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 TSAWorking Unit #11 – Zymoetz(Volume 1)Zymotez RZYMO440-00000ZYMOETZ RIVERPacific Inland ResourcesSmithers, BCTriton Environmental Consultants LtdRichmond, BC1998



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

(Working Unit #11 - Zymoetz)

Prepared for:

PO Box 3130 Smithers, BC VOJ 2N0

April 1998

Prepared by:



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)

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- pink (O. gorbuscha)
- steelhead and rainbow trout (O. mykiss)
- mountain whitefish (*Prosopium williamsoni*)
- peamouth chub (Mylocheilus caurinus)
- longnose sucker (*Catastomus catastomus*)
- 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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ACKNOWLEDGMENTS

Triton Environmental Consultants Ltd.'s project team for this inventory project included:

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Triton would like to thank Mr. Alan Baxter of Pacific Inland Resources for his assistance throughout the planning and field phases of this project. The principal contract monitor was Mr. Paul Giroux, B.C. Ministry of Environment, Lands and Parks. Smithers office. The quality assurance was conducted by Mr. Ward Prystay and Mr. Ryan Sherman. Triton would also like to thank Mr. Dave Reynard and Mr. Steve Grey of Highland Helicopters. This project was funded by Forest Renewal B.C. The province has not accepted the contents of this product for the purposes of the Forest Practices Code, and reserves the right to dispute the validity of summarized results. The province does not necessarily agree with the classification assigned to any individual stream reach, for use in logging plans, silviculture prescriptions or any other application.

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

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Logging is the dominant resource activity in this working unit and a number of forest recreation sites are found off of the McDonell 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 1 and cutthroat trout were caught by electrofishing in reach 3 and in one tributaries to reach one, one tributary to reach 2, two tributaries to reach 3 and in one 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.

DFO/MoELP Stream Survey Form	Site Number: E96	Reach No.: 3
	Coal Cr.	TRITON Environmental Consultants Ltd.
Location: E96, Unit 11, 600m SW of Louise Lake.	Stream (Gaz.): Coal Creek	Watershed Code: 440-7411-000-000-000-000-000-000-000-000-000-
Map #: 93 L 082 Reach L U.T.M.: 9 .5845 .60791 Length s	ength (km): 2.5 MA Date: 22-Jul-97 Tin urveyed (m): 200.0 AE Survey Crew: JL \EM	e: 9:30 Agency: TEC Access: H Fish Card: N Field Historical [
Channel Characteristics Av. Chan. Width (m):	Specific Data	Obstructions
Av. Wet. Width (m): 1.2 MS Av. Max Riffle Depth (cm): 5 MS Av. Max Pool Depth (cm): 43 MS	2.0 1.7 1.0 1.1 0.5 1.2 5 7 4 5 5 40 50 60 39 24	
Gradient (%): 1.0 CL Pool: 10 Riffle: 10 Run: 80 Other: 0 % Side Channel: 10-40 GE	Bed Material Fines Clay, silt, sand (<2mm):	Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method
% Debris Area: 5-15 GE %Stable: 0 GE	Gravels Small (2-16mm): 10 3 Large (16-64mm): 7 7 Sm. cobble (64-128mm): 0	Comments
Cover Cover Total % : 20 GE Pool LOD Bidr In Veg O Veg 30 0 0	Larges Lge cobble (128-256mm): 0 0 Bider cobble (>256mm): 0 0	C1: S4 C2: LS = 1%, RS = 1%
Crown Closure %: 0 Aspect: W	D90 (cm): 0 Compaction: Medium	C3 No fisheries sensitive zones noted.
Discharge	Banks Height (m): 0.2 % Unstable: 0	 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
Wetted Width (m) : I.0 MS Mean Depth (m) : 0.1 MS Mean Velocity (m/s) : 0.38 F	Fines Gravels Larges Bedrock	C6 D0 was not measured, the water was clear to the bottom. The mean air temperature on this day was 13.8.C.
Discharge (m3/s) : 0.05 F	Valley : Channel Ratio [10+] Stage: [H] Flood Signs Ht(m): [0.7]	banks. Good rearing habitat noted at this site.
Keach Symbol (Fish)	Bars (%): 0 pH: 8.5 Braided: Y	
	Water Temp. (°C): 8.5 02 (ppm):	



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

DFO/MoELP Stream Survey Form	Site Number: KARLA 36 Coal Cr.	Reach No.: 1 TIDITON Environmental Consultants Ltd.
Location: KARLA 36, Unit 11, mainstem site, see C5. Map #: 93 L 082 I T.M. 9 (9 580) 60753	Stream (Gaz.): Coal Creek	Watershed Code: 440-7411-000-000-000-000-000-000-000-000-000-
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 Riffle Depth (cm): 28 MS Gradient (%): 6.0 CL Pool: 20 Riffle: 40 Webris Area: 5-15 GE % Stable: 40 GE Cover Cover Total %: 35 Ge 15 30 5 Cown Closure %: 10 Aspect: E	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 Bed Material Fines Clay, silt, sand (<2mm):	Obstructions C Height (m) Type Location Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method RB 2 90-112 J R EL EL Comments C1 S2 C2 LS = 10%, RS = 24% S No fisheries sensitive zones were noted at this site. C4 The electrochecking effort using a Smithreet 15 A model was 190 seconds over 177 router meters Shocking
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 Discharge (m3/s) : 0.51 F Reach Symbol (Fish) RB 7 B 6.0 1351 (Width, Valley: Channel, Slope) (Bed Material) (Bed Material)	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 02 (ppm): Turb. (cm): 37	 And cloudshocking enough using a similation is requestive was too seconds over 177 square interest. Sildeking was limited at this site because the shocker was frequently cutting out. A large puncture was noted in the fuel line. C3 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.

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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.

DFO/MoELP Stream Survey Form	Site Number: Z138	Reach No.: 1
	Trib to Coal	Cr. TRITON Environmental Consultants Ltd.
Location: Z138, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 039-0300-000-000-000-000-000-000-000-000
Map #: 93 L 082 Reach Le U.T.M. : 9 .579877.6075884 Length su	ngth (km): [1.5] [MA] Date: [13-Aug-97] Tim nrveyed (m): [100.0] [GE] Survey Crew: JP \KG	ne: 12:56 Agency: TEC Access: H Fish Card: N Field Historical Access: E Field Photos: Z-18-7,8,9,10 Air Photos:
Channel Characteristics	Specific Data	Obstructions
Av. Chain. Within (in): 1.3 MS Av. Wet. Width (m): 1.3 MS Av. Max Riffle Depth (cm): 7 MS Av. Max Riffle Depth (cm): 32 MS Gradient (%): 9.0 CL Pool: 33 Riffle: 15 Wetted Channel: 10-40 GE % Stable: 60 GE % Obbris Area: 5-15 GE % Stable: 60 GE Cover Cover Tutal %: 45 Gradient (%): 20 5 25 Pool LOD Bldr In Veg O Veg Ctbnk 15 20 20 5 25 Crown Closure %: 55 Aspect: S Discharge Wetted Width (m): 0.0 MS Mean Depth (m): 0.62 F Discharge (m3/s): 0.19 F Reach Symbol (Fish) CT DV 2 C 9.0 1450	1.4 1.4 2.0 1.8 2.0 1.7 1.5 1.2 1.6 0.9 1.5 1.2 5 4 8 12 41 51 20 18 Bed Material IO Gravels Small (2-16mm): IO Gravels Large (16-64mm): IS Sm. cobble (64-128mm): IS Bider cobble (128-256mm): IS Bedrock 0 D90 (cm): 30 Compaction: Medium Bedrock Distage: Fines Gravels Larges Bedrock Confinement: 0C Valley : Channel Ratio 5-10 5 Stage: M Flood Signs Ht(m): 0.5 Bars (%): 40 pHi : 6.9 Braided: Y Water Temp. (°C): 15.0 <td< th=""><th>Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method DV 2 45-100 J R EL EL CT 4 95-110 J R EL EL Comments Cli S3 C2 LS-26%, RS=25% C3 No fisheries sensitive zones noted. C4 CH Comments C2 Call S-26%, RS=25% C3 No fisheries sensitive zones noted. C4 CH Comments Call S-26%, RS=25% C3 Call S-26%, RS=25% C3 Call S-26%, RS=25% C3 No additional bank texture information. C4 C2 C3 C3 Do was not measu</th></td<>	Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method DV 2 45-100 J R EL EL CT 4 95-110 J R EL EL Comments Cli S3 C2 LS-26%, RS=25% C3 No fisheries sensitive zones noted. C4 CH Comments C2 Call S-26%, RS=25% C3 No fisheries sensitive zones noted. C4 CH Comments Call S-26%, RS=25% C3 Call S-26%, RS=25% C3 Call S-26%, RS=25% C3 No additional bank texture information. C4 C2 C3 C3 Do was not measu



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

DFO/MoELP Stream Survey Form	Site Number: Z139 Trib to Coal	Cr. TRITON Environmental Consultants Ltd.
Location: Z139, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 039-0200-000-000-000-000-000-000-000-000-0
Map #: 93 L 082 Reach I U.T.M. : 9 .579628.6075693 Length	ength (km): 3.0 MA Date: 13-Aug-97 Time surveyed (m): 100.0 GE Survey Crew: JP \KG	ne: 13:56 Agency: TEC Access: H Fish Card: N Field Historical A A A A A A A A A A A A A A A A A A A
Av. Chan. Width (m): 2.7 MS Av. Wet. Width (m): 3.6 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 % Side Channel: 0-10 GE % Side Channel: 010 GE % Stable: 60 GE Cover Cover Total %: 45 GE Pool LOD Bldr In Veg Veg Cthnk 25 30 0 0 30 15 Crown Closure %: 60 Aspect : E Discharge 60 Aspect : E E	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 Bed Material Fines Clay, silt, sand (<2mm):	C Height (m) Type Location 0 C 0.6 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 Ci S3 Ci S3 Ci S3 Ci LS=1%, RS=1% Ci Ci No fisheries sensitive zones noted. Ci The electroshocking effort, using a Smithroot 12 B POW model set at 1, 5, 500V, was 258 seconds over 100 meters.
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 (Fish) CT DV 3 D 6.0 2440 (Width, Valley: Channed, Skope) (Bed Material)	Fines Gravels Larges Bedrock Confinement: UC Valley : Channel Ratio 10+ Stage: M Flood Signs Ht(m): Bars (%): 25 pH: 7.0 Water Temp. (°C): 02 (ppm): 10 Turb. (cm): Cond. (µmhos): 90	 No additional bank texture information. 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. This is great rearing and spawning habitat; some nice deep pools and LOD cover.

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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

DFO/MoELP Stream Survey Form	Site Number: Z140 Trib to Coal	Cr. TRITON Environmental Consultants Ltd.
Location: Z140, Unit 11 Map #: 93 L 082 Reach Length (km): U.T.M. : 9.578742.6073241 Length surveyed (m):	Stream (Gaz.): Unnamed 1.0 MA Date: 13-Aug-97 Time 200.0 GE Survey Crew: JP \KG \	Watershed Code: 032-4100-000-000-000-000-000-000-000-000-00
Channel Characteristics Av. Chan. Width (m): 2.0 MS 2.1 Av. Wet. Width (m): 2.1 MS 2.1 Av. Wet. Width (m): 2.1 MS 2.1 N Av. Max Riffle Depth (cm): 0 MS 35 Gradient (%): 1.0 CL 0 MS Pool: 0 Riffle: 0 Run: 100 Other: 0 % Side Channel: 0 GE Gravel % Stable: 10 GE Gravel % Debris Area: >15 GE Gravel % Stable: 10 GE Larges Pool LOD Bldr In Veg O Veg Cbnk S 15 0 20 30 30 GC7 D90 (cm Discharge N Mean Depth (m): Image: Fines Stage: Stage: Stage: Stage: N Mean Depth (m): (Fish) Image: Stage: Bars (% Mean Velocity (m/s): (Fish) Image: Stage: Bars (%	Specific Data 2.2 2.4 2.0 1.4 2.1 2.7 2.4 1.7 1.4 2.2 28 28 aterial Clay, silt, sand (<2mm):	Obstructions Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 3 Method C Species Number Size Range (mm) Life Phase Use 1 Use 3 Method Comments Cl S3. Riffles were not observed. C2 LS=0%, RS=0% C3 No fisheries sensitive zones noted. C4 Comments C3 No fisheries sensitive zones noted. C3 Comments. C3 No additional bank texture information. C6 C7 C1



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

DFO/MoELP Stream Survey Form	Site Number: E101 Trib. to Coal	Reach No.: 2 Cr. TRITON Environmental Consultants Ltd.
Location: E101, Unit 11, 1.8km North of Louise Lk. Map #: 93 L 082 Reach L U.T.M. : 9.5849 .60814 Length	Stream (Gaz.): Unnamed ength (km): 2.0 MA Date: 22-Jul-97 Tim nurveyed (m): 100.0 GE Survey Crew: JL \EM	Watershed Code: 039-5200-000-000-000-000-000-000-000-000-00
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 % Stable: 0 GE % Side Channel: 0 GE % Stable: 0 GE % Stable: 0 GE % Stable: 0 GE Pool LOD Bidr In Veg Veg Ctbnk 60 5 0 0 10 25 Crown Closure %: 15 Aspect: S Discharge	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 Bed Material Fines Clay, silt, sand (<2mm): 20 20 Gravels Small (2-16mm): 30 15 Large (16-64mm): 30 15 Large (16-64mm): 15 Sm. cobble (64-128mm): 20 Larges Lge cobble (128-256mm): 50 Bider cobble (>256mm): 15 Bider cobble (>256mm): 15 Bedrock 0 0 D90 (cm): 30 Compaction: Medium Montable: 10 10 Fines Gravels Larges Bedrock Valley : Channel Ratio 5-10 Stage: M Flood Signs Hf(m): 0.4 Bars (%): 0 pH: 8.2 Braided: N	Obstructions Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 3 Method C Species Number Size Range (mm) Life Phase Use 1 Use 3 Method C Species Number Size Range (mm) Life Phase Use 1 Use 3 Method C Species Nethod J R EL Comments C2 LS = 1%, RS = 4% C3 C3 No fisheries sensitive zones noted. C4 C4 The electroshocking effort, using a Smithroot 12 B POW model, set at 1-5-300V, was 256 seconds over 100 meters. C3 C6 No additional bank texture information. C0 C6 DO was not measured, the water was clear to the bottom. The mean air tem



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

DFO/MoELP Stream Survey Form	Site Number: E104 Trib. to Coal	Reach No.: 1 I Cr. TRITON Environmental Consultants Ltd.	
Location: E104, Unit 11, North of Coal Creek.	Stream (Gaz.): Unnamed	Watershed Code: 039-3000-000-000-000-000-000-000-000-000	
Map #: 93 L 082 Reach L U.T.M. : 9.5825 .60798 Length :	ength (km): [1.6] [MA] Date: [23-Jul-97] Tim urveyed (m): [200.0] [AE] Survey Crew: JL \EM	ne: [8:45] Agency: [TEC] Access: [H] Fish Card: [N] Field [A] Historical [A\\\\\\\ Air Photos: [E-10-8,9] Air Photos: [
Channel Characteristics Av. Chan. Width (m): 1.6 Av. Wet. Width (m): 1.5 MS Av. Wet. Width (m): 1.5 N Av. Max Riffle Depth (cm): 0 Gradient (%): 1.0 CL Pool: 0 Riffle: 0 Run: 100 Yolde Channel: 0-10 GE % Side Channel: 0-10 GE % Stable: 0 GE Vebris Area: 5-15 GE % Stable: 0 GE Pool LOD Bidr In Veg Veg Ctbnk 10 0 50 10 30 Crown Closure %: 0 Aspect: SW Discharge Wetted Width (m): 1.9 MS Mean Depth (m): 0.6 MS	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): 100 100 100 Gravels Small (2-16mm): 0 0 0 Gravels Small (2-16mm): 0 0 0 Large (16-64mm): 0 0 0 0 Large (16-64mm): 0 0 0 0 Larges Lge cobble (64-128mm): 0 0 0 Bider cobble (>256mm): 0 0 0 0 Bedrock 0 0 0 0 0 D90 (cm): 0 Compaction: Low 0 0 Fines Gravels Larges Bedrock 0 0 % Unstable: 0 0 0 0 0 0	Obstructions Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method Comments Ci S3 Ci LS = 1%, RS = 1% Ci Ci S3 Ci LS = 1%, RS = 1% Ci Ci S3 Ci LS = 1%, RS = 1% Ci Ci S3 Ci LS = 1%, RS = 1% Ci Ci S3 Ci Ci S3 Ci Ci S4 Method Ci <td co<="" td=""></td>	
Discharge (m3/s) : 0.06 F Reach Symbol (Fisb) (RB) (DV) 2 D 1.0 F (Width, Valky: Channel, Slope) (Bed Material)	Valley : Channel Ratio 10+ Stage: M Flood Signs H1(m):		



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

DFO/MoELP Stream Survey Form	Site Number: E105 Trib. to Coal	Reach No.: 2 Cr. TRITON Environmental Consultants Ltd.
Location: E105, Unit 11, North of Coal Creek. Map #: 93 L 082 Reach Lee U.T.M. : 9.5823 .60798 Length su	Stream (Gaz.): Unnamed ngth (km): 2.0 MA Date: 23-Jul-97 Tim rveyed (m): 100.0 GE Survey Crew: JL \EM	Watershed Code: 039-3200-000-000-000-000-000-000-000-000-00
Channel Characteristics Av. Chan. Width (m): 2.3 MS Av. Wet. Width (m): 2.3 MS Av. Wet. Width (m): 2.3 MS Av. Max Riffle Depth (cm): 0 MS Av. Max Pool Depth (cm): 0 MS Av. Max Pool Depth (cm): 66 MS Gradient (%): 1.0 CL Pool: 20 Riffle: 0 Wetted Channel: 0-10 GE V Debris Area: 0-55 GE V Stable: 0 GE Cover Cover Total %: 50 O 0 90 10 Cover Cover Total %: S Discharge Wetted Width (m): 0.5 Wetted Width (m): 0.5 MS Mean Depth (m): 0.13 F Discharge (m3/s): 0.02 F Reach Symbol (Fish) (RB) (DV) 2 1.0 F	Specific Data 2.4 3.0 2.4 3.0 2.4 0.8 2.2 2.4 2.8 3.2 2.3 0.9 78 47 50 87 Bed Material Fines Clay, silt, sand (<2mm): 100 100 Gravels Small (2-16mm): 0 0 Gravels Small (2-16mm): 0 0 0 Large (16-64mm): 0 0 0 Large (16-64mm): 0 0 0 Larges Lge cobble (128-256mm): 0 0 Bedrock 0 0 0 0 D90 (cm): 0 Compaction: Medium Bedrock 0 0 0 0 D90 (cm): 0 Compaction: Medium M Height (m): 0.1	Obstructions Fish Summary © Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method Comments Comments © S3 © LS = 1%, RS = 1% © This reach runs through a sedge meadow. © The electroshocking effort was not recorded at this site. © No additional bank texture information. © DO was not measured, the water was clear to the bottom. The mean air temperature on this day was 11.1.C. © Excellent instream vegeation cover was noted at this site. Cascades, roughly 20cm in height, make up 10% of the flow type at this site.



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

DFO/MoELP Stream Survey Form	Site Number: E106 Trib. to Coal	Reach No.: 1 I Cr. TRITON Environmental Consultants Ltd.
Location: E106, Unit 11, S of Coal Creek.	Stream (Gaz.): Unnamed	Watershed Code: 039-2000-000-000-000-000-000-000-000-000-0
Map #: 93 L 082 Reach L U.T.M. : 9 5822 .60772 Length :	ength (km): [1.2] [MA] Date: 23-Jul-97] Tim surveyed (m): [100.0] [GE] Survey Crew: JL \EM	ne: 10:45 Agency: TEC Access: H Fish Card: N Field Historical All All All All All All All All All A
Channel Characteristics Av. Chan. Width (m): 0.8 MS Av. Wet. Width (m): 0.6 MS Av. Max Riffle Depth (cm): 3 MS Av. Max Rool Depth (cm): 21 MS Av. Max Pool Depth (cm): 21 MS Av. Max Pool Depth (cm): 21 MS Av. Max Pool Depth (cm): 21 MS Gradient (%): 14.0 CL Pool: 20 Riffle: 5 % Side Channel: 0-10 GE % Stable: 0 GE % Stable: 0 GE Pool LOD Bidr In Veg O Veg Ctbnk 20 15 0 5 40 20 Crown Closure %: 15 Aspect : NW Discharge Wetted Width (m) : 0.13 F Discharge (m3/s) : 0.00 F (DV) 1 D 14.0 F (Wette, Valley: Channet, Stope) (Bed Material) (Bed Material)	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 Bed Material Fines Clay, silt, sand (<2mm): 100 100 Gravels Small (2-16mm): 0 0 Gravels Small (2-16mm): 0 0 Large (16-64mm): 0 0 Large (16-64mm): 0 0 Larges Lge cobble (64-128mm): 0 Larges Lge cobble (5-256mm): 0 0 Bedrock 0 0 0 0 D90 (cm): 0 Compaction: Low Banks Height (m): 0.1 % % Unstable: 0 0 0 Fines Gravels Larges Bedrock 0 Valley : Channel Ratio 10+ Stage: L Flood Signs Ht(m): 10+ Stage: <td>Obstructions Fish Summary C Species NF NA NF NA Comments Ci S4 Ci No fisheries sensitive zones noted. Ci No diditional bank texture information. Ci D0 was not measured, the water was clear to the bottom. The mean air temperature on this day was 11.1.C. Ci This creek flows through a wooded area, the substrate consists of fines and is covered in spongy mosses in some spots. This creek also has some subterreancan flow in some areas.</td>	Obstructions Fish Summary C Species NF NA NF NA Comments Ci S4 Ci No fisheries sensitive zones noted. Ci No diditional bank texture information. Ci D0 was not measured, the water was clear to the bottom. The mean air temperature on this day was 11.1.C. Ci This creek flows through a wooded area, the substrate consists of fines and is covered in spongy mosses in some spots. This creek also has some subterreancan flow in some areas.


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

DFO/MoELP Stream Survey Form	Site Number: E107 Trib. to Coal C	Reach No.: 1 Cr. TRITON Environmental Consultants Ltd.
Location: E107, Unit 11, North of Coal Cr. Map #: 93 L 082 Reach Le U.T.M. : 9.5820 .60780 Length su	Stream (Gaz.): Unnamed ngth (km): 1.7 MA Date: 23-Jul-97 urveyed (m): 100.0 GE Survey Crew:	Watershed Code: 039-2400-000-000-000-000-000-000-000-000-00
Channel Characteristics Av. Chan. Width (m): 0.5 MS Av. Wet. 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 Av. Max Pool Depth (cm): 15 MS Gradient (%): 6.0 Cl Pool: 20 Riffle: 30 Voide Channel: 0 GE 0 % Side Channel: 0 GE 0 % Side Channel: 0 GE 0 % Side Channel: 0 GE 0 % Stable: 0 GE 0 Cover Cover Total %: 15 GE Pool LOD Bldr In Veg O Veg Ctbnk 5 30 20 0 20 25 Crown Closure %: 40 Aspect : S Discharge 0.00 MS Mean Velocity (m/s) : 0.25 F Discharge (m3/s) : 0.00 </th <th>Specific Data 0.4 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 Bed Material Fines Clay, silt, sand (<2mm):</th> 20 20 Gravels Small (2-16mm): 40 20 Gravels Small (2-16mm): 40 20 Sm. cobble (64-128mm): 30 20 Sm. cobble (64-128mm): 30 Large (16-64mm): 30 Larges Lge cobble (128-256mm): 0 Bider cobble (>256mm): 0 0 Bedrock 0 0 D90 (cm): 17 :Compaction: Medium Banks Height (m): 0.2 % Unstable: 0 0 Fines Gravels Larges Bedrock Confinement: UC Valley : Channel Ratio 10+ Stage: H Flood Signs Ht(m): 0.4 Bars (%)	Specific Data 0.4 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 Bed Material Fines Clay, silt, sand (<2mm):	Distructions Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA NA EL EL Comments S4 EL S4 S5 S6 S6 <td< th=""></td<>



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

DFO/MoELP Stream Survey Form	Site Number: E108 Trib. to Coal	Reach No.: 2
Location: E108, Unit 11, East of Coal Creek. Map #: 93 L 082 Reach Lo U.T.M. : 9.5820 .60750 Length s	Stream (Gaz.): Unnamed :ngth (km): 2.0 MA Date: 23-Jul-97 Tim arveyed (m): 100.0 GE Survey Crew: EM UL	Watershed Code: 038-8500-000-000-000-000-000-000-000-000-0
Channel Characteristics Av. Chan. Width (m): Av. Wet. Width (m): 1.3 Av. Wet. Width (m): 1.4 Av. Max Riffle Depth (cm): 5 Av. Max Pool Depth (cm): 21 Av. Max Pool Depth (cm): 21 Av. Max Pool Depth (cm): 21 MS Av. Max Pool Depth (cm): 21 Gradient (%): 2.0 CL Pool: 20 Riffle: 20 Weide Channel: 0.10 GE % Side Channel: 0.5 GE % Side Channel: 0.5 GE % Stable: 0 GE Cover Cover Total %: 30 GE Pool LOD Bldr In Veg O Veg Ctbnk 10 20 10 0 30 30 Crown Closure %: 20 Aspect : W Discharge 0.14 F Discharge (m3/s) : 0.02 F Reach Symbol (Fish) DV 1 C 1360 <th>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 Bed Material Fines Clay, silt, sand (<2mm):</th> 10 10 Gravels Small (2-16mm): 30 15 Gravels Small (2-16mm): 30 15 Gravels Small (2-16mm): 25 Large (16-64mm): 15 Sm. cobble (64-128mm): 25 Larges Lge cobble (128-256mm): 60 25 Blder cobble (>256mm): 10 0 0 D90 (cm): 25 Compaction: Medium 10 Bedrock 0 0 0 0 D90 (cm): 25 Compaction: Medium 10 Bedrock 0 0 0 0 Yalley : Channel Ratio 5-10 510 510 Stage: H Flood Signs Ht(m): <td< th=""><th>Obstructions Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 3 Method DV 2 60-80 J R EL Comments Cl S4 Cl S4</th></td<>	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 Bed Material Fines Clay, silt, sand (<2mm):	Obstructions Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 3 Method DV 2 60-80 J R EL Comments Cl S4 Cl S4

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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

DPU/MOLLP Stream Survey Form	Site Number: E109 Trib. to Coal	Cr. TRITON
		Environmental Consultants Ltd.
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) U.T.M.: 9 .5793 .60748 Length surveyed (m)	: 2.2 MA Date: 23-Jul-97 Tim a): 100.0 GE Survey Crew: JL \EM	e: 14:40 Agency: TEC Access: H Fish Card: N Field Historical
Channel Characteristics	Specific Data	Obstructions
Av. Chan. Width (m): 3.3 MS 4.1 Av. Wet. Width (m): 3.3 MS 4.1 Av. Wet. Width (m): 3.3 MS 4.1 Av. Max Riffle Depth (cm): 0 MS 4.1 Av. Max Riffle Depth (cm): 0 MS 100 Gradient (%): 1.0 CL Image: Clock of the state of the sta	0 3.0 3.5 2.5 3.5 3.0 0 3.0 3.5 2.5 3.5 3.0 0 3.0 3.5 2.5 3.5 3.0 100 120 Material es Clay, silt, sand (<2mm):	Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA NA VO 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.
Discharge Discharge Wetted Width (m) : 2.0 Mean Depth (m) : 1.0 Mean Velocity (m/s) : 0.04 Discharge (m3/s) : 0.06 F Vall (DV) Wat (DV) Wat (DV) (Bed Material)	M.S. % Unstable: 0 es Gravels Larges Bedrock dinement: UC ley: Channel Ratio 10+ ley: H Flood Signs Ht(m):	 Wating. Ko additional bank texture information. DO was not measured, the water was clear to the bottom. The mean air temperature in this day was 11.1.C. 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.



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

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DFO/MoELP Stream Survey Form	Site Number: E110 Trib. to Coal	Reach No.: 5 Cr. TRITON
Location: E110, Unit 11, West of Coal Creek. Map #: 93 L 082 Reach Length (Stream (Gaz.): Unnamed (km): 0.5 MA Date: [23-Jul-97] Time:	Watershed Code: 038-8800-000-000-000-000-000-000-000-000
Channel Characteristics Av. Chan. Width (m): 1.8 MS Av. Wet. Width (m): 1.7 MS Av. Max Riffle Depth (cm): 0 MS Av. Max Riffle Depth (cm): 30 MS Av. Max Pool Depth (cm): 30 MS Av. Max Pool Depth (cm): 30 MS Av. Max Pool Depth (cm): 30 MS Gradient (%): 1.0 CL Pool: 10 Rum: 90 Viside Channel: 0 GE Viside Cover Cover Total %: 60 Gradient In Veg O Veg Ctbnk 0	Specific Data I.3 2.0 1.6 2.4 1.7 1.5 1.2 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 ed Material Fines Clay, silt, sand (<2mm): 100 100 Gravels Small (2-16mm): 0 0 Gravels Small (2-16mm): 0 0 Large (16-64mm): 0 0 Large (16-64mm): 0 0 Larges Lge cobble (54-128mm): 0 0 Larges Lge cobble (128-256mm): 0 0 Bilder cobble (>256mm): 0 0 0 D90 (cm): 0 0 Bilder cobble (>256mm): 0 0 0 D90 (cm): 0 Fines Gravels Larges Bedrock Confinement: UC	Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method C Species NA EL EL Comments Size 1% Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method Ci So fiss 15% RS = 1% Size Size Size Size Size Ci Ns fiss is formation. Comments Size Size



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

DFO/MoELP Stream Survey Form	Site Number: E95 Trib. to Coal	Reach No.: 1 Cr. Image: Cr.
Location: E95, Unit 11, 300m South of Louise Lake. Map #: 93 L 082 Reach Leng U.T.M.: 9.5843 . 60788 Length surrouter	Stream (Gaz.): Unnamed gth (km): [1.8] [MA] Date: [22-Jul-97] Tim veyed (m): [200.0] [AE] Survey Crew: JL \EM	Watershed Code: 039-4600-000-000-000-000-000-000-000-000-00
Channel Characteristics Av. Chan. Width (m): 1.1. MS Av. Wet. Width (m): 1.0. MS Av. Wet. Width (m): 1.0. MS Av. Max Riffle Depth (cm): 4 MS Av. Max Rool Depth (cm): 21 MS Av. Max Pool Depth (cm): 21 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 7 % Stable: 10 GE 7 Your Cover Total %: 15 GE Pool LOD Bldr In Veg O Veg Ctbnk 15 35 0 15 35 Crown Closure %: 0 Aspect : W Discharge Wetted Width (m) : 0.1 MS Mean Velocity (m/s) : 0.17 F Discharge (m3/s) : 0.01 F Cr 1 1 0 5500 <th>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 Bed Material 50 50 50 Gravels Small (2-16mm): 50 25 Large (16-64mm): 25 25 25 Sm. cobble (64-128mm): 0 0 Large 16-64mm): 25 25 Sm. cobble (64-128mm): 0 0 Larges Lge cobble (128-256mm): 0 0 Bedrock 0 0 0 0 Bedrock 0 0 0 0 D90 (cm): 5 Compaction: Medium 0.2 % Unstable: 10 10 10 Fines Gravels Larges Bedrock 0.3 Stage: M Flood Signs Ht(m): 0.3 Bars (%): 0 pH: 8.4 Braided: Y <th>Obstructions Fish Summary Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method C T 5 70-100 J Image: Commentemposities EL EL Comments Image: Commentemposities S4 Image: Commentemposities El Image: Commentemposities Image: Commentemposi</th></th>	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 Bed Material 50 50 50 Gravels Small (2-16mm): 50 25 Large (16-64mm): 25 25 25 Sm. cobble (64-128mm): 0 0 Large 16-64mm): 25 25 Sm. cobble (64-128mm): 0 0 Larges Lge cobble (128-256mm): 0 0 Bedrock 0 0 0 0 Bedrock 0 0 0 0 D90 (cm): 5 Compaction: Medium 0.2 % Unstable: 10 10 10 Fines Gravels Larges Bedrock 0.3 Stage: M Flood Signs Ht(m): 0.3 Bars (%): 0 pH: 8.4 Braided: Y <th>Obstructions Fish Summary Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method C T 5 70-100 J Image: Commentemposities EL EL Comments Image: Commentemposities S4 Image: Commentemposities El Image: Commentemposities Image: Commentemposi</th>	Obstructions Fish Summary Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method C T 5 70-100 J Image: Commentemposities EL EL Comments Image: Commentemposities S4 Image: Commentemposities El Image: Commentemposities Image: Commentemposi



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

DFO/MoELP Stream Survey Form	Site Number: KARLA 31 Trib. to Coal	Reach No.: 1 I Cr. INTRITON Environmental Consultants Ltd.
Location: KARLA 31, Unit 11, 2.4 km W of Sandstone Cr Map #: 93 L 082 Reach Leng	eck, see C5 Stream (Gaz.): Unnamed th (km): [1.1] MA] Date: [23-Sep-96] Tim	Watershed Code: 038-9900-000-000-000-000-000-000-000-000-0
U.T.M.: 9.5805 60751 Length surv	eyed (m): [100.0] GE Survey Crew: JP \KG 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	Obstructions K-3-14,15 Air Photos: C Height (m) Type Location
Av. Max Pool Depth (cm): 26 MS Gradient (%): 10.0 CL Pool: 50 Riffle: 10 % Side Channel: >40 GE % Side Channel: >15 GE % Side Channel: >15 GE % Side Channel: >10 GE % Side Channel: >33 GE % Stable: 70 GE Pool LOD Bidr In Veg Veg Cover 0 0 10 Crown Closure % : 35 Asnect : W	27 25 26 24 Bed Material Fines Clay, silt, sand (<2mm):	Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA EL EL EL Comments C1 S4 S4 EL C2 LS = 1%, RS = 18% S1 No Isheries sensitive zones were noted at this site.
Discharge Wetted Width (m) : 0.8 Mean Depth (m) : 0.1 Mean Velocity (m/s) : 0.31 Discharge (m3/s) : 0.02 F 0.02 Reach Symbol (Finb) (DV)	Banks Height (m): 0.2 % Unstable: 0 Fines Gravels Larges Confinement: UC Valley: Channel Ratio Stage: L Flood Signs Ht(m): 0 Bars (%): 0 pH: 7.6 Water Temp (%): 60 62 (comb)	 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.
I D IO.0 F (Width, Valley: Channel, Slope) (Bed Material)	Turb. (cm): 27 Cond. (µmhos): 60	



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



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

DFO/MoELP Stream Survey Form	Site Number: KARLA 33 Trib. to Coal	Reach No.: 1 I Cr. TRITON Environmental Consultants Ltd.
Location: KARLA 33, Unit 11, see C5.	Stream (Gaz.): Unnamed	Watershed Code: 038-8500-000-000-000-000-000-000-000-000-0
Map #: 93 L 082 Reach Lo U.T.M. : 9.5809 .60746 Length s	ngth (km): 1.7 MA Date: 24-Sep-96 Tim reveyed (m): 250.0 GE Survey Crew: JP \KG	ne: [11:38] Agency: [TEC] Access: [V2] Fish Card: [N] Field [X] Historical [GALANAN Photos: [K-3-18,19] Air Photos: [
Av. Chan. Width (m): 1.7 MS Av. Wet. Width (m): 1.6 MS Av. Max Riffle Depth (cm): 3 MS Av. Max Riffle Depth (cm): 18 MS Av. Max Pool Depth (cm): 18 MS Gradient (%): 4.0 CL Pool: 40 Riffle: 20 % Side Channel: GE >15 GE % Debris Area: >15 GE % Stable: 40 GE Cover Cover Total %: 30 GE Pool LOD Bldr In Veg O Veg Ctbnk 25 15 5 0 20 35 Crown Closure %: 10 Aspect: W	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 Bed Material Fines Clay, silt, sand (<2mm): 50 50 Gravels Small (2-16mm): 30 15 Large (16-64mm): 15 15 Sm. cobble (64-128mm): 10 Larges Lge cobble (128-256mm): 20 Blder cobble (>256mm): 5 Bedrock 0 0 D90 (cm): 58 Compaction: Medium	C Height (m) Type Location Fish Summary
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 Reach Symbol (Fish) (RB) (DV) 2 B 4.0 5320 (Width, Valky: Channel, Slope) (Bed Material)	Banks Height (m): 0.2 % Unstable: 25 Fines Gravels Larges 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 02 (ppm): Turb. (cm): 20 Cond. (µmhos): 60	 Ine 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. Lat N 54 48' 44.1", Long W 127 42' 25.3" No additional bank texture information. DO was not measured at this site. The mean air temperature on this day was 5.5°C Some good rearing cover was found at this site. A large amount of organic debris was noted in the channel. The air temperature at this site was 7 degrees celcius.



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



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

DFO/MoELP Stream Survey Form	Site Number: KARLA 34 Trib. to Coal	Reach No.: 1 Cr. TRITON Environmental Consultants Ltd.
Location: KARLA 34, Unit 11, see C5. Map #: 93 L 082 Reach Leng U.T.M. : 9.5807 .60755 Length sur	Stream (Gaz.): Unnamed gth (km): 0.9 MA Date: 24-Sep-96 Tim veyed (m): 230.0 GE Survey Crew: JP \KG	Watershed Code: 039-0000-000-000-000-000-000-000-000-000
Channel Characteristics Av. Chan. Width (m): 0.8 Av. Wet. Width (m): 0.6 Av. Wet. Width (m): 0.6 Av. Max Riffle Depth (cm): 3 Av. Max Riffle Depth (cm): 12 Av. Max Pool Depth (cm): 12 Gradient (%): 6.0 Cl. Pool: Pool: 20 Riffle: 40 Run: 30 Wether Stable: 30 GE % Stable: Your Total %: 35 GE 20 Stable: 15 Greater %: 15 Aspect : W	Specific Data 0.7 0.5 1.0 1.6 0.6 0.7 0.6 0.3 1.0 0.7 0.7 0.5 1 2 3 3 4 7 6 18 12 19 Bed Material 30 30 30 Gravels Small (2-16mm): 40 20 Large (16-64mm): 20 20 5 Bed rock Sm. cobble (64-128mm): 10 15 Bider cobble (>256mm): 30 15 5 Bedrock 0 0 0 0 D90 (cm): 31 Compaction: Medium 10	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 EL Comments EL Cl S4 Cl LS = 6%, RS = 11% Cl No fisheries sensitive zones were noted at this site. Cl No fisheries sensitive zones were noted at this site. Cl The electroshocking effort, using a Smithroot 15 A model was 255 seconds over 96 square meters. The attached lake upstream of the sampling area should be minnow trapped.
Wetted Width (m) : 0.7 MS Mean Depth (m) : 0.1 MS Mean Velocity (m/s) : 0.29 F Discharge (m3/s) : 0.02 F Reach Symbol (Fisb) (RB) (DV) 1 C 6.0 3430 (Width, Valley: Channel, Slope) (Bed Material)	Fines Gravels Larges Bedrock Confinement: OC Valley : Channel Ratio 5-10 Stage: L Flood Signs Ht(m): 0.6 Bars (%): 0 pH: 7.4 Braided: N Water Temp. (°C): 4.0 02 (ppm): 19 Turb. (cm): 70	 C3: Lat N 54 49' 14.2", Long W 127 44' 35.2" 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: This stream would provide good rearing habitat at high flows. C9: The air temperature at this site was 7.C.



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



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

DFO/MoELP Stream Survey Form	Site Number: KARLA 35 Trib. to Coal	Reach No.: 1 I Cr. TRITON Environmental Consultants Ltd.
Location: KARLA 35, Unit 11, see C5.	Stream (Gaz.): Unnamed	Watershed Code: 039-1300-000-000-000-000-000-000-000-000-00
Map #: 93 L 082 Reach Length (k U.T.M. : 9.5808.60761 Length surveyed	m): 1.4 MA Date: 24-Sep-96 Tim 1 (m): 180.0 GE Survey Crew: JP \KG	ne: 13:00 Agency: TEC Access: V2 Fish Card: N Field X Historical
Channel Characteristics Av. Chan. Width (m): Av. Wet. Width (m): 0.9 Av. Wet. Width (m): 0.8 Av. Max Riffle Depth (cm): 4 Av. Max Pool Depth (cm): 17 MS Av. Max Pool Depth (cm): 17 Av. Max Pool Depth (cm): 17 MS Av. Max Pool Depth (cm): 17 MS Gradient (%): 4.0 CL Pool: 20 Refile: 25 % Side Channel: GE 10 % Side Channel: 40 GE % Stable: 40 GE Pool LOD Bidr In Veg O Veg Cbnk 20 20 0 30 30 30 Crown Closure % : 5 Aspect : W D Discharge Ba Ba S Wetted Width (m) : 0.13 F C Mean Depth (m) : 0.01 F S S Mean Velocity (m/s) : 0.01 F S S (RB) (DV)	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 d Material Fines Clay, silt, sand (<2mm):	Obstructions <u> <u> </u></u>



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.

