 1996/09/27
Site #: K62, Flood zone.

Location: ARNE 43, Unit 11, at km 4.3 on the Hankin FSR, see C5.

Stream (Gaz.): Unnamed

Watershed Code: 040-1500-000-000-000-000-000-000-000-000-

Map #: 93 L 083 Reach Length (km): 0.2 MA Date: 26-Sep-96 Time: 13:33 Agency: TEC Access: V2 Fish Card: N Field Historical
 U.T.M.: 9 5936 60757 Length surveyed (m): 100.0 HC Survey Crew: AKLA BLA \ \ \ \ \ \ Photos: A-4-25, A-5-1 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 0.5 MS
 Av. Wet. Width (m): 0.3 MS
 Av. Max Riffle Depth (cm): 2 MS
 Av. Max Pool Depth (cm): 7 MS
 Gradient (%): 2.0 CL
 Pool: 2 Riffle: 50 Run: 48 Other: 0
 % Side Channel: 0 GE
 % Debris Area: 5-15 GE
 % Stable: 100 GE

Specific Data

0.3	0.4	0.4	0.9	0.6	0.7
0.4	0.3	0.3	0.4	0.4	0.3
2	2	3	2	1	1
7	12	9	5	3	5

Obstructions

C	Height (m)	Type	Location

Bed Material

Fines	Clay, silt, sand (<2mm):	60	60
Gravels	Small (2-16mm):	40	35
	Large (16-64mm):		5
Larges	Sm. cobble (64-128mm):	0	0
	Lge cobble (128-256mm):	0	0
Bedrock	Blder cobble (>256mm):	0	0
		0	0

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				VO

Comments

- C1: S4
- C2: The side slopes were not measured at this site.
- C3: No fisheries sensitive zones were noted at this site.
- C4: This site was not electrofished, no habitat was available to shock.
- C5: Lat N 54 49' 10.9", Long W 127 32' 35.7"
- C6: No additional bank texture information.
- C7: DO, pH and conductivity were not measured at this site. The mean air temperature on this day was 12.7°C
- C8: Future sampling is recommended during high flow.
- C9: The channel is undefined from the toe of the slope.

Cover

Cover Total %: 95 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
0	15	0	0	45	40

Crown Closure %: 90 Aspect: N

Discharge

Wetted Width (m): 0.2 MS
 Mean Depth (m): 0.0 MS
 Mean Velocity (m/s): 0.10 F
 Discharge (m3/s): 0.00 F

Banks

Height (m): 0.4
 % Unstable: 0
 Fines Gravels Larges Bedrock
 Confinement: N/A
 Valley: Channel Ratio N/A
 Stage: L Flood Signs Ht(m): 0.15
 Bars (%): 0 pH: Braided: N
 Water Temp. (°C): 6.0 O2 (ppm):
 Turb. (cm): 12 Cond. (µmhos):

Reach Symbol

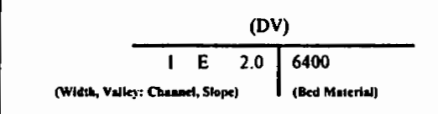




Photo #: A-4-25, 26-Sep-96
Site #: A43, Looking downstream.



Photo #: A-5-1, 26-Sep-96
Site #: A43, Looking upstream.

Location: ARNE 45, Unit 11, 3.7 km on the Hankin FSR, see C5. Stream (Gaz.): Unnamed Watershed Code: 040-1100-000-000-000-000-000-000-000-

Map #: 93 L 083 Reach Length (km): 0.8 MW Date: 26-Sep-96 Time: 16:19 Agency: TEC Access: V2 Fish Card: N Field Historical
 U.T.M.: 9 5952 60766 Length surveyed (m): 100.0 GE Survey Crew: AKLA BLA \ \ \ \ \ \ Photos: A-5-4,5 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 0.9 MS
 Av. Wet. Width (m): 0.7 MS
 Av. Max Riffle Depth (cm): 2 MS
 Av. Max Pool Depth (cm): 10 MS
 Gradient (%): 15.0 CL
 Pool: 10 Riffle: 50 Run: 40 Other: 0
 % Side Channel: 0 GE
 % Debris Area: 0.5 GE
 % Stable: 100 GE

Specific Data

0.7	1.0	0.9	1.1	0.9	1.0
0.6	0.8	0.7	0.9	0.8	0.6
2	4	1	2	2	1
17	14	11	3	6	9

Obstructions

C	Height (m)	Type	Location

Bed Material

Fines	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	70	10
	Large (16-64mm):		60
Larges	Sm. cobble (64-128mm):		10
	Lge cobble (128-256mm):	20	9
Bedrock	Blder cobble (>256mm):		1
		0	0

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				VO

Comments

- C1: S6
- C2: The side slopes were not measured at this site.
- C3: No fisheries sensitive zones were noted at this site.
- C4: This site was not electrofished as no fish habitat was available to shock.
- C5: Lat N 54 49' 38.9", Long W 127 31' 05.0"
- C6: No additional bank texture information.
- C7: DO, pH and conductivity were not measured at this site. The mean air temperature on this day was 12.7°C
- C8: This site contains no fish habitat. A frog was noted at this site. The channel contains horsetails (Equisetum sp.) however there is no riparian vegetation at this site, which runs through a cutblock.

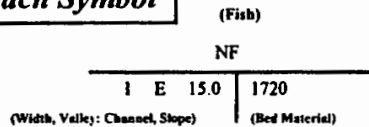
Cover

Cover Total %: 8 GE
 Pool LOD Bldr In Veg O Veg Ctnbk
 0 38 2 5 50 5
 Crown Closure %: 2 Aspect: W

Discharge

Wetted Width (m): 0.1 MS
 Mean Depth (m): 0.0 MS
 Mean Velocity (m/s): 0.45 F
 Discharge (m³/s): 0.00 F

Reach Symbol



Banks

Height (m): 0.2
 % Unstable: 0
 Fines Gravels Larges Bedrock
 Confinement: N/A
 Valley: Channel Ratio N/A
 Stage: L Flood Signs Ht(m): 0.1
 Bars (%): 0 pH: Braided: N
 Water Temp. (°C): 11.0 O2 (ppm):
 Turb. (cm): 17 Cond. (µmhos):



Photo #: A-5-4, 26-Sep-96
Site #: A45, Looking upstream in cutblock.



Photo #: A-5-5, 26-Sep-96
Site #: A45, Looking downstream at road crossing.

Location: KARLA 63, Unit 11, 260m North of Passby Creek, see C5.

Stream (Gaz.): Unnamed

Watershed Code: 031-1100-000-000-000-000-000-000-000-000-

Map #: 93 L 073 Reach Length (km): 4.1 MA Date: 27-Sep-96 Time: 16:43 Agency: TEC Access: V2 Fish Card: N Field Historical
 U.T.M.: 9 5962 .60732 Length surveyed (m): 120.0 GE Survey Crew: JP\KG \ \ \ \ \ \ \ Photos: K-6-13,14,15 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 8.6 MS
 Av. Wet. Width (m): 4.0 MS
 Av. Max Riffle Depth (cm): 5 MS
 Av. Max Pool Depth (cm): 35 MS
 Gradient (%): 4.0 CL
 Pool: 25 Riffle: 40 Run: 20 Other: 15
 % Side Channel: 0-10 GE
 % Debris Area: >15 GE
 % Stable: 30 GE

Specific Data

5.6	8.8	14.1	7.8	7.6	7.8
4.7	6.2	4.1	2.6	2.6	3.8
3	5	3	6	10	
30	41	38	22	42	

Obstructions

C	Height (m)	Type	Location

Bed Material

Fines	Clay, silt, sand (<2mm):	20	20
Gravels	Small (2-16mm):	30	10
	Large (16-64mm):		20
	Sm. cobble (64-128mm):		20
Larges	Lge cobble (128-256mm):	50	20
	Blidr cobble (>256mm):		10
Bedrock		0	0

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	CO	1	34	J	R			EL

Comments

- C1: S2
- C2: LS = 2%, RS = 3%
- C3: No fisheries sensitive zones were noted at this site.
- C4: The electroshocking effort, using a Smithroot 15 A model was 85 seconds over 60 square meters. The shocker was malfunctioning at this site. Fry were seen in pools in the sampling area.
- C5: Lat N 54 47' 47.9", Long W 127 30' 12.5"
- C6: No additional bank texture information.
- C7: DO was not measured at this site. The water ws clear to the bottom. The mean air temperature on this day was 13.8°C
- C8: Some good spawning and rearing habitat was observed at this site.
- C9: The air temperature at this site was 11 degrees celcius.

Cover

Cover Total %: 35 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnbk
30	15	15	0	15	25

Crown Closure %: 10 Aspect: S

Banks

Height (m): 0.2
 % Unstable: 15

Fines Gravels Larges Bedrock

Confinement: UC
 Valley: Channel Ratio 10+
 Stage: L Flood Signs Ht(m): 0.4
 Bars (%): 15 pH: 7.9 Braided: Y
 Water Temp. (°C): 10.0 O2 (ppm):
 Turb. (cm): 42 Cond. (µmhos): 60

Discharge

Wetted Width (m): 2.5 MS
 Mean Depth (m): 0.2 MS
 Mean Velocity (m/s): 0.66 F
 Discharge (m3/s): 0.25 F

Reach Symbol

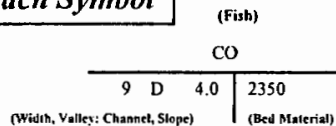




Photo #: K-6-13, 1996/09/27
Site #: K63, Looking upstream.



Photo #: K-6-14, 1996/09/27
Site #: K63, Looking downstream.



Photo #: K-6-15, 1996/09/27

Site #: K63, Coho Salmon caught by electrofishing.



Location: ARNE 39, Unit 11, see C5.

Stream (Gaz.): Unnamed

Watershed Code: 004-0540-000-000-000-000-000-000-000-

Map #: 93 L 083 Reach Length (km): 0.8 MA Date: 25-Sep-96 Time: 15:36 Agency: TEC Access: V2 Fish Card: N Field Historical
 U.T.M.: 9.5913 .60767 Length surveyed (m): 150.0 GE Survey Crew: JP VAKLA \ \ \ \ \ \ Photos: A-4-17,18 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 0.9 MS
 Av. Wet. Width (m): 0.9 MS
 Av. Max Riffle Depth (cm): 4 MS
 Av. Max Pool Depth (cm): 9 MS
 Gradient (%): 4.0 CL
 Pool: 15 Riffle: 40 Run: 25 Other: 20
 % Side Channel: 0 GE
 % Debris Area: 5-15 GE
 % Stable: 25 GE

Specific Data

0.7	0.5	0.7	0.7	1.2	1.7
0.8	0.8	0.9	0.9	0.9	1.5
3	4	4	5	4	
13	7	10	9	4	

Obstructions

C	Height (m)	Type	Location

Bed Material

Fines	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	50	20
	Large (16-64mm):		30
Larges	Sm. cobble (64-128mm):		20
	Lge cobble (128-256mm):	40	15
	Bldr cobble (>256mm):		5
Bedrock		0	0

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Cover

Cover Total %: 20 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
15	5	20	0	20	40

Crown Closure %: 15 Aspect: E

D90 (cm): 40 Compaction: High

Comments

- C1: S4
- C2: LS = 12%, RS = 16%
- C3: No fisheries sensitive zones were noted at this site.
- C4: The electroshocking effort, using a Smithroot 15 A model, 340 seconds over 80 square meters.
- C5: Lat N 54 49' 47.7", Long w 127 34' 38.4"
- C6: No additional bank texture information.
- C7: DO, pH and conductivity were not measured at this site. The mean air temperature on this day was 8.8°C
- C8: This stream may provide rearing habitat, particularly at higher flows, when some deeper pools would be present. Downstream of the site, there is no defined channel.
- C9: The air temperature was 7.C.

Discharge

Wetted Width (m): 0.8 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.33 F
 Discharge (m3/s): 0.02 F

Banks

Height (m): 0.1

% Unstable: 20

Fines Gravels Larges Bedrock

Confinement: FC
 Valley: Channel Ratio 2-5
 Stage: L Flood Signs Ht(m): 0.2
 Bars (%): 0 pH: Braided: N
 Water Temp. (°C): 5.0 O2 (ppm):
 Turb. (cm): 13 Cond. (µmhos):

Reach Symbol

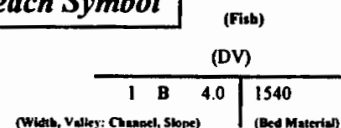




Photo #: A-4-17, 25-Sep-96
Site #: A39, Looking upstream through alders.



Photo #: A-4-18, 25-Sep-96
Site #: A39, Looking downstream.



Photo #: A-4-23, 26-Sep-96

Site #: A42, Looking upstream, moss-covered rocks in channel.



Photo #: A-4-24, 26-Sep-96

Site #: A42, Looking downstream.



Location: ARNE 44, Unit 11, 3.7km on the Hankin FSR, see C5.

Stream (Gaz.): Unnamed

Watershed Code: 040-0800-000-000-000-000-000-000-000-000-

Map #: 93 L 083 Reach Length (km): 1.1 MA Date: 26-Sep-96 Time: 15:23 Agency: TEC Access: V2 Fish Card: N Field Historical
 U.T.M.: 9 5949 60774 Length surveyed (m): 100.0 GE Survey Crew: AKL\BL\ \ \ \ \ \ \ \ \ \ \ Photos: A-5-2,3 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 1.4 MS
 Av. Wet. Width (m): 0.8 MS
 Av. Max Riffle Depth (cm): 3 MS
 Av. Max Pool Depth (cm): 24 MS
 Gradient (%): 2.0 CL
 Pool: 20 Riffle: 40 Run: 40 Other: 0
 % Side Channel: 0 GE
 % Debris Area: 5-15 GE
 %Stable: 95 GE

Specific Data

1.1	1.2	1.7	1.0	1.7	1.7
0.9	1.0	0.8	1.0	0.5	0.7
3	7	5	3	8	3
26	17	18	38	22	20

Obstructions

C	Height (m)	Type	Location

Bed Material

Fines	Clay, silt, sand (<2mm):	80	80
Gravels	Small (2-16mm):	10	5
	Large (16-64mm):		5
Larges	Sm. cobble (64-128mm):		5
	Lge cobble (128-256mm):	10	5
Bedrock	Bllder cobble (>256mm):		0
			0

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Comments

- C1: S4
- C2: The side slopes were not measured at this site.
- C3: No fisheries sensitive zones were noted at this site.
- C4: The electroshocking effort, using a Smithroot 15 A model was 90 seconds over 25 square meters. The shocker cut out after 90 seconds.
- C5: Lat N 54 50' 05.5", Long W 127 31' 20.9"
- C6: No additional bank texture information.
- C7: DO, pH and conductivity were not measured at this site. The mean air temperature on this day was 12.7°C
- C8: Potential rearing and poor spawning habitat were observed at this site. An oily sheen was noted on the surface of the water at this site, which flows through an old cutblock. Two beaver ponds were seen downstream of the site.

Cover

Cover Total %: 10 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnbk
0	75	0	10	5	10

Crown Closure %: 5 Aspect: SW

Banks

Height (m): 0.4

% Unstable: 0

Fines Gravels Larges Bedrock

Confinement: N/A

Valley : Channel Ratio N/A

Stage: L Flood Signs Ht(m): 0.3

Bars (%): 2 pH: Braided: N

Water Temp. (°C): 8.0 O2 (ppm):

Turb. (cm): 38 Cond. (µmhos):

Discharge

Wetted Width (m): 0.7 MS

Mean Depth (m): 0.0 MS

Mean Velocity (m/s): 0.24 F

Discharge (m3/s): 0.00 F

Reach Symbol

(Fish)

(CT) (DV)

1 E 2.0 8110

(Width, Valley: Channel, Slope)

(Bed Material)



Photo #: A-5-2, 26-Sep-96
Site #: A44, Looking downstream towards pond area.



Photo #: A-5-3, 26-Sep-96
Site #: A44, Looking upstream through cutblock.



Photo #: A-5-6, 26-Sep-96

Site #: A46, Looking downstream, alders in cutblock.



Photo #: A-5-7, 26-Sep-96

Site #: A46, Looking upstream, side-hill with planted pine.



Location: RYAN 117, Unit 11, see C5.

Stream (Gaz.): Unnamed

Watershed Code: 040-5200-000-000-000-000-000-000-000-0

Map #: Reach Length (km): Date: Time: Agency: Access: Fish Card: Field Historical
 U.T.M.: Length surveyed (m): Survey Crew: RH JLV \ \ \ \ \ \ \ \ \ \ Photos: Air Photos:

Channel Characteristics

Av. Chan. Width (m):
 Av. Wet. Width (m):
 Av. Max Riffle Depth (cm):
 Av. Max Pool Depth (cm):
 Gradient (%):
 Pool: Riffle: Run: Other:
 % Side Channel:
 % Debris Area:
 % Stable:

Specific Data

0.7	1.4	1.0	1.3	2.0	1.2
0.7	1.3	0.9	0.4	2.0	1.0
7	9	6			
12	11	30			

Obstructions

C	Height (m)	Type	Location
	1	BD	0.2

Bed Material

Fines	Clay, silt, sand (<2mm):	20	20
Gravels	Small (2-16mm):	65	20
	Large (16-64mm):		45
	Sm. cobble (64-128mm):		5
Larges	Lge cobble (128-256mm):	15	5
	Blder cobble (>256mm):		5
Bedrock		0	0

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Comments

- C1: S4
- C2: LS = 18%, RS = 11%
- C3: No fisheries sensitive zones were noted at this site.
- C4: The electroshocking effort, using a Smithroot 15 A model was 400 seconds over 330 square meters. Electrofishing this site was difficult due to the dense willow in the area.
- C5: Lat N 54 49' 53.3", Long W 127 34' 28.1"
- C6: No additional bank texture information.
- C7: DO, pH, conductivity were not measured at this site. The water was clear to the bottom. The mean air temperature on this day was 8.8°C
- C8: A beaver dam below the road may be preventing fish access upstream at this stream. Overstream vegetation and cutbanks are the prevalent forms of fish cover at this site.

Cover

Cover Total %:

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
5	20	0	0	45	30

Crown Closure %: Aspect:

Discharge

Wetted Width (m):
 Mean Depth (m):
 Mean Velocity (m/s):
 Discharge (m³/s):

Banks

Height (m):
 % Unstable:
 Fines Gravels Larges Bedrock

Confinement:
 Valley: Channel Ratio

Stage: Flood Signs Ht(m):

Bars (%): pH: Braided:

Water Temp. (°C): O₂ (ppm):

Turb. (cm): Cond. (µmhos):

Reach Symbol

(Fish)

(DV)

1 D 5.0 2620

(Width, Valley: Channel, Slope) (Bed Material)



Photo #: R-7-11, 1996/09/25
Site #: R117, Looking downstream.



Photo #: R-7-12, 1996/09/25
Site #: R117, Looking upstream through willows.

Location: ARNE 26, Unit 11, see C5.

Stream (Gaz.): Unnamed

Watershed Code: 041-2800-000-000-000-000-000-000-000-0

Map #: 93 L 083 Reach Length (km): 0.3 MA Date: 23-Sep-96 Time: 10:55 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 6013 60803 Length surveyed (m): 200.0 HC Survey Crew: AKL\HK\ \ \ \ \ \ \ \ \ \ \ Photos: A-3-4,5 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 2.4 MS
 Av. Wet. Width (m): 2.0 MS
 Av. Max Riffle Depth (cm): 15 MS
 Av. Max Pool Depth (cm): 27 MS
 Gradient (%): 5.0 CL
 Pool: 10 Riffle: 50 Run: 40 Other: 0
 % Side Channel: 0-10 GE
 % Debris Area: 5 GE
 % Stable: 80 GE

Specific Data

1.7	2.8	2.7	1.9	2.4	3.1
1.7	2.0	1.8	1.7	1.9	2.8
15	16	9	20		
20	22	40			

Obstructions

C	Height (m)	Type	Location

Bed Material

Fines	Clay, silt, sand (<2mm):	5	5
Gravels	Small (2-16mm):	45	10
	Large (16-64mm):		35
Larges	Sm. cobble (64-128mm):		20
	Lge cobble (128-256mm):	50	20
Bedrock	Blder cobble (>256mm):		10
		0	0

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	DV	4	60-145	J	R			EL

Cover

Cover Total %: 35 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
0	20	30	0	30	20

Crown Closure %: 20 Aspect: SW

Banks

Height (m): 0.6

% Unstable: 30

Fines Gravels Larges Bedrock

Confinement: OC

Valley: Channel Ratio 5-10

Stage: L Flood Signs Ht(m): 0.4

Bars (%): 20 pH: Braided: N

Water Temp. (°C): 1.0 O2 (ppm):

Turb. (cm): 40 Cond. (µmhos):

Discharge

Wetted Width (m): 1.6 MS

Mean Depth (m): 0.2 MS

Mean Velocity (m/s): 0.29 F

Discharge (m³/s): 0.07 F

Reach Symbol

(Fish)

DV

2 C 5.0 0550

(Width, Valley: Channel, Slope)

(Bed Material)

Comments

- C1: S3
- C2: LS = 3%, RS = 7%
- C3: No fisheries sensitive zones were noted at this site.
- C4: The electroshocking effort, using a Smithroot 15 A model was 427 seconds.
- C5: Lat N 54 51' 34.3", Long W 127 25' 18.7"
- C6: No additional bank texture information.
- C7: DO, pH, and conductivity were not measured at this site. The water was clear to the bottom. The mean air temperature on this day was 3.8°C
- C8: Some good Dolly Varden rearing habitat was observed at this site. Pools associated with LOD were noted, as were many undercut banks.



Photo #: A-3-4, 22-Sep-96
Site #: A26, Looking upstream.



Photo #: A-3-5, 23-Sep-96
Site #: A26, Looking downstream.



Location: ARNE 28, Unit 11, upper Passby Cr. area, see C5.

Stream (Gaz.): Unnamed

Watershed Code: 440-8930-000-000-000-000-000-000-000-0

Map #: 93 L 083 Reach Length (km): 0.2 MA Date: 23-Sep-96 Time: 13:10 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 6006 60805 Length surveyed (m): 100.0 HC Survey Crew: RH UL \ \ \ \ \ \ \ \ \ \ Photos: A-3-8,9 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 1.1 MS
 Av. Wet. Width (m): 1.0 MS
 Av. Max Riffle Depth (cm): 4 MS
 Av. Max Pool Depth (cm): 20 MS
 Gradient (%): 2.0 CL
 Pool: 25 Riffle: 15 Run: 60 Other: 0
 % Side Channel: GE
 % Debris Area: 10 GE
 % Stable: 80 GE

Specific Data

1.4	1.3	1.1	0.9	0.7	1.2
1.0	1.2	1.0	0.9	0.7	1.1
5	4	3			
20	25	15			

Obstructions

C	Height (m)	Type	Location
	0	BD	0.0

Cover

Cover Total %: 20 GE

Pool	LOD	Bldr	In Veg	O Veg	Crbnk
0	30	0	0	40	30

Crown Closure %: 30 Aspect: W

Bed Material

Fines	Clay, silt, sand (<2mm):	60	60
Gravels	Small (2-16mm):	35	25
	Large (16-64mm):		10
Larges	Sm. cobble (64-128mm):		5
	Lge cobble (128-256mm):	5	0
	Blder cobble (>256mm):		0
Bedrock		0	0

D90 (cm): 6 Compaction: Low

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
C4	NF			NA				VO

Discharge

Wetted Width (m): 0.5 MS
 Mean Depth (m): 0.0 MS
 Mean Velocity (m/s): 0.72 F
 Discharge (m³/s): 0.01 F

Banks

Height (m): 0.3
 % Unstable: 0
 Fines Gravels Larges Bedrock

Confinement: N/A
 Valley: Channel Ratio N/A
 Stage: M Flood Signs Ht(m): 0.2
 Bars (%): 0 pH: Braided: N
 Water Temp. (°C): 3.7 O2 (ppm):
 Turb. (cm): 25 Cond. (µmhos):

Reach Symbol

(Fish)
 (DV)
 I E 2.0 6400
 (Width, Valley: Channel, Slope) (Bed Material)

Comments

C1: S4
 C2: The side slopes were not measured at this site.
 C3: No fisheries sensitive zones were noted at this site.
 C4: This site was not electrofished.
 C5: Lat N 54 51' 41.2", Long W 127 25' 57.6"
 C6: No additional bank texture information.
 C7: DO, pH and conductivity were not measured at this site. The water was clear to the bottom. The mean air temperature on this day was 3.8°C
 C8: This site has great access to Passby Creek. Some good rearing habitat was noted at this site. This stream would be used a high water refuge from Passby Creek. The beaver dam close to the mouth of this stream may be an obstruction. The beaver pond at this site contains a lot of sediment.



Photo #: A-3-8, 23-Sep-96
Site #: A28, Looking downstream.



Photo #: A-3-9, 23-Sep-96
Site #: A28, Looking upstream.

Location: ARNE 29, Unit 11, upper Passby Creek area, see C5. Stream (Gaz.): Unnamed Watershed Code: 041-2600-000-000-000-000-000-000-000-0

Map #: 93 L 083 Reach Length (km): 0.6 MA Date: 23-Sep-96 Time: 13:53 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9.6003 .60804 Length surveyed (m): 100.0 HC Survey Crew: RH VL \ \ \ \ \ \ \ \ \ \ Photos: A-3-10,11 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 2.2 MS
 Av. Wet. Width (m): 1.6 MS
 Av. Max Riffle Depth (cm): 6 MS
 Av. Max Pool Depth (cm): 32 MS
 Gradient (%): 4.0 CL
 Pool: 10 Riffle: 50 Run: 40 Other: 0
 % Side Channel: 0-10 GE
 % Debris Area: 0-5 GE
 % Stable: 80 GE

Specific Data

2.5	2.5	2.0	2.1	1.9	2.0
0.9	2.2	1.8	1.5	1.7	1.4
6	7	7	5	6	
28	35				

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	DV	1	68	J	R			EL

Comments

- C1: S3
- C2: The side slopes were not measured.
- C3: Fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 15 A model, was 236 seconds over 105 square meters.
- C5: Lat N 55 51' 38.2", Long W 127 26' 14.6"
- C6: No additional bank texture information.
- C7: DO, pH and conductivity were not measured. The mean air temperature on this day was 3.8°C
- C8: This is a very shallow channel, which fans through a swamp. Low timber values were noted. The trees are small and sparse. Some good spawning and rearing habitat was noted. Pools are limited.

Cover

Cover Total %: 20 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
0	40	0	0	50	10

Crown Closure %: 10 Aspect: W

Bed Material

Fines	Clay, silt, sand (<2mm):	25	25
Gravels	Small (2-16mm):	70	20
	Large (16-64mm):		50
Larges	Sm. cobble (64-128mm):		5
	Lge cobble (128-256mm):	5	0
	Blder cobble (>256mm):		0
Bedrock		0	0

D90 (cm): 8 Compaction: Medium

Discharge

Wetted Width (m): 1.0 MS
 Mean Depth (m): 0.0 MS
 Mean Velocity (m/s): 0.42 F
 Discharge (m3/s): 0.01 F

Banks

Height (m): 0.2
 % Unstable: 10

Fines Gravels Larges Bedrock

Confinement: N/A
 Valley : Channel Ratio N/A
 Stage: L Flood Signs Ht(m): 0.2
 Bars (%): 5 pH: Braided: N
 Water Temp. (°C): 3.5 O2 (ppm):
 Turb. (cm): 35 Cond. (µmhos):

Reach Symbol

(Fish)

DV

2 E 4.0 | 2710

(Width, Valley: Channel, Slope)

(Bed Material)



Photo #: A-3-10, 23-Sep-96
Site #: A29, Looking upstream through overhanging willows.



Photo #: A-3-11, 23-Sep-96
Site #: A29, Looking downstream.

Location: ARNE 30, Unit 11, 1410m downstream of site A26, upper Passby Cr. area, see C5.

