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

*(Working Unit #14 - Toboggan)*

TRITON
Environmental Consultants Ltd.

*2565.00/WP8354*

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

## *(Working Unit #14 - Toboggan)*

*Prepared for:*

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## EXECUTIVE SUMMARY

Triton Environmental Consultants Ltd. was retained by Pacific Inland Resources (PIR) in partnership with the Ministry of Environment, Lands and Parks (MELP) in Smithers to conduct reconnaissance level fish and fish habitat inventories in the Bulkley Forest District. This report summarizes the historical fisheries data collected by SKR Consultants Ltd. and the field data collected by Triton survey crews in working unit 14. The historical records indicate the presence of the following species in this working area:

- coho (*Oncorhynchus kisutch*)
- pink (*O. gorbuscha*)
- sockeye (*O. nerka*)
- steelhead and rainbow trout (*O. mykiss*)
- cutthroat trout (*O. clarkii*)
- lamprey (*Lampetra spp.*)
- mountain whitefish (*Prosopium williamsoni*)
- Dolly Varden (*Salvelinus malma*)
- longnose sucker (*Catastomus catastomus*)
- sculpins (*Cottus sp.*)
- redsided shiner (*Richardsonius balteatus*)
- northern squawfish (*Ptychocheilus oregonensis*)
- long nose dace (*Rhinichthys cataractae*)
- largescale sucker (*C. macroshelius*)
- peamouth chub (*Mylochelius caurinus*)

A total of 49 sites were sampled between July 7 and September 20 1997. Seven sites were classified as "Not A Creek" due to the lack of a defined channel. Fish were captured by electrofishing at 13 sites, and were visually observed at 3 and the species sampled include Dolly Varden, rainbow trout, coho, burbot, lamprey, cutthroat trout, northern squawfish an unidentified salmon species and an unidentified sucker species. A total of 4 sites were classified as S5 or S6, the basis for the non fish bearing status is summarized. This report also includes recommendations for resampling in reaches where fish use is likely but where no fish were caught.

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## ACKNOWLEDGMENTS

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## 1.2 Objectives

Triton's objectives 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 requiring 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 British Columbia and contains several major tributaries to the Bulkley and Babine Rivers.. The 1:20,000 TRIM sheets that cover the study area are: 93 L 065, 93 L 074, 93 L 075, 93 L 084, 93 L 094.
The streams sampled in this inventory include :

- Chicken Lake Creek (460-3454-000)
- Club Creek (460-3454-267-616)
- Dahlie Creek (460-3738-332)
- Elliot Creek (460-2429-477)
- Glacier Gulch Creek (460-2429-515)
- Glass Creek (460 2429 515 096)
- Kathlyn Creek (460-3454-267)
- Owens Creek (460-2429-161)
- Powers Creek (460-3924-000)
- Seymour Creek (460-3738-000)
- Simpson Creek (460-3454-267-278)
- Toboggan Creek (460-2429-000)

Unnamed tributaries to Toboggan Creek, Glass Creek, Kathlyn Creek, Glacier Gulch Creek, and Owens Creek were also sampled in this inventory.

## 2.2 Access

The majority of the sample sites were accessed by road. The upper reaches of Owens Creek and Elliot Creek were to be sampled by helicopter, however bad weather and terrain prevented access.

# 1.0 INTRODUCTION

## 1.1 Background

Pacific Inland Resources retained Triton Environmental Consultants Ltd. to conduct a reconnaissance level fish and fish habitat inventory in 14 watershed units 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 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 riparian management areas.

This report summarizes historical and field data collected in working unit 14, which consists of Toboggan Creek and tributaries draining into the west side of the Bulkley River, between Trout Creek and the confluence with the Telkwa River (see Figure 1). It covers approximately 280 km² and comprises 3.5% of the study area. Fisheries information is available for the section of the Bulkley River flowing through this unit, as well as for Toboggan Creek (to 1 km above the confluence with the Toboggan Lake outlet), lower Owens Creek, Elliot Creek, Glacier Gulch Creek and the inlets of Kathlyn Lake. Kathlyn Creek, lower Simpson Creek and Chicken Lake Creek also have fisheries information (Saimoto 1996). The historical information indicates the presence of the following species in this working unit:

- coho
- pink
- sockeye
- steelhead and rainbow trout
- cutthroat trout
- lamprey
- mountain whitefish
- Dolly Varden
- longnose sucker
- sculpins
- redside shiner
- northern squawfish
- longnose dace
- largescale sucker
- peamouth chub

## LEGEND

- River / Stream
- Lakes
- Highway
- Railway
- 093M.000 UTM Mapsheet
- Watershed Boundary
- Unit Boundaries (by mapsheet)
- Study Area (by mapsheet)


**INSET MAP**

BABINE RIVER WATERSHED

KISPIOX RIVER WATERSHED

BULKLEY RIVER WATERSHED

BABINE LAKE WATERSHED

BABINE RIVER WATERSHED

UNIT 14

HAZELTON

SOUTH HAZELTON

SMITHERS

TELKWA

HOUSTON

Skeena River, Nilkitkwa River, Babine River, Kispiox River, Nichyeskwa Cr., Shegunia River, Suskwa River, Harold Price Cr., Driftwood River, Kitwancool River, Bulkley River, Blunt Cr., Babine Lake, Kitseguecla River, Kitsuns Cr., Fulton River, Red Canyon Cr., Serb Cr., Telkwa River, Zymoetz River, Clore River, Kitnayakwa River

093M.095 093M.096 093M.085 093M.086 093M.087 093M.075 093M.076 093M.077 093M.067 093M.066 093M.068 093M.055 093M.056 093M.057 093M.058 093M.045 093M.046 093M.047 093M.048 093M.035 093M.036 093M.037 093M.038 093M.024 093M.025 093M.026 093M.027 093M.028 093M.013 093M.014 093M.015 093M.016 093M.017 093M.018 093M.002 093M.003 093M.004 093M.005 093M.006 093M.007 093M.008 093L.100 093L.091 093L.092 093L.093 093L.095 093L.096 093L.097 093L.098 093L.094 103I.090 093L.081 093L.082 093L.083 093L.084 093L.085 093L.086 093L.087 093L.088 103I.080 093L.071 093L.072 093L.073 093L.074 093L.075 093L.076 093L.077 093L.061 093L.062 093L.063 093L.064 093L.065 093L.066 093L.067 093L.052 093L.053 093L.054 093L.055 093L.056 093L.057 093L.042 093L.043 093L.044 093L.045

| | | |
|---|---|---|
| **FISH AND FISH HABITAT INVENTORY IN THE BULKLEY FOREST DISTRICT** | Sources : 1 : 20,000 TRIM<br>B.C. Watershed Atlas 1 : 50,000<br>M.O.E.L.P | 5 0 5 10 15 20 Kilometers<br>**1 : 500,000** |
| **UNIT 14 OVERVIEW MAP**<br>Project ID : 2565 | Projection : UTM Zone 9<br>Datum : NAD83<br>Created : February, 1998 | TRITON Environmental Consultants Ltd. |

FIGURE 1

MAp 256506223

## 2.3 Resource Use

This unit is heavily populated and resource use includes farming, logging, gravel extraction and recreation. A fish hatchery is located in reach 1 of Toboggan Creek.

# 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 the photodocumentation for working unit 14 is provided in Appendix 3.

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 $m^2$ 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

Records are available from two Water Survey of Canada (WSC) stations within Unit 14. The station locations and their corresponding periods of record are:

- Kathlyn Creek above Simpson Creek (08EE010), 1967 to 1979
- Simpson Creek at the Mouth (08EE012), 1969 to 1995

Kathlyn Creek above Simpson Creek has a drainage area of 24.6 km² and recorded a mean annual discharge (MAD) of 0.223 m³/s. The recorded minimum and maximum mean daily discharges were 0 m³/s and 1.42 m³/s, respectively.

Simpson Creek at the mouth has a drainage area of 13.2 km² and recorded a mean annual discharge (MAD) of 0.286 m³/s. The recorded minimum and maximum mean daily discharges were 0.002 m³/s and 5.29 m³/s, respectively.

Summary information and hydrographs are presented for each station in Appendix 1.

### 4.2 Water Quality

As agreed with the Contract Monitor, water samples were not collected for chemical analyses. The parameters that were measured for each site, however, were pH, temperature and conductivity. Conductivity was measured with a handheld Hanna TDS Tester #3 and a Hanna Conductivity TDS #3. The acceptable values of conductivity for electroshocking purposes must exceed 30 µS. 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 in 1996 that the depth of the deepest pool would be the default value in the database when the water was clear to the bottom. Thereafter, it was agreed that the description "clear to bottom" would suffice.

**Table 2** summarizes the temperature, pH and conductivity measurements collected in this inventory. Water temperatures during field sampling ranged between 5.0°C and 21°C, and the average water temperature was 9.92°C. The pH values ranged from 5.80 to 8.10, with an average pH of 7.38. The conductivity ranged from 10 to 380 (umhos/cm) with an average value of 84.18. The pH values obtained in Glacier Gulch Creek, Kathlyn Creek, Simpson Creek, Club Creek were typically quite low, ranging from 5.80 in reach 1 of Glacier Gulch Creek to 6.90 in reach 1 of Club Creek, with one high pH of 8.1 in a diversion of Glacier Gulch Creek. The value of 5.80 obtained in reach 1 of Glacier Gulch Creek seems particularly low. The stream was at high flow at the time of sampling, with high velocity and turbidity, which may have impacted on pH. Future water quality sampling is recommended for this stream.

## 5.0 RESULTS AND DISCUSSION

The survey took place between July 7 and September 20 1997. A total of 49 sites were sampled and 7 sites were classified as "Not a creek" due to the absence of a defined channel. Four sites were classified as non fish bearing and fish were caught by

electrofishing at 13 sites and visually observed at 3. The species sampled were cutthroat trout, rainbow trout, coho salmon, Dolly Varden, northern sucker, burbot and lamprey. An unidentified salmon species and an unidentified sucker species were also observed.

A summary of barriers identified in this inventory is listed in **Table 3**. The summary information for all sites in working unit 14 is listed in **Table 4**. This table is organized alphabetically, by sub-basin and includes fish data, stream classifications and sampling methods . 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**. **Table 7** summarizes the wildlife and wildlife signs observed in this working area. Individual fish data for this working unit have been summarized in Appendix 2. Fish catch data were compiled for all records that contained a discrete size measurement. These data were summarised and plotted in histograms by species, the results are presented in Figures 2a through 2j.