)FO/MoELP Stream Survey Form	Site Number: KARLA 37 Trib. to Coal	Cr. Reach No.: 1
		Environmental Consultants Ltd.
Location: KARLA 37, Unit 11, see C5.	Stream (Gaz.): Unnamed	Watershed Code: 039-0800-000-000-000-000-000-000-000-000-0
Map #: 93 L 082 Reach Leng J.T.M. : 9.5791 .60766 } Length surv	th (km): 1.1 [MW] Date: 24-Sep-96 Tim eyed (m): 100.0 [GE] Survey Crew: JP \KG	e: [14:52] Agency: TEC Access: [V2] Fish Card: N Field Kistorical
Av. Chan. Width (m): 1.4 MS Av. Wet. Width (m): 0.6 MS Av. Max Riffle Depth (cm): 4 MS Av. Max Pool Depth (cm): 10 MS	Specific Data 1.5 1.0 1.5 1.6 1.1 1.7 0.9 0.4 0.4 0.6 0.5 1.0 3 5 4 4 4 9 8 12 8 15	C Height (m) Type Location 1 C 0.4
Gradient (%): 18.0 GE Pool: 10 Riffle: 50 Run: 20 Other: 20 % Side Channel: 0 GE 0 GE 0 GE % Debris Area: 5-15 GE 20 GE % Stable: 20 GE 0 GE Cover Cover Total %: 25 GE Pool LOD Bldr In Veg Veg Ctbnk 10 10 30 0 20 30 Crown Closure %: 25 Aspect: S S	Fines Clay, silt, sand (<2mm): 10 10 Gravels Small (2-16mm): 40 15 25 Large (16-64mm): 20 20 20 15 Larges Lge cobble (64-128mm): 50 15 15 Bider cobble (>256mm): 0 0 0 0 D90 (cm): 39 Compaction: High	Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA EL EL EL Comments Ci S4 S4 <t< td=""></t<>
Discharge Wetted Width (m) : 0.8 Mean Depth (m) : 0.0 Mean Velocity (m/s) : 0.39 Discharge (m3/s) : 0.01 F 0.01 Reach Symbol (Fish)	Banks Height (m): 0.2 % Unstable: 20 Fines Gravels Larges Confinement: CO Valley : Channel Ratio 0-2 Stage: L Flood Signs H1(m): 0.7 Bars (%): 0 pH: Braided: N	 C4 The electroshocking effort, using a Smithroot 15 A model was 88 seconds over 12 square meters. The electroshocker was cutting out frequently at this site, due to a punctured fuel line. C5 Lat N 54 49' 52.5", Long w 127 46' 05.5" 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 noted at this site, however the .9m cascade could prevent fish access upstream. Future sampling is recommended.



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



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

DFO/MoELP Stream Survey Form	Site Number: Y262	Reach No.: 2
	Trib. to Coal	Cr. TRITON Environmental Consultants Ltd.
Location: Y262, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 039-1800-000-000-000-000-000-000-000-000-00
Map #: 93 L 082 Reach L U.T.M. : 9.581244.6078175 Length :	ength (km): 1.7 MA Date: 14-Sep-97 Tim urveyed (m): 100.0 GE Survey Crew: JP \FC	e: 8:41 Agency: TEC Access: H Fish Card: N Field Historical Historical Photos: Y-31-18,19 Air Photos:
Channel Characteristics	Specific Data	Obstructions
Av. Chan. Width (m): 0.6 MS Av. Wet. Width (m): 0.5 MS Av. Max Riffle Depth (cm): 1 MS Av. Max Riffle Depth (cm): 14 MS Gradient (%): 6.0 CL Pool: 15 Riffle: 10 Run: 75 Other: % Side Channel: 0-10 GE % Debris Area: >15 GE %Stable: 40 GE Cover Cover Total %: 60 GE Pool LOD Bldr In Veg Veg Ctbnk 0 30 0 20 50 0 Crown Closure %: 10 Aspect: S	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 1 1 16 22 9 10 10 Fines Clay, silt, sand (<2mm):	Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA NA EL EL Comments Ci S6 Ci LS = 10%, RS = 26% So Ci No fisheries sensitive zones present in the sampling area. So Ci The elementsching offert uning a Smithrent 12 B POW model set at 15,500V, use 114 seconds over 200m
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 Confinement: UC Valley: Channel Ratio 10+ Stage: L Flood Signs Ht(m): 0 Bars (%): 0 pH: 7.5 Braided: N Water Temp. (°C): 7.5 02 (ppm): 10+ Turb. (cm): Cond. (µmhos): 90	 The electrosnocking error, using a Smithroot 12 B FOW model, set at 1-3-300V, was 114 seconds over 2001 No additional bank texture information. DO was not measured, the water was clear to the bottom. The air temperature at this site was 4.5.C. 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 creck. About 20% of the flow is either subterrainean or almost subterrainean.



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

DFO/MoELP Stream Survey Form	Site Number: Y263	Reach No.: 1
	Trib. to Coa	I Cr. TRITON Environmental Consultants Ltd.
Location: Y263, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 039-3000-000-000-000-000-000-000-000-000
Map #: 93 L 082 Reach Length (km U.T.M. : 9.582384.6078593 Length surveyed (): 1.8 MA Date: 14-Sep-97 Tin m): 100.0 GE Survey Crew: JP \FC	ne: 9:26) Agency: [TEC] Access: [11] Fish Card: [N] Field 🔀 Historical
Channel Characteristics	Specific Data	Obstructions
Av. Chan. Width (m): 2.3 MS 1 Av. Wet. Width (m): i.4 MS 0 Av. Wet. Width (m): i.4 MS 0 Av. Max Riffle Depth (cm): 5 MS 3 Gradient (%): 3.0 CL 3 Pool: 15 Riffle: 20 Run: 65 Other: 0 % Side Channel: 0-10 GE Fi GE Fi G % Side Channel: 0-10 GE GE GE G % Stable: 30 GE G G Cover Cover Total %: 35 GE Li Pool LOD Bidr<	.6 2.0 2.2 2.1 1.6 4.0 .6 1.0 1.3 1.7 1.2 2.8 8 6 4 4 5 9 42 35 27 33 Material mes Clay, silt, sand (<2mm):	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.
Discharge Bai 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 Va 0.02 F Reach Symbol (Fish) Sta CT Va Va (Width, Valley: Channel, Slope) (Bed Material) Tu	Iks Ileight (m): 0.3 % Unstable: 0 nes Gravels Larges Bedrock 0 nfinement: UC lley: Channel Ratio 10+ ge: M Flood Signs Ht(m): 0.6 rs (%): 5 pH: 7.7 Braided: N ter Temp. (°C): 8.0 02 (ppm): 120 b. (cm): Cond. (µmhos): 120	 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.



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

DFO/MoELP Stream Survey Form	Site Number: Y264	Reach No.: 2
	Trib. to Coal	I Cr. TRITON Environmental Consultants Ltd.
Location: Y264, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 039-4100-000-000-000-000-000-000-000-000-00
Map #: 93 L 082 Reach Lo U.T.M. : 9 .584465.6077530 Length st	ngth (km): [1.3] [MW] Date: [14-Sep-97] Tim arveyed (m): [100.0] [GE] Survey Crew: JP \FC	ne: [10:15] Agency: TEC Access: [1] Fish Card: [N] Field X Ilistorical
Channel Characteristics Av. Chan. Width (m): 1.4 MS Av. Wet. Width (m): 1.2 MS Av. Wet. Width (m): 1.2 MS Av. Max Riffle Depth (cm): 3 MS Av. Max Riffle Depth (cm): 19 MS Av. Max Riffle Depth (cm): 19 MS Av. Max Pool Depth (cm): 19 MS Gradient (%): 4.0 CL Pool: 10Riffle: 10Run: 80 Other: 0 % Side Channel: 0-10 GE 60 GE % Stable: 60 GE 60 GE Pool LOD Bldr In Veg Veg Ctbnk 15 30 0 5 15 35 Crown Closure % : 40 Aspect : NW Discharge Wetted Width (m) : 0.3 MS Mean Depth (m) : 0.05 F	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 1.5 1.5 2.3 2.4 Bed Material 60 60 60 60 60 Gravels Small (2-16mm): 20 10 10 Gravels Small (2-16mm): 20 10 Large (16-64mm): 10 10 10 Large (16-64mm): 10 10 10 Large tobble (128-256mm): 20 10 Bider cobble (28-256mm): 0 0 D90 (cm): 20 10 Bedrock 0 0 0 D90 (cm): 20 Compaction: Medium % Unstable: 0 0 % Unstable: 0 0 % Unstable: 0 0 Fines Gravels Larges Bedrock	Obstructions Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method N Comments Cli 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 1-5-500V, 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.
(Fish) (BV) (Width, Valley: Channel, Slope) (Bcd Material)	Valicy : Channel Katio 5-10 Stage: M Flood Signs IIt(m): 0.3 Bars (%): 0 pll: 7.5 Braided: N Water Temp. (°C): 8.5 02 (ppm): Turb. (cm): Cond. (µmhos): 80	and large cobble diminish spawning habitat quality at this site.



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

DFO/MoELP Stream Survey Form	Site Number: KARLA 25 Trib. to Loui	se L. TRITON Environmental Consultants Ltd.
Location: KARLA 25, Unit 11, trib to Louise Lake, which drains into Creek, see C5. Map #: 93 L 082 Reach Length (km): U.T.M. : 9.5860 .60823 Length surveyed (m):	Coal Stream (Gaz.): Unnamed 0.8 MA Date: 22-Sep-96 Tim 125.0 GE Survey Crew: KG VP	Watershed Code: 039-7800-000-000-000-000-000-000-000-000-00
Channel Characteristics Av. Chan. Width (m): 0.7 MS 0.9 Av. Wet. Width (m): 0.5 MS 0.4 Av. Max Riffle Depth (cm): 5 MS 3 Av. Max Pool Depth (cm): 14 MS 22 Gradient (%): 12.0 CI Bed M Pool: 35 Riffle: 20 Run: 40 Other: 5 % Side Channel: 0 GE Fines Gravel Gravel Gravel % Side Channel: 0 GE Y Stable: 70 GE Gravel % Stable: 70 GE Gravel Gravel Gravel Gravel Cover Cover Total %: 25 GE Larges Debris 0 45 15 5 20 15 D90 (cm Discharge Wetted Width (m): 1.0 MS Fines Mean Velocity (m/s): 0.19 F Confine Mean Velocity (m/s): 0.19 F Confine Stage: Stage: Stage:	Specific Data 0.6 0.7 0.8 0.5 0.8 0.6 0.6 0.5 0.3 0.4 5 6 4 5 17 5 11 13 aterial Imath: 10 10 Small (2-16mm): 30 10 Large (16-64mm): 30 10 Sm. cobble (64-128mm): 15 Lge cobble (128-256mm): 60 30 Blder cobble (>256mm): 15 45 Compaction: High	Obstructions
(Fiss) (Fiss) (Bars (% (RB) (DV) 1 D 12.0 1360 (Width, Valley: Channel, Slope) (Bed Material) Turb. (c): 0 pH: 7.8 Braided: N emp. (°C): 3.5 02 (ppm): m): 22 Cond. (μmhos): 90	C9. The air temperature at this site was 6.C.



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.

DFO/MoELP Stream Survey Form	Site Number: E100 Trib. to Louis	Reach No.: 1 e Lk. I TRITON Environmental Consultants Ltd.
Location: E100, Unit 11, North of Louise Lake. Map #: 93 L 082 Reach Length (km):	Stream (Gaz.): Unnamed	Watershed Code: 039-7500-000-000-000-000-000-000-000-000-00
Channel Characteristics Av. Chan. Width (m): 1.0 MS 0.8 Av. Wet. Width (m): 1.0 MS 0.7 Av. Max Riffle Depth (cm): 5 MS 45 Gradient (%): 10.0 GE 8 Pool: 20 Riffle: 20 Rue % Side Channel: 0-10 GE 8 6 % Side Channel: 0-10 GE 6 6 % Side Channel: 0 0 GE 6 % Stable: 0 GE 6 Gra Cover Cover Total %: 20 GE Lar Pool LOD Bldr In Veg O Veg Ctbnk 15 30 0 25 30 Crown Closure %: 60 Aspect: S D90 0	Specific Data 0.9 1.2 1.2 0.9 1.0 0.9 1.3 1.4 1.1 0.8 4 7 4 3 22 25 20 30 Material 90 90 90 s Clay, silt, sand (<2mm):	Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method CT 1 110 J R EL Comments Ci S4 Ci S4 Ci S4 Ci S4 Ci No fisheries sensitive zones noted.
Discharge Bank 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 Valle Stage Reach Symbol (Fish) CT 1 D 10.0 9100 (Widik, Valley: Chanaet, Stope) (Bed Material)	KS	 The electroshocking effort, using a Smithroot 12 B POW model, set at 1-5-300V, was 150 seconds over 50 meters. Fines and larges make up the bank texture at this site. DO was not measured, the water was clear to the bottom. The mean air temperature on this day was 13.8.C. This creek has a lot of LOD, cutbank and overstream vegetation cover.



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
DFO/MoELP Stream Survey Form	Site Number: E102 Trib. to Louis	Reach No.: 3 e Lk. TRITON Environmental Consultants Ltd.
Location: E102, Unit 11, SE of Louise Lake. Map #: <u>93 L 082</u> Reach I U.T.M. : <u>9.5868 .60793</u> Length	Stream (Gaz.): Unnamed ength (km): [1.3] MA Date: [22-Jul-97] Tim surveyed (m): [100.0] GE Survey Crew: EM VL	Watershed Code: 440-7411-809-000-000-000-000-000-000-000-000-000
Channel Characteristics C1 Av. Chan. Width (m): 0.9 MS Av. Wet. Width (m): 0.9 MS Av. Max Riffle Depth (cm): 3 MS Av. Max Riffle Depth (cm): 3 MS Av. Max Pool Depth (cm): 21 MS Gradient (%): 4.0 CL Pool: 20 Riffle: 10 Reference % Side Channel: 0 GE % Side Channel: 0 % Debris Area: >15 GE % Stable: 0 GE Pool LOD Bldr< In Veg O Veg Ctbnk 10 60 0 10 20 Crown Closure %: 40 Aspect : N Discharge	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 Bed Material 100 100 100 100 100 Gravels Small (2-16mm): 0 0 0 Gravels Small (2-16mm): 0 0 Gravels Small (2-16mm): 0 0 Large (16-64mm): 0 0 0 Large tobble (64-128mm): 0 0 Larges Lge cobble (128-256mm): 0 0 Bedrock 0 0 0 0 Bedrock 0 0 0 0 D90 (cm): 0 Compaction: Low Banks Height (m): 0.3	Obstructions Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 3 Method C Species Number Size Range (mm) Life Phase Use 1 Use 3 Method Comments Comments Cit S4. Additional channel and wetted widths of 1.5m and 1.3m respectively, were obtained at this site. Cit Comments Cit Comments Cit Cit Cit No fisheries sensitive zones noted. Cit Cit Methods for 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 subterrainean in several places. Cit Cit Cit Cit Methods have some decent rearing



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

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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

DFO/MoELP Stream Survey Form	Site Number: E103	Reach No.: 1
	Trib. to Louise	e Lk. TRITON Environmental Consultants Ltd.
Location: E103, Unit 11, East of Louise Lk.	Stream (Gaz.): Unnamed	Watershed Code: 039-6700-000-000-000-000-000-000-000-000-00
Map #: 93 L 082 Reach L U.T.M. : 9.5864 .60798 Length :	ength (km): 2.3 MA Date: 22-Jul-97 Time urveyed (m): 100.0 GE Survey Crew: JL \EM	e: [15:41] Agency: [TEC] Access: [H] Fish Card: [N] Field [X] Historical [
Channel Characteristics	Specific Data	Obstructions
Av. Chan. Width (m): 1.1 MS Av. Wet. Width (m): 0.8 MS Av. Max Riffle Depth (cm): 7 MS Av. Max Rool Depth (cm): 7 MS Av. Max Pool Depth (cm): 16 MS Av. Max Pool Depth (cm): 16 MS Av. Max Pool Depth (cm): 16 MS Gradient (%): 7.0 CL Pool: 30 Riffle: 30 V Side Channel: 0 GE V Stable: 0 GE Cover Cover Total % : 60 GE Pool LOD Bldr In Veg O Veg Ctbnk 30 30 0 0 30 10 Intervention Intervention Max Gradient % : 30 30 10 Intervention Intervention Max Stable: 30 30 10 Intervention Intervention Max Stable: 30 30 10 Intervention Intervention Max Stable: Stable:	0.7 1.2 0.8 1.6 1.4 1.1 1.0 1.1 0.6 0.4 0.5 1.1 1.0 1.1 0.6 0.4 0.5 1.1 5 6 7 11 11 1.6 20 14 12 Bed Material Fines Clay, silt, sand (<2mm):	Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method C4 NF NA EL 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. C4 No additional bank texture information.
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 (Fisb) (CT) 1 D 7.0 2440 (Width, Velict: Cheanel, Stope)	Fines Gravels Larges Bedrock Confinement: UC Valley: Channel Ratio 10+ Stage: E Flood Signs Ht(m): 0.5 Bars (%): 0 pH: 8.1 Braided: N Water Temp. (°C): 9.0 02 (ppm): 90	 No additional bank texture information. C6 D0 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.



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

DFO/MoELP Stream Survey Form	Site Number: E98 Trib. to Louis	Reach No.: 1 Se Lk. TRITON Environmental Consultants Ltd.
Location: E98, Unit 11, NE of Louise Lk.	Stream (Gaz.): Unnamed	Watershed Code: 039-7400-000-000-000-000-000-000-000-000-00
Map #: 93 L 082 Reach Lo U.T.M. : 9.5865 .60805 Length s	ngth (km): 1.2 MA Date: 22-Jul-97 Tim urveyed (m): 200.0 AE Survey Crew: JL \EM	ne: 11:00 Agency: TEC Access: H Fish Card: N Field Historical A \ \ \ \ \ \ \ 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. 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 % Stable: 0 GE Cover Cover Total %: 2 GE Pool LOD Bldr In Veg O veg Ctbnk 0 0 0 0 0 0	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 1 13 11 10 14 10 100 Bed Material Fines Clay, silt, sand (<2mm):	Obstructions Fish Summary C Species NF NA NF NA Comments C1 S4 C2 LS = 1%, RS = 1%
Crown Closure % : 0; Aspect : SW 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 Reach Symbol (Fisb) (DV) 2 D 3.0 F (Width, Valley: Channel, Slope) (Bed Material)	D90 (cm): 0 Compaction: Medium Banks Height (m): 0.1 % Unstable: 0 Fines Gravels Larges 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): 10+ 30 Turb. (cm): Cond. (µmhos): 30 30	 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.



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

DFO/MoELP Stream Survey Form	Site Number: E99 Trib. to Louis	Reach No.: 5 te Lk. TRITON Environmental Consultants Ltd.
Location: E99, Unit 11, North of Louise Lk. Map #: 93 L 082 Reach 1	Stream (Gaz.): Unnamed ength (km): 2.0 MA Date: 22-Jul-97 Tim	Watershed Code: 039-7400-000-000-000-000-000-000-000-000-00
Channel Characteristics Av. Chan. Width (m): Av. Wet. Width (m): 0.9 MS Av. Wet. Width (m): 0.9 Av. Max Riffle Depth (cm): 6 MS Av. Max Pool Depth (cm): 27 MS Av. Max Pool Depth (cm): 27 MS Av. Max Pool Depth (cm): 27 MS Av. Max Pool Depth (cm): 1.5 CL Pool: 15 Riffle: 15 Run: 60 Other: Yo Bebris Area: 0-10 GE % Stable: 0 GE Cover Cover Total %: 20 Cover Cover Total %: 20 Cover Cover Total %: 20 GE Pool LOD Bidr In Veg O Veg Ctbnk 15 20 15 0 30 20 Crown Closure %: 0 Aspect: W Discharge Wetted Width (m): 1.0 MS Mean Velocity (m/s): 0.27 F Discharge (m3/s): 0.02 F Reach Symbol	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 10 10 10 Gravels Small (2-16mm): 30 15 Large (16-64mm): 15 30 15 Sm. cobble (64-128mm): 30 15 Large (16-64mm): 15 Sm. cobble (64-128mm): 30 Large (16-64mm): 15 Sm. cobble (64-128mm): 30 Large (16-64mm): 30 Large (16-64mm): 30 Bars cobble (2256mm): 60 20 Bedrock 0 0 0 D90 (cm): 25 Compaction: Medium Banks Height (m): 0.2 % Unstable: 0 0 Walter Temp. 10 10+ Stage: H Flood Signs Ht(m): 0.4 Bars (%): </th <th>Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method C Species Number Size Range (mm) Life Phase Use 1 Use 3 Method C C Species Number Size Range (mm) Life Phase Use 1 Use 3 Method C C 2 60-100 J EL EL Comments C1 S4 C2 LS = 10% C3 Fines and larges make up the bank texture at this site. </th>	Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method C Species Number Size Range (mm) Life Phase Use 1 Use 3 Method C C Species Number Size Range (mm) Life Phase Use 1 Use 3 Method C C 2 60-100 J EL EL Comments C1 S4 C2 LS = 10% C3 Fines and larges make up the bank texture at this site.



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.

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DFO/MoELP Stream Survey Form	Site Number: KARLA 75 Henderson	Cr. Reach No.: 2 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: 440-9648-000-000-000-000-000-000-000-000-000-0
Map #: 93 L 074 Reach Le U.T.M.: 9.6049.60703 Length st	ngih (km): 0.9 [MA] Date: [28-Sep-96] Tim prveyed (m): 150.0 [GE] Survey Crew: JP \KG	ne: [17:17] Agency: [TEC] Access: [V2] Fish Card: N Field Illistorical GALANA 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. 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. % Stable: 70 GE Cover Cover Total % : Q20 35 5 0 Discharge N Mean Depth (m) :	Specific Data 7.6 8.0 12.4 18.0 12.1 16.8 Bed Material Fines Clay, silt, sand (<2mm):	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 NA NA NA Comments Cl S2 Cl The side slopes were not measured at this site. Cl S2 Cl The side slopes were not measured at this site. Cl S2 Cl The side slopes were not dectrofished. Cl Lat N 54 46' 10.4", Long W 127 22' 13.1" Cl No additional bank texture information. Cl Water quality could not be evaluated at this site. The mean air temperature on this day was 10.5°C Cl This site could provide rearing habitat, with extensive boulder cover, if water were present in the channel.
(RB) (DV) 13 D 4.0 1360 (Width, Valley: Channel, Slope) (Bed Material)	Image: Second state (%): 10 pit: Braided: Y N Water Temp. (°C): 02 (ppm):	

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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.

DFO/MoELP Stream Survey Form	Site Number: Y261 Henderson Cr.	Reach No.: 3 TRITON Environmental Consultants Ltd.
Location: Y261, Unit 11 Map #: [93 L 074 Reach Length U.T.M. : [9.605233.6070932 Length survey	Stream (Gaz.): Henderson Creck (km): 0.9 MW Date: [13-Sep-97] Time: [15:13] red (m): 200.0 GE Survey Crew: JP \FC \ \ \ \ \ \ \ \ \	Watershed Code: 440-9871-000-000-000-000-000-000-000-000-000-0
Av. Chan. Width (m): 10.0 MS Av. Wet. Width (m): 2.7 MS Av. Max Riffle Depth (cm): 12 MS Av. Max Riffle Depth (cm): 12 MS Av. Max Pool Depth (cm): 51 MS Av. Max Pool Depth (cm): 10.0 CL Pool: 20 Riffle: 30 Wetted Channel: 0 GE GE % Side Channel: 0 GE GE % Side Channel: 0 GE GE % Debris Area: 5-15 GE GE % Stable: 20 GE GE Pool LOD Bldr In Veg O Veg Ctbnk 25 25 50 0 0 Cover Cover Total % : 30 GE Pool LOD Bldr In Veg O Veg Ctbnk 25 25 50 0 0 Cover 15 Aspect : SW Discharge (Table And Color And Col	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 Red Material Fines Clay, silt, sand (<2mm):	Immuary es Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method es Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method es Na Image: Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method es Na Image: Size Range (mm) NA Image: Size Range (mm) El mission NA Image: Size Range (mm) NA Image: Size Range (mm) El mission NA Image: Size Range (mm) NA Image: Size Range (mm) El mission Size Range (mm) NA Image: Size Range (mm) Size Range (mm) El mission Size Range (mm) NA Image: Size Range (mm) El Image: Size Range (mm) El 0%, RS = 70% Size Range (mm) 0%, RS = 70% Size Range (mm) Mission Size Range (mm) Size Range (mm) Size Range (mm) Size Range (mm) 0%, RS = 70% Size Range (mm) Mis



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

DFO/MoELP Stream Survey Form	Site Number: Y260 Sloan Cr.	Reach No.: 2 TRITON Environmental Consultants Ltd.
Location: Y260, Unit 11 Map #: 93 L 074 Reach L	Stream (Gaz.): Sloan Creek ength (km): <u>3.4</u> [MW] Date: [13-Sep-97] Tim	Watershed Code: 440-9871-442-000-000-000-000-000-000-000-000-000
Length 1 Av. Chan. Width (m): Av. Max Riffle Depth (cm): Av. Max Pool Depth (cm): Clip Gradient (%): Gradient (%): Colspan="2">Clip Run: Pool: 20 Riffle: 20 Run: 20 Other: 40 GE % Side Channel: >40 GE >40 GE % Stable: 10 GE Cover Cover 10 GE Cover Cover Total % : 10 GE Pool LOD Bldr In Veg O Veg Ctbnk 10 20 60 0 10 0 Crown Closure % : 60	Survey Crew: JP \FC 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 Bed Material Fines Clay, silt, sand (<2mm):	Fish Summary Air Photos: C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA EL EL Comments C1 S5 C2 LS = 85%, RS = 35% C3 No fisheries sensitive zones noted.
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 Reach Symbol (Fish) S B 22.0 1360 (Width, Valley: Channel, Slope) (Bed Material)	Banks Ileight (m): 0.2 % Unstable: 20 % Unstable: 20 Fines Gravels Larges Confinement: FC Valley : Channel Ratio 2-5 Stage: L Flood Signs IIt(m): 0.8 Bars (%): 75 pII: 6.8 Braided: N Water Temp. (°C): 8.0 02 (ppm):	 C4 The elctroshocking 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.



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

1. ES

Mulwain Creek is 25.9 km in length and if 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.

DFO/MoELP Stream Survey Form	Site Number: E126	Reach No.: 3
	Mulwain Cr.	TRITON Environmental Consultants Ltd.
Location: E126, Unit 11, Mulwain mainstem, reach 3.	Stream (Gaz.): Mulwain Creek	Watershed Code: 440-6382-012-000-000-000-000-000-000-000-000-00
Map #: [1031 090 Reach Le U.T.M. : [9.5585 .60839 Length su	ngth (km): 0.8 MA Date: 26-Jul-97 Time: arveyed (m): 100.0 GE Survey Crew: JL \EM \ \	10:30 Agency: TEC Access: H Fish Card: N Field X Historical 1 1 1 1 Photos: E-12-7,8,9 Air Photos:
Channel Characteristics Av. Chan. Width (m): 1.9 Av. Wet. Width (m): 1.8 Av. Wet. Width (m): 1.8 Av. Max Riffle Depth (cm): 9 Av. Max Rool Depth (cm): 47 MS Av. Max Pool Depth (cm): 47 Gradient (%): 2.0 Pool: 30 Riffle: 20 Kun: 50 Other: 0 % Side Channel: 10-40	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	Fish Summary C. Species Number Size Bange (mm)
% Debris Area: 0.5 GE % Stable: 10 GE Cover Cover Total % : 20 GE Pool LOD Bldr In Veg O Veg Ctbnk 30 10 10 10 20 20 Crown Closure % : 5 Aspect : E	Gravels Small (2-16mm): 30 15 Large (16-64mm): 15 15 30 15 Larges Lge cobble (64-128mm): 30 30 15 Bider cobble (>256mm): 15 15 15 15 Bedrock 0 0 0 0 0	RB 2 70-95 J R EL Comments
Discharge Wetted Width (m) : 0.8 Mean Depth (m) : 0.3 Mean Velocity (m/s) : 0.19 Discharge (m3/s) : 0.03 Reach Symbol (Fish) RB 2	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 02 (ppm):	 The electroshocking effort, using a Smithroot 12 B POW model, set at I-5-300V, was 155 seconds over 40 meters. No additional bank texture information. DO was not measured, the water was clear to the bottom. The mean air temperature on this day was 13.1.C. 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.



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

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DFO/MoELP Stream Survey Form	Site Number: W118	Reach No.: 2
	Mulwain Cr.	TRITON Environmental Consultants Ltd.
Location: W118, Unit 11	Stream (Gaz.): Mulwain Creek	Watershed Code: 440-6382-012-000-000-000-000-000-000-000-000-0
Map #: 1031 090 Reach I U.T.M. : 9.5633 .60817 Length	ength (km): 7.0 MA Date: 26-Jul-97 Time: 10:30 urveyed (m): 300.0 GE Survey Crew: KA \JP \ \ \	D Agency: [TEC] Access: [H] Fish Card: [N] Field [☐] Historical [
Channel Characteristics Av. Chan. Width (m): 14.0	Specific Data 0055	tructions
Av. Wet. Width (m): 10.7 MS Av. Max Riffle Depth (cm): 12 MS Av. Max Pool Depth (cm): 67 MS Conditions (%): 2.0 CI	14.1 14.0 13.0 9.6 6.5 7.2 14 13 12 9 12 15 24 47 30 120 80 100	
Pool: 20 Riffle: 30 Run: 50 Other: 0 % Side Channel: 0 GE GE % Debris Area: 0-5 GE %Stable: 30 GE	Bed Material Fish Fines Clay, silt, sand (<2mm):	Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method RB 1 110 J R EL
Cover Cover Total % : 40 GE Pool LOD Bidr In Veg O Veg Ctbnk	Large Large Comminitient 20 Sm. cobble Sm. cobble 20 Comminitient Larges Lge cobble 128-256mm): 20 Cli s2 Bider cobble >256mm): 10 Cli s2	aments
25 10 30 0 10 25 Crown Closure % : 5 Aspect : S	Bedrock 10 10 C2 LS D90 (cm): 44 Compaction: Medium C3 No	S=5%, RS=2% o fisheries sensitive zones noted.
Discharge Wetted Width (m): Mean Depth (m): 0.3	Banks Height (m): 0.1 % Unstable: 30 Fines Gravels Larges Bedrock C6 C6 D0	ne electroshocking effort, using a Smithroot 12 B POW model set at 600V, was 541 seconds over 250 eters. The right bank varies from 2% slope at the bottom to a 40% slope at the top where it is bedrock. O was not measured at this site, the water was clear to bottom. The mean air temperature on this day was
Mean Velocity (m/s) : 0.76 F Discharge (m3/s) : 1.13 F Reach Symbol (Fish)	Confinement: OC 13 Valley: Channel Ratio 5-10 C7 Th Stage: M Flood Signs Ht(m): 1 an Bars (%): 20 pH: 7.4 Braided: N	.1 C. is is a great stream with habitat for all life stages. It has perfect spawning substrate associated with pools d long runs. The rearing habitat consists of cutbanks, pools, bouders, etc. The substrate is varied.
RB 14 C 2.0 1351	Water Temp. (°C): 9.0 02 (ppm):	

DFO/MoELP Stream Survey Form	Site Number: W119	Reach No.: 1
	Trib to Mulwa	in Cr. TRITON Environmental Consultants Ltd.
Location: W119, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 065-4300-000-000-000-000-000-000-000-000-00
Map #: 1031 090 Reach L U.T.M.: 9.5636 .60812 Length s	ength (km): 1.6 MA Date: 26-Jul-97 Tim urveyed (m): 150.0 GE Survey Crew: KA VP	e: 11:50 Agency: TEC Access: H Fish Card: N Field Historical N N N 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 C1 Av. Wet. Width (m): 3.3 MS C1 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 % Stable: 60 GE % Stable: 60 GE % Stable: 60 GE Pool LOD Bldr In Veg Veg Cthak 25 25 10 0 10 30 Crown Closure %: 10 Aspect: S Discharge	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 Bed Material In the second se	Obstructions C Height (m) Type Location 12 C 1.6 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 Cl S3. One additional measurement of 4.0 was taken for riffle depth. Cl LS=4%, RS=10% Cl Cl No fisheries sensitive zones noted. Cl Cl The electroshocking effort, using a Smithroot 12 B POW model set at 800V, was 542 seconds over 100 meters. Cl No additional bank texture information. Cl DO was not measured at this site, the water was clear to bottom. The mean air temperature on this day was 13.1 C. Cl 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.



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

DFO/MoELP Stream Survey Form	Site Number: W120	Reach No.: 1
		Environmental Consultants Ltd.
Location: W120, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 065-4200-000-000-000-000-000-000-000-000-00
Map #: 1031 090 Reach Length (km): U.T.M.: 9 .5636 .60809 Length surveyed (m):	1.1 MA Date: 26-Jul-97 Tim 100.0 GE Survey Crew: KA UP	ne: 13:00 Agency: TEC Access: H Fish Card: N Field Historical PARTINE PHOTOS: W-13-13,14,15,16 Air Photos:
Channel Characteristics	Specific Data	Obstructions
Av. Wet. Width (m): 1.6 MS 1.5 Av. Wet. Width (m): 1.6 MS 1.5 Av. Max Riffle Depth (cm): 6 MS 4 Av. Max Riffle Depth (cm): 28 MS 42 Gradient (%): 2.0 CL Bed N Yool: 30 Riffle: 30 Run: 40 Other: 0 Yo Side Channel: 0-10 GE Fines Grave Fines Grave Yo Stable: 40 GE Grave Grave Grave Grave Cover Cover Total % : 30 GE Large Large Pool LOD Bldr<	3.0 1.8 3.7 2.0 1.0 2.3 1.4 1.7 1.6 1.4 5 6 7 3 8 21 21 27 24 36 Aaterial Clay, silt, sand (<2mm):	Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method DV 14 60-100 J R EL EL Comments Ci S3. C2 LS=5%, RS=5% Ci 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.
Discharge Bank 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 Reach Symbol (Fish) Stage: 0 0 2530 (Width, Valley: Channel, Slope) (Bed Material) Turb.	S Height (m): 0.1 % Unstable: 50 ⊗ Gravels Larges Bedrock nement: OC /: Channel Ratio 5-10 M Flood Signs Ht(m): 0.5 %): 5 pH: 7.8 Braided: N Temp. (°C): 7.0 02 (ppm): 30	 17 The electrosnocking error, using a simulator 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.



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

Triton Environmental Consultants Ltd.



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

DFO/MoELP Stream Survey Form	Site Number: W121 Trib to Mulwai	Reach No.: 1 in Cr. TRITON Environmental Consultants Ltd.
Location: W121, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 065-4000-000-000-000-000-000-000-000-000-0
Map #: 1031 090 Reach Le U.T.M. : 9 .5633 .60807 Length su	ngth (km): 1.1 MA Date: 26-Jul-97 Time rveyed (m): 100.0 GE Survey Crew: KA \JP	e: 13:30 Agency: TEC Access: H Fish Card: N Field Historical
Channel Characteristics CI Av. Chan. Width (m): I.S MS CI Av. Chan. Width (m): Av. Max Riffle Depth (cm): Av. Max Riffle Depth (cm): 4 Av. Max Rool Depth (cm): 26 Av. Max Pool Depth (cm): 26 Av. Max Pool Depth (cm): 26 Av. Max Pool Depth (cm): 26 Gradient (%): 2.0 Cl Pool: 30 Riffle: 20 Volde Channel: 0-10 % Side Channel: 0-10 % Debris Area: 5-15 % Stable: 50 Cover Cover Total %: 30 0 Cover Total %: 30 Graduet (m): 0.10 25 30 0 Mean Depth (m): 0.11 Mean Depth (m): 0.15 Mean Velocity (m/s): 0.15 Discharge (m3/s): 0.01 QV 2 C QV 2 C 2.0 2530 (Wetted Width (m):	Specific Data 0.8 1.4 1.6 1.3 1.0 1.5 1.2 1.4 1.3 0.4 1.1 1.6 4 6 3 5 4 21 24 22 24 42 23 Bed Material Fines Clay, silt, sand (<2mm): 20 20 Gravels Small (2-16mm): 50 20 Gravels Small (2-16mm): 50 20 Large (16-64mm): 50 30 10 Bder cobble (64-128mm): 20 20 20 Larges Lge cobble (128-256mm): 30 10 Bder cock 0 0 0 0 D90 (cm): 19 Compaction: Medium Banks Height (m): 0.1 % Unstable: 50 Fines Gravels Larges Bedrock 0 0 Valley : Channet Ratio 5-10 Stage: M Flood Signs Ht(m): 0.4 Bars (%): 0 pH: 7.7 <t< td=""><td>Obstructions Fish Summary © Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method DV 10 60-70 J R EL Comments Ci S3. Two additional measurements were taken for channel and wetted widths; 2.9 and 2.2, 1.5 and 1.6. C2 LS=4%, RS=4% Ci No fisheries sensitive zones noted. C4 The electroshocking effort, using a Smithroot 12 B POW model set at 800V, was 102 seconds over 60 meters. C5 No additional bank texture information. C6 D0 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 some good rearing cover in the form of debris and cutbanks.</td></t<>	Obstructions Fish Summary © Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method DV 10 60-70 J R EL Comments Ci S3. Two additional measurements were taken for channel and wetted widths; 2.9 and 2.2, 1.5 and 1.6. C2 LS=4%, RS=4% Ci No fisheries sensitive zones noted. C4 The electroshocking effort, using a Smithroot 12 B POW model set at 800V, was 102 seconds over 60 meters. C5 No additional bank texture information. C6 D0 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 some good rearing cover in the form of debris and cutbanks.



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



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Photo #: W-13-19, 26-Jul-97 Site #: W121, Looking downstream at the channel

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DFO/MoELP Stream Survey Form	Site Number: Y89 Trib to Mulwa	Reach No.: 1
<u></u>		Environmental Consultants Ltd.
Location: Y89, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 038-0300-000-000-000-000-000-000-000-000
Map #: 93 L 081 Reach Leng U.T.NI. : 9.56785.607688 Length sur	gth (km): 1.5 MW Date: 26-Jul-97 Tim veyed (m): 100.0 GE Survey Crew: JP \SJ \	e: 8:12 Agency: [TEC] Access: [H] Fish Card: [N] Field 🔀 Historical [
Channel Characteristics	Specific Data	Obstructions
Av. Chan. Width (m): 2.4 MS	1.8 1.9 2.1 2.3 4.0 2.3	
Av. Wet. Width (m): 1.6 MS	1.3 2.0 1.9 1.3 2.2 1.2	
Av. Max Riffle Depth (cm): 6 MS	6 4 5 6 6 8	
Av. Max Pool Deptn (cm):	20 18 30 21 24 21	
Gradient (%): 9.0 CL	Bed Material	Fish Summary
* Side Channel:		C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method
% Debris Area: >15 GE	Small (2-16mm): 20	DV 2 73-90 J R EL
%Stable: 50 GE	Gravels 50 50 30	
	Sm. cobbie (64-128mm): 15	Comments
Cover Total % : 30 GE	Larges Lge cobble (128-256mm): 50 15	
Pool LOD Bldr In Veg O Veg Ctbnk	Bider cobble (>256mm): 20	C1. S3.
	Bedrock 0 0	C2 LS=30%, RS=30%
Crown Closure % : 25 Aspect : NW	D90 (cm): 54 Compaction: High	C3: No fisheries sensitive zones noted.
		C4: The electroshocking effort, using a Smithroot 12 B POW model set at 1-5, 400V, was 129 seconds over 100
Discharge	Banks	meters.
Wetted Width (m)	% Unstable: 10	C5: No additional bank texture information.
Mean Depth (m):	Fines Gravels 🔀 Larges 🗌 Bedrock 🔲	CO. DO use not measured at this site, the water use clear to bottom. The mean air temperature on this day use
Mean Velocity (m/s) : 0.45 F	Confinement: OC	13.1 C.
Discharge (m3/s) : 0.01 F	Valley : Channel Ratio 5-10	C7. The cover in this stream is composed of step-pools and builders. There is most on the substrate and LOD
	Stage: M Flood Signs Ht(m): 0.3	cover. Cascades make up 20% of the flow.
Keach Symbol (Fish)	Bars (%): 10 pH; 6.5 Braided: N	
DV		
2 C 9.0 0550	water Lemp. ("C): [9.0 02 (ppm): []	

DFO/MoELP Stream Survey Form	Site Number: Y90 Trib to Mulwa	Reach No.: 1
		Environmental Consultants Ltd.
Location: Y90, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 038-0400-000-000-000-000-000-000-000-000-0
Map #: [93 L 081 Reach Length U.T.M. : 9 .56774 .607705 Length surve	h (km): [1.8] [MA] Date: [26-Jul-97 Tim eyed (m): [100.0] [GE] Survey Crew: JP \SJ \	ie: 9:05 Agency: TEC Access: II Fish Card: N Field 🔀 Ilistorical [A A A A A A A A A A A A A A A A A A A
Av. Chan. Width (m): 4.3 MS Av. Wet. Width (m): 2.0 MS	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	Obstructions
Av. Max Riffle Depth (cm): 8 MS Av. Max Pool Depth (cm): 34 MS Gradient (%): 15.0 CL Pool: 30 Riffle: 20 % Side Channel: 0 GE % Stable: 40 GE % Stable: 40 GE % Cover Cover Total %: 50 Ge Cover 5 Stable: 5 Cover Stable: Cover Stable: Cover Stable: Stable: 5 Stable: 5 Cover Stable: Stable: 5	9 10 8 9 7 8 45 25 37 33 35 30 Bed Material Fines Clay, silt, sand (<2mm):	Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method DV 4 45-90 J EL EL Comments Ci S3. Ci S3. S3. Ci S3. The side slopes were not measured. Ci No fisheries sensitive zones noted. The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 300V, was 137 seconds over 100 meters. Ci No additional bank texture information.
Mean Depth (m) : 0.1 MS Mean Depth (m) : 0.1 MS Mean Velocity (m/s) : 0.63 F Discharge (m3/s) : 0.07 F Output to the second	Fines Gravels Larges Bedrock Confinement: CO Valley: Channel Ratio 2-5 Stage: M Flood Signs Ilt(m): 0.5 Bars (%): 10 pl1: 6.4 Braided: N Water Temp. (°C): 8.5 02 (ppm): Turb. (cm): 200	 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 roacks at this site.