Stream (Gaz.): Unnamed

Watershed Code: 041-2300-000-000-000-000-000-000-000-0

Map #: 93 L 083 Reach Length (km): 0.2 MA Date: 23-Sep-96 Time: 14:55 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 6002 60807 Length surveyed (m): 150.0 GE Survey Crew: AKLA HK \ \ \ \ \ \ Photos: A-3-12,13,14,17,18 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 2.1 MS
 Av. Wet. Width (m): 1.4 MS
 Av. Max Riffle Depth (cm): 10 MS
 Av. Max Pool Depth (cm): 24 MS
 Gradient (%): 18.0 CL
 Pool: 10 Riffle: 20 Run: 10 Other: 60
 % Side Channel: GE
 % Debris Area: 0.5 GE
 % Stable: 15 GE

Specific Data

1.8	2.6	2.4	2.0	2.3	1.7
1.5	1.9	1.0	1.3	1.2	1.4
10	14	8	10		
28	21	26	29	22	20

Obstructions

C	Height (m)	Type	Location

Bed Material

	Fines	Clay, silt, sand (<2mm):	0	0
Gravels	Small (2-16mm):		25	5
	Large (16-64mm):			20
Larges	Sm. cobble (64-128mm):			20
	Lge cobble (128-256mm):		75	30
Bedrock	Blder cobble (>256mm):			25
			0	0

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Comments

- C1: S3
- C2: LS = 15%, RS = 20%
- C3: No fisheries sensitive zones were noted at this site.
- C4: This site was electrofished with a Smithroot 15 A model for 305 seconds over 100 meters. Pools were shocked at this site.
- C5: Lat N 54 51' 48", Long W 127 26' 19.8"
- C6: The banks at this site are comprised of larges and gravels.
- C7: DO, pH and conductivity were not measured at this site. The water was clear to the bottom. Cascades comprise 60% of the flow this site. The mean air temperature on this day was 3.8°C
- C8: There is potential rearing habitat at this site, however, the 23% gradient occurring at the mouth of this stream, could be a barrier at lower flows. This is a high energy stream during run off.

Cover

Cover Total %: 60 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
5	5	60	0	20	10

Crown Closure %: 35 Aspect: SW

D90 (cm): 45 Compaction: High

Discharge

Wetted Width (m): 1.0 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.30 F
 Discharge (m3/s): 0.02 F

Banks

Height (m): 0.5
 % Unstable: 40
 Fines Gravels Larges Bedrock
 Confinement: OC
 Valley : Channel Ratio 5-10
 Stage: L Flood Signs Ht(m): 0.7
 Bars (%): 0 pH: Braided: N
 Water Temp. (°C): 3.0 O2 (ppm):
 Turb. (cm): 29 Cond. (µmhos):

Reach Symbol

(Fish)
 (DV)
 2 C 18.0 | 0370
 (Width, Valley: Channel, Slope) | (Bed Material)



Photo #: A-3-12, 23-Sep-96
Site #: A30, Looking downstream.



Photo #: A-3-13, 23-Sep-96
Site #: A30, Looking upstream towards cascade and small pool.



Photo #: A-3-17, 23-Sep-96

Site #: A30, Spawning Dolly Varden char downstream A30 in Passby Creek.



Photo #: A-3-18, 23-Sep-96

Site #: A30, Spawning Dolly Varden char downstream A30 in Passby Creek.



Photo #: A-3-14, 23-Sep-96

Site #: d/s A30, Slide into Passby C. 50m downstream of A30.

DFO/MoELP Stream Survey Form

Site Number: ARNE 31

Reach No.: 1

Trib. to Passby Cr.



TRITON

Environmental Consultants Ltd.

Location: ARNE 31, Unit 11, 3300m downstream of site A26, see C5.

Stream (Gaz.): Unnamed

Watershed Code: 041-1200-000-000-000-000-000-000-000-0

Map #: 93 L 083 Reach Length (km): 0.8 MA Date: 23-Sep-96 Time: 16:56 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 5986 60806 Length surveyed (m): 200.0 HC Survey Crew: AKL\HK\ \ \ \ \ \ \ \ Photos: A-3-23,24 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 1.6 MS
 Av. Wet. Width (m): 1.1 MS
 Av. Max Riffle Depth (cm): 6 MS
 Av. Max Pool Depth (cm): 20 MS
 Gradient (%): 6.0 CL
 Pool: 30 Riffle: 55 Run: 10 Other: 5
 % Side Channel: GE
 % Debris Area: 0.5 GE
 % Stable: 80 GE

Specific Data

1.3	1.6	1.8	1.2	1.4	2.2
1.2	1.0	1.6	0.8	1.3	0.6
6	7	2	7		
21	16	19	24		

Obstructions

C	Height (m)	Type	Location

Bed Material

Fines	Clay, silt, sand (<2mm):	0	0
Gravels	Small (2-16mm):	30	5
	Large (16-64mm):		25
Larges	Sm. cobble (64-128mm):		30
	Lge cobble (128-256mm):	70	25
Bedrock	Blder cobble (>256mm):		15
		0	0

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Comments

- C1: S3
- C2: LS = 15%, RS = 30%
- C3: No fisheries sensitive zones were noted at this site.
- C4: The electroshocking effort, using a Smithroot 15 A model, was 352 seconds over 140 square meters.
- C5: Lat N 54 51' 45.9", Long W 127 27' 49.7"
- C6: The banks at this site contain both fines and gravels.
- C7: DO, pH and conductivity were not measured at this site. The water was clear to the bottom. Cascades comprise 5% of the flow type at this site. The mean air temperature on this day was 3.8°C
- C8: Some good rearing habitat, including a lot of undercut banks, was observed at this site. Only marginal spawning habitat was observed at this site however. The use of this stream by fish would be expected at different flow stages and water temperatures.

Cover

Cover Total %: 40 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
0	5	40	0	15	40

Crown Closure %: 30 Aspect: SE

D90 (cm): 38 Compaction: Medium

Discharge

Wetted Width (m): 0.6 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.17 F
 Discharge (m3/s): 0.01 F

Banks

Height (m): 0.3
 % Unstable: 0
 Fines Gravels Larges Bedrock

Confinement: UC
 Valley: Channel Ratio 10+
 Stage: L Flood Signs Ht(m): 0.25
 Bars (%): 0 pH: Braided: N
 Water Temp. (°C): 4.0 O2 (ppm):
 Turb. (cm): 24 Cond. (µmhos):

Reach Symbol

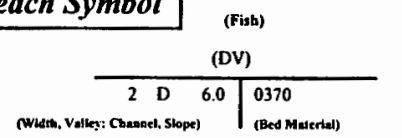




Photo #: A-3-23, 23-Sep-96
Site #: A31, Looking upstream, meterstick across channel.



Photo #: A-3-24, 23-Sep-96
Site #: A31, Looking downstream.

Location: ARNE 38, Unit 11, Northwest of Willow Lake, see C5. Stream (Gaz.): Unnamed Watershed Code: 040-2000-000-000-000-000-000-000-000-000-

Map #: 93 L 083 Reach Length (km): 3.0 MW Date: 25-Sep-96 Time: 13:33 Agency: TEC Access: V2 Fish Card: N Field Historical
 U.T.M.: 9 59310 .60770 Length surveyed (m): 500.0 GE Survey Crew: AKLA JPA \ \ \ \ \ \ \ \ Photos: A-4-15,16 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 4.8 MS
 Av. Wet. Width (m): 1.9 MS
 Av. Max Riffle Depth (cm): 6 MS
 Av. Max Pool Depth (cm): 38 MS
 Gradient (%): 4.0 CL
 Pool: 25 Riffle: 15 Run: 50 Other: 10
 % Side Channel: 0-10 GE
 % Debris Area: >15 GE
 %Stable: 30 GE

Specific Data

5.2	4.4	5.1	4.8	4.9	4.5
1.7	1.2	1.6	2.1	2.2	2.8
8	5	4	7	6	
70	29	30	47	14	

Obstructions

C	Height (m)	Type	Location
C8	1	BD	0.3

Bed Material

Fines	Clay, silt, sand (<2mm):	60	60
Gravels	Small (2-16mm):	30	15
	Large (16-64mm):		15
Larges	Sm. cobble (64-128mm):	10	10
	Lge cobble (128-256mm):	10	0
	Blder cobble (>256mm):		0
Bedrock		0	0

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	DV	5	50-180	J	R			EL

Comments

- C1: S3
- C2: LS = 2%, RS = 2%
- C3: No fisheries sensitive zones were noted at this site.
- C4: The electroshocking effort, using a Smithroot 15 A model was 199 seconds. A spawning male was observed while sampling and the crew cut the electrofishing trial short.
- C5: Lat N 54 49' 51.9", Long W 127 31' 10.1"
- C6: No additional bank texture information.
- C7: DO, pH and conductivity were not measured at this site. The water was clear to the bottom. The mean air temperature on this day was 8.8°C
- C8: This site contains some good spawning habitat. The stream flows into a beaver dam wetland. Ten beaver dams were noted in the first 300 meters of this stream.
- C9: The air temperature at this site was 7.C.

Cover

Cover Total % : 25 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
40	20	0	0	10	30

Crown Closure % : 5 Aspect : W

D90 (cm): 8 Compaction: Low

Discharge

Wetted Width (m): 1.5 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.79 F
 Discharge (m3/s): 0.09 F

Banks

Height (m): 0.2
 % Unstable: 40
 Fines Gravels Larges Bedrock
 Confinement: UC
 Valley : Channel Ratio 10+
 Stage: L Flood Signs Ht(m): 0.5
 Bars (%): 15 pH: 7.9 Braided: Y
 Water Temp. (°C): 5.0 O2 (ppm):
 Turb. (cm): 70 Cond. (µmhos): 110

Reach Symbol

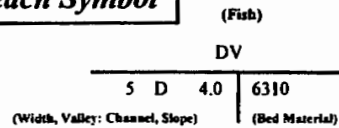




Photo #: A-4-15, 25-Sep-96
Site #: A38, Looking upstream, large gravel bars.



Photo #: A-4-16, 25-Sep-96
Site #: A38, Looking downstream.



Photo #: A-4-19, 25-Sep-96
Site #: A40, Looking upstream toward bridge.



Photo #: A-4-20, 25-Sep-96
Site #: A40, Looking downstream, grass-covered banks.



Photo #: A-4-21, 26-Sep-96

Site #: A41, Looking downstream, logging debris in channel.



Photo #: A-4-22, 26-Sep-96

Site #: A41, Looking upstream.



Location: RYAN 100, Unit 11, 4.0 km W of Passby Cr.

Stream (Gaz.): Unnamed

Watershed Code: 040-2200-000-000-000-000-000-000-000-0

Map #: 93 L 083 Reach Length (km): 1.0 MA Date: 23-Sep-96 Time: 16:50 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 5922 60791 Length surveyed (m): 130.0 GE Survey Crew: RH J/L \ \ \ \ \ \ \ Photos: R-6-8,9 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 0.9 MS
 Av. Wet. Width (m): 0.6 MS
 Av. Max Riffle Depth (cm): 6 MS
 Av. Max Pool Depth (cm): 8 MS
 Gradient (%): 19.0 CL
 Pool: 5 Riffle: 80 Run: 0 Other: 15
 % Side Channel: 0 GE
 % Debris Area: 0.5 GE
 % Stable: 5 GE

Specific Data

1.0	0.7	0.9	0.8	1.1	0.7
0.5	0.5	0.8	0.6	0.7	0.5
5	4	8			
8	8				

Obstructions

C	Height (m)	Type	Location

Bed Material

Fines	Clay, silt, sand (<2mm):	5	5
Gravels	Small (2-16mm):	20	5
	Large (16-64mm):		15
Larges	Sm. cobble (64-128mm):	75	25
	Lge cobble (128-256mm):		25
Bedrock	Blder cobble (>256mm):	0	0

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				NA

Cover

Cover Total %: 30 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
0	20	20	0	30	30

 Crown Closure %: 60 Aspect: E

D90 (cm): 45 Compaction: Medium

Comments

- C1: S4
- C2: LS = 30%, RS = 40%
- C3: No fisheries sensitive zones were noted at this site.
- C4: Too little flow was found in the stream on the sampling day to effectively electrofish the site. However, the confluence of this site and R99 was electrofished and fish were caught.
- C5: Lat N 54 51' 13.2, Long W 127 33' 47.5"
- C6: No additional bank texture information.
- C7: DO, pH and conductivity were not measured at this site. The water was clear to the bottom. The mean air temperature on this day was 3.8°C
- C8: Several .7m high cascades were noted in the sampling area that would not be impassable at high flow.
- C9: The air temperature at this site was 4.C.

Discharge

Wetted Width (m): 0.3 MS
 Mean Depth (m): 0.0 MS
 Mean Velocity (m/s): 0.19 F
 Discharge (m3/s): 0.00 F

Banks

Height (m): 0.4
 % Unstable: 0
 Fines Gravels Larges Bedrock
 Confinement: OC
 Valley : Channel Ratio 5-10
 Stage: L Flood Signs Ht(m): 0.4
 Bars (%): 0 pH: Braided: N
 Water Temp. (°C): 3.5 O2 (ppm):
 Turb. (cm): 8 Cond. (µmhos):

Reach Symbol

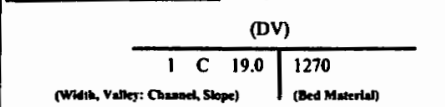




Photo #: R-6-8, 1996/09/23
Site #: R100, Looking upstream, meterstick across channel.



Photo #: R-6-9, 1996/09/23
Site #: R100, Looking downstream.



Location: RYAN 101, Unit 11, see C5.

Stream (Gaz.): Unnamed

Watershed Code: 040-6900-000-000-000-000-000-000-000-0

Map #: 93 L 083 Reach Length (km): 0.6 MA Date: 23-Sep-96 Time: 17:50 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 5977 60751 Length surveyed (m): 150.0 GE Survey Crew: RH\JL \ \ \ \ \ \ \ \ Photos: R-6-10,11 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 3.5 MS
 Av. Wet. Width (m): 2.0 MS
 Av. Max Riffle Depth (cm): 13 MS
 Av. Max Pool Depth (cm): 35 MS
 Gradient (%): 18.0 CL
 Pool: 15 Riffle: 50 Run: 5 Other: 30
 % Side Channel: 0 GE
 % Debris Area: 0-5 GE
 % Stable: 0 GE

Specific Data

7.3	2.4	3.7	1.8	2.7	3.4
2.1	2.0	1.9	1.6	2.0	2.5
14	12	14			
47	30	29			

Obstructions

C	Height (m)	Type	Location
C8	1	F	0.1

Bed Material

Fines	Clay, silt, sand (<2mm):	5	5
Gravels	Small (2-16mm):	30	10
	Large (16-64mm):		20
Larges	Sm. cobble (64-128mm):		20
	Lge cobble (128-256mm):	60	20
Bedrock	Blder cobble (>256mm):		20
		5	5

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	DV	1	40	J	R			EL

Comments

- C1: S3
- C2: LS = 65%, RS = 55%
- C3: No fisheries sensitive zones were noted at this site.
- C4: The electroshocking effort, using a 12 B POW model was 300 seconds over 150 meters.
- C5: Lat N 54 48' 48.7", Long W 127 28 46.8"
- C6: The banks at this site contain both fines and larges.
- C7: DO, pH conductivity were not measured at this site. The water was clear to the bottom. The mean air temperature on this day was 3.8°C
- C8: A number of cascades and small falls (up to 70cm in height) were noted, but are not expected to be barriers to fish passage upstream. The step pool habitat at this site would allow fish movement beyond these small obstructions.

Cover

Cover Total %: 30 GE
 Pool LOD Bldr In Veg O Veg Ctnk
 35 15 30 0 10 10
 Crown Closure %: 20 Aspect: W

Discharge

Wetted Width (m): 0.7 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.39 F
 Discharge (m³/s): 0.02 F

Banks

Height (m): 0.5
 % Unstable: 0
 Fines Gravels Larges Bedrock

Reach Symbol

(Fish)
 DV
 4 B 18.0 0361
 (Width, Valley: Channel, Slope) (Bed Material)

Confinement: FC

Valley: Channel Ratio 2-5
 Stage: L Flood Signs Ht(m): 0.5
 Bars (%): 5 pH: Braided: N
 Water Temp. (°C): 3.5 O2 (ppm):
 Turb. (cm): 47 Cond. (µmhos):



Photo #: R-6-10, 1996/09/23
Site #: R101, Looking downstream, moss-covered LOD.



Photo #: R-6-11, 1996/09/23
Site #: R101, Looking upstream, cascade over debris.



Location: RYAN 102, Unit 11, sec C5.

Stream (Gaz.): Unnamed

Watershed Code: 001-0100-000-000-000-000-000-000-000-0

Map #: 93 L 083 Reach Length (km): 1.2 MA Date: 23-Sep-96 Time: 18:10 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 5970 60768 Length surveyed (m): 200.0 GE Survey Crew: RHJL \ \ \ \ \ \ Photos: None Air Photos:

Channel Characteristics

Av. Chan. Width (m): 1.0 MS
 Av. Wet. Width (m): 0.7 MS
 Av. Max Riffle Depth (cm): 5 MS
 Av. Max Pool Depth (cm): 13 MS
 Gradient (%): 13.0 CL
 Pool: 15 Riffle: 70 Run: 15 Other: 0
 % Side Channel: 0-10 GE
 % Debris Area: 0-5 GE
 % Stable: 50 GE

Specific Data

1.6	1.2	0.7	0.4	0.8	1.0
0.8	0.9	0.7	0.4	0.7	0.9
4	5	7			
18	12	10			

Obstructions

C	Height (m)	Type	Location

Bed Material

Fines	Clay, silt, sand (<2mm):	40	40
Gravels	Small (2-16mm):	30	15
	Large (16-64mm):		15
Larges	Sm. cobble (64-128mm):		10
	Lge cobble (128-256mm):	30	10
	Blder cobble (>256mm):		10
Bedrock		0	0

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Comments

- C1: S4
- C2: The side slopes were not measured at this site.
- C3: No fisheries sensitive zones were noted at this site.
- C4: The electroshocking effort, using a 12 B POW model was 410 seconds over 200 meters. The amount of available habitat to shock was limited at this site, due to the low flow in the channel at the time of sampling.
- C5: Lat N 54 49' 44.1", Long W 127 29' 24.0"
- C6: The banks at this site were composed of fines and some larges.
- C7: DO, pH and conductivity were not evaluated at this site. The water was clear to the bottom. The mean air temperature on this day was 3.8°C
- C8: The fish were likely down in the mainstem at the time of sampling due to the low flows present in the channel.

Cover

Cover Total %: 40 GE

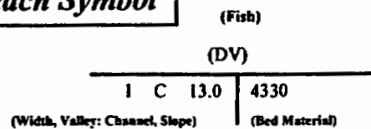
Pool	LOD	Bldr	In Veg	O Veg	Ctnk
10	10	10	0	40	30

 Crown Closure %: 80 Aspect: SE

Discharge

Wetted Width (m): 0.7 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.26 F
 Discharge (m3/s): 0.01 F

Reach Symbol



Banks

Height (m): 0.2
 % Unstable: 0
 Fines Gravels Larges Bedrock
 Confinement: OC
 Valley: Channel Ratio 5-10
 Stage: L Flood Signs Ht(m): 0.2
 Bars (%): 0 pH: Braided: N
 Water Temp. (°C): 4.0 O2 (ppm):
 Turb. (cm): 18 Cond. (µmhos):

Location: RYAN 99, Unit 11, 1.4km W of Passby Cr.

Stream (Gaz.): Unnamed

Watershed Code: 040-2100-000-000-000-000-000-000-000-0

Map #: 93 L 083 Reach Length (km): 2.5 MW Date: 23-Sep-96 Time: 16:15 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9.5922 .60791 Length surveyed (m): 300.0 GE Survey Crew: RH JL \ \ \ \ \ \ Photos: R-6-6,7 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 1.3 MS
 Av. Wet. Width (m): 1.3 MS
 Av. Max Riffle Depth (cm): 10 MS
 Av. Max Pool Depth (cm): 28 MS
 Gradient (%): 6.0 CL
 Pool: 20 Riffle: 60 Run: 20 Other: 0
 % Side Channel: 0-10 GE
 % Debris Area: 0-5 GE
 % Stable: 0 GE

Specific Data

1.3	1.0	1.9	1.1	1.3	1.4
1.3	1.2	1.9	1.1	1.2	1.4
12	9				
30	27	26			

Obstructions

C	Height (m)	Type	Location

Bed Material

	Clay, silt, sand (<2mm):	20	20
Gravels	Small (2-16mm):	50	25
	Large (16-64mm):		25
	Sm. cobble (64-128mm):		10
Larges	Lge cobble (128-256mm):	30	10
	Blder cobble (>256mm):		10
Bedrock		0	0

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	DV	3	80	J	R			EL

Cover

Cover Total %: 55 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
20	20	10	0	20	30

 Crown Closure %: 25 Aspect: SE

D90 (cm): 27 Compaction: Medium

Comments

- C1: S4
- C2: LS = 30%, RS = 37%
- C3: No fisheries sensitive zones were noted at this site.
- C4: The electroshocking effort, using a 12 B POW model, was 240 seconds over 150 meters.
- C5: Lat N 54 51' 13.2", Long W 127 33' 47.5"
- C6: No additional bank texture information.
- C7: DO, pH and conductivity were not measured at this site. The water was clear to the bottom. The mean air temperature on this day was 3.8°C
- C8: No additional habitat information.
- C9: The air temperature at this site was 4.C.

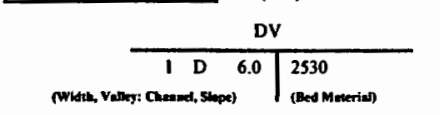
Discharge

Wetted Width (m): 0.8 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.18 F
 Discharge (m3/s): 0.01 F

Banks

Height (m): 0.4
 % Unstable: 0
 Fines Gravels Larges Bedrock

Reach Symbol



Confinement: UC
 Valley: Channel Ratio 10+
 Stage: L Flood Signs Ht(m): 0.4
 Bars (%): 5 pH: Braided: N
 Water Temp. (°C): 3.0 O2 (ppm):
 Turb. (cm): 30 Cond. (µmhos):



Photo #: R-6-7, 1996/09/23
Site #: R99, Looking downstream.



Location: RYAN 98, Unit 11, 1.4km NE of Hankin Lake, see C5.

Stream (Gaz.): Unnamed

Watershed Code: 040-6000-000-000-000-000-000-000-000-0

Map #: 93 L 083

Reach Length (km): 0.6 MW

Date: 23-Sep-96

Time: 15:10

Agency: TEC

Access: H

Fish Card: N

Field Historical

U.T.M.: 9 5923 60830

Length surveyed (m): 200.0 GE

Survey Crew: RH UL \ \ \ \ \ \ \ \

Photos: R-6-4,5

Air Photos:

Channel Characteristics

Av. Chan. Width (m): 1.3 MS
 Av. Wet. Width (m): 1.1 MS
 Av. Max Riffle Depth (cm): 5 MS
 Av. Max Pool Depth (cm): 14 MS
 Gradient (%): 20.0 CL
 Pool: 50 Riffle: 25 Run: 25 Other: 0
 % Side Channel: 10-40 GE
 % Debris Area: 5-15 GE
 % Stable: 90 GE

Specific Data

0.9	0.9	1.3	1.5	1.4	1.6
0.8	0.8	1.2	1.5	1.2	1.3
7	5	2	3	6	5
21	18	6	15	12	

Obstructions

C	Height (m)	Type	Location

Bed Material

	Clay, silt, sand (<2mm):		
Fines		5	5
Gravels	Small (2-16mm):	15	5
	Large (16-64mm):		10
Larges	Sm. cobble (64-128mm):		20
	Lge cobble (128-256mm):	80	25
Bedrock	Blder cobble (>256mm):		35
		0	0

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Comments

- C1: S4
- C2: The side slopes were not evaluated at this site.
- C3: No fisheries sensitive zones were noted at this site.
- C4: The electroshocking effort, using a 12 B POW model was 600 seconds over 225 meters. Shocking was not possible upstream of this site as the water level was too low at the time of sampling.
- C5: Lat N 54 53' 08", Long W 127 33' 38"
- C6: No additional bank texture information.
- C7: DO, pH and conductivity were not measured at this site. The water was clear to the bottom. The mean air temperature on this day was 3.8°C
- C8: Some nice step pool habitat was observed at this site.

Cover

Cover Total %: 50 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
20	20	20	0	20	20

Crown Closure %: 50 Aspect: W

Banks

Height (m): 1.0

% Unstable: 0

Fines Gravels Larges Bedrock

Confinement: FC

Valley: Channel Ratio 2-5

Stage: L Flood Signs Ht(m): 0.5

Bars (%): 0 pH: Braided: N

Water Temp. (°C): 3.0 O2 (ppm):

Turb. (cm): 21 Cond. (µmhos):

Discharge

Wetted Width (m): 0.4 MS

Mean Depth (m): 0.2 MS

Mean Velocity (m/s): 0.06 F

Discharge (m³/s): 0.00 F

Reach Symbol

(Fish)

(DV)

I B 20.0 | 1180

(Width, Valley: Channel, Slope)

(Bed Material)



Photo #: R-6-4, 1996/09/23
Site #: R98, Looking upstream.



Photo #: R-6-5, 1996/09/23
Site #: R98, Looking downstream.

5.5 Red Canyon Creek (440-6208-000) (103I 080, 103I 090, 93 L 081, 93 L 071)

5.5.1 Sensitive Habitats and Barriers

Red Canyon Creek is 16.24 km in length and is fed by 36 tributaries. Spawning and rearing habitat were identified in reach 1, however reaches 2 and above have been classified as non fish bearing due the lack of evidence of resident populations above a 6 meter cascade on the mainstem. A number of the tributaries above this cascade have barriers of their own, for example an 8 meter falls was identified above site Z148, on a large tributary to reach 2 of Red Canyon. Reach 1 of the mainstem is a wide low gradient channel, with both spawning and rearing habitat. Reach 2 is considerably more confined with a series of cascades and moderate gradient. This pattern is consistent through reach 3 up to the headwaters. Red Canyon was sampled at 25 locations, including reaches 1,2 and 3 of the mainstem.

5.5.2 Fish Summary Tables and Stream Classification

Rainbow trout, cutthroat trout and Dolly Varden are historically present at the confluence with the Zymoetz River. Bull trout, and Dolly Varden were captured by electrofishing in reach 1 of Red Canyon Creek, which was classified as an S1 based on an average channel width of 25.20 meters and the presence of fish in the sampling area. Dolly Varden were also caught by electrofishing in 3 tributaries to Red Canyon Creek. No fish were caught in the 12 sample sites located above the 6 meter cascade identified in reach 2, despite the presence of some excellent rearing and spawning habitat, particularly at Z148 and Z149 on 103I 090. Two lakes occur above reach 1 in the Red Canyon system, but do not appear to support fish as no fish were caught above the barrier. Reach 2 of the mainstem has been classified as an S5 based on an average channel width of 11.02 meters and absence of fish in the sampling area. This reach is fed by both S5 and S6 sized streams. Suitable fish habitat is abundant above the barriers on this system and no fish were caught at any of the sample sites.

Reach 1 of Red Canyon creek is fed by a 6.0 km long tributary which is typical of the streams in this watershed. It is accessible only through reach 2, beyond which multiple barriers were identified by survey crews. A 5 meter cascade and an 8 meter and a 6 meter falls were identified on the main creek. The 5 meter cascade delineates the upper limits of fish distribution in this stream, which provides Dolly Varden habitat in reach 1. This stream was classified as an S2 in reach 1, based on an average channel width of 19.12 meters and the presence of Dolly Varden, captured by electrofishing at the sample site. Reach 1 of this tributary is also fed by an S2 sized stream, with an average channel width of 7.13 meters and the presence of Dolly Varden, also caught by electrofishing in the sampling area. The main creek was classified as an S5 above the 5 meter cascade, in reach 4. The tributary sampled above the 8 meter and 6 meter falls, was also classified as S5.



Location: Y169, Unit 11

Stream (Gaz.): Red Canyon Creek

Watershed Code: 440-6208-000-000-000-000-000-000-000-0

Map #: 1031 090 Reach Length (km): 5.3 MA Date: 16-Aug-97 Time: 16:00 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 56174 .607484 Length surveyed (m): 1000.0 GE Survey Crew: JL UP \ \ \ \ \ \ \ \ Photos: Y-19-10,11,14,15 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 11.5 T
 Av. Wet. Width (m): 8.1 T
 Av. Max Riffle Depth (cm): 20 MS
 Av. Max Pool Depth (cm): 40 MS
 Gradient (%): 3.0 CL
 Pool: 10 Riffle: 40 Run: 40 Other: 10
 % Side Channel: 0-10 GE
 % Debris Area: 0-5 GE
 % Stable: 10 GE

Specific Data

8.0	3.5	12.0	21.2	14.0	10.5
6.0	2.5	10.0	12.2	11.5	6.5
26	20	19	17	20	
50	40	35	37		

Bed Material

Fines	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	30	15
	Large (16-64mm):		15
	Sm. cobble (64-128mm):		10
Larges	Lge cobble (128-256mm):	40	10
	Bllder cobble (>256mm):		20
Bedrock		20	20

D90 (cm): Compaction: Medium

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Comments

- C1: S5.
- C2: LS=15%, RS=17%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at 1, 5, 600V, was 401 seconds over 150 meters.
- C5: No additional bank texture information.
- C6: DO was not measured at this site. The air temperature at this site was 20.0 C.
- C7: A 3 m cascade and a 2 m cascade were noted. Boulders and cutbanks provide most of the cover for fish at this site.
- C8: Fossils of bivalves and cephalopods are abundant in the sampling area.