## 5.1 Chicken Lake Creek (460-3454-000) (93 L 074, 93 L 075)

### 5.1.1 Sensitive Habitats and Barriers

Chicken Lake Creek is 4.3 km in length and is fed by 2 tributaries. No barriers to fish migration were noted in Chicken Lake Creek, however, fish distribution is most likely limited to halfway up reach 2, as the TRIM sheet indicates the channel has steep gradient and is quite confined. No sensitive habitats were noted. Reach 1 has low gradient, flows through a residential area and is crossed by roads and railway tracks. Reach 2 has quite steep gradient and is also confined. Chicken Lake Creek was sampled once, in reach 2.

### 5.2.2 Fish Summary Tables and Stream Classification

Pink salmon and steelhead have been recorded at the mouth of this stream. No fish were caught by electrofishing at site E138. This stream was classified as an S3 in reach 2 based on an average channel width of 3.83 meters and the presence of suitable fish habitat in the sampling area. The tributaries to this stream are small and would likely be classified as S4.

**DFO/MoELP Stream Survey Form**

**Site Number:** E138 **Reach No.: 2**

**Chicken Lake Cr.**

TRITON Environmental Consultants Ltd.

**Location:** E138, Unit 14 **Stream (Gaz.):** Chicken Lake Creek **Watershed Code:** 460-3454-000-000-000-000-000-000-000-000-000-0

**Map #:** 93 L 074 **Reach Length (km):** 1.3 MA **Date:** 28-Jul-97 **Time:** 15:00 **Agency:** TEC **Access:** V2 **Fish Card:** N Field ☒ Historical ☐

**U.T.M. :** 9 .6160 .60728 **Length surveyed (m):** 100.0 GE **Survey Crew:** JL \EM\ \ \ \ \ \ \ **Photos:** E-13-10,11,12 **Air Photos:**

## Channel Characteristics

| | | |
|---|---|---|
| Av. Chan. Width (m): | 3.8 | MS |
| Av. Wet. Width (m): | 2.2 | MS |
| Av. Max Riffle Depth (cm): | 11 | MS |
| Av. Max Pool Depth (cm): | 28 | MS |
| Gradient (%): | 6.0 | CL |
| Pool: 10 Riffle: 20 Run: 50 Other: | 20 | |
| % Side Channel: | 0 | GE |
| % Debris Area: | 0-5 | GE |
| %Stable: | 0 | GE |

*Specific Data*

| | | | | | |
|---|---|---|---|---|---|
| 5.0 | 3.2 | 4.0 | 3.3 | 2.9 | 4.6 |
| 2.0 | 2.4 | 3.0 | 1.9 | 2.3 | 1.4 |
| 12 | 10 | 13 | 14 | 5 | |
| 35 | 20 | 29 | 32 | 23 | |

## Cover

Cover Total % : 20 GE

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

Crown Closure % : 15 Aspect : W

## Bed Material

| | | | |
|---|---|---|---|
| Fines | Clay, silt, sand (<2mm): | 0 | 0 |
| Gravels | Small (2-16mm): | 20 | 5 |
| | Large (16-64mm): | | 10 |
| Larges | Sm. cobble (64-128mm): | 80 | 25 |
| | Lge cobble (128-256mm): | | 30 |
| | Bldr cobble (>256mm): | | 30 |
| Bedrock | | 0 | 0 |

D90 (cm): 40 Compaction: Medium

## Discharge

| | | |
|---|---|---|
| Wetted Width (m) : | 1.9 | MS |
| Mean Depth (m) : | 0.1 | MS |
| Mean Velocity (m/s) : | 0.50 | F |
| Discharge (m3/s) : | 0.07 | F |

## Banks

Height (m): 0.3

% Unstable: 0

Fines ☐ Gravels ☒ Larges ☐ Bedrock ☐

Confinement: FC

Valley : Channel Ratio 2-5

Stage: H Flood Signs Ht(m): 1.3

Bars (%): 10 pH: 8.0 Braided: N

Water Temp. (°C): 10.0 02 (ppm):

Turb. (cm): Cond. (µmhos): 20

## Reach Symbol

(Fish)

(DV)

4 B 6.0 | 0280

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

## Obstructions

| C | Height (m) | Type | Location |
|---|---|---|---|
| | 2 | C | 1.8 |

## Fish Summary

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

## Comments

C1 S3

C2 LS = 45%, RS = 40%

C3 No fisheries sensitive zones noted.

C4 The electroshocking effort was not recorded at this site.

C5 Gravels and larges make up the bank texture at this site.

C6 DO was not measured, the water as clear to the bottom. The mean air temperature on this day was 15.5.C.

C7 This reach is fast flowing, with multiple cascades over large cobble and boulder. Pools are limited in comparison to riffles, cascades e.t.c. Cutbank, boulder and overstream vegetation cover is abundant in the sampling area. Heavy alder growth results in stable banks at this site. Numerous flood signs were noted in this area.


Photo #: E-13-10, 28-Jul-97
Site #: E138, Looking upstream at the channel, note boulder and cobble cover


Photo #: E-13-11, 28-Jul-97
Site #: E138, Looking downstream at the channel, note cobble cover


Photo #: E-13-12, 28-Jul-97
Site #: E138, Looking upstream at a 2m cascade

## 5.2 Club Creek (460-3454-267-616) (93 L 084)

### 5.2.1 Sensitive Habitats and Barriers

Club Creek is 2.9 km in length and is fed by 3 tributaries. No barriers to fish migration were identified by sampling crews and no limits to fish distribution were noted on the TRIM sheet. Wetlands were noted in direct contact with the channel in reach 2 and have been identified as fisheries sensitive zones. This tributary to Kathlyn Lake is characterized by low gradient, and the upper reaches have wetlands associated with beaver activity. Club creek was sampled in reaches 1, 2 and 3.

### 5.2.2 Fish Summary Tables and Stream Classification

The historical information indicates the presence of lamprey, cutthroat trout and rainbow trout in reach 1 at the mouth. Lamprey, coho and cutthroat trout were captured in reach 1 by electrofishing and cutthroat trout and coho were captured in reach 2 by electrofishing. No fish were caught in reach 3 which was electrofished very briefly. The fast flow and high turbidity would have made capture of shocked fish very difficult so fishing was stopped. Reaches 1 and 2 of this stream have been classified as S2 based on average channel widths of 5.10 meters and 7.42 meters respectively and the presence of fish in the sampling areas. Reach 3 has been classified as S3 based on an average channel width of 3.38 meters. Part of the flow of Glacier Gulch Creek has been diverted into the Club Creek system, increasing expected channel widths and flows. This was discovered at site Z66, located on a previously unmapped reach at a partly blown out road crossing. This reach consists of a fairly recent channel, with fast flowing water. Sampling crews working in Club Creek noted exceptionally wide channel widths and fast flow given the size and gradient of the stream indicated on the TRIM map. An aerial or ground survey to determine where this diversion from Glacier Gulch meets Club Creek is recommended. The tributaries to Club Creek are unsampled but are most likely small S4 sized streams

DFO/MoELP Stream Survey Form

**Site Number:** W176 **Reach No.: 1**

**Club Cr.**

TRITON Environmental Consultants Ltd.

**Location:** W176, Unit 14 **Stream (Gaz.):** Club Creek **Watershed Code:** 460-3454-267-616-000-000-000-000-000-000-000-0

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Map #: | 93 L 084 | Reach Length (km): | 1.3 | MA | Date: | 13-Aug-97 | Time: | 12:40 | Agency: | TEC | Access: | V2 | Fish Card: | N | Field ☒ Historical ☐ |
| U.T.M. : | 9 .6143 .60769 | Length surveyed (m): | 100.0 | GE | Survey Crew: | KA \DD\ \ \ \ \ \ \ | | | Photos: | -11,12,13,14,15,16,17,18 | | | Air Photos: | | |

## Channel Characteristics

| | | | |
|---|---|---|---|
| | Av. Chan. Width (m): | 5.1 | MS |
| | Av. Wet. Width (m): | 5.1 | MS |
| N | Av. Max Riffle Depth (cm): | 0 | MS |
| | Av. Max Pool Depth (cm): | 52 | MS |
| | Gradient (%): | 2.0 | CL |
| | Pool: 10 Riffle: 0 Run: 90 Other: 0 | | |
| C7 | % Side Channel: | 0-10 | GE |
| | % Debris Area: | 0-5 | GE |
| | %Stable: | 10 | GE |

*Specific Data*

| | | | | | |
|---|---|---|---|---|---|
| 2.4 | 6.0 | 5.2 | 5.0 | 6.0 | 6.0 |
| 2.4 | 6.0 | 5.2 | 5.0 | 6.0 | 6.0 |
| 50 | 60 | 60 | 40 | | |

## Cover

C7 Cover Total % : 20 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 20 | 10 | 0 | 0 | 20 | 50 |

Crown Closure % : 40 Aspect : NE

## Bed Material

| | | | |
|---|---|---|---|
| Fines | Clay, silt, sand (<2mm): | 10 | 10 |
| Gravels | Small (2-16mm): | 80 | 20 |
| | Large (16-64mm): | | 60 |
| Larges | Sm. cobble (64-128mm): | 10 | 10 |
| | Lge cobble (128-256mm): | | 0 |
| | Bldr cobble (>256mm): | | 0 |
| Bedrock | | 0 | 0 |

D90 (cm): 7 Compaction: Medium

## Discharge

| | | |
|---|---|---|
| Wetted Width (m) : | 2.1 | MS |
| Mean Depth (m) : | 0.4 | MS |
| Mean Velocity (m/s) : | 0.78 | F |
| Discharge (m3/s) : | 0.49 | F |

## Banks

C7 Height (m): 0.1

% Unstable: 0

Fines ☒ Gravels ☐ Larges ☐ Bedrock ☐

Confinement: UC

Valley : Channel Ratio 10+

Stage: Flood C7 Flood Signs Ht(m): 0

Bars (%): 0 pH: 6.9 Braided: N

Water Temp. (°C): 10.0 02 (ppm):

Turb. (cm): 18 Cond. (µmhos): 20

## Reach Symbol

(Fish)

CT CO

5 D 2.0 | 1810

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

## Obstructions

## Fish Summary

| C | Species | Number | Size Range (mm) | Life Phase | Use 1 | Use 2 | Use 3 | Method |
|---|---|---|---|---|---|---|---|---|
| | CT | 1 | 80 | J | R | | | VO |
| | CT | 2 | 150-245 | A | R | | | EL |
| | CO | 4 | 50 | J | R | | | EL |
| | L | 1 | 130 | NA | | | | EL |

## Comments

C1: S2.