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

DFO/MoELP Stream Survey Form	Site Number: Y91 Trib to Mulwai	Reach No.: 1 in Cr. TRITON Environmental Consultants Ltd.
Location: Y91, Unit 11 Map #: 93 L 081 Reach Length (km): UT N : 9 56765 602212 Length surveyed (m):	Stream (Gaz.): Unnamed 1.3 MW Date: [26-Jul-97] Time 100 0 GE S S S	Watershed Code: 038-0600-000-000-000-000-000-000-000-000-0
Channel Characteristics Av. Chan. Width (m): 3.4 MS 2.0 Av. Chan. Width (m): 1.8 MS 1.8 Av. Wet. Width (m): 1.8 MS 9 Av. Max Riffle Depth (cm): 10 MS 9 Av. Max Pool Depth (cm): 25 MS 38 Gradient (%): 10.0 CL Bed M Pool: 15 Riffle: 35 Run: 40 Other: 10 % Side Channel: 0-10 GE Fines % Side Channel: 0-10 GE Grave % Stable: 40 GE Grave % Stable: 40 GE Large Pool LOD Bldr< In Veg O Veg Ctbnk 30 30 35 0 5 0 D90 (c Discharge Mean Depth (m): 0.7 MS Fines Mean Depth (m): 0.1 MS Fines Stage Mean Velocity (m/s): 0.81 Fi Valle Stage <t< th=""><th>Specific Data 3.8 4.0 2.8 2.6 4.9 2.3 1.7 1.4 0.8 2.5 12 11 13 9 9 28 20 27 20 19 Aaterial 0 0 0 Association 30 10 Large (16-64mm): 30 10 Large (16-64mm): 20 20 Sm. cobble (64-128-256mm): 20 Bider cobble (>256mm): 10 20 20 Sm. cobble (5256mm): 10 yck 20 S Height (m): 0.3 % Unstable: 80 S Height (m): 0.3 % Unstable: 80 S Height (m): 0.51 y: Channel Ratio 2-5 : M Flood Signs H1(m): 0.51 (%): 20; p11: 6.1 Braided: Yi r Temp. (°C): 10.0 02 (ppm): 10</th><th>Distructions E Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method DV 2 78-88 J EL EL Comments C1 S3. C2 LS=85%, RS=125% G No fisheries sensitive zones noted. C4 The electroshocking effort, using a smithroot 12 B POW model set at I, 5, 300V, was 114 seconds. G C5 No additional bank texture information. G 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 step-pool habitat. Cascades over rocks and LOD comprise 10% of the flow.</th></t<>	Specific Data 3.8 4.0 2.8 2.6 4.9 2.3 1.7 1.4 0.8 2.5 12 11 13 9 9 28 20 27 20 19 Aaterial 0 0 0 Association 30 10 Large (16-64mm): 30 10 Large (16-64mm): 20 20 Sm. cobble (64-128-256mm): 20 Bider cobble (>256mm): 10 20 20 Sm. cobble (5256mm): 10 yck 20 S Height (m): 0.3 % Unstable: 80 S Height (m): 0.3 % Unstable: 80 S Height (m): 0.51 y: Channel Ratio 2-5 : M Flood Signs H1(m): 0.51 (%): 20; p11: 6.1 Braided: Yi r Temp. (°C): 10.0 02 (ppm): 10	Distructions E Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method DV 2 78-88 J EL EL Comments C1 S3. C2 LS=85%, RS=125% G No fisheries sensitive zones noted. C4 The electroshocking effort, using a smithroot 12 B POW model set at I, 5, 300V, was 114 seconds. G C5 No additional bank texture information. G 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 step-pool habitat. Cascades over rocks and LOD comprise 10% of the flow.


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

DFO/MoELP Stream Survey Form	Site Number: Y92 Trib to Mulwain	Reach No.: 1 Cr. IIITON
Location: Y92, Unit 11 Map #: 93 L 081 Reach Length	Stream (Gaz.): Unnamed 1 (km): 0.9 MW Date: [26-Jul-97] Time: ved (m): 200.0 GE Summer Commun. IB (SL))	Watershed Code: 038-0700-000-000-000-000-000-000-000-000-0
Channel Characteristics Av. Chan. Width (m): 7.8 MS Av. Wet. Width (m): 5.0 MS Av. Wet. Width (m): 5.0 MS Av. Max Riffle Depth (cm): 19 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 15 GE % Debris Area: 5-15 GE 6E % Stable: 15 GE 15 GE Pool LOD Bldr In Veg O veg Cover Cover Total %: 70 , GE 6E Discharge 0 0 0 0 Wetted Width (m): 0.9 MS 68 68 Mean Depth (m): 0.2 MS 68 68	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 10 10 10 10 Gravels Small (2-16mm): 20 10 Gravels Small (2-16mm): 20 10 Large (16-64mm): 10 10 10 Sm. cobble (64-128mm): 10 10 10 Larges Lage cobble (128-256mm): 70 10 Bider cobble (>256mm): 0 0 0 D90 (cm): 80 Compaction: High 60 Banks Height (m): 0.3 3 % Unstable: 10 10 6 Fines Gravels Larges Bedrock 6 Confinement: OC 5-10 6 6	Pbstructions Vish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method DV 2 125-130 A EL VO DV 2 125-130 A EL VO Comments Solution No VO VO S2. LS=15%, RS=36% Solutional sensitive zones noted. The electroshocking effort, using a Smithroot 12 B POW model set at 1, 5, 300V, was 70 seconds over 100 meters. No additional bank texture information. DO was not measured at this site, the water was clear to bottom. The mean air temperature on this day was 13.1 C.



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

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DFO/MoELP Stream Survey Form	Site Number: Y93 Trib to Mulwai	Reach No.: 1
Location: Y93, Unit 11	Stream (Gaz.): Unnamed	Environmental Consultants Ltd. Watershed Code: 038-1800-000-000-000-000-000-000-000-000-0
Map #: 93 L 081 Reach Length (km U.T.M. : 9.56646.607785 Length surveyed (n): [.9] MW Date: [26-Jul-97] Time m): [100.0] GE Survey Crew: JP \SJ \	e: 13:17 Agency: TEC Access: H Fish Card: N Field Historical
Channel Characteristics Av. Chan. Width (m): 3.4 MS MS Av. Wet. Width (m): 1.8 MS 0 Av. Max Riftle Depth (cm): 6 MS 0 Av. Max Riftle Depth (cm): 18 MS 0 Av. Max Pool Depth (cm): 18 MS 0 Gradient (%): 25.0 GE Bed % Side Channel: 0 GE Fi % Side Channel: 0 GE Fi % Stable: 30 GE GE Cover Cover Total % : [30 GE L Pool LOD Bidr In Veg O Veg Ctbnk 20 35 40 0 5 0 1 Crown Closure % : [5 Aspect : [N D9 D9	Specific Data 1.4 3.4 4.5 3.6 3.6 4.0 1.8 1.5 1.9 3.1 1.6 1.7 5 9 4 6 6 4 12 12 11 16 28 19 Material nes Clay, silt, sand (<2mm): 10 10 ravels Small (2-16mm): 40 20 Large (16-64mm): 10 10 20 Sm. cobble (64-128mm): 15 15 15 arges Lge cobble (128-256mm): 40 15 Blder cobble (>256mm): 10 10 10 0 (cm): Compaction: High 10 10	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=55% C3 No fisheries sensitive zones noted. C4 The electroshocking effort, using a Smithroot 12 B POW model set at 1, 5, 300V, was 148 seconds over 100 interes.
Wetted Width (m): 0.4 MS Mean Depth (m): 0.0 MS Mean Velocity (un/s): 0.49 Fi Discharge (m3/s): 0.15 Fi Vr 0.15 Fi Reach Symbol (Fish) Ba NF Wr 3 C 25.0 1441 (Width, Valley: Channel, Slope) (Bed Material) Tu	ines Gravels ✓ Larges 45 ines Gravels ✓ Larges Bedrock onfinement: OC	 No additional bank texture information. 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.



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

NEO/MaEL D Stream Survey Form	Site Number VOA	Daash Na -	1
JFO/MOELF Stream Survey Form	Trib to Mulwa	in Cr.	TRITON Environmental Consultants Ltd.
Location: Y94, Unit 11	Stream (Gaz.): Unnamed		Watershed Code: 038-2000-000-000-000-000-000-000-000-000-0
Map #: 93 L 081 Reach Length (km) U.T.M. : 9.56645.607836 Length surveyed (r): 3.1 MW Date: [26-Jul-97] Tin n): 300.0 GE Survey Crew: SJ VP	ne: [14:20] Agency: [TEC] Ac	ccess: [1] Fish Card: N Field Ilistorical Y-12-8,9,10,11 Air Photos:
Channel Characteristics	Specific Data	Obstructions	
Av. Chan. Width (m): 11.2 MS 8 Av. Wet. Width (m): 6.0 MS 5. Av. Max Riffle Depth (cm): 21 MS 1 Av. Max Riffle Depth (cm): 21 MS 1 Av. Max Pool Depth (cm): 57 MS 3 Gradient (%): 5.0 CL Eddition Pool: 20 Riffle: 30 Other: 20 % Side Channel: 10-40 GE Fin Fin % Stable: 0 GE GE Cr Cover Cover Total %: 40 GE La Pool LOD Bldr In Veg Veg Ctbnk 30 20 40 0 10 Bed	0 9.0 11.3 20.9 11.0 7.1 0 6.8 6.0 7.0 6.1 5.1 7 10 23 32 21 5 70 68 43 70 Material 10 10 10 avels Clay, silt, sand (<2mm):	Fish Summary C Species Number Size Rang DV 7 90-12 Comments Cli S2. C1 S2. C2 LS=20%, RS=10%	e (mm) Life Phase Use 1 Use 2 Use 3 Method 25 J R EL
.: Crown Closure % : 0 Aspect : SE D90 Discharge Ban Wetted Width (m) : 4.3 MS Mean Depth (m) : 0.2 MS Fin Mean Velocity (m/s) : 0.79 F Cool Discharge (m3/s) : 1 0.51 F Val Reach Symbol (Fish) Bar Bar DV Val Sta 11 D 5.0 1360 Tur (Width, Valley: Channet, Slope) (Bed Material) Tur Tur	(cm): 65 Compaction: High !KS Height (m): 0.1 % Unstable: 40 nes Gravels Larges Gravels Larges Bedrock nfinement: UC ley: Channel Ratio 10+ ge: M Flood Signs Ht(m): 1.3' s (%): 40 pH: 5.9 Braided: Y ter Temp. (°C): 8.0 02 (ppm): 50 b. (cm): Cond. (µmhos): 50	 C3. No fisheries sensitive zones noted. C4. The electroshocking effort, using a S C5. No additional bank texture information of the sense of the se	Smithroot 12 B POW model set at 145 seconds over 100 meters. ion. he water was clear to bottom. The mean air temperature on this day was bitat with patches of spawning gravel. Cascades comprise 20% of the



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

ed Watershed Code: 037-5400-000-000-000-000-000-000-000-000-00
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $
 15 0 0 C2 LS=20%, RS=49% C3 No fisheries sensitive zones noted. C4 The shocker was not working properly at this site. Dolly Varden were caught in this creek at a later date when the crew returned to confirm fish presence. The electroshocking effort, using a Smithroot 12 B POW model, was 110 seconds over 70 meters. C5 No additional bank texture information. C6 DO was not measured at this site, the water was clear to bottom. Water temperature also was not measured at this site due to the thermometer being broken. The air temperature on this day was 18 C. C7 Boulder cover is predominant at this site which has some good rearing cover. The crew flew channel to the



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

DFO/MoELP Stream Survey Form	Site Number: Z126	Reach No.: 1
	Trib to Mulwa	IRTON Environmental Consultants Ltd.
Location: Z126, Unit 11, upstream of Z125 at confluent 1.15km upstream of road crossing	ce with mainstem, Stream (Gaz.): Unnamed	Watershed Code: 037-7500-000-000-000-000-000-000-000-000-0
Map #: 93 L 081 Reach Lo U.T.M.: 9.571563.6077889 Length st	ength (km): 1.3 MA Date: 12-Aug-97 Tim urveyed (m): 100.0 GE Survey Crew: JP \KG	ne: 10:43 Agency: TEC Access: H Fish Card: N Field Historical
Channel Characteristics	Specific Data	Obstructions
Cl Av. Chan. Width (m): 5.0 MS Cl Av. Wet. Width (m): 4.0 MS Av. Max Riffle Depth (cm): 21 MS Av. Max Pool Depth (cm): 36 MS	5.4 5.0 4.9 5.1 5.4 3.6 3.7 4.3 3.7 3.4 4.9 3.2 20 24 18 21 57 35 30 25 32	C Height (m) Type Location 1 C 0.0
Gradient (%): 16.0 CL C7 Pool: 25 Riffle: 25 Run: 25 Other: 25	Bed Material	Fish Summary
% Side Channel: 0-10 GE % Debris Area: >15 GE % Stable: 30 GE	Fines Clay, silt, sand (<2mm): 10 10 Gravels Small (2-16mm): 40 20 Large (16-64mm): 20 20	C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA NA NA NA
Cover Total % : 30 GE	Sm. cobble (64-128mm): 10 Larges Lge cobble (128-256mm): 50 10 Pldra cobble (5256mm): 20 20 20	Comments C1: S3. One additional measurement was taken for both channel and wetted widths; 5.6 and 4.7.
Pool LOD Bidr In Veg O Veg Ctbnk 20 20 40 0 10 10	Bedrock 0 0	C2 LS=58%, RS=27%
Crown Closure %: 10 Aspect: W	D90 (cm): 69 Compaction: High	C3: No fisheries sensitive zones noted.
Discharge	Banks Height (m): 0.4	C5. No additional bank texture information
Wetted Width (m): 2.4 MS	Fines Gravels Larges Bedrock	C6 DO was not measured at this site, the water was clear to bottom. The air temperature at this site was 21.5 C.
Mean Depending : 0.2 Mass Mean Velocity (m/s) : 0.48 F Discharge (m3/s) : 0.17 F	Confinement: FC Valley : Channel Ratio 2-5	C7: Cascades over LOD and boulders makes up 25% of the flow. This reach has some nice boulder and LOD cover. It could provide rearing habitat for bulltrout and Dolly Varden. Future sampling is recommended.
Reach Symbol (Fish)	Stage: M Flood Signs Ht(m): 0.8 Bars (%): 10 nH: 7.8 Braided: V	
(DV) (RB)	Water Temp. (°C): 6.0 02 (ppm):	
5 B 16.0 1450 (Width, Valles: Channel, Slope) (Bed Material)	Turb. (cm): Сопd. (µmhos): 90	



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

DFO/MoELP Stream Survey Form	Site Number: Z127 Trib to Mulwa	Reach No.: 1 in Cr. TRITON Environmental Consultants Ltd.
Location: Z127, Unit 11, 44m downstream of confluence Map #: 93 L 081 Reach Leng	of Z125 and Z126 Stream (Gaz.): Unnamded zth (km): 0.6 MA Date: [12-Aug-97] Tim	Watershed Code: 037-6900-000-000-000-000-000-000-000-000-00
U.T.M.: 9.5712 .60778 Length sur	veyed (m): 100.0 GE Survey Crew: JP \KG	Image: Contract of the second secon
Av. Chan. Width (m): 5.7 MS Av. Wet. Width (m): 3.5 MS Av. Max Riffle Depth (cm): 13 MS Av. Max Rool Depth (cm): 39 MS Gradient (%): 11.0 GE Pool: 20 Riffle: 30 Run: 35 Other: 15 % Side Channel: 0-10 GE % 9 MS GE % Side Channel: 0-10 GE % % Stable: 30 GE % Stable: 30 GE % Stable: 30 GE Pool LOD Bidr In Veg O Veg Ctbnk 30 30 30 5 5 Crown Closure % : 15 Aspect : SE SE Discharge Wetted Width (m) : Mean Depth (m) : Mean Velocity (m/s) : <td>5.2 4.9 5.0 7.4 6.1 5.5 2.9 2.1 2.4 5.8 4.2 3.5 19 14 8 10 12 32 42 32 42 48 Bed Material 10 10 10 Gravels Small (2-16mm): 40 20 Large (16-64mm): 20 20 20 Large (16-64mm): 20 20 20 Large (16-64mm): 20 20 15 Bider cobble (128-256mm): 50 15 Bider cobble (>256mm): 15 15 Bedrock 0 0 0 D90 (cm): 92 Compaction: High 0.3 % Unstable: 10 10 10 Fines Gravels Larges Bedrock 0 Valley : Channel Ratio 5-10 5-10 5 Stage: M Flood Signs Ht(m): 0.7! Bars (%): 25 pH: 7.6 Braided: Y Water Temp. (°C):<td>Fish Summary <u>NF</u> <u>NF</u> <u>NF</u> <u>C</u> <u>No</u> <u>No</u> <u>No</u> <t< td=""></t<></td></td>	5.2 4.9 5.0 7.4 6.1 5.5 2.9 2.1 2.4 5.8 4.2 3.5 19 14 8 10 12 32 42 32 42 48 Bed Material 10 10 10 Gravels Small (2-16mm): 40 20 Large (16-64mm): 20 20 20 Large (16-64mm): 20 20 20 Large (16-64mm): 20 20 15 Bider cobble (128-256mm): 50 15 Bider cobble (>256mm): 15 15 Bedrock 0 0 0 D90 (cm): 92 Compaction: High 0.3 % Unstable: 10 10 10 Fines Gravels Larges Bedrock 0 Valley : Channel Ratio 5-10 5-10 5 Stage: M Flood Signs Ht(m): 0.7! Bars (%): 25 pH: 7.6 Braided: Y Water Temp. (°C): <td>Fish Summary <u>NF</u> <u>NF</u> <u>NF</u> <u>C</u> <u>No</u> <u>No</u> <u>No</u> <t< td=""></t<></td>	Fish Summary <u>NF</u> <u>NF</u> <u>NF</u> <u>C</u> <u>No</u> <u>No</u> <u>No</u> <t< td=""></t<>

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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

DFO/MoELP Stream Survey Form	Site Number: Z128	Reach No.: 1
	Trib to Mulwa	in Cr. TRITON Environmental Consultants Ltd.
Location: Z128, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 037-4100-000-000-000-000-000-000-000-000-00
Map #: 93 L 081 Reach Length (km) U.T.M.: 9.566124.6078145 Length surveyed (r	n): 100.0 GE Survey Crew: JP \KG	ie: 12:44 Agency: TEC Access: H Fish Card: N Field Historical
Channel Characteristics Av. Chan. Width (m): 4.9 MS 3. Av. Wet. Width (m): 2.6 MS 1. Av. Max Riffle Depth (cm): 8 MS 1. Av. Max Riffle Depth (cm): 31 MS 1. Av. Max Pool Depth (cm): 31 MS 1. Gradient (%): 12.0 CL Pool: 40 Pool: 40 Riffle: 15 Run: 40 Other: 5 % Side Channel: 0-10 GE Fin 5 S Gr % Stable: 20 GE Gr Gr Cover Cover Total % : 35 GE La Pool LOD Bldr In Veg O Veg Ctbnk Bed 30 15 35 5 10 D90 Crown Closure % : 5 Aspect : NE D90	Specific Data 6 3.8 6.0 6.8 5.4 4.0 1 3.1 2.2 3.0 2.6 3.5 2 4 7 8 7 25 2 1 58 43 43 Material I0 10 10 avels Small (2-16mm): 30 10 avels Small (2-16mm): 30 10 ges Clay, silt, sand (<2mm):	Obstructions
Discharge Ban 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 Val Stag Ban Mean Velocity (m/s) : 0.03 F Val Stag DV 5 B 12.0 1342	ks Height (m): 0.6 % Unstable: 25 es Gravels Larges Ifinement: FC ley: Channel Ratio 2-5 ge: L Flood Signs Ht(m): 0.7 si (%): 20 pH: 7.4 Braided: Y er Temp. (°C): 12.0 02 (ppm):	 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.



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

DFO/MoELP Stream Survey Form	Site Number: Z129 Trib to Mulwai	in Cr. TRITON Environmental Consultants Ltd.
Location: Z129, Unit 11 Map #: 93 L 081 Reach Length (km): U.T.M. : 9.5659.60782 Length surveyed (m):	Stream (Gaz.): Unnamed 1.3 MA Date: 12-Aug-97 Time 100.0 GE Survey Crew: JP \KG \	Watershed Code: 037-4100-000-000-000-000-000-000-000-000-00
Channel Characteristics I Av. Chan. Width (m): 1.2 MS Av. Wet. Width (m): 0.5 Av. Max Riffle Depth (cm): 2 Av. Max Riffle Depth (cm): 2 Av. Max Riffle Depth (cm): 16 MS 2 Av. Max Riffle Depth (cm): 16 MS 2 Av. Max Pool Depth (cm): 16 MS 13 Gradient (%): 28.0 Pool: 20 Red Materia 0 GE Fines % Side Channel: 0 GE % Stable: 90 GE % Stable: 90 GE Cover Cover Cover Total %: 20 GE Pool LOD Bldr In Veg O Veg Ctbnk 0 30 5 So 10 Cover Closure %: 50 Aspect : NE Discharge Banks Mean Depth (m) : 0.04	Specific Data 1.0 1.1 0.7 1.4 1.7 1.0 0.8 0.4 0.0 0.0 2 2 12 7 8 18 40 Tterial Clay, silt, sand (<2mm):	Obstructions C Height (m) Type Location F F Sector Sector Nember Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA NA NA NA NA Comments S6. One additional measurement was taken for both channel and wetted widths; 1.7 and 0.4. C2 LS=7%, RS=31% Ci No fisheries sensitive zones noted. C4 Too little flow was available for electroshocking at this site. Ci No additional bank texture information. C6 D0 was not measured at this site, the water was clear to bottom. The air temperature at this site was 22 C. Ci 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.



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

DFO/MoELP Stream Survey Form	Site Number: Z80	Reach No.: 1
	Trib to Mulwai	in Cr. TRITON Environmental Consultants Ltd.
Location: Z80, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 037-5300-000-000-000-000-000-000-000-000-00
Map #: 93 L 081 Reach La U.T.M. : 9.565193.6081553 Length s	arveyed (m): 0.8 MA Date: 26-Jul-97 Time arveyed (m): 150.0 GE Survey Crew: DD \KG	e: 8:37 Agency: TEC Access: H Fish Card: N Field Historical
Channel Characteristics Av. Chan. Width (m): 1.8 MS Av. Wet. Width (m): 1.3 MS Av. Max Biffle Death (cm): 8 MS	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 8	Obstructions
Av. Max Pool Depth (cm): 28 MS Gradient (%): 1.5 CL Pool: 20 Riffle: 15 % Side Channel: 0-10 GE % Debris Area: >15 GE	24 39 21 28 26 Bed Material Fines Clay, silt, sand (<2mm):	Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method DV 11 45-80 J R EL
%Stable: 60 GE Cover Cover Total % : 35 GE Pool LOD Bidr In Veg O Veg Ctbnk 20 40 0 5 10 25	Gravels 50 50 Large (16-64mm): 25 Sm. cobble (64-128mm): 10 Larges Lge cobble (128-256mm): 10 Blder cobble (>256mm): 0 Bedrock 0 0	Ci s3. C2 LS= 0%, RS= 0%
Crown Closure % : 35 Aspect : SW Discharge Wetted Width (m) : 1.0 MS Mean Depth (m) : 0.1 MS	D90 (cm): 10 Compaction: Low Banks	 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 to be a constructed on the second second
Mean Velocity (m/s) : 0.47 F Discharge (m3/s) : 0.04 F Reach Symbol (Fish) DV	Confinement: UC Valley : Channel Ratio 10+ Stage: M Flood Signs Ht(m): 0.4 Bars (%): 5 pH: 7.6 Braided: Y Water Temp. (°C): 6.0 02 (ppm): 1	 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.



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

DFO/MoELP Stream Survey Form	Site Number: Z81 Trib to Mulwain Cr.	Reach No.: 1
Location: Z81, Unit 11 Map #: 93 L 081 Reach Length (U.T.M. : 9.565783.6082049 Length surveyo	Stream (Gaz.): Unnamed km): 0.3 MA Date: 26-Jul-97 Time: 9:52 d (m): 200.0 GE Survey Crew: DD\KG\\\\\\\\\	Watershed Code: 037-5700-000-000-000-000-000-000-000-000-0
Channel Characteristics Cl Av. Chan. Width (m): 4.9 MS Av. Max Wet. Width (m): 3.6 MS Av. Max Riffle Depth (cm): 19 MS Av. Max Pool 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 9 8 % Side Channel: >15 GE 9 8 % Stable: 30 GE 9 8 % Stable: 30 GE 9 9 Cover Cover Total %: 35 GE % Stable: 30 0 5 10 Crown Closure %: 1 Aspect: W Discharge Wetted Width (m): 3.2 MS Mean Depth (m): 0.21 F 5 C 6.0 1450	Specific Data Obstrue 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 23 23 28 43 29 44 25 44 25 Primes Clay, silt, sand (<2mm): 10 10 Gravels Small (2-16mm): 40 15 Large (16-64mm): 25 50 15 Larges Large (128-256mm): 50 15 Bider cobble (>256mm): 50 15 S3. The and 4.4, C2 Ls=269 C3 No fishte and ks Height (m): 0.2 C3 No fishte anks Height (m): 0.2 C3 No fishte Confinement: OC Valley : Channel Ratio 5-10 Stage: M Flood Signs Ht(m): 1 Bars (%): 20 pH: 7.6 Braided: Y) Y Water Temp. (°C): 6.0 02 (ppm	Type Location ght (m) Type Location 2 C 2.8 ummary es Number Size Range (mm) Life Phase Use 1 Use 3 Method the size Range (mm) Life Phase Use 1 Use 3 Method the size Range (mm) Life Phase Use 3 Method the size Range (mm) Life Phase Use 3 Method the size Range (mm) Life Phase Use 1 Use 3 Method the size Range (mm) Life Phase Use 3 Method tell Size Additional Method Net Size Additional Method EL the additional measurements were taken for both the channel and wetted widths; 9.5 and 6.0, 13.0 9.4 and 7.4. Size Size Size Size Colspan="2">Size Size Size Colspan="2">Size Size Size Size Size Size Size Size



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

DFO/MoELP Stream Survey Form	Site Number: Z82 Trib to Mulwai	n Cr. TRITON Environmental Consultants Ltd.
Location: Z82, Unit 11 Map #: 93 L 081 J.T.M. : 9.565783.6082049 Length surveyed (m):	Stream (Gaz.): Unnamed 3.6 MA Date: 26-Jul-97 Time 200.0 GE Survey Crew: DD \KG	Watershed Code: 065-3900-000-000-000-000-000-000-000-000-00
Channel Characteristics Av. Chan. Width (m): 7.0 MS 6.0 Av. Wet. Width (m): 4.6 MS 4.2 Av. Max Riffle Depth (cm): 11 MS 10 Av. Max Rool Depth (cm): 60 MS 38 Gradient (%): 2.0 CL Bed M Your Max Rool Depth (cm): 60 MS 38 Gradient (%): 2.0 CL Bed M Your Max Rool Depth (cm): 60 MS 38 Gradient (%): 2.0 CL Bed M Your Max Rool Depth (cm): 60 MS 38 Gradient (%): 2.0 GE Grave Your Debris Area: 20 GE Grave Cover Cover Total %: 70 GE Largee Pool LOD Bldr In Veg O Veg Ctbnk Bedroc 30 30 0 0 10 D90 (cn Discharge Wetted Width (m): 3.3 MS MS Fines	Specific Data 6.9 7.4 6.5 8.4 7.1 4.2 5.0 4.9 4.7 4.8 8 12 14 10 45 42 50 125 aterial Clay, silt, sand (<2mm): 10 10 Small (2-16mm): 20 10 Small (2-16mm): 20 10 Large (16-64mm): 20 10 Small (2-16mm): 20 10 Small (2-16mm): 20 10 Large (16-64mm): 20 10 Small (2-16mm): 20 10 Small (2-16mm): 20 10 Small (2-16mm): 20 10 Small (2-16mm): 30 Compaction: Medium Small (2-16mm): 30 Milet colspan="2">Compaction: Medium Milet colspan="2">State Milet colspan="2">State Milet (m): 0.2 <tr< th=""><th>Obstructions Fish Summary</th></tr<>	Obstructions Fish Summary



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

DFO/MoELP Stream Survey Form	Site Number: Z83 Trib to Mulwa	Reach No.: 1 in Cr. TRITON Environmental Consultants Ltd.
Location: Z83, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 037-6600-000-000-000-000-000-000-000-000-0
Map #: 93 L 081 Reach Length (km): U.T.M. : 9 .5657 .60820 Length surveyed (m	0.6 MA Date: 26-Jul-97 Tim 100.0 GE Survey Crew: DD \K	ne: 12:11 Agency: TEC Access: H Fish Card: N Field Historical C G\\\\\\\ Photos: Z-11-5,6,7 Air Photos:
Channel Characteristics Av. Chan. Width (m): 1.4 Av. Wet. Width (m): 1.1 MS Av. Wet. Width (m): 1.1 MS 0.9 Cl Av. Max Riffle Depth (cm): 0 MS 18 Gradient (%): 11.5 MA 18 Gradient (%): 11.5 MA MS Pool: 10 Rum: 90 Other: 0 % Side Channel: 0 GE Gra Fine % Debris Area: 0-5 GE Gra % Stable: 100 GE Gra 10 40 0 40 10 Cover Total %: 25 GE Lar Pool LOD Bldr In Veg O Veg Ctbnk D90 10 40 0 40 10 D90 Discharge Bani Fine Fine Fine Wetted Width (m): 1.1 MS Fine Mean Depth (m): 0.25 F Cond	Specific Data 1.1 1.2 1.6 1.6 1.2 0.9 1.1 1.3 1.5 1.0 15 10 50 50 Material s Clay, silt, sand (<2mm): 60 60 Material s Clay, silt, sand (<2mm): 60 60 Material s Clay, silt, sand (<2mm): 60 60 Material Small (2-16mm): 40 30 Large (16-64mm): 10 Blder cobble (128-256mm): 0 Blder cobble (>256mm): 0 Compaction: Low K Compaction: Low S Gravels Larges Bedrock Interment:	Obstructions Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method DV 2 65-70 J R EL Comments Cl S4. No riffles were noted. 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 188 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.
Discharge (m3/s) : 0.02 F Valle Reach Symbol (Fish) Bars DV Wate 1 D 12.0 6400 (Width, Valley: Channel, Slope) (Bed Material) Turb	cy : Channel Ratio 10+ e: L Flood Signs Ht(m): 0.4 (%): 0 pH: 7.4 Braided: N er Temp. (°C): 9.0 02 (ppm): . (cm): Cond. (µmhos): 130	C7. This is a small stream with rearing cover. It's feeding a main channel.



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

DFO/MoELP Stream Survey Form	Site Number: Z84	Reach No.: 2
	Trib to Mulwain	n Cr. TRITON Environmental Consultants Ltd.
Location: Z84, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 065-3900-000-000-000-000-000-000-000-000-00
Map #: 93 L 081 Reach Length (kn U.T.M. : 9.566943.6083840 Length surveyed	m): 3.1 MA Date: 26-Jul-97 Time: (m): 600.0 GE Survey Crew: KG \DD \	13:24 Agency: TEC Access: H Fish Card: N Field Historical V V V Photos: Z-11-11,12,13 Air Photos:
Channel Characteristics Av. Chan. Width (m): 5.2 MS Av. Wet. Width (m): 4.3 MS Av. Wet. Width (m): 4.3 MS Av. Max Riffle Depth (cm): 19 MS Av. Max Pool Depth (cm): 24 MS Gradient (%): 4.0 CL Pool: 10 Riffle: 30 % Side Channel: 10-40 GE % Side Channel: 0 GE % Stable: 0 GE Cover Cover Total %: 20 Pool LOD Bidr In Veg O Veg Ctown Closure %: 1 Aspect: W D5	Specific Data 5.0 5.2 4.9 5.4 4.5 6.0 4.2 4.9 3.7 4.0 4.3 4.6 20 30 9 17 30 21 22 I Material ines Clay, silt, sand (<2mm): 10 10 ines Clay, silt, sand (<2mm): 30 10 iravels Small (2-16mm): 30 10 irayets Small (2-16mm): 30 10 irayets Sm. cobble (64-128mm): 15 20 sarges Lge cobble (128-256mm): 60 20 Bider cobble (>256mm): 25 25 of ock 0 0 0	Obstructions C Height (m) Type Location 5 F 4.2 5 F 3.6 Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA NA NA NA NA Comments C1 S5. C2 LS=0%, RS=0% C1 S5. C3 No fisheries sensitive zones noted. C1 S5.
Discharge Ba Wetted Width (m) : 3.4 MS Mean Depth (m) : 0.2 MS Mean Velocity (m/s) : 0.83 F Discharge (m3/s) : 0.42 F V V State Reach Symbol (Fish) State NF State State (Width, Valley: Channek, Slope) (Bed Material)	Piks Height (m): 0.1 % Unstable: 20 ines Gravels Larges Bedrock onfinement: UC ulley : Channel Ratio 10+ age: M Flood Signs Ht(m): 0.6 rs (%): 15 pH: 7.1 Braided: Y ater Temp. (°C): 7.0 02 (ppm): 60	 ¹⁴ The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 500V, was 447 seconds over 200 meters. ¹⁶ No additional bank texture information. ¹⁶ DO was not measured at this site, the water was clear to bottom. The air temperature at this site was 16 C. ¹⁷ The boulder cover is predominant in this stream. ¹⁸ A grizzly bear was noted in the sedge meadownearby the stream. This area has some terrific grizzly habitat.



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

DFO/MoELP Stream Survey Form	Site Number: Z85 Trib to Mulwain Cr	Reach No.: 1
Location: Z85, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 037-5100-000-000-000-000-000-000-000-000-00
Map #: 93 L 081 Reach Length (I U.T.M. : 9 .564889.6079982 Length surveyed	km): 1.1 MW Date: 26-Jul-97 Time: 14:0 d (m): 100.0 GE Survey Crew: DD \KG \ \ \ \	2 Agency: TEC Access: H Fish Card: N Field X Historical A V V 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 Riffle Depth (cm): 37 MS Av. Max Pool Depth (cm): 37 MS Gradient (%): 13.0 CL Pool: 15 Riffle: 40 Run: 40 Other: 5 % Side Channel: 1040 GE 60 GE % Stable: 60 GE 60 GE % Stable: 60 GE 60 GE Pool LOD Bldr In Veg O Veg Ctbnk 20 30 25 0 5 20 Crown Closure % : 15 Aspect : S Base Discharge Wetted Width (m) : 0.1 MS Mean Depth (m) : 0.42 F Discharge (m3/s) : 0.04 F S 15 1450 (Vidth, Valley: Channel, Slope) (Bed Material) 1450 1450	Specific Data Obs 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 3.4 47 41 31 30 C Prines Clay, silt, sand (<2mm): 10 10 Gravels Small (2-16mm): 40 15 Large (16-64mm): 25 50 15 Bider cobble (64-128mm): 25 15 Bider cobble (>256mm): 10 0 000 (cm): 24 Compaction: High C1 C2: L Compaction: High C3: N C4: Tmm % C3: N Confinement: UC UC C4: Tmm Valley : Channel Ratio 10+ Si C6 Data (C4: Tmm C3: N C6 D D Phieght (m): 0.6 C3: N C5: N C6 D C7 C5: N C6 D	tructions Height (m) Type Location 1 C 0.1 1 R Life Phase Use 1 Use 2 Use 3 Method 1 C 6 55-110 J R EL Thements 1 C 0.10 J R EL Thements 3 S=35%, RS=36% 0 fisheries sensitive zones noted. the electroshocking effort, using a Smithroot 12 B POW model set at L 5, 600V, was 366 seconds over 175 eters. 0 additional bank texture information.