Cover

Cover Total %: 15 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
10	10	50	0	0	30

Crown Closure %: 15 Aspect: SE

Discharge

Wetted Width (m): 10.5 MS
 Mean Depth (m): 0.3 MS
 Mean Velocity (m/s): 0.62 F
 Discharge (m3/s): 1.46 F

Banks

Height (m): 0.5

% Unstable: 50

Fines Gravels Larges Bedrock

Confinement: FC

Valley : Channel Ratio | 2-5 |

Stage: M Flood Signs II(m): 1

Bars (%): 15 pH: 7.4 Braided: Y

Water Temp. (°C): 13.0 02 (ppm):

Turb. (cm): 70 Cond. (µmhos): 20

Reach Symbol

(Fish)

NF

12 B 3.0 | 1342

(Width, Valley: Channel, Slope)

(Bed Material)



Photo #: Y-18-22B, 16/08/97
Site #: Y169, Looking upstream at the channel



Photo #: Y-19-0, 16/08/97
Site #: Y169, Looking upstream at the channel



Photo #: Y-19-10, 16/08/97
Site #: Y169, Looking upstream at the channel



Photo #: Y-19-11, 16/08/97
Site #: Y169, Looking downstream at the channel



Photo #: Y-19-14, 16/08/97
Site #: Y169, Looking upstream at the channel

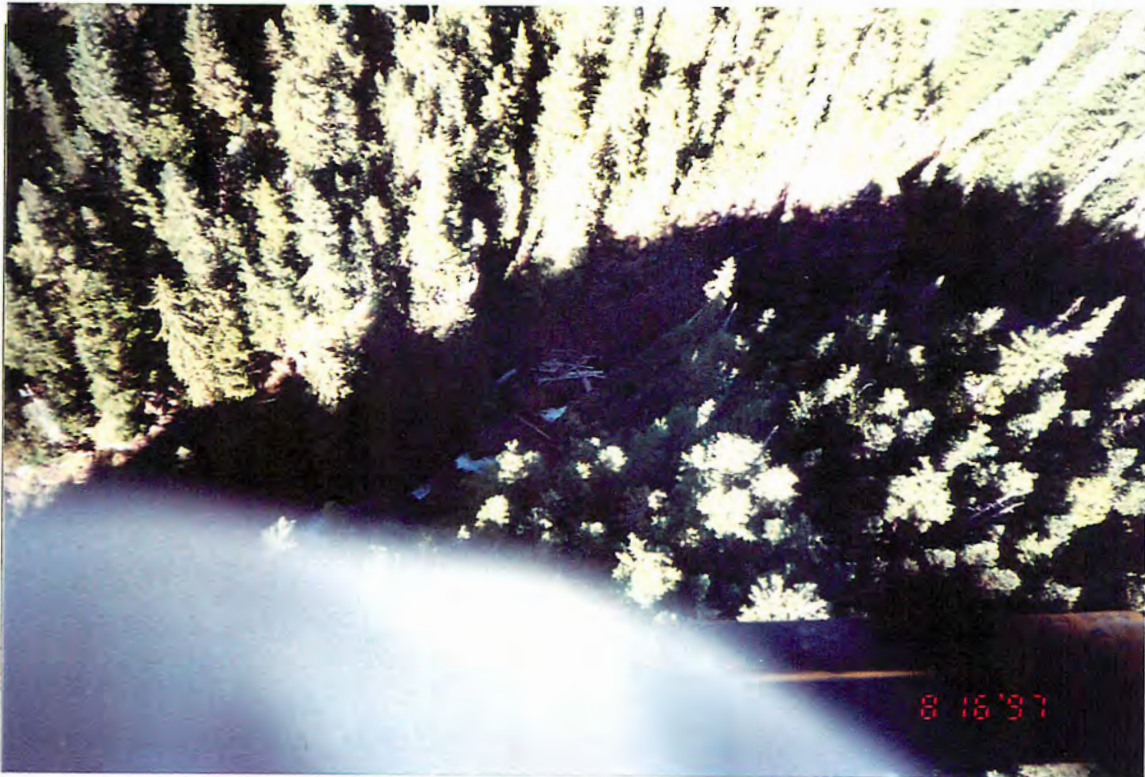


Photo #: Y-19-15, 16/08/97
Site #: Y169, Looking downstream at the channel

Location: Z130, Unit 11

Stream (Gaz.): Red Canyon Cr.

Watershed Code: 440-6208-000-000-000-000-000-000-000-0

Map #: 93 L 071 Reach Length (km): 6.6 MA Date: 12-Aug-97 Time: 15:10 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9.571173.6077639 Length surveyed (m): 200.0 GE Survey Crew: JP\KG \ \ \ \ \ \ \ Photos: Z-17-4,5,6,7 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 25.2 MS
 Av. Wet. Width (m): 12.6 MS
 Av. Max Riffle Depth (cm): 23 MS
 Av. Max Pool Depth (cm): 81 MS
 Gradient (%): 1.0 CL
 Pool: 20 Riffle: 45 Run: 35 Other: 0
 % Side Channel: 10-40 GE
 % Debris Area: 5-15 GE
 % Stable: 20 GE

Specific Data

28.7	20.0	20.0	26.0	19.0	37.5
14.0	12.0	10.0	8.0	10.0	21.5
35	13	20			
63	100	80			

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	DV	1	145	A				EL
	DV	4	70-105	J	R			EL

Comments

- C1: S1. Discharge measurements were not taken as it was too dangerous to wade.
- C2: LS=0%, RS=0%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 700V, was 213 seconds over 100 meters.
- C5: No additional bank texture information.
- C6: DO was not measured at this site. The air temperature at this site was 19.5 C.
- C7: This is a large channel with high flow, even at this low flow stage. There is good habitat; with some boulder and LOD cover. The crew used the formula and two of the fish turned out to be bulltrout. DNA samples were taken.

Cover

Cover Total %: 30 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
20	15	45	0	10	10

 Crown Closure %: 1 Aspect: E

Bed Material

Fines	Clay, silt, sand (<2mm):	20	20
Gravels	Small (2-16mm):	40	15
	Large (16-64mm):		25
	Sm. cobble (64-128mm):		10
Larges	Lge cobble (128-256mm):	40	15
	Blder cobble (>256mm):		15
Bedrock		0	0

D90 (cm): 49 Compaction: Medium

Discharge

C1 Wetted Width (m): 0.0 GE
 C1 Mean Depth (m): 0.0 GE
 C1 Mean Velocity (m/s): 0.00 F
 C1 Discharge (m³/s): 0.00 F

Banks

Height (m): 0.5
 % Unstable: 0
 Fines Gravels Larges Bedrock
 Confinement: UC
 Valley: Channel Ratio 10+
 Stage: L Flood Signs Ht(m): 1.8
 Bars (%): 80 pH: 7.5 Braided: Y
 Water Temp. (°C): 9.5 O2 (ppm):
 Turb. (cm): 20 Cond. (µmhos): 30

Reach Symbol

(Fish) DV BT

25	D	1.0	2440
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 (Width, Valley: Channel, Slope) (Bed Material)



Photo #: Z-17-3, 12-Aug-97
Site #: Z130, Looking upstream at the channel



Photo #: Z-17-4, 12-Aug-97
Site #: Z130, Looking downstream at the channel



Photo #: Z-17-5, 12-Aug-97
Site #: Z130, Measuring fish with the meterstick



Photo #: Z-17-6, 12-Aug-97
Site #: Z130, Measuring fish with the meterstick



Photo #: Z-17-7, 12-Aug-97

Site #: Z130, Measuring two Bull Trout with the meterstick



Location: Z149, Unit 11

Stream (Gaz.): Red Canyon Creek

Watershed Code: 440-6208-000-000-000-000-000-000-000-0

Map #: 1031 090 Reach Length (km): 5.2 MA Date: 16-Aug-97 Time: 10:55 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9.559486.6076490 Length surveyed (m): 100.0 GE Survey Crew: CF KG \ \ \ \ \ \ \ \ Photos: Z-19-23,24 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 11.0 MS
 Av. Wet. Width (m): 6.1 MS
 Av. Max Riffle Depth (cm): 16 MS
 Av. Max Pool Depth (cm): 54 MS
 Gradient (%): 2.5 CL
 Pool: 5 Riffle: 55 Run: 40 Other: 0
 % Side Channel: 0-10 GE
 % Debris Area: 5-15 GE
 % Stable: 20 GE

Specific Data

11.1	11.4	13.0	12.5	10.5	7.6
4.1	9.0	6.2	5.9	6.7	4.9
14	18	10	21		
34	26	103			

Obstructions

Cover Cover Total %: 30 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
5	10	75	0	10	0

Crown Closure %: 5 Aspect: E

Bed Material

Fines	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	30	10
	Large (16-64mm):		20
	Sm. cobble (64-128mm):		15
Larges	Lge cobble (128-256mm):	50	15
	Bldr cobble (>256mm):		20
Bedrock		10	10

D90 (cm): Compaction: High

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Discharge

Wetted Width (m): 5.3 MS
 Mean Depth (m): 0.2 MS
 Mean Velocity (m/s): 0.66 F
 Discharge (m3/s): 0.52 F

Banks Height (m): 0.5
 % Unstable: 20

Fines Gravels Larges Bedrock

Confinement: FC
 Valley: Channel Ratio 2-5
 Stage: M Flood Signs Ht(m): 1.1
 Bars (%): 25 pH: 7.4 Braided: Y
 Water Temp. (°C): 10.0 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 40

Reach Symbol

(Fish) NF

11	B	2.5	1351
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(Width, Valley: Channel, Slope) (Bed Material)

Comments

C1: S5
 C2: LS=12%, RS=29%
 C3: No fisheries sensitive zones noted.
 C4: The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 500V, was 410 seconds over 130 meters.
 C5: No additional bank texture information.
 C6: DO was not measured at this site, the water was clear to bottom. The air temperature at this site was 18 C.
 C7: This reach has some great boulder and cobble cover, as well as one very deep pool. This reach would provide rearing habitat and potential spawning habitat.
 C8: No fish were caught at this site, located above a series of cascades preventing fish passage upstream. As a result it has been classified as non fish bearing.



Photo #: Z-19-23, 16-Aug-97

Site #: Z149, Looking upstream at the channel, note the slumping bank

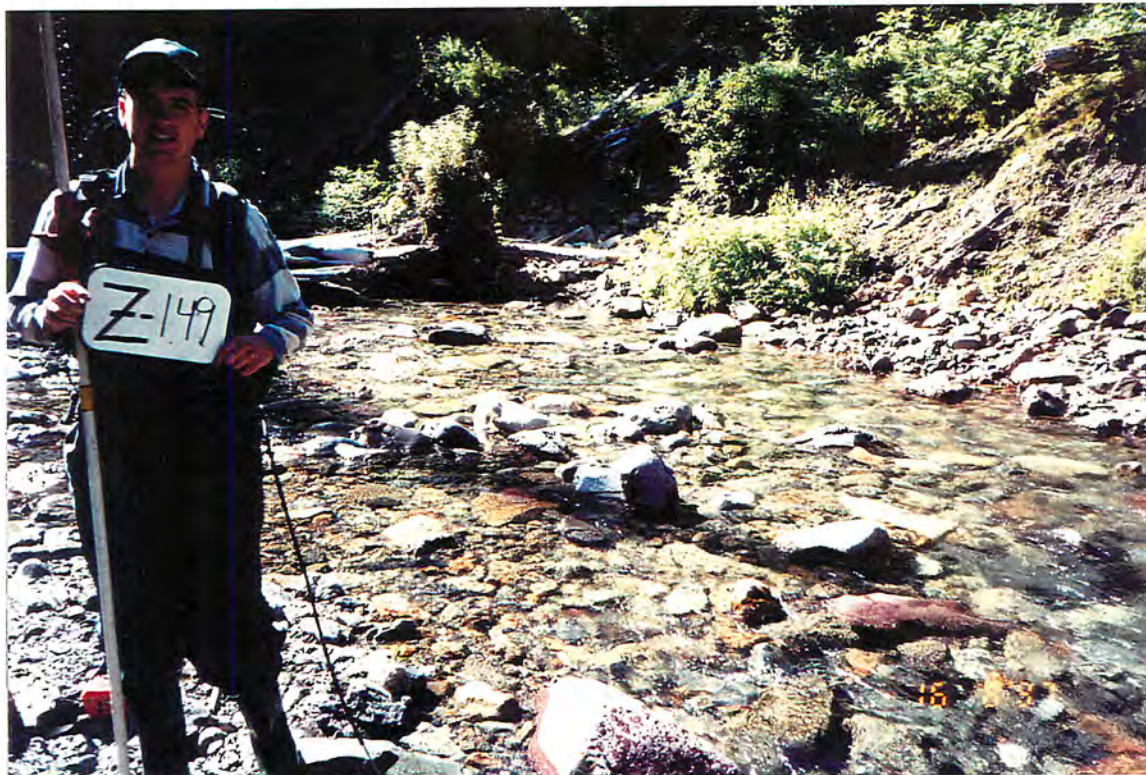


Photo #: Z-19-24, 16-Aug-97

Site #: Z149, Looking downstream at the channel



Location: Z151, Unit 11

Stream (Gaz.): Red Canyon Creek

Watershed Code: 440-6208-000-000-000-000-000-000-000-0

Map #: 1031090 Reach Length (km): 3.5 AE Date: 16-Aug-97 Time: 15:10 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9.55879.607676 Length surveyed (m): 100.0 GE Survey Crew: CF\KG\ \ \ \ \ \ Photos: Z-20-2,3,4,5,6 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 8.9 MS
 Av. Wet. Width (m): 3.4 MS
 Av. Max Riffle Depth (cm): 9 MS
 Av. Max Pool Depth (cm): 35 MS
 Gradient (%): 10.0 CL
 Pool: 35 Riffle: 30 Run: 25 Other: 10
 % Side Channel: 0-10 GE
 % Debris Area: 5-15 GE
 % Stable: 25 GE

Specific Data

9.4	11.5	8.8	8.5	6.8	8.5
1.3	4.5	5.2	3.2	3.4	2.6
5	7	14	11	6	
62	25	27	33	26	

Obstructions

C	Height (m)	Type	Location
	4	C	12.3
	3	C	12.4
	2	C	12.3

Bed Material

Fines	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	30	10
	Large (16-64mm):		20
	Sm. cobble (64-128mm):		10
Larges	Lge cobble (128-256mm):	40	15
	Blder cobble (>256mm):		15
Bedrock		20	20

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Comments

- C1: S5
- C2: LS=9%, RS=29%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 500 V, was 339 seconds over 100 meters.
- C5: No additional bank texture information.
- C6: DO was not measured at this site, the water was clear to bottom. The mean air temperature on this day was 14 C.
- C7: This reach has some great rearing pools and boulder and LOD cover. Three cascades were noted in the sampling area that would prevent juvenile fish passage upstream.
- C8: No fish were caught at this site, located above a series of cascades on Red Canyon Cr. which would prevent fish passage upstream. As a result it has been classified as non fish bearing.

Cover

Cover Total %: 40 GE

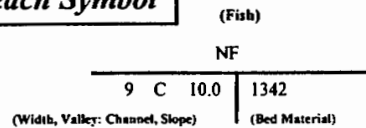
Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
10	25	45	0	10	10

 Crown Closure %: 5 Aspect: E

Discharge

Wetted Width (m): 1.7 MS
 Mean Depth (m): 0.2 MS
 Mean Velocity (m/s): 0.60 F
 Discharge (m³/s): 0.15 F

Reach Symbol



Banks

Height (m): 0.3
 % Unstable: 20
 Fines Gravels Larges Bedrock
 Confinement: OC
 Valley : Channel Ratio 5-10
 Stage: L Flood Signs Ht(m): 0.8
 Bars (%): 60 pH: 7.8 Braided: Y
 Water Temp. (°C): 14.0 02 (ppm):
 Turb. (cm): Cond. (µmhos): 40



Photo #: Z-20-3, 16-Aug-97

Site #: Z151, Looking upstream at the channel, note the cascade in the background



Photo #: Z-20-4, 16-Aug-97

Site #: Z151, Looking downstream at the channel with LOD



Photo #: Z-20-5, 16-Aug-97

Site #: Z151, Looking upstream at the channel, with boulders and a cascade



Photo #: Z-20-6, 16-Aug-97

Site #: Z151, Looking upstream at a cascade

DFO/MoELP Stream Survey Form

Site Number: Y168

Reach No.: 1

Tri to Red Canyon Cr.



TRITON
Environmental Consultants Ltd.

Location: Y168, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 068-4800-000-000-000-000-000-000-000-

Map #: 1031 090 Reach Length (km): 1.0 MA Date: 16-Aug-97 Time: 14:45 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9.5618 .60749 Length surveyed (m): 100.0 GE Survey Crew: JLJP \ \ \ \ \ \ \ \ Photos: Y-19-7,8,9 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 3.5 MS
 Av. Wet. Width (m): 1.4 MS
 Av. Max Riffle Depth (cm): 4 MS
 Av. Max Pool Depth (cm): 31 MS
 Gradient (%): 11.0 CL
 Pool: 15 Riffle: 20 Run: 55 Other: 10
 % Side Channel: 0-10 GE
 % Debris Area: >15 GE
 % Stable: 30 GE

Specific Data

3.9	4.1	2.4	2.3	3.6	4.7
2.0	1.3	1.4	1.2	1.2	1.4
6	4	3	4		
26	45	24	23	37	

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Comments

- C1: S5.
- C2: LS=45%, RS=42%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at 1, 5, 600V, was 300 seconds over 120 meters.
- C5: No additional bank texture information.
- C6: DO was not measured at this site, the water was clear to bottom. The air temperature at this site was 20.0 C.
- C7: This reach has pool, LOD and boulder cover as well as some spawning gravels. However, steep gradient at the mouth may prevent fish migration.

Cover

Cover Total %: 30 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
20	35	25	0	10	10

 Crown Closure %: 40 Aspect: S
 D90 (cm): Compaction: High

Bed Material

Fines	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	30	15
	Large (16-64mm):		15
	Sm. cobble (64-128mm):		20
Larges	lge cobble (128-256mm):	50	15
Bedrock	Blder cobble (>256mm):		15
		10	10

Discharge

Wetted Width (m): 0.8 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.09 F
 Discharge (m3/s): 0.01 F

Banks

Height (m): 0.4
 % Unstable: 10
 Fines Gravels Larges Bedrock
 Confinement: FC
 Valley: Channel Ratio 2-5
 Stage: M Flood Signs III(m): 0.9
 Bars (%): 20 pH: 7.1 Braided: Y
 Water Temp. (°C): 12.5 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 30

Reach Symbol

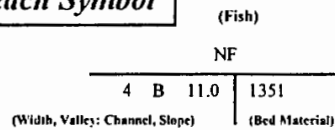




Photo #: Y-19-7, 16/08/97
Site #: Y168, Looking upstream at the channel



Photo #: Y-19-8, 16/08/97
Site #: Y168, Looking upstream at the channel, note log jam



Photo #: Y-19-9, 16/08/97

Site #: Y168, Looking downstream at the channel



Photo #: W-I-1, 16-Aug-97

Site #: W189, Looking upstream at the channel, note the extensive cobble bars



Photo #: W-I-2, 16-Aug-97

Site #: W189, Looking downstream at the channel



Photo #: W-I-3, 16-Aug-97
Site #: W190, Looking upstream at the channel



Photo #: W-I-4, 16-Aug-97
Site #: W190, Looking downstream at the channel, note slumping right bank



Photo #: W-I-5, 16-Aug-97
Site #: W190, Looking upstream at a 12m falls barrier



Photo #: W-I-6, 16-Aug-97
Site #: W190, Looking upstream at a 10m falls barrier

DFO/MoELP Stream Survey Form

Site Number: W191

Reach No.: 1

Trib to Red Canyon Cr.



TRITON

Environmental Consultants Ltd.

Location: W191, Unit 11; 4.6km east of Unit 11 boundary

Stream (Gaz.): Unnamed

Watershed Code: 052-1600-000-000-000-000-000-000-000-

Map #: 103I 080 Reach Length (km): 2.8 MA Date: 16-Aug-97 Time: 13:30 Agency: TEC Access: H Fish Card: Ni Field Historical
 U.T.M.: 9.5617 .60718 Length surveyed (m): 150.0 GE Survey Crew: JP\DD\ \ \ \ \ \ \ \ \ \ \ Photos: W-1-7,8,9 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 6.8 MS
 Av. Wet. Width (m): 2.6 MS
 Av. Max Riffle Depth (cm): 6 MS
 Av. Max Pool Depth (cm): 32 MS
 Gradient (%): 9.0 CL
 Pool: 30 Riffle: 20 Run: 40 Other: 10
 % Side Channel: 0-10 GE
 % Debris Area: 5-15 GE
 % Stable: 0 GE

Specific Data

6.3	7.5	8.2	5.3	8.6	5.0
2.1	3.1	2.9	2.2	2.9	2.6
5	4	6	7	6	6
23	37	35	30	28	40

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Comments

- C1: S5.
- C2: LS=70%, RS=82%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at 1, 5, 500V, was 364 seconds over 150 meters.
- C5: No additional bank texture information.
- C6: DO was not measured at this site, the water was clear to bottom. The air temperature at this site was 17.0 C.
- C7: There is good rearing habitat at this site in the form of deep pools and boulders. There is a 10m chute downstream on the mainstem that would prevent fish passage upstream to this tributary.

Cover

Cover Total %: 30 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
40	10	50	0	0	0

 Crown Closure %: 0 Aspect: N

Bed Material

Fines	Clay, silt, sand (<2mm):	20	20
Gravels	Small (2-16mm):	20	10
	Large (16-64mm):		10
Larges	Sm. cobble (64-128mm):		10
	Lge cobble (128-256mm):	40	10
	Blder cobble (>256mm):		20
Bedrock		20	20

D90 (cm): 0 Compaction: Medium

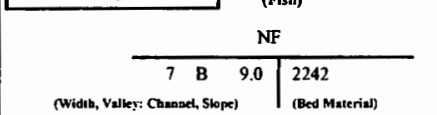
Discharge

Wetted Width (m): 2.2 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.61 F
 Discharge (m3/s): 0.10 F

Banks

Height (m): 0.4
 % Unstable: 80
 Fines Gravels Larges Bedrock
 Confinement: CO
 Valley : Channel Ratio 2-5
 Stage: M Flood Signs Ht(m): 1.2
 Bars (%): 10 pH: 7.8 Braided: Y
 Water Temp. (°C): 9.0 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 50

Reach Symbol



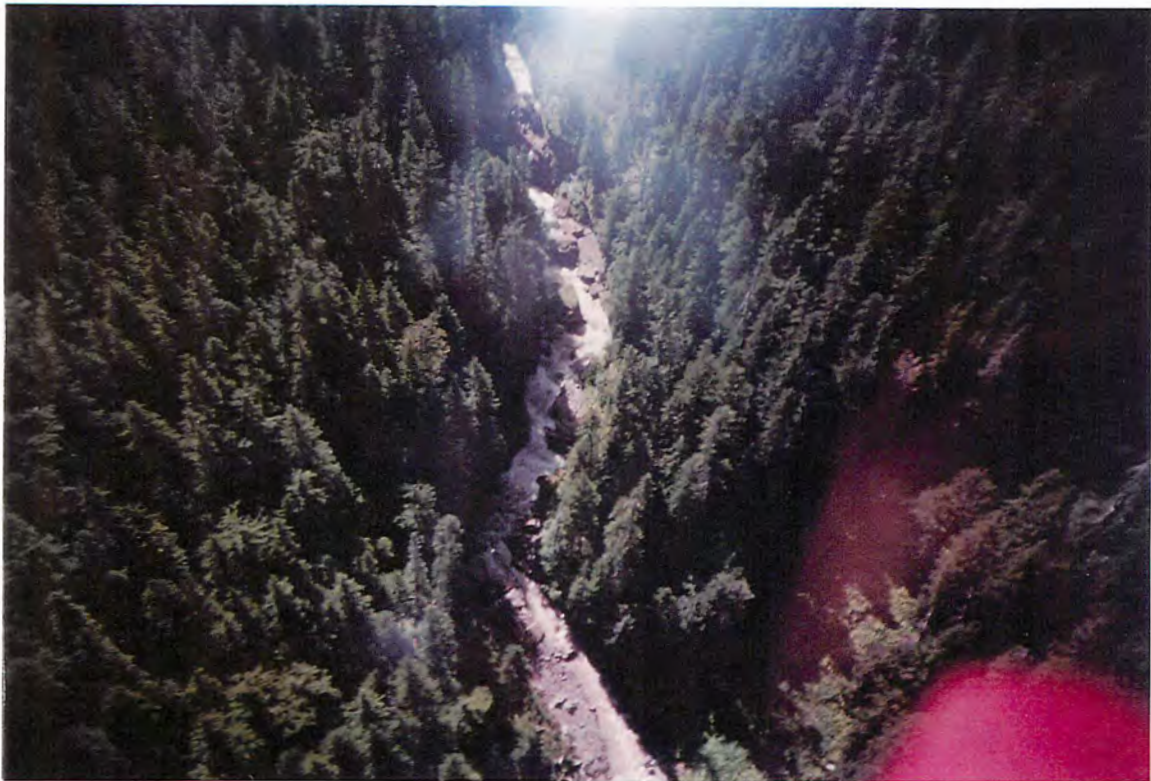


Photo #: W-I-7, 16-Aug-97
Site #: W191, Looking upstream at a 5m cascade barrier



Photo #: W-I-8, 16-Aug-97
Site #: W191, Looking upstream at the channel



Photo #: W-I-9, 16-Aug-97

Site #: W191, Looking downstream at the channel



Photo #: W-I-10, 16-Aug-97
Site #: W192, Looking upstream at the channel



Photo #: W-I-11, 16-Aug-97
Site #: W192, Looking downstream at the channel, note the turbidity of the water



Photo #: W-I-12, 16-Aug-97
Site #: W192, Measuring fish with the meterstick



Location: W193, Unit 11; 5.5km east of Unit 11 boundary

Stream (Gaz.): Unnamed

Watershed Code: 051-9900-000-000-000-000-000-000-000-

Map #: 1031 080 Reach Length (km): 0.9 MA Date: 16-Aug-97 Time: 15:40 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9.5624 .60727 Length surveyed (m): 175.0 GE Survey Crew: JP\DD\ \ \ \ \ \ \ \ \ Photos: W-I-13,14,15,16 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 7.1 MS
 Av. Wet. Width (m): 2.3 MS
 Av. Max Riffle Depth (cm): 4 MS
 Av. Max Pool Depth (cm): 30 MS
 Gradient (%): 6.0 CL
 Pool: 25 Riffle: 10 Run: 55 Other: 10
 % Side Channel: 0 GE
 % Debris Area: 5-15 GE
 % Stable: 20 GE

Specific Data

7.7	6.8	5.5	7.2	7.3	8.3
2.0	1.9	2.8	3.5	1.7	2.1
5	6	7	2	3	2
27	27	34	28	25	41

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	DV	3	160-198	A	R			EL
	DV	1	110	J	R			EL

Comments

- C1: S2.
- C2: LS=16%, RS=48%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 400V, was 143 seconds over 175 meters.
- C5: No additional bank texture information.
- C6: DO was not measured at this site, the water was clear to bottom. The air temperature at this site was 23.0 C.
- C7: There is good rearing habitat here in the form of deep plunge pools and boulder cover. There is a series of debris jams above which fish were found. Spawning habitat was noted.