C2: LS=1%, RS=1%

C3: No fisheries sensitive zones noted.

C4: The electroshocking effort, using a Smithroot 12 B POW model set at 500V, was 215 seconds over.130 meters.

C5: No additional bank texture information.

C6: DO was not measured at this site. The air temperature at this site was 18.0 C.

C7: Side channels have been created by a landowner diverting water into a manmade channel. The cover was difficult to estimate as the area was flooded and the wtaer was fast flowing and highly turbid. The bed material consists mainly of gravels and some small cobble. The stream was in flood at the time of sampling, but an even higher flood sign was found.

Photo #: W-G-11, 13-Aug-97
Site #: W176, Looking upstream at a flooding channel

Photo #: W-G-12, 13-Aug-97
Site #: W176, Looking downstream at a flooding channel

Photo #: W-G-14, 13-Aug-97
Site #: W176, Measuring fish with the meterstick

Photo #: W-G-15, 13-Aug-97
Site #: W176, Measuring fish with the meterstick

Photo #: W-G-16, 13-Aug-97
Site #: W176, Measuring fish with the meterstick (fish mostly covered by meterstick)

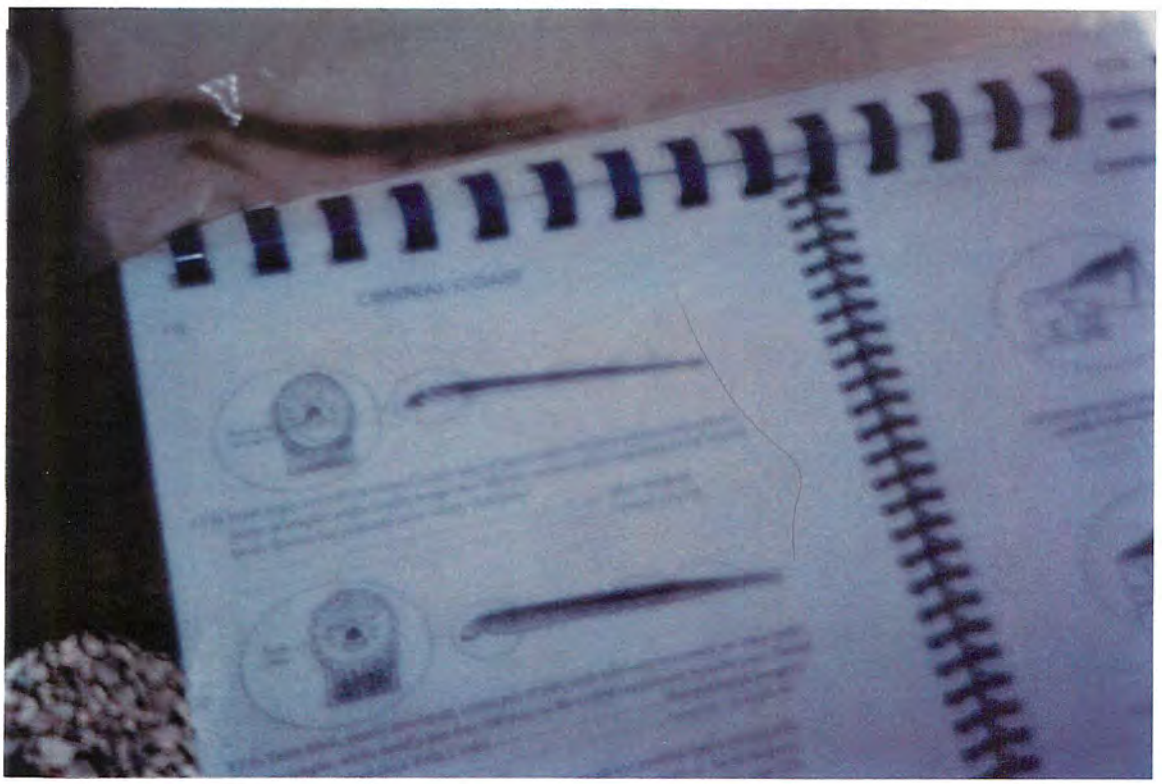

Photo #: W-G-17, 13-Aug-97
Site #: W176, Looking at a lamprey in the plastic bag

**DFO/MoELP Stream Survey Form**

**Site Number:** W177 **Reach No.:** 2

**Club Cr.**

TRITON Environmental Consultants Ltd.

**Location:** W177, Unit 14 **Stream (Gaz.):** Unnamed **Watershed Code:** 460-3454-267-616-000-000-000-000-000-000-000-0

**Map #:** 93 L 084 **Reach Length (km):** 0.4 MA **Date:** 13-Aug-97 **Time:** 13:45 **Agency:** TEC **Access:** V2 **Fish Card:** N **Field** ☒ **Historical** ☐

**U.T.M. :** 9 .6136 .60775 **Length surveyed (m):** 100.0 GE **Survey Crew:** KA \D \ \ \ \ \ \ \ **Photos:** W-G-19,20,21,22,23 **Air Photos:**

## Channel Characteristics

| | | | |
|---|---|---|---|
| | Av. Chan. Width (m): | 7.4 | GE |
| | Av. Wet. Width (m): | 7.4 | GE |
| N | Av. Max Riffle Depth (cm): | 0 | GE |
| C7 | Av. Max Pool Depth (cm): | 80 | GE |
| | Gradient (%): | 3.0 | CL |
| C7 | Pool: 10 Riffle: 0 Run: 80 Other: 10 | | |
| | % Side Channel: | 0-10 | GE |
| | % Debris Area: | 5-15 | GE |
| | %Stable: | 20 | GE |

*Specific Data*

| | | | | | |
|---|---|---|---|---|---|
| 4.0 | 9.0 | 12.0 | 6.0 | 7.0 | 6.5 |
| 4.0 | 9.0 | 12.0 | 6.0 | 7.0 | 6.5 |
| 80 | | | | | |

## Cover

Cover Total % : 30 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 50 | 40 | 0 | 0 | 10 | 0 |

Crown Closure % : 10 Aspect : SE

## Bed Material

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

N D90 (cm): 0 N Compaction: Low

## Discharge

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

## Reach Symbol

(Fish)

CO CT

7 C 3.0 | F

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

## Banks

C7 Height (m): 0.0

% Unstable: 50

Fines ☒ Gravels ☐ Larges ☐ Bedrock ☐

Confinement: OC

Valley : Channel Ratio 5-10

Stage: Flood C7 Flood Signs Ht(m): 0

Bars (%): 0 pH: 6.7 Braided: Y

Water Temp. (°C): 10.0 02 (ppm):

Turb. (cm): 3 Cond. (µmhos): 20

## Obstructions

## Fish Summary

| C | Species | Number | Size Range (mm) | Life Phase | Use 1 | Use 2 | Use 3 | Method |
|---|---|---|---|---|---|---|---|---|
| | CO | 2 | 50-80 | F | R | | | EL |
| | CT | 1 | 60 | J | R | | | EL |

## Comments

C1 S2.

C2 LS=50%, RS=40%

C3 No fisheries sensitive zones noted.

C4 The electroshocking effort, using a Smithroot 12 B POW model, was 275 seconds over 100 meters.

C5 No additional bank texture information.

C6 DO was not measured at this site. The water was very turbid. The air temperature at this site was 24.0 C.

C7 The water is flooded approximately 1 ft over the banks. The site consists of a series of beaver ponds, all of which were blowing out at the time of sampling. The velocity was too high and the bottom too unstable to measure discharge. Even at this high flow, this section provides good rearing habitat.

Photo #: W-G-19, 13-Aug-97
Site #: W177, Looking upstream at the channel, note the dead tree in the center

Photo #: W-G-20, 13-Aug-97
Site #: W177, Looking downstream at the channel, note the highly turbid water

Photo #: W-G-23, 13-Aug-97
Site #: W177, Measuring fish with the meterstick

**DFO/MoELP Stream Survey Form**

**Site Number:** Z66

**Reach No.: 3**

**Club Cr.**

TRITON Environmental Consultants Ltd.

**Location:** Z66, Uni 14 **Stream (Gaz.):** Club Creek **Watershed Code:** 460-3454-267-616-000-000-000-000-000-000-000-0

**Map #:** 93 L 084 **Reach Length (km):** 1.6 MW **Date:** 22-Jul-97 **Time:** 18:52 **Agency:** TEC **Access:** V2 **Fish Card:** N **Field** ☒ **Historical** ☐

**U.T.M.:** 9 .612352.6077636 **Length surveyed (m):** 100.0 GE **Survey Crew:** JP \KG\ \ \ \ \ \ \ **Photos:** Z-8-19,20,21 **Air Photos:**

## Channel Characteristics

| | | | |
|---|---|---|---|
| | Av. Chan. Width (m): | 3.4 | MS |
| | Av. Wet. Width (m): | 2.3 | MS |
| | Av. Max Riffle Depth (cm): | 41 | GE |
| C1 | Av. Max Pool Depth (cm): | 0 | GE |
| | Gradient (%): | 3.0 | CL |
| | Pool: 0 Riffle: 90 Run: 0 Other: 10 | | |
| | % Side Channel: | 0 | GE |
| | % Debris Area: | 0-5 | GE |
| | %Stable: | 10 | GE |

**Specific Data**

| | | | | | |
|---|---|---|---|---|---|
| 4.0 | 3.8 | 3.6 | 2.7 | 2.6 | 3.6 |
| 3.9 | 1.6 | 2.1 | 1.8 | 1.7 | 2.8 |
| 50 | 49 | 37 | 29 | | |

## Cover

Cover Total %: 10 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 0 | 0 | 60 | 0 | 20 | 20 |

Crown Closure %: 8 Aspect: E

## Bed Material

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

D90 (cm): 16 Compaction: Medium

## Discharge

| | | |
|---|---|---|
| Wetted Width (m): | 2.9 | MS |
| Mean Depth (m): | 0.3 | MS |
| Mean Velocity (m/s): | 1.62 | F |
| Discharge (m3/s): | 1.06 | F |

## Banks

Height (m): 0.1

% Unstable: 75

Fines ☐ Gravels ☐ Larges ☒ Bedrock ☐

Confinement: UC

Valley : Channel Ratio 10+

Stage: H Flood Signs Ht(m): 0.3

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

Water Temp. (°C): 8.5 02 (ppm):

Turb. (cm): 20 Cond. (µmhos): 30

## Reach Symbol

(Fish)

(RB)

3 D 3.0 | 1360

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

## Obstructions

## Fish Summary

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

## Comments

C1 S3. No pools were found in the sampling area.