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

DFO/MoELP Stream Survey Form	Site Number: E125 Trib. to Mulwain	Reach No.: 1 Cr. IIITON
Landan El26 Unit 11 West of Multiple Const.		Environmental Consultants Ltd.
Map #: [1031 090 Reach L U.T.M.: 9.5586 .60836 Length s	Stream (Gaz.): Unnamed ength (km): 1.6 MA Date: 26-Jul-97 Time: 1 urveyed (m): 100.0 GE Survey Crew: JL \EM \ \	Watersned Code: 063-9400-000-000-000-000-000-000-000-000-00
Channel Characteristics Av. Chan. Width (m): 2.0 MS Av. Wet. Width (m): 1.6 MS Av. Max Riffle Depth (cm): 3 MS Av. Max Riffle Depth (cm): 31 MS Av. Max Riffle Depth (cm): 31 MS Av. Max Pool Depth (cm): 31 MS Av. Max Pool Depth (cm): 31 MS Gradient (%): 3.0 CL Pool: 30 Riffle: 30 Value Channel: 0 GE GE % Stable: 0 GE GE Volue Cover Total %: 10 GE Pool LOD Bldr In Veg Veg Ctonk 20 20 0 20 40 Crown Closure %: 5 Aspect: NE Discharge	Specific Data Ø 2.7 2.1 1.7 1.8 1.8 1.7 1.5 1.7 1.8 1.8 1.5 1.4 4 3 4 3 3 28 34 30 29 35 Bed Material I0 10 10 Gravels Small (2-16mm): 20 10 Gravels Small (2-16mm): 20 10 Large (16-64mm): 10 10 Sm. cobble (64-128mm): 35 Larges Lge cobble (128-256mm): 70 30 Blder cobble (>256mm): 5 5 5 Bedrock 0 0 0 0 D90 (cm): 18 Compaction: Medium 35 SmalkS Height (m): 0.2 % Unstable: 0 % Unstable: 0 0 5 5 Confinement: UC Yalley: Channel Ratio 10+ 5 Stage: M Flood Signs Ht(m): 0.4 4 Bars (%): 25 <th>bstructions ish Summary Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method B 4 70-130 J R EL omments S3 LS = 1%, RS = 20% No fisheries sensitive zones noted. The electroshocking effort at this site, using a Smithroot 12 B POW model, set at 1-5-300V, was 200 seconds over 50 meters. / </th>	bstructions ish Summary Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method B 4 70-130 J R EL omments S3 LS = 1%, RS = 20% No fisheries sensitive zones noted. The electroshocking effort at this site, using a Smithroot 12 B POW model, set at 1-5-300V, was 200 seconds over 50 meters. /



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

DFO/MoELP Stream Survey Form	Site Number: E127	Reach No.: 1
	Trib. to Mulwa	ain Cr. TRITON Environmental Consultants Ltd.
Location: E127, Unit 11, East of Mulwain Creek.	Stream (Gaz.): Unnamed	Watershed Code: 065-8800-000-000-000-000-000-000-000-000-0
Map #: 1031 090 Reach Lo U.T.M. : 9.5594 .60837 Length s	ength (km): 2.0 MA Date: 26-Jul-97 Tin urveyed (m): 100.0 GE Survey Crew: JL \EM	ne: 11:15 Agency: TEC Access: H Fish Card: N Field Historical Access: H Fish Card: N Field Historical Access: E-12-10,11 Air Photos:
Channel Characteristics	Specific Data	Obstructions
Av. Wet. Width (m): 0.8 MS Av. Max Riffle Depth (cm): 0 GE Av. Max Pool Depth (cm): 0 GE Av. Max Pool Depth (cm): 0 GE Gradient (%): 8.0 CL Pool: 0 Riffle: 0 % Side Channel: 0 GE % Side Channel: 0 GE % Debris Area: 5-15 GE % Stable: 10 GE % Stable: 10 GE Pool LOD Bldr In Veg Veg Cover Total %: 60 GE Pool LOD Bldr In Veg Veg Crown Closure %: 0 10 30 10 Crown Closure %: 0 Aspect : SE Discharge	1.2 0.8 0.9 0.6 0.4 0.9 Bed Material Fines Clay, silt, sand (<2mm): 80 80 Graveis Small (2-16mm): 10 5 Graveis Small (2-16mm): 10 5 Sm. cobble (64-128mm): 10 5 Large (16-64mm): 5 5 Sm. cobble (64-128mm): 10 0 Larges Lage cobble (128-256mm): 10 0 Bder cock 0 0 0 0 Bder cock 0 0 0 0 D90 (cm): 0 Compaction: Low 0 0 Fines Gravels Larges Bedrock 0 Fines Gravels Larges Bedrock 0 Fines Gravels Larges Bedrock 0 Confinement: UC UC 0 0	Fish Summary C Species Number Size Range (mm) Life Phase Use I Use 2 Use 3 Method NF NF NA I
Reach Symbol (Fish) (DV) (RB) 1 D 8.0 8110 Oldeb Value Chung Simol Get Mandell Get Mandell	Stage: M Flood Signs Ht(m): 0.1 Bars (%): 0 pH: 7.5 Braided: N Water Temp. (°C): 8.0 02 (ppm): 1 1 Turb. (cm): Cond. (umbos): 20	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

DFO/MoELP Stream Survey Form	Site Number: E128 Trib. to Mulwa	Reach No.: 1 in Cr. TRITON Environmental Consultants Ltd.
Location: E128, Unit 11, North of Mulwain Creek. Map #: [1031 090 Reach L	Stream (Gaz.): Unnamed ength (km): <u>0.4</u> [MA] Date: <u>26-Jul-97</u>] Tim	Watershed Code: 065-9000-000-000-000-000-000-000-000-000-0
O. 1.M. : 9.3593.00839 Lengm : Channel Characteristics Av. Chan. Width (m): 10.0 MS Av. Wet. Width (m): 3.4 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 % % See % Side Channel: 10-40 GE % % See See % Side Channel: 0 GE % Stable: 0 GE % Stable: 0 GE % Stable: 0 GE Cover Cover Total % : 15 GE 20 25 25 0 10 20 Crown Closure % : 5 Aspect : W 30	Specific Data 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 Fines Clay, siit, sand (<2mm):	Fish Summary E-12-12,13 Air Photos: Obstructions Obstructions Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA EL Comments Ci S2 Ci S2 Ci S2 Ci S2 Ci S2 Ci S2 S2 Ci S2 Ci S2 S2 S2 Ci S2 S4 S4 Ci S2 S4 S5 Ci S4 S4 S5 S5 S5 S5 Ci S4 S5 S5 S5 S5 S5 Ci S5 S5 S5 Ci S5 S5 S5 S6 S6 S6
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) 10 D 3.0 1270 (Width, Valley: Channel, Slope) (Bed Materias)	Banks Height (m): 0.3 % Unstable: 0 Fines Gravels Larges Confinement: UC Valley: Channel Ratio 10+ Stage: M Flood Signs Ht(m): 1.5 Bars (%): 60 pH: 7.5 Braided: Y Water Temp. (°C): 02 (ppm): 10 10 Turb. (cm): Cond. (µmhos): 10 10	 C4 The electroshocking efort, 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

DFO/MoELP Stream Survey Form	Site Number: E129	Reach No.: 1
	Trib. to Mulwai	in Cr. TRITON Environmental Consultants Ltd.
Location: E129, Unit 11, North of Mulwain Cr.	Stream (Gaz.): Unnamed	Watershed Code: 065-6700-000-000-000-000-000-000-000-000-00
Map #: 1031 090 Reach Le U.T.M. : 9 .5811 .60838 Length su	ngth (km): 1.0 MA Date: 26-Jul-97 Time arveyed (m): 100.0 GE Survey Crew: EM \JL	: 13:00 Agency: TEC Access: H Fish Card: N Field Historical E-12-14,15,16 Air Photos:
Channel Characteristics	Specific Data	Obstructions
Av. Chain, Width (m): 2.3 MS Av. Wet. Width (m): 2.3 MS Av. Max Riffle Depth (cm): 4 MS Av. Max Pool Depth (cm): 41 MS Av. Max Pool Depth (cm): 41 MS Gradient (%): 4.0 CL Pool: 25 Riffle: 25 Value 0-10 GE '/ Stable: 0-5 GE '/ Debris Area: 0-5 GE '/ Stable: 5 GE Cover Cover Total '% : 20 Pool LOD Bldr In Veg O Veg Cown Closure '% : 20 Aspect : S Discharge	2.3 3.0 0.0 0.0 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 Bed Material Fines Clay, silk, sand (<2mm):	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 Comments Cl S3, with a recommendation for an upgrade to an S2 based on the abundance of fish in this reach. Cl S3, with a recommendation for an upgrade to an S2 based on the abundance of fish in this reach. Cl S3, with a recommendation for an upgrade to an S2 based on the abundance of fish in this reach. Cl S3, with a recommendation for an upgrade to an S2 based on the abundance of fish in this reach. Cl S3, with a recommendation for an upgrade to an S2 based on the abundance of fish in this reach. Cl S3, with a recommendation for an upgrade to an S2 based on the abundance of fish in this reach. Cl S4 Model, set at 1-5-300V, was 50 seconds over 20 meters. The shocking 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. Cl D0 was not measured, the water was clear to the bottom. The mean air temperature on this day was 13.1.C. Cl D0 and plunge pools provide a large amount of habitat structure in this reach. Prominent flood signs and stable ban



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

DFO/MoELP Stream Survey Form	Site Number: E130 Trib. to Mulwa	Reach No.: 1 in Cr. TRITON . Environmental Consultants Ltd.
Location: E130, Unit 11, South of Mulwain Cr. Map #: [1031 090 Reach Le U.T.M. : [9.5606 .60834 Length su	Stream (Gaz.): Unnamed ngth (km): 2.5 MA Date: [26-Jul-97] Time urveyed (m): 100.0 GE Survey Crew: JL VEM	Watershed Code: 065-6900-000-000-000-000-000-000-000-000-00
Channel Characteristics Av. Chan. Width (m): Av. Chan. Width (m): 9.1 Av. Wet. Width (m): 6.1 Av. Max Riffle Depth (cm): 16 Av. Max Riffle Depth (cm): 16 Av. Max Pool Depth (cm): 47 MS Av. Max Pool Depth (cm): 47 Gradient (%): 5.0 CL Pool: 20 Riffle: 70 Pool: 20 Riffle: 70 Run: 10 V Side Channel: 0 GE % Stable: 0 GE V Debris Area: 0.5 GE % Stable: 0 GE Cover Cover Total %: 15 GE Pool LOD Bidr In Veg O Veg Ctbnk 30 20 25 0 15 10 Crown Closure %: 5 Aspect : N Discharge	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 Bed Material Fines Clay, silt, sand (<2mm):	Obstructions Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method DV DV 1 200 A DV Nethod Comments C2 S2 C2 Comments C2 C2 C3 C2 C3 C2 C3 C2 C3 C2 C3 C3 C2 C3 DV Method C3 C3 C3



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

DFO/MoELP Stream Survey Form	Site Number: E240 Trib. to Mulwain	n Cr. TRITON Environmental Consultants Ltd.
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 Len U.T.M. : 9 .5625 .60784 Length sur	gth (km): 1.0 MW Date: 22-Aug-97 Time: rveyed (m): 200.0 GE Survey Crew: SJ \EM \	H Fish Card: N Field Historical H Fish Card: N Field Historical H Fish Card: N Field Historical
Channel Characteristics Av. Chan. Width (m): Av. Chan. Width (m): 1.6 Av. Wet. Width (m): 1.6 Av. Wet. Width (m): 1.6 Av. Max Riffle Depth (cm): 3 Av. Max Pool Depth (cm): 20 Av. Max Pool Depth (cm): 20 Gradient (%): 17.0 CL Pool: 10 Riffle: 30 Run: 50 Other: 10 % Side Channel: 0.6E % Stable: 10 GE % Stable: 10 GE Cover Cover Cover Total %: 10 GE Cover Cover Total %: 20 25 30 0 5 Crown Closure %: 10 Mean Depth (m): 0.1 Mean Depth (m): 0.0 Mean Velocity (m/s): 1.13 Fibh (BT) 7 C 17.0 1540	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 Bed Material 10 10 10 10 Gravels Small (2-16mm): 50 25 Large (16-64mm): 50 25 Sm. cobble (64-128mm): 15 Larges Lge cobble (128-256mm): 40 Bedrock 0 0 D90 (cm): 50 Compaction: Medium Barnks Height (m): 0.4 % Unstable: 40 Fines Gravels Larges Gravels Larges Bedrock Confinement: OC Valley: Channel Ratio 5-10 Stage: E Flood Signs Ht(m): 0.6 Bars (%): 60 pH: Braided: N Water Temp. (°C): 8.5 02 (ppm): 10 <th>Obstructions Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method EL Comments C3 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 C2 LS = 100%, RS = 80% C2 LS = 100%, RS = 80% C3 Colspan="2">Colspan="2">Colspan="2">Colspan= 2 Colspan= 2 Colspan= 2 Life POW Colspan= 2 Colspan= 2</th>	Obstructions Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method EL Comments C3 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 C2 LS = 100%, RS = 80% C2 LS = 100%, RS = 80% C3 Colspan="2">Colspan="2">Colspan="2">Colspan= 2 Colspan= 2 Colspan= 2 Life POW Colspan= 2 Colspan= 2



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

DFO/MoELP Stream Survey Form	Site Number: E241 Trib. to Mulwa	Reach No.: 2 in Cr. TRITON Environmental Consultants Ltd.
Location: E241, Unit 11, South of Mulwain Creek Map #: 1031 090 Reach Lo U.T.M. : 9.5592 .60817 Length st	Stream (Gaz.): Unnamed :ngth (km): 2.0 MW Date: 22-Aug-97 Time urveyed (m): 250.0 GE Survey Crew: SJ \EM	Watershed Code: 065-6900-000-000-000-000-000-000-000-000-00
Channel Characteristics Av. Chan. Width (m): Av. Chan. Width (m): 10.0 Av. Wet. Width (m): 4.6 Av. Max Riffle Depth (cm): 6 Av. Max Riffle Depth (cm): 6 Av. Max Pool Depth (cm): 26 MS Av. Max Pool Depth (cm): 5.0 Cl Pool: 15 Riffle: 40 Run: 40 Other: 5 % Side Channel: 0-10 GE % Stable: 10 GE % Stable: 10 GE % Stable: 10 GE Cover Cover Total % : 15 GE Pool LOD Bldr In Veg O Veg Ctbnk 15 20 40 0 10 15 Crown Closure % : 0 Aspect : N	Specific Data 12.0 10.2 13.7 7.4 9.5 7.1 4.0 4.4 5.2 6.1 2.4 5.3 10 9 4 7 3 4 30 18 27 41 23 17 Bed Material Fines Clay, silt, sand (<2mm): 10 10 Gravels Small (2-16mm): 30 15 Large (16-64mm): 30 15 Large (16-64mm): 15 Sm. cobble (64-128mm): 20 Larges Lge cobble (128-256mm): 60 20 Bder cobble (>256mm): 0 0 0 D90 (cm): 62 Compaction: High 50 Banks Height (m): 0.6 30	Obstructions C Height (m) Type Location 3 C 1.0 3 C 1.5 4 C 2.0 Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA EL State Method EL State Comments Ci S2 S3 No fisheries sensitive zones noted. S4 The electroshocking effort, using a Smithroot 12B POW model, set at 1-5-500V, was 560 seconds over 150 meters. S5 Eines, gravets and larges make up the bask texture at this size
Mean Depth (m) : 0.1 MS Mean Velocity (m/s) : 0.49 F Discharge (m3/s) : 0.05 F (Fish) (DV) 10 C 5.0 1360 (Width, Valley: Channel, Stope) (Bed Material)	Fines Graveis Larges Bedrock Confinement: OC Valley : Channel Ratio 5-10 Stage: L Flood Signs Ht(m): 1 Bars (%): 60 pH: 7.4 Braided: Y Water Temp. (°C): 12.5 02 (ppm): 70 Turb. (cm): Cond. (µmhos): 70	 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 meanders in the valley and actively eroding bends contribute fines and gravels to the bedload. Habitat complexity is low, as reflected by the lack of LOD and associated pools. Occasional deep runs and numerous boulders provide cover for fish in the sampling area. C8 Evidence of high seasonal flows was noted. Roughly 5% of the flow at this site consists of cascades.



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

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Photo #: E-23-14, 22-Aug-97 Site #: E241, Looking upstream at a barrier on a tributary to Mulwain Creek

DFO/MoELP Stream Survey Form	Site Number: E242	Reach No.: 2
	Trib. to Mulw	ain Cr. TRITON Environmental Consultants Ltd.
Location: E242, Unit 11, North of Mulwain Cr.	Stream (Gaz.): Unnamed	Watershed Code: 038-0700-000-000-000-000-000-000-000-000-0
Map #: 93 L 081 Reach L U.T.M. : 9.5685 .60764 Length s	ength (km): 1.9 MA Date: 22-Aug-97 Ti surveyed (m): 100.0 GE Survey Crew: SJ \EI	ne: 16:45 Agency: TEC Access: H Fish Card: N Field A Historical
Channel Characteristics	Specific Data	Obstructions
Av. Chan. Width (m): 5.0 MS Av. Wet. Width (m): 2.6 MS Av. Max Riffle Depth (cm): 6 MS Av. Max Rool Depth (cm): 34 MS Gradient (%): 16.0 CL Pool: 15 Riffle: 25 Wetted Channel: 0 GE % % Side Channel: 0 GE % Side Channel: 0 GE % Stable: 25 GE Cover Cover Total %: 15 GE Veg O Veg Ctbnk 40 40 10 30 0 IO 30 0 10 Crown Closure %: 5 Aspect: S Discharge Wetted Width (m): 0.4 MS Mean Depth (m): 0.11 MS Mean Velocity (m/s): 1.01 F Discharge (m3/s): 0.03 F (DV)	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 Bed Material 10 10 10 10 Gravels Small (2-16mm): 20 10 Large (16-64mm): 10 10 10 Large (16-64mm): 20 10 20 Larges Lge cobble (64-128mm): 20 20 Bedrock 10 10 10 10 D90 (cm):	Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA I I I EL Comments Image: Species and seconds over 15% S3 Image: Species and larges make up the bank texture at this site. Ci S3 S3 Ci LS = 75%, RS = 70% Site at 1-5-500V, was 408 seconds over 150 meters. Ci The electroshocking effort, using a Smithroot 12 B POW model, set at 1-5-500V, was 408 seconds over 150 meters. Gi Ci To an another and the same up the bank texture at this site. Site DO was not measured, the water was clear to the bottom. The mean air temperature on this day was 16.8.C. Ci 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.



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

DFO/MoELP Stream Survey Form	Site Number: Z174 Trib. to Mulwa	Reach No.: 1 in Cr. TRITON Environmental Consultants Ltd.
Location: Z174, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 037-5000-000-000-000-000-000-000-000-000-0
Map #: 1031 090 Reach L U.T.M. : 9.564200.6079538 Length s	ength (km): 1.7 MW Date: 22-Aug-97 Tim urveyed (m): 900.0 GE Survey Crew: CF \KC	e: 11:49 Agency: TEC Access: H Fish Card: N Field Historical
Channel Characteristics Av. Chan. Width (m): 9.1 MS Av. Wet. Width (m): 3.5 MS Av. Wet. Width (m): 3.5 MS Av. Max Riffle Depth (cm): 8 MS Av. Max Pool Depth (cm): 31 MS Av. Max Pool Depth (cm): 31 MS Gradient (%): 3.0 CF Pool: 25 Riffle: 25 Run: 45 Other: 5 % Side Channel: 10-40 GE % Debris Area: >15 GE % Stable: 30 GE 30 GE Cover Cover Total %: 35 GE Pool LOD Bldr In Veg O Veg Ctbnk 10 20 70 0 0 0 Crown Clesure %: 0 Aspect : E Discharge Wetted Width (m) : 1.3 MS Mean Depth (m) : 0.1 MS Mean Velocity (m/s) : 0.53 F Discharge (m3/s) : 0.05 F Reach Symbol (F	Specific Data 7.6 8.3 6.7 12.0 10.9 9.2 3.2 4.7 4.1 3.1 3.4 2.8 10 3 6 7 8 12 24 34 35 32 32 Bed Material Fines Clay, silt, sand (<2mm): 20 20 Gravels Small (2-16mm): 40 15 Large (16-64mm): 25 5m. cobble (64-128mm): 10 Larges Lge cobble (128-256mm): 10 15 Bider cobble (>256mm): 15 10 15 Bedrock 0 0 0 0 D90 (cm): 42 Compaction: High Banks Height (m): 0.4 % Unstable: 0 0 0 Fines Gravels Larges Bedrock 0 Confinement: UC Yalley : Channel Ratio 10+ Stage: L </th <th>Obstructions Fish Summary </th>	Obstructions Fish Summary



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

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DFO/MoELP Stream Survey Form	Site Number: 2175 Trib. to Mulwa	Reach No.: 1 in Cr. TRITON Environmental Consultants Ltd.
Location: Z175, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 065-6200-000-000-000-000-000-000-000-000-00
Map #: 1031 090 Reach Length (km U.T.M.: 9 .561329.6082831 Length surveyed (n): 2.2 MW Date: 22-Aug-97 Tim (m): 100.0 GE Survey Crew: CF \KC	ne: 13:24 Agency: TEC Access: H Fish Card: N Field Historical
Channel Characteristics Av. Chan. Width (m): 4.8 MS Av. Wet. Width (m): 2.1 MS Av. Wet. Width (m): 2.1 MS Av. Max Riffle Depth (cm): 7 MS Av. Max Riffle Depth (cm): 7 MS Av. Max Pool Depth (cm): 30 MS Gradient (%): 2.5 CL Pool: 20 Riffle: 35 % Side Channel: 10-40 GE Fi % Debris Area: >15 GE GE % Stable: 40 GE G Cover Cover Total %: 35 GE L Pool LOD Bldr< in Veg <over ctbnk<="" td=""> De 20 30 35 0 5 10 Crown Closure %: 0 Aspect : E D9 Discharge Ban Wetted Width (m) : 0.1 MS Fi Mean Depth (m) : 0.1 MS Fi Co</over>	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 MAterial Image: Clay, silt, sand (<2mm): 10 10 ines Clay, silt, sand (<2mm): 15 ines Gravels Compaction: High ines Gravels </th <th>Obstructions Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 3 Method DV 9 S5-117 J R EL DV 10 NA VO Comments Cli: S3 C2 LS=39%, RS=44% C2 Comments C2 Comments C2 C3 S3 C2 C3 C3 Comments C2 C3 C2 C2 C3 C2 C2 C2 C2 C2 <</th>	Obstructions Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 3 Method DV 9 S5-117 J R EL DV 10 NA VO Comments Cli: S3 C2 LS=39%, RS=44% C2 Comments C2 Comments C2 C3 S3 C2 C3 C3 Comments C2 C3 C2 C2 C3 C2 C2 C2 C2 C2 <
Reach Symbol (Fish) Ba DV 5 B 2.5 1450 (Width, Valle): Channet, Slope) (Bed Material) Tuttorial	age: L Flood Signs Ht(m): 0.6 rs (%): 30 pH: 7.4 Braided: Y ater Temp. (°C): 12.0 02 (ppm): rb. (cm): Cond. (μmhos): 80	

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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

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DFO/MoELP Stream Survey Form	Site Number: Z176 Trib. to Mulwa	Reach No.: 2 in Cr. TRITON Environmental Consultants Ltd.
Location: Z176, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 065-5500-000-000-000-000-000-000-000-000
Map #: 1031 100 Reach Lengt U.T.M.: 9.560847.608661 Length surve	h (km): 2.0 MW Date: 22-Aug-97 Time eyed (m): 200.0 GE Survey Crew: CF \KG	e: 14:20 Agency: TEC Access: H Fish Card: N Field Historical C
Channel Characteristics Av. Chan. Width (m): 5.6 HC Av. Wet. Width (m): 3.0 HC Av. Wet. Width (m): 10 MS 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 % Stable: 0 GE % Stable: 0 GE Pool LOD Bldr In Veg Q Veg, Ctbnk 50 0 40 0 10 Crown Closure %: 1 Aspect: E Discharge Wetted Width (m): 0.32 F Discharge (m3/s): 0.04 F Mean Velocity (m/s): 0.32 F Discharge (m3/s): 0.04 F Keath Symbol (Fish) NF 6 7.0 1432 (Width, Yalley: Channed, Slope) (Bed Material)	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 10 180 50 42 51 54 52 Bed Material Fines Clay, silt, sand (<2mm):	Obstructions



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

DFO/MoELP Stream Survey Form	Site Number: Z177	Reach No.: 1
	Trib. to Mulwa	in Cr. TRITON Environmental Consultants Ltd.
Location: Z177, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 065-5500-000-000-000-000-000-000-000-000
Map #: 1031 100 Reach Len U.T.M. : 9.562656.6084499 Length sur	gth (km): 4.6 MW Date: 22-Aug-97 Time rveyed (m): 250.0 GE Survey Crew: CF \KG	e: 15:40 Agency: TEC Access: H Fish Card: N Field Historical
Channel Characteristics Av. Chan. Width (m): 8.4	Specific Data	Obstructions
Av. Wet. Width (m): 4.2 MS Av. Max Riffle Depth (cm): 13 MS Av. Max Pool Depth (cm): 40 MS	2.8 3.8 5.0 3.2 5.6 4.6 10 17 6 14 17 20 40 60	
Gradient (%): 10.0 MA Pool: 25 Riffle: 50 Run: 25 Other: 0 % Side Channel: 10-40 GE % Debris Area: 5-15 GE % Stable: 35 GE	Bed Material Fines Clay, silt, sand (<2mm):	Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method DV 4 95-160 J R EL DV 1 45 F R EL
Cover Cover Total % : 40 GE Pool LOD Bldr In Veg O Veg Ctbnk 30 35 15 0 0 20	Sm. cobble (64-128mm): 15 Larges Lge cobble (128-256mm): 50 20 Blder cobble (>256mm): 15 Bedrock 0 0	C1: s2 C2: LS=19%, RS=5%
Crown Closure % : 0 Aspect : SE	D90 (cm): 32 Compaction: High	C3 No fisheries sensitive zones noted.
Discharge Wetted Width (m) : 3.1 Mean Depth (m) : 0.2 Mean Velocity (m/s) : 0.43	Banks Height (m): 0.8 % Unstable: 20 Fines Gravels Larges Bedrock 10	 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 16.8 C.
Discharge (m3/s) : 0.20 F Reach Symbol (Fisb)	Valley : Channel Ratio 10+ Stage: M Flood Signs Ht(m): 0.7	C? There is good boulder and pool rearing cover at this site, as well as rearing habitat and potential spawning habitat.
	Bars (76): 55 pri. 7.0 Branded. 1 Water Temp. (°C): 11.0 02 (ppm):	•



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

DFU/MOELP Stream Survey Form	Site Number: Z178	Reach No.: 2
	Trib. to Mulwain	n Cr. TRITON Environmental Consultants Ltd.
Location: Z178, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 065-4300-000-000-000-000-000-000-000-000-00
Map #: 1031 090 Reach Length (kn U.T.M. : 9 .561453. 608057 Length surveyed (n): [1.5] [MW] Date: [22-Aug-97] Time: (m): [160.0] [GE] Survey Crew: CF \KG \	Ib:41 Agency: IEC Access: H Fish Card: N Field X Historical N N Photos: Z-22-22,23, Z-23-1 Air Photos: Image: Constraint of the second secon
Channel Characteristics Av. Chan. Width (m): 6.1 MS Av. Wet. Width (m): 2.6 MS Av. Wet. Width (m): 2.6 MS Av. Max Riffle Depth (cm): 12 MS Av. Max Riffle Depth (cm): 24 MS Av. Max Pool Depth (cm): 24 MS Gradient (%): 12.0 CL Pool: 40 Riffle: 15 Run: 35 Other: 10 % Side Channel: 0-10 GE Fi % Stable: 30 GE GE Cover Cover Total %: 40 GE L Pool LOD Bldr In Veg O Veg Cthnk 10 30 50 0 10 Be Crown Closure %: 5 Aspect : E D9 Discharge Ban	Specific Data 5.9 7.5 4.9 6.0 6.0 2.2 4.7 2.0 2.0 2.1 11 12 15 10 11 12 35 23 16 16 32 I Material 10 10 10 ines Clay, silt, sand (<2mm): 10 10 iravels Small (2-16mm): 30 10 iravels Small (2-16mm): 20 Sm. cobble (64-128mm): 15 Large (16-64mm): 20 Blder cobble (128-256mm): 60 20 Blder cobble (>256mm): 25 odrock 0 0 0 0 0 10 (cm): 64 Compaction: Medium	Obstructions C Height (m) Type Location 12 C 1.5 Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA EL NA EL Comments C1 S5 C2 LS=2%, RS=29% C3 No fisheries sensitive zones noted. C4 The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 300V and H, 6, 400V, was 485 seconds over 165 meters.
Wetted Width (m) : 2.3 MS Mean Depth (m) : 0.1 MS Mean Velocity (m/s) : 0.58 F Discharge (m3/s) : 0.10 F Va 0.10 F Reach Symbol (Fish) Str 0 1360 Wa (Width, Valley: Channel, Slope) (Bed Material) Tuto	ines Gravels A Larges Bedrock onfinement: OC alley: Channel Ratio 5-10 age: L Flood Signs Ht(m): 1.1 rs (%): 35 pH: 7.5 Braided: Y ater Temp. (°C): 11.5 02 (ppm): rb. (cm): Cond. (µmhos): 150	 ^{C6} 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 16.8 C. ^{C7} This site has great rearing habitat, including cobble, boulder and LOD cover.



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

DFO/MoELP Stream Survey Form	Site Number: W116 Trib to Mulwai	n Cr. TRITON Environmental Consultants Ltd.
Location: W116, Unit 11 Map #: 1031 090 Reach Length (km): J.T.M. : 9 .5633 .60821 Length surveyed (m):	Stream (Gaz.): Unnamed 0.9 MW Date: 26-Jul-97 Time 100.0 MA Survey Crew: KA UP	Watershed Code: 065-5200-000-000-000-000-000-000-000-000-0
Channel Characteristics Av. Chan. Width (m): 2.1 MS 1.6 Av. Wet. Width (m): 2.4 MS 1.8 Av. Max Riffle Depth (cm): 0 MS 130 Gradient (%): 1.5 CL 0 MS Av. Max Pool Depth (cm): 78 MS 130 Gradient (%): 1.5 CL 0 0 % Side Channel: 0-10 GE Fines % Debris Area: 0-5 GE Grave % Stable: 10 GE Grave Cover Cover Total %: 30 GE Larg Pool LOD Btdr In Veg O Veg Ctbnk 40 0 30 20 10 Bedro Cover Cover Total %: 30 GE Bank N Wetted Width (m) : GE Fines N N Mean Depth (m) : GE Fines Confi N Mean Velocity (m/s) : F Confi Valley N Mean Velocit	Specific Data 2.4 1.5 3.7 2.2 1.3 2.6 1.8 4.0 2.5 1.5 36 70 36 117 Alaterial Clay, silt, sand (<2mm):	Obstructions Fish Summary <u>Species</u> <u>Number</u> <u>Size Range (mm)</u> <u>Life Phase</u> <u>Use 1</u> <u>Use 2</u> <u>Use 3</u> <u>Method</u> Dispecies <u>Number</u> <u>Size Range (mm)</u> <u>Life Phase</u> <u>Use 1</u> <u>Use 2</u> <u>Use 3</u> <u>Method</u> Dispecies <u>Number</u> <u>Size Range (mm)</u> <u>NA</u> <u>EL</u> Comments <u>Size</u> S3. <u>Ci</u> The side slopes were not measured. <u>No</u> No fisheries sensitive zones noted. <u>Ci</u> The electroshocking effort, using a Smithroot 12 B POW model set at 1000V, was 221 seconds over 60 meters. No Do was not measured at this site, the water was clear to bottom. The mean air temperature on this day was 13.1 C. Ci 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 subterrainean 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

DFO/MoELP Stream Survey Form	Site Number: W117 Trib to Mulwa	Reach No.: 1 in Cr. TRITON Environmental Consultants Ltd.
Location: Will7, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 065-5200-000-000-000-000-000-000-000-000-0
Map #: 1031 090 Reach L U.T.M. : 9.5634 .60818 Length s	ength (km): 0.3 MA Date: 26-Jul-97 Tim urveyed (m): 60.0 GE Survey Crew: KA UP	e: 9:50 Agency: TEC Access: H Fish Card: N Field Historical W-13-3,4,5,6 Air Photos:
Channel Characteristics Av. Chan. Width (m): 1.0 MS Av. Wet. Width (m): 0.8 MS Av. Wet. Width (m): 0.8 MS Av. Max Riffle Depth (cm): 0 MS Av. Max Riffle Depth (cm): 12 MS Av. Max Pool Depth (cm): 12 MS Gradient (%): 2.5 CL Pool: 40 Riffle: 0 % Side Channel: 0 GE % Stable: 10 GE Cover Cover Total % : 10 Pool LOD Bldr< In Veg	Specific Data 0.7 0.6 0.6 1.5 1.3 1.5 0.7 0.5 0.5 0.8 1.4 0.7 11 8 14 15 14 0.7 Bed Material Fines Clay, silt, sand (<2mm):	Obstructions Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method DV 1 114 A EL EL Comments Ci S4. S4.
Crown Closure % : 13 Aspect : SW Discharge Wetted Width (m) : 0.4 MS Mean Depth (m) : 0.6 MS Mean Velocity (m/s) : 0.22 F Discharge (m3/s) : 0.04 F Reach Symbol (Fish) DV I D 2.5 4420 (Width, Valley: Channel, Slope) (Bed Material) (Bed Material)	DSU (cm): 0 Compaction: High Banks Height (m): 0.1 % Unstable: 20 Fines Gravels Larges Bedrock Confinement: UC Valley: Channel Ratio 10+ Stage: M Flood Signs Ht(m): 0.2 Bars (%): 0 pH: 8.0 Braided: N Water Temp. (°C): 8.0 02 (ppm): 20 Turb. (cm): Cond. (µmhos): 20	 No fisheries sensitive zones noted. C4 The electroshocking effort, using a Smithroot 12 B POW model set at 100V, was 50 seconds over 25 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 The channel is small but defined in part of the sampling area and discontinuous in another.

12.



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

Lass.

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 reachs 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.

DFO/MoELP Stream Survey Form	Site Number: ARNE 27 Passby C	Reach No.: 2 r. TRITON Environmental Consultants Ltd.
Location: ARNE 27, Unit 11, upper Passby Cr., see C5.	Stream (Gaz.): Passby Creek	Watershed Code: 440-8930-000-000-000-000-000-000-000-000-000-
Map #: 93 L 083 Reach Length (km): U.T.M. : 9 .6011 .60802 Length surveyed (m):	9.6 MA Date: 23-Sep-96 Tin 1400.0 HC Survey Crew: AKL	ne: 11:49 Agency: TEC Access: H Fish Card: N Field Historical Historical HK////////////////////////////////////
Av. Chan. Width (m): 5.1 T 3.2 Av. Wet. Width (m): 3.5 T 1.5 Av. Wet. Width (m): 3.5 T 1.5 Av. Max Riffle Depth (cm): 16 MS 20 Av. Max Pool Depth (cm): 44 MS 45 Gradient (%): 3.5 CL Bed M Your Side Channel: GE Fines GE Your Side Channel: GE GE Grave Your Side Channel: GE GE Grave Your Stable: 60 GE Grave Cover Cover Total % : 40 GE Large Pool LOD Bidr In Veg O Veg Ctbnk Bedrow	Specific Data 3.6 6.2 4.1 4.0 9.5 2.5 3.7 2.7 3.1 7.4 18 15 12 42 Taterial Clay, silt, sand (<2mm): 0 0 Is Small (2-16mm): 30 10 Is Small (2-16mm): 25 Sm. cobble (64-128mm): 25 Ige cobble (128-256mm): 70 35 Blder cobble (>256mm): 10 is 0 0	C Height (m) Type Location Fish Summary
Crown Closure %: 15 Aspect: NW D90 (cr Discharge Banks 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 Valley Stage: Reach Symbol (Fisb) DV 5 D (Width, Valley: Channel, Skopt) (Bed Material) Turb. (n): 35 Compaction: Medium Height (m): 0.4 % Unstable: 30 Gravets Larges Bedrock ement: UC : Channel Ratio 10+ L Flood Signs Ht(m): 0.5 %): 4 pH: Braided: N Femp. (°C): 2.2 02 (ppm): cm): 45 Cond. (µmhos):	 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



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.

DFO/MoELP Stream Survey Form Site Number: KARLA 62 Reach No.: 1 Passby Cr. Passby Cr. Leastion: KARLA 62, Unit 11, 90hn North of the Zymoste River, see C5 Stream (Gaz.): Passby Creek Watershed Cade: 440-8330-000-000-000-000-000-000-000-000-0			
Leadien: KRLA 62, Unit 11, 9000 Month of the Zymonez River, see C3. Stream (Gaz.): Passy Creat. Water Med. 2000 Water Med. 2000 Water Med. 2000 Water Med. 2000 Month of the Zymonez River, see C3. Map #: <u>91.073</u> Reach Length (Lim): <u>2000</u> <u>CF</u> James [601] Agency: [TC] Access: [V] Field C Historie Channel Characteristics Specific Data Specific Data Obstructions C Access: [V] Field C Historie Charnel Characteristics Second Comment 11 21 10 11 13 47 13 21 9 32 Image: C Historie C Second Comment C <th>DFO/MoELP Stream Survey Form</th> <th>Site Number: KARLA 62 Passby C</th> <th>2 Reach No.: 1 r. TRITON Environmental Consultants Ltd.</th>	DFO/MoELP Stream Survey Form	Site Number: KARLA 62 Passby C	2 Reach No.: 1 r. TRITON Environmental Consultants Ltd.
Channel Characteristics Specific Data Ci Av. Chan. Width (m): 18.4 T Av. Wet. Width (m): 94 T Av. Wet. Width (m): 94 T Av. Wet. Width (m): 94 T Av. Max. Pool Depth (cm): 13 4.1 Av. Max. Pool Depth (cm): 13 4.1 Av. Max. Pool Depth (cm): 13 50 91 22 19 32 Gradient (%): 1.3 50 91 22 19 32 Gradient (%): 1.3 50 91 22 19 32 Weth Victor (m): 50 90 22 19 32 Fine: Carwels Small (2-16mm): 50 20 Weth Victor (m): 50 20 15 15 Bider cobble (128-256mm): 10 10 10 25 10 0 10 10 25 10 0 10 10 10 25 10 0 10 10 10 10 25 </td <td>Location: KARLA 62, Unit 11, 900m North of the Zyn Map #: 93 L 073 Reach L U.T.M. : 9.5962 .607318 Length s</td> <td>noetz River, see C5. Stream (Gaz.): Passby Creek ength (km): 2.7 MA Date: 27-Sep-96 Tin urveyed (m): 200.0 GE Survey Crew: JP KC</td> <td>Watershed Code: 440-8930-000-000-000-000-000-000-000-000-000-</td>	Location: KARLA 62, Unit 11, 900m North of the Zyn Map #: 93 L 073 Reach L U.T.M. : 9.5962 .607318 Length s	noetz River, see C5. Stream (Gaz.): Passby Creek ength (km): 2.7 MA Date: 27-Sep-96 Tin urveyed (m): 200.0 GE Survey Crew: JP KC	Watershed Code: 440-8930-000-000-000-000-000-000-000-000-000-
Gradient (%): 10 Clip Pool: 20 Riffle: 30 Run: 50 Other: 6 % Side Channel: 10-40 GE Fines Clay, silt, sand (2mm): 10 10 % Side Channel: 10-40 GE Fines Clay, silt, sand (2mm): 50 20 % Stable: 20 GE Fines Clay, silt, sand (2mm): 50 20 Cover Cover Total %: 40 GE Image (16-44mm): 30 15 Bider cobble (128-256mm): 40 15 Image Ise Cobble (128-256mm): 40 15 Bider cobble (128-256mm): 10 0 0 0 0 0 Crown Closure %: 15 Aspect: SW Barks Height (m): 0.1 % Uetted Width (m): 6.4 T Fines Gravets Large Bedrock 0 Wetted Width (m): 0.58 Fines Gravets Large Bedrock 0 Cit Mean Velocity (m/s): 0.58 Fines Gravets Large Bedrock Cit Cit Sit A mode was 409 seconds over 150 square mete	Channel Characteristics C1 Av. Chan. Width (m): Av. Wet. Width (m): 9.4 T Av. Max Riffle Depth (cm): Av. Max Pool Depth (cm): 13 MS	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	Obstructions C Height (m) Type Location
Discharge Compaction: Meanum Wetted Width (m): 6.4 Wetted Width (m): 6.4 Fines Gravels Larges Bedrock Mean Depth (m): 0.58 Discharge (m3/s): 0.56	Gradient (%): 1.0 CL Pool: 20 Riffle: 30 Run: 50 Other: 0 % Side Channel: 10-40 GE % Stable: 20 GE % Stable: 20 GE Cover Cover Total %: 40 GE Pool LOD Bldr In Veg O Veg Ctbnk 25 25 10 0 30 10	Bed Material Fines Clay, silt, sand (<2mm):	Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method C4 RB 1 175 A VO Comments Cil 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%
Reach Symbol (Fisb) (DV) RB (DV) RB 18 D 1.0 19 D 1.0 Stage: L Flood Signs Ht(m): 0.5 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. Expose roots of hank weetation provide some instream cover at this site.	Discharge Wetted Width (m): Mean Depth (m): Mean Velocity (m/s): Discharge (m3/s): Discharge (m3/s): (DV) RB 18 D 10	Banks Height (m): 0.1 % Unstable: 0 Fines Gravels Larges 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):	 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.



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.

DFO/MoELP Stream Survey Form	Site Number: ARNE 43 Trib. to Passl	Reach No.: 1 by Cr. TRITON Environmental Consultants Ltd.
Location: ARNE 43, Unit 11, at km 4.3 om the Hankit Map #: 93 L 083 Reach L U.T.M. : 9.5936 .60757 Length	FSR, see C5. Stream (Gaz.): Unnamed ength (km): 0.2 MA Date: 26-Sep-96 Tim urveyed (m): 100.0 HC Survey Crew:	Watershed Code: 040-1500-000-000-000-000-000-000-000-000-0
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 Av. Max Pool Depth (cm): 7 MS Gradient (%): 2.0 CL Pool: 2 Riffle: 50 Wets below is Area: 0 GE % % Side Channel: 0 GE % % Side Channel: 0 GE % % Side Channel: 0 GE % % Stable: 100 GE GE Cover Cover Total %: 95 GE Pool LOD Bidr<	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 Bed Material 60 60 60 Gravels Small (2-16mm): 40 35 Large (16-64mm): 40 35 Large (16-64mm): 0 0 Larges Lge cobble (128-256mm): 0 0 Bedrock 0 0 0 0 D90 (cm): 2 Compaction: Low Banks Height (m): 0.4 % Unstable: 0 0 Fines Graveis Larges Bedrock O Stage: L Flood Signs H((m): 0.15 Bars (%): 0 pH: Braided: N Water Temp. (°C): 6.0 02 (ppm): Turb (cm): 12	Obstructions <u>c</u> <u>Height (m)</u> <u>Type</u> <u>Location</u> Fish Summary <u>c</u> <u>Species</u> <u>Number</u> <u>Size Range (mm)</u> <u>Life Phase</u> <u>Use 1</u> <u>Use 2</u> <u>Use 3</u> <u>Method</u> <u>NF</u> <u>NF</u> <u>NA</u> <u>VO</u> Comments Ci S4 Ci The side slopes were not measured at this site. Ci The side slopes were not measured at this site. Ci S4 Ci The side slopes were not measured at this site. Ci The side slopes were not measured at this site. Ci S4 Ci The side slopes were not measured at this site. Ci The side slopes were not measured at this site. Ci Lat N 54 49' 10.9", Long W 127 32' 35.7" Ci Do, pH and conductivity were not measured at this site. The mean air temperature on this day was 12.7°C Ci po, pH and conductivity were not measured at this site. The mean air temperature on this day was 12.7°C Ci The channel is undefined from the toe of the slope.

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Photo #: A-4-25, 26-Sep-96 Site #: A43, Looking downstream.



Photo #: A-5-1, 26-Sep-96 Site #: A43, Looking upstream.

DFO/MoELP Stream Survey Form	Site Number: ARNE 45 Trib to Passb	Reach No.: 1 by Cr. Invironmental Consultants Ltd.
Location: ARNE 45, Unit 11, 3.7 km on the Hankin FSR, see C5. Map #: 93 L 083 Reach Length (km): J.T.M.: 9.5952 .60766 Length surveyed (m):	Stream (Gaz.): Unnamed 0.8 MW Date: 26-Sep-96 Tim 100.0 GE Survey Crew: AKL\1	Watershed Code: 040-1100-000-000-000-000-000-000-000-000
Channel Characteristics Av. Chan. Width (m): 0.9 MS 0.7 Av. Max. Width (m): 0.7 MS 0.6 Av. Wet. Width (m): 0.7 MS 0.6 Av. Max Riffle Depth (cm): 2 MS 17 Gradient (%): 10 MS 17 Gradient (%): 15.0 CL Pool: 10 Yo Debris Area: 0 GE Fines % Stable: 100 GE Grave Volume Cover Total %: 8 GE Pool LOD Bldr In Veg Veg Ctbnk 0 38 2 5 5 5 Crown Closure %: 2 Aspect : W D90 (cn Discharge Wetted Width (m) : 0.1 MS Fines Mean Depth (m) : 0.0 MS Fines Confine Mean Velocity (m/s) : 0.45 F Confine Discharge (m3/s) : (Finb) Stage: Bars (% NF Water Nater </td <td>Specific Data 1.0 0.9 1.1 0.9 1.0 0.8 0.7 0.9 0.8 0.6 4 1 2 2 1 14 11 3 6 9 Iderial Internal Internal Internal Clay, silt, sand (<2mm):</td> 10 10 Is Small (2-16mm): 70 60 Is Small (2-16mm): 70 60 Is Small (2-16mm): 70 10 Large (16-64mm): 60 60 5m. cobble (64-128mm): 10 Large (16-64mm): 0 0 0 0 Is Smacobble (5256mm): 20 9 Bider cobble (228-256mm): 1 1 k 0 0 0 a): IO Compaction: Low 1 k 0 0 0 a): IO Compaction: Low 1 work Instable: 0 0 channel Ratio N/A 1 <td< td=""><td>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 VO VO Comments Cl 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. C3 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 C6 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.</td></td<>	Specific Data 1.0 0.9 1.1 0.9 1.0 0.8 0.7 0.9 0.8 0.6 4 1 2 2 1 14 11 3 6 9 Iderial Internal Internal Internal Clay, silt, sand (<2mm):	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 VO VO Comments Cl 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. C3 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 C6 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.