Cover

Cover Total %: 50 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
65	10	25	0	0	0

 Crown Closure %: 20 Aspect: NW

Bed Material

Fines	Clay, silt, sand (<2mm):	20	20
Gravels	Small (2-16mm):	20	10
	Large (16-64mm):		10
	Sm. cobble (64-128mm):		20
Larges	Lge cobble (128-256mm):	50	20
	Blder cobble (>256mm):		10
Bedrock		10	10

D90 (cm): 0 N Compaction: High

Discharge

Wetted Width (m): 1.5 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.48 F
 Discharge (m3/s): 0.05 F

Banks

Height (m): 0.2
 % Unstable: 80
 Fines Gravels Larges Bedrock
 Confinement: OC
 Valley: Channel Ratio 5-10
 Stage: M Flood Signs Ht(m): 0.8
 Bars (%): 75 pH: 7.9 Braided: Y
 Water Temp. (°C): 10.5 02 (ppm):
 Turb. (cm): Cond. (µmhos): 120

Reach Symbol

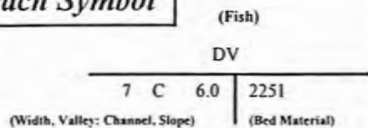




Photo #: W-I-13, 16-Aug-97
Site #: W193, Looking upstream at the channel



Photo #: W-I-14, 16-Aug-97
Site #: W193, Looking downstream at the channel, at the confluence



Photo #: W-I-15, 16-Aug-97
Site #: W193, Measuring fish with the meterstick



Photo #: W-I-16, 16-Aug-97
Site #: W193, Looking upstream at a chute above W193 on the main creek



Photo #: Y-18-21, 16/08/97
Site #: Y165, Looking upstream at the channel



Photo #: Y-18-22, 16/08/97
Site #: Y165, Looking downstream at the channel, note thick over-veg



Location: Y166, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 064-7000-000-000-000-000-000-000-000-000-

Map #: 1031 090 Reach Length (km): 1.0 MA Date: 16-Aug-97 Time: 11:20 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 561316.6075341 Length surveyed (m): 100.0 GE Survey Crew: JLJP \ \ \ \ \ \ \ \ \ \ Photos: Y-18-23,24 Air Photos:

Channel Characteristics

Specific Data

Av. Chan. Width (m): 1.9 MS
 Av. Wet. Width (m): 0.3 MS
 Cl Av. Max Riffle Depth (cm): 0 MS
 Av. Max Pool Depth (cm): 7 MS
 Gradient (%): 42.0 CL
 Pool: 100 Riffle: 0 Run: 0 Other: 0
 % Side Channel: 0-10 GE
 % Debris Area: >15 GE
 % Stable: 20 GE

	1.4	2.0	2.6	2.3	1.1	2.1
	0.7	0.4	0.4	0.0	0.0	0.0
	5	12	3			

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				NA

Comments

- C1: S6. No riffles were observed.
- C2: LS=46%, RS=45%
- C3: No fisheries sensitive zones noted.
- C4: This site was not electrofished as there was not enough water.
- C5: No additional bank texture information.
- C6: DO was not measured at this site, the water was clear to bottom. The air temperature at this site was 15.0 C.
- C7: This creek is dry with only a few small pools, so cover was estimated for medium flow. There is a 20 m falls at the mouth.

Bed Material

Fines	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	20	10
	Large (16-64mm):		10
	Sm. cobble (64-128mm):		10
Larges	Lge cobble (128-256mm):	70	10
	Blder cobble (>256mm):		50
Bedrock		0	0

Cover

Cover Total %: 20 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
15	30	30	0	15	10

 Crown Closure %: 10 Aspect: SW

D90 (cm): 45 Compaction: Medium

Discharge

Wetted Width (m):
 Mean Depth (m):
 Mean Velocity (m/s):
 Discharge (m3/s):

Banks

Height (m): 0.3
 % Unstable: 40
 Fines Gravels Larges Bedrock

Reach Symbol

(Fish) NF

2	D	42.0	1270
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 (Width, Valley: Channel, Slope) (Bed Material)

Confinement: UC
 Valley : Channel Ratio 10+
 Stage: Dry Flood Signs Ht(m): 0.8
 Bars (%): 95 pH: 7.4 Braided: N
 Water Temp. (°C): 13.0 02 (ppm):
 Turb. (cm): Cond. (µmhos): 100



Photo #: Y-18-23, 16/08/97
Site #: Y166, Looking upstream at the channel



Photo #: Y-18-24, 16/08/97
Site #: Y166, Looking downstream at the channel



Photo #: Y-19-1, 16/08/97
Site #: Y167, Looking upstream at the channel



Photo #: Y-19-2, 16/08/97
Site #: Y167, Looking downstream at the channel



Photo #: Y-19-3, 16/08/97
Site #: Y167, Looking upstream at the channel



Photo #: Y-19-5, 16/08/97
Site #: Y167, Looking upstream at the channel



Location: Y170, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 064-7600-000-000-000-000-000-000-000-000-

Map #: 1031 090 Reach Length (km): 2.6 MA Date: 16-Aug-97 Time: 16:47 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9.5599 .60766 Length surveyed (m): 100.0 GE Survey Crew: JL UP \ \ \ \ \ \ \ Photos: Y-19-12,13 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 2.8 MS
 Av. Wet. Width (m): 0.8 MS
 Av. Max Riffle Depth (cm): 5 MS
 Av. Max Pool Depth (cm): 32 MS
 Gradient (%): 17.0 CL
 Pool: 30 Riffle: 50 Run: 20 Other: 0
 % Side Channel: 0 GE
 % Debris Area: 0.5 GE
 % Stable: 10 GE

Specific Data

2.9	3.1	3.2	2.2	2.6	2.8
0.7	0.9	0.3	0.4	0.9	1.9
3	5	5	4	8	
34	36	26	22	41	

Bed Material

Fines	Clay, silt, sand (<2mm):	20	20
Gravels	Small (2-16mm):	30	10
	Large (16-64mm):		20
	Sm. cobble (64-128mm):		10
Larges	Lge cobble (128-256mm):	40	10
	Blder cobble (>256mm):		20
Bedrock		10	10

D90 (cm): Compaction: Medium

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Comments

- C1: S6.
- C2: LS=45%, RS=47%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at 1, 5, 500V, was 233 seconds over 100 meters.
- C5: No additional bank texture information.
- C6: DO was not measured at this site, the water was clear to bottom. The air temperature at this site was 20.0 C.
- C7: Cover for fish is provided by deep pools and LOD at this site. There is very little spawning substrate in this reach.

Cover

Cover Total %: 30 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
30	15	30	0	15	10

Crown Closure %: 20 Aspect: S

Discharge

Wetted Width (m): 0.4 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.23 F
 Discharge (m³/s): 0.01 F

Banks

Height (m): 0.3
 % Unstable: 20

Fines Gravels Larges Bedrock

Confinement: CO
 Valley : Channel Ratio 2-5
 Stage: M Flood Signs H(m): 1
 Bars (%): 10 pH: 7.2 Braided: N
 Water Temp. (°C): 12.0 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 20

Reach Symbol

(Fish)

NF

3 B 17.0 | 2341

(Width, Valley: Channel, Slope)

(Bed Material)



Photo #: Y-19-12, 16/08/97
Site #: Y170, Looking upstream at the channel



Photo #: Y-19-13, 16/08/97
Site #: Y170, Looking downstream at the channel, note boulder cover



Photo #: Z-17-8, 12-Aug-97
Site #: Z131, Looking upstream at the channel



Photo #: Z-17-9, 12-Aug-97
Site #: Z131, Looking upstream at the channel



Location: Z132, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 037-8100-000-000-000-000-000-000-000-000-

Map #: 93 L 081 Reach Length (km): 1.2 MA Date: 12-Aug-97 Time: 16:46 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 .5646 .60738 Length surveyed (m): 1.2 AE Survey Crew: JP \ KG \ \ \ \ \ \ \ \ Photos: Z-17-10,11,11A Air Photos:

Channel Characteristics

Av. Chan. Width (m): 2.6 AE
 Av. Wet. Width (m): 1.5 AE
 Av. Max Riffle Depth (cm): 6 AE
 Av. Max Pool Depth (cm): 25 AE
 Gradient (%): 11.0 AE
 Pool: 35 Riffle: 10 Run: 55 Other: 0
 % Side Channel: 10-40 AE
 % Debris Area: >15 AE
 % Stable: 30 AE

Specific Data

3.0	2.7	2.0
1.5	1.6	1.5
2	5	10
25		

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				NA

Comments

- C1: S3. No discharge measurements were taken as this survey was done from the air.
- C2: LS=0%, RS=0%
- C3: No fisheries sensitive zones noted.
- C4: This site was not electrofished as this was an aerial survey.
- C5: No additional bank texture information.
- C6: The pH, DO, water temperature and conductivity measurements were not taken at this site as this survey was done from the air. The mean air temperature on this day was 16.9.C.
- C7: This channel is similar to that sampled at Z131 in that it has very low flow and ill defined banks in some areas. This stream has also been classified as fish bearing in reach 1.

Cover

Cover Total %: 30 AE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
20	40	30	0	10	0

 Crown Closure %: 35 Aspect: SE

Bed Material

Fines	Clay, silt, sand (<2mm):	20	20
Gravels	Small (2-16mm):	40	20
	Large (16-64mm):		20
Larges	Sm. cobble (64-128mm):		10
	Lge cobble (128-256mm):	40	15
	Blder cobble (>256mm):		15
Bedrock		0	0

D90 (cm): 26 Compaction: Medium

Discharge

Wetted Width (m): 1.5 AE
 Mean Depth (m): AE
 Mean Velocity (m/s): F
 Discharge (m3/s): F

Banks

Height (m): 0.1
 % Unstable: 0
 Fines Gravels Larges Bedrock
 Confinement: UC
 Valley : Channel Ratio 10+
 Stage: L Flood Signs Ht(m): 0.8
 Bars (%): 40 pH: Braided: Y
 Water Temp. (°C): O2 (ppm):
 Turb. (cm): Cond. (µmhos):

Reach Symbol

(Fish)
 (DV) (BT)
 3 D 11.0 2440
 (Width, Valley: Channel, Slope) (Bed Material)



Photo #: Z-17-10, 12-Aug-97
Site #: Z132, Looking upstream at the channel



Photo #: Z-17-11, 12-Aug-97
Site #: Z132, Looking upstream at the channel



Location: Z147, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 064-7900-000-000-000-000-000-000-000-000-

Map #: 1031 090 Reach Length (km): 2.2 MA Date: 16-Aug-97 Time: 9:37 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9_55844_607540 Length surveyed (m): 100.0 GE Survey Crew: CF\KG\ \ \ \ \ \ \ \ Photos: Z-19-17,18,19,20 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 22.5 HC
 Av. Wet Width (m): 10.0 HC
 Av. Max Riffle Depth (cm): 21 HC
 Av. Max Pool Depth (cm): 23 HC
 Gradient (%): 3.0 CL
 Pool: 5 Riffle: 45 Run: 50 Other: 0
 % Side Channel: >40 GE
 % Debris Area: 5-15 GE
 % Stable: 20 GE

Specific Data

19.5	19.8	19.1	19.6	28.0	28.9
9.6	15.8	12.4	9.1	6.1	6.9
23	15	24	23		
17	18	34			

Obstructions

C	Height (m)	Type	Location
	8	F	1.1

Bed Material

Fines	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	30	10
	Large (16-64mm):		20
Larges	Sm. cobble (64-128mm):		20
	Lge cobble (128-256mm):	60	20
	Blder cobble (>256mm):		20
Bedrock		0	0

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Comments

- C1: ss
- C2: LS=0%, RS=0%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 500V, was 482 seconds over 200 meters.
- C5: No additional bank texture information.
- C6: DO was not measured at this site, the water was clear to bottom. The air temperature at this site was 18 C.
- C7: This site is located above a series of cascades which prevent fish passage upstream.

Cover

Cover Total %: 25 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
0	15	70	0	5	10

 Crown Closure %: 0 Aspect: NE

D90 (cm): 89 Compaction: Medium

Discharge

Wetted Width (m): 5.7 MS
 Mean Depth (m): 0.3 MS
 Mean Velocity (m/s): 1.08 F
 Discharge (m3/s): 1.39 F

Banks

Height (m): 0.5
 % Unstable: 0
 Fines Gravels Larges Bedrock
 Confinement: UC
 Valley: Channel Ratio 10+
 Stage: L Flood Signs Ht(m): 1.3
 Bars (%): 70 pH: 7.4 Braided: Y
 Water Temp. (°C): 6.0 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 10

Reach Symbol

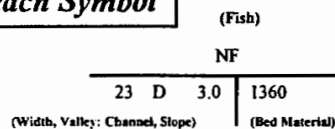




Photo #: Z-19-17, 16-Aug-97

Site #: Z147, Looking downstream at the channel, note the abundance of boulders and large cobble



Photo #: Z-19-18, 16-Aug-97

Site #: Z147, Looking upstream at the channel

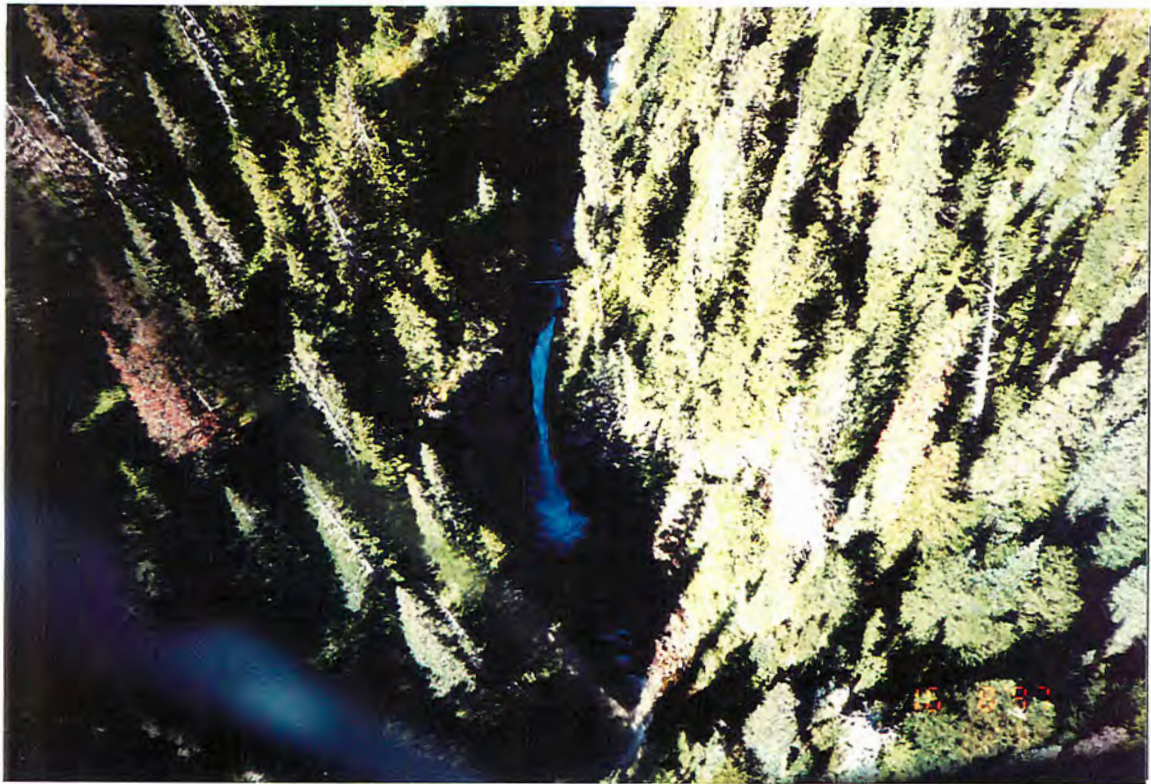


Photo #: Z-19-19, 16-Aug-97
Site #: Z147, Looking upstream at a falls barrier



Photo #: Z-19-20, 16-Aug-97
Site #: Z147, Looking upstream at the channel and barriers

Location: Z148, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 064-7900-000-000-000-000-000-000-000-000-

Map #: 1031090 Reach Length (km): 0.7 MA Date: 16-Aug-97 Time: 10:07 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9.559486.6076490 Length surveyed (m): 100.0 GE Survey Crew: CF\KG\ \ \ \ \ \ \ \ Photos: Z-19-21,22 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 12.3 HC
 Av. Wet. Width (m): 6.7 HC
 Av. Max Riffle Depth (cm): 24 MS
 Av. Max Pool Depth (cm): 39 MS
 Gradient (%): 2.5 CL
 Pool: 10 Riffle: 50 Run: 35 Other: 5
 % Side Channel: 10-40 GE
 % Debris Area: 5-15 GE
 % Stable: 10 GE

Specific Data

13.4	19.0	8.7	8.5	12.0	10.7
4.6	5.6	6.3	6.4	11.4	5.9
20	22	30			
30	38	50	38		

Obstructions

C	Height (m)	Type	Location
	2	C	0.1

Bed Material

Fines	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	40	15
	Large (16-64mm):		25
Larges	Sm. cobble (64-128mm):		10
	Lge cobble (128-256mm):	40	15
	Blder cobble (>256mm):		15
Bedrock		10	10

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Comments

- C1: S5
- C2: LS= 8%, RS= 10%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 500V, was 434 seconds over 100 meters.
- C5: No additional bank texture information.
- C6: DO was not measured at this site, the water was clear to bottom. The mean air temperature on this day was 14 C.
- C7: This site is located above a series of cascades preventing fish passage upstream. There is good boulder cover here as well as fast moving water. Bull trout or Dolly Varden could use this habitat.
- C8: No fish were caught at this site, located above a series of cascades on the main creek which prevent fish passage upstream. This tributary has been classified as non fish bearing as a result.

Cover

Cover Total %: 30 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
15	5	70	0	10	0

 Crown Closure %: 10 Aspect: N

Discharge

Wetted Width (m): 5.3 MS
 Mean Depth (m): 0.3 MS
 Mean Velocity (m/s): 0.93 F
 Discharge (m3/s): 1.11 F

Banks

Height (m): 0.8
 % Unstable: 20
 Fines Gravels Larges Bedrock
 Confinement: FC
 Valley : Channel Ratio 2-5
 Stage: M Flood Signs Ht(m): 1.4
 Bars (%): 30 pH: 7.4 Braided: Y
 Water Temp. (°C): 8.0 02 (ppm):
 Turb. (cm): Cond. (µmhos): 20

Reach Symbol

(Fish) NF

12	B	2.5	1441
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 (Width, Valley: Channel, Slope) (Bed Material)



Photo #: Z-19-21, 16-Aug-97
Site #: Z148, Looking downstream at the channel



Photo #: Z-19-22, 16-Aug-97
Site #: Z148, Looking upstream at the channel



Photo #: Z-19-25, 16-Aug-97
Site #: Z150, Looking upstream at a falls barrier



Photo #: Z-20-1, 16-Aug-97
Site #: Z150, Looking downstream at the channel, note the large amount of bedrock



Location: Z152, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 440-6208-000-000-000-000-000-000-000-0

Map #: 1031 090

Reach Length (km): 0.8 MA

Date: 16-Aug-97 Time: 16:16

Agency: TEC

Access: H

Fish Card: N

Field Historical

U.T.M.: 9.560200.6076114

Length surveyed (m): 100.0 GE

Survey Crew: KG\CF \ \ \ \ \ \ \ \

Photos: Z-20-7,8

Air Photos:

Channel Characteristics

Av. Chan. Width (m): 3.4 MS
 Av. Wet. Width (m): 1.5 MS
 Av. Max Riffle Depth (cm): 4 MS
 Av. Max Pool Depth (cm): 30 MS
 Gradient (%): 5.0 CL
 Pool: 35 Riffle: 10 Run: 50 Other: 5
 % Side Channel: 0-10 GE
 % Debris Area: >15 GE
 %Stable: 60 GE

Specific Data

3.0	3.6	5.0	2.8	2.5
1.6	1.8	0.9	1.4	1.6
5	2	6	3	
24	20	27	48	

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Comments

- C1: S5
- C2: LS=18%, RS=40%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 500V, was 202 seconds over 100 meters.
- C5: No additional bank texture information.
- C6: DO was not measured at this site, the water was clear to bottom. The air temperature on this day was 15 C.
- C7: This is a small stream which could provide rearing habitat. LOD cover is fairly abundant.
- C8: No fish were caught at this site, located above a series of cascades on Red Canyon Cr. which prevent fish passage upstream. As a result it has been classified as non fish bearing.

Cover

Cover Total %: 45 GE

Pool	LOD	Bldr	In Veg	O Veg	Cfbnk
15	30	15	5	20	15

Crown Closure %: 50 Aspect: S

Bed Material

Fines	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	30	15
	Large (16-64mm):		15
Larges	Sm. cobble (64-128mm):		20
	Lge cobble (128-256mm):	60	25
	Bldr cobble (>256mm):		15
Bedrock		0	0

D90 (cm): 60 Compaction: Medium

Discharge

Wetted Width (m): 1.3 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.15 F
 Discharge (m3/s): 0.01 F

Banks

Height (m): 0.3
 % Unstable: 10
 Fines Gravels Larges Bedrock
 Confinement: FC
 Valley : Channel Ratio 2-5
 Stage: M Flood Signs Ht(m): 0.8
 Bars (%): 35 pH: 7.6 Braided: Y
 Water Temp. (°C): 11.0 02 (ppm):
 Turb. (cm): Cond. (µmhos): 40

Reach Symbol

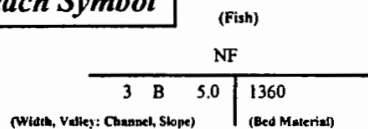




Photo #: Z-20-7, 16-Aug-97
Site #: Z152, Looking upstream at the channel



Photo #: Z-20-8, 16-Aug-97
Site #: Z152, Looking downstream at the channel

Location: E123, Unit 11, East of Red Canyon Creek.

Stream (Gaz.): Unnamed

Watershed Code: 036-3800-000-000-000-000-000-000-000-000-

Map #: 93 L 071 Reach Length (km): 1.2 MA Date: 25-Jul-97 Time: 14:00 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 5677 60724 Length surveyed (m): 100.0 GE Survey Crew: J L A E M \ \ \ \ \ \ \ \ Photos: E-11-24,25 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 3.0 MS
 Av. Wet. Width (m): 1.3 MS
 Av. Max Riffle Depth (cm): 5 MS
 Av. Max Pool Depth (cm): 26 MS
 Gradient (%): 6.0 CL
 Pool: 20 Riffle: 40 Run: 40 Other: 0
 % Side Channel: 0-10 GE
 % Debris Area: 5-15 GE
 % Stable: 10 GE

Specific Data					
3.0	3.2	4.5	2.0	2.7	2.5
0.8	1.5	2.0	1.2	1.3	1.0
6	4	5	5	3	
25	23	24	30		

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Comments

- C1: S3
- C2: LS = 13%, RS = 10%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort was not recorded at this site.
- C5: No additional bank texture information.
- C6: DO was not measured, the water was clear to the bottom. The mean air temperature on this day was 13.8.C.
- C7: This reach has both spawning and rearing habitat.

Cover Cover Total %: 25 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
20	30	5	0	30	15

Crown Closure %: 40 Aspect: W

Bed Material

Fines	Clay, silt, sand (<2mm):	20	20
Gravels	Small (2-16mm):	30	15
	Large (16-64mm):		15
	Sm. cobble (64-128mm):		15
Larges	Lge cobble (128-256mm):	50	20
	Blder cobble (>256mm):		15
Bedrock		0	0

D90 (cm): 35 Compaction: Medium

Discharge

Wetted Width (m): 0.8 MS
 Mean Depth (m): 0.0 MS
 Mean Velocity (m/s): 0.29 F
 Discharge (m3/s): 0.01 F

Banks

Height (m): 0.3
 % Unstable: 0
 Fines Gravels Larges Bedrock
 Confinement: UC
 Valley : Channel Ratio 10+
 Stage: M Flood Signs Ht(m): 1.5
 Bars (%): 30 pH: 8.1 Braided: Y
 Water Temp. (°C): 8.5 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 30

Reach Symbol

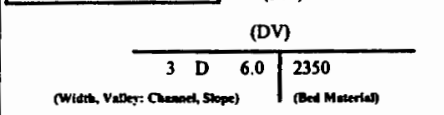




Photo #: E-11-24, 25-Jul-97

Site #: E123, Looking upstream at the channel with devil's club



Photo #: E-11-25, 25-Jul-97

Site #: E123, Looking downstream at the channel with devil's club



Location: E124, Unit 11, East of Red Canyon Creek.

Stream (Gaz.): Unnamed

Watershed Code: 036-3900-000-000-000-000-000-000-000-

Map #: 93 L 071 Reach Length (km): 1.5 MA Date: 25-Jul-97 Time: 15:17 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9.5678 .60720 Length surveyed (m): 100.0 GE Survey Crew: JL \EM\ \ \ \ \ \ \ \ Photos: E-12-1,2,3 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 1.8 MS
 Av. Wet. Width (m): 1.7 MS
 Av. Max Riffle Depth (cm): 4 MS
 Av. Max Pool Depth (cm): 16 MS
 Gradient (%): 2.0 CL
 Pool: 20 Riffle: 10 Run: 70 Other: 0
 % Side Channel: 0 GE
 % Debris Area: >15 GE
 % Stable: 10 GE

Specific Data

2.2	2.0	1.8	1.8	1.0
2.2	2.0	1.8	1.6	0.8
3	4	6	5	3
18	20	11	15	

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	DV	1	70	J	R			EL

Cover

Cover Total %: 20 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
10	30	20	0	30	10

 Crown Closure %: 20 Aspect: S

Bed Material

Fines	Clay, silt, sand (<2mm):	60	60
Gravels	Small (2-16mm):	20	10
	Large (16-64mm):		10
	Sm. cobble (64-128mm):		10
Larges	Lge cobble (128-256mm):	20	10
	Blder cobble (>256mm):		0
Bedrock		0	0

Comments

- C1: S3
- C2: LS = 70%, RS = 12%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model, was not recorded at this site.
- C5: No additional bank texture information.
- C6: DO was not measured, the water was clear to the bottom. The mean air temperature on this day was 13.8.C.
- C7: This reach has some rearing habitat, LOD cover is particularly abundant.

Discharge

Wetted Width (m): 1.9 MS
 Mean Depth (m): 0.2 MS
 Mean Velocity (m/s): 0.07 F
 Discharge (m3/s): 0.02 F

Banks

Height (m): 0.2
 % Unstable: 0
 Fines Gravels Larges Bedrock
 Confinement: OC
 Valley : Channel Ratio 5-10
 Stage: M Flood Signs Ht(m): 0.3
 Bars (%): 0 pH: 6.8 Braided: N
 Water Temp. (°C): 10.0 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 70

Reach Symbol

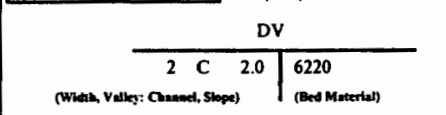




Photo #: E-12-1, 25-Jul-97
Site #: E124, Measuring fish with a meterstick



Photo #: E-12-2, 25-Jul-97
Site #: E124, Looking upstream at the channel



Photo #: E-12-3, 25-Jul-97

Site #: E124, Looking downstream at the channel

Location: E238, Unit 11, south of Red Canyon Cr.

Stream (Gaz.): Unnamed

Watershed Code: 052-0700-000-000-000-000-000-000-000-

Map #: 1031 080 Reach Length (km): 1.9 MA Date: 22-Aug-97 Time: 11:30 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9.5623 .60718 Length surveyed (m): 100.0 GE Survey Crew: SJ\EM\ \ \ \ \ \ \ \ Photos: E-23-3,4 Air Photos:

Channel Characteristics

Specific Data

Av. Chan. Width (m): 5.3 MS
 Av. Wet. Width (m): 1.7 MS
 Av. Max Riffle Depth (cm): 3 MS
 Av. Max Pool Depth (cm): 26 MS
 Gradient (%): 16.0 CL
 Pool: 35 Riffle: 20 Run: 30 Other: 15
 % Side Channel: 0 GE
 % Debris Area: 5-15 GE
 % Stable: 0 GE

4.2	6.2	4.7	5.0	6.0	5.5
1.3	1.3	1.0	2.7	1.7	2.0
3	3	4	3	2	
30	27	26	22	23	

Bed Material

Fines	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	10	5
	Large (16-64mm):		5
Larges	Sm. cobble (64-128mm):		30
	Lge cobble (128-256mm):	80	25
	Blder cobble (>256mm):		25
Bedrock		0	0

D90 (cm): 80 Compaction: Medium

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Comments

- C1: S2
- C2: LS = 30%, RS = 23%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model, set at 1-5-500V, was 270 seconds over 100 meters.
- C5: Fines and larges make up the bank texture at this site.
- C6: DO was not measured, the water was clear to the bottom. The mean air temperature on this day was 16.8 C.
- C7: Step pool habitat was noted at this site. Boulder cover is abundant.