C2 LS= 4%, RS= 4%

C3 No fisheries sensitive zones noted.

C4 The electroshocking effort, using a Smithroot 12 B POW, was 25 seconds over 20 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 14 C.

C7 The shocking conditions were very poor; with high turbidity and water velocity. The water is silty and the banks have flooded downstream of the road crossing. You can hear the substrate moving. According to residents this stream has been here 2-3 years, and is a blown section of Galcier Gulch Creek that now feeds into Club Creek. Downstream sampling confirmed that this flow feeds into Club Creek.

Photo #: Z-8-19, 22-Jul-97
Site #: Z66, Looking downstream at the channel, note the highly turbid water

Photo #: Z-8-20, 22-Jul-97
Site #: Z66, Looking upstream at the channel


Photo #: Z-8-21, 22-Jul-97
Site #: Z66, Looking across stream at the channel

## 5.3 Dahlie Creek (460-3738-332) (93 L 074, 93 L 075)

### 5.3.1 Sensitive Habitats and Barriers

Dahlie Creek is 8.2 km in length and is fed by 3 tributaries. No barriers to fish migration were identified by field crews however potential barriers associated with gradient and confinement exist in reach 2. Reach 1 has low gradient and is crossed by 8 roads. Reach 2 has steep gradient, which decreases steadily toward the headwaters in reach 3. Dahlie Creek was sampled once in reach 1.

### 5.3.2 Fish Summary Table and Stream Classification

No fish were caught in Dahlie Creek, which was electrofished in reach 1. Some suitable rearing habitat was observed in this sampling area however and the stream was classified as an S3 based on an average channel width of 4.40 meters. The tributaries to this stream are S4 sized creeks, with the upper reaches classified as non fish bearing S6 due to steep gradient.

**DFO/MoELP Stream Survey Form**

**Site Number:** Z49 **Reach No.: 1**

**Dahlie Cr.**

TRITON Environmental Consultants Ltd.

**Location:** Z49, Unit 14, at Ford Mercury on Frontage Road. **Stream (Gaz.):** Dahlie cr. **Watershed Code:** 460-3738-332-000-000-000-000-000-000-000-000-0

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Map #:** | 93 L 075 | **Reach Length (km):** | 3.5 | MA | **Date:** | 18-Jul-97 | **Time:** | 12:10 | **Agency:** | TEC | **Access:** | V2 | **Fish Card:** | N | **Field** ☒ **Historical** ☐ |
| **U.T.M. :** | 9 .61896 .607112 | **Length surveyed (m):** | 130.0 | GE | **Survey Crew:** | JL\KG\ \ \ \ \ \ \ | | | | | **Photos:** | Z-6-25,Z-7-1,2 | **Air Photos:** | | |

## Channel Characteristics

| | | | |
|---|---|---|---|
| C1 | Av. Chan. Width (m): | 4.4 | MS |
| C1 | Av. Wet. Width (m): | 2.5 | MS |
| | Av. Max Riffle Depth (cm): | 9 | MS |
| | Av. Max Pool Depth (cm): | 27 | MS |
| | Gradient (%): | 2.5 | CL |
| | Pool: 10 Riffle: 30 Run: 60 Other: 0 | | |
| | % Side Channel: | 0-10 | GE |
| | % Debris Area: | 5-15 | GE |
| | %Stable: | 40 | GE |

*Specific Data*

| | | | | | |
|---|---|---|---|---|---|
| 3.0 | 3.2 | 3.3 | 3.3 | 3.9 | 4.0 |
| 1.9 | 2.5 | 2.5 | 1.9 | 2.7 | 2.7 |
| 6 | 10 | 7 | 13 | | |
| 28 | 17 | 22 | 37 | 31 | |

## Cover

Cover Total % : 25 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 20 | 20 | 10 | 0 | 40 | 10 |

Crown Closure % : 30 Aspect : N

## Bed Material

| | | | |
|---|---|---|---|
| Fines | Clay, silt, sand (<2mm): | 10 | 10 |
| Gravels | Small (2-16mm): | 60 | 20 |
| | Large (16-64mm): | | 40 |
| Larges | Sm. cobble (64-128mm): | 30 | 15 |
| | Lge cobble (128-256mm): | | 10 |
| | Bldr cobble (>256mm): | | 5 |
| Bedrock | | 0 | 0 |

D90 (cm): 20 Compaction: Medium

## Discharge

| | | |
|---|---|---|
| Wetted Width (m) : | 2.8 | MS |
| Mean Depth (m) : | 0.1 | MS |
| Mean Velocity (m/s) : | 0.42 | F |
| Discharge (m3/s) : | 0.09 | F |

## Banks

Height (m): 0.1

% Unstable: 20

Fines ☒ Gravels ☐ Larges ☐ Bedrock ☐

Confinement: OC

Valley : Channel Ratio 5-10

Stage: M Flood Signs Ht(m): 5

Bars (%): 5 pH: 7.7 Braided: Y

Water Temp. (°C): 13.0 02 (ppm):

Turb. (cm): Cond. (µmhos): 100

## Reach Symbol

(Fish)

(RB) (DV)

4 C 2.5 | 1630

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

## Obstructions

## Fish Summary

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

## Comments

C1 S3. One additional measurement was taken for channel and wetted width, 4.7 and 3.4.

C2 LS=34%, RS=7%

C3 No fisheries sensitive zones noted.

C4 The electroshocking effort, using a Smithroot I5 A model, was 273 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 is crossed by both Highway 16 and Frontage Road, but is protected at both crossings. There is some cobble cover present, but overall the cover is not great. Bed material is variable throghout the surveyed area. Occasionally the creek is somewhat confined. The riparian cover has been removed at certain points along the path running alongside the creek.

Photo #: Z-6-25, 18-Jul-97
Site #: Z49, Looking downstream at the channel, note the dense alder cover

Photo #: Z-7-1, 18-Jul-97
Site #: Z49, Looking upstream at the channel

Photo #: Z-7-2, 18-Jul-97
Site #: Z49, Looking across stream at the channel

## 5.4 Elliot Creek (460-2429-477) (93 L 084)

### 5.4.1 Sensitive Habitats and Barriers

Elliot Creek is 8.68 km in length and is fed by 20 tributaries. A 4 meter cascade was identified in reach 4 of Elliot Creek during an aerial survey, and no sensitive habitats were found. A large gravel pit was noted on the right bank of Elliot Creek in reach 2. No sedimentation problems were noted but periodic monitoring of this pit is recommended. Reach 1 has low gradient, is unconfined and crossed by a railway line. Reach 2 has moderate gradient with occasional confinement at the top end of the reach. Reach 3 has moderate to steep gradient and confinement, which is consistent through reach 4. Reach 5 is characterized by extreme gradient. Elliot Creek was sampled in reaches 2 and 3 of the mainstem.

### 5.4.2 Fish Summary Tables and Stream Classification

The historical records indicate the presence of spawning coho at the mouth of the stream and Dolly Varden at the reach 1 and 2 break. This system was electrofished in reaches 2 and 3 and Dolly Varden were caught at both sample sites. Reach 2 was classified as an S3 based on the presence of Dolly Varden and an average channel width of 4.60 meters. Reach 3 was classified as an S2 in reach 2 based on the presence of Dolly Varden and an average channel width of 6.25 meters. Fish distribution is likely limited to the Reach 3 and 4 break, bad weather prevented access to this reach and future sampling is strongly recommended. The tributaries to this stream have been classified as non fish bearing due to extreme gradient.

**DFO/MoELP Stream Survey Form**

**Site Number:** W181 **Reach No.: 3**

**Elliot Cr.**

TRITON Environmental Consultants Ltd.

**Location:** W181, Unit 14 **Stream (Gaz.):** Elliot Creek **Watershed Code:** 460-2429-477-000-000-000-000-000-000-000-000-0

**Map #:** 93 L 084 **Reach Length (km):** 2.5 MA **Date:** 14-Aug-97 **Time:** 11:20 **Agency:** TEC **Access:** V2 **Fish Card:** N Field ☒ Historical ☐

**U.T.M. :** 9 .6084 .60825 **Length surveyed (m):** 200.0 GE **Survey Crew:** KA \DD\ \ \ \ \ \ \ **Photos:** W-H-5,6,7 **Air Photos:**

## Channel Characteristics

| | | |
|---|---|---|
| Av. Chan. Width (m): | 6.3 | MS |
| Av. Wet. Width (m): | 4.3 | MS |
| Av. Max Riffle Depth (cm): | 14 | MS |
| Av. Max Pool Depth (cm): | 41 | MS |
| Gradient (%): | 12.0 | CL |
| Pool: 20 Riffle: 30 Run: 20 Other: 30 | | |
| % Side Channel: | 0-10 | GE |
| % Debris Area: | 5-15 | GE |
| %Stable: | 15 | GE |

*Specific Data*

| | | | | | |
|---|---|---|---|---|---|
| 5.0 | 5.2 | 6.7 | 6.2 | 4.4 | 10.0 |
| 4.0 | 4.9 | 5.1 | 4.8 | 3.2 | 3.8 |
| 18 | 20 | 10 | 12 | 10 | 16 |
| 25 | 37 | 46 | 48 | 45 | 47 |

## Cover

Cover Total % : 25 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 25 | 15 | 35 | 0 | 10 | 15 |

Crown Closure % : 40 Aspect : E

## Bed Material

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

D90 (cm): 70 Compaction: Medium

## Discharge

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

## Banks

Height (m): 0.1

% Unstable: 20

Fines ☐ Gravels ☐ Larges ☒ Bedrock ☐

## Reach Symbol

(Fish)

DV

6 B 12.0 | 1351

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

Confinement: FC

Valley : Channel Ratio 2-5

Stage: M Flood Signs Ht(m): 1

Bars (%): 10 pH: 7.9 Braided: Y

Water Temp. (°C): 7.0 02 (ppm):

Turb. (cm): Cond. (µmhos): 110

## Obstructions

## Fish Summary

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

## Comments

C1 S2.