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.

DFO/MoELP Stream Survey Form	Site Number: KARLA 63 Trib to Passby	Reach No.: 1 y Cr. INTON Environmental Consultants Ltd.
Location: KARLA 63, Unit 11, 260m North of Passby Creek, see C5. Map #: 93 L 073 Reach Length (km): U.T.M. : 9.5962 .60732	Stream (Gaz.): Unnamed 4.1 MA Date: 27-Sep-96 Time 120.0 GE Survey Crew: JP \KG	Watershed Code: 031-1100-000-000-000-000-000-000-000-000
Channel Characteristics Av. Chan. Width (m): 8.6 MS 5.6 Av. Wet. Width (m): 4.0 MS 4.7 Av. Max Riffle Depth (cm): 5 MS 3 Av. Max Riffle Depth (cm): 35 MS 30 Gradient (%): 4.0 CL 9 MS 30 Gradient (%): 4.0 CL Pool: 25 Riffle: 40 Run: 20 Other: 15 % Side Channel: 0-10 GE GE Fines Gravel: Gravel: % Stable: 30 GE Cover Cover Total %: 35 GE Larges Pool LOD Bidr In Veg Veg Cbnk Bcdroct 30 15 15 0 15 25 D90 (cm Discharge Image: Stage: Banks Fines Stage: Stage: Mean Depth (m) : 0.25 F Valley : Stage: Stage: Mean Velocity (m/s) : 0.25 F Stage: Stage: Bars (% </td <td>Specific Data 8.8 14.1 7.8 7.6 7.8 6.2 4.1 2.6 2.6 3.8 5 3 6 10 41 38 22 42 Iterial Clay, silt, sand (<2mm):</td> 20 Small (2-16mm): 30 10 Large (16-64mm): 30 20 Sm. cobble (64-128mm): 20 Sm. cobble (64-128mm): 50 20 Blder cobble (128-256mm): 50 20 Blder cobble (>256mm): 10 0 0 :: 34 Compaction: Medium 10 :: 34 Compaction: Medium 10 :: 34 Compaction: Medium 15 :: 10 0.2	Specific Data 8.8 14.1 7.8 7.6 7.8 6.2 4.1 2.6 2.6 3.8 5 3 6 10 41 38 22 42 Iterial Clay, silt, sand (<2mm):	Obstructions C Iteight (m) Type Location Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 3 Method Comments Ci S2 C2 LS = 2%, RS = 3% Ci S2 Ci S2 Ci S2 Ci S2 Ci S4 Ci S2 Ci S4 Ci S4 S4 S4 S5 Sconds over 60 square meters. The shocker was malfunctioning at this site. Fry were seen in pools in the sampling area. Ci Iat N 54 47' 47.9", Iong W 127 30' 12.5" Ci No additional bank texture information. Ci D0 was not measured at this site. The water ws clear to the bottom. The mean air temperature on this day was 13.8°C Ci Some good spawning and rearing habitat was observed at this site. Ci The air temperature at this site was 11 degrees celcius.



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.

DFO/MoELP Stream Survey Form	Site Number: ARNE 39 Trib. to Passb	Reach No.: 1 by Cr. If TRITON Environmental Consultants Ltd.
Location: ARNE 39, Unit 11, see C5. Map #: 93 L 083 Reach Length (km): U.T.M. : 9.5913 .60767 Length surveyed (m):	Stream (Gaz.): Unnamed 0.8 MA Date: 25-Sep-96 Tim 150.0 GE Survey Crew: JP \AK	Watershed Code: 004-0540-000-000-000-000-000-000-000-000
Channel Characteristics Av. Chan. Width (m): 0.9 MS 0.7 Av. Wet. Width (m): 0.9 MS 0.8 Av. Max Riffle Depth (cm): 4 MS 3 Av. Max Riffle Depth (cm): 9 MS 13 Gradient (%): 4.0 CL Bed N Yool: 15 Riffle: 40 Run: 25 OE Yo Side Channet: 0 GE Fines Grav Yo Side Channet: 0 GE Fines Yo Debris Area: 5-15 GE Grav Cover Cover Total %: 20 GE Larg Pool LOD Bldr In Veg O Veg Ctbnk IS 5 20 0 20 40 Bedro Crown Closure %: 15 Aspect : E D90 (c Discharge Wetted Width (m) : 0.33 F Confit Mean Depth (m) : 0.1 MS Fines Stage: Mean Velocity (m/s) : 0.02 F	Specific Data 0.5 0.7 0.7 1.2 1.7 0.8 0.9 0.9 0.9 1.5 4 4 5 4 7 10 9 4 Adterial Adterial Adterial Adterial Adterial Adterial Clay, silt, sand (<2mm):	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 Image: Size Range (mm) Life Phase Use 1 Use 3 Method NF NA Image: Size Range (mm) NA Image: Size Range (mm) EL Comments Size Range (mm) NA Image: Size Range (mm) NA Image: Size Range (mm) Cl S4 S4 S4 S4 S4 S4 S4 Cl S4 S2 S4 S4



Photo #: A-4-17, 25-Sep-96 Site #: A39, Looking upstream through alders.



Photo #: A-4-18, 25-Sep-96 Site #: A39, Looking downstream.

DFO/MoELP Stream Survey Form	Site Number: ARNE 42 Trib. to Passh	Reach No.: 1 by Cr. INTON Environmental Consultants Ltd.
Location: ARNE 42, Unit 11, km 4.3 on the Hankin FS	R, see C5. Stream (Gaz.): Unnamed	Watershed Code: 040-1600-000-000-000-000-000-000-000-000-0
Map #: 93 L 083 Reach Le U.T.M. : 9 .5935 .60757 Length st	ngth (km): 1.0 MA Date: (26-Sep-96) Tim urveyed (m): 400.0 HC Survey Crew: AKL\ I	Ine: 12:47 Agency: TEC Access: V2 Fish Card: N Field X Historical I BL\ \ \ \ A-4-23,24 Air Photos: I I
Av. Chan. Width (m): 0.6 MS Av. Wet. Width (m): 0.4 MS Av. Max Riffle Depth (cm): 1 MS Av. Max Riffle Depth (cm): 7 MS Av. Max Riffle Depth (cm): 7 MS Gradient (%): 9.0 CL C9 Pool: 2 Riffle: 13 Kide Channel: 0 GE % Stable: 90 Webris Area: 25 GE % Stable: 90 GE Cover Cover Total %: 70 GE GE Pool LOD Bldr In Veg Veg Ctbnk 0 20 0 0 70 10 Crown Closure %: 20 Aspect : NE Discharge 20 Aspect : NE	Specific Data 0.9 0.6 0.8 0.5 0.6 0.5 0.3 0.9 0.1 0.4 0.2 1 1 1 2 2 1 11 6 8 6 5 5 Bed Material 10 10 10 10 Gravels Small (2-16mm): 80 20 Gravels Small (2-16mm): 80 60 Sm. cobble (64-128mm): 5 5 Large (16-64mm): 5 5 Larges Lge cobble (128-256mm): 10 5 Bider cobble (>256mm): 0 0 0 D90 (cm): 13 Compaction: Low	C Height (m) Type Location Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method C4 NF NA NA VO VO Comments Ci S6 Ci LS = 5%, RS = 5% Ci Na Na VO Ci S6 Ci LS = 5%, RS = 5% Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method Ci S6 Ci LS = 5%, RS = 5% Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method Ci S6 Ci LS = 5%, RS = 5% Size Range (mm) Life Phase Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method Ci S6 Ci LS = 5%, RS = 5% Size Range (mm) Life Phase Life Phase Use 1 Life Phase Life
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 Reach Symbol (Fish) NF 1 E 9.0 1810 (Width, Valley: Channel, Slope)	Winstable: 0 Fines Gravels Larges Bedrock Confinement: N/A Valley : Channel Ratio N/A Stage: L Flood Signs Ht(m): 0.2 Bars (%): 10 pH: Braided: N Water Temp. (°C): 5.0 02 (ppm):	 Lat N 34 49 117, Long W 127 32 41.3 C6 No additional habitat information. C7 DO, pH and conductivity were not measured at this site. The mean air temperature on this day was 12.7°C C8 At best this site may provide marginal fish habitat. The gravels at this site are angular and unsuitable for spawning. C9 Most of the flow at this site is subterrainian.



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.

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FO/MoELP Stream Survey Form	Site Number: ARNE 44	Reach No.: 3
	Trib. to Passi	by Cr. TRITON Environmental Consultants Ltd.
ocation: ARNE 44, Unit 11, 3.7km on the Hankin FS	R, see C5. Stream (Gaz.): Unnamed	Watershed Code: 040-0800-000-000-000-000-000-000-000-000
Aap #: 93 L 083 Reach L J.T.M. : 9 5949 .60774 Length s	ength (km): [1.1] [MA] Date: [26-Sep-96] Tin urveyed (m): [100.0] [GE] Survey Crew: AKL\]	ae: 15:23 Agency: TEC Access: 172 Fish Card: N Field Historical BLAAAAAA Photos: A-5-2,3 Air Photos:
Channel Characteristics	Specific Data	Obstructions
Av. Wet. Width (m): 0.8 MS Av. Max Riffle Depth (cm): 5 MS Av. Max Pool Depth (cm): 24 MS	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	C Height (m) Type Location
Gradient (%): 2.0 CL Pool: 20 Riffle: 40 Run: 40 Other: 0 % Side Channel: 0 GE % 5-15 GE % Stable: 95 GE 64 64 64	Bed Material Fines Clay, silt, sand (<2mm):	C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA EL
Cover Cover Total % : 10 GE Pool LOD Bidr in Veg O Veg Ctbnk 0 75 0 10 5 10	Sm. cobble (64-128mm): 5 Larges Sm. cobble (128-256mm): 10 5 Bider cobble (>256mm): 0 0 Bedrock 0 0	Comments Ci S4 C2 The side slopes were not measured at this site.
Oischarge Wetted Width (m) : 0.7 MS Mean Denth (m) : 0.0 MS	Banks Height (m): 0.4 % Unstable: 0 Fines 🛛 Gravels 🗋 Larges 🗋 Bedrock	 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 back texture information
Mean Velocity (m/s) : 0.24 F Discharge (m3/s) : 0.00 F Reach Symbol (Fish)	Confinement: N/A Valley : Channel Ratio N/A Stage: L Flood Signs Ht(m): 0.3 Bars (%): 2	 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.



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.

DFO/MoELP Stream Survey Form	Site Number: ARNE 46 Trib. to Passh	Reach No.: 1 by Cr. I TRITON
Location: ARNE 46, Unit 11, 3.7km on the Hankin FSI Map #: [93 L 083] Reach La U.T.M. : [9.5953 .60764] Length s	R, see C5. Stream (Gaz.): Unnamed ength (km): 1.8 MA Date: 26-Sep-96 Tim urveyed (m): 150.0 GE Survey Crew: AKL\1	Environmental Consultants Ltd. Watershed Code: 040-0800-000-000-000-000-000-000-000-000
Channel Characteristics Av. Chan. Width (m): 1.3 MS Av. Wet. Width (m): 1.3 MS Av. Wet. Width (m): 1.3 MS Av. Max Riffle Depth (cm): 6 MS Av. Max Pool Depth (cm): 30 MS Gradient (%): 2.5 CL Pool: 48 Riffle: 2 Pool: 48 Riffle: 2 Run: 50 V Side Channel: 0 GE % Stable: 100 GE Vebris Area: 5-15 GE % Stable: 100 GE Cover Cover Total %: 95 GE GE Pool LOD Bldr In Veg O Veg Ctbnk 0 10 0 30 50 10 Crown Closure %: 10 Aspect : SW Discharge	Specific Data 0.8 0.6 1.8 1.5 1.3 1.7 0.6 0.5 1.6 1.5 1.6 1.8 6 9 4	Obstructions <u> <u> </u></u>



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.

DFO/MoELP Stream Survey Form	Site Number: RYAN 117 Trib. to Passb	by Cr. TRITON Environmental Consultants Ltd.
Location: RYAN 117, Unit 11, see C5.	Stream (Gaz.): Unnamed	Watershed Code: 040-5200-000-000-000-000-000-000-000-000-0
Map #: 93 L 083 Reach L U.T.M. : 9.5916 .60767 Length s	urveyed (m): 2.3 MA Date: 25-569-96 Tim urveyed (m): 300.0 GE Survey Crew: RH VL	R-7-11,12 Air Photos:
Av. Chan. Width (m): 1.3 MS Av. Wet. Width (m): 1.1 MS Av. Max Riffle Depth (cm): 7 MS Av. Max Riffle Depth (cm): 18 MS Gradient (%): 4.5 CL Pool: 10 Riffle: 60 % Side Channel: 0-10 GE % Stable: 20 GE Cover Cover Total %: 75 GE Pool LOD Bldr In Veg O Veg Ctbnk 5 20 0 45 30 Crown Closure %: 80 Aspect: E	Specyce 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 Bed Material Fines Clay, silt, sand (<2mm): 20 20 Gravels Small (2-16mm): 65 20 Large (16-64mm): '+'+' 45 5 Larges Lge cobble (64-128mm): 5 Larges Lge cobble (128-256mm): 15 Blder cobble (>256mm): 5 5 Bedrock 0 0	C Height (m) Type Location 1 BD 0.2 Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA EL
Discharge Wetted Width (m) : 0.7 [MS] Mean Depth (m) : 0.1 [MS] Mean Velocity (m/s) : 0.24 [F] Discharge (m3/s) : 0.01 [F] Reach Symbol (Flsh) (DV) 1 D 5.0 [2620 (Width, Valley: Chassel, Slope) (Bed Material)	Banks Height (m): 0.2 % Unstable: 0 % Unstable: 0 Fines Gravels Larges Confinement: UC Valley: Channel Ratio 10+ Stage: 1 Flood Signs Ht(m): 0.2 Bars (%): 5 pH: Braided: N Water Temp. (°C): 5.0 02 (ppm): Turb. (cm): 30 Cond. (µmhos):	 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. C3 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 acess upstream at this stream. Overstream vegetation and cutbanks are the prevalent forms of fish cover at this site.



Photo #: R-7-11, 1996/09/25 Site #: R117, Looking downstream.



Photo #: R-7-12, 1996/09/25 Site #: R117, Looking upstream through willows.

DFO/MoELP Stream Survey Form	Site Number: ARNE 26 Trib. to Passb	Reach No.: 1 by Cr. If RITON Environmental Consultants Ltd.
Location: ARNE 26, Unit 11, see C5. Map #: 03 L 083 Reach Le U.T.M. : 9.6013.60803 Length su	Stream (Gaz.): Unnamed gth (km): 0.3 MA Date: 23-Sep-96 Tin veyed (m): 200.0 HC Survey Crew: AKL\	Watershed Code: 041-2800-000-000-000-000-000-000-000-000-00
Channel Characteristics Av. Chan. Width (m): 2.4 Av. Wet. Width (m): 2.0 Av. Wet. Width (m): 2.0 Av. Max Riffle Depth (cm): 13 Av. Max Riffle Depth (cm): 13 Av. Max Pool Depth (cm): 27 Gradient (%): 5.0 Pool: 10 Pool: 10 Width (m): 0 Your Depth (cm): 27 MS 5.0 CL Pool: Your Depth (cm): 5.0 Your Depth (cm): 5.0 Cover 0 Your Depth (cm): 5.0 Cover 0 Your Depth (cm): 5.0 Your Depth (cm): 5.0 Cover 0 Your Depth (cm): 5.0 Cover 0 Cover 0 Cover 0 Cover 0 Cover 0 Cover 30 Cover 30 Cover 30 Cover 30<	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 2.8 20 22 40 40 40 Bed Material Fines Clay, silt, sand (<2mm):	Obstructions C Height (m) Type Location Fish Summary
Wested 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: Channet, Stope) (Bed Material) (Bed Material)	% 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 02 (ppm): 1 Turb. (cm): 40 Cond. (µmhos): 1	 CS 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.
DFO/MoELP Stream Survey Form	Site Number: ARNE 28 Trib. to Pass	by Cr. TRITON Environmental Consultants Ltd.
Location: ARNE 28, Unit 11, upper Passby Cr. area, see C5. Map #: 93 L 083 Reach Length (I U.T.M. : 9.6006.60805	Stream (Gaz.): Unnamed km): 0.2 MA Date: 23-Sep-96 Ti sd (m): 100.0 HC Survey Crew: RH U	Watershed Code: 440-8930-000-000-000-000-000-000-000-000-000-
Av. Chan. Width (m): 1.1 MS Av. Chan. Width (m): 1.0 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 Webris Area: 10 GE GE % Stable: 80 GE GE Voebris Area: 10 GE GE % Stable: 80 GE GE Pool LOD Bldr In Veg O veg Ctbnk 0 30 0 40 30 I Discharge Wetted Width (m): 0.5 MS MS	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	Obstructions C Height (m) Type Location 0 BD 0.0 Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method C4 NF NA NA VO Comments Cli S4 C2 The side slopes were not measured at this site. C3 No fisheries senstive 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 hask texture information
Mean Depth (m) : 0.0 MS Mean Velocity (m/s) : 0.72 F Discharge (m3/s) : 0.01 F Reach Symbol (Fish) S (DV) 1 E 2.0 6400 (Width, Valley: Channel, Slope) (Bed Material) T	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 02 (ppm):	 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 containes 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.

DFO/MoELP Stream Survey Form	Site Number: ARNE 29 Trib. to Passb	y Cr. TRITON Environmental Consultants Ltd.
Location: ARNE 29, Unit 11, upper Passby Creek area, see	C5. Stream (Gaz.): Unnamed	Watershed Code: 041-2600-000-000-000-000-000-000-000-000-00
Map #: 93 L 083 Reach Length U.T.M.: 9.6003 60804 Length surve	h (km): 0.6 MA Date: 23-Sep-96 Tim yed (m): 100.0 HC Survey Crew: RH \JL	e: 13:53 Agency: TEC Access: H Fish Card: N Field Historical
Channel Characteristics Av. Chan. Width (m): 2.2 Av. Wet. Width (m): 1.6 Av. Wet. Width (m): 1.6 Av. Max Riffle Depth (cm): 6 Av. Max Pool Depth (cm): 32 Gradient (%): 4.0 Pool: 10 Reach Symbol 0 Wetted Width (m): 1.0 MS 0.40 O 0 Stable: 80 Cover 6 Vested Width (m): 1.0 Mean Depth (m): 0.0 Mean Depth (m): 0.42 Pischarge (m3/s): 0.01 F Discharge (m3/s): DV 2 E 4.0 Z Y	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 Bed Material Fines Clay, silt, sand (<2mm):	Obstructions Fish Summary © Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method DV DV 1 68 J R Life Phase Use 1 Use 2 Use 3 Method DV 1 68 J R EL Comments Cl S3 Cl The side slopes were not measured. Cl Fisheries sensitive zones noted. Cl The side slopes were not measured. Cl The side slopes were noted. Cl The side slopes were not measured. Cl The side slopes were not measured. Cl The side slope

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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.

DFO/MoELP Stream Survey Form	Site Number: ARNE 30 Trib. to Passb	Reach No.: 1 by Cr. INTRITON Environmental Consultants Ltd.
Location: ARNE 30, Unit 11, 1410m downstream of site Passby Cr. area, see C5. Map #: 93 L 083 U.T.M. : 9 .6002 .60807	A26, upper Stream (Gaz.): Unnamed gth (km): 0.2 MA Date: [23-Scp-96] Tim rveyed (m): 150.0 [GE] Survey Crew: AKL\ H	Watershed Code: 041-2300-000-000-000-000-000-000-000-000-00
Channel Characteristics Av. Chan. Width (m): 2.1 MS Av. Chan. Width (m): 1.4 MS Av. Wet. Width (m): 1.4 MS Av. Wet. Width (m): 1.4 MS Av. Max Riffle Depth (cm): 10 MS Av. Max Rool Depth (cm): 10 MS Av. Max Pool Depth (cm): 24 MS Gradient (%): 18.0 CL Pool: 10 Riffle: 20 Run: 10 Other: % Side Channel: GE % GE % Stable: 15 GE Cover Cover Total %: 60 GE Pool LOD Bldr< In Veg Veg Ctbak 5 5 60 0 20 10 Crown Closure %: 35 Aspect : SW	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 Bed Material Fines Clay, silt, sand (<2mm):	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 EL EL Comments Ci S3 Ci LS = 15%, RS = 20% C3 No fisheries sensitive zones were noted at this site.
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 Discharge (m3/s) : 0.02 F (Eisb) (Fisb) (DV) 2 C 18.0 0370 (Width, Valley: Channel, Slope) (Bed Material) (Bed Material)	Banks Height (m): 0.5 % Unstable: 40 Fines Gravels Larges Bedrock Confinement: OC Valley : Channel Ratio 5-10 Stage: I Stage: I Flood Signs Ht(m): 0.7 Bars (%): 0 pH: Braided: N Water Temp. (°C): 3.0 02 (ppm): I Turb. (cm): 29 Cond. (µmhos): I	 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 occuring at the mouth of this stream, could be a barrier at lower flows. This is a high energy stream during run off.

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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 Trib. to Passb	Reach No.: 1 by Cr. TRITON Environmental Consultants Ltd.
Location: ARNE 31, Unit 11, 3300m downstream of s Map #: 93 L 083 Reach L U.T.M. : 9.5986 60806 Length s	ite A26, see C5. Stream (Gaz.): Unnamed ength (km): 0.8 MA Date: 23-Sep-96 Tin surveyed (m): 200.0 HC Survey Crew: AKL	Watershed Code: 041-1200-000-000-000-000-000-000-000-000-0
Channel Characteristics Av. Chan. Width (m): Av. Chan. Width (m): 1.1 MS Av. Wet. Width (m): 1.1 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 % Side Channel: GE V GE % Side Channel: GE % Debris Area: 0-5 % Stable: 80 GE Cover Cover Total %: 40 O 5 40 0 Cover Closure %: 30 Aspect : SE Discharge 0.1 MS Mean Depth (m) : 0.1 MS Mean Depth (m) : 0.01 F Discharge (m3/s) : 0.01 F (DV) 2 D 6.0 0370 (Wetted Width; Valies; Chassel, Stope) (Bed Material)	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 Bed Material Fines Clay, silt, sand (<2mm):	Obstructions <u> <u> </u></u>

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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.

DFO/MoELP Stream Survey Form	Site Number: ARNE 38 Trib. to Passb	Reach No.: 1 by cr. TIRITON Environmental Consultants Ltd.
ARNE 38, Unit 11, Northwest of Willow Lake Anp #: 93 L 083 Reach Ler J.T.M. : 9.59310.60770 Length survey	e, see C5. Stream (Gaz.): Unnamed ngth (km): 3.0 MW Date: 25-Sep-96 Tim rveyed (m): 500.0 GE Survey Crew: AKL\ J	Watershed Code: 040-2000-000-000-000-000-000-000-000-000
Av. Chan. Width (m): 4.8 MS Av. Wet. Width (m): 1.9 MS Av. Wet. Width (m): 1.9 MS Av. Max Riffle Depth (cm): 6 MS Av. Max Rool Depth (cm): 38 MS Gradient (%): 4.0 CL Pool: 25 Riffle: 15 Weited Channel: 0-10 GE % Stable: 30 GE Cover Cover Total %: 25 GE Pool LOD Bldr In Veg O Veg Ctbnk 40 20 0 10 30 GE Cover Cover Total %: 25 GE Pool LOD Bldr In Veg O Veg Ctbnk 40 20 0 10 30 GE Cower Closure %: 5 Aspect: W Discharge 0.1 MS Mean Velocity (m/s): 0.79 F Discharge (m3/s): 0.09 F E Reach Symbol (Fish)	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 Bed Material Fines Clay, silt, sand (<2mm): 60 60 Gravels Small (2-16mm): 30 15 Large (16-64mm): 30 15 Large (16-64mm): 10 0 Large scobble (428-256mm): 10 0 Bedrock 0 0 0 Bedrock 0 0 0 D90 (cm): 8 Compaction: Low Earges in Bedrock Gravels Larges Bedrock Gravels Larges Bedrock 0 Pines Gravels Larges Bedrock 0 Confinement: UC Valley : Channel Ratio 10+ 10+ Stage: L Flood Signs Ht((m): 0.5 Bars (%): <td< td=""><td>Ubstructions</td></td<>	Ubstructions



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.

DFO/MoELP Stream Survey Form	Site Number: ARNE 40 Trib. to Passb	Reach No.: 3 by Cr. TRITON Environmental Consultants Ltd.
Location: ARNE 40, Unit 11, see C5. Map #: 93 L 083 Reach Length (km): U.T.M.: 9.5934_60760 Length surveyed (m):	Stream (Gaz.): Unnamed 5.5 MW Date: 25-Sep-96 Tin 200.0 GE Survey Crew: AKL)	Watershed Code: 440-8913-000-000-000-000-000-000-000-000-000-0
Channel Characteristics Av. Chan. Width (m): 6.0 MS 6.8 Av. Wet. Width (m): 4.7 MS 4.2 Av. Max Riffle Depth (cm): 10 MS 10 Av. Max Riffle Depth (cm): 10 MS 10 Av. Max Pool Depth (cm): 46 MS 27 Gradient (%): 2.0 Cl Bed Ma "Side Channel: 0 GE Fines "& Side Channel: 0 GE Fines "& Side Channel: 0 GE Gravels "& Stable: 10 GE Gravels Cover Cover Total %: 30 GE Larges Pool LOD Bidr In Veg Veg Cbnk 30 0 0 20 30 D90 (cm) Discharge Banks Fines Sales Fines Wetted Width (m) : 3.8 MS Fines Valley : Mean Depth (m) : 0.39 F Confinen Valley : Stage: Bars (%	Specific Data 5.0 7.6 4.4 4.6 7.3 3.9 6.2 4.1 4.1 5.9 28 60 39 61 58 Iterial Clay, silt, sand (<2mm):	Obstructions C Height (m) Type Location Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method C4 C1 1 75 J R EL DV 1 A S VO Comments C1 S2 C2 LS = 4%, RS = 5% C C3 No fisheries sensitive zones were noted at this site. C C4 The electroshocking effort, using a Smithroot 15 A model was 93 seconds over 37.6 meters. In addition to the juvenile cuthroat caught by electrofishing, an 280 mm adult Dolly Varden was captured. The electroshocking effort was minimal at this site because of concerns regarding impacts on spawners. C5 Lat N 54 49 20.8°, Long w 127 32' 42* C6 No additional bank texture information. C7 D0, pH, and conductivity were not measured at this site. The mean air temperature on this day was 8.8°C C6 Excellent rearing and good spawning habitat were observed at this site. C9 The air temperature at this site was 7.C.



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.

DFO/MoELP Stream Survey Form	Site Number: ARNE 41 Trib. to Passb	Reach No.: 1 by Cr. TRITON Environmental Consultants Ltd.
Location: ARNE 41, Unit 11, km 4.3 on the Hankin FSI Map #: 93 L 083 Reach Le U.T.M. : 9 5934 60758 Length su	R, see C5. Stream (Gaz.): Unnamed ngth (km): [1.3] MA Date: [26-Sep-96] Tin Irveyed (m): [150.0] HC Survey Crew: AKL\	Watershed Code: 040-1700-000-000-000-000-000-000-000-000-0
Channel Characteristics Av. Chan. Width (m): Av. Wet. Width (m): 1.2 MS Av. Max Riffle Depth (cm): 4 MS Av. Max Pool Depth (cm): 18 MS Gradient (%): 2.0 CL Pool: 50 Riffle: 20 Your 0 GE 0 GE Volume 0 GE 0 GE Volume 0 0 GE 0 Volume 0 35 0 0 60 5 Crown Closure % : 60 Hasset : E E Discharge Wetted Width (m) : 0.8 MS Mean Depth (m) : 0.3 MS E Discharge (m3/s) : 0.08 F E Quitter (Theory) (CT) (DV) 2 E 2.0 3700	Specific Data 1.5 1.1 1.0 1.7 2.0 2.1 0.9 1.0 1.0 1.7 1.4 1.4 6 2 2 3 5 5 10 10 10 13 19 45 Bed Material Fines Clay, silt, sand (<2mm): 25 25 Gravels Small (2-16mm): 75 35 Gravels Small (2-16mm): 75 40 Sm. cobble (64-128mm): 0 0 0 Large (16-64mm): 0 0 0 Bedrock 0 0 0 Bedrock 0 0 0 D90 (cm): 7 Compaction: Low Banks Height (m): 0.3 % Unstable: 0 0 Fines Gravets Larges Bedrock Confinement: N/A N/A Stage: I Flood Signs Ht(m): 0.1 Bars (%): 2 pH: Braid	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 EL EL Comments Ci S3 Ci List = 22%, RS = 36% Ci No fisheries sensitive zones were noted at this stie. Ci S3 Ci List = 22%, RS = 36% Ci No fisheries sensitive zones were noted at this stie. Ci No fisheries sensitive zones were noted at this stie. Ci No fisheries sensitive zones were noted at this stie. Ci No fisheries sensitive zones were noted at this stie. Ci No diditional bank texture information. Ci No additional bank texture information. Ci DO, pH, conductivity were not measured at this site. The water was clear to the bottom. The mean air temperature on this day was 12.7°C Ci Some good rearing and spawning habitat were observed at this site. Much of the debris at this site is derived from the cutblock this stream was sampled in. Ci The air temperature



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.

DFO/MoELP Stream Survey Form	Site Number: RYAN 100 Trib. to Passb	Reach No.: 1 by Cr. If RITON Environmental Consultants Ltd.
Location: RYAN 100, Unit 11, 4.0 km W of Passby Cr. Map #: 93 L 083 Reach Length (km	Stream (Gaz.): Unnamed	Watershed Code: 040-2200-000-000-000-000-000-000-000-000
Channel Characteristics Av. Chan. Width (m): 0.9 MS Av. Chan. Width (m): 0.6 MS Av. Wet. Width (m): 0.6 MS Av. Max Riffle Depth (cm): 6 MS Av. Max Rool Depth (cm): 8 MS Gradient (%): 19.0 CL Pool: 5 Riffle: 80 % Side Channel: 0 GE Fi % Stable: 5 GE GE % Stable: 5 GE GE Cover Cover Total % : 30 GE L Pool LOD Bldr< In Veg O Veg Ctbnk 0 20 0 30 30 Be Crown Closure % : 60 Aspect : E D9	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 I Material ines Clay, silt, sand (<2mm): 5 ines Clay, silt, sand (<2mm): 20 5 iravels Small (2-16mm): 20 15 Large (16-64mm): 25 15 .arges Lge cobble (128-256mm): 75 25 Bider cobble (>256mm): 25 25 edrock 0 0 0 0 0 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 NA NA Comments Ci S4 S4
Discharge Bai Wetted Width (m) : 0.3 MS Mean Depth (m) : 0.0 MS Mean Depth (m) : 0.19 F Discharge (m3/s) : 0.00 F Va 0.00 F Reach Symbol (Fisb) (DV) 1 C 19.0 1270	<i>nks</i>	 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.



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.

DFO/MoELP Stream Survey Form	Site Number: RYAN 101 Trib. to Passby Cr.	Reach No.: 1 TRITON Environmental Consultants Ltd.
Location: RYAN 101, Unit 11, see C5.	Stream (Gaz.): Unnamed	Watershed Code: 040-6900-000-000-000-000-000-000-000-000-0
Map #: 93 L 083 Reach Le U.T.M.: 9.5977 .60751 Length st	ngth (km): 0.6 MA Date: 23-Sep-96 Time: 17:50 arveyed (m): 150.0 GE Survey Crew: RH VIL \ \ \	Agency: TEC Access: H Fish Card: N Field Historical
Av. Chan. Width (m): 3.5 MS Av. Wet. Width (m): 2.0 MS Av. Max Riffle Depth (cm): 13 MS Av. Max Riffle Depth (cm): 13 MS Av. Max Pool Depth (cm): 35 MS Gradient (%): 18.0 CL Pool: 15 Riffle: 50 % Side Channel: 0 GE % Stable: 0 GE % Stable: 0 GE COVET Cover Total %: 30 Cover GE 0 GE Pool LOD Bldr In Veg O Veg Ctbnk 35 15 30 0 10 Crown Closure %: 20 Aspect: W Discharge 0.1 MS Mean Depth (m): 0.39 F Discharge (m3/s): 0.02 F Reach Symbol (Fish) DV 4 B 18.0 0361	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 Bed Material Fines Clay, silt, sand (<2mm): 5 5 Gravels Small (2-16mm): 30 10 Large (16-64mm): 20 20 20 Larges Sm. cobble (64-128mm): 20 20 Larges Lge cobble (128-256mm): 60 20 Larges Lge cobble (>256mm): 5 5 D90 (cm): 42 Compaction: Medium C2 Eanks	Height (m) Type Location 1 F 0.1 Summary Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method DV 1 40 J R EL EL ments



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.

DFO/MOELP Stream Survey Form	Site Number: RYAN 102 Trib. to Passb	Reach No.: 2 by Cr. TRITON Environmental Consultants Ltd.
Location: RYAN 102, Unit 11 , see C5. Map #: 93 L 083 Reach Lo	Stream (Gaz.): Unnamed	Watershed Code: 001-0100-000-000-000-000-000-000-000-00
U.T.M.: 9.5970_60768 Length s Channel Characteristics Av. Chan. Width (m): 1.0 MS Av. Wet. Width (m): 0.7 MS Av. Max Riffle Depth (cm): 5 MS	Specific Data GE Survey Crew: RH UL Specific Data Image: Control of the second	Obstructions None Air Photos: C Height (m) Type Location
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 Cover Cover Total %: 40 GE Pool LOD Bldr In Veg Veg Ctbnk 10 10 0 40 30 GE Crown Closure %: 80 Aspect : SE	Bed Material Fines Clay, silt, sand (<2mm):	Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA EL EL EL Comments S4 C2 The side slopes were not measured at this site. C3 No fisheries sensitive zones were noted at this site.
Discharge Wetted Width (m) : 0.7 Mean Depth (m) : 0.1 Mean Velocity (m/s) : 0.26 Discharge (m3/s) : 0.01 F	Banks Height (m): 0.2 % Unstable: 0 Fines Gravels Larges Confinement: OC Valley: Channel Ratio Stage: L Flood Signs Ht(m): 0.2	 C4 The elelectroshocking 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.

DFO/MoELP Stream Survey Form	Site Number: RYAN 99 Trib. to Passb	Reach No.: 2 by Cr. TRITON Environmental Consultants Ltd.
- Location: RYAN 99, Unit 11, 1.4km W of Passby Cr.	Stream (Gaz.): Unnamed	Watershed Code: 040-2100-000-000-000-000-000-000-000-000-0
Map #: 93 L 083 Reach I U.T.M. : 9.5922 .60791 Length	Length (km): 2.5 MW Date: [23-Sep-96] Tim surveyed (m): 300.0 GE Survey Crew: RH VL	ne: [16:15] Agency: [TEC] Access: [H] Fish Card: [N] Field [X] Historical [A \ \ \ \ \ \ \ \ Photos: [
Channel Characteristics Av. Chan. Width (m): 1.3 MS Av. Wet. 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 C1 Pool: 20 Riffle: 60 Weted Channel: 0-10 GE % Stable: 0 GE % Stable: 0 GE Cover Cover Total % : 55 GE Pool LOD Bldr In Veg O Veg Ctbnk 20 20 10 0 20 30 Crown Closure % : 25 Aspect : SE Discharge 0.11 MS Mean Depth (m) : 0.12 MS Discharge (m3/s) : 0.01 F Dv 1 D 6.0 2530	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 Bed Material 20 20 20 Gravels Clay, silt, sand (<2mm):	Obstructions Iteight (m) Type Location Fish Summary <u>C</u> Species <u>DV</u> <u>B</u> Summary <u>C</u> Species <u>DV</u> <u>B</u> Summary <u>B</u> Summary <u>C</u> Species <u>Number</u> Size Range (mm) <u>Life Phase</u> Use 1 Use 2 Use 3 Method <u>DV</u> <u>3</u> 80 <u>J</u> R <u>C</u> Species <u>Number</u> Size Range (mm) <u>Life Phase</u> Use 1 Use 2 Use 3 Method <u>DV</u> <u>3</u> 80 <u>J</u> R <u>C</u> Species <u>Number</u> Size Range (mm) <u>Life Phase</u> <u>Use 3 Method</u> <u>C</u> S4 <u>C</u> LS = 30%, RS = 37% <u>C</u> No additional bank texture information. <u>C</u> Seconductivity were not measured at this site. The water was clear to the bottom. The mean air temperature on this day was 3.8°C



Photo #: R-6-7, 1996/09/23 Site #: R99, Looking downstream.

DFO/MoELP Stream Survey Form	Site Number: RYAN 98	Reach No.: 6
	Trib. to Han	kin L. TRITON Environmental Consultants Ltd.
Location: RYAN 98, Unit 11, 1.4km NE of Hankin La	ike, see C5. Stream (Gaz.): Unnamed	Watershed Code: 040-6800-000-000-000-000-000-000-000-000-0
Map #: 93 L 083 Reach L U.T.M. : 9.5923 .60830 Length	ength (km): 0.6 MW Date: 23-Sep-96 Til surveyed (m): 200.0 GE Survey Crew: RH V	me: [15:10] Agency: [TEC] Access: [H] Fish Card: [N] Field [X] Historical
Channel Characteristics	Specific Data	Obstructions
Av. Chan. Width (m): 1.3 MS Av. Wet. Width (m): 1.1 MS Av. Max Riffle Depth (cm): 5 MS Av. Max Riffle Depth (cm): 14 MS Gradient (%): 20.0 CL Pool: 50 Riffle: 25 Other: 0 0 CE % Side Channel: 10-40 GE % Debris Area: 5-15 GE %Stable: 90 GE Cover Cover Total % : 50 GE Pool LOD Bldr In Veg O Veg Ctbnk 20 20 0 20 20 20 20	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 Bed Material Fines Clay, silt, sand (<2mm): 5 5 Gravels Small (2-16mm): 15 5 Large (16-64mm): 10 10 5m. cobble (64-128mm): 20 Larges Lge cobble (128-256mm): 80 25 35 Bedrock 0 0 0 0 D90 (cm): 50 Compaction: Medium	C Height (m) Type Location Fish Summary
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) 1 B 20.0 1180 (Width, Valley: Chassed, Slope) (Bed Material)	Banks Height (m): 1.0 % Unstable: 0 % Unstable: 0.5 Stage: L Flood Signs Ht(m): 0.5 Bars (%): 0 pH: Braided: N Water Temp. (°C): 3.0 02 (ppm): Turb. (cm): 21 Cond. (µmhos):	 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 C6: Some nice step pool habitat was observed at this site.



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

6

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 1031 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.

DFO/MoELP Stream Survey Form	Site Number: Y169	Reach No.: 2	
	Red Canyon	Cr. TRITON Environmental Consultants Ltd.	
Location: Y169, Unit 11	Stream (Gaz.): Red Canyon Creek	Watershed Code: 440-6208-000-000-000-000-000-000-000-000-000-	
Map #: [103] 090 Reach Length U.T.M. : [9.56174.607484 Length surve	n (km): 5.3 MA Date: [16-Aug-97] Tim yed (m): 1000.0 GE Survey Crew: JL \IP \	ae: 16:00 Agency: [TEC] Access: [H] Fish Card: [N] Field X Historical	
Channel Characteristics Av. Chan. Width (m): 11.5 T Av. Wet. Width (m): 8.1 T Av. Wet. Width (m): 20 MS Av. Max Riffle Depth (cm): 20 MS Av. Max Pool Depth (cm): 40 MS Gradient (%): 3.0 CL Pool: 10 Run: 40 Width (m): 40 MS Av. Max Pool Depth (cm): 40 MS Gradient (%): 3.0 CL Pool: 10 Run: 40 Width Area: 0.5 GE % Stable: 10 GE Cover Cover Total %: 15 Ge 0 30 Crown Closure %: 15 Aspect : SE Discharge I	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 15 Large (16-64mm): 10 15 15 Sm. cobble (64-128mm): 40 10 10 Bder cobble (128-256mm): 40 10 20 D90 (cm):	Obstructions Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA EL Comments Comments Ci S5. Ci S6. Ci S6. Ci S6. Ci S6. Ci S6. Ci S6. Ci Ci S6. <td colspa<="" td=""></td>	
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 Reach Symbol (Fish) NF 12 B Width, Valley: Channel, Slope) (Bed Material)	% Unstable: 50 Fines Gravels Larges Sedrock Confinement: FC Valley: Channel Ratio 2-5 Stage: M Flood Signs Ilt(m): 1 Bars (%): 15 pH: 7.4 Braided: Y Water Temp. (°C): 13.0 02 (ppm): 1 Turb. (cm): 70 Cond. (µmhos): 20	 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. 	