Cover

Cover Total %: 25 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
10	25	45	0	10	10

Crown Closure %: 5 Aspect: N

Discharge

Wetted Width (m): 0.3 MS
 Mean Depth (m): 0.0 MS
 Mean Velocity (m/s): 0.29 F
 Discharge (m3/s): 0.03 F

Banks

Height (m): 0.3
 % Unstable: 0

Fines Gravels Larges Bedrock

Confinement: FC
 Valley: Channel Ratio 2-5

Stage: M Flood Signs Ht(m): 0.5

Bars (%): 50 pH: 7.6 Braided: N

Water Temp. (°C): 9.5 O2 (ppm):

Turb. (cm): Cond. (µmhos): 120

Reach Symbol

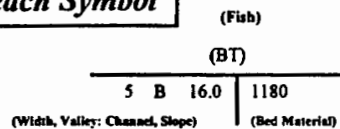




Photo #: E-23-3, 22-Aug-97
Site #: E238, Looking downstream at the channel



Photo #: E-23-4, 22-Aug-97
Site #: E238, Looking upstream at the channel, note the instream woody debris

Location: E239, Unit 11, North of Red Canyon Creek

Stream (Gaz.): Unnamed

Watershed Code: 064-5700-000-000-000-000-000-000-000-000

Map #: 1031 090 Reach Length (km): 0.8 MA Date: 22-Aug-97 Time: 12:30 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 5620 60745 Length surveyed (m): 1000.0 AE Survey Crew: SJ\EM \ \ \ \ \ \ \ \ Photos: E-23-5,6,7 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 4.8 MS
 Av. Wet. Width (m): 1.2 MS
 Av. Max Riffle Depth (cm): 2 MS
 Av. Max Pool Depth (cm): 29 MS
 Gradient (%): 10.0 CL
 Pool: 20 Riffle: 20 Run: 60 Other: 0
 % Side Channel: 0 GE
 % Debris Area: 15 GE
 % Stable: 10 GE

Specific Data

4.0	5.1	7.0	4.5	3.3	5.1
1.2	1.2	1.0	1.8	0.9	1.2
3	2	1	2	4	
21	20	22	40	42	

Obstructions

C	Height (m)	Type	Location
	30	C	0.0

Bed Material

	Fines	Clay, silt, sand (<2mm):	0	0
Gravels	Small (2-16mm):		40	20
	Large (16-64mm):			20
	Sm. cobble (64-128mm):			10
Larges	Lge cobble (128-256mm):		50	20
	Blder cobble (>256mm):			20
Bedrock			10	10

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Comments

- C1: S5
- C2: LS = 35%, RS = 20%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model, set at 1-5-900V, was 460 seconds over 200 meters.
- C5: Fines, larges and bedrock make up the bank texture at this site.
- C6: DO was not measured, the water was clear to the bottom. The mean air temperature on this day was 16.8.C.
- C7: Bedrock is the main component of the substrate at this site. Cover is provided by cutbanks, LOD, boulders and small plunge pools.
- C8: This reach has been classified as non fish bearing because no fish were caught in this area, which is located above a 30m cascade at the mouth of the stream.

Cover

Cover Total % : 10 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
0	20	55	0	10	15

 Crown Closure % : 20 Aspect : S

Discharge

Wetted Width (m): 0.8 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.10 F
 Discharge (m3/s): 0.01 F

Reach Symbol

(Fish) NF
 5 B 10.0 0451
 (Width, Valley: Channel, Slope) (Bed Material)

Banks

Height (m): 0.3
 % Unstable: 5
 Fines Gravels Larges Bedrock
 Confinement: FC
 Valley : Channel Ratio 2-5
 Stage: L Flood Signs Ht(m): 1
 Bars (%): 60 pH: 7.4 Braided: N
 Water Temp. (°C): 11.5 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 70



Photo #: E-23-5, 22-Aug-97
Site #: E239, Looking upstream at a cascade/falls barrier



Photo #: E-23-6, 22-Aug-97
Site #: E239, Looking downstream at the channel



Location: Z173, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 064-4900-000-000-000-000-000-000-000-000-

Map #: 1031090

Reach Length (km): 1.4 MA

Date: 22-Aug-97 Time: 10:45

Agency: TEC

Access: H

Fish Card: N

Field Historical

U.T.M.: 9.563738.607427

Length surveyed (m): 100.0 GE

Survey Crew: CF\KG\ \ \ \ \ \ \ \

Photos: Z-22-7,8

Air Photos:

Channel Characteristics

Av. Chan. Width (m): 2.9 MS
 Av. Wet. Width (m): 0.3 MS
 N Av. Max Riffle Depth (cm): 0 MS
 Av. Max Pool Depth (cm): 11 MS
 Gradient (%): 8.0 CL
 Pool: 100 Riffle: 0 Run: 0 Other: 0
 % Side Channel: 0 GE
 % Debris Area: 5-15 GE
 % Stable: 20 GE

Specific Data

3.2	3.6	3.5	3.0	1.8	2.2
0.6	0.3	0.2	0.6	0.0	0.0
11	8	13			

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA	I			NA

Comments

- C1: S3. As the stream consisted of small isolated pools riffle depth and discharge measurements could not taken.
- C2: LS=7%, RS=5%
- C3: No fisheries sensitive zones noted.
- C4: The electrochocking effort was not carried out as the stream was a series of isolated pools.
- C5: No additional bank texture information.
- C6: DO was not measured at this site, the water was clear to bottom. The air temperature at this site was 14.5 C.
- C7: This was a mostly dry channel at the time of sampling, but it would provide habitat at higher flow. There is some good boulder and undercut bank cover in the sampling area.

Cover

Cover Total %: 30 GE

Pool	LOD	Bldr	In Veg	O Veg	Cibnk
0	5	50	0	30	15

Crown Closure %: 45 Aspect: SW

Bed Material

Fines	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	20	10
	Large (16-64mm):		10
Larges	Sm. cobble (64-128mm):	70	30
	Lge cobble (128-256mm):		20
	Blder cobble (>256mm):		20
Bedrock		0	0

D90 (cm): 34 Compaction: High

Discharge

N Wetted Width (m):
 N Mean Depth (m):
 N Mean Velocity (m/s):
 N Discharge (m3/s):

Banks

Height (m): 0.3
 % Unstable: 10

Fines Gravels Larges Bedrock

Confinement: OC
 Valley : Channel Ratio 5-10

Stage: Dry Flood Signs H4(m): 0.8

Bars (%): 90 pH: 7.1 Braided: Y

Water Temp. (°C): 11.0 O2 (ppm):

Turb. (cm): Cond. (µmhos): 60

Reach Symbol

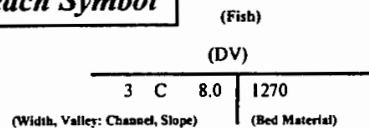




Photo #: Z-22-7, 22-Aug-97
Site #: Z173, Looking across stream at the channel



Photo #: Z-22-8, 22-Aug-97
Site #: Z173, Looking across stream at the channel, note the low flow stage

5.6 Sandstone Creek (440-7670-000) (93 L 082)

5.6.1 Sensitive Habitats and Barriers

The mainstem of Sandstone Creek is 9.8 km in length and is fed by 13 tributaries. In general, Sandstone Creek is a low gradient stream with stretches of moderate confinement. Reach 1 has low gradient and varied confinement and reach 2 is Sandstone Lake. Reach 3 has low gradient, is unconfined and flows through a network of fisheries sensitive wetlands. Reach 4 is a small unnamed lake and reach 5 drains a somewhat steep slope and is unconfined. A beaver dam was noted 420 meters upstream from the mouth, but no other barriers were observed. Sandstone Lake and reach 5 of Sandstone Creek provide excellent rearing habitat. This system was sampled at 7 locations, including reach 1 of the mainstem.

5.6.2 Fish Summary Tables and Stream Classification

The historical records indicate the presence of cutthroat trout, rainbow trout and Dolly Varden at the mouth, as well as Dolly Varden and cutthroat trout upstream in Sandstone Lake. Two sites were electrofished in 1996, with cutthroat trout caught in the mainstem in reach 1. Rainbow trout were caught by electrofishing in reach 3 and cutthroat trout were caught by electrofishing in a tributary to Sandstone Lake in 1997. The mainstem of Sandstone Creek was classified as an S3 in reach 1, based on an average channel width of 4.1 meters and the presence of cutthroat trout in the sampling area. It was classified as an S3 in reach 3, based on the presence of fish and an average channel width of 1.5 meters. Four S4 sized reaches, 1 S3 sized reach and one "NC" were identified by sampling crews working in this watershed. The remaining unsampled tributaries appear to be S4 sized streams.

Location: KARLA 29, Unit 11, 400 m North of Zymoetz River, see C5. Stream (Gaz.): Sandstone Creek Watershed Code: 440-7670-000-000-000-000-000-000-000-0

Map #: 93 L 082 Reach Length (km): 4.6 MA Date: 23-Sep-96 Time: 16:05 Agency: TEC Access: V2 Fish Card: N Field Historical
 U.T.M.: 9 5827 60737 Length surveyed (m): 180.0 GE Survey Crew: JP KG \ \ \ \ \ \ \ \ \ \ Photos: K-3-10,11 Air Photos:

Channel Characteristics

C1: Av. Chan. Width (m): 4.1 MS
 Av. Wet. Width (m): 2.8 MS
 Av. Max Riffle Depth (cm): 13 MS
 Av. Max Pool Depth (cm): 30 MS
 Gradient (%): 7.0 CL
 Pool: 15 Riffle: 30 Run: 50 Other: 5
 % Side Channel: 0-10 GE
 % Debris Area: 5-15 GE
 % Stable: 80 GE

Specific Data

4.3	3.0	3.7	3.5	4.6	5.3
2.8	2.6	2.9	3.3	2.4	2.5
21	6	16	9	15	
32	23	29	37	30	

Obstructions

C	Height (m)	Type	Location

Bed Material

Fines	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	30	10
	Large (16-64mm):		20
	Sm. cobble (64-128mm):		10
Larges	Lge cobble (128-256mm):	60	30
	Blder cobble (>256mm):		20
Bedrock		0	0

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	CT	1	85	J	R			EL

Comments

- C1: S3, with a recommendation to check downstream for changes in stream class.
- C2: LS = 25%, RS = 69%
- C3: No fisheries sensitive zones were noted at this site.
- C4: The electroshocking effort, using a Smithroot 12 B POW model was 365 seconds over 100 meters.
- C5: Lat N 54 48' 15.5", Long W 127 42' 47.9"
- C6: No additional bank texture information.
- C7: DO was not measured at this site. The water was clear to the bottom. The mean air temperature on this day was 3.8°C
- C8: Excellent rearing cover, comprised primarily of boulders was observed at this site. Sampling is recommended upstream, closer to the lake.

Cover

Cover Total %: 45 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
15	20	25	5	20	15

Crown Closure %: 25 Aspect: SW

D90 (cm): 37 Compaction: High

Discharge

Wetted Width (m): 2.0 MS
 Mean Depth (m): 0.2 MS
 Mean Velocity (m/s): 0.88 F
 Discharge (m3/s): 0.26 F

Banks

Height (m): 0.2
 % Unstable: 5
 Fines Gravels Larges Bedrock
 Confinement: OC
 Valley : Channel Ratio 5-10
 Stage: L Flood Signs Ht(m): 0.8
 Bars (%): 5 pH: 7.8 Braided: Y
 Water Temp. (°C): 4.0 O2 (ppm):
 Turb. (cm): 37 Cond. (µmhos): 60

Reach Symbol

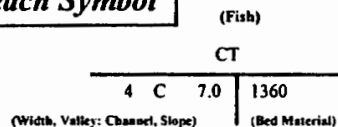




Photo #: K-3-10, 1996/09/23
Site #: K29, Looking upstream.



Photo #: K-3-11, 1996/09/23
Site #: K29, Looking downstream.



Location: W95, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 440-7670-000-000-000-000-000-000-000-0

Map #: 93 L 082 Reach Length (km): 2.2 MA Date: 22-Jul-97 Time: 13:11 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9.5876 .60765 Length surveyed (m): 200.0 GE Survey Crew: KA UP \ \ \ \ \ \ \ \ Photos: W-11-4,5,6 Air Photos:

Channel Characteristics

CI Av. Chan. Width (m): 1.5 MS
 CI Av. Wet. Width (m): 1.4 MS
 N Av. Max Riffle Depth (cm): 0 GE
 N Av. Max Pool Depth (cm): 0 GE
 Gradient (%): 1.0 CL
 Pool: 0 Riffle: 0 Run: 100 Other: 0
 % Side Channel: 0-10 GE
 % Debris Area: 0-5 GE
 % Stable: 25 GE

Specific Data

1.1	1.4	1.4	1.7	1.3	1.7
1.0	1.2	1.4	1.7	1.3	1.3

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	RB	3	90-100	J	R			EL

Comments

- C1: S3. Two additional measurements were taken for channel and wetted widths; 1.7 and 1.7, 1.9 and 1.8
- C2: LS=7%, RS=2%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at 800V, was 276 seconds over 100 meters.
- C5: No additional bank texture information.
- C6: DO was not measured at this site. The mean air temperature on this day was 13.8 C.
- C7: The water in the sampling area is tea coloured and contains a large amount of suspended organic material. Rearing habitat is present. There may be oxygen availability problems.

Bed Material

Fines	Clay, silt, sand (<2mm):	100	100
Gravels	Small (2-16mm):	0	0
	Large (16-64mm):		0
Larges	Sm. cobble (64-128mm):		0
	Lge cobble (128-256mm):	0	0
	Blder cobble (>256mm):		0
Bedrock		0	0

N D90 (cm): 0 Compaction: Low

Cover Cover Total %: 25 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
30	0	0	10	20	40

Crown Closure %: 15 Aspect: SW

Banks Height (m): 0.1
 % Unstable: 0

Fines Gravels Larges Bedrock

Confinement: UC
 Valley: Channel Ratio 10+
 Stage: M Flood Signs Ht(m): 0.2
 Bars (%): 0 pH: 7.6 Braided: N
 Water Temp. (°C): 10.0 O2 (ppm):
 Turb. (cm): 61 Cond. (µmhos): 70

Discharge

Wetted Width (m): 1.2 MS
 Mean Depth (m): 0.6 MS
 Mean Velocity (m/s): 0.02 F
 Discharge (m3/s): 0.01 F

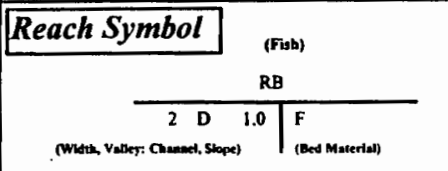




Photo #: W-11-4, 22-Jul-97

Site #: W95, Looking upstream at the channel through sedges



Photo #: W-11-5, 22-Jul-97

Site #: W95, Looking downstream at the channel through sedges

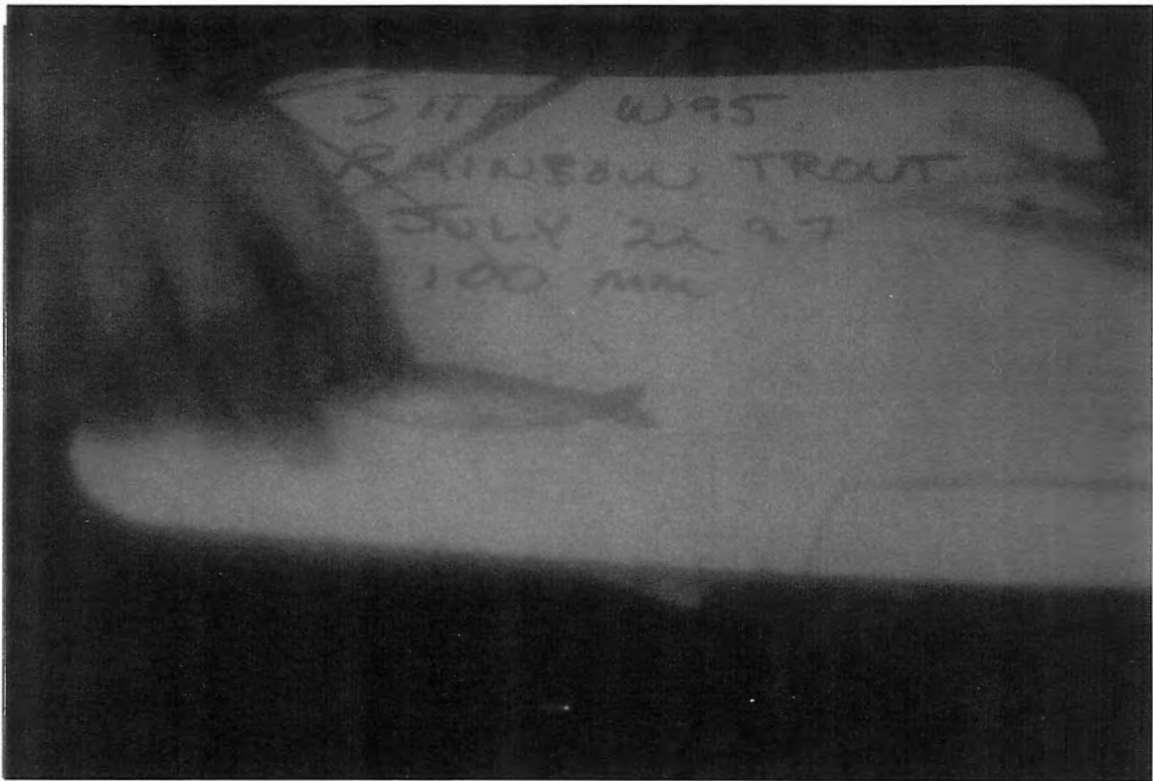


Photo #: W-11-6, 22-Jul-97

Site #: W95, Photodocumentation of trout at the site



Location: KARLA 30, Unit 11, 640 m North of Zymoetz river, see C5.

Stream (Gaz.): Unnamed

Watershed Code: 039-8400-000-000-000-000-000-000-000-000-

Map #: 93 L 082 Reach Length (km): 1.6 MA Date: 23-Sep-96 Time: 16:13 Agency: TEC Access: V2 Fish Card: N Field Historical
 U.T.M.: 9.5827 60738 Length surveyed (m): 100.0 GE Survey Crew: JP/KG \ \ \ \ \ \ Photos: K-3-12,13 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 1.5 MS
 Av. Wet. Width (m): 1.0 MS
 Av. Max Riffle Depth (cm): 8 MS
 Av. Max Pool Depth (cm): 20 MS
 Gradient (%): 11.0 CL
 Pool: 20 Riffle: 40 Run: 10 Other: 30
 % Side Channel: 0 GE
 % Debris Area: 5-15 GE
 % Stable: 30 GE

Specific Data

1.3	1.8	1.7	1.6	1.4	1.3
0.7	0.9	1.9	1.2	1.0	0.6
5	7	6	8	16	
18	16	22	23		

Obstructions

C	Height (m)	Type	Location

Bed Material

Fines	Clay, silt, sand (<2mm):	5	5
Gravels	Small (2-16mm):	35	10
	Large (16-64mm):		25
Larges	Sm. cobble (64-128mm):	30	
	Lge cobble (128-256mm):	60	20
	Blder cobble (>256mm):		10
Bedrock		0	0

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Cover

Cover Total %: 35 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
15	10	30	0	15	30

Crown Closure %: 15 Aspect: W

D90 (cm): 30 Compaction: High

Comments

- C1: S3
- C2: LS = 23%, RS = 61%
- C3: No fisheries sensitive zones were noted at this site.
- C4: The electroshocking effort, using a 12 B POW model, was 140 seconds over 75 meters. The water temperature at the time of sampling was 3.C.
- C5: Lat N 54 48' 17.4", Long W 127 42' 45"
- C6: No additional bank texture information.
- C7: DO was not measured at this site. The mean air temperature on this day was 3.8°C
- C8: No barriers to fish passage were noted at this site, which is connected with Sanstone Creek, a known fish bearing stream.

Discharge

Wetted Width (m): 1.6 MS
 Mean Depth (m): 0.2 MS
 Mean Velocity (m/s): 0.05 F
 Discharge (m3/s): 0.01 F

Banks

Height (m): 0.3

% Unstable: 20

Fines Gravels Larges Bedrock

Confinement: CO

Valley: Channel Ratio 0-2

Stage: L Flood Signs Ht(m): 0.5

Bars (%): 0 pH: 7.7 Braided: N

Water Temp. (°C): 3.0 O2 (ppm):

Turb. (cm): 23 Cond. (µmhos): 50

Reach Symbol

(Fish)

(RB) (DV) (CT)

2 A 11.0 | 1360

(Width, Valley: Channel, Slope)

(Bed Material)



Photo #: K-3-12, 1996/09/23
Site #: K30, Looking upstream, grassy banks.



Photo #: K-3-13, 1996/09/23
Site #: K30, Looking downstream toward culvert.



Location: Y252, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 039-8700-000-000-000-000-000-000-000-000-

Map #: 93 L 082 Reach Length (km): 1.1 | MW Date: 12-Sep-97 Time: 12:52 Agency: TEC Access: V4 Fish Card: N Field Historical
 U.T.M.: 9 584346.60756 Length surveyed (m): 200.0 | GE Survey Crew: JP\FC\ \ \ \ \ \ \ \ Photos: Y-30-14,15 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 0.7 | MS
 Av. Wet. Width (m): 0.7 | MS
 Av. Max Riffle Depth (cm): 3 | MS
 Av. Max Pool Depth (cm): 15 | MS
 Gradient (%): 8.0 | CL
 Pool: 10 | Riffle: 10 | Run: 60 | Other: 20
 % Side Channel: 10-40 | GE
 % Debris Area: 50 | GE
 % Stable: 75 | GE

Specific Data

0.6	0.4	0.9	0.8	0.8	0.8
0.6	0.4	0.9	0.8	0.8	0.7
3	2	2	2	4	
21	12	11			

Bed Material

Fines	Clay, silt, sand (<2mm):	70	70
Gravels	Small (2-16mm):	20	10
	Large (16-64mm):		10
	Sm. cobble (64-128mm):		10
Larges	Lge cobble (128-256mm):	10	0
	Bldr cobble (>256mm):		0
Bedrock		0	0

D90 (cm): 13 Compaction: Low

Cover

Cover Total %: 25 | GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnbk
0	45	0	5	25	25

Crown Closure %: 25 Aspect: S

Discharge

Wetted Width (m): 0.3 | MS
 Mean Depth (m): 0.1 | MS
 Mean Velocity (m/s): 0.03 | F
 Discharge (m3/s): 0.00 | F

Reach Symbol

(Fish)
 (RB) (DV)
 1 C 8.0 | 7210
 (Width, Valley: Channel, Slope) (Bed Material)

Banks

Height (m): 0.1
 % Unstable: 0
 Fines Gravels Larges Bedrock

Confinement: OC
 Valley : Channel Ratio 5-10
 Stage: M Flood Signs II(m): 0.2
 Bars (%): 0 pH: 7.5 Braided: N
 Water Temp. (°C): 8.5 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 110

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Comments

C1: S4
 C2: LS = 28%, RS = 44%
 C3: No fisheries sensitive zones noted.
 C4: The electroshocking effort, using a Smithroot 12 B POW model, set at 1-5-500V, was 70 seconds over 200 meters.
 C5: No additional bank texture information.
 C6: DO was not measured, the water was clear to the bottom.
 C7: This reach could provide rearing habitat, as well as refuge at high water. This is a small stream with a definite channel and moss covered cobble. Deeply undercut banks were observed in the sampling area.



Photo #: Y-30-14, 12/09/97
Site #: Y252, Looking upstream at the channel



Photo #: Y-30-15, 12/09/97
Site #: Y252, Looking downstream at the channel

Location: Y253, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 039-8600-000-000-000-000-000-000-000-

Map #: 93 L 082 Reach Length (km): 1.7 MW Date: 12-Sep-97 Time: 14:01 Agency: TEC Access: V4 Fish Card: N Field Historical
 U.T.M.: 9 583504. 607460 Length surveyed (m): 150.0 GE Survey Crew: JP\FC \ \ \ \ \ \ \ \ Photos: Y-30-16,17,18,19 Air Photos:

Channel Characteristics

C1 Av. Chan. Width (m): 1.1 MS
 C1 Av. Wet. Width (m): 0.9 MS
 Av. Max Riffle Depth (cm): 3 MS
 Av. Max Pool Depth (cm): 20 MS
 Gradient (%): 5.0 CL
 Pool: 10 Riffle: 30 Run: 60 Other: 0
 % Side Channel: 0 GE
 % Debris Area: 0.5 GE
 % Stable: 40 GE

Specific Data

0.7	0.8	1.0	1.1	1.1	1.2
1.0	0.8	0.7	0.9	1.3	1.3
4	2	2	3	3	
17	26	23	18	16	

Bed Material

Fines	Clay, silt, sand (<2mm):	30	30
Gravels	Small (2-16mm):	60	30
	Large (16-64mm):		30
Larges	Sm. cobble (64-128mm):	10	0
	Lge cobble (128-256mm):		0
	Blder cobble (>256mm):		0
Bedrock		0	0

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
C4	DV	11	81-120	J	R			EL

Comments

- C1: S4. Additional channel and wetted widths of 2.0 m and .6 m were taken in the sampling area.
- C2: The side slopes were not measured.
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort at this site, using a Smithroot 12 B POW model, set at I-5-500V, was 178 seconds over 120 meters. Six of the DV listed in the fish summary were visually observed.
- C5: Fines and gravels make up the bank texture at this site.
- C6: DO was not measured, the water was clear to the bottom. The air temperature at this site was 14.5.C.
- C7: This reach has a lot of rearing cover as well as some potential spawning habitat.