C2 LS=100%, RS=100%

C3 No fisheries sensitive zones noted.

C4 The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 500V, was 462 seconds over 200 meters.

C5 No additional bank texture information.

C6 DO was not measured at this site, the water was clear to bottom. The mean temperature on this day was 18.1 C.

C7 Step pool habitat as well as boulder cover was noted at this site. The water was quite turbulent at the time of sampling.

Photo #: W-H-5, 14-Aug-97
Site #: W181, Looking upstream at the channel, note the abundant LOD

Photo #: W-H-6, 14-Aug-97
Site #: W181, Looking downstream at the channel


Photo #: W-H-7, 14-Aug-97
Site #: W181, Measuring fish with the meterstick

**DFO/MoELP Stream Survey Form**

**Site Number:** Z63

**Reach No.: 2**

**Elliot Cr.**

TRITON Environmental Consultants Ltd.

**Location:** Z63, Unit 14 | **Stream (Gaz.):** Elliot Creek | **Watershed Code:** 460-2429-477-000-000-000-000-000-000-000-000-0

**Map #:** 93 L 084 | **Reach Length (km):** 1.5 MW | **Date:** 22-Jul-97 | **Time:** 15:51 | **Agency:** TEC | **Access:** V2 | **Fish Card:** N | **Field** ☒ **Historical** ☐

**U.T.M. :** 9 .60994 .608329 | **Length surveyed (m):** 100.0 GE | **Survey Crew:** KG\JP\ \ \ \ \ \ \ | **Photos:** Z-8-11,12,13,14 | **Air Photos:**

## Channel Characteristics

| | | | |
|---|---|---|---|
| C1 | Av. Chan. Width (m): | 4.6 | MS |
| C1 | Av. Wet. Width (m): | 3.5 | MS |
| | Av. Max Riffle Depth (cm): | 16 | MS |
| | Av. Max Pool Depth (cm): | 47 | MS |
| | Gradient (%): | 4.0 | CL |
| | Pool: 20 Riffle: 55 Run: 10 Other: 15 | | |
| | % Side Channel: | 10-40 | GE |
| | % Debris Area: | 5-15 | GE |
| | %Stable: | 10 | GE |

*Specific Data*

| | | | | | |
|---|---|---|---|---|---|
| 5.2 | 4.9 | 5.0 | 4.4 | 3.2 | 4.9 |
| 4.0 | 3.8 | 3.7 | 3.3 | 2.8 | 2.8 |
| 11 | 18 | 20 | | | |
| 47 | 40 | 53 | | | |

## Cover

Cover Total % : 40 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 15 | 5 | 55 | 0 | 10 | 15 |

Crown Closure % : 35 Aspect : NE

## Bed Material

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

D90 (cm): 28 Compaction: High

## Discharge

| | | |
|---|---|---|
| Wetted Width (m) : | 3.7 | MS |
| Mean Depth (m) : | 0.2 | MS |
| Mean Velocity (m/s) : | 0.54 | F |
| Discharge (m3/s) : | 0.30 | F |

## Banks

Height (m): 0.5

% Unstable: 0

Fines ☐ Gravels ☒ Larges ☐ Bedrock ☐

Confinement: UC

Valley : Channel Ratio 10+

Stage: M Flood Signs Ht(m): 0.7

Bars (%): 0 pH: 7.7 Braided: N

Water Temp. (°C): 9.0 02 (ppm):

Turb. (cm): Cond. (µmhos): 90

## Reach Symbol

(Fish)

DV

5 D 4.0 | 1450

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

## Obstructions

## Fish Summary

| C | Species | Number | Size Range (mm) | Life Phase | Use 1 | Use 2 | Use 3 | Method |
|---|---|---|---|---|---|---|---|---|
| | DV | 5 | 95-115 | J | R | | | EL |

## Comments

C1 S3. One additional measurement was taken for channel and wetted widths; 4.9 and 3.8.

C2 LS=29%, RS=5%

C3 No fisheries sensitive zones noted.

C4 The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 400V, was 124 seconds over 100 meters.

C5 No additional bank texture information.

C6 DO was not measured at this site, the water was clear to bottom. The mean air temperature on this day was 13.8 C.

C7 This is a fast moving creek with some nice boulder and pool cover.

Photo #: Z-8-11, 22-Jul-97
Site #: Z63, Measuring fish on the fishboard

Photo #: Z-8-12, 22-Jul-97
Site #: Z63, Measuring DV on the fishboard

Photo #: Z-8-13, 22-Jul-97
Site #: Z63, Looking upstream at the channel

Photo #: Z-8-14, 22-Jul-97
Site #: Z63, Looking downstream at the channel

## 5.5 Glacier Gulch Creek (460-2429-515) (93 L 084)

### 5.5.1 Sensitive Habitats and Barriers

Glacier Gulch Creek is 7.18 km in length and is fed by 21 tributaries. A pair of falls occurs where Glacier Gulch Creek flows over the lower end of the Hudson Bay Glacier. No sensitive habitats were noted on this system. Reach 1 of this stream has low gradient and is crossed by both a railway and a power line. Reach 2 has steadily increasing, moderate gradient and the TRIM sheet indicates potential cascades. Reach 3 is very steep and flows directly off of the glacier. A natural diversion into Club Creek occurs in reach 2. Glacier Gulch Creek was sampled at 2 locations, including reach 1 of the mainstem.

### 5.5.2 Fish Summary Tables and Stream Classification

The historical information indicates the presence of spawning coho in reach 1. Dolly Varden were caught by electrofishing in a tributary to reach 1 of Glacier Gulch Creek, however no fish were caught in the mainstem, which was electrofished in reach 1. Glacier Gulch was sampled in reach 1 of the mainstem and was classified as an S2 based on an average channel width of 15.75 meters and the presence of boulder and cobble rearing cover in the sampling area. The tributary was classified as an S3 based on the presence of Dolly Varden and an average channel width of 1.83 meters. The tributaries to this creek are typically S5 and S6 sized streams characterized by extreme gradient.

**DFO/MoELP Stream Survey Form**

**Site Number:** W178 **Reach No.: 1**

## Glacier Gulch Cr.

TRITON Environmental Consultants Ltd.

Location: W178, Unit 14 | Stream (Gaz.): Glacier Gulch Creek | Watershed Code: 460-2429-515-000-000-000-000-000-000-000-000-0

Map #: 93 L 084 | Reach Length (km): 4.5 MA | Date: 13-Aug-97 | Time: 15:05 | Agency: TEC | Access: V2 | Fish Card: N | Field ☒ Historical ☐

U.T.M. : 9 .6119 .60784 | Length surveyed (m): 100.0 GE | Survey Crew: KA \DD\ \ \ \ \ \ \ | Photos: W-F-24,25 | Air Photos:

### Channel Characteristics

| | | | |
|---|---|---|---|
| | Av. Chan. Width (m): | 15.8 | MS |
| | Av. Wet. Width (m): | 11.5 | MS |
| | Av. Max Riffle Depth (cm): | 35 | GE |
| N | Av. Max Pool Depth (cm): | 0 | GE |
| | Gradient (%): | 9.0 | CL |
| C7 | Pool: 0 Riffle: 90 Run: 0 Other: 10 | | |
| | % Side Channel: | 0 | GE |
| | % Debris Area: | 0-5 | GE |
| | %Stable: | 10 | GE |

**Specific Data**

| | | | | | |
|---|---|---|---|---|---|
| 16.0 | 22.0 | 10.0 | 15.0 | | |
| 12.0 | 18.0 | 8.0 | 8.0 | | |
| 40 | 27 | 31 | 30 | 45 | 35 |

### Cover

C7 Cover Total % : 10 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 0 | 10 | 80 | 0 | 10 | 0 |

Crown Closure % : 20 Aspect : N

### Bed Material

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

D90 (cm): 30 Compaction: Medium

### Discharge

| | | |
|---|---|---|
| Wetted Width (m) : | 10.0 | GE |
| Mean Depth (m) : | 0.4 | GE |
| Mean Velocity (m/s) : | 2.50 | F |
| Discharge (m3/s) : | 7.50 | F |

### Banks

Height (m): 0.2

% Unstable: 20

Fines ☐ Gravels ☒ Larges ☐ Bedrock ☐

Confinement: UC

Valley : Channel Ratio 10+

Stage: H Flood Signs Ht(m): 0.5

Bars (%): 10 pH: 5.8 Braided: Y

Water Temp. (°C): 9.0 02 (ppm):

Turb. (cm): Cond. (µmhos): 10

### Reach Symbol

(Fish)

(DV) (CT)

16 D 9.0 | 1450

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

### Obstructions

### Fish Summary

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

### Comments

C1: S2.

C2: LS=5%, RS=5%

C3: No fisheries sensitive zones noted.

C4: This site was not electrofished due to velocity and turbidity.

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 21.0 C.

C7: The large cobble and boulders at the margins would provide some cover. The road runs through the stream, but it is too hazardous to cross at this flow.

Photo #: W-G-24, 13-Aug-97
Site #: W178, Looking upstream at the channel

Photo #: W-G-25, 13-Aug-97
Site #: W178, Looking downstream at the channel

**DFO/MoELP Stream Survey Form**

**Site Number:** E306 **Reach No.: 1**

**Trib. to Glacier Gulch Cr.**

TRITON Environmental Consultants Ltd.