Photo #: Y-18-22B, 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

DFO/MoELP Stream Survey Form	Site Number: Z130	Reach No.: 1
	Red Canyon	Cr. TRITON Environmental Consultants Ltd.
Location: Z130, Unit 11	Stream (Gaz.): Red Canyon Cr.	Watershed Code: 440-6208-000-000-000-000-000-000-000-000-000-
Map #: 93 L 071 Reach Len U.T.M. : 9.571173.6077639 Length sur	ogth (km): 6.6 MA Date: 12-Aug-97 Tim rveyed (m): 200.0 GE Survey Crew: JP \KG	ne: 15:10 Agency: TEC Access: H Fish Card: N Field Historical
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 Riffle Depth (cm): 23 MS Av. Max Pool Depth (cm): 81 MS Gradient (%): 1.0 CL Pool: 20 Riffle: 45 Voide Channel: 10-40 GE % Side Channel: 10-40 GE % Side Channel: 20 GE Voide Cover Cover Total %: 30 GE Pool LOD Bldr In Veg O Veg Ctbnk 20 15 45 0 10 10 Crown Closure %: 1 Aspect: E Discharge 0.00 F C1 Mean Depth (m): 0.00 F C1 Mean Velocity (m/s): 0.00 F C1 Discharge (m3/s): 0.00 F C2 D 10 2440 Aspect E Aspect C	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 Bed Material Fines Clay, silt, sand (<2mm):	Obstructions Fish Summary Method DV 1 145 A DV 1 145 A EL Comments Comments <t< th=""></t<>



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

DFO/MoELP Stream Survey Form	Site Number: Z149 Red Canyon Cr.	Reach No.: 2 TRITON Environmental Consultants Ltd.	
Location: Z149, Unit 11 Map #: 1031 090 Reach Length (km):	Stream (Gaz.): Red Canyon Creek	Watershed Code: 440-6208-000-000-000-000-000-000-000-000-000-	
U.T.M. : 9 .559486.6076490 Length surveyed (m)	100.0 GE Survey Crew: CF \KG \ \ \ \ Specific Data Obst	ructions	
Av. Chan. Width (m): 11.0 MS 11.1 Av. Wet. Width (m): 6.1 MS 4.1 Av. Max Riffle Depth (cm): 16 MS 14 Av. Max Rool Depth (cm): 54 MS 34 Gradient (%): 2.5 CL 34 Gradient (%): 2.5 CL 76 76 Pool: 5 Riffle: 55 Run: 40 Other: 0 % Side Channel: 0-10 GE Fines % Stable: 20 GE Grav Cover Cover Total %: 30 GE Larg Pool LOD Bldr In Veg Veg Ctbnk Bedru 5 10 75 0 10 0 Bedru Crown Closure %: 5 Aspect : E D90 (c Discharge Wetted Width (m) : 5.3 MS Fines Mean Velocity (m/s) : 0.66 F Confi Valley Mean Velocity (m/s) : 0.52 F Valley Bars (NF NF Stage <td>11.4 13.0 12.5 10.5 7.6 9.0 6.2 5.9 6.7 4.9 18 10 21 26 103 Aaterial Fish Clay, silt, sand (<2mm):</td> 10 10 Clay, silt, sand (<2mm):	11.4 13.0 12.5 10.5 7.6 9.0 6.2 5.9 6.7 4.9 18 10 21 26 103 Aaterial Fish Clay, silt, sand (<2mm):	<td>Summary species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA Image: Size Range (mm) NA Image: Size Range (mm) EL ments Image: Size Range (mm) NA Image: Size Range (mm) Ima</td>	Summary species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA Image: Size Range (mm) NA Image: Size Range (mm) EL ments Image: Size Range (mm) NA Image: Size Range (mm) Ima

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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

DFO/MoELP Stream Survey Form	Site Number: Z151	Reach No.: 3
	Red Canyon Cr.	TRITON Environmental Consultants Ltd.
Location: Z151, Unit 11	Stream (Gaz.): Red Canyon Creek	Watershed Code: 440-6208-000-000-000-000-000-000-000-000-000-
Map #: 1031 090 Reach Length (kn U.T.M. : 9.55879.607676 Length surveyed	3.5 AE Date: [6-Aug-97] Time: [15:10] A m): 100.0 GE Survey Crew: CF \KG \ \ \ \ \ \ \ \	gency: TEC Access: H Fish Card: N Field Historical Photos: Z-20-2,3,4,5,6 Air Photos:
Channel Characteristics Av. Chan. Width (m): 8.9	Specific Data Obstructi Obstructi Obstructi C Height	ONS
Av. Wet. Width (m): 3.4 MS Av. Max Riffle Depth (cm): 9 MS Av. Max Pool Depth (cm): 35 MS	.3 4.5 5.2 3.2 3.4 2.6 5 7 14 11 6 52 25 27 33 26	C 12.3 C 12.4 C 12.3
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	Material Fish Sun nes Clay, silt, sand (<2mm):	Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NA NA EL
Cover Cover Total %: 40 GE Pool LOD Bldr In Veg O Veg Ctbnk 10 25 45 0 10 10 Crown Closure %: 5 Arnet: E	Sm. cobble (64-128mm): 10 arges Lge cobble (128-256mm): 40 15 Bider cobble (>256mm): 15 Ci: S5 sdrock 20 20 0 (cm): Ci: S5 Ci: S5	S=29%
Discharge Bai Wetted Width (m) : 1.7 Mean Depth (m) : 0.2 Mean Velocity (m/s) : 0.60 Discharge (m3/s) : 0.15	2ks Height (m): 0.3 % Unstable: 20 ines Gravels Larges Bedrock C6 DO was no 14 C. itley : Channel Ratio 5-10 C7 This reach sampling a	shocking effort, using a Smithroot 12 B POW model set at I, 5, 500 V, was 339 seconds over 100 hal bank texture information. It measured at this site, the water was clear to bottom. The mean air temperature on this day was has some great rearing pools and boulder and LOD cover. Three cascades were noted in the rea that would prevent juvenile fish passage upstream.
Reach Symbol (Fish) Ba	age: L Flood Signs Ht(m): U.8 rs (%): 60 pH: 7.8 Braided: Y C8: No fish we fish passag ater Temp. (°C): 14.0 02 (ppm):	re caught at this site, located above a series of cascades on Red Canyon Cr. which would prevent e upstream. As a result it has been classified as non fish bearing.



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: ¥168 Tri to Red Cany	Reach No.: 1 yon Cr. TRITON Environmental Consultants Ltd.
Location: Y168, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 068-4800-000-000-000-000-000-000-000-000-0
Map #: [1031 090 Reach Len U.T.M. : [9.5618.60749 Length sur	gth (km): [.0] [MA] Date: [16-Aug-97] Tim veyed (m): [100.0] [GE] Survey Crew: JLNP	ne: 14:45 Agency: TEC Access: H Fish Card: N Field K Historical
Channel Characteristics	Specific Data	Obstructions
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	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 3 4 26 45 24 23 37	
Gradient (%): 11.0 CL Pool: 15 Riffle: 20 Run: 55 Other: 10 % Side Channel: 0.10 GE 0.10 GE % Debris Area: >15 GE 30 GE %Stable: 30 GE GE	Bed Material Fines Clay, silt, sand (<2mm):	Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA EL
Pool LOD Bldr In Veg O Veg Ctbnk 20 35 25 0 10 10 Crown Closure % : 40 Aspect : \$\$\$	Blder cobble (>256mm): 15 Bedrock 10 10 D90 (cm): Compaction: High	C1 S5. C2 LS=45%, RS=42% C3 No fisheries sensitive zones noted.
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 Confinement: FC Valley : Channel Ratin 2-5	 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 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.
Reach Symbol (Fish) NF 4 B 11.0 1351	Stage: M Flood Signs Ilt(m): 0.9 Bars (%): 20 pII: 7.1 Braided: Y Water Temp. (°C): 12.5 02 (ppm):	



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

DFO/MoELP Stream Survey Form	Site Number: W189 Trib to Red Can	Reach No.: 4 yon Cr. TRITON Environmental Consultants Ltd.
Location: W189, Unit 11; 2.4km east of unit 11 bound Map #: 1031080 Reach L Reach L	Iary Stream (Gaz.): Unnamed ength (km): 1.6 MA Date: 16-Aug-97 Time	Watershed Code: 064-5300-000-000-000-000-000-000-000-000-00
Channel Characteristics Av. Chan. Width (m): 26.0 MS Av. Wet. Width (m): 6.8 MS Av. Wet. Width (m): 6.8 MS Av. Max Riffle Depth (cm): 5 MS Av. Max Pool Depth (cm): 26 MS Gradient (%): 5.3 CL Pool: 5 Riffle: 70 % Side Channel: >40 GE % Side Channel: >40 GE % Stable: 0 GE % Stable: 0 GE Cover Cover Total %: 15 GE Pool LOD Bldr In Veg O Veg Ctbnk 20 10 70 0 0 0 0 Crown Closure %: 0 Aspect: N Discharge Wetted Width (m): 3.9 MS Mean Depth (m): 0.53 F 0.53 F Discharge (m3/s): 0.53 F 0.53 F Q D 6.0 2260 0 </th <th>Specific Data 20.0 27.0 19.0 29.0 28.0 33.0 6.0 14.0 5.0 4.5 4.0 7.5 4 4 5 6 5 4 25 25 18 23 31 36 Bed Material 20 20 20 20 Gravels Small (2-16mm): 20 10 Large (16-64mm): 10 10 Sm. cobble (64-128mm): 20 Larges Lge cobble (128-256mm): 20 20 20 Bedrock 0 0 0 20 20 Bedrock 0 0 0 0 0 D90 (cm): 39 Compaction: Medium 0.1 % Unstable: 80 Fines Gravels Larges Bedrock 0 0 D90 (cm): 39 Compaction: Medium 0.1 % Unstable: 80 Fines Gravels Larges Bedrock 10 10 Valley : Channel Ratio 10+ 10 14<</th> <th>Obstructions C Height (m) Type Location a F 3.3 i0 C 2.0 Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF N NA EL EL EL Comments Ci S5. Ci LS=10%, RS=30% Ci No fisheries sensitive zones noted. Ci The electroshocking effort, using a Smithroot 12 B POW model set at 1, 5, 700V, was 410 seconds over 200 meters. Si No additional bank texture information. Ci D0 was not measured at this site. The air temperature at this site was 15.0 C. Ci This is a high energy system that provides some cover for fish. The 8m falls and the 6m falls however are barriers. There is no overwintering habitat on this tributary.</th>	Specific Data 20.0 27.0 19.0 29.0 28.0 33.0 6.0 14.0 5.0 4.5 4.0 7.5 4 4 5 6 5 4 25 25 18 23 31 36 Bed Material 20 20 20 20 Gravels Small (2-16mm): 20 10 Large (16-64mm): 10 10 Sm. cobble (64-128mm): 20 Larges Lge cobble (128-256mm): 20 20 20 Bedrock 0 0 0 20 20 Bedrock 0 0 0 0 0 D90 (cm): 39 Compaction: Medium 0.1 % Unstable: 80 Fines Gravels Larges Bedrock 0 0 D90 (cm): 39 Compaction: Medium 0.1 % Unstable: 80 Fines Gravels Larges Bedrock 10 10 Valley : Channel Ratio 10+ 10 14<	Obstructions C Height (m) Type Location a F 3.3 i0 C 2.0 Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF N NA EL EL EL Comments Ci S5. Ci LS=10%, RS=30% Ci No fisheries sensitive zones noted. Ci The electroshocking effort, using a Smithroot 12 B POW model set at 1, 5, 700V, was 410 seconds over 200 meters. Si No additional bank texture information. Ci D0 was not measured at this site. The air temperature at this site was 15.0 C. Ci This is a high energy system that provides some cover for fish. The 8m falls and the 6m falls however are barriers. There is no overwintering habitat on this tributary.



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

DFO/MoELP Stream Survey Form	Site Number: W190 Trib to Red Can	Reach No.: 1 ayon Cr. TRITON Environmental Consultants Ltd.
Location: W190, Unit 11; 2.5km east of Unit 11 boundary	Stream (Gaz.): Unnamed	Watershed Code: 052-2200-000-000-000-000-000-000-000-000
Map #: 1031 080 Reach Length U.T.M. : 9 .5611 .60711 Length surve	h (km): 1.5 MA Date: 16-Aug-97 Tim yed (m): 175.0 GE Survey Crew: JP \DD	ne: 12:00 Agency: TEC Access: H Fish Card: N Field Historical
Channel Characteristics Av. Chan. Width (m): 19.4 GE Av. Wet. Width (m): 11.2 GE Av. Max Riffle Depth (cm): 6 MS Av. Max Riffle Depth (cm): 31 MS Gradient (%): 8.0 CL Pool: 5 Riffle: 20 % Side Channel: 10-40 GE % Side Channel: 10-40 GE % Side Channel: 0 GE % Stable: 0 GE % Stable: 0 GE Cover Cover Total %: 10 GE Pool LOD Bldr In Veg O Veg Crown Closure %: 0 Aspect: Discharge Mean Depth (m): 0.4 Mean Depth (m): 0.4 GE Mean Velocity (m/s): 2.50 F Discharge (m3/s): 4.28 F	Specific Data 26.0 21.0 19.2 23.0 11.0 16.0 10.5 14.0 9.5 19.0 6.0 8.0 2 5 6 10 5 5 28 22 33 31 42 Bed Material Fines Clay, silt, sand (<2mm):	Obstructions C Height (m) Type Location 8 F 3.3 10 C 2.0 Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method MF NA Image: Name of the state of the sta
(Fish) NF 19 D 8.0 1180 (Width, Valley: Channel, Slope) (Bed Material)	Stage: M Flood Signs Ht(m): 1.1 Bars (%): 75 pH: 7.9 Braided: Y Water Temp. (°C): 2.0 02 (ppm): Turb. (cm): 6 Cond. (µmhos): 30	



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

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Photo #: W-I-6, 16-Aug-97 Site #: W190, Looking upstream at a 10m falls barrier

DFO/MoELP Stream Survey Form	Site Number: W191 Trib to Red Can	Reach No.: 1 ayon Cr. Invironmental Consultants Ltd.
Location: W191, Unit 11; 4.6km east of Unit 11 boun	dary Stream (Gaz.): Unnamed	Watershed Code: 052-1600-000-000-000-000-000-000-000-000-00
Map #: 1031 080 Reach L U.T.M.: 9.5617.60718 Length	Length (km): 2.8 MA Date: 16-Aug-97 Tin surveyed (m): 150.0 GE Survey Crew: JP \DE	ne: 13:30 Agency: TEC Access: H Fish Card: N Field Historical
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; Av. Max Pool Depth (cm): 32 MS; Av. Max Pool Depth (cm): 32 MS; Gradient (%): 9.0 CL Pool: 30 Riffle: 20 % Side Channel: 0-10 GE % Stable: 0 GE Ø Stable: 0 GE Pool LOD Bldr In Veg O Veg Ctbnk 40 10 50 0 0 0 Crown Closure %: 0 Aspect : N Discharge Wetted Width (m) : 2.2 MS; Mean Depth (m) : 0.10 F; Discharge (m3/s) : 0.10 F; NF 7 B 9.0 2242 (Width, Valley: Channet, Slope) (Bed Material)	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 Bed Material Fines Clay, silt, sand (<2mm):	Obstructions Fish Summary C Species NF Ster Range (mm) Life Phase Use 1 Use 2 Use 3 Method NE Ster Ne Ster Ster Ster <



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

DFO/MoELP Stream Survey Form	Site Number: W192 Trib to Red Can	Reach No.: 1 yon Cr. TRITON Environmental Consultants Ltd.
Location: W192, Unit 11; 5.3km east of Unit11 bounda	ry Stream (Gaz.): Unnamed	Watershed Code: 064-5300-000-000-000-000-000-000-000-000-00
U.T.M.: 9.5625 .60725 Length st	Irveyed (m): 150.0 GE Survey Crew: JP \DD	N N
Av. Wet. Width (m): 8.2 GE Av. Max Riffle Depth (cm): 6 MS Av. Max Pool Depth (cm): 61 MS Gradient (%): 2.0 CL Pool: 5 Siffle: 90 % Side Channel: 10-40 GE % Side Channel: 0-5 GE % Stable: 0 GE Østable: 0 GE Cover Cover Total %: 20 GE Pool LOD Bldr In Veg O ge Ctown Closure %: 5 90 0 0 Discharge N Sil GE	5.2 14.5 6.5 9.5 6.5 7.0 5 4 6 8 6 8 74 70 38 38 38 Bed Material Fines Clay, silt, sand (<2mm):	Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method DV 2 180-190 A R EL EL Comments Ci s2.
Wetted Width (m) : 5.1 [GE] Mean Depth (m) : 0.5 [MS] Mean Velocity (m/s) : 2.02 [F] Discharge (m3/s) : 3.86 [F] Reach Symbol (Fish) DV 19 C 2.0 1270 (Width, Velicy: Channel, Slope)	Fines Gravels Larges Bedrock Confinement: OC Valley: Channel Ratio 5-10 Stage: M Flood Signs Ht(m): 1 Bars (%): 90 pH: 7.8 Braided: Y Water Temp. (°C): 4.0 02 (ppm): 30 Turb. (cm): 14 Cond. (µmhos): 30	 C6 DO was not measured at this site. The air temperature at this site was 23.0 C. C7 Boulder and cobble cover was observed at this site. Aquatic insects were quite abundant at the time of sampling.



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

DFO/MoELP Stream Survey Form	Site Number: V Trib to	W193 D Red Ca	Reach No.: 1 Inyon Cr. TRITON Environmental Consultants Ltd.
Location: W193, Unit 11; 5.5km east of Unit 11 bounda Map #: 1031 080 Reach Len U.T.M. : 9.5624 .60727 Length sur	y Stream (Gaz.): Uni gth (km): 0.9 MA Date: 14 veyed (m): 175.0 GE Survey C	named 5-Aug-97] 7 Frew: JP V	Watershed Code: 051-9900-000-000-000-000-000-000-000-000-0
Channel Characteristics Av. Chan. Width (m): 7.1 MS Av. Wet. Width (m): 2.3 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 % Stable: 20 GE % Stable: 20 GE GE Cover Cover Total %: 50 GE Pool LOD Bldr In Veg O Veg Ctbnk 65 10 25 0 0 0 Crown Closure %: 20 Aspect: NW Discharge	Specific Data 7.7 6.8 5.5 7.2 7.3 2.0 1.9 2.8 3.5 1.7 5 6 7 2 3 27 27 34 28 25 Bed Material Small (2-16mm): Large (16-64mm): Small (2-16mm): Large (16-64mm): Blder cobble (128-256mm): Blder cobble (128-256mm): Blder cobble (>256mm): Blder cobble (>256mm): Blder cobble (>256mm): Height (m): Mathematical	8.3 2.1 2 41 20 20 10 10 20 50 20 10 10 10 10 10 10 10 10 10 1	Obstructions Fish Summary Mumber Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method DV DV 3 160-198 A R EL DV 1 100 J Comments Cli 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 1, 5, 400V, was 143 seconds over 175 meters. CS No additional bank texture information.
Mean Depth (m): 0.1 MS Mean Velocity (m/s): 0.48 F Discharge (m3/s): 0.05 F Reach Symbol (Fish) DV 7 C 6.0 2251 (Width, Valley: Channel, Slope) (Bed Material) (Bed Material)	Confinement: OC Valley : Channel Ratio 5-10 Stage: M Flood Signs Ht(m): Bars (%): 75 pH: 7.9 Braided Water Temp. (°C): 10.5 02 (ppm): Turb. (cm): Cond. (µmhos)	0.8 1: Y : 120	 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.



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

DFO/MoELP Stream Survey Form	Site Number: ¥165 Trib to Red Can	Reach No.: 1 yon Cr. Image: State of the state
Location: Y165, Unit 11 Map #: 1031 090 Rench Length 11 T. M 9, 5608, 60756 Length surve	Stream (Gaz.): Unnamed h (km): 1.0 MA Date: 16-Aug-97 Tin even (m): 120.0 GE Summer Groups U.D.	Watershed Code: 064-7200-000-000-000-000-000-000-000-000-00
Channel Characteristics Av. Chan. Width (m): 2.5 MS Av. Wet. Width (m): 1.3 MS Av. Max Riffle Depth (cm): 3 MS Av. Max Riffle Depth (cm): 11 MS Av. Max Pool Depth (cm): 11 MS Av. Max Pool Depth (cm): 11 MS Av. Max Pool Depth (cm): 11 MS Gradient (%): 20.0 CL Pool: 33 Riffle: 40 Run: 20 Other: 5 % Side Channel: 0-10 GE % % Stable: 20 GE 20 GE Cover Cover Total %: 20 GI! Pool LOD Bldr In Veg O Veg Ctbnk 0 50 25 0 20 5 Crown Closure %: 20 Aspect: SW Discharge Wetted Width (m): 0.8 MS Mean Depth (m): 0.0 MS MS Mean Velocity (m/s): 0.12 F Discharge (m3/s): 0.07 F	Specific Data 1.2 3.5 1.9 2.8 2.0 3.7 0.9 0.7 1.7 2.0 0.6 1.6 2 3 2 4 3 8 12 11 15 9 Bed Material 10 10 10 10 Gravels Small (2-16mm): 40 20 Large (16-64mm): 20 20 20 Sm. cobble (64-128mm): 15 15 Large (16-64mm): 50 15 Bider cobble (128-256mm): 50 15 Bider cobble (>256mm): 0 0 D90 (cm): 33 Compaction: Medium Battks Height (m): 0.2 % Unstable: 40 Fines Gravels Larges Bedrock 0 0 Stage: M Flood Signs Ht(m): 1 Bars (%): 20 pH: 7.2 Braided: Y Water Temp. (°C): 10.0 02 (ppm): 1 1 <th>Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA NA EL EL Comments NA EL Cl S6. S6. S6. S6. Cl The electroshocking effort, using a Smithroot 12 B POW model set at 1, 5, 400V, was 192 seconds over 120 meters. No fisheries sensitive zones noted. Ch The electroshocking effort, using a Smithroot 12 B POW model set at 1, 5, 400V, was 192 seconds over 120 meters. S6. Ch DO was not measured at this site, the water was clear to bottom. The air temperature at this site was 13.5 C. The gradent in this stream is steep but passable at the mouth and then lowers upstream. At the time of surveying it was a small stream at low stage with a series of Small pools connected by riffles with most of the rearing habitat in the form of overhead vegetation and LOD and some curbanks. Some spawning gravel was observed and could be used at higher flows. No fish were caught but the creek drains into the fish bearing Red Canyon Creek. A 3.0 m cascade was observed in this reach.</th>	Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA NA EL EL Comments NA EL Cl S6. S6. S6. S6. Cl The electroshocking effort, using a Smithroot 12 B POW model set at 1, 5, 400V, was 192 seconds over 120 meters. No fisheries sensitive zones noted. Ch The electroshocking effort, using a Smithroot 12 B POW model set at 1, 5, 400V, was 192 seconds over 120 meters. S6. Ch DO was not measured at this site, the water was clear to bottom. The air temperature at this site was 13.5 C. The gradent in this stream is steep but passable at the mouth and then lowers upstream. At the time of surveying it was a small stream at low stage with a series of Small pools connected by riffles with most of the rearing habitat in the form of overhead vegetation and LOD and some curbanks. Some spawning gravel was observed and could be used at higher flows. No fish were caught but the creek drains into the fish bearing Red Canyon Creek. A 3.0 m cascade was observed in this reach.



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

DFO/MoELP Stream Survey Form	Site Number: Y166 Trib to Red Can	Reach No.: 1 yon Cr.	No.: 1 TRITON Environmental Consultants Ltd.	
Location: Y166, Unit 11 Map #: 1031 090 Reach Leng U.T.M. : 9.561316.6075341 Length surv	Stream (Gaz.): Unnamed th (km): 1.0 MA Date: 16-Aug-97 Tim eyed (m): 100.0 GE Survey Crew: JLJP	We: 11:20 Agency: TEC Acces	atershed Code: 064-7000-000-000-000-000-000-000-000-000-0	
Av. Chan. Width (m): 1.9 MS Av. Wet. Width (m): 0.3 MS C1 Av. Max Riffle Depth (cm): 0 MS Av. Max Rool Depth (cm): 7 MS Av. Max Pool Depth (cm): 7 MS Gradient (%): 42.0 CL Pool: 100 Run: 0 % Side Channel: 0-10 GE % Side Channel: 20 GE % Stable: 20 GE Cover Cover Total % : 20 GE Pool LOD Bldr In Veg O Veg Ctbnk 15 30 30 0 15 10 Crown Closure % : 10 Aspect : SW Discharge N Mean Depth (m) : N Discharge (m3/s) :	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 Bed Material Fines Clay, silt, sand (<2mm): 10 10 Gravels Small (2-16mm): 20 10 Gravels Large (16-64mm): 10 10 Sm. cobble (64-128mm): 10 10 Barges Lge cobble (128-256mm): 70 10 Bedrock 0 0 0 0 D90 (cm): 45 Compaction: Medium Banks Height (m): 0.3 % Unstable: 40 40 Fines Gravels Larges Bedrock 0 Valley : Channel Ratio 10+ Valley : Channel Ratio 10+ Stage: Dry Flood Signs H1(m): 0.8 Bars (%): 95 pH: 7.4 Braided: N Water Te	Fish Summary C Species Number Size Range (no. 1000) NF Size Range (no. 1000) Size Range (no. 1000) Comments Cl S6. No riffles were observed. C2 LS=46%, RS=45% C3 C3 No fisheries sensitive zones noted. C4 This site was not electrofished as there C5 No additional bank texture information C6 DO was not measured at this site, the work C7 This creek is dry with only a few small at the mouth.	nm) Life Phase Use 1 Use 2 Use 3 Method NA NA NA NA was not enough water.	



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

DFO/MoELP Stream Survey Form	Site Number: Y167 Trib to Red Can	Reach No.: 1 yon Cr. TRITON Environmental Consultants Ltd.
Location: Y167, Unit 11 Map #: 1031 090 Reach Length (km): U.T.M. : 19.561894.6074752 Length surveyed (m):	Stream (Gaz.): Unnamed [2.9] MA Date: [16-Aug-97] Tin [100.0] GE Survey Crew: II NP	Watershed Code: 064-6000-000-000-000-000-000-000-000-000
Channel Characteristics C1 Av. Chan. Width (m): 5.5 MS 4.0 C1 Av. Chan. Width (m): 4.4 MS 3.4 Av. Wet. Width (m): 4.4 MS 3.4 Av. Max Riffle Depth (cm): 20 MS 29 Av. Max Pool Depth (cm): 78 MS 80 Gradient (%): [4.0] CL 80 Gradient (%): [4.0] CL Pool: 20 Run: 20 Other: 40 Fines % Side Channel: 0 GE >15 GE Gravel Fines % Stable: 10 GE Side Channel: 10 GE Larges % Stable: 10 GE Larges Gravel Larges Pool LOD Bidr In Veg Veg Ctbnk Bedroct 30 30 20 0 15 5 N D90 (cm Discharge	Specific Data 8.6 8.2 2.5 6.3 2.0 5.9 5.7 2.5 6.0 2.0 18 10 20 22 120 80 50 60 rterial IO Clay, sill, sand (<2nim): IO Small (2-16mm): Large (16-64mm): Sm. cobble (64-128mm): 20 5 Blder cobble (128-256mm): 20 5 50 Blder cobble (>256mm): 20 5 10 50 50 50 50 50 50 50 50 50 50 50 50 50 50 50 50 50 50 6 Compaction: High Height (m): 6 0-2 % Unstable: 20 6 Flood Signs H((m): 0.3 <th>Obstructions Image: Stream of the s</th>	Obstructions Image: Stream of the s



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

DFO/MoELP Stream Survey Form	Site Number: Y170	Reach No.: 1
	Trib to Red Can	iyon Cr. TRITON Environmentol Consultants Ltd.
Location: Y170, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 064-7600-000-000-000-000-000-000-000-000-00
Map #: 1031 090 Reach Length U.T.M. : 9.5599 .60766 Length survey	(km): 2.6 MA Date: 16-Aug-97 Tin ed (m): 100.0 GE Survey Crew: JL VP	ne: 16:47 Agency: TEC Access: H Fish Card: N Field X Historical N Field X Historical N
Channel Characteristics	Specific Data	Obstructions
Av. Chan. Width (m): 2.2 MS Av. Wet. Width (m): 0.8 MS Av. Max Riffle Depth (cm): 5 MS Av. Max Pool Depth (cm): 32 MS Av. Max Pool Depth (cm): 32 MS Gradient (%): 17.0 CL Pool: 30 Run: 20 Void Channel: 0 GE % Side Channel: 0 GE % Stable: 10 GE Cover Cover Total %: 30 Gool LOD Bildr In Veg O Veg Ctbnk 10 Grown Closure %: 20 Aspect:	2.9 5.1 3.2 2.2 2.0 2.8 0.7 0.9 0.3 0.4 0.9 1.9 3 5 5 4 8 34 36 26 22 41 Ped Material Fines Clay, silt, sand (<2mm): 20 20 Gravels Small (2-16mm): 30 10 Large (16-64mm): 10 20 30 10 Larges Lge cobble (64-128mm): 10 10 20 Blder cobble (>256mm): 40 10 20 20 Bedrock 10 10 10 10	Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA EL EL EL Comments C1 S6. C2 LS=45%, RS=47% C3 No fisheries sensitive zones noted.
Discharge I 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 Reach Symbol (Fish) NF 3 B 17.0 (Width, Valley: Channel, Slope) (Bed Material)	Battks Ileight (m): 0.3 Sattks '% Unstable: 20 Fines Gravels Larges 20 Fines Gravels Larges Bedrock 1 Confinement: CO 2-5 1 Valley : Channel Ratio 2-5 1 1 Stage: M Flood Signs H1(m): 1 Bars (%): 10 pH: 7.2 Braided: N Water Temp. (°C): 12.0 02 (ppm): 1 1 Turb. (cm): Cond. (µmhos): 20 1	 C4 The electroshocking effort, using a Smithroot 12 B POW model set at I, 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.



Photo #: Y-19-12, 16/08/97 Site #: Y170, Looking upstream at the channel

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Photo #: Y-19-13, 16/08/97 Site #: Y170, Looking downstream at the channel, note boulder cover

	CI. N	
DFO/MoELP Stream Survey Form	Site Number: 2131 Trib to Red Can	yon Cr. TRITON
		Environmentai Consultants Ltd.
Location: Z131, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 036-4700-000-000-000-000-000-000-000-000-00
Map #: 93 L 081 Reach Length U.T.M.: 9.56688.607392 Length surve	h (km): 1.1 MA Date: 12-Aug-97 Tim yed (m): 1800.0 AE Survey Crew: JP \KG	ne: 16:30 Agency: TEC Access: H Fish Card: N Field Historical
Channel Characteristics	Specific Data	Obstructions
Av. Chan. Width (m): 3.1 AE Av. Wet. Width (m): 0.8 AE Av. Max Riffle Depth (cm): 3 AE Av. Max Riffle Depth (cm): 20 AE Gradient (%): 19.0 MA Pool: 30 Riffle: 10 Run: 60 Other: 0 % Side Channel: 10-40 AE % Stable: 40 AE Cover Cover Total %: 30 AE Pool LOD Bldr In Veg O Veg Ctbnk 20 50 20 0 10 0 Crown Closure %: 30 Aspect: S S	3.5 2.7 0.9 0.8 2 4 20 3 Bed Material Fines Clay, silt, sand (<2mm):	Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA NA NA NA NA Comments
Discharge N Wetted Width (m) : N Mean Depth (m) : AE N Mean Velocity (m/s) : F N Discharge (m3/s) : F Reach Symbol (Fisb) (DV) (BT) 3 D 3 D (Width, Valley: Channel, Skope) (Bed Material)	Banks Height (m): 0.2 % Unstable: 30 Fines Gravels Larges Confinement: UC Valley : Channel Ratio 10+ Stage: L Flood Signs Ht(m): 0.8 Bars (%): 60 pH: Braided: Y Water Temp. (°C): 02 (ppm):	 C4 This site was not electrofished as this was an aerial survey. C5 No additional bank texture information. C6 pH, DO, water temperature and conductivity measurements were not taken at this site dueas this was an aerial survey. The water was clear to bottom. The mean air temperature on this day was 16.9 C. C7 The channel dries up approximately 800m from the mouth, and it fans out or moves underground into a low gradient area. It has been classified as fish bearing, but the channel appears to be unstable near the mouth, which degrades the habitat quality.



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

Triton Environmental Consultants Ltd.

DFO/MoELP Stream Survey Form	Site Number: Z132	Reach No.: 1
	Trib to Red Can	ayon Cr.
Location: Z132, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 037-8100-000-000-000-000-000-000-000-000-00
Map #: 93 L 081 Reach Length (km): U.T.M. : 9.5646 .60738 Length surveyed (m):	1.2 MA Date: [12-Aug-97] Tim 1.2 AE Survey Crew: JP \KG	ne: 16:46 Agency: TEC Access: H Fish Card: N Field Historical
Channel Characteristics	Specific Data	Obstructions
Av. Wet. Width (m): 1.5 AE 1.5 Av. Max Riffle Depth (cm): 6 AE 2 Av. Max Riffle Depth (cm): 6 AE 2 Av. Max Pool Depth (cm): 25 AE 25 Gradient (%): 11.0 AE 25 Gradient (%): 11.0 AE Bed M % Side Channel: 10-40 AE 6 % Side Channel: 10-40 AE 6 % Stable: 30 AE 6 Cover Cover Total %: 30 AE Pool LOD Bldr In Veg Veg Ctonk 20 40 30 0 10 0 0 Crown Closure %: 35 Aspect : SE D90 (cr	2.7 2.0 1.6 1.5 5 10 Taterial Taterial Taterial Small (2-16mm): 10 Is Small (2-16mm): 10 Is Small (2-16mm): 10 Large (16-64mm): Sm. cobble (64-128mm): IO Sm. cobble (64-128mm): IO IS Bider cobble (>256mm): IS Bider cobble (>256mm): IS Compaction: Medium	Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA NA NA 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.
Discharge Banks N Wetted Width (m) : 1.5 AE N Mean Depth (m) : AE Fines N Mean Depth (m) : AE Fines N Mean Velocity (m/s) : Fi Confin N Discharge (m3/s) : Fi Confin N Discharge (m3/s) : Fi Stage: Reach Symbol (Fish) Stage: Bars (% (DV) (BT) 3 D 11.0 2440 (Width, Valley: Channel, Slope) (Bed Material) Turb. (Height (m): 0.1 % Unstable: 0 Gravels ☐ Larges ☐ Bedrock ☐ ement: UC : Channel Ratio 10+ [L] Flood Signs Ht(m): 0.8 6): [40] pH: [] Braided: [Y] Temp. (°C): [] 02 (ppm): [] cm): [] Cond. (µmhos): []]	 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 is has very low flow and ill defined banks in some areas. This stream has also been classified as fish bearing in reach 1.



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

DFO/MoELP Stream Survey Form	Site Number: Z147 Trib to Red Can	Reach No.: 2 ayon Cr. Invironmental Consultants Ltd.		
Location: Z147, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 064-7900-000-000-000-000-000-000-000-000-00		
Map #: 1031 090 Reach Length (km): 2.2 MA Date: 16-Aug-97 Time: 9:37 Agency: TEC Access: H Fish Card: N Field X Historical U.T.M.: 9.55844.607540 Length surveyed (m): 100.0 GE Survey Crew: CF \KG \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \				
Channel Characteristics Av. Chan. Width (m): 22.5 HC Av. Wet. Width (m): 10.0 HC Av. Wet. Width (m): 10.0 HC Av. Max Riffle Depth (cm): 21 HC Av. Max Pool Depth (cm): 21 HC Av. Max Pool Depth (cm): 23 HC Gradient (%): 3.0 CL Pool: S Riffle: 45 Run: 50 Other: 0 % Side Channel: >40 GE % 0 GE % Side Channel: >40 GE % 50 Other: 0 % Side Channel: >40 GE % 515 GE % Debris Area: 5-15 GE % 50 GE Cover Cover Total % : 25 GE Pool LOD Bidr In Veg O Veg Ctbnk 0 15 70 0 5 10 Crown Closure % : 0 Aspect : NE Discharge 1.39 F Discharge (m3/s) : 1.39 F	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 Bed Material Fines Clay, silt, sand (<2mm): 10 10 Gravels Small (2-16mm): 30 10 Large (16-64mm): 20 Large (16-64mm): 20 Large (16-64mm): 20 Large (16-64mm): 20 Bider cobble (64-128mm): 20 Bider cobble (128-256mm): 20 Bider cobble (>256mm): 20 Bedrock 0 0 D90 (cm): 89 Compaction: Medium Banks Height (m): 0.5 '4 Unstable: 0 0 Fines Gravels Larges Bedrock O Fines Gravels Larges Bedrock Stage: L Flood Signs Ht(m): 1.3 Bars (%): 70 pH: 7	Obstructions		



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

	Trib to Red Can	iyon Cr. TRITON Environmental Consultants Ltd.
Location: Z148, Unit 11 Map #: [1031 090 Reach L J.T.M. : [9.559486.6076490 Length :	Stream (Gaz.): Unnamed ength (km): 0.7 MA Date: 16-Aug-97 Tim surveyed (m): 100.0 GE Survey Crew: CF \KC	Watershed Code: 064-7900-000-000-000-000-000-000-000-000-00
Channel Characteristics Av. Chan. Width (m): 12.1 HC Av. Wet. Width (m): 6.7 HC Av. Max Riffle Depth (cm): 24 MS Av. Max Riffle Depth (cm): 24 MS Av. Max Pool Depth (cm): 25 CL Pool: 10 Riffle: 50 Run: 35 Other: 5 % Side Channel: 10-40 GE % Stable: 10 GE % Stable: 10 GE % Stable: 10 GE Cover Cover Total %: 30 GE GE Pool LOD Bldr In Veg O Veg Ctbnk 15 5 70 0 10 0 O Crown Closure %: 10 10 0 0 Gradient (m): 0.3 MS Mean Depth (m): 0.3 MS Mean Velocity (m/s): 0.93 F Discharge (m3/s) : 1.11	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 Bed Material 10 10 10 Gravels Small (2-16mm): 40 15 Large (16-64mm): 25 25 5m. cobble (64-128mm): 10 Larges Lge cobble (128-256mm): 40 15 Bedrock 10 10 10 D90 (cm): Compaction: Medium 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	Obstructions ^C Height (m) Type Location ² C 01 Fish Summary ^C Species Number Size Range (mm) Life Phase Use I Use 2 Use 3 Method ^{NF} NA EL ^C Species Number Size Range (mm) Life Phase Use I Use 2 Use 3 Method ^C Species Number Size Range (mm) NA EL ^C Species Specis Species Species Species Species Species S



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

DFO/MoELP Stream Survey Form	Site Number: Z150 Trib to Red Cany	Reach No.: 1 yon Cr. TRITON Environmental Consultants Ltd.
Location: Z150, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 065-0600-000-000-000-000-000-000-000-000
Map #: 1031 090 Reach Le U.T.M. : 9 .5593 .60769 Length st	Image: Mage:	H Fish Card: N Field Historical H Fish Card: N Field Historical H Fish Card: N Field Historical
Av. Chan. Width (m): 9.1 MS Av. Wet. Width (m): 2.9 MS Av. Wet. Width (m): 2.9 MS Av. Max Riffle Depth (cm): 21 MS Av. Max Riffle Depth (cm): 21 MS Av. Max Pool Depth (cm): 21 MS Gradient (%): 5.0 CL Pool: 50 Riffle: 15 % Side Channel: 0 GE % Stable: 0 GE Cover Cover Total %: 20 GE Pool LOD Bldr In Veg Veg Ctbnk 50 0 45 0 5 0 GE Crown Closure %: 0 Aspect: SE	Specific Data 6.9 8.9 6.5 11.5 10.9 9.6 4.5 3.1 3.4 2.3 1.9 2.4 20 23 20	Obstructions C Height (m) Type Location 10 F 0.1 Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA NA EL Comments C1 S5 C2 LS=65%, RS=63% C3 No fisheries sensitive zones noted. C4 The elemental line of first union of fisheries line of fisherie
Discharge Wetted Width (m) : 2.0 MS Mean Depth (m) : 0.4 MS Mean Velocity (m/s) : 1.21 F Discharge (m3/s) : 0.73 F Reach Symbol (Fish) NF 9 B 5.0 1234 (Width, Valky: Chansel, Slope) (Bed Material)	Banks Height (m): 2.1 % Unstable: 0 % Unstable: 0 Fines Gravels Larges Confinement: CO Valley: Channel Ratio 2-5 Stage: M Flood Signs Ht(m): 0.8 Bars (%): 25 pH: 7.4 Braided: N Water Temp. (°C): 11.0 02 (ppm): 10 Turb. (cm): Cond. (µmhos): 10	 The electroshocking effort, using a Smithroot 12 B POW model set at 1, 5, 500V, was 87 seconds over 70 meters. No additional bank texture information. DO was not measured at this site, the water was clear to bottom. The air temperature at this site was 18.5 C. There is some nice deep pool cover in this reach. The crew did not climb above the falls to sample for safety reasons. No fish were caught. The site was located above a series of cascades on the mainstem which prevent fish passage upstream. As a result this tributary has been classified as non fish bearing.