Cover

Cover Total %: 30 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
5	20	0	0	15	60

Crown Closure %: 40 Aspect: SW

Discharge

Wetted Width (m): 1.1 MS
 Mean Depth (m): 0.0 MS
 Mean Velocity (m/s): 0.23 F
 Discharge (m3/s): 0.01 F

Banks

Height (m): 0.1
 % Unstable: 0
 Fines Gravels Larges Bedrock
 Confinement: OC
 Valley : Channel Ratio 5-10
 Stage: M Flood Signs Ht(m): 0.3
 Bars (%): 10 pH: 8.0 Braided: N
 Water Temp. (°C): 9.0 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 160

Reach Symbol

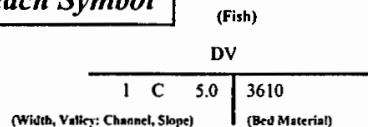




Photo #: Y-30-16, 12/09/97
Site #: Y253, Looking upstream at the channel



Photo #: Y-30-17, 12/09/97
Site #: Y253, Looking downstream at the channel, cutbank cover habitat

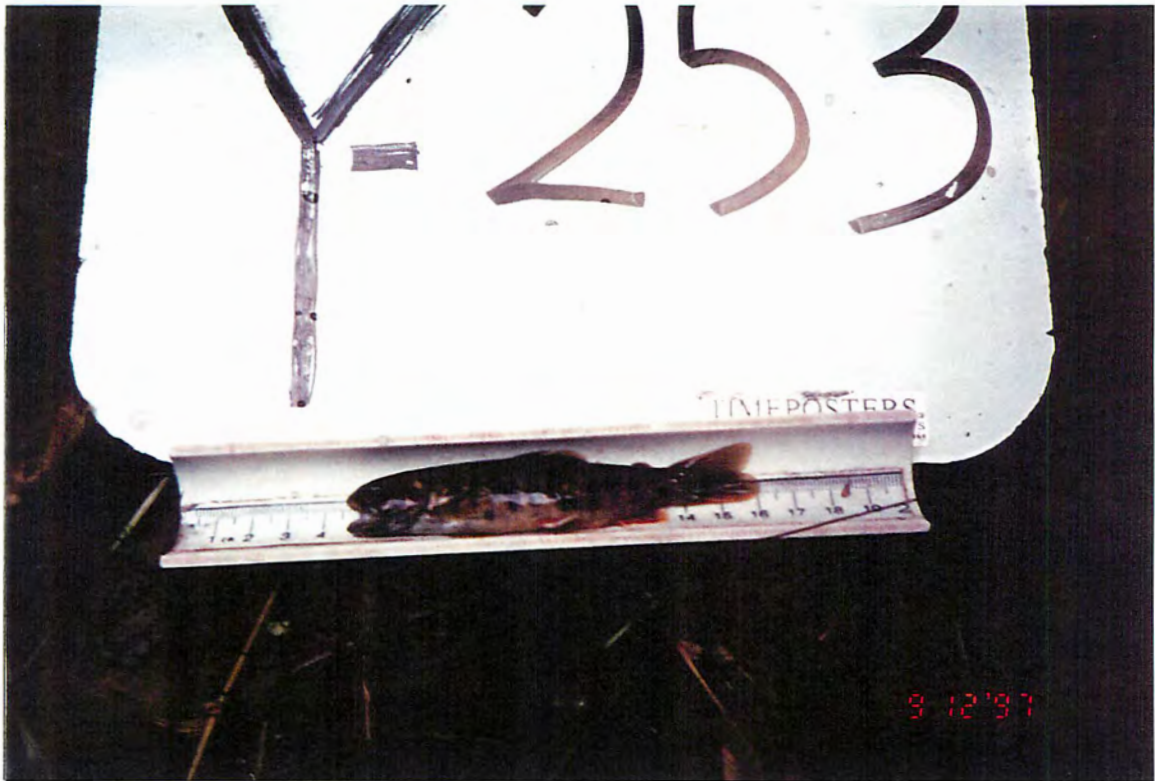


Photo #: Y-30-18, 12/09/97
Site #: Y253, Measuring fish on the fish board



Photo #: Y-30-19, 12/09/97
Site #: Y253, Measuring fish on the fish board



Location: Y254, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 039-8500-000-000-000-000-000-000-000-

Map #: 93 L 082 Reach Length (km): 1.2 MW Date: 12-Sep-97 Time: 14:48 Agency: TEC Access: V4 Fish Card: N Field Historical
 U.T.M.: 9 58382 60742 Length surveyed (m): 100.0 GE Survey Crew: JP VFC \ \ \ \ \ \ \ \ Photos: Y-30-24,25 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 1.0 MS
 Av. Wet. Width (m): 0.7 MS
 Av. Max Riffle Depth (cm): 2 MS
 Av. Max Pool Depth (cm): 7 MS
 Gradient (%): 3.0 CL
 Pool: 5 Riffle: 5 Run: 90 Other: 0
 % Side Channel: 0-10 GE
 % Debris Area: >15 GE
 % Stable: 20 GE

Specific Data

1.2	0.6	1.2	1.3	0.8	0.7
0.9	0.6	1.0	0.4	0.7	0.6
2	3	2			
7	8	7			

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Comments

- C1: S4
- C2: LS = 15%, RS = 25%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model, set at I-5-500V, was 75 seconds over 100 meters.
- C5: No additional bank texture information.
- C6: DO was not measured, the water was clear to the bottom. The air temperature at this site was 15.5.C.
- C7: There is some LOD and overstream vegetation cover in the sampling area, however, there is little suitable fish habitat at this site. Typically this reach is comprised of muddy/silty runs. Roughly 90% of the crown closure is alder.
- C8: A tag reading TLP#4, 16m @205 degrees to ST14 TSL A51161 AW FP June 8/95, was noted on a tree at this site.

Cover Cover Total % : 10 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
0	20	0	5	75	0

Crown Closure % : 90 Aspect : S

Bed Material

	Clay, silt, sand (<2mm):	80	80
Gravels	Small (2-16mm):	10	5
	Large (16-64mm):		5
	Sm. cobble (64-128mm):		5
Larges	Lge cobble (128-256mm):	10	5
	Bldr cobble (>256mm):		0
Bedrock		0	0

D90 (cm): 13 Compaction: Low

Discharge

Wetted Width (m): 0.7 MS
 Mean Depth (m): 0.0 MS
 Mean Velocity (m/s): 0.04 F
 Discharge (m3/s): 0.00 F

Banks Height (m): 0.1
 % Unstable: 5

Fines Gravels Larges Bedrock

Confinement: UC
 Valley : Channel Ratio 10+
 Stage: M Flood Signs H(m):
 Bars (%): 0 pH: 7.3 Braided: N
 Water Temp. (°C): 10.0 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 70

Reach Symbol

(Fish) (DV) (RB)

I D 3.0 8110

(Width, Valley: Channel, Slope) (Bed Material)



Photo #: Y-30-24, 12/09/97
Site #: Y254, Looking upstream at the channel



Photo #: Y-30-25, 12/09/97
Site #: Y254, Looking downstream at the channel

Location: Y255, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 039-9300-000-000-000-000-000-000-000-

Map #: 93 L 082 Reach Length (km): 1.1 MW Date: 12-Sep-97 Time: 16:42 Agency: TEC Access: FT Fish Card: N Field Historical
 U.T.M.: 9 5857 6075330 Length surveyed (m): 100.0 GE Survey Crew: JP V C \ \ \ \ \ \ \ \ Photos: Y-30-20,21,22,23 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 1.3 MS
 Av. Wet. Width (m): 1.0 MS
 Av. Max Riffle Depth (cm): 2 MS
 Av. Max Pool Depth (cm): 17 MS
 Gradient (%): 4.0 CL
 Pool: 10 Riffle: 5 Run: 85 Other: 0
 % Side Channel: 0-10 GE
 % Debris Area: >15 GE
 % Stable: 20 GE

Specific Data

0.9	0.8	0.8	0.9	1.2	1.7
0.8	0.8	0.9	1.0	1.3	1.6
2	1	2			
15	15	14	11	31	

Obstructions

Cover

Cover Total %: 20 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
15	25	0	5	15	40

Crown Closure %: 20 Aspect: NW

Bed Material

Fines	Clay, silt, sand (<2mm):	60	60
Gravels	Small (2-16mm):	20	10
	Large (16-64mm):		10
	Sm. cobble (64-128mm):		10
Larges	Lge cobble (128-256mm):	20	10
	Blder cobble (>256mm):		0
Bedrock		0	0

D90 (cm): 20 Compaction: Low

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
C4	CT	10	30-98	J	R			EL

Comments

- C1: S4. Additional channel and wetted widths of 1.5, 1.8, 1.8m and .7, .9, .8m were taken at this site.
- C2: LS = 18%, RS = 7%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model, set at 1-5-600V, was 224 seconds over 100 meters. Six of the CT listed in the fish summary were visually observed.
- C5: No additional bank texture information.
- C6: DO was not measured, the water was clear to the bottom. The air temperature at this site was 14.C.
- C7: This stream has some good cutbank and LOD cover, as well as a few deep pools. Spawning habitat is limited in this reach by high levels of silt.

Discharge

Wetted Width (m): 0.2 MS
 Mean Depth (m): 0.0 MS
 Mean Velocity (m/s): 0.14 F
 Discharge (m3/s): 0.00 F

Banks

Height (m): 0.1
 % Unstable: 5

Fines Gravels Larges Bedrock

Confinement: UC
 Valley: Channel Ratio 10+
 Stage: M Flood Signs Ht(m): 0.2
 Bars (%): 5 pH: 7.5 Braided: Y
 Water Temp. (°C): 10.5 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 80

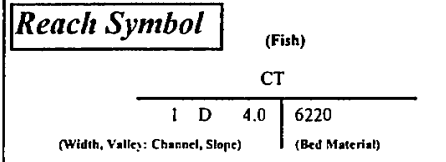




Photo #: Y-30-20, 12/09/97
Site #: Y255, Looking upstream at the channel



Photo #: Y-30-21, 12/09/97
Site #: Y255, Looking downstream at the channel



Photo #: Y-30-22, 12/09/97
Site #: Y255, Measuring fish on the fish board



Photo #: Y-30-23, 12/09/97
Site #: Y255, Measuring fish on the fish board

5.7 Serb Creek (460-8150-000) (93 L 072, 93 L 062)

5.7.1 Sensitive Habitats and Barriers

The mainstem of Serb Creek is roughly 29.9 km in length and is fed by 52 tributaries. Reach 1 has varied confinement, but low gradient and contains a number of side channels and wetlands identified as fisheries sensitive zones. Reach 2 is short and the channel is more confined. Reach 3 has low gradient and is totally unconfined, with multiple sidechannels, wetlands and small lakes identified as fisheries sensitive zones. These small lakes in close proximity to the main channel are abundant for roughly 3 km of this reach. The extensive side channels found in reach 3 would provide excellent refuge from the Serb Creek mainstem. Reach 4 is quite confined and many of its tributaries are closely associated with icefields. Significant barriers were identified at six locations in tributaries to this system, which typically identify the upper limits of fish distribution in a given creek (see Table 3). It is interesting to note that fish were captured at site Z76 on a very large tributary to reach 3 of Serb Creek, above a 7 meter falls and a 4 meter cascade. This creek is not fed by a lake supporting resident fish populations so the presence of fish at this site is quite unique. The Serb Creek watershed was sampled in 27 locations, including reach 4 of the mainstem.

5.7.2 Fish Summary Tables and Stream Classification

The historical records indicate Dolly Varden and steelhead at the mouth of Serb Creek. Dolly Varden are also indicated 21 km from the mouth while steelhead are indicated at 9 km from the mouth. Bull trout were captured by electrofishing in a tributary to reach 3, in a side channel area and Dolly Varden were captured by electrofishing in 4 tributaries to reach 3. Cutthroat trout were also captured by electrofishing in a tributary to Serb Creek.

Serb Creek was classified as an S1 in the headwaters, based on an average channel width of 36.83 meters and the presence of fish habitat. A number of S1 sized tributaries were identified in this reach. The entire upper watershed appears to be subject to blowout, with a huge flood zone identified at Z69 and ragged newly created banks identified at Z76, both classified as S1. The lower reaches of the tributaries sampled in this inventory are either fish bearing or have been classified as fish inferred based on the presence of fish and or fish habitat. Cascade and falls barriers were identified in many of the tributaries to this system and typically they represent the upper limit of fish distribution in the streams. For example, multiple cascade barriers as well as a 5 meter falls were identified on the tributary sampled at Z71. No fish were caught above these barriers despite the presence of excellent fish habitat.

DFO/MoELP Stream Survey Form

Site Number: Z70

Reach No.: 2

Serb Cr.



TRITON
Environmental Consultants Ltd.

Location: Z70, Unit 11

Stream (Gaz.): Serb Creek

Watershed Code: 440-8150-000-000-000-000-000-000-000-0

Map #: 93 L 062 Reach Length (km): 1.4 MW Date: 24-Jul-97 Time: 12:52 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9.5804 .60572 Length surveyed (m): 300.0 GE Survey Crew: JP \ K G \ \ \ \ \ \ \ \ Photos: Z-9-8,9,10 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 36.8 GE
 Av. Wet. Width (m): 10.3 GE
 CI Av. Max Riffle Depth (cm): 0 GE
 Av. Max Pool Depth (cm): 2 GE
 Gradient (%): 1.0 CL
 Pool: 10 Riffle: 20 Run: 70 Other: 0
 % Side Channel: >40 GE
 % Debris Area: >15 GE
 % Stable: 10 GE

Specific Data

34.0	37.0	38.0	38.0	36.0	38.0
9.0	7.0	8.0	10.0	13.0	15.0
1	2	2			

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				NA

Comments

- C1: S1. Riffle depth measurements were not taken, as they could not be seen. Discharge measurements were not taken.
- C2: LS=12%, RS=42%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 800V, was 72 seconds over 100 meters.
- C5: No additional bank texture information.
- C6: DO was not measured at this site, the water was turbid. The air temperature at this site was 12 C.
- C7: Cover in the form of deep pools, LOD and boulders was noted.
- C: Moose and bear sign were abundant in the sampling area.

Cover

Cover Total %: 20 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
15	25	40	0	5	15

 Crown Closure %: 25 Aspect: N

Bed Material

Fines	Clay, silt, sand (<2mm):	20	20
Gravels	Small (2-16mm):	40	20
	Large (16-64mm):		20
Larges	Sm. cobble (64-128mm):		15
	Lge cobble (128-256mm):	40	15
	Blder cobble (>256mm):		10
Bedrock		0	0

D90 (cm): 40 Compaction: Medium

Discharge

CI Wetted Width (m): 0.0 GE
 CI Mean Depth (m): 0.0 GE
 CI Mean Velocity (m/s): 0.00 F
 CI Discharge (m3/s): 0.00 F

Banks

Height (m): 4.0
 % Unstable: 90
 Fines Gravels Larges Bedrock
 Confinement: UC
 Valley: Channel Ratio 10+
 Stage: L Flood Signs Ht(m): 5.5
 Bars (%): 25 pH: 7.7 Braided: Y
 Water Temp. (°C): 5.5 O2 (ppm):
 Turb. (cm): 25 Cond. (µmhos): 50

Reach Symbol

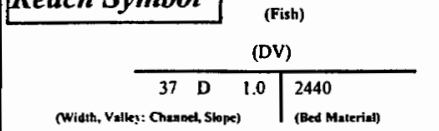




Photo #: Z-9-8, 24-Jul-97
Site #: Z70, Looking downstream at the channel



Photo #: Z-9-9, 24-Jul-97
Site #: Z70, Looking upstream at the channel



Photo #: Z-9-10, 24-Jul-97

Site #: Z70, Looking upstream at the confluence of sites E69 and E70



Photo #: Z-9-18, 24-Jul-97
Site #: Z73, Looking downstream at the channel



Photo #: Z-9-19, 24-Jul-97
Site #: Z73, Looking upstream at the channel



Location: RYAN 173, Unit 11, 1.6km SW of Mc Donnell Lake, see C5.

Stream (Gaz.): Unnamed

Watershed Code: 033-4000-000-000-000-000-000-000-000-0

Map #: 93 L.072 Reach Length (km): 0.6 GE Date: 01-Oct-96 Time: 13:00 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9_5865_60703 Length surveyed (m): 150.0 GE Survey Crew: RHJL \ \ \ \ \ \ \ \ Photos: None Air Photos:

Channel Characteristics

Av. Chan. Width (m): 0.7 GE
 Av. Wet. Width (m): 0.5 GE
 Av. Max Riffle Depth (cm): 3 GE
 Av. Max Pool Depth (cm): 10 GE
 Gradient (%): 5.0 CL
 Pool: 5 Riffle: 20 Run: 75 Other: 0
 % Side Channel: 0-10 GE
 % Debris Area: 5-15 GE
 % Stable: 80 GE

Specific Data

[Empty box for Specific Data]

Obstructions

C	Height (m)	Type	Location

Bed Material

	Clay, silt, sand (<2mm):	70	70
Gravels	Small (2-16mm):	15	5
	Large (16-64mm):		10
Larges	Sm. cobble (64-128mm):		10
	Lge cobble (128-256mm):	15	5
Bedrock	Blder cobble (>256mm):		0
		0	0

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
C4	NF			NA				VO

Cover

Cover Total %: 35 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
0	20	0	0	60	20

 Crown Closure %: 65 Aspect: NE

D90 (cm): 18 Compaction: Medium

Comments

- C1: S6
- C2: The side slopes were not measured at this site.
- C3: No fisheries sensitive zones were noted at this site.
- C4: This site was not electrofished as too little water was present in the channel at the time of sampling.
- C5: Lat N 54 46' 20.8", Long W 127 39' 19.2"
- C6: No additional bank texture information.
- C7: DO, pH were not measured at this site. The water was clear to the bottom. The air temperature high on this day was 10.8°C
- C8: This is an intermittent channel. The lack of water at this site would prevent fish access.

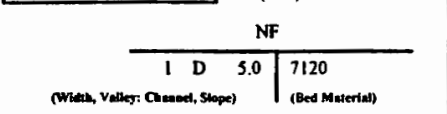
Discharge

Wetted Width (m):
 Mean Depth (m):
 Mean Velocity (m/s):
 Discharge (m3/s):

Banks

Height (m): 0.1
 % Unstable: 0
 Fines Gravels Larges Bedrock
 Confinement: UC
 Valley: Channel Ratio 10+
 Stage: L Flood Signs Ht(m): 0.1
 Bars (%): 0 pH: Braided: N
 Water Temp. (°C): 3.0 O2 (ppm):
 Turb. (cm): 10 Cond. (µmhos):

Reach Symbol





Location: W124, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 029-9000-000-000-000-000-000-000-000-000-

Map #: 93 L 063 Reach Length (km): 0.6 MW Date: 27-Jul-97 Time: 15:00 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 5933 60614 Length surveyed (m): 100.0 GE Survey Crew: KA JP \ \ \ \ \ \ Photos: W-A-2,3 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 3.5 GE
 Av. Wet. Width (m): 3.5 GE
 N Av. Max Riffle Depth (cm): 0 GE
 N Av. Max Pool Depth (cm): 0 GE
 Gradient (%): 1.0 CL
 Pool: 0 Riffle: 0 Run: 100 Other: 0
 % Side Channel: 0 GE
 % Debris Area: 0.5 GE
 % Stable: 5 GE

Specific Data

[Empty box for Specific Data]

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				NA

Comments

- C1: S3.
- C2: LS=1%, RS=1%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort was not effective at this site due to the depth of the water.
- C5: No additional bank texture information.
- C6: DO was not measured at this site. The mean air temperature on this day was 15.0 C.
- C7: This site has great amphibian habitat, many tadpoles were seen. There also appears to be favourable rearing habitat for RB with deep water, instream vegetation and cutbanks.

Cover

Cover Total %: 20 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
0	0	0	40	20	40

 Crown Closure %: 5 Aspect: W

Bed Material

Fines	Clay, silt, sand (<2mm):	100	100
Gravels	Small (2-16mm):	0	0
	Large (16-64mm):		0
	Sm. cobble (64-128mm):		0
Larges	Lge cobble (128-256mm):	0	0
	Blder cobble (>256mm):		0
Bedrock		0	0

N D90 (cm): 0 Compaction: Low

Discharge

Wetted Width (m): 3.7 MS
 Mean Depth (m): 0.8 MS
 Mean Velocity (m/s): 0.03 F
 Discharge (m3/s): 0.06 F

Banks

Height (m): 0.1
 % Unstable: 30
 Fines Gravels Larges Bedrock
 Confinement: UC
 Valley : Channel Ratio 10+
 Stage: H Flood Signs Ht(m): 0.1
 Bars (%): 0 pH: 7.6 Braided: N
 Water Temp. (°C): 14.0 02 (ppm):
 Turb. (cm): 103 Cond. (µmhos): 30

Reach Symbol

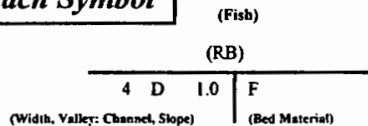




Photo #: W-A-2, 27-Jul-97
Site #: W124, Looking upstream at the channel



Photo #: W-A-3, 27-Jul-97
Site #: W124, Looking downstream at the channel



Location: W125, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 033-5700-000-000-000-000-000-000-000-000-

Map #: 93 L 063 Reach Length (km): 2.2 MA Date: 27-Jul-97 Time: 16:00 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 5932 60616 Length surveyed (m): 100.0 GE Survey Crew: KA JP \ \ \ \ \ \ \ \ Photos: W-A-4,5,6 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 1.5 MS
 Av. Wet. Width (m): 1.6 MS
 Av. Max Riffle Depth (cm): 5 MS
 Av. Max Pool Depth (cm): 19 MS
 Gradient (%): 2.5 CL
 Pool: 10 Riffle: 20 Run: 70 Other: 0
 % Side Channel: 0 GE
 % Debris Area: 5-15 GE
 % Stable: 30 GE

Specific Data

1.4	1.2	1.1	1.7	1.6	2.0
1.4	1.2	1.3	1.7	1.7	2.2
6	7	6	4	5	3
14	15	20	18	25	21

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	RB	1	100	J	R			EL

Comments

- C1: S3.
- C2: LS=5%, RS=3%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at 700V, was 265 seconds over 100 meters.
- C5: No additional bank texture information.
- C6: DO, pH and conductivity were not measured at this site, the water was clear to bottom. The mean air temperature on this day was 15.0 C.
- C7: Rearing habitat was noted at this site.

Cover

Cover Total %: 20 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
20	10	30	20	10	10

 Crown Closure %: 20 Aspect: NW

Bed Material

Fines	Clay, silt, sand (<2mm):	20	20
Gravels	Small (2-16mm):	40	20
	Large (16-64mm):		20
	Sm. cobble (64-128mm):		20
Larges	Lge cobble (128-256mm):	40	10
	Blder cobble (>256mm):		10
Bedrock		0	0

D90 (cm): 28 Compaction: Medium

Discharge

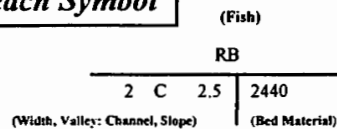
Wetted Width (m): 1.1 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.15 F
 Discharge (m³/s): 0.01 F

Banks

Height (m): 0.1
 % Unstable: 20
 Fines Gravels Larges Bedrock

Confinement: OC
 Valley : Channel Ratio 5-10
 Stage: M Flood Signs Ht(m): 0.2
 Bars (%): 0 pH: Braided: N
 Water Temp. (°C): 11.0 02 (ppm):
 Turb. (cm): Cond. (µmhos):

Reach Symbol



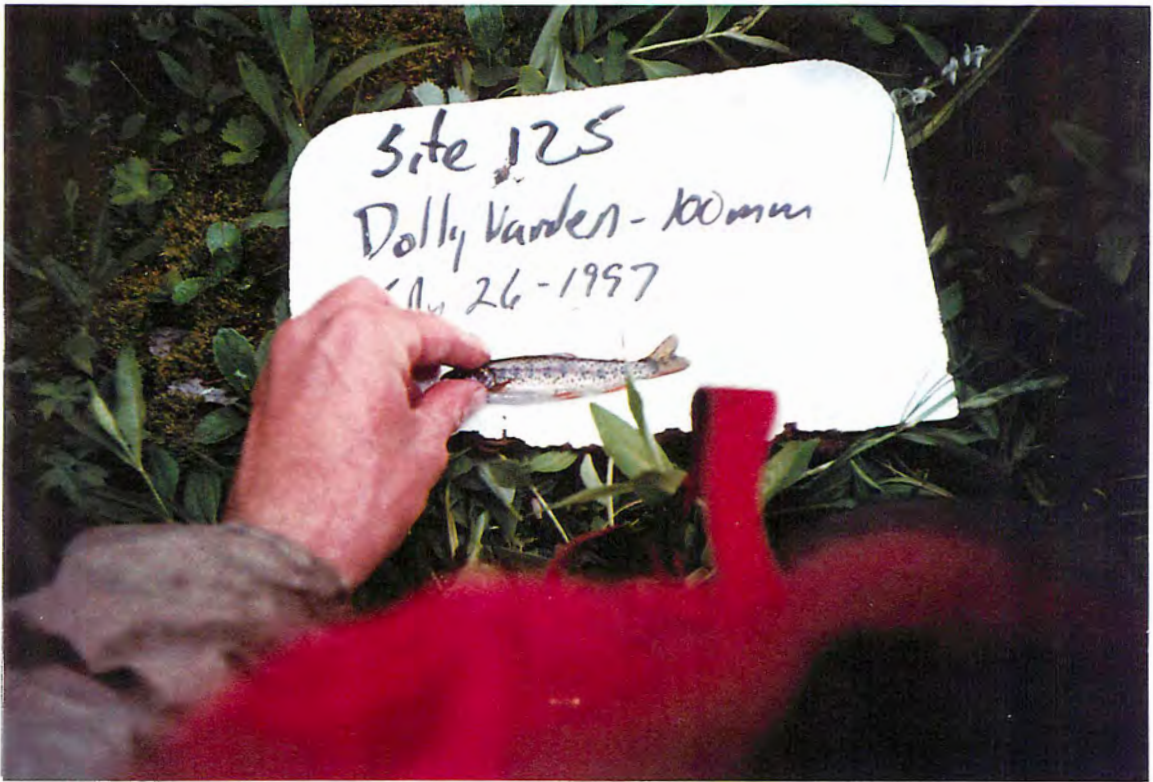


Photo #: W-A-4, 27-Jul-97
Site #: W125, Looking at trout on the photoboard



Photo #: W-A-5, 27-Jul-97
Site #: W125, Looking upstream at the channel



Photo #: W-A-6, 27-Jul-97

Site #: W125, Looking downstream at the channel



Photo #: Y-10-9, 24/07/97
Site #: Y77, Looking across stream, note abundant cobble cover.



Photo #: Y-10-10, 24/07/97
Site #: Y77, Looking upstream at the channel, note LOD in the stream.

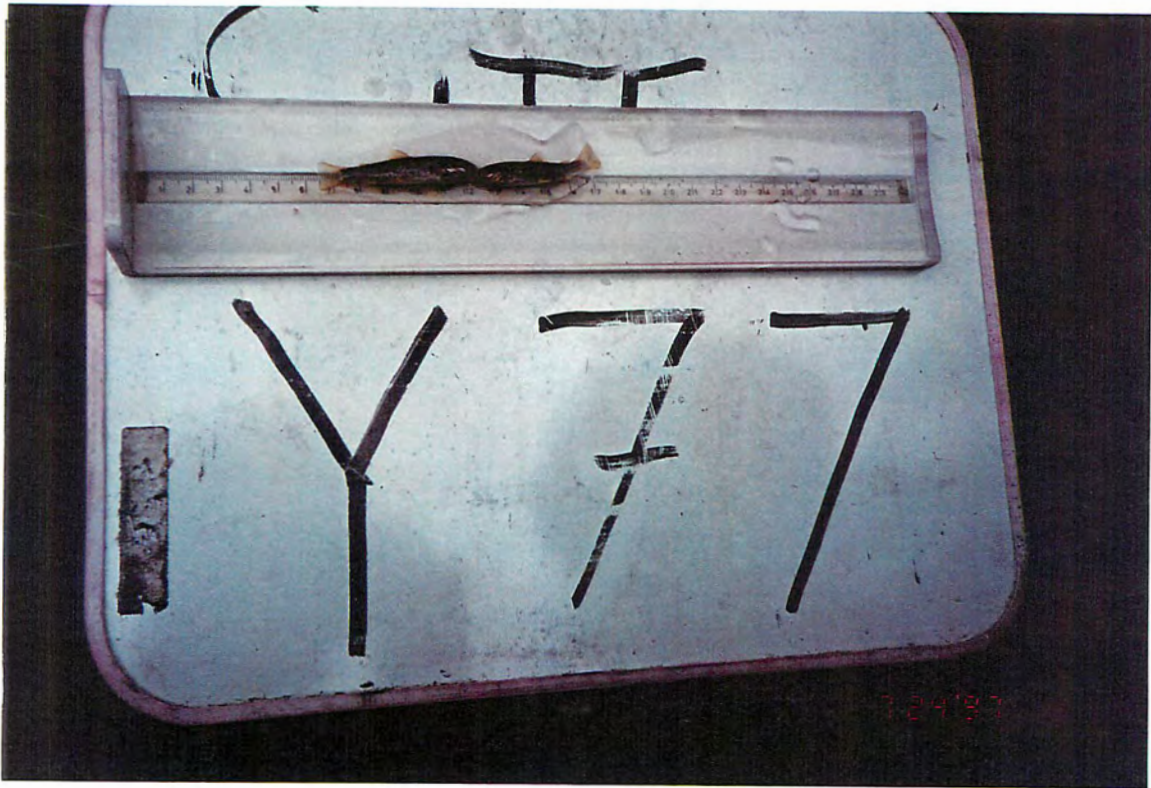


Photo #: Y-10-11, 24/07/97
Site #: Y77, Fish on the fish board.



Photo #: Y-10-12, 24/07/97
Site #: Y77, Fish on the fish board.