**Location:** E306, Unit 14, NW of Kathlyn Lake. **Stream (Gaz.):** Unnamed **Watershed Code:** 048-3200-000-000-000-000-000-000-000-000-000-

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Map #: | 93 L 084 | Reach Length (km): | 0.4 | MW | Date: | 14-Sep-97 | Time: | 13:00 | Agency: | TEC | Access: | V4 | Fish Card: N | Field ☒ | Historical ☐ |
| U.T.M. : | 9 .6117 .60785 | Length surveyed (m): | 100.0 | GE | Survey Crew: | SJ \LE \ \ \ \ \ \ \ | | | Photos: | E-29-14,15,16 | Air Photos: | | | | |

## Channel Characteristics

| | | |
|---|---|---|
| Av. Chan. Width (m): | 1.8 | MS |
| Av. Wet. Width (m): | 1.1 | MS |
| Av. Max Riffle Depth (cm): | 4 | MS |
| Av. Max Pool Depth (cm): | 27 | MS |
| Gradient (%): | 3.0 | CL |
| Pool: 15 Riffle: 25 Run: 60 Other: | 0 | |
| % Side Channel: | >40 | GE |
| % Debris Area: | >15 | GE |
| %Stable: | 0 | GE |

*Specific Data*

| | | | | | |
|---|---|---|---|---|---|
| 1.6 | 2.0 | 2.0 | 1.3 | 2.0 | 2.1 |
| 0.8 | 0.6 | 1.4 | 1.0 | 1.6 | 1.5 |
| 3 | 4 | 3 | 5 | 6 | |
| 17 | 30 | 35 | 32 | 23 | |

## Bed Material

| | | | |
|---|---|---|---|
| Fines | Clay, silt, sand (<2mm): | 30 | 30 |
| Gravels | Small (2-16mm): | 60 | 30 |
| | Large (16-64mm): | | 30 |
| Larges | Sm. cobble (64-128mm): | 10 | 5 |
| | Lge cobble (128-256mm): | | 5 |
| | Blder cobble (>256mm): | | 0 |
| Bedrock | | 0 | 0 |

D90 (cm): 7 Compaction: Medium

## Cover

Cover Total % : 15 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 40 | 10 | 0 | 0 | 25 | 25 |

Crown Closure % : 40 Aspect : NE

## Discharge

| | | |
|---|---|---|
| Wetted Width (m) : | 0.6 | MS |
| Mean Depth (m) : | 0.1 | MS |
| Mean Velocity (m/s) : | 0.36 | F |
| Discharge (m3/s) : | 0.02 | F |

## Banks

Height (m): 0.1

% Unstable: 30

Fines ☒ Gravels ☐ Larges ☐ Bedrock ☐

Confinement: UC

Valley : Channel Ratio 10+

Stage: L Flood Signs Ht(m): 0.4

Bars (%): 30 pH: 7.3 Braided: Y

Water Temp. (°C): 9.0 02 (ppm):

Turb. (cm): Cond. (µmhos): 40

## Reach Symbol

(Fish)

DV

2 D 3.0 | 3610

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

## Obstructions

## Fish Summary

| C | Species | Number | Size Range (mm) | Life Phase | Use 1 | Use 2 | Use 3 | Method |
|---|---|---|---|---|---|---|---|---|
| | DV | 1 | 180 | A | | | | EL |

## Comments

C1: S3

C2: LS = 10%, RS = 5%

C3: No fisheries sensitive zones noted.

C4: The electroshocking effort, using a Smithroot 12 B POW model, set at I-5-600V, was 400 seconds over 125 meters.

C5: Fines and gravles make up the bank texture at this site.

C6: DO was not measured, the water was clear to the bottom. The air temperature at this site was 13.C.

C7: The road crossing has no culvert at this site. LOD scour pools, plunge pools, LOD and cutbanks provide rearing cover at this site. The number of side channels and isolated pools in the sampling area illustrates that the channel moves around during high flow.


Photo #: E-29-14, 14-Sep-97
Site #: E306, Looking upstream at the channel


Photo #: E-29-15, 14-Sep-97
Site #: E306, Looking downstream at the channel

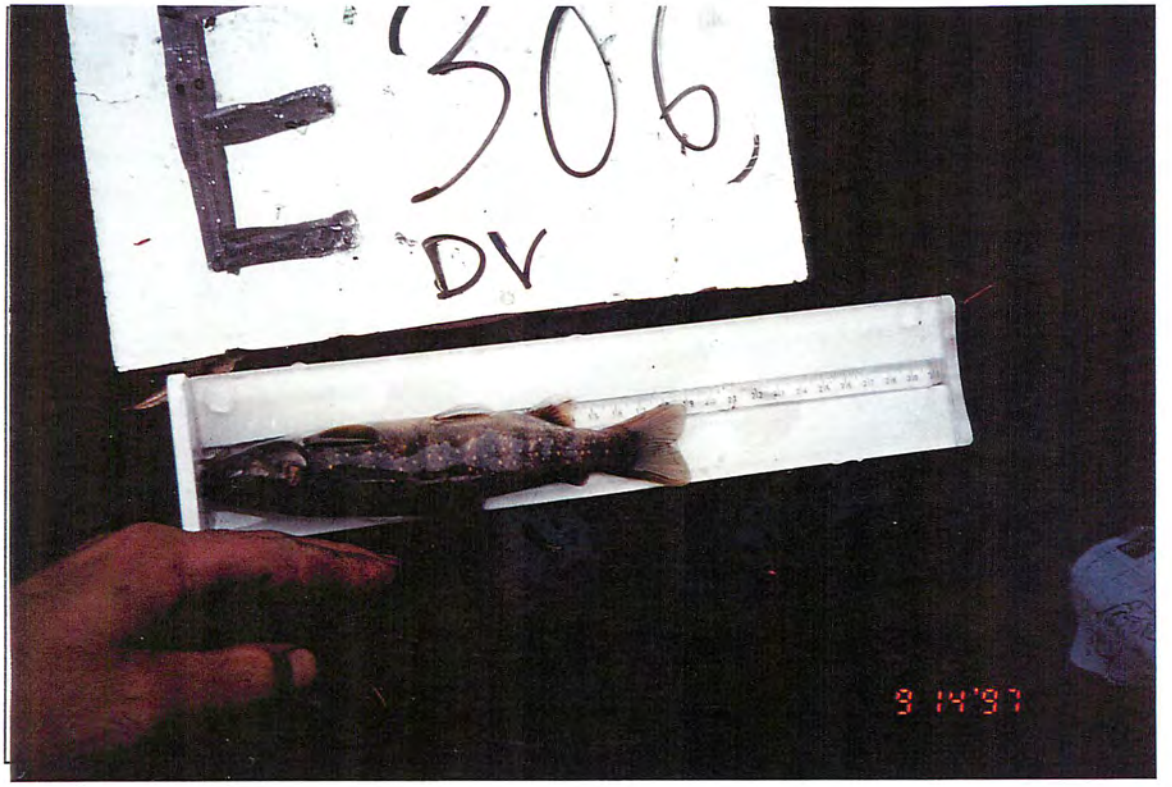


Photo #: E-29-16, 14-Sep-97
Site #: E306, Measuring Dolly Varden on the fishboard

## 5.6 Glass Creek (460 2429 515 096) (93 L 084)

### 5.6.1 Sensitive Habitats and Barriers

Glass Creek is 4.9 km in length and is fed by 4 km. No barriers were identified by field crews working in this area. Reach 1 has low gradient and is unconfined with the exception of one small confined area in the headwaters. Wetlands were noted in the headwaters on the TRIM sheet, and were classified as fisheries sensitive zones. The tributaries are crossed by roads, including highway 16. The Glass Creek system was sampled at 2 locations, including reach 1 of the mainstem.

### 5.6.2 Fish Summary Tables and Stream Classification

The historical information indicates the presence of : sockeye, coho, Dolly Varden, cutthroat trout, mountain whitefish, largescale sucker and sculpin in Toboggan Lake. No fish were caught in Glass Creek which was electroshocked in reach 1 or in the tributary, also electroshocked in reach 1. The mainstem was classified as an S3 based on an average channel width of 3.15 meters and the presence of deep run and instream vegetation cover in the sampling area. The tributary was classified as an S3 based on an average channel width of 1.85 meters and the presence of fish habitat in the sampling area. Glass Creek flows alongside highway 16 and is located in an agriculturally developed area. Additional water quality sampling is recommended.

**DFO/MoELP Stream Survey Form** **Site Number:** Z61 **Reach No.: 1**

# Glass Creek

TRITON Environmental Consultants Ltd.

**Location:** Z61, Unit 14, 555m SE of Toboggan Lake. **Stream (Gaz.):** Glass Creek **Watershed Code:** 460-2429-515-096-000-000-000-000-000-000-000-0

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Map #: | 93 L 084 | Reach Length (km): | 3.3 | MA | Date: | 22-Jul-97 | Time: | 14:24 | Agency: | TEC | Access: | H | Fish Card: | N | Field ☒ Historical ☐ |
| U.T.M. : | 9 .613229.6081353 | Length surveyed (m): | 100.0 | GE | Survey Crew: | JP \KG\ \ \ \ \ \ \ | | | Photos: | Z-8-3,4 | Air Photos: | | | | |

## Channel Characteristics

| | | |
|---|---|---|
| Av. Chan. Width (m): | 3.1 | MS |
| Av. Wet. Width (m): | 2.9 | MS |
| Av. Max Riffle Depth (cm): | 0 | GE |
| Av. Max Pool Depth (cm): | 0 | GE |
| Gradient (%): | 0.5 | CL |
| Pool: 0 Riffle: 0 Run: 100 Other: 0 | | |
| % Side Channel: | 0 | GE |
| % Debris Area: | 0 | GE |
| %Stable: | 0 | GE |

*Specific Data*

| | | | | | |
|---|---|---|---|---|---|
| 3.0 | 3.6 | 3.2 | 3.2 | 3.1 | 2.8 |
| 2.5 | 3.2 | 3.0 | 3.0 | 2.9 | 2.8 |

## Cover

Cover Total % : 40 GE

| Pool | LOD | Bldr | In Veg | Q Veg | Ctbnk |
|---|---|---|---|---|---|
| 0 | 0 | 0 | 50 | 50 | 0 |

Crown Closure % : 40 Aspect : NW

## Bed Material

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

D90 (cm): 0 Compaction: Low

## Discharge

| | | |
|---|---|---|
| Wetted Width (m) : | 1.8 | MS |
| Mean Depth (m) : | 0.4 | MS |
| Mean Velocity (m/s) : | 0.22 | F |
| Discharge (m3/s) : | 0.12 | |

## Banks

Height (m): 0.2

% Unstable: 0

Fines ☒ Gravels ☐ Larges ☐ Bedrock ☐

## Reach Symbol

(Fish)

(DV)

3 D 0.5 | F

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

Confinement: UC

Valley : Channel Ratio 10+

Stage: H Flood Signs Ht(m): 0.4

Bars (%): 0 pH: 7.3 Braided: N

Water Temp. (°C): 11.0 02 (ppm):

Turb. (cm): 15 Cond. (µmhos): 100

## Obstructions

## Fish Summary

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

## Comments

C1: S3.

C2: LS=0%, RS=0%

C3: No fisheries sensitive zones noted.

C4: The electroshocking effort, using a Smithroot 12 B POW set at I, 5, was 113 seconds over 100 meters.

C5: No additional bank texture information.