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

DFO/MoELP Stream Survey Form •	Site Number: Z152 Trib to Red Canyo	Reach No.: 1 on Cr. TRITON Environmental Consultants Ltd
Location: Z152, Unit 11 Map #: 1031 090 Reach Lengt U.T.M. : 9.560200.6076114 Length surve	Stream (Gaz.): Unnamed th (km): 0.8 MA Date: 16-Aug-97 Time: eyed (m): 100.0 GE Survey Crew: KG \CF \	Watershed Code: 440-6208-000-000-000-000-000-000-000-000-000-
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 Riffle Depth (cm): 30 [MS] Gradient (%): 5.0 [CL] Pool: 35 Riffle: 10 Run: 50 Other: 5 % Side Channel: 0-10 [GE] % Side Channel: 0-10 [GE] % Stable: 60 [GE] Cover Cover Total %: 45 [GE] 60 [GE] Pool LOD Bid# in Veg O Veg Ctbmk 15 30 [15 5 20 [15] Crown Closure %: 50 [Aspect:: S] Discharge [I] Wetted Width (m): 0.1 [MS] Mean Depth (m): 0.1 [MS] Mean Velocity (m/s): 0.15 [F] Discharge (m3/s): 0.01 [F] Reach Symbol (Fish) NF 3 [B] 5.0 [1360	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 Bed Material Fines Clay, silt, sand (<2mm):	Distructions Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method D NF NA Image: Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method C NF NA Image: Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method C NF NA Image: Size Range (mm) Life Phase Use 1 Use 3 Method EL Comments NA Image: Size Range (mm) Life Phase Use 1 Use 3 Method EL Comments Size Range (mm) NA Image: Size Range (mm) Life Phase Use 1 Use 3 Method EL Comments Size Range (mm) NA Image: Size Range (mm) Na Image: Size Range (mm) Size Range (mm)



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

DFO/MoELP Stream Survey Form	Site Number: E123 Trib. to Red Can	Reach No.: 1 yon Cr. TRITON Environmental Consultants Ltd.
Location: E123, Unit 11, East of Red Canyon Creek. Map #: 93 L 071 Reach L Reach L U.T.M. : 9.5677 . 60724	Stream (Gaz.): Unnamed ength (km): []	Watershed Code: 036-3800-000-000-000-000-000-000-000-000-00
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 Av. Max Pool Depth (cm): 26 MS Gradient (%): 6.0 CL Pool: 20Riffle: 40Run: 40Other: 0 % Side Channel: 0-10 GE % 5-15 GE % Stable: 10 GE % 5-15 GE Pool LOD Bldr In Veg O Veg Ctbnk 20 30 5 0 30 15 Crown Closure %: 40 Aspect: W Discharge	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 Bed Material Fines Clay, silt, sand (<2mm):	Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF N NA Image: Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF N NA Image: Size Range (mm) NA Image: Size Range (mm) EL Comments Size Range (mm) NA Image: Size Range (mm) EL EL Ci S3 Size Range (mm) NA Image: Size Range (mm) EL EL Comments Size Range (mm) NA Image: Size Range (mm) EL EL Ci S3 Size Range (mm) Size Range (mm) NA EL Size Range (mm) EL Ci S3 Size Range (mm) Size Range (mm) Size Range (mm) EL Size Range (mm) EL Ci S3 Size Range (mm) Size Range (mm) Size Range (mm) Size Range (mm) Size Range (mm) <td< th=""></td<>



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

DFO/MoELP Stream Survey Form	Site Number: E124 Trib. to Red Can	Reach No.: 1 yon Cr. TRITON Environmental Consultants Ltd.
Location: E124, Unit 11, East of Red Canyon Creek.	Stream (Gaz.): Unnamed	Watershed Code: 036-3900-000-000-000-000-000-000-000-000-00
Map #: 93 L 071 Reach L U.T.M. : 9.5678 .60720 Length s	ength (km): 1.5 MA Date: 25-Jul-97 Tim urveyed (m): 100.0 GE Survey Crew: Л. \EM	Here: IS:17 Agency: TEC Access: H Fish Card: N : Field X Historical [\\\\\\\\\ Photos:
Av. Chan. Width (m): 1.8 MS Av. Wet. Width (m): 1.7 MS Av. Max Riffle Depth (cm): 4 MS Av. Max Riffle Depth (cm): 4 MS Av. Max Riffle Depth (cm): 16 MS Av. Max Riffle Depth (cm): 16 MS Av. Max Pool Depth (cm): 16 MS Gradient (%): 2.0 CL Pool: 20 Riffle: 10 Value 30 10 Reach Symbol (Fisb)	Specific Data 2.2 2.0 1.8 1.6 0.8 3 4 6 5 3 18 20 11 15 Bed Material Fines Clay, silt, sand (<2mm):	Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method DV 1 70 J R EL 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. C3 No additional bank texture information. C6 D0 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.



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

1

DFO/MoELP Stream Survey Form	Site Number: E238 Trib. to Red Can	Reach No.: 2 yon Cr. TRITON Environmental Consultants Ltd.
Location: E238, Unit 11, south of Red Canyon Cr. Map #: 1031 080 U.T.M.: 9.5623 .60718	Stream (Gaz.): Unnamed gth (km): [] MA Date: 22-Aug-97 Tim veyed (m): []00.0 GE Survey Crew: SJ \EM	Watershed Code: 052-0700-000-000-000-000-000-000-000-000-0
Channel Characteristics Av. Chan. Width (m): 5.3 MS Av. Wet. Width (m): 1.7 MS Av. Max Riffle Depth (cm): 3 MS Av. Max Riffle Depth (cm): 26 MS Av. Max Pool Depth (cm): 26 MS Gradient (%): 16.0 CL Pool: 35 Riffle: 20 Pool: 35 Riffle: 20 Run: 30 Other: 15 '/ Side Channel: 0 GE GE 6 GE 6 '/ Debris Area: 5-15 GE 6 GE 6 6 Cover Cover Total %: 25 GE 6 6 6 Cover Cover Total %: 25 GE 6 6 6 6 Discharge 0 10 10 10 10 6 6 6 7 Discharge (m3/s): 0.03 MS Mean Velocity (m/s): 0.29 F 6 7 Broscharge (m3/s): (BT) (Fish)	Specific Data 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 30 27 26 22 23 Bed Material Fines Clay, silt, sand (<2mm):	Obstructions Fish Summary C Species Number Size Range (mm) Life Phase Use I Use 2 Use 3 Method NA EL Comments Comments Cl S2 Cl S4 POW model, set at 1-5-500V, was 270 seconds over 100 meters. Cl S2 Cl S2 Cl S2 <td< th=""></td<>



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

DFO/MoELP Stream Survey Form	Site Number: E239 Trib. to Red Car	Reach No.: 1 nyon Cr. TRITON Environmental Consultants Ltd.
Location: E239, Unit 11, North of Red Canyon Creek Map #: [1031 090 U.T.M. : 9.5620.60745	Stream (Gaz.): Unnamed 0.8 MA Date: 22-Aug-97 Tin 1000.0 AE Survey Crew: SJ \EN	Watershed Code: 064-5700-000-000-000-000-000-000-000-000-00
Channel Characteristics Av. Chan. Width (m): 4.8 MS 4.0 Av. Wet. Width (m): 1.2 MS 3 Av. Max Riffle Depth (cm): 2 MS 3 Av. Max Riffle Depth (cm): 29 MS 21 Gradient (%): 10.0 CL 0.0 CL Pool: 20 Riffle: 20 Run: 60 Other: 0 % Side Channel: 0 GE Fine % Side Channel: 0 GE Gradient % Side Channel: 0 GE Gradient % Side Channel: 10 GE GE % Stable: 10 GE Gradient 0 20 55 0 10 Cover Total %: 10 GE Largetter Pool LOD Bidr< In Veg O Veg Ctbnk Bedr N 0 20 55 0 10 15 N Crown Closure %: 20 Aspect : S N D90 (dt) Mean Depth (m) : 0.10 F	Specific Data 5.1 7.0 4.5 3.3 5.1 1.2 1.0 1.8 0.9 1.2 2 1 2 4 20 22 40 42 Material 0 0 0 s Clay, silt, sand (<2mm): 0 0 vels Small (2-16mm): 40 20 vels Small (2-16mm): 40 20 s Clay, silt, sand (<2mm): 0 0 vels Small (2-16mm): 40 20 small (2-16mm): 40 20 small (2-16mm): 10 20 Sm. cobble (64-128mm): 10 20 ges Lge cobble (128-256mm): 50 20 ock 10 10 10 10 cm):	Obstructions



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

JEO/MOLLE SUCAM SULVEY FORM	Site Number: 2173	
	Trib. to Red Car	iyon Cr. IRITON Environmental Consultants Ltd.
Location: Z173, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 064-4900-000-000-000-000-000-000-000-000-0
Map #: 1031 090 Reach Length (km U.T.M. : 9 .563738. 607427 Length surveyed (not surv): 1.4 MA Date: 22-Aug-97 Tin n): 100.0 GE Survey Crew: CF \KC	ne: 10:45 Agency: TEC Access: H Fish Card: N Field Historical
Channel Characteristics	Specific Data	Obstructions
Av. Chan. Width (m): 2.9 MS 3 Av. Wet. Width (m): 0.3 MS 0 N Av. Wet. Width (m): 0.3 MS 0 N Av. Max Riffle Depth (cm): 0 MS 1 Av. Max Pool Depth (cm): 11 MS 1 Gradient (%): 8.0 CL Bed "Pool: 100 Riffle: 0 Run: 0 Other: 0 % Side Channel: 0 GE Fin 6 % Stable: 20 GE Gi Gi Cover Cover Total %: 30 GE La Pool LOD Bldr In Veg Veg Ctbnk 0 5 50 0 30 15 Crown Closure %: 45 Aspect: SW D90	2 3.6 3.5 3.0 1.8 2.2 6 0.3 0.2 0.6 0.0 0.0 1 8 13 10 10 Material ses Clay, silt, sand (<2mm):	Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA I NA Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA I NA Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA I NA Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA I NA Comments COmments CI 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.
Discharge Ban N Wetted Width (m) : Fi N Mean Depth (m) : Co N Mean Velocity (m/s) : Co N Discharge (m3/s) : Co N Discharge (m3/s) : Co Reach Symbol (Fish) Sta (DV) 3 C 8.0 1270 (Width, Valley: Chansed, Slope) (Bed Material) Tur	KS Height (m): 0.3 '% Unstable: 10 nes Gravels Larges Bedrock afinement: OC ley: Channel Ratio 5-10 ge: Dry Flood Signs Ht(m): 0.8 s (%): 90 pH: 7.1 Braided: Y ter Temp. (°C): 11.0 02 (ppm): 60 b. (cm): Cond. (µmhos): 60	 The electrochocking effort was not carried out as the stream was a series of isolated pools. No additional bank texture information. DO was not measured at this site, the water was clear to bottom. The air temperature at this site was 14.5 C. 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.



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.

DFO/MoELP Stream Survey Form	Site Number: KARLA 29 Sandstone	Reach No.: 1 Cr. TRITON Environmental Consultants Ltd.
Location: KARLA 29, Unit 11, 400 m North of Zymov Map #: 93 L 082 Reach L U.T.M. : 9.5827 60737 Length :	etz River, see C5. Stream (Gaz.): Sandstone Creek ength (km): 4.6 MA Date: 23-Sep-96 Tin aurveyed (m): 180.0 GE Survey Crew: JP \KG	Watershed Code: 440-7670-000-000-000-000-000-000-000-000-0
Channel Characteristics Cl Av. Chan. Width (m): Av. Max. Wet. Width (m): 2.8 Av. Max Riffle Depth (cm): 13 Av. Max Riffle Depth (cm): 13 Av. Max Riffle Depth (cm): 13 Av. Max Pool Depth (cm): 30 MS Av. Max Pool Depth (cm): 30 Gradient (%): 7.0 CL Pool: 15 Riffle: 30 Run: 50 Other: % Side Channel: 0-10 GE % Stable: 80 GE Cover Cover Total %: 45 GE Yold LOD Bldr In Veg Veg Ctower Cover Total %: 45 GE Pool LOD Bldr In Veg Veg Ctower Cover Total %: 25 Aspect : SW Discharge Wetted Width (m) : 2.0 MS Mean Depth (m) : 0.20 MS Mean Velocity (m/s) : 0.88 F Discharge (m3/s) : 0.26 F Reach Symbol (Fish) (Fish)	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 Bed Material Fines Clay, silt, sand (<2mm):	Obstructions C Height (m) Type Location Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method CT 1 85 J R EL Comments Ci S3, with a recommendation to check downstream for changes in stream class. Ci S3, with a recommendation to check downstream for changes in stream class. Ci S3, with a recommendation to check downstream for changes in stream class. Ci S3, with a recommendation to check downstream for changes in stream class. Ci S2 = 25%, RS = 69% Ci The electroshocking effort, using a Smithroot 12 B POW model was 365 seconds over 100 meters. Ci Lat N 54 48' 15.5°, Long W 127 42' 47.9° Ci Mo additional bank texture information. Ci 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 Ci Excellent rearing cover, comprised primarily of boulders was observed at this site. Sampling is recommended upstream, closer to the lake.



Photo #: K-3-10, 1996/09/23 Site #: K29, Looking upstream.



Photo #: K-3-11, 1996/09/23 Site #: K29, Looking downstream.

DFO/MoELP Stream Survey Form	Site Number: W95 Trib to Sandsto	Reach No.: 3 me Cr. TRITON Environmental Consultants Ltd.
Location: W95, Unit II Map #: 93 L 082 Reach 1	Stream (Gaz.): Unnamed	Watershed Code: 440-7670-000-000-000-000-000-000-000-000-0
U.T.M.: 9.5876 .60765 Length	surveyed (m): 200.0 GE Survey Crew: KA UP Specific Data	W-11-4,5,6 Air Photos: Obstructions
C1 Av. Chan. Width (m): 1.3 MS C1 Av. Wet. Width (m): 1.4 MS N 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 % Side Channel: 0-10 GE % Side Channel: 0-5 GE % Stable: 25 GE % Stable: 25 GE Pool LOD Bldr In Veg Veg Ctbnk 30 0 0 10 20 40 Crown Closure % : 15 Aspect : SW	1.1 1.4 1.4 1.7 1.3 1.7 1.0 1.2 1.4 1.7 1.3 1.7 1.0 1.2 1.4 1.7 1.3 1.3 Bed Material Fines Clay, silt, sand (<2mm):	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.
Discnarge 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 Reach Symbol (Fisb) RB 2 D 1.0 F (Width, Valley: Channel, Slope) (Bed Material) (Bed Material)	Fines X 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 02 (ppm): 10 10 Turb. (cm): 61 Cond. (µmhos): 70	 C3 No additional bank texture information. C6 C6 D0 was not measured at this site. The mean air temperature on this day was 13.8 C. C7 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.



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

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Leader: KARLA 30, Unit 11, 640 m North of Zymoetz river, see C3. Stream (Gaz.): Unnamed Watershell Case: Watershell Case:	Trib. to Sandstone Cr. TRITON Environmental Consultants Ltd.
Channel CharacteristicsAv. Chan. Width (m): 1.3 1.8 1.7 1.6 1.4 1.3 Av. Wet. Width (m): 1.0 MS 0.7 0.9 1.9 1.2 1.0 0.6 Av. Max Rifle Depth (cm): 8 MS 5 7 6 8 16 Av. Max Pool Depth (cm): 20 MS 18 16 22 23 Pool: 20 Rifle: 40 Run: 10 Off 30 7 6 8 16 Av. Max Pool Depth (cm): 20 MS 18 16 22 23 7 6 8 Vastable: 10 Off 10 10 10 10 10 10 10 10 Vastable: 30 Off 25 $5m$ $coble (64 128mm)$: 35 10 20 LODBidr 10 Veg O toba 10 10 10 10 10 DischargeBanksHeight (m): 03 0 0 0 0 0 Wetted Width (m): 1.6 MS 10 Large S C Sectors 10 00 Wetted Width (m): 1.6 MS 10 Large S C Commention: 10 C Trevels 10 10 00 0 0 0 0 10 10 10 10 10 0 0 0 0 $Cover Total %:150000001010$	Stream (Gaz.): Unnamed Watershed Code: 039-8400-000-000-000-000-000-000-000-000-00
Mean Depth (m): 0.2 MS Mean Depth (m): 0.2 MS Mean Velocity (m/s): 0.05 F Discharge (m3/s): 0.01 F Valley: Channel Ratio 0.2 Stage: L Flood Signs Ht(m): 0.5 Kean Network Kight Kight Kight	VOSTIFICIONS 1.7 1.6 1.4 1.3 1.9 1.2 1.0 0.6 6 8 16 22 23 J It, sand (-2mm): 5 1.6 5 10 It, sand (-2mm): 5 5 2.1 Gmm): 35 10 It6-64mm): 30 25 bile (64-128mm): 30 0 0 0 0 Comments Ci is 3 Ci is 23 Ci is 3 Ci is 24 Ci is 3 Ci is 20 Is is 2.3%, RS = 61% Ci is 20 Ci is 3 Ci is 20 Is certashocking effort, using a 12 B POW model, was 140 seconds over 75 meters. The water temperature at the time of sampling was 3.C. 'K Unstable: 20 is is larges is Bedrock Ci is 0.0 additional bank texture information. Ci is 0 Ci is 0.0 additional bank texture information. Ci is 0 Ci is 0.5 <tr< td=""></tr<>



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.

DFO/MoELP Stream Survey Form	Site Number: Y252 Trib. to Sandsto	Reach No.: 1 One Cr. TRITON Environmental Consultants Ltd.
Location: Y252, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 039-8700-000-000-000-000-000-000-000-000-00
Map #: 93 L 082 Reach L U.T.M. : 9.584346.60756 Length s	ength (km): [1,1] [MW] Date: [12-Sep-97] Tim urveyed (m): [200.0] [GE] Survey Crew: JP \FC	e: [12:52] Agency: [TEC] Access: [V4] Fish Card: [N] Field 🔀 Historical [VVVVVVV Photos: Y-30-14,15] Air Photos:
Channel Characteristics Av. Chan. Width (m): 0.7 MS Av. Wet. 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 Av. Max Pool Depth (cm): 15 MS Av. Max Pool Depth (cm): 15 MS Gradient (%): 8.0 CL Pool: 10 Riffle: 10 % Side Channel: 10-40 GE % Stable: 75 GE Ø 45 0 5 25 Cover Cover Total %: 25 GE Pool LOD Bldr In Veg O Veg Ctbnk Ø 45 0 5 25 25 Crown Closure %: 25 Aspect : S Discharge Wetted Width (m) : 0.3 MS Mean Depth (m): 0.03 F Discharge (m3/s) : 0.00 F Reacht Symbol (Fish) (RB) (DV)	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 10 Sm. cobble (64-128mm): 10 Large (16-64mm): 10 Bedrock 0 0 Bedrock 0 0 Bedrock 0 0 D90 (cm): 13 Compaction: Low Banks Ileight (m): 0.1 % Unstable: 0 0 Fines Gravels Larges Bedrock O Valley : Channel Ratio 5-10 Stage: M Flood Signs IIt(m): 0.2 Bars (%): 0 pII: 7.5 Braided: N	Obstructions Fish Summary © Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA Comments Comments Cl 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. C3 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

DFO/MoELP Stream Survey Form	Site Number: Y253 Trib. to Sandsto	Reach No.: 1 one Cr. I TRITON Environmental Consultants Ltd.		
Location: Y253, Unit 11 Map #: 03 L 082 Reach Length (kr	Stream (Gaz.): Unnamed m): 1.7 MW Date: 12-Sep-97	Watershed Code: 039-8600-000-000-000-000-000-000-000-000-00		
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 Riffle Depth (cm): 20 MS Av. Max Pool Depth (cm): 20 MS Gradient (%): 5.0 C1 Pool: 10 Riffle: 30 Run: 60 Other: 0 % Side Channel: 0.5 GIE F G G F G % Debris Area: 0.5 GIE 40 GE G G % Stable: 40 GE G G G G Pool LOD Bldr< In Veg O Veg Cbnk B Grown Closure % : 40 Aspect : SW D D	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 Material Sines Clay, silt, sand (<2mm): 30 30 Gravels Small (2-16mm): 60 30 Large (16-64mm): 60 30 Large (16-64mm): 10 Large (128-256mm): 10 Blder cobble (>256mm): 0 0 90 (cm): 12 Compaction: Medium	Obstructions Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 3 Method C Species Number Size Range (mm) Life Phase Use 1 Use 3 Method C Species Number Size Range (mm) Life Phase Use 1 Use 3 Method C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method C Species Number Size Range (mm) Life Phase Use 3 Method C Species Numeron C Comments C C Species No fisheries sensitive zones noted. <td c<="" colspan="2" th=""></td>		
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 W (Fish) S DV 1 C 5.0 (Width, Valley: Channel, Slope) (Bed Material) To	Fines	 Fines and gravels make up the bank texture at this site. DO was not measured, the water was clear to the bottom. The air temperature at this site was 14.5.C. This reach has a lot of rearing cover as well as some potential spawning habitat. 		



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

DFO/MoELP Stream Survey Form	Site Number: Y254	Reach No.: 1
	Trib. to Sandsto	one Cr. TRITON Environmental Consultants Ltd.
Location: Y254, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 039-8500-000-000-000-000-000-000-000-000-00
Map #: 93 L 082 Reach L U.T.M. : 9.58382.60742 Length s	ength (km): 1.2 MW Date: 12-Sep-97 Tim urveyed (m): 100.0 GE Survey Crew: JP \FC	ne: [14:48] Agency: [TEC] Access: [V4] Fish Card: [N] Field 🔀 Historical
Channel Characteristics	Specific Data	Obstructions
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 % Side Channel: 0-10 GE % Debris Area: >15 GE %Stable: 20 GE Cover Cover Total %: 10 Ge 0 5 75 Cown Closure %: 90 Aspect: S	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 7 8 7 '8 7 7 80 80 Gravels Small (2-16mm): 10 5 Large (16-64mm): 5 5 5 Larges Lge cobble (64-128mm): 10 5 Blder cobble (>256mm): 10 5 Blder cobble (>256mm): 0 0 D90 (cm): 13 Compaction: Low	Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA NA EL Comments
Discharge Wetted Width (m) : 0.7 Mean Depth (m) : 0.0 Mean Velocity (m/s) : 0.04 Discharge (m3/s) : 0.00 F Discharge (m3/s) : 0.00 (Fish) (DV) (RB) I D I D (Width, Valley: Channel, Stope) (Bed Material)	Battks Ileight (m): 0.1 % Unstable: 5 Fines Gravels Larges Confinement: UC Valley: Channel Ratio 10+ Stage: M Flood Signs Ht(m): Bars (%): 0 pH: 7.3 Water Temp. (°C): 10.0 02 (ppm): Turb. (cm): Cond. (µmhos): 70	 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.

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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

DFO/MoELP Stream Survey Form	Site Number: Y255 Trib. to Sandsto	Reach No.: 1 ne Cr. TRITON	
Location: Y255, Unit I1 Map #: 93 L 082 Reach Length (km): U.T.M. : 9.5857 .6075330 Length surveyed (m):	Stream (Gaz.): Unnamed [.1.1] [MW] Date: [12-Sep-97] Time [.100.0] [GE] Survey Crew: JP \FC \	Watershed Code: 039-9300-000-000-000-000-000-000-000-000	
Channel Characteristics C1 Av. Chan. Width (m): 1.3 MS 0.9 Av. Wet. Width (m): 1.0 MS 0.8 Av. Max Riffle Depth (cm): 2 MS 2 Av. Max Riffle Depth (cm): 17 MS 15 Gradient (%): 4.0 CL End Fines Yool: 10 Riffle: S Run: 85 Other: 0 Yo Side Channel: 0-10 GE Fines Gravel Yo Side Channel: 0-10 GE GE Yo Side Channel: 0-10 GE GE Yo Stable: 20 GE Larges Cover Cover Total % : 20 GE Discharge Sold: 15 40 D90 (cm Discharge (m3/s) : 0.0 MS Man Velocity (m/s) : 0.14 Fi Mean Velocity (m	Specific Data 0.8 0.8 0.9 1.2 1.7 0.8 0.9 1.0 1.3 1.6 1 2 15 14 11 31 faterial Clay, silt, sand (<2mm): 60 60 15 14 11 31 faterial Clay, silt, sand (<2mm): 60 60 Small (2-16mm): 20 10 Large (16-64mm): 10 10 10 Sm. cobble (64-128mm): 10 10 10 Sm. cobble (64-128mm): 10 10 10 Large (16-64mm): 20 10 10 Lge cobble (128-256mm): 20 10 10 Lge cobble (>2256mm): 0 0 0 start 0 0 0 0 start 0 0 0 0 start 0 0 0 0 start 1 1 1 0 0 s	Obstructions Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method C Species Number Size Range (mm) Life Phase Use 1 Use 3 Method C Species Number Size Range (mm) Life Phase Use 3 Method C Species Number Size Range (mm) Life Phase Use 3 Method C Species Number Size Range (mm) Life Phase Use 3 Method Comments Comments Size Range (mm) Life For Size Range (mm) Size Range (mm) <td colspa="2" si<="" th=""></td>	



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

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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 Serb Cr.	Reach No.: 2 TRITON Environmental Consultants Ltd.
Location: Z70, Unit 11	Stream (Gaz.): Serb Creek	Watershed Code: 440-8150-000-000-000-000-000-000-000-000-000-
Map #: 93 L 062 Reach L U.T.M. : 9.5804 .60572 Length s	ength (km): 1.4 MW Date: 24-Jul-97 Tim urveyed (m): 300.0 GE Survey Crew: JP \KG	ne: 12:52 Agency: TEC Access: H Fish Card: N Field Historical
Channel Characteristics Av. Chan. Width (m): 36.8 GE Av. Wet. Width (m): 10.3 GE Av. Wet. Width (m): 10.3 GE Av. Max Riffle Depth (cm): 0 GE Av. Max Riffle Depth (cm): 2 GE Gradient (%): 1.0 CL Pool: 10Riffle: 20Run: 70Other: 0 % Side Channel: >40 GE % >40 GE % Debris Area: >15 GE % Stable: 10 GE Cover Cover Total %: 20 GE GE Pool LOD Bldr In Veg O Veg Ctbnk 15 25 40 0 5 15 Crown Closure %: 25 Aspect: N	Specific Data 34.0 37.0 38.0 36.0 38.0 9.0 7.0 8.0 10.0 13.0 15.0 1 2 2 20 Bed Material Fines Clay, silt, sand (<2mm):	Obstructions Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA Comments Comments Cli S1. Riffle depth measurements were not taken, as they could not be seen. Discharge measurements were no taken. C2 LS=12%, RS=42% Ci C3 No fisheries sensitive zones noted. Ci
Discharge C1 Wetted Width (m) : 0.0 GE C1 Mean Depth (m) : 0.0 GE C1 Mean Depth (m) : 0.00 F C1 Discharge (m3/s) : 0.00 F C1 Discharge (m3/s) : 0.00 F (Pish) (Pish) (DV) 37 D 1.0 2440 (Width, Valley: Changet, Slope) (Bed Material) (Bed Material)	Banks Height (m): 4.0 % Unstable: 90 Fines Gravels Larges 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 02 (ppm): 50	 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.



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

DFO/MoELP Stream Survey Form	Site Number: Z73	Reach No.: 1
	Side Channel to S	Serb Cr. TRITON Environmental Consultants Ltd.
Location: Z73, Unit 11, on a side channel to Serb Creek, in braided area of the mainstem.	n a heavily Stream (Gaz.): Unnamed	Watershed Code: 440-8150-000-000-000-000-000-000-000-000-000-
Map #: 93 L 062 Reach Lengt U.T.M. : 9 .584859.6060926 Length surv	th (km): 0.1 MW Date: 24-Jul-97 Time eyed (m): 50.0 GE Survey Crew: JP \KG	e: 16:50 Agency: TEC Access: H Fish Card: N Field Historical Photos: Z-9-18,19 Air Photos:
Channel Characteristics CI Av. Chan. Width (m): Av. Wet. Width (m): 3.6 MS Av. Wet. Width (m): 3.6 MS CI Av. Max Riffle Depth (cm): 0 MS Av. Max Riffle Depth (cm): 0 MS Av. Max Pool Depth (cm): 00 MS Gradient (%): 0.5 CL Pool: 10 Riffle: 0 Run: 90 Other: 0 % Side Channel: 0 GE %Stable: 50 GE % Stable: 50 GE Cover Total % : 70 GE Pool LOD Bldr In Veg O Veg Ctbnk 0 25 0 40 10 25	Specific Data 4.1 3.7 3.8 3.2 3.2 3.4 3.7 3.6 4.5 3.2 3.1 3.8 110 55 75 5 5 5 Bed Material 90 90 90 90 Gravels Small (2-16mm): 10 10 10 Large (16-64mm): 0 0 0 0 Larges Lge cobble (128-256mm): 0 0 0 Bider cobble (>256mm): 0 0 0 0	Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method DV 2 55-100 J R EL Comments
Crown Closure % : 10 Aspect : S Discharge	D90 (cm): 1 Compaction: Low Banks Height (m): 0.2 % Unstable: 5 Fines Gravels Larges Confinement: UC Valley: Channel Ratio 10+ Stage: M Flood Signs Ht(m): 0.5 Bars (%): 0 pH: Braided: N Water Temp. (°C): 11.0 02 (ppm): 20	 C3 No fisheries sensitive zones noted. C4 The electroshocking effort, using a Smithroot 12 B POW set at 300V, was 50 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 mean air temperature on this day was 11.9 C. C7 The small side channel was limiting for the shocking distance. This is a fair sized side channel between two lakes, connected to Serb Creek via side channels. Great instream vegetation cover for fish was noted.



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

DFO/MoELP Stream Survey Form	Site Number: RYAN 173 Trib to Serb	Reach No.: 1 Cr. TRITON Environmental Consultants Ltd.
Location: RYAN 173, Unit 11, 1.6km SW of Mc Dor	nnel Lake, see C5. Stream (Gaz.): Unnamed	Watershed Code: 033-4000-000-000-000-000-000-000-000-000
Map #: 93 L 072 Reach L U.T.M. : 9.5865 .60703 Length	ength (km): 0.6 GE Date: 01-Oct-96 Time surveyed (m): 150.0 GE Survey Crew: RH \JL	ne: [13:00] Agency: [TEC] Access: [H] Fish Card: [N] Field [X] Historical [A A A A A A A A A A A A A A A A A A A
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: SRiffle: 20 Run: % Side Channel: 0-10 GE % Stable: 80 GE Ø V Debris Area: 5-15 GE Ø 20 0 0 60 20 Cover Cover Total % : 35 GE Ø 20 0 0 60 20 Crown Closure % : 65 Aspect : NE Discharge N Mean Depth (m) : N N N Mean Velocity (m/s) : N N N N Mean Velocity (m/s) : NF NF NF	Specific Data Specific Data Bed Material 70 70 Gravels Small (2-16mm): 15 5 Gravels Small (2-16mm): 15 5 Large (16-64mm): 10 5 10 Sm. cobble (64-128mm): 10 5 10 Larges Lge cobble (128-256mm): 15 5 Blder cobble (>256mm): 15 5 8 Bedrock 0 0 0 D90 (cm): 18 Compaction: Medium Banks Height (m): 0.1 % Unstable: 0 0 Fines Gravels Larges Bedrock Confinement: UC Valley : Channel Ratio 10+ Stage: I Flood Signs Ht(m): 0.1 Bars (%): 0 pH: Braided: N Water Temp. (°C): 3.0 02 (ppm): I	Obstructions <u> <u> </u></u>

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DFO/MoELP Stream Survey Form	Site Number: W124	Reach No.: 1
	Trib to Serb	Cr. TRITON Environmental Consultants Ltd.
Location: W124, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 029-9000-000-000-000-000-000-000-000-000
Map #: 93 L 063 Reach Leng U.T.M.: 9 .5933 .60614 Length surv	th (km): 0.6 MW Date: 27-Jul-97 Tim reyed (m): 100.0 GE Survey Crew: KA \JP	ne: 15:00 Agency: TEC Access: H Fish Card: N Field Historical PARAMENT Photos: W-A-2,3 Air Photos:
Channel Characteristics	Specific Data	Obstructions
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 % Side Channel: 0 GE % Debris Area: 0-5 GE % Stable: 5 GE Cover Cover Total %: 20 Q 0 0 40 Crown Closure %: 5 Aspect: Discharge	Bed Material Fines Clay, silt, sand (<2mm):	Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA NA NA NA NA Comments
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	% Unstable: 30 Fines Gravels Larges Bedrock 10+	 CS: 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.
Reach Symbol (Fisb) (RB) 4 D 1.0 F (Width, Valley: Channet, Stope) (Bed Material)	Stage: H Flood Signs Ht(m): 0.1 Bars (%): 0 pH: 7.6 Braided: N Water Temp. (°C): 14.0 02 (ppm): 1 30 Turb. (cm): 103 Cond. (µmhos): 30	



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

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DFO/MoELP Stream Survey Form	Site Number: W125 Trib to Serb	Reach No.: 2 Cr. TRITON Environmental Consultants Ltd.
Location: W125, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 033-5700-000-000-000-000-000-000-000-000-00
Map #: 93 L 063 Reach L U.T.M. : 9.5932 .60616 Length s	ength (km): 2.2 MA Date: 27-Jul-97 Tim urveyed (m): 100.0 GE Survey Crew: KA UP	ne: [16:00] Agency: TEC Access: H Fish Card: N Field Historical
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 You Bart Channel: 0 GE % Side Channel: 0 GE % Stable: 30 GE Vorer Cover Total %: 20 Cover GE You Bidr In Veg Vetted Nidth (m): 1.1 MS Mean Depth (m): 0.11 MS Mean Velocity (m/s): 0.15 F Discharge (Fish) RB 2 C 2.5 2440 (Width, Valley: Channel, Slope) (Bed Material)	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 Bed Material Fines Clay, silt, sand (<2mm): 20 20 Gravels Small (2-16mm): 40 20 Gravels Small (2-16mm): 40 20 Large (16-64mm): 20 20 20 Large (16-64mm): 20 20 20 Large cobble (128-256mm): 40 10 Blder cobble (>256mm): 0 0 0 D90 (cm): 28 Compaction: Medium Banks Height (m): 0.1 20 % Unstable: 20 20 20 Fines Gravels Larges Bedrock 0 0 090 (cm): 28 Compaction: Medium 0.1 20 Fines Gravels Larges	Obstructions Fish Summary Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method Comments Ci S3. Ci LS=5%, RS=3% Ci n Fisheries sensitive zones noted. Ci The electroshocking effort, using a Smithroot 12 B POW model set at 700V, was 265 seconds over 100 meters. Ci No additional bank texture information. Ci 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. Ci Ci Rearing habitat was noted at this site. Site and the site. Site and the site and the site.



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



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Photo #: W-A-6, 27-Jul-97 Site #: W125, Looking downstream at the channel

DFO/MoELP Stream Survey Form	Site Number: Y77	Reach No.: 1
	Trib to Serb	Cr. TRITON Environmentol Consultants Ltd.
Location: Y77, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 033-5700-000-000-000-000-000-000-000-000-00
Map #: 93 L 072 Reach Length (km): J.T.M. : 9.5897.60644 Length surveyed (m)	3.7 MW Date: 24-Jul-97 Tin 100.0 GE Survey Crew: DD \S	ne: 9:00 Agency: TEC Access: H Fish Card: N Field Historical J\\\\\\\ Photos: Y-10-9,10,11,12 Air Photos:
Channel Characteristics	Specific Data	Obstructions
Av. Wet. Width (m): 3.9 MS 5.1 Av. Max Riffle Depth (cm): 6 MS 6 Av. Max Riffle Depth (cm): 38 MS 35 Gradient (%): 2.0 CL CL Pool: 10 Riffle: 20 Run: 65 Other: 5 % Side Channel: 10-40 GE Fines Grav Grav % Stable: 10 GE Grav Grav Grav Cover Cover Total %: 20 GE Larg Pool LOD Bldr In Veg Veg Ctbnk 30 40 20 0 10 Bedr Crown Closure %: 10 Aspect: NW D90 (ct)	3.2 2.9 3.6 2.9 5.6 5 7 6 5 40 47 32 35 Aaterial Clay, silt, sand (<2mm):	Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method DV 3 45-110 J R EL Comments Ci S2. C2 LS=32%, RS=6% C3 No fisheries sensitive zones noted.
Discharge Bank Wetted Width (m) : 3.i MS Mean Depth (m) : 0.2 MS Mean Velocity (m/s) : 0.77 F Discharge (m3/s) : 0.36 F Valle Stage Reacht Symbol (Fish) DV 7 C 2.0 1270 (Width, Valley: Channel, Slope) (Bed Material) Turb.	Image: Solution of the system of the sys	 C4: The electroshocking effort, using a Smithroot 12 B POW model set at G, 6, 300V, was 187 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 11.5 C. C7: This stream has good rearing habitat with lots of LOD and scour pool habitat.



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.

DFO/MoELP Stream Survey Form	Site Number: Y78	Reach No.: 1
	Trib to Serb	Cr. TRITON Environmental Consultants Ltd.
Location: Y78, unit 11	Stream (Gaz.): Unnamed	Watershed Code: 033-5800-000-000-000-000-000-000-000-000-00
Map #: 93 L 072 Reach Length (k U.T.M. : 9.589460642 Length surveyed	m): 1.8 MA Date: 24-Jul-97 Tim (m): 100.0 GE Survey Crew: DD\SJ	e: [10:30] Agency: TEC Access: H Fish Card: N Field 🔀 Historical
Channel Characteristics	Specific Data	Obstructions
Av. Chan. Width (m): I.I. MS Av. Wet. Width (m): 0.8 Av. Wet. Width (m): 0.8 Av. Max Riffle Depth (cm): 3 Av. Max Pool Depth (cm): 28 MS Av. Max Pool Depth (cm): 28 Gradient (%): 6.0 CL Pool: 20 Riffle: 10 % Side Channel: 0 GE % Debris Area: 5-15 GE % Stable: 70 GE Pool LOD Bldr In Veg Oveg Ctbnk 20 30 0 30 20 Crown Closure %: 40 Aspect: W) N	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 3 30 18 40 29 23 3 <i>Material</i>	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.
Discharge Ba 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] Wetted Width, Valles: Channet, Slope) (Fish)	IIeight (m): 0.1 Winstable: 50 Fines Gravels Larges Bedrock Confinement: OC Yalley : Channel Ratio 5-10 tage: M Flood Signs H1(m): 0.5 ars (%): 0 pH: 7.8 Braided: Ni Vater Temp. (°C): 8.0 02 (ppm): 60	 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 ocver. Potential spawning habitat was also identified.



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.

DFO/MoELP Stream Survey Form	Site Number: Y79	Reach No.: 2
	Trib to Serb	Cr. TRITON Environmental Consultants Ltd.
Location: Y79, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 033-5900-000-000-000-000-000-000-000-000-00
Map #: 93 L 072 Reach Length (km U.T.M. : 9.5891 .60641 Length surveyed (): [1.5] MW Date: [24-Jul-97] Tin m): [100.0] GE Survey Crew: DD \S.	ne: 11:45 Agency: TEC Access: H Fish Card: N Field 🔀 Historical J\\\\\\\\ Photos: Y-10-15,16,17,18 Air Photos:
Channel Characteristics	Specific Data	Obstructions
Av. Chan. Width (m): 4.1 MS 4 Av. Wet. Width (m): 3.3 MS 3 Av. Wet. Width (m): 3.3 MS 3 Av. Max Riffle Depth (cm): 8 MS 4 Gradient (%): 7.0 CL 6 Pool: 30 Riffle: 20 Run: 40 Width (m): 3.3 MS 4 4 Gradient (%): 7.0 CL 6 6 % Side Channel: 0 GE 6 6 % Stable: 50 GE G G Cover Cover Total % + 60 GE 6	.6 3.5 3.6 3.8 4.2 5.1 .4 2.9 2.6 3.2 2.9 4.6 9 8 7 10 6 7 28 47 30 74 Material Image: Clay, silt, sand (<2mm):	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
Pool LOD Bldr In Veg O Veg Ctbnk End :[30] 20 30 0 10 10 Be :Crown Closure % : 60 Aspect : NW D90	Interset Interset	C1 S3. C2 LS=15%, RS=10% C3 No fisheries sensitive zones noted.
Discharge Ban Wetted Width (m): 2.11 MS	Iks Height (m): 0.2 % Unstable: 25	 C4: The electroshocking effort, using a Smithroot 12 B POW model, was 15 seconds over 1 meter. C5: No additional bank texture information.
Mean Depth (m) : 0.2 MS FI Mean Velocity (m/s) : 0.97, F Co Discharge (m3/s) : 0.31, F Va	nfinement: UC (Iley : Channel Ratio	 CO 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.
Reach Symbol (Fish) Bai	rs (%): 0 pH: 7.8 Braided: N	
4 D 7 0 1270	ter Temp. (°C): 12.0 02 (ppm):	



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.

DFO/MoELP Stream Survey Form	Site Number: Y80 Trib to Serb	Reach No.: 5 Cr. TRITON Environmental Consultants Ltd.
Location: Y80, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 033-5800-000-000-000-000-000-000-000-000-00
Map #: 93 L 072 Reach Lo U.T.M. : 9.5879 .60624 Length s	ength (km): [1.1] [MW] Date: [24-Jul-97] Tim urveyed (m): [200.0] [GE] Survey Crew: DD \SJ	e: 13:15 Agency: TEC Access: H Fish Card: N Field Historical
Channel Characteristics Av. Chan. Width (m): 2.3 MS. Av. Wet. Width (m): 2.3 MS. Av. Wet. Width (m): 5 MS. Av. Max Riffle Depth (cm): 5 MS. Av. Max Pool Depth (cm): 47 MS! Av. Max Pool Depth (cm): 47 MS! Av. Max Pool Depth (cm): 47 MS! Gradient (%): 1.5 CL Pool: 10 Riffle: \$1 Run: 85 Volter: 0; GE % Side Channel: 0; GE % Order Area: >15; GE % Stable: 60 ; GE Cover Cover Total %: 50 GE, Pool LOD Bidr< In Veg Veg Ctbk 30 40 5 0 0 25 Crown Closure %: 5 Aspect : NE Discharge	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 62 5 Bed Material Fines Clay, silt, sand (<2mm):	Obstructions Fish Summary Q Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method DV 8 40-95 J R 1 EL Comments Cl S3. Cl LS=4%, RS=8% Cl No fisheries sensitive zones noted. Cl The electroshocking effort, using a Smithroot 12 B POW model set at 1, 5, 300V, was 149 seconds over 20 meters. Cl No additional bank texture information. Cl DO was not measured at this site, the water was clear to bottom. The air temperature at this site was 18.0 C. Cr This steam has good rearing habitat in the form of LOD, pools, curbanks and deep runs. About 200 meters upstream, the creek changes to an 54. The stream flows directly into a small take which looks shallow from the air. There is an abundance of caddis larvae in the stream and the lake. Cl Numerous frogs with red underbellies were seen, as well as 8 Canada Geese on the lake.