Location: Y78, unit 11

Stream (Gaz.): Unnamed

Watershed Code: 033-5800-000-000-000-000-000-000-000-000-

Map #: 93 L 072 Reach Length (km): 1.8 MA Date: 24-Jul-97 Time: 10:30 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9.5894 .60642 Length surveyed (m): 100.0 GE Survey Crew: DDASJA \ \ \ \ \ \ \ \ Photos: Y-10-13,14 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 1.1 MS
 Av. Wet. Width (m): 0.8 MS
 Av. Max Riffle Depth (cm): 3 MS
 Av. Max Pool Depth (cm): 28 MS
 Gradient (%): 6.0 CL
 Pool: 20 Riffle: 10 Run: 60 Other: 10
 % Side Channel: 0 GE
 % Debris Area: 5-15 GE
 % Stable: 70 GE

Specific Data

1.2	1.0	1.3	1.2	1.2	1.0
0.5	0.8	1.1	1.1	0.9	0.7
2	3	4	2	3	
30	18	40	29	23	

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	CT	3	80-100	J	R			EL
	DV	2	70-9-0	J	R			EL

Comments

- C1: S4.
- C2: LS=15%, RS=17%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at G, 5, 300V, was 295 seconds over 80 meters.
- C5: No additional bank texture information.
- C6: DO was not measured at this site, the water was clear to bottom. The air temperature at this site was 12.0 C.
- C7: This unmapped S4 has good rearing habitat in the form of deep pools and LOD cover. Potential spawning habitat was also identified.

Cover

Cover Total %: 30 GE
 Pool LOD Bldr In Veg O Veg Ctnk
 20 30 0 0 30 20
 Crown Closure %: 40 Aspect: W

Bed Material

Fines	Clay, silt, sand (<2mm):	20	20
Gravels	Small (2-16mm):	40	20
	Large (16-64mm):		20
Larges	Sm. cobble (64-128mm):	25	
	Lge cobble (128-256mm):	40	15
Bedrock	Blder cobble (>256mm):		0
		0	0

N D90 (cm): 21 N Compaction: Medium

Discharge

Wetted Width (m): 0.9 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.16 F
 Discharge (m3/s): 0.01 F

Banks

Height (m): 0.1
 % Unstable: 50
 Fines Gravels Larges Bedrock

Confinement: OC
 Valley: Channel Ratio 5-10
 Stage: M Flood Signs Ht(m): 0.5
 Bars (%): 0 pH: 7.8 Braided: N
 Water Temp. (°C): 8.0 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 60

Reach Symbol

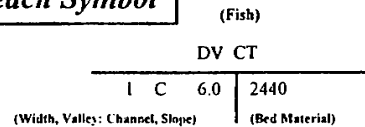




Photo #: Y-10-13, 24/07/97
Site #: Y78, Looking upstream at the channel.



Photo #: Y-10-14, 24/07/97
Site #: Y78, Looking downstream at the channel.



Location: Y79, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 033-5900-000-000-000-000-000-000-000-000-

Map #: 93 L 072 Reach Length (km): 1.5 | MW Date: 24-Jul-97 Time: 11:45 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 5891 60641 Length surveyed (m): 100.0 | GE Survey Crew: DD \S\ \ \ \ \ \ \ \ Photos: Y-10-15,16,17,18 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 4.1 | MS
 Av. Wet. Width (m): 3.3 | MS
 Av. Max Riffle Depth (cm): 8 | MS
 Av. Max Pool Depth (cm): 45 | MS
 Gradient (%): 7.0 | CL
 Pool: 30 | Riffle: 20 | Run: 40 | Other: 10
 % Side Channel: 0 | GE
 % Debris Area: 5-15 | GE
 % Stable: 50 | GE

Specific Data

4.6	3.5	3.6	3.8	4.2	5.1
3.4	2.9	2.6	3.2	2.9	4.6
9	8	7	10	6	
47	28	47	30	74	

Bed Material

Fines	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	20	10
	Large (16-64mm):		10
Larges	Sm. cobble (64-128mm):		20
	Lge cobble (128-256mm):	70	30
	Blder cobble (>256mm):		20
Bedrock		0	0

D90 (cm): 35 Compaction: Medium

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	CT	1	100	J	R			EL
	DV	1	92	J	R			EL
	DV	6	3-20	F	R			VO

Comments

- C1: S3.
- C2: LS=15%, RS=10%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model, was 15 seconds over 1 meter.
- C5: No additional bank texture information.
- C6: DO was not measured at this site, the water was clear to bottom. The air temperature at this site was 15.0 C.
- C7: This stream has excellent rearing habitat in the form of LOD, plunge pools, cutbanks and boulder cover. There are also spawning possibilities.

Cover

Cover Total %: 60 | GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
30	20	30	0	10	10

Crown Closure %: 60 | Aspect: NW

Discharge

Wetted Width (m): 2.1 | MS
 Mean Depth (m): 0.2 | MS
 Mean Velocity (m/s): 0.97 | F
 Discharge (m3/s): 0.31 | F

Banks

Height (m): 0.2

% Unstable: 25

Fines Gravels Larges Bedrock

Confinement: UC

Valley: Channel Ratio 10+

Stage: M Flood Signs 11t(m): 0.8

Bars (%): 0 | pH: 7.8 | Braided: N

Water Temp. (°C): 12.0 02 (ppm):

Turb. (cm): Cond. (µmhos): 80

Reach Symbol

(Fish)

CT DV

4 D 7.0 | 1270

(Width, Valley: Channel, Slope)

(Bed Material)



Photo #: Y-10-15, 24/07/97
Site #: Y79, 100mm CT on the fish board.



Photo #: Y-10-16, 24/07/97
Site #: Y79, 92mm DV on the fish board.



Photo #: Y-10-17, 24/07/97

Site #: Y79, Looking upstream at the channel, note boulder and LOD cover.



Photo #: Y-10-18, 24/07/97

Site #: Y79, Looking downstream at the channel.



Location: Y80, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 033-5800-000-000-000-000-000-000-000-000-

Map #: 93 L 072 Reach Length (km): 1.1 MW Date: 24-Jul-97 Time: 13:15 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 5879 60624 Length surveyed (m): 200.0 GE Survey Crew: DD \S\ \ \ \ \ \ \ Photos: Y-10-19,20,21,22 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 2.3 MS
 Av. Wet. Width (m): 2.3 MS
 Av. Max Riffle Depth (cm): 5 MS
 Av. Max Pool Depth (cm): 47 MS
 Gradient (%): 1.5 CL
 Pool: 10 Riffle: 5 Run: 85 Other: 0
 % Side Channel: 0 GE
 % Debris Area: >15 GE
 % Stable: 60 GE

Specific Data

2.5	2.0	1.7	1.4	3.2	2.7
2.5	2.0	1.7	1.4	3.2	2.7
4	6	5			
45	37	41	52	62	

Obstructions

Bed Material

Fines	Clay, silt, sand (<2mm):	20	20
Gravels	Small (2-16mm):	20	10
	Large (16-64mm):		10
	Sm. cobble (64-128mm):		40
Larges	Lge cobble (128-256mm):	60	15
	Bllder cobble (>256mm):		5
Bedrock		0	0

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	DV	8	40-95	J	R	I		EL

Comments

- C1: S3.
- C2: LS=4%, RS=8%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 300V, was 149 seconds over 20 meters.
- C5: No additional bank texture information.
- C6: DO was not measured at this site, the water was clear to bottom. The air temperature at this site was 18.0 C.
- C7: This stream has good rearing habitat in the form of LOD, pools, cutbanks and deep runs. About 200 meters upstream, the creek changes to an S4. The stream flows directly into a small lake which looks shallow from the air. There is an abundance of caddis larvae in the stream and the lake.
- C8: Numerous frogs with red underbellies were seen, as well as 8 Canada Geese on the lake.

Cover

Cover Total %: 50 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
30	40	5	0	0	25

Crown Closure %: 5 Aspect: NE

D90 (cm): 30 Compaction: Medium

Discharge

Wetted Width (m): 0.9 MS
 Mean Depth (m): 0.2 MS
 Mean Velocity (m/s): 0.63 F
 Discharge (m3/s): 0.21 F

Banks

Height (m): 0.1
 % Unstable: 10

Fines Gravels Larges Bedrock

Confinement: UC
 Valley : Channel Ratio 10+
 Stage: M Flood Signs III(m): 0.5
 Bars (%): 0 pH: 7.8 Braided: N
 Water Temp. (°C): 10.0 02 (ppm):
 Turb. (cm): Cond. (µmhos): 60

Reach Symbol

(Fish)

DV

2 D 1.5 2260

(Width, Valley: Channel, Slope)

(Bed Material)



Photo #: Y-10-19, 24/07/97
Site #: Y80, DV on the fish board.



Photo #: Y-10-20, 24/07/97
Site #: Y80, Looking upstream at the channel.



Photo #: Y-10-21, 24/07/97
Site #: Y80, Looking downstream at the channel.



Photo #: Y-10-22, 24/07/97
Site #: Y80, A frog captured in the sampling area.



Photo #: Y-10-23, 24/07/97
Site #: Y81, Looking upstream at the channel.



Photo #: Y-10-24, 24/07/97
Site #: Y81, Looking downstream at the channel.

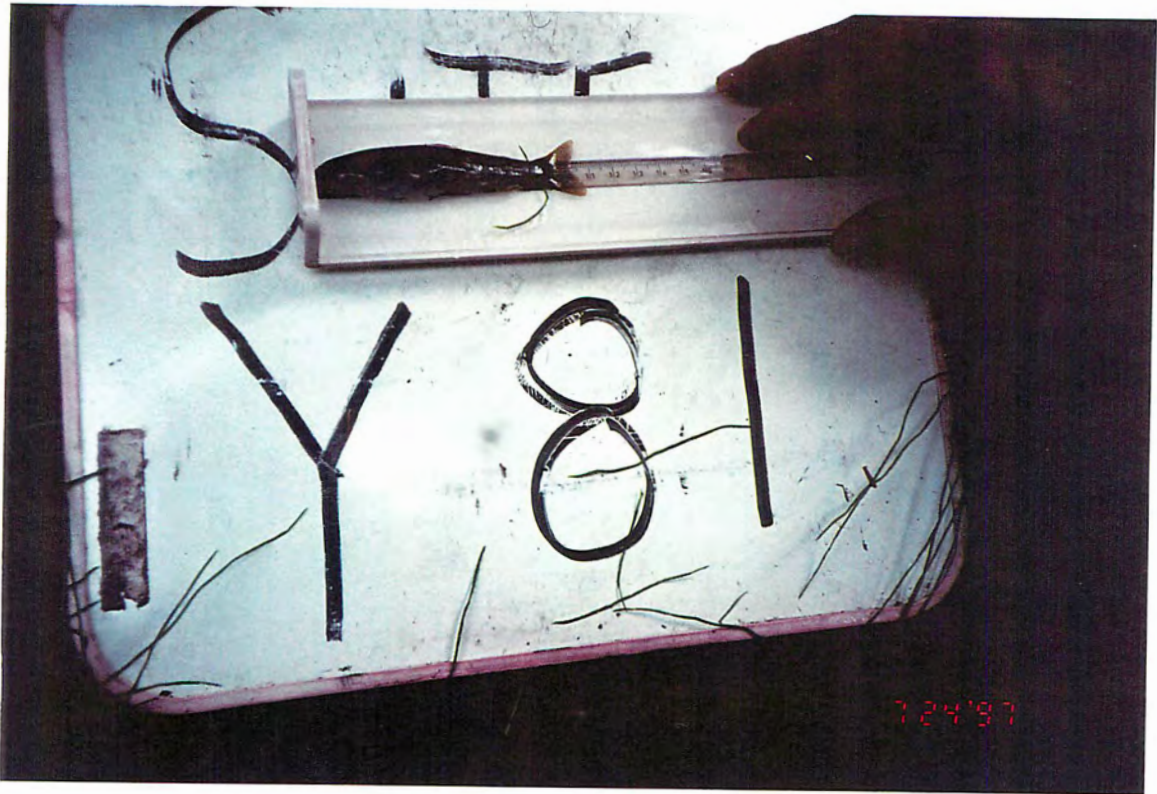


Photo #: Y-10-25, 24/07/97
Site #: Y81, DV on the fish board.



Photo #: Y-11-2, 25/07/97
Site #: Y83, Looking upstream at the channel



Photo #: Y-11-3, 25/07/97
Site #: Y83, Looking downstream at the channel



Location: Y84, Unit 11; NW side of Serb Cr, 15.6km up from Zymoetz R.

Stream (Gaz.): Unnamed

Watershed Code: 033-6500-000-000-000-000-000-000-000-000-

Map #: 93 L 072 Reach Length (km): 0.6 | MW Date: 25-Jul-97 Time: 9:55 Agency: TEC Access: II Fish Card: N Field Historical
 U.T.M.: 9 58554 606363 Length surveyed (m): 100.0 | GE Survey Crew: JP\SJ \ \ \ \ \ \ \ \ Photos: Y-11-4,5,6 Air Photos:

Channel Characteristics

CI Av. Chan. Width (m): 2.1 | MS
 CI Av. Wet. Width (m): 2.1 | MS
 N Av. Max Riffle Depth (cm): 0 | GE
 N Av. Max Pool Depth (cm): 0 | GE
 Gradient (%): 0.5 | CL
 Pool: Riffle: Run: Other:
 % Side Channel: 10-40 | GE
 % Debris Area: 0-5 | GE
 % Stable: 10 | GE

Specific Data

2.1	2.0	0.9	1.3	3.0	1.1
2.1	2.0	0.8	1.3	3.0	1.1

Bed Material

Fines	Clay, silt, sand (<2mm):	100	100
Gravels	Small (2-16mm):	0	0
	Large (16-64mm):		0
	Sm. cobble (64-128mm):		0
Larges	Lge cobble (128-256mm):	0	0
	Blder cobble (>256mm):		0
Bedrock		0	0

N D90 (cm): 0 Compaction: Low

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Comments

- C1: S3. One additional measurement was made for channel and wetted widths; 2.3 and 2.3. Some measurements were not taken as there were no riffles or pools and the water was too slow.
- C2: LS=35%, RS=0%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 300V was 192 seconds over 150 meters.
- C5: No additional bank texture information.
- C6: DO was not measured at this site, the water was clear to bottom. The mean air temperature on this day was 13.6 C.
- C7: This stream has a deep slow channel running through a swamp into Serb Creek. It narrows and becomes isolated pools above the swamp.
- C8: A frog was observed.

Cover

Cover Total %: 20 | GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
0	10	0	35	35	20

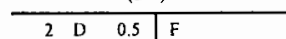
Crown Closure %: 0 Aspect: E

Discharge

N Wetted Width (m):
 N Mean Depth (m):
 N Mean Velocity (m/s):
 N Discharge (m3/s):

Reach Symbol

(Fish)
(DV)



(Width, Valley: Channel, Slope) (Bed Material)

Banks

Height (m): 0.1
 % Unstable: 0

Fines Gravels Larges Bedrock

Confinement: UC
 Valley: Channel Ratio 10+
 Stage: II Flood Signs II(m): 0
 Bars (%): 0 pH: 7.2 Braided: Y
 Water Temp. (°C): 12.0 02 (ppm):
 Turb. (cm): Cond. (µmhos): 20



Photo #: Y-11-4, 25/07/97
Site #: Y84, Looking downstream at the channel



Photo #: Y-11-6, 25/07/97
Site #: Y84, Looking upstream at the channel



Photo #: Y-11-7, 25/07/97

Site #: Y85, Looking upstream at the channel, note rafted woody debris



Photo #: Y-11-8, 25/07/97

Site #: Y85, Looking downstream at the channel



Photo #: Y-11-9, 25/07/97

Site #: Y85, Measuring fish on the fish board



Location: Y86, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 033-7000-000-000-000-000-000-000-000-

Map #: 93 L 072 Reach Length (km): 0.7 | MW Date: 25-Jul-97 Time: 12:37 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9_058481.606224 Length surveyed (m): 300.0 | GE Survey Crew: JP\SJ\ \ \ \ \ \ \ \ Photos: Y-11-10,11,12,13 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 6.8 | MS
 Av. Wet. Width (m): 4.0 | MS
 Av. Max Riffle Depth (cm): 12 | MS
 Av. Max Pool Depth (cm): 48 | MS
 Gradient (%): 4.0 | CL
 Pool: 10 | Riffle: 40 | Run: 45 | Other: 5
 % Side Channel: 10-40 | GE
 % Debris Area: >15 | GE
 % Stable: 30 | GE

Specific Data

7.4	4.0	9.9	7.4	5.6	6.8
4.6	2.8	3.8	4.1	4.7	3.8
14	7	13	12		
45	36	33	90	35	

Bed Material

Fines	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	40	20
	Large (16-64mm):		20
	Sm. cobble (64-128mm):		20
Larges	Lge cobble (128-256mm):	50	20
	Blder cobble (>256mm):		10
Bedrock		0	0

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	DV	2	170	NA				EL

Comments

- C1: S2.
- C2: LS=0%, RS=0%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at 1, 5, 700V, was 740 seconds over 200 meters.
- C5: No additional bank texture information.
- C6: DO was not measured at this site, the water was clear to the bottom. The mean air temperature on this day was 13.6 C.
- C7: This channel seems to move around quite a bit. Unstable banks and dry flow channels are fairly abundant in this area. Cobble was noted in the trees and both live and dead trees were seen in the channel. Although this stream has fast flow, there is very good boulder, LOD and pool cover.

Cover

Cover Total %: 20 | GE
 Pool LOD Bldr In Veg O Veg Ctnk
 20 40 25 0 5 10
 Crown Closure %: 30 Aspect: SE

Discharge

Wetted Width (m): 2.4 | MS
 Mean Depth (m): 0.2 | MS
 Mean Velocity (m/s): 1.01 | F
 Discharge (m3/s): 0.36 | F

Reach Symbol

(Fish)
 DV
 7 D 4.0 | 1450
 (Width, Valley: Channel, Slope) (Bed Material)

Banks

Height (m): 0.1
 % Unstable: 100
 Fines Gravels Larges Bedrock
 Confinement: UC
 Valley : Channel Ratio 10+
 Stage: M Flood Signs Ht(m): 1.2
 Bars (%): 20 pH: 7.5 Braided: Y
 Water Temp. (°C): 8.5 02 (ppm):
 Turb. (cm): Cond. (µmhos): 30



Photo #: Y-11-10, 25/07/97
Site #: Y86, Looking upstream at the channel, note flood signs



Photo #: Y-11-11, 25/07/97
Site #: Y86, Looking downstream at the channel, note rafted woody debris



Photo #: Y-11-12, 25/07/97
Site #: Y86, Looking upstream at a falls barrier



Photo #: Y-11-13, 25/07/97
Site #: Y86, Looking upstream at a falls barrier



Photo #: Y-11-17, 25/07/97
Site #: Y88, Looking upstream at the channel



Photo #: Y-11-18, 25/07/97
Site #: Y88, Looking downstream at the channel



Location: Z247, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 033-6400-000-000-000-000-000-000-000-000-

Map #: 93 L 062 Reach Length (km): 1.2 MA Date: 13-Sep-97 Time: 14:49 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9.589812.60576 Length surveyed (m): 100.0 GE Survey Crew: KGJL \ \ \ \ \ \ \ \ Photos: Z-31-7,8,9 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 1.9 MS
 Av. Wet. Width (m): 1.4 MS
 Av. Max Riffle Depth (cm): 8 MS
 Av. Max Pool Depth (cm): 30 MS
 Gradient (%): 16.5 MA
 Pool: 25 Riffle: 10 Run: 40 Other: 25
 % Side Channel: 0 GE
 % Debris Area: 0 GE
 % Stable: 0 GE

Specific Data

1.8	1.9	1.6	1.5	3.1	1.5
1.7	1.7	1.3	1.4	1.1	1.1
8	8	9			
25	23	41			

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Comments

- C1: S6
- C2: LS-31%, RS-50%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at 1, 5, 500V & 400V, was 268 seconds over 150 meters.
- C5: No additional bank texture information.
- C6: DO was not measured at this site, the water was clear to bottom. The air temperature at this site was 6.5 C.
- C7: This is a high elevation reach with no vegetation cover. The substrate consists of bedrock and larges. The cover is comprised of pools and boulders. A large cascade was noted downstream of the sampling area. The gradient decreases below this point.

Cover

Cover Total %: 20 GE

Pool LOD Bldr In Veg O Veg Ctnk
 40 0 60 0 0 0

Crown Closure %: 0 Aspect: NW

Bed Material

Fines	Clay, silt, sand (<2mm):	0	0
Gravels	Small (2-16mm):	20	0
	Large (16-64mm):		20
	Sm. cobble (64-128mm):		5
Larges	Lge cobble (128-256mm):	30	10
	Blder cobble (>256mm):		15
Bedrock		50	50

D90 (cm): Compaction: High

Discharge

Wetted Width (m): 0.2 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 1.11 F
 Discharge (m3/s): 0.00 F

Banks

Height (m): 0.5
 % Unstable: 90

Fines Gravels Larges Bedrock

Confinement: FC
 Valley : Channel Ratio : 2.5
 Stage: L Flood Signs II(m): 1.6
 Bars (%): 0 pH: 7.9 Braided: N
 Water Temp. (°C): 6.0 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 70

Reach Symbol

(Fish)

NF

2 B 17.0 0235

(Width, Valley: Channel, Slope)

(Bed Material)



Photo #: Z-31-7, 13-Sep-97
Site #: Z247, Looking downstream at the channel



Photo #: Z-31-8, 13-Sep-97
Site #: Z247, Looking upstream at the channel



Photo #: Z-31-9, 13-Sep-97
Site #: Z247, Looking upstream at the channel

Location: Z67, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 025-9700-000-000-000-000-000-000-000-000-

Map #: 93 L 062 Reach Length (km): 1.3 MW Date: 24-Jul-97 Time: 9:58 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 581487.6059471 Length surveyed (m): 150.0 GE Survey Crew: JP \ KG \ \ \ \ \ \ \ \ Photos: Z-8-22,23,24,25 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 13.6 MS
 Av. Wet. Width (m): 9.3 MS
 Av. Max Riffle Depth (cm): 28 MS
 Av. Max Pool Depth (cm): 44 MS
 Gradient (%): 1.5 CL
 Pool: 10 Riffle: 60 Run: 30 Other: 0
 % Side Channel: >40 GE
 % Debris Area: 5-15 GE
 % Stable: 40 GE

Specific Data

15.7	12.7	8.0	21.4	12.1	11.7
11.1	10.6	7.2	10.1	10.1	6.6
32	23	30			
30	43	60			

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	DV	2	100-300	J	R			EL

Comments

- C1: S2.
- C2: LS=1%, RS=5%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 800V, was 166 seconds over 150 meters.
- C5: No additional bank texture information.
- C6: DO was not measured at this site, the water was clear to bottom. The mean air temperature on this day was 11.9 C.
- C7: Side channel and aquatic root cover is abundant at this site. The pools are numerous but not exceptionally deep.

Cover

Cover Total %: 35 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
15	20	5	0	40	20

 Crown Closure %: 5 Aspect: E

Bed Material

Fines	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	50	20
	Large (16-64mm):		30
	Sm. cobble (64-128mm):		20
Larges	Lge cobble (128-256mm):	40	15
	Blder cobble (>256mm):		5
Bedrock		0	0

D90 (cm): 15 Compaction: Medium

Discharge

Wetted Width (m): 9.4 MS
 Mean Depth (m): 0.3 MS
 Mean Velocity (m/s): 1.39 F
 Discharge (m3/s): 2.94 F

Banks

Height (m): 1.0
 % Unstable: 25
 Fines Gravels Larges Bedrock
 Confinement: UC
 Valley : Channel Ratio 10+
 Stage: M Flood Signs Ht(m): 0.8
 Bars (%): 25 pH: 8.0 Braided: Y
 Water Temp. (°C): 5.5 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 20

Reach Symbol

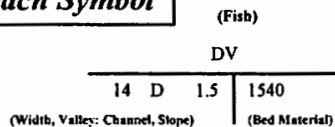




Photo #: Z-8-22, 24-Jul-97
Site #: Z67, Looking downstream at the channel



Photo #: Z-8-23, 24-Jul-97
Site #: Z67, Looking upstream at the channel, note the turbidity of the water



Photo #: Z-8-24, 24-Jul-97
Site #: Z67, Measuring fish with the meterstick

Location: Z68, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 026-0400-000-000-000-000-000-000-000-000

Map #: 93 L 062 Reach Length (km): 1.0 MW Date: 24-Jul-97 Time: 10:46 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 5798 60610 Length surveyed (m): 110.0 GE Survey Crew: JP \ K G \ \ \ \ \ \ \ \ Photos: Z-9-1,2,3 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 2.4 MS
 Av. Wet. Width (m): 1.4 MS
 Av. Max Riffle Depth (cm): 9 MS
 Av. Max Pool Depth (cm): 28 MS
 Gradient (%): 2.0 CL
 Pool: 20 Riffle: 30 Run: 45 Other: 5
 % Side Channel: 10-40 GE
 % Debris Area: >15 GE
 % Stable: 60 GE

Specific Data

2.6	1.9	2.9	1.6	3.1	2.3
1.3	1.5	1.6	1.2	1.7	1.2
8	10	9	8	10	
31	34	17	25	32	

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				NA

Bed Material

Fines	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	40	15
	Large (16-64mm):		25
Larges	Sm. cobble (64-128mm):		20
	Lge cobble (128-256mm):	50	15
Bedrock	Blder cobble (>256mm):		15
		0	0

Comments

- C1: S6.
- C2: LS=2%, RS=22%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 700V, was 87 seconds over 150 meters.
- C5: No additional bank texture information.
- C6: DO was not measured at this site, the water was clear to bottom. The air temperature at this site was 11 C.
- C7: This site has some beautiful rearing habitat, located above a falls in a canyon.

Cover

Cover Total %: 55 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
15	30	20	10	10	15

 Crown Closure %: 10 Aspect: S

D90 (cm): 38 Compaction: Medium

Discharge

Wetted Width (m): 1.3 MS
 Mean Depth (m): 0.3 MS
 Mean Velocity (m/s): 0.04 F
 Discharge (m3/s): 0.01 F

Banks

Height (m): 0.2
 % Unstable: 15
 Fines Gravels Larges Bedrock
 Confinement: UC
 Valley : Channel Ratio 10+
 Stage: M Flood Signs Ht(m): 0.5
 Bars (%): 10 pH: 7.8 Braided: Y
 Water Temp. (°C): 9.0 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 30

Reach Symbol

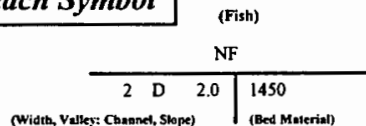




Photo #: Z-8-25, 24-Jul-97
Site #: Z68, Looking downstream at the channel



Photo #: Z-9-1, 24-Jul-97
Site #: Z68, Looking upstream at the channel



Photo #: Z-9-2, 24-Jul-97

Site #: Z68, Looking upstream at a series of falls and cascade barriers



Photo #: Z-9-3, 24-Jul-97

Site #: Z68, Looking upstream at a falls



Location: Z71, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 025-6700-000-000-000-000-000-000-000-000-

Map #: 93 L 062 Reach Length (km): 3.2 MW Date: 24-Jul-97 Time: 14:21 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9.585325.6056530 Length surveyed (m): 100.0 GE Survey Crew: JP \KG\ \ \ \ \ \ \ \ Photos: Z-9-11,12,13,14 Air Photos:

Channel Characteristics

CI Av. Chan. Width (m): 3.0 MS
 CI Av. Wet. Width (m): 2.9 MS
 Av. Max Riffle Depth (cm): 11 MS
 Av. Max Pool Depth (cm): 34 MS
 Gradient (%): 5.0 CL
 Pool: 10 Riffle: 20 Run: 60 Other: 10
 % Side Channel: 0 GE
 % Debris Area: 0.5 GE
 % Stable: 0 GE

Specific Data

3.0	3.2	3.1	3.6	3.1	1.6
3.0	3.2	3.0	3.7	3.0	1.6
15	5	12	8	16	
33	27	32	30	45	40

Obstructions

C	Height (m)	Type	Location
	5	F	4.5

Bed Material

Fines	Clay, silt, sand (<2mm):	20	20
Gravels	Small (2-16mm):	60	30
	Large (16-64mm):		30
Larges	Sm. cobble (64-128mm):	10	
	Lge cobble (128-256mm):	20	5
	Bllder cobble (>256mm):		5
Bedrock		0	0

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				NA

Comments

- C1: S3. One extra measurement was taken for both the channel and wetted widths; 3.2 and 3.1.
- C2: LS= 0%, RS= 0%
- C3: No fisheries sensitive zoned noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at 1, 5, was 374 seconds over 110 meters.
- C5: No additional bank texture information.
- C6: DO was not measured at this site, the water was clear to bottom. The air temperature on this day was 12 C.
- C7: Nice rearing habitat and some spawning sized gravels. No fish were caught above the falls.