C6: DO was not measured at this site, the water was turbid. The mean air temperature on this day was 13.8 C.

C7: This creek has a deep channel with turbid water. There is potential DV and RB cover in the form of deep runs and instream vegetation.


Photo #: Z-8-3, 22-Jul-97
Site #: Z61, Looking downstream at the channel

Photo #: Z-8-4, 22-Jul-97
Site #: Z61, Looking upstream at the channel

**DFO/MoELP Stream Survey Form**

**Site Number:** E313 **Reach No.: 1**

**Trib. to Glass Cr.**

TRITON Environmental Consultants Ltd.

**Location:** E313, Unit 14 **Stream (Gaz.):** Unnamed **Watershed Code:** 048-5800-000-000-000-000-000-000-000-000-000-

**Map #:** 93 L 084 **Reach Length (km):** 2.4 MW **Date:** 15-Sep-97 **Time:** 15:30 **Agency:** TEC **Access:** V2 **Fish Card:** N **Field** ☒ **Historical** ☐

**U.T.M. :** 9 .6141 .60804 **Length surveyed (m):** 100.0 GE **Survey Crew:** SJ\LE\ \ \ \ \ \ \ **Photos:** E-30-5,6 **Air Photos:**

## Channel Characteristics

| | | |
|---|---|---|
| Av. Chan. Width (m): | 1.9 | MS |
| Av. Wet. Width (m): | 0.9 | MS |
| Av. Max Riffle Depth (cm): | 2 | MS |
| Av. Max Pool Depth (cm): | 11 | MS |
| Gradient (%): | 1.0 | CL |
| Pool: 30 Riffle: 10 Run: 60 Other: | 0 | |
| % Side Channel: | 0-10 | GE |
| % Debris Area: | >15 | GE |
| %Stable: | 0 | GE |

**Specific Data**

| | | | | | |
|---|---|---|---|---|---|
| 1.9 | 1.7 | 1.8 | 1.9 | 2.1 | 1.7 |
| 0.9 | 1.6 | 1.1 | 0.5 | 0.7 | 0.6 |
| 1 | 2 | 3 | 2 | 1 | |
| 10 | 12 | 14 | 9 | 11 | |

## Cover

Cover Total % : 10 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 5 | 0 | 5 | 0 | 90 | 0 |

Crown Closure % : 20 Aspect : NW

## Bed Material

| | | | |
|---|---|---|---|
| Fines | Clay, silt, sand (<2mm): | 40 | 40 |
| Gravels | Small (2-16mm): | 40 | 20 |
| | Large (16-64mm): | | 20 |
| Larges | Sm. cobble (64-128mm): | 20 | 10 |
| | Lge cobble (128-256mm): | | 5 |
| | Bldr cobble (>256mm): | | 5 |
| Bedrock | | 0 | 0 |

D90 (cm): 15 Compaction: Medium

## Discharge

| | | |
|---|---|---|
| Wetted Width (m) : | 0.3 | MS |
| Mean Depth (m) : | 0.1 | MS |
| Mean Velocity (m/s) : | 0.19 | F |
| Discharge (m3/s) : | 0.00 | F |

## Banks

Height (m): 0.1

% Unstable: 20

Fines ☐ Gravels ☒ Larges ☐ Bedrock ☐

Confinement: UC

Valley : Channel Ratio 10+

Stage: L Flood Signs Ht(m): 0.2

Bars (%): 40 pH: 7.0 Braided: N

Water Temp. (°C): 9.0 02 (ppm):

Turb. (cm): Cond. (µmhos): 110

## Reach Symbol

(Fish)

(DV)

2 D 1.0 | 4420

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

## Obstructions

## Fish Summary

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

## Comments

C1 S3

C2 LS = 8%, RS = 7%

C3 No fisheries sensitive zones noted.

C4 The electroshocking effort, using a Smithroot 12 B POW model, set at I-5-500V, was 212 seconds over 100 meters.

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. The air temperature at this site was 15.C.

C7 This reach has been impacted by livestock activity, trampled banks were noted by the crew. All riparian cover has been removed in the field that this creek runs through. Little rearing and limited potential spawning habitat were observed in the sampling area.


Photo #: E-30-5, 15-Sep-97
Site #: E313, Looking upstream at the channel

Photo #: E-30-6, 15-Sep-97
Site #: E313, Looking downstream at the channel

## 5.7 Kathyln Creek (460-3454-267) (93 L 084, 93 L 085)

### 5.7.1 Sensitive Habitats and Barriers

Kathlyn Creek is 12.24 km in length and is fed by 12 tributaries. Reach 1 flows between Kathlyn Lake and the Bulkley River, through a low gradient farming and residential area. This creek is crossed by 8 roads, including highway 16. Reach 2 is Kathlyn Lake. Reach 3 has low to moderate gradient and flows through pasture and forest. Reach 4 undergoes an increase in gradient which peaks in extreme gradient in reach 5. No sensitive habitats were identified in this system, however, Kathlyn Creek and Lake are located in a heavily developed urban area. Human garbage was noted on the stream banks of Kathlyn Creek at site Z48. The Kathlyn Creek system was sampled in 4 locations, including reaches 1 and 3 of the mainstem.

### 5.7.2 Fish Summary Tables and Stream Classification

The historical information indicates the presence of pink, coho and steelhead at the mouth of Kathlyn Creek, and coho, pink, rainbow trout, mountain whitefish, steelhead, red sided shiner, northern squawfish, largescale sucker, prickly sculpin, long nose dace, cutthroat trout, lamprey and pink salmon on the upstream side of the highway 16 crossing, at the confluence with Chicken Lake Creek. Kathlyn Lake supports red sided shiner, steel head, northern squawfish, cutthroat trout, rainbow trout, large scale sucker, prickly sculpin, peamouth chub and whitesucker. Four sites on the Kathlyn Lake system were electrofished and fish were caught at 3. An unidentified salmon species was observed in reach 1, cutthroat trout were captured in reach 3 and burbot, cutthroat trout and a sculpin species were captured in a tributary to reach 3. Reaches 1 and 3 have been classified as S2 based on the presence of fish at the sample sites and average channel widths of 5.80 meters and 5.25 meters respectively. Some deep run and overstream vegetation cover was noted in reach 1. The remaining reaches were unsampled, however, reach 4 is likely an S3 and reach 5 is most likely an S5. The tributaries in the lower reaches would be classified as S3 and S4 and the tributaries in the upper reaches are steep and would be classified as S6.

**DFO/MoELP Stream Survey Form**

**Site Number:** W172 **Reach No.: 3**

**Kathlyn Cr.**

TRITON Environmental Consultants Ltd.

**Location:** W172, Unit 14; 1.4km down Nielson Rd, 700m north of CNR **Stream (Gaz.):** Kathlyn Creek **Watershed Code:** 460-3454-267-000-000-000-000-000-000-000-000-0

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Map #: | 93 L 084 | Reach Length (km): | 2.4 | MA | Date: | 12-Aug-97 | Time: | 8:20 | Agency: | TEC | Access: | V2 | Fish Card: | N | Field ☒ Historical ☐ |
| U.T.M. : | 9 .6141 .60756 | Length surveyed (m): | 125.0 | GE | Survey Crew: | KA \DD \ \ \ \ \ \ \ | | | | | Photos: | W-F-15 ,16,17,18 | Air Photos: | | |

## Channel Characteristics

| | | |
|---|---|---|
| Av. Chan. Width (m): | 5.3 | MS |
| Av. Wet. Width (m): | 2.7 | MS |
| Av. Max Riffle Depth (cm): | 10 | MS |
| Av. Max Pool Depth (cm): | 32 | MS |
| Gradient (%): | 8.0 | CL |
| Pool: 25 Riffle: 40 Run: 35 Other: | 0 | |
| % Side Channel: | 0-10 | GE |
| % Debris Area: | 5-15 | GE |
| %Stable: | 30 | GE |

*Specific Data*

| | | | | | |
|---|---|---|---|---|---|
| 6.1 | 4.6 | 6.0 | 5.6 | 3.7 | 5.5 |
| 3.2 | 2.6 | 2.0 | 2.4 | 3.1 | 2.8 |
| 8 | 11 | 12 | 7 | 11 | 12 |
| 43 | 18 | 27 | 43 | 30 | 29 |

## Cover

Cover Total % : 35 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 30 | 15 | 30 | 0 | 10 | 15 |

Crown Closure % : 30 Aspect : NE

## Bed Material

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

D90 (cm): 41 Compaction: Medium

## Discharge

| | | |
|---|---|---|
| Wetted Width (m) : | 1.4 | MS |
| Mean Depth (m) : | 0.2 | MS |
| Mean Velocity (m/s) : | 0.50 | F |
| Discharge (m3/s) : | 0.11 | F |

## Banks

Height (m): 0.3

% Unstable: 60

Fines ☒ Gravels ☐ Larges ☐ Bedrock ☐

## Reach Symbol

(Fish)

CT

5 C 8.0 | 1450

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

Confinement: OC

Valley : Channel Ratio 5-10

Stage: M Flood Signs Ht(m): 13

Bars (%): 15 pH: 6.8 Braided: N

Water Temp. (°C): 8.0 02 (ppm):

Turb. (cm): Cond. (µmhos): 20

## Obstructions

## Fish Summary

| C | Species | Number | Size Range (mm) | Life Phase | Use 1 | Use 2 | Use 3 | Method |
|---|---|---|---|---|---|---|---|---|
| | CT | 27 | 65-205 | NA | | | | EL |

## Comments

C1 S2.

C2 LS=20%, RS=20%

C3 No fisheries sensitive zones noted.

C4 The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 500V, was 317 seconds over 100 meters.

C5 No additional bank texture information.

C6 DO was not measured at this site, the water was clear to bottom but grey in colour. The air temperature at this site was 14.0 C.

C7 Pools and boulders/cobble provide cover for fish at this site. Garbage was noted in the stream.

Photo #: W-F-15, 13-Aug-97
Site #: W172, Looking upstream at the channel

Photo #: W-F-16, 13-Aug-97
Site #: W172, Looking downstream at the channel, note the LOD cover

Photo #: W-F-17, 13-Aug-97
Site #: W172, Measuring cutthroat trout with the meterstick

Photo #: W-F-18, 13-Aug-97
Site #: W172, Measuring cutthroat trout with the meterstick

**DFO/MoELP Stream Survey Form**

**Site Number:** Z48

**Reach No.: 1**

**Kathlyn Cr.**

TRITON Environmental Consultants Ltd.