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.

DFO/MoELP Stream Survey Form	Site Number: Y81	Reach No.: 1
	Trib to Serb	Cr. TRITON Environmental Consultants Ltd.
Location: Y81, Unit 11; 150m north of site	Stream (Gaz.): Unnamed	Watershed Code: 033-5600-000-000-000-000-000-000-000-000-00
Map #: 93 L 072 Reach Length (U.T.M.: 9.5896 .60654 Length surveyor	km): [1.4] [MW] Date: [24-Jul-97] Tin d (m): [100.0] [GE] Survey Crew: DD \SJ	ne: 15:30 Agency: TEC Access: H Fish Card: N Field Historical
Channel Characteristics	Specific Data	Obstructions
Av. Wet. Width (m): 1.9 MS Av. Max Riffle Depth (cm): 4 MS Av. Max Pool Depth (cm): 27 MS Av. Max Pool Depth (cm): 27 MS Gradient (%): 1.0 CL Pool: 20 Riffle: 20 % Side Channel: 0-10 GE % Stable: 25 GE % Stable: 25 GE Cover Cover Total %: 20 Hool LOD Bldr In Veg O Veg Crown Closure %: 40 Aspect: W	1.5 1.4 1.9 2.0 2.2 2.3 4 3 5 6 4 28 20 20 21 45 Ped Material Fines Clay, silt, sand (<2mm):	Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method DV 3 65-100 J R EL Comments C1 S3. C2 LS=8%, RS=5% C3 No fisheries sensitive zones noted.
Discharge B Wetted Width (m) : 0.9 [MS] Mean Depth (m) : 0.1 [MS] Mean Velocity (m/s) : 1.10 [F] Discharge (m3/s) : 0.08 [F] Reacht Symbol (Fish) DV 2 D 1.0 2620	anks Ileight (m): 0.1 % Unstable: 25 Fines Stages Bedrock Confinement: UC Valley: Channel Ratiu 10+ Stage: M Flood Signs IIt(m): 0.5 Bars (%): 10 pII: 7.7 Braided: Y Water Temp. (°C): 9.0 02 (ppm): 1 1	 C5 The electroshocking effort, using a Smithroot 12 B POW model, was 167 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 mean air temperature on this day was 18.0 C. C7 This stream has excellent spawning substrate for CO and RB. It is also good for rearing with pools created by abundant LOD. It is, subject to blowout in freshet. Our hundered meters upstream of the sampling are a 5 m wide tributary flows into the north side. Heavy braiding was noted.



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.

DFO/MoELP Stream Survey Form	Site Number: Y83	Reach No.: 1
	Trib to Serb	Cr. TRITON Environmental Consultants Ltd.
Location: Y83, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 110-1200-000-000-000-000-000-000-000-000
Map #: 93 L 072 Reach Ler U.T.M. : 9.58539.606343 Length su	ngth (km): 0.5 MW Date: 25-Jul-97 Tim rveyed (m): 100.0 GE Survey Crew: JP \SJ \	: 9:00 Agency: [TEC] Access: [H] Fish Card: N] Field Historical
Channel Characteristics	Specific Data	Obstructions
Av. Chan. Width (m): 1.4 MS Av. Wet. Width (m): 0.9 MS Av. Max Riffle Depth (cm): 2 MS Av. Max Pool Depth (cm): 12 MS Gradient (%): 4.5 CL Pool: 10 Run: 80 Wetted Channel: 10-40 GE % Side Channel: 10-40 GE % Side Channel: 10-40 GE % Stable: 60 GE Cover Cover Total %: 60 Graduet: 50 Aspect : E Discharge S0 Aspect : E Wetted Width (m) : 0.6 MS Mean Depth (m) : 0.26 F Discharge (m3/s) : 0.12; i F (DV) I. D. 60 630	0.8 1.1 1.6 0.7 1.5 2.9 0.7 0.8 1.0 0.8 0.4 2.0 2 1 2 3 2 2 8 11 17 10 13 15 Bed Material Fines Clay, silt, sand (<2mm): 50 50 Gravels Small (2-16mm): 20 10 10 Large (16-64mm): 10 10 15 Larges Lge cobble (128-256mm): 30 10 Blder cobble (>256mm): 5 5 5 Bedrock 0 0 0 0 D90 (cm): 29 Compaction: Low Banks Height (m): 0.1 - % Unstable: 10 - - - % Unstable: 10 - - - Confinement: UC - - - Valley : Channel Ratio 10+ - - - Stage: L Flood Signs	Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA NA EL Comments C1 S4. 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, 300V, was 165 seconds over 100 meters. C5 No additional bank texture information. C6 D0 was not measured at this site, the water was clear to bottom. The mean air temperature on this day was 13.8 C. C7 This stream has lots of cover in the form of deep cutbanks and LOD, which completely covers the channel in some areas. This stream is not on the map.



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

OFO/MoELP Stream Survey Form	Site Number: Y84 Trib to Serb (Cr. TRITON Environmental Consultants Ltd.
J.T.M.: 9.58554.606363 Reach Length surveyed	Zymoctz R. Stream (Gaz.): Unnamed (m): 0.6 MW Date: 25-Jul-97 Time: I (m): 100.0 GE Survey Crew: JP \SJ \	Watershed Code: 033-6500-000-000-000-000-000-000-000-000-00
Channel Characteristics I Av. Chan. Width (m): 2.1 MS Av. Wet. Width (m): 2.1 MS Av. Wet. Width (m): 2.1 MS N Av. Max Riffle Depth (cm): 0 GE Gradient (%): 0.5 CL Pool: 0 Riffle: 0 % Side Channel: 10-40 GE % Side Channel: 10-40 GE % Side Channel: 10 GE % Stable: 10 GE % Stable: 10 GE Pool LOD Bldr In Veg O 10 0 35 35 Cover Cover Total %: 20 GE Pool LOD Bldr In Veg O Veg Crown Closure %: 0 Aspect: E N Discharge Ra S S N Wetted Width (m): N S S N Mean Velocity (m/s): S S S N Discharge (m3/s): S S	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 2.1 2.0 0.8 1.3 3.0 1.1 2.1 2.0 0.8 1.3 3.0 1.1 2.1 2.0 0.8 1.3 3.0 1.1 2.1 2.0 0.8 1.3 3.0 1.1 2.1 2.0 0.8 1.3 3.0 1.1 2.1 2.0 0.8 1.3 3.0 1.1 2.1 2.0 0.8 1.3 3.0 1.1 2.1 2.0 0.8 1.3 3.0 1.1 3.0 1.1 100 100 100 0 Gravels Small (2-16mm): 0 0 0 0 Large (16-64mm): 0 0 0 0 0 Large cobble (128-256mm): 0 0 0 0 Bider cobble (>256mm): 0 0 0 0 <	Ubstructions Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA Image: Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method Comments NA Image: Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method Comments NA Image: Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method Comments NA Image: Size Range (mm) NA Image: Size Range (mm) El Comments Size Range (mm) NA Image: Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method El Comments Size Range (mm) NA Image: Size Range (mm) El Size Range (mm) El Comments Size Range (mm) NA Image: Size Range (mm) Matero Matero Size Range (mm) Size Range (mm) Size Range (mm) Size Range (mm) Size Range (mm)

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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

DFO/MoELP Stream Survey Form	Site Number: Y85 Trib to Serb	Reach No.: 1 Cr. TRITON Environmental Consultants Ltd.
Location: Y85, Unit 11; SE side of Serb Creek, 15.6km upstream Zymoetz R. Map #: 93 1.072 Reach Length (km) U.T.M.: 9.58650.606278 Length surveyed Channel Characteristics Av. Chan. Width (m): 31.9 HC Av. Chan. Width (m): 7.8 IIC Av. Wet. Width (m): 7.8 IIC Av. Max Riffle Depth (cm): 68 MS Av. Max Riffle Depth (cm): 63 MS Av. Max Riffle Depth (cm): 3.5 CL Pool: 10Riffle: 45 Run: Voter: 0.100 GE F % Stable: 0 GE F Voter Cover Total %: 20 GE Pool LOD Bldr In Veg O Veg Ctbnk Jo 20 50 0 0 O D Discharge Ba MS MS MS MS Mean Depth (m): 0.2 MS MS MS	m from Stream (Gaz.): Unnamed m): 1.2 MW Date: [25-Jul-97] Time (m): 400.0 GE Survey Crew: JP \SJ \ Specific Data 30.7 26.4 32.8 24.1 51.2 26.3 6.2 5.0 11.3 8.5 10.4 5.6 30 256 37 22 15 47 90 115 130 85 78 10 10 Gravels Clay, silt, sand (<2mm): 10 10 Gravels Small (2-16mm): 20 10 10 Sm. cobble (64-128mm): 35 35 35 35 Large (16-64mm): 35 30 36 30 35 Bilder cobble (>256mm): 70 30 35 35 Bilder cobble (>256mm): 0 0 0 0 990 (cm): 24 Compaction: High 5 5 Withs Height (m): 0.3 % 0.0 0 970 (cm):	Watershed Code: 033-6400-000-000-000-000-000-000-000-000-00
Discharge (m3/s) : I.37 I II Reach Symbol (Fish) S DV 32 D 4.0 1270 (Width, Valley: Channel, Stope) (Bed Material) T	Valley : Channel Ratio 10+ Stage: M Flood Signs IIt(m): 2 Bars (%): 40 pII: 7.3 Braided: Y Vater Temp. (°C): 7.5 02 (ppm): 60	C^{7} . Boulders, pools and LOD provide the cover for fish at this site.

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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

DFO/MoELP Stream Survey Form	Site Number: Y86	Reach No.: 1
	Trib to Serb	Cr. TRITON Environmental Consultants Ltd.
Location: Y86, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 033-7000-000-000-000-000-000-000-000-000
Map #: 93 L 072 Reach Length (km): U.T.M.: 9.058481.606224 Length surveyed (m):	0.7 [MW] Date: [25-Jul-97] Tin [300.0] [GE] Survey Crew: JP \SJ	ne: 12:37 Agency: TEC Access: H Fish Card: N Field 🔀 Historical [\ \ \ \ \ \ \ \ Photos: Y-11-10,11,12,13 Air Photos:
Channel Characteristics Av. Chan. Width (m): 6.8 MS 7.4 Av. Wet. Width (m): 4.0 MS 4.6 Av. Wet. Width (m): 12 MS 14 Av. Max Riffle Depth (cm): 12 MS 14 Av. Max Pool Depth (cm): 48 MS 45 Gradient (%): 4.0 CL Pool: 10 Pool: 10 Riffle: 40 Run: 45 Other: 5 % Side Channel: 10-40 GE Fines Gravels Gravels Gravels % Stable: 30 GE Gravels Gravels Gravels Larges Cover Cover Total % : 20 GE Larges D90 (cm) Discharge S0 Aspect : SE D90 (cm) Mean Depth (m) : 0.2 MS Fines Mean Velocity (m/s) : 1.01 Fi Confine Discharge (m3/s) : 0.36 Fi Valley :	Specific Data 4.0 9.9 7.4 5.6 6.8 2.8 3.8 4.1 4.7 3.8 7 13 12 36 33 90 35 Iterial Clay, silt, sand (<2mm):	Obstructions Fish Summary C Species 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 D0 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
Reach Symbol Stage: DV Bars (%) 7 D 4.0 1450 (Width, Valley: Channel, Slope) (Bed Material) Turb. (ci	M Flood Signs Ht(m): [[.2] : [20] pH: [7.5] Braided: [Y] emp. (°C): [8.5, 02 (ppm): [] m): [30]	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,t there is very good boulder, LOD and pool cover.

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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
DFO/MoELP Stream Survey Form	Site Number: Y88	Reach No.: 2
	Trib to Serb	Cr. TRITON Environmental Consultants Ltd.
Location: Y88, Unit 11; 10.2km upstream from the mouth of Se	b Cr. Stream (Gaz.): Unnamed	Watershed Code: 033-6100-000-000-000-000-000-000-000-000-00
Map #: 93 L 072 Reach Length (kn U.T.M. : 9.58740 .606514 Length surveyed (): E.7 MW Date: 25-Jul-97 Tim n): 300.0 GE Survey Crew: SJ \IP \	ne: 16:40 Agency: TEC Access: 11 Fish Card: N Field 🔀 Historicat [A A A A A A A A Photos: Y-11-17,18 Air Photos:
Channel Characteristics	Specific Data	Obstructions
Av. Chan. Width (m): 1.3 MS Av. Wet. Width (m): 0.8 MS 0.8	.1 0.9 1.2 1.5 1.3 1.5 .9 0.6 0.6 1.5 0.5 0.9	
Av. Max Riffle Depth (cm): 7 MS	8 6 7 6 7	
Av. Max Pool Depth (cm): 20 MS	8 20 15 20 25	
Gradient (%): 15.0 CL	Material	Fish Summary
Pool: 20 Riffle: 20 Run: 60 Other: 0		C Species Number Size Range (mm) Life Phase Lise 1 Lise 2 Lise 3 Method
% Side Channel:	Small (2 1(mm)): 10 10	DV 2 90-100 J VO
%Stable: 30 GE G	ravels Large (16-64mm): 70 40	
	Sm. cobble (64-128mm): 15	Comments
Cover Cover Total % : 40 GE	arges Lge cobble (128-256mm): 20 5	
Pool LOD Bldr In Veg O Veg Ctbnk	Bider cobble (>256mm): 0	
10 20 0 0 30 40 B	drock 0 0	C ² : LS=1%, RS=1%
Crown Closure % : 0 Aspect : 5 D9	0 (cm): 15 Compaction: High	C3 ² No fisheries sensitive zones noted.
Discharge Ba	Leight (m): 0.1	C4 The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 400V, was 186 seconds over 200
Discharge	% Unstable: 5	
Wetted Width (m): 0.7 MS F	nes 🖂 Gravels 🗌 Larges 🗍 Bedrock 🔲	No additional bank texture information.
Mean Depth (m): 0.1 MS Mean Velocity (m/s): 0.73 F	- Francisco - UC -	10.0 DO was not measured at this site, the water was clear to bottom. The mean air temperature on this day was 13.6 C.
Discharge (m3/s) : 0.04 F	lley : Channel Ratio	C7. The substrate gradually changes with the gradient from silt at the mouth to gravel at the sample site. In some
Si	ige: i M Flood Signs Ht(m): 0.5	places the cover is close to 100% due to dense overstream vegetation cover.
(Fish) (Fish)	rs (%): 0 pH: 7.2 Braided: N	C8: A beaver dam was observed on this tributary, 200m upstream of the confluence with Serb Creek. A
DV	ter Temp. (°C): 8.0 02 (ppm):	swimming beaver was observed.
1 D 15.0 1720		
	C 1000 C 1000 C 100 C 10	



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

DFO/MoELP Stream Survey Form	Site Number: Z247 Trib to Serb	Cr. TRITON Environmental Consultants Ltd.
Accation: Z247, Unit 11 Ap #: 93 L 062 J.T.M. : 9.589812.60576 Length su	Stream (Gaz.): Unnamed ngth (km): 1.2 MA Date: [13-Sep-97] Tim urveyed (m): 100.0 GE Survey Crew: KG \JL	Watershed Code: 033-6400-000-000-000-000-000-000-000-000-00
Channel Characteristics Av. Chan. Width (m): 1.9 Av. Wet. Width (m): 1.4 MS Av. Wet. Width (m): 1.4 Av. Max Riffle Depth (cm): 8 MS Av. Max Riffle Depth (cm): 30 MS Gradient (%): 16.5 MA Pool: 25 Riffle: 10 % Side Channel: 0 GE % Side Channel: 0 GE % Debris Area: 0 GE % Stable: 0 GE Cover Cover Total %: 20 Cover Cover Total %: 20 GE Pool LOD Bldr Max 0 60 0 0 Crown Closure %: 0 Aspect: NW Discharge 0.1 MS Mass Mean Depth (m): 0.1 MS NF Discharge (m3/s): 0 00 F NF 2 NF 12 NF	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 Bed Material Fines Clay, silt, sand (<2mm): 0 0 Gravels Small (2-16mm): 20 0 Large (16-64mm): 20 0 Large (16-64mm): 50 50 Larges Lge cobble (128-256mm): 30 10 Blder cobble (>256mm): 50 50 50 D90 (cm): Compaction: High 15 Banks Height (m): 0.5 90 Fines Gravels Larges Bedrock X Confinement: FC Valley : (* hannel Ratio 2-5 Stage: L Flood Signs IIt(m): 1.6 Bars (%): 0 pH: 7.9 Braided: N	Obstructions Fish Summary <u>C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method</u> <u>NF</u> <u>C Species Number Size Range (mm) NA</u> <u>C Species Spec</u>



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

DFO/MoELP Stream Survey Form	Site Number: Z67 Trib to Serb	Reach No.: 1 Cr. TRITON Environmental Consultants Ltd.
Location: Z67, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 025-9700-000-000-000-000-000-000-000-000-00
Map #: 93 L 062 Reach L U.T.M. : 9.581487.6059471 Length :	ength (km): 1.3 MW Date: 24-Jul-97 Tim surveyed (m): 150.0 GE Survey Crew: JP \KG	ne: 9:58 Agency: [TEC] Access: H Fish Card: N Field Historical
Channel Characteristics Av. Chan. Width (m): Av. Wet. Width (m): 9.3 Av. Max Riffle Depth (cm): 28 Av. Max Riffle Depth (cm): 28 Av. Max Rool Depth (cm): 28 Av. Max Pool Depth (cm): 44 MS Av. Max Pool Depth (cm): 44 Av. Max Pool Depth (cm): 44 Gradient (%): 1.5 CL Pool: 10 Riffle: 60 Run: 30 Other: 0 % Side Channel: >40 GE % % Stable: 40 GE % Stable: 40 GE Cover Cover Total %: 35 GE Pool LOD Bldr In Veg O Veg Ctbnk 15 20 5 0 40 20 Crown Closure %: 5 Aspect : E 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	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 Bed Material Fines Clay, silt, sand (<2mm): 10 10 Gravels Small (2-16mm): 50 20 Large (16-64mm): 50 20 Large 16-64mm): 30 30 Sm. cobble (64-128mm): 20 Larges Lge cobble (128-256mm): 40 Blder cobble (>256mm): 40 15 Bedrock 0 0 D90 (cm): 15 Compaction: Medium Banks Height (m): 1.0 % Unstable: 25 Fines Gravels Larges Bedrock 10+ Stage: M Flood Signs Ht(m): 0.8 Bars (%): 25 pH: 8.0 Braided: Y Water Temp. (°C): 5.5 02 (ppm): 20 Turb, (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



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

DFO/MoELP Stream Survey Form	Site Number: Z68 Trib to Serb	Reach No.: 3 Cr. TRITON Environmental Consultants Ltd.
Location: Z68, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 026-0400-000-000-000-000-000-000-000-000-0
Map #: 93 L 062 Reach L J.T.M. : 9.5798 .60610 Length s	ength (km): 1.0 MW Date: 24-Jul-97 Tim urveyed (m): 110.0 GE Survey Crew: JP \KG	e: 10:46 Agency: TEC Access: H Fish Card: N Field Historical Access: H Fish Card: N Field Historical Access: Z-9-1,2,3 Air Photos:
Channel Characteristics Av. Chan. Width (m): 2.4 MS Av. Wet. Width (m): 1.4 MS Av. Wet. Width (m): 1.4 MS Av. Max Riffle Depth (cm): 9 MS Av. Max Riffle Depth (cm): 28 MS Gradient (%): 2.0 CL Pool: 20 Riffle: 30 Yool: 20 Riffle: 30 Run: 45 Voter: 20 Riffle: 30 Run: 45 Other: 5 % Side Channel: 10-40 GE % >15 GE % Stable: 60 GE % Stable: 60 GE Cover Cover Total % : 55 GE S Pool LOD Bldr In Veg O Veg Ctbnk 15 15 30 20 10 10 15 Crown Closure % : 10 Aspect : S Discharge	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 Bed Material Fines Clay, silt, sand (<2mm):	Destructions Fish Summary <u> <u>NF</u> <u> <u> NF</u> <u> <u> </u> <u>NF</u> <u> <u> </u> <u>NF</u> <u> <u> </u> <u>NF</u> <u> <u> </u> <u> <u> </u> <u> </u> <u> <u> </u> <u> <u> </u> <u> </u> <u> <u> </u> <u> <u> </u> <u> </u> <u> <u> </u> <u> <u> </u> <u> </u> <u> <u> </u> <u> </u> <u> </u> <u> </u> <u> <u> </u> <u> </u> <u> </u> <u> </u> <u> <u> </u> <u> </u> <u> </u> <u> </u> <u> </u> </u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u>



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

DFO/MoELP Stream Survey Form	Site Number: Z71 Trib to Serb C	Reach No.: 3 Cr. TRITON Environmental Consultants Ltd.
Location: Z71, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 025-6700-000-000-000-000-000-000-000-000-00
Map #: 93 L 062 Reach Length (km): U.T.M. : 9.585325.6056530 Length surveyed (m):	3.2 MW Date: 24-Jul-97 Time: 100.0 GE Survey Crew: JP \KG \	14:21 Agency: TEC Access: H Fish Card: N Field Historical [1 1 1 1 N Events Events [
C1 Av. Chan. Width (m): 3.0 MS 3.0 C1 Av. Wet. Width (m): 2.9 MS 3.0 Av. Max Riffle Depth (cm): 11 MS 15 Av. Max Rool Depth (cm): 34 MS 33 Gradient (%): 5.0 CL 0 Pool: 10 Riffle: 20 Run: 60 Other: 10 % Side Channel: 0 GE Fines Grave % Stable: 0 GE Grave Cover Cover Total %: 35 GE Large	3.2 3.1 3.6 3.1 1.6 3.2 3.0 3.7 3.0 1.6 5 12 8 16 27 32 30 45 40 Taterial Clay, silt, sand (<2mm):	C Height (m) Type Location 5 F 4.5 Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA NA NA NA
Pool LOD Bidr In Veg O Veg Ctbnk 30 0 40 5 5 20 Crown Closure % : 0 Aspect : N	Bider cobble (>256mm): 5 k 0 0 a): 63 Compaction: High	 C2: LS= 0%, RS= 0% C3: No fisheries sensitive zoned noted. C4: The electrochecking effort using a Smithreet 12 B POW model set at 1.5 uses 224 seconds ours 110 meters.
Discharge Banks 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 Reach Symbol (Fish) (DV) Water	Height (m): 0.1 % Unstable: 10 Gravels Larges Bedrock ement: UC Channel Ratio 10+ M Flood Signs Ht(m): 0.45 6): 5 pH: 7.6 Braided: N Fremp. (°C): 12.0 02 (ppm):	 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.



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

DFO/MoELP Stream Survey Form	Site Number: 272 Trib to Serb	Cr. TRITON Environmental Consultants Ltd.
Location: Z72, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 025-5900-000-000-000-000-000-000-000-000-0
Map #: 93 L 062 Reach L U.T.M. : 9.584859.6060926 Length s	ength (km): 0.6 MW Date: 24-Jul-97 Tim urveyed (m): 150.0 GE Survey Crew: JP \KG	ne: 16:20 Agency: TEC Access: H Fish Card: N Field Historical
Channel Characteristics Av. Chan. Width (m): 2.1 MS Av. Wet. 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 % Side Channel: 0 GE % Side Channel: 0 GE % Stable: 25 GE Cover Cover Total %: 30 Max 10 35 0 0 20 35 Crown Closure %: 10 Aspect: N Discharge	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 Bed Material Fines Clay, silt, sand (<2mm): 90 90 Gravels Small (2-16mm): 10 10 Large (16-64mn): 0 0 Large (16-64mn): 0 0 Larges Large (16-64mn): 0 Larges Lage cobble (128-256mm): 0 Blder cobble (>256mm): 0 0 Bedrock 0 0 0 D90 (cm): 1 Compaction: Medium Banks Height (m): 0.3 % Unstable: 5 Fines Gravels Larges Bedrock Confinement: UC Valley : Channel Ratio 10+ Stage: M Flood Signs Ht(m): 0.5 Bars (%): 0 pli1: 7.7 Braided: N	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 Cli S3. No rifles were noted in the sampling area. Cli S3. No rifles were noted in the sampling area. Cli S3. No rifles were noted in the sampling area. Cli LS=0%, RS=0% Cli No fisheries sensitive information Cli The electroshocking effort, using a Smithroot 12 B POW model set at 1, 5, 300V was 291 seconds over 100 meters. Cli No additional bank texture information. Cli DO was not measured at this site, the water was clear to bottom. The mean air temperature on this day was 11.9 C. Cli This small stream provides some rearing cover in the form of undercut banks, small pools and overstream vegetation.



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

DFO/MoELP Stream Survey Form	Site Number: Z74	Reach No.: 2
	Trib to Serb	Cr. TRITON Environmental Consultants Ltd.
Location: Z74, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 026-3500-000-000-000-000-000-000-000-000-00
Map #: 93 L 062 Reach Length (km): U.T.M.: 9.5815 .60566 Length surveyed (m):	3.4 MW Date: 25-Jul-97 Tim 300.0 GE Survey Crew: JP \KG	ne: 9:10 Agency: TEC Access: H Fish Card: N Field Historical
Channel Characteristics Av. Chan. Width (m): 25.2 GE 22.0 Av. Wet. Width (m): 7.2 GE 7.0 Av. Wet. Width (m): 7.2 GE 30 C1 Av. Max Riffle Depth (cm): 0 GE 30 Gradient (%): 14.0 CL 900! 30 Riffle: 20 Run: 20 Other: 30 % Side Channel: 10-40 GE Fines 9 6 6 % Side Channel: 10-40 GE Grave 6 6 6 % Stable: 0 GE Grave 6 6 6 6 Cover Cover Total % : 50 GE 6	Specific Data 25.0 27.0 26.0 25.0 26.0 8.0 10.0 7.0 6.0 5.0 50 20 20 20 20 Atterial Clay, silt, sand (<2mm):	Obstructions C Height (m) Type Location 20 F 0.6 Fish Summary C Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA NA NA NA NA Comments
Discharge Banks Cl Wetted Width (m) : 0.0 GE Fines Cl Mean Depth (m) : 0.0 GE Fines Cl Mean Depth (m) : 0.00 F Confir Cl Discharge (m3/s) : 0.00 F Confir Cl Discharge (m3/s) : 0.00 F Valley Reach Symbol (Fish) Stage: Bars (* NF 25 D 14.0 1270 (Width, Valley: Channel, Slope) (Bed Material) Turb. (*	S Height (m): 4.0 % Unstable: 100 Gravels Larges Bedrock mement: UC : Channel Ratio 10+ L Flood Signs Ht(m): %): 25 pH: Braided: Y Temp. (°C): 02 (ppm):	 The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 500V, was 309 seconds over 200 meters. No additional bank texture information. DO was not measured at this site. The air temperature at this site was 8 C. 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.

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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

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DFO/MoELP Stream Survey Form	Site Number: Z75 Trib to Serb	Reach No.: 1 Cr. TRITON Environmentol Consultants Ltd.	
Location: Z75, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 025-6300-000-000-000-000-000-000-000-000-00	
Map #: 93 L 062 Reach Le U.T.M. : 9.5830 .60607 Length s	ength (km): 0.1 MW Date: 25-Jul-97 Tim arveyed (m): 100.0 GE Survey Crew: DD \KC	ne: 10:39 Agency: TEC Access: H Fish Card: N Field Historical	
Channel Characteristics Av. Chan. Width (m): Av. Wet. Width (m): 1.6 MS Av. Wet. Width (m): 1.6 MS Av. Max Riffle Depth (cm): 0 MS Av. Max Riffle Depth (cm): 0 MS Av. Max Pool Depth (cm): 0 MS Av. Max Pool Depth (cm): 0.5 CL Pool: 10 Riffle: 0 Run: 90 Other: 0 % Side Channel: 0 GE % Stable: 50 GE Voebris A rea: >15 GE % Stable: 50 GE Cover Cover Total %: 30 GE Pool LOD Bidr In Veg O Veg Ctbnk 10 20 0 0 50 20 Crown Closure %: 30 Aspect : NE Discharge	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 Bed Material Fines Clay, silt, sand (<2mm): 100 100 Gravels Small (2-16mm): 0 0 Gravels Small (2-16mm): 0 0 Large (16-64mm): 0 0 0 Large (16-64mm): 0 0 0 Large cobble (128-256mm): 0 0 0 Bider cobble (>256mm): 0 0 0 Bedrock 0 0 0 0 D90 (cm): 0 Compaction: Low Banks Height (m): 0.1 0 0 % Unstable: 0 0 0 0 Bars (%): 0 10+ 30 30 Bars (%): 0 PH: Braided: N Water Temp. (°C): 5.0 02 (ppm): Image: <th colspace<="" td=""><td>Obstructions Fish Summary <u> Species</u> Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method BT 1 J R EL Comments </td></th>	<td>Obstructions Fish Summary <u> Species</u> Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method BT 1 J R EL Comments </td>	Obstructions Fish Summary <u> Species</u> Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method BT 1 J R EL Comments

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Site #: Z75, Looking upstream at the channel



Site #: Z75, Looking downstream at the channel





Photo #: Z-9-24, 25-Jul-97 Site #: Z75, Measuring fish on the fishboard

DFO/MoELP Stream Survey Form	Site Number: Z76 Trib to Serb	Reach No.: 3 Cr. TRITON Environmental Consultants Ltd.
Location: Z76, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 033-6400-000-000-000-000-000-000-000-000-00
Map #: 93 L 062 Reach Le U.T.M. : 9.587164.6060115 Length su	ngth (km): 5.7 MW Date: 25-Jul-97 Tim rveyed (m): 400.0 GE Survey Crew: DD \K4	ne: 11:25 Agency: TEC Access: H Fish Card: N Field Historical GAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
Channel Characteristics Av. Chan. Width (m): 26.6 Av. Wet. Width (m): 7.3 Av. Max Riffle Depth (cm): 25 Av. Max Riffle Depth (cm): 42 Av. Max Pool Depth (cm): 42 Gradient (%): 5.0 CL Pool: Pool: 15 No Bebris Area: >10 % Side Channel: >40 % Side Channel: >40 % Side Channel: >40 % Side Channel: >10 % Side Channel: >10 % Side Channel: >10 % Side Channel: >10 % Stable: 10 GE % Stable: 10 GE % Stable: 10 GE 0 Cover Total %: 15 10 70 0 5 Crown Closure %: 1 Aspect: W Discharge Wetted Width (m): Mean Velocity (m/s): 0.99 F Discharge (m3/s): 0.68 </td <td>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 Bed Material ID 10 10 Gravels Small (2-16mm): 20 5 Gravels Small (2-16mm): 20 5 15 Gravels Small (2-16mm): 10 10 10 Gravels Small (2-16mm): 20 5 15 Large (16-64mm): 10 10 10 10 Larges Large (16-64mm): 10 10 10 Larges Lege cobble (128-256mm): 70 25 35 Bedrock 0 0 0 0 0 D90 (cm): 62 Compaction: High Fines Gravels Larges Bedrock 90 Fines Gravels Larges Bedrock 90 Fines Gravels</td> <td>Obstructions</td>	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 Bed Material ID 10 10 Gravels Small (2-16mm): 20 5 Gravels Small (2-16mm): 20 5 15 Gravels Small (2-16mm): 10 10 10 Gravels Small (2-16mm): 20 5 15 Large (16-64mm): 10 10 10 10 Larges Large (16-64mm): 10 10 10 Larges Lege cobble (128-256mm): 70 25 35 Bedrock 0 0 0 0 0 D90 (cm): 62 Compaction: High Fines Gravels Larges Bedrock 90 Fines Gravels Larges Bedrock 90 Fines Gravels	Obstructions
UV 27 B 5.0 (Width, Valley: Channel, Slope) (Bed Material)	Water Temp. (°C): 6.5 02 (ppm): Turb. (cm): Cond. (µmhos):	

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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

DFO/MoELP Stream Survey Form	Site Number: E146	Reach No.: 2
	Trib. to Serb	Cr. TRITON Environmental Consultants Ltd.
Location: E146, Unit 11, East of Serb Creek.	Stream (Gaz.): Unnamed	Watershed Code: 033-5700-000-000-000-000-000-000-000-000-00
Map #: 93 L 073 Reach L U.T.M. : 9 .5919 .60628 Length s	ength (km): 2.2 MA Date: 07-Aug-97 Tim urveyed (m): 100.0 GE Survey Crew: SJ \EM	e: 9:00 Agency: TEC Access: H Fish Card: N Field Historical
Channel Characteristics Av. Chan. Width (m):	Specific Data 5.0 3.3 2.8 2.6 2.9 3.0	Obstructions
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 % 5-15 GE % Debris Area: 5-15 GE % 5-15 GE % Stable: 40 GE GE 60 0 10 35 Cover 10 35 0 0 10 35 10 35	5.0 3.1 2.4 2.1 2.5 3.3 11 8 7 9 7 30 40 33 45 37 50 Bed Material 0 Fines Clay, silt, sand (<2mm): 30 30 0 Fines Clay, silt, sand (<2mm): 30 30 Gravels Small (2-16mm): 50 25 Large (16-64mm): 25 25 10 Larges Lge cobble (64-128mm): 10 10 Blder cobble (>256mm): 0 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
Discharge Wetted Width (m) : 1.3 Mean Depth (m) : 0.1 Mean Velocity (m/s) : 0.71 Discharge (m3/s) : 0.08 F Discharge (m3/s) : 0.08 CT DV 3 D 2.0 3520 Wetter Vetter Daved Step) 654 Mercich	Banks Height (m): 0.3 % Unstable: 0 Fines Gravels Larges Confinement: UC Valley: Channel Ratio Stage: M Flood Signs Ht(m): 0.5 Bars (%): 15 PH: 7.0 Braided: N Water Temp. (°C): 7.5 O2 (ppm): 50	 ¹⁰ The electroshocking effort, using a Smithroot 12 B POW model, set at I-5-400V, was 400 seconds over 100 meters. ¹⁰ No additional bank texture information. ¹⁰ DO was not measured, the water was clear to the bottom. The mean air temperature on this day was 13.8.C ¹⁰ 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.



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

DFO/MoELP Stream Survey Form	Site Number: E147	
	I rib. to Sert	Cr. IRITON Environmental Consultants Ltd.
Location: E147, Unit 11, East of Serb Creek	Stream (Gaz.): Unnamed	Watershed Code: 030-5300-000-000-000-000-000-000-000-000
Map #: 93 L 073 Reach Lo U.T.M. : 9 .5921 .60628 Length s	ength (km): 0.7 MA Date: 07-Aug-97 Tin urveyed (m): 100.0 GE Survey Crew: SJ \EN	ne: 9:30 Agency: TEC Access: H Fish Card: N Field Historical
Channel Characteristics	Specific Data	Obstructions
Av. Chan. Width (m): 2.4 MS Av. Wet. Width (m): 2.8 MS	1.5 2.8 3.0 2.5 2.6 2.2 1.6 3.4 2.9 3.0 2.9 2.7	
Av. Max Riffle Depth (cm):	7 6 5 8 7	
Av. Max Pool Depth (cm): 42 MS	33 40 50 42 45	
Gradient (%): 5.0 CL	Bed Material	Fish Summary
% Side Channel: 0-10 GE	Fines Clay silt sand (<2 mm): 50 50	C Species Number Size Range (mm) Life Phase Lise 1 Lise 2 Lise 3 Method
% Debris Area: >15 GE	Small (2-16mm): 15	DV 1 70 J R EL
%Stable: 40 GE	Gravels 30 15	
Cover	Sm. cobble (64-128mm): 15	Comments
Cover Total % : 20 GE	Larges Lge cobble (128-256mm): 20 5	iCii sa
Pool LOD Bldr In Veg O Veg Ctbnk	Bider cobble (>256mm): 0	C^2 S = 20% RS = 10%
		No fisheries sensitive zones noted at this site.
Discharge	Banks Height (m): 0.3	104 The electroshocking effort, using a Smithroot 12 B POW model set at I-5-400V, was 434 seconds over 100 meters.
	% Unstable: 5	C5: No additional bank texture information
Mean Depth (m) : 0.1 MS	Fines Gravels Larges Bedrock	
Mean Velocity (m/s) : 0.32 F	Confinement: UC	in the mean air temperature on this day was 13.8.C.
Discharge (m3/s) : 0.05 F	Valley : Channel Ratio 10+	54. Spawning and rearing habitat is present at this site. LOD and cutbank cover are abundant.
Reach Symbol	Stage: M Flood Signs Ht(m): 0.4	
(Fish)	Bars (%): 15 pH: 7.1 Braided: N	
DV CT	Water Temp. (°C): 8.0 02 (ppm):	



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

DFO/MoELP Stream Survey Form	Site Number: E191	Reach No.: 3
	Trib. to Serb Cr.	TRITON Environmental Consultants Ltd.
Location: E191, Unit 11, Serb Cr. watershed.	Stream (Gaz.): Unnamed	Watershed Code: 025-9700-000-000-000-000-000-000-000-000-00
Map #: 93 L 062 Reach Length (km) U.T.M. : 9 .5791 .60591 Length surveyed (m)	2.1 MA Date: 13-Aug-97 Time: 16:): 100.0 GE Survey Crew: SJ \EM \ \ \ \	0] Agency: TEC Access: H Fish Card: N Field Historical
Channel Characteristics Av. Chan. Width (m): 24.3 Av. Wet. Width (m): 10.3 Av. Wet. Width (m): 10.3 Av. Wet. Width (m): 10.3 Av. Max Riffle Depth (cm): 19 Av. Max Riffle Depth (cm): 19 Av. Max Rool Depth (cm): 68 Gradient (%): 3.0 Clip Pool: 5 Riffle: 60 Run: 35 Other: % Side Channel: 10-40 % Side Channel: 10-40 % Side Channel: 0 % Side Channel: 0 % Stable: 0 GE Gradient % Stable: 0 GE Gradient Pool LOD Bidr In Veg O 10 Cover Total %: 10 GE Beddie D90 Crown Closure %: 0 Aspect: NE D90 Banne Wetted Width (m): 9.0 HC HC Wetted Width (m): 9.0	Specific Data Obs. 0 29.4 26.0 14.6 18.7 21.0 13.0 8.6 8.5 9.9 10.6 21.0 21 17 18 27 19 64.69 72.49 65 Material Small (2-16mm): 10 10 10 10 C s Clay, silt, sand (<2mm):	tructions Height (m) Type Location 8 C 2.6 As a colspan="2">Species Nummary Species Number Size Range (mm) Life Phase Use 1 Use 2 Use 3 Method NF NA NA EL EL nments S 8%, RS = 30% So fisheries sensitive zones noted. he electroshocking effort, using a Smithroot 12 B POW model, set at 1-5-400V, was 360 seconds over 100 eters. The high speed and turbidity of the water at this site made electroshocking difficult. travels and larges make up the bank texture at this site.
Mean Velocity (m/s) : 1.12 F Com Discharge (m3/s) : 2.27 F Valle Reach Symbol (Flab) Bars (DV) (BT) 24 D 3.0 1450	Inement: UC Image: Comparison of the second se	xtensive braiding demonstrates channel instability in this reach, which contains numerous mid channel bars, ame with, others without vegetation. Cover is provided by LOD, scour pools, sidechannels and cutbanks.



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
OFO/MoELP Stream Survey Form	Site Number: Z69 Trib. to Serb	Reach No.: 1 Cr. TRITON Environmental Consultants Ltd.
ocation: Z69, Unit 11	Stream (Gaz.): Unnamed	Watershed Code: 026-3500-000-000-000-000-000-000-000-000-00
Iap #: 93 L 062 Reach L U.T.M. : 9 .5808 .60571 Length s	ength (km): 0.6 MW Date: 24-Jul-97 Tin surveyed (m): 600.0 GE Survey Crew: JP \KC	ne: 11:32 Agency: TEC Access: H Fish Card: N Field Historical
Channel Characteristics Av. Chan. Width (m): 31.8 Av. Wet. Width (m): 7.1 GE Av. Max Riffle Depth (cm): 0 GE Av. Max Riffle Depth (cm): 0 Gradient (%): 12.0 CL Pool: 25 Riffle: 50 % Side Channel: >40 GE % Side Channel: >40 GE % Stable: 0 GE Cover 0 GE % Stable: 0 GE Cover Cover Total %: 20 GE Pool LOD Bldr In Veg O Veg Ctbnk 10 25 60 0 5 0 0 GE Cover Cover Total %: 5 Aspect: W Discharge	Specific Data 10.0 25.0 23.0 26.0 55.0 51.5 6.5 8.0 6.0 6.0 10.0 Bed Material Fines Clay, silt, sand (<2mm):	Obstructions