Cover

Cover Total % : 35 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
30	0	40	5	5	20

Crown Closure % : 0 Aspect : N

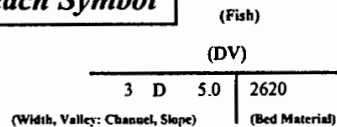
Discharge

Wetted Width (m): 1.5 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.61 F
 Discharge (m3/s): 0.07 F

Banks

Height (m): 0.1
 % Unstable: 10
 Fines Gravels Larges Bedrock

Reach Symbol



Confinement: UC
 Valley : Channel Ratio 10+
 Stage: M Flood Signs Ht(m): 0.45
 Bars (%): 5 pH: 7.6 Braided: N
 Water Temp. (°C): 12.0 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 10



Photo #: Z-9-11, 24-Jul-97
Site #: Z71, Looking upstream at the channel



Photo #: Z-9-12, 24-Jul-97
Site #: Z71, Looking downstream at the channel



Photo #: Z-9-4, 24-Jul-97

Site #: Z69, Looking upstream at the channel, note the flood signs and highly turbid water

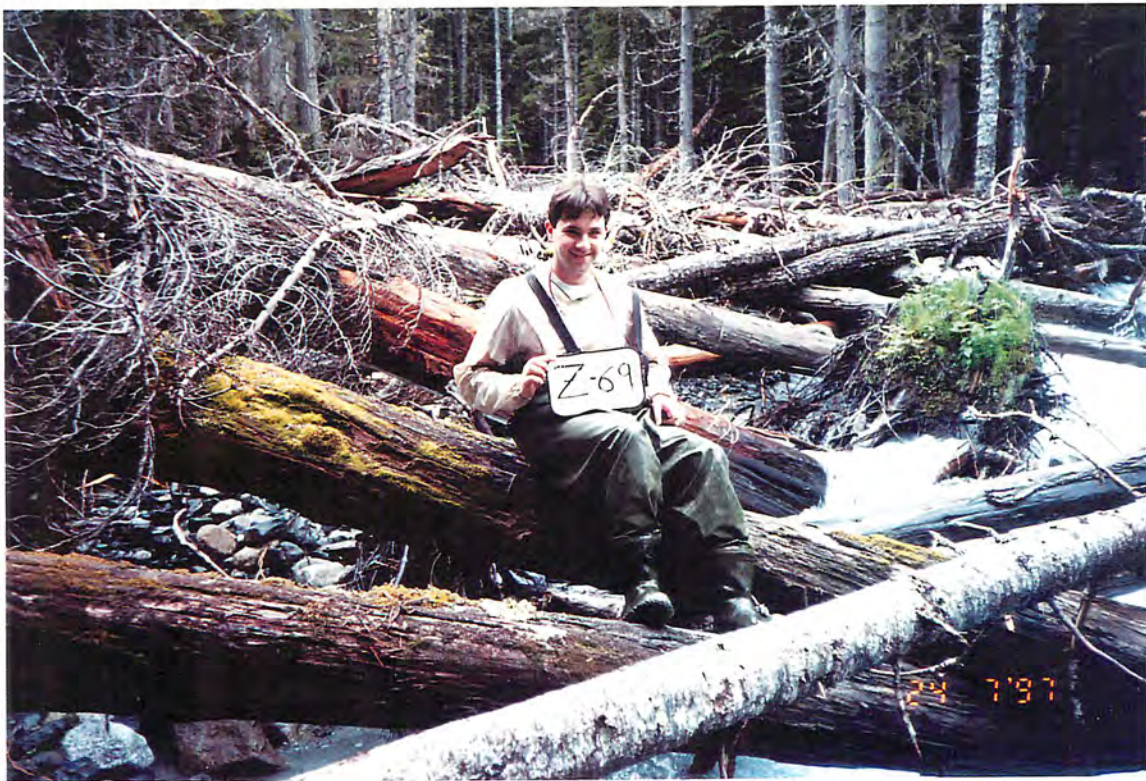


Photo #: Z-9-5, 24-Jul-97

Site #: Z69, Looking downstream at the channel, note the rafted woody debris



Photo #: Z-9-6, 24-Jul-97

Site #: Z69, Looking upstream at the channel, note the large falls



Photo #: Z-9-7, 24-Jul-97

Site #: Z69, Looking downstream at a blown out channel



Photo #: Z-9-13, 24-Jul-97

Site #: Z71, Looking upstream at a canyon and a series barriers



Photo #: Z-9-14, 24-Jul-97

Site #: Z71, Looking downstream at a canyon and a falls barrier



Location: Z72, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 025-5900-000-000-000-000-000-000-000-000

Map #: 93 L 062

Reach Length (km): 0.6 MW

Date: 24-Jul-97

Time: 16:20

Agency: TEC

Access: H

Fish Card: N

Field Historical

U.T.M.: 9_584859.6060926

Length surveyed (m): 150.0 GE

Survey Crew: JP\KG \ \ \ \ \ \ \ \

Photos: Z-9-15,16,17

Air Photos:

Channel Characteristics

Av. Chan. Width (m): 2.1 MS
 Av. Wet. Width (m): 2.1 MS
 C1 Av. Max Riffle Depth (cm): 0 MS
 Av. Max Pool Depth (cm): 30 MS
 Gradient (%): 3.0 CL
 Pool: 10 Riffle: 0 Run: 90 Other: 0
 % Side Channel: 0 GE
 % Debris Area: >15 GE
 %Stable: 25 GE

Specific Data

1.6	1.6	1.7	1.8	3.3	2.9
1.8	1.9	1.8	1.9	2.5	2.8
30	30	31			

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	DV	1	55	J	R			EL

Comments

- C1: S3. No riffles were noted in the sampling area.
- C2: LS=0%, RS=0%
- C3: No fisheries sensitive information
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 300V was 291 seconds over 100 meters.
- C5: No additional bank texture information.
- C6: DO was not measured at this site, the water was clear to bottom. The mean air temperature on this day was 11.9 C.
- C7: This small stream provides some rearing cover in the form of undercut banks, small pools and overstream vegetation.

Cover

Cover Total %: 30 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
10	35	0	0	20	35

Crown Closure %: 10 Aspect: N

Bed Material

Fines	Clay, silt, sand (<2mm)	90	90
Gravels	Small (2-16mm):	10	10
	Large (16-64mm):		0
Larges	Sm. cobble (64-128mm):		0
	Lge cobble (128-256mm):	0	0
Bedrock	Blder cobble (>256mm):		0
		0	0

D90 (cm): 1 Compaction: Medium

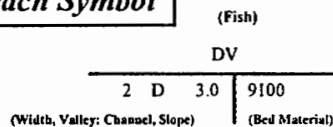
Discharge

Wetted Width (m): 1.6 MS
 Mean Depth (m): 0.3 MS
 Mean Velocity (m/s): 0.12 F
 Discharge (m3/s): 0.04 F

Banks

Height (m): 0.3
 % Unstable: 5
 Fines Gravels Larges Bedrock

Reach Symbol



Confinement: UC
 Valley: Channel Ratio 10+
 Stage: M Flood Signs H(m): 0.5
 Bars (%): 0 pH: 7.7 Braided: N
 Water Temp. (°C): 11.0 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 20



Photo #: Z-9-15, 24-Jul-97
Site #: Z72, Measuring fish with the meterstick



Photo #: Z-9-16, 24-Jul-97
Site #: Z72, Looking upstream at the channel



Photo #: Z-9-17, 24-Jul-97

Site #: Z72, Looking downstream at the channel



Location: Z74, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 026-3500-000-000-000-000-000-000-000-

Map #: 93 L 062 Reach Length (km): 3.4 MW Date: 25-Jul-97 Time: 9:10 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9.5815 .60566 Length surveyed (m): 300.0 GE Survey Crew: JPKG \ \ \ \ \ \ \ \ \ \ Photos: Z-9-20,21 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 25.2 GE
 Av. Wet. Width (m): 7.2 GE
 C1 Av. Max Riffle Depth (cm): 0 GE
 Av. Max Pool Depth (cm): 33 GE
 Gradient (%): 14.0 CL
 Pool: 30 Riffle: 20 Run: 20 Other: 30
 % Side Channel: 10-40 GE
 % Debris Area: 0-5 GE
 % Stable: 0 GE

Specific Data

22.0	25.0	27.0	26.0	25.0	26.0
7.0	8.0	10.0	7.0	6.0	5.0
30	50	20			

Obstructions

C	Height (m)	Type	Location
	20	F	0.6

Bed Material

	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	20	5
	Large (16-64mm):		15
Larges	Sm. cobble (64-128mm):		10
	Lge cobble (128-256mm):	70	20
	Blder cobble (>256mm):		40
Bedrock		0	0

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				NA

Comments

- C1: S5. Riffle depth measurements were not taken. Discharge measurements were not taken.
- C2: LS=16%, RS=16%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 500V, was 309 seconds over 200 meters.
- C5: No additional bank texture information.
- C6: DO was not measured at this site. The air temperature at this site was 8 C.
- C7: This channel has blown out, ripping new banks and reducing bank stability. The flow type is dominated by cascades. This reach is located above a 20m falls. The wading conditions were dangerous at this site, so most measurements were ground estimates.

Cover

Cover Total %: 50 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
20	0	75	0	5	0

Crown Closure %: 0 Aspect: N

D90 (cm): 213 Compaction: High

Discharge

C1 Wetted Width (m): 0.0 GE
 C1 Mean Depth (m): 0.0 GE
 C1 Mean Velocity (m/s): 0.00 F
 C1 Discharge (m3/s): 0.00 F

Banks

Height (m): 4.0
 % Unstable: 100
 Fines Gravels Larges Bedrock
 Confinement: UC
 Valley: Channel Ratio 10+
 Stage: L Flood Signs Ht(m):
 Bars (%): 25 pH: Braided: Y
 Water Temp. (°C): 02 (ppm):
 Turb. (cm): Cond. (µmhos):

Reach Symbol

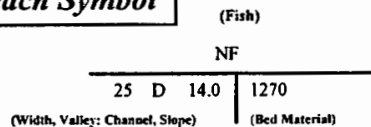




Photo #: Z-9-20, 25-Jul-97

Site #: Z74, Looking downstream at the channel, note the highly turbid water



Photo #: Z-9-21, 25-Jul-97

Site #: Z74, Looking upstream at the channel, note the fast flowing turbid water

Location: Z75, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 025-6300-000-000-000-000-000-000-000-000-

Map #: 93 L 062 Reach Length (km): 0.1 MW Date: 25-Jul-97 Time: 10:39 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 5830 60607 Length surveyed (m): 100.0 GE Survey Crew: DD\KG\ \ \ \ \ \ \ \ \ \ \ Photos: Z-9-22,23,24 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 1.8 MS
 Av. Wet. Width (m): 1.6 MS
 CI Av. Max Riffle Depth (cm): 0 MS
 Av. Max Pool Depth (cm): 35 MS
 Gradient (%): 0.5 CL
 Pool: 10 Riffle: 0 Run: 90 Other: 0
 % Side Channel: 0 GE
 % Debris Area: >15 GE
 %Stable: 50 GE

Specific Data

2.2	1.6	1.5	1.2	2.1	2.4
2.0	1.2	1.4	1.2	1.6	2.2
26	48	32			

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	BT	1		J	R			EL

Comments

- C1: S3. No riffles were noted at this site.
- C2: LS=0%, RS=0%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 400V, was 327 seconds over 125 meters.
- C5: No additional bank texture information.
- C6: DO was not measured at this site, the water was clear to bottom. The air temperature at this site was 14 C.
- C7: The stream flows into a lake, at which point the channel disappears roughly 150m in from the lake. An aerial reconnaissance showed that the channel is quite dry upstream and has undergone some blowout.

Cover

Cover Total %: 30 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
10	20	0	0	50	20

 Crown Closure %: 30 Aspect: NE

Bed Material

Fines	Clay, silt, sand (<2mm):	100	100
Gravels	Small (2-16mm):	0	0
	Large (16-64mm):		0
Larges	Sm. cobble (64-128mm):		0
	Lge cobble (128-256mm):	0	0
	Blder cobble (>256mm):		0
Bedrock		0	0

D90 (cm): 0 Compaction: Low

Discharge

Wetted Width (m): 1.1 MS
 Mean Depth (m): 0.5 MS
 Mean Velocity (m/s): 0.04 F
 Discharge (m3/s): 0.02

Banks

Height (m): 0.1
 % Unstable: 0
 Fines Gravels Larges Bedrock
 Confinement: UC
 Valley: Channel Ratio 10+
 Stage: M Flood Signs H1(m): 30
 Bars (%): 0 pH: Braided: N
 Water Temp. (°C): 5.0 O2 (ppm):
 Turb. (cm): Cond. (µmhos):

Reach Symbol

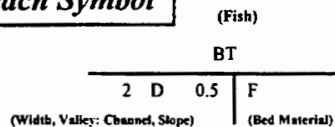


Photo #: Z-9-23, 25-Jul-97
Site #: Z75, Looking upstream at the channel



Photo #: Z-9-22, 25-Jul-97
Site #: Z75, Looking downstream at the channel





Photo #: Z-9-24, 25-Jul-97
Site #: Z75, Measuring fish on the fishboard

Location: Z76, Unit 11

Stream (Gaz.): Unnamed

Watershed Code: 033-6400-000-000-000-000-000-000-000-000

Map #: 93 L 062 Reach Length (km): 5.7 MW Date: 25-Jul-97 Time: 11:25 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9_587164.6060115 Length surveyed (m): 400.0 GE Survey Crew: DD KG \ \ \ \ \ \ \ \ \ \ Photos: Z-10-1,2,3,4,5,6 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 26.6 MS
 Av. Wet. Width (m): 7.3 MS
 Av. Max Riffle Depth (cm): 25 MS
 Av. Max Pool Depth (cm): 42 MS
 Gradient (%): 5.0 CL
 Pool: 15 Riffle: 45 Run: 30 Other: 10
 % Side Channel: >40 GE
 % Debris Area: >15 GE
 % Stable: 10 GE

Specific Data

26.6	16.0	41.6	36.0	18.3	21.1
8.3	5.2	7.2	7.4	6.2	9.3
34	18	24			
40	54	33			

Obstructions

C	Height (m)	Type	Location
	7	F	1.8
	4	C	2.7

Bed Material

Fines	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):	20	5
	Large (16-64mm):		15
Larges	Sm. cobble (64-128mm):		10
	Lge cobble (128-256mm):	70	25
	Blder cobble (>256mm):		35
Bedrock		0	0

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	DV	2	90	J	R			EL

Comments

- C1: S1.
- C2: LS=38%, RS=9%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 500V was 693 seconds over 300 meters.
- C5: No additional bank texture information.
- C6: DO was not measured at this site, the water was clear to bottom. The air temperature at this site was 9 C.
- C7: This channel has blown out and appears to have ripped new banks in some areas. The fish were caught in the small pools and cobble/boulder habitat.
- C8: An American dipper was noted at the site.

Cover

Cover Total %: 35 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
15	10	70	0	0	5

 Crown Closure %: 1 Aspect: W

Discharge

Wetted Width (m): 4.6 HC
 Mean Depth (m): 0.2 MS
 Mean Velocity (m/s): 0.99 F
 Discharge (m3/s): 0.68 F

Reach Symbol

(Fish)
 DV

27	B	5.0	1270
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 (Width, Valley: Channel, Slope) (Bed Material)

Banks

Height (m): 1.0
 % Unstable: 90
 Fines Gravels Larges Bedrock
 Confinement: CO
 Valley: Channel Ratio: 2-5
 Stage: L Flood Signs Ht(m): 2
 Bars (%): 90 pH: Braided: Y
 Water Temp. (°C): 6.5 O2 (ppm):
 Turb. (cm): Cond. (µmhos):



Photo #: Z-10-1, 25-Jul-97
Site #: Z76, Looking downstream at the channel



Photo #: Z-10-2, 25-Jul-97
Site #: Z76, Looking upstream at the channel



Photo #: Z-10-3, 25-Jul-97
Site #: Z76, Measuring fish with the meterstick



Photo #: Z-10-4, 25-Jul-97
Site #: Z76, Looking upstream falls barriers



Photo #: Z-10-5, 25-Jul-97
Site #: Z76, Looking upstream falls barriers



Photo #: Z-10-6, 25-Jul-97
Site #: Z76, Looking upstream falls barriers



Location: E146, Unit 11, East of Serb Creek.

Stream (Gaz.): Unnamed

Watershed Code: 033-5700-000-000-000-000-000-000-000-

Map #: 93 L 073 Reach Length (km): 2.2 MA Date: 07-Aug-97 Time: 9:00 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 5919 60628 Length surveyed (m): 100.0 GE Survey Crew: SJ\EM\ \ \ \ \ \ \ \ Photos: E-14-4,5,6,7 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 3.3 MS
 Av. Wet. Width (m): 3.1 MS
 Av. Max Riffle Depth (cm): 8 MS
 Av. Max Pool Depth (cm): 39 MS
 Gradient (%): 2.0 CL
 Pool: 20 Riffle: 20 Run: 60 Other: 0
 % Side Channel: 0-10 GE
 % Debris Area: 5-15 GE
 % Stable: 40 GE

Specific Data

5.0	3.3	2.8	2.6	2.9	3.0
5.0	3.1	2.4	2.1	2.5	3.3
11	8	7	9	7	
30	40	33	45	37	50

Obstructions

Bed Material

Fines	Clay, silt, sand (<2mm):	30	30
Gravels	Small (2-16mm):	50	25
	Large (16-64mm):		25
Larges	Sm. cobble (64-128mm):		10
	Lge cobble (128-256mm):	20	10
	Blder cobble (>256mm):		0
Bedrock		0	0

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	DV	2	80-90	J	R			EL
	CT	2	50	J	R			EL

Comments

- C1: S3
- C2: LS = 5%, RS = 12%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model, set at 1-5-400V, was 400 seconds over 100 meters.
- C5: No additional bank texture information.
- C6: DO was not measured, the water was clear to the bottom. The mean air temperature on this day was 13.8C
- C7: L.O.D. cutbank and instream vegetation cover is abundant in the sampling area. Excellent rearing and some spawning habitat was observed at this site.

Cover

Cover Total %: 20 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
20	35	0	0	10	35

Crown Closure %: 35 Aspect: NW

D90 (cm): 15 Compaction: Medium

Discharge

Wetted Width (m): 1.5 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.71 F
 Discharge (m3/s): 0.08 F

Banks

Height (m): 0.3
 % Unstable: 0
 Fines Gravels Larges Bedrock
 Confinement: UC
 Valley : Channel Ratio 10+
 Stage: M Flood Signs Ht(m): 0.5
 Bars (%): 15 pH: 7.0 Braided: N
 Water Temp. (°C): 7.5 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 50

Reach Symbol

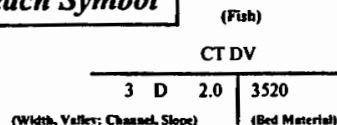




Photo #: E-14-4, 07-Aug-97
Site #: E146, Measuring fish on the fish board

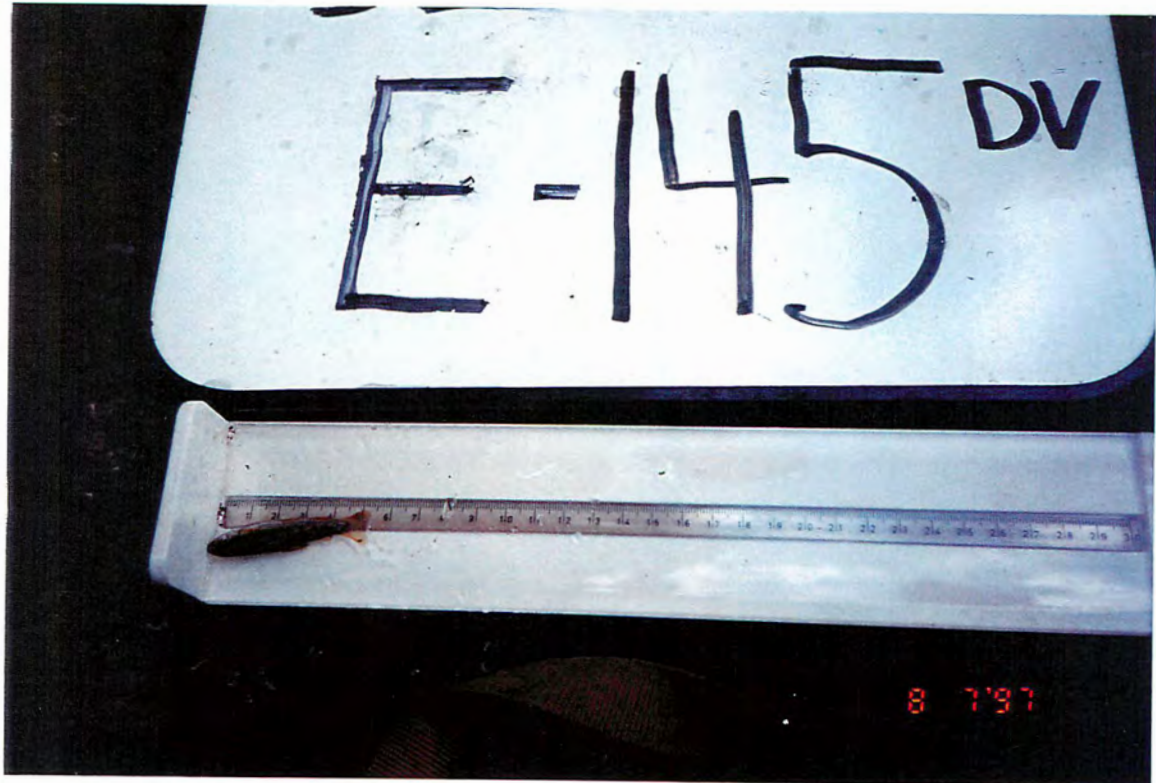


Photo #: E-14-5, 07-Aug-97
Site #: E146, Measuring fish on the fish board



Photo #: E-14-6, 07-Aug-97
Site #: E146, Looking upstream at the channel



Photo #: E-14-7, 07-Aug-97
Site #: E146, Looking downstream at the channel, note LOD cover

Location: E147, Unit 11, East of Serb Creek

Stream (Gaz.): Unnamed

Watershed Code: 030-5300-000-000-000-000-000-000-000-

Map #: 93 L 073 Reach Length (km): 0.7 MA Date: 07-Aug-97 Time: 9:30 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9.5921 .60628 Length surveyed (m): 100.0 GE Survey Crew: SJ\EM\ \ \ \ \ \ \ \ Photos: E-14-8,9,10 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 2.4 MS
 Av. Wet. Width (m): 2.8 MS
 Av. Max Riffle Depth (cm): 7 MS
 Av. Max Pool Depth (cm): 42 MS
 Gradient (%): 5.0 CL
 Pool: 20 Riffle: 30 Run: 40 Other: 10
 % Side Channel: 0-10 GE
 % Debris Area: >15 GE
 % Stable: 40 GE

Specific Data

1.5	2.8	3.0	2.5	2.6	2.2
1.6	3.4	2.9	3.0	2.9	2.7
7	6	5	8	7	
33	40	50	42	45	

Obstructions

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	DV	1	70	J	R			EL
	CT	4	70-120	J	R			EL

Comments

- C1: S3
- C2: LS = 20%, RS = 10%
- C3: No fisheries sensitive zones noted at this site.
- C4: The electroshocking effort, using a Smithroot 12 B POW model set at I-5-400V, was 434 seconds over 100 meters.
- C5: No additional bank texture information.
- C6: DO was not measured, the water was clear to the bottom. The mean air temperature on this day was 13.8.C.
- C7: Spawning and rearing habitat is present at this site. LOD and cutbank cover are abundant.

Cover

Cover Total %: 20 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctnk
20	30	0	0	10	40

Crown Closure %: 35 Aspect: W

Bed Material

	Clay, silt, sand (<2mm):	50	50
Gravels	Small (2-16mm):	30	15
	Large (16-64mm):		15
Larges	Sm. cobble (64-128mm):		15
	Lge cobble (128-256mm):	20	5
	Blder cobble (>256mm):		0
Bedrock		0	0

D90 (cm): 8 Compaction: Medium

Discharge

Wetted Width (m): 1.9 MS
 Mean Depth (m): 0.1 MS
 Mean Velocity (m/s): 0.32 F
 Discharge (m3/s): 0.05 F

Banks

Height (m): 0.3
 % Unstable: 5

Fines Gravels Larges Bedrock

Confinement: UC
 Valley: Channel Ratio 10+
 Stage: M Flood Signs Ht(m): 0.4
 Bars (%): 15 pH: 7.1 Braided: N
 Water Temp. (°C): 8.0 O2 (ppm):
 Turb. (cm): Cond. (µmhos): 50

Reach Symbol

(Fish)

DV CT

2	D	5.0	5320
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(Width, Valley: Channel, Slope) (Bed Material)



Photo #: E-14-8, 07-Aug-97
Site #: E147, Looking upstream at the channel



Photo #: E-14-9, 07-Aug-97
Site #: E147, Looking downstream at the channel



Photo #: E-14-10, 07-Aug-97
Site #: E147, Measuring fish on the fish board



Location: E191, Unit 11, Serb Cr. watershed.

Stream (Gaz.): Unnamed

Watershed Code: 025-9700-000-000-000-000-000-000-000-

Map #: 93 L 062 Reach Length (km): 2.1 MA Date: 13-Aug-97 Time: 16:10 Agency: TEC Access: H Fish Card: N Field Historical
 U.T.M.: 9 5791 60591 Length surveyed (m): 100.0 GE Survey Crew: SJ\EM\ \ \ \ \ \ Photos: E-18-24,25 Air Photos:

Channel Characteristics

Av. Chan. Width (m): 24.3 HC
 Av. Wet. Width (m): 10.3 HC
 Av. Max Riffle Depth (cm): 19 MS
 Av. Max Pool Depth (cm): 68 MS
 Gradient (%): 3.0 CL
 Pool: 5 Riffle: 60 Run: 35 Other: 0
 % Side Channel: 10-40 GE
 % Debris Area: 0-5 GE
 % Stable: 0 GE

Specific Data

36.0	29.4	26.0	14.6	18.7	21.0
11.1	13.0	8.6	8.5	9.9	10.6
11	21	17	18	27	19
90	64	69	72	49	65

Obstructions

C	Height (m)	Type	Location
	8	C	2.6

Bed Material

	Fines	Clay, silt, sand (<2mm):	10	10
Gravels	Small (2-16mm):		40	15
	Large (16-64mm):			20
	Sm. cobble (64-128mm):			20
Larges	Lge cobble (128-256mm):		50	25
	Blder cobble (>256mm):			10
Bedrock			0	0

Fish Summary

C	Species	Number	Size Range (mm)	Life Phase	Use 1	Use 2	Use 3	Method
	NF			NA				EL

Comments

- C1: S1
- C2: LS = 8%, RS = 30%
- C3: No fisheries sensitive zones noted.
- C4: The electroshocking effort, using a Smithroot 12 B POW model, set at 1-5-400V, was 360 seconds over 100 meters. The high speed and turbidity of the water at this site made electroshocking difficult.
- C5: Gravels and larges make up the bank texture at this site.
- C6: DO was not measured, the mean air temperature on this day was 21.0 C.
- C7: Extensive braiding demonstrates channel instability in this reach, which contains numerous mid channel bars, some with, others without vegetation. Cover is provided by LOD, scour pools, sidechannels and cutbanks.

Cover

Cover Total %: 10 GE

Pool	LOD	Bldr	In Veg	O Veg	Ctbnk
30	15	45	0	0	10

 Crown Closure %: 0 Aspect: NE

Discharge

Wetted Width (m): 9.0 HC
 Mean Depth (m): 0.3 MS
 Mean Velocity (m/s): 1.12 F
 Discharge (m³/s): 2.27 F

Reach Symbol

(Fish)
 (DV) (BT)
 24 D 3.0 | 1450
 (Width, Valley: Channel, Slope) | (Bed Material)

Banks

Height (m): 0.2
 % Unstable: 40
 Fines Gravels Larges Bedrock
 Confinement: UC
 Valley: Channel Ratio 10+
 Stage: M Flood Signs Ht(m): 0.7
 Bars (%): 60 pH: 7.1 Braided: Y
 Water Temp. (°C): 8.0 O2 (ppm):
 Turb. (cm): 3 Cond. (µmhos): 10



Photo #: E-18-24, 13-Aug-97
Site #: E191, Looking upstream at the channel



Photo #: E-18-25, 13-Aug-97
Site #: E191, Looking downstream at the channel