**Location:** Z48, Unit 14, 400m north of Smithers golf course | **Stream (Gaz.):** Kathlyn Cr. | **Watershed Code:** 460-3454-267-000-000-000-000-000-000-000-000-0

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Map #: | 93 L 085 | Reach Length (km): | 4.8 | MW | Date: | 18-Jul-97 | Time: | 11:21 | Agency: | TEC | Access: | V2 | Fish Card: | N | Field ☒ Historical ☐ |
| U.T.M.: | 9 .66162 .607408 | Length surveyed (m): | 80.0 | GE | Survey Crew: | JL\KG\ \ \ \ \ \ \ | | | | | | | Photos: | Z-6-23,24 | Air Photos: |

## Channel Characteristics

| | | | |
|---|---|---|---|
| C1 | Av. Chan. Width (m): | 5.8 | MS |
| C1 | Av. Wet. Width (m): | 5.3 | MS |
| | Av. Max Riffle Depth (cm): | 0 | MS |
| | Av. Max Pool Depth (cm): | 54 | MS |
| | Gradient (%): | 0.5 | CL |
| | Pool: 10 Riffle: 0 Run: 90 Other: 0 | | |
| | % Side Channel: | 0 | GE |
| | % Debris Area: | >15 | GE |
| | %Stable: | 40 | GE |

*Specific Data*

| | | | | | |
|---|---|---|---|---|---|
| 4.9 | 5.4 | 5.4 | 5.4 | 8.1 | 5.9 |
| 5.3 | 4.1 | 5.3 | 5.3 | 6.0 | 5.4 |
| | | | | | |
| 41 | 50 | 54 | 72 | | |

## Cover

Cover Total %: 40 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 10 | 50 | 0 | 5 | 25 | 10 |

Crown Closure %: 5 Aspect: S

## Bed Material

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

D90 (cm): 2 Compaction: Low

## Discharge

| | | |
|---|---|---|
| Wetted Width (m): | 5.2 | MS |
| Mean Depth (m): | 0.8 | MS |
| Mean Velocity (m/s): | 0.41 | F |
| Discharge (m3/s): | 1.28 | F |

## Banks

Height (m): 26.0

% Unstable: 0

Fines ☒ Gravels ☐ Larges ☐ Bedrock ☐

Confinement: UC

Valley : Channel Ratio: 10+

Stage: H Flood Signs Ht(m): 0.7

Bars (%): 0 pH: 7.4 Braided: N

Water Temp. (°C): 11.0 02 (ppm):

Turb. (cm): Cond. (µmhos): 40

## Reach Symbol

(Fish)

PK ST

6 D 0.5 | 5500

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

## Obstructions

## Fish Summary

| C | Species | Number | Size Range (mm) | Life Phase | Use 1 | Use 2 | Use 3 | Method |
|---|---|---|---|---|---|---|---|---|
| | SA | 1 | 80 | J | R | | | VO |

## Comments

C1 S2. One additional measurement was taken for both the channel and wetted widths, 5.3 and 4.9.

C2 LS=4%, RS=7%

C3 No fisheries sensitive zones noted.

C4 There was no electroshocking carried out at this site as the historical information indicates the presence of PK, CO, RB, MW, ST, RSC, NSC, LSU, CAS, LNC, CT and L in this reach. Visual observations of rearing fish were made by the sampling crew.

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 2. C.

C7 This is an urban stream with some garbage. It has good flow with a gravel bottom. Private properties are adjacent to it and it runs into Kathlyn Lake.


Photo #: Z-6-23, 18-Jul-97
Site #: Z48, Looking downstream at the channel

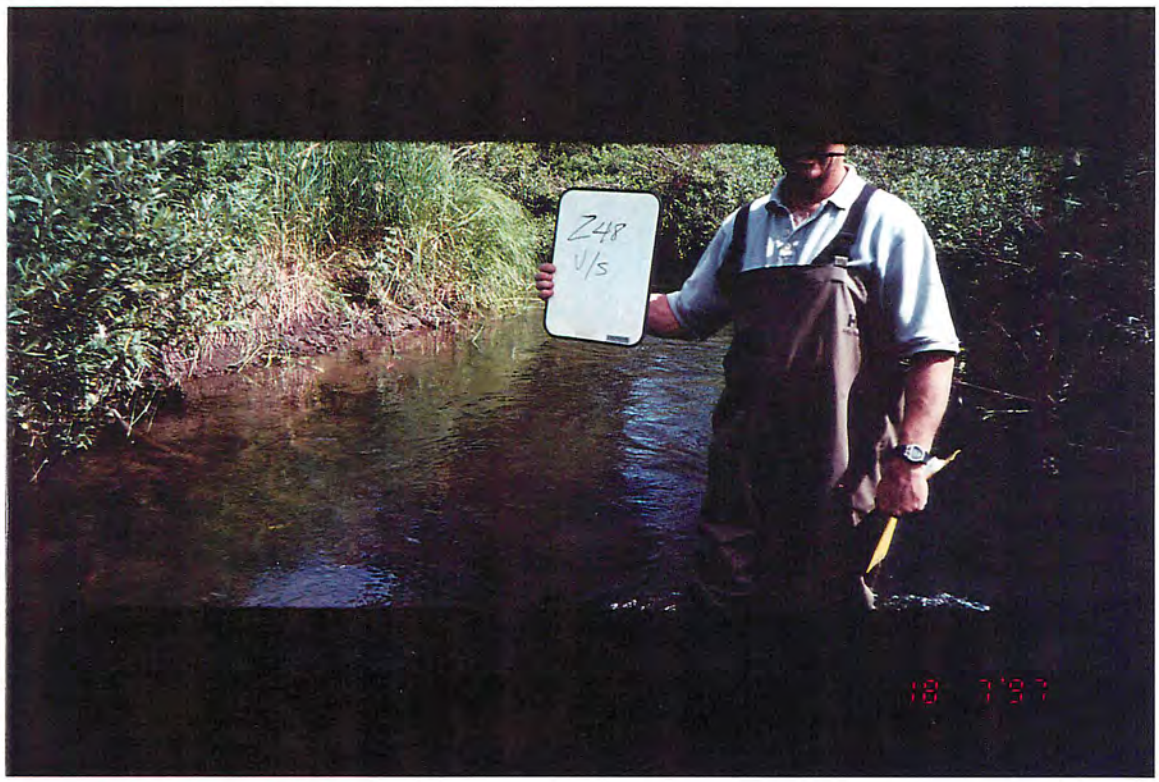


Photo #: Z-6-24, 18-Jul-97
Site #: Z48, Looking upstream at the channel

**DFO/MoELP Stream Survey Form**

**Site Number:** W175 **Reach No.: 1**

**Trib to Kathlyn Cr.**

TRITON Environmental Consultants Ltd.

**Location:** W175, Unit 14 **Stream (Gaz.):** Unnamed **Watershed Code:** 048-6400-000-000-000-000-000-000-000-000-000-

**Map #:** 93 L 084 **Reach Length (km):** 1.2 MA **Date:** 13-Aug-97 **Time:** 11:15 **Agency:** TEC **Access:** V2 **Fish Card:** N Field ☒ Historical ☐

**U.T.M. :** 9 .6144 .60760 **Length surveyed (m):** 125.0 GE **Survey Crew:** KA \DD\ \ \ \ \ \ \ **Photos:** W-G-1,1A,4,5,7,8,9,10 **Air Photos:**

## Channel Characteristics

| | | |
|---|---|---|
| Av. Chan. Width (m): | 2.7 | MS |
| Av. Wet. Width (m): | 2.1 | MS |
| Av. Max Riffle Depth (cm): | 9 | MS |
| Av. Max Pool Depth (cm): | 34 | MS |
| Gradient (%): | 4.0 | CL |
| Pool: 25 Riffle: 15 Run: 60 Other: 0 | | |
| % Side Channel: | 0 | GE |
| % Debris Area: | 0-5 | GE |
| %Stable: | 40 | GE |

*Specific Data*

| | | | | | |
|---|---|---|---|---|---|
| 2.9 | 2.5 | 3.1 | 3.1 | 2.2 | 2.3 |
| 2.3 | 2.4 | 2.0 | 2.7 | 2.0 | 1.5 |
| 9 | 7 | 13 | 17 | 5 | 4 |
| 41 | 34 | 32 | 33 | 28 | 39 |

## Bed Material

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

D90 (cm): 13 Compaction: High

## Cover

Cover Total % : 40 GE

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

Crown Closure % : 80 Aspect : SE

## Discharge

| | | |
|---|---|---|
| Wetted Width (m) : | 2.0 | MS |
| Mean Depth (m) : | 0.1 | MS |
| Mean Velocity (m/s) : | 0.64 | F |
| Discharge (m3/s) : | 0.13 | F |

## Banks

Height (m): 0.1

% Unstable: 25

Fines ☒ Gravels ☐ Larges ☐ Bedrock ☐

Confinement: UC

Valley : Channel Ratio 10+

Stage: M Flood Signs Ht(m): 0.4

Bars (%): 0 pH: 6.9 Braided: N

Water Temp. (°C): 9.0 02 (ppm):

Turb. (cm): 32 Cond. (µmhos): 20

## Reach Symbol

(Fish)

CT BB L CC

3 D 4.0 | 2440

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

## Obstructions

## Fish Summary

| C | Species | Number | Size Range (mm) | Life Phase | Use 1 | Use 2 | Use 3 | Method |
|---|---|---|---|---|---|---|---|---|
| | CT | 48 | 70-180 | NA | | | | EL |
| | BB | 1 | 180 | NA | | | | EL |
| | C | 1 | 95 | NA | | | | EL |

## Comments

C1: S3.

C2: LS=10%, RS=5%

C3: No fisheries sensitive zones noted.

C4: The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 500V, was 167 seconds over 100 meters.

C5: No additional bank texture information.

C6: DO was not measured at this site. The air temperature at this site was 16.0 C.

C7: The cutbanks here are 0.4m or more deep and are associated with deep runs. Cobble and pools provide cover at this site. The landowner has diverted the flow creating deep pool cover.

Photo #: W-G-1, 13-Aug-97
Site #: W175, Looking downstream at the channel

Photo #: W-G-4, 13-Aug-97
Site #: W175, Measuring fish with the meterstick

Photo #: W-G-5, 13-Aug-97
Site #: W175, Measuring fish with the meterstick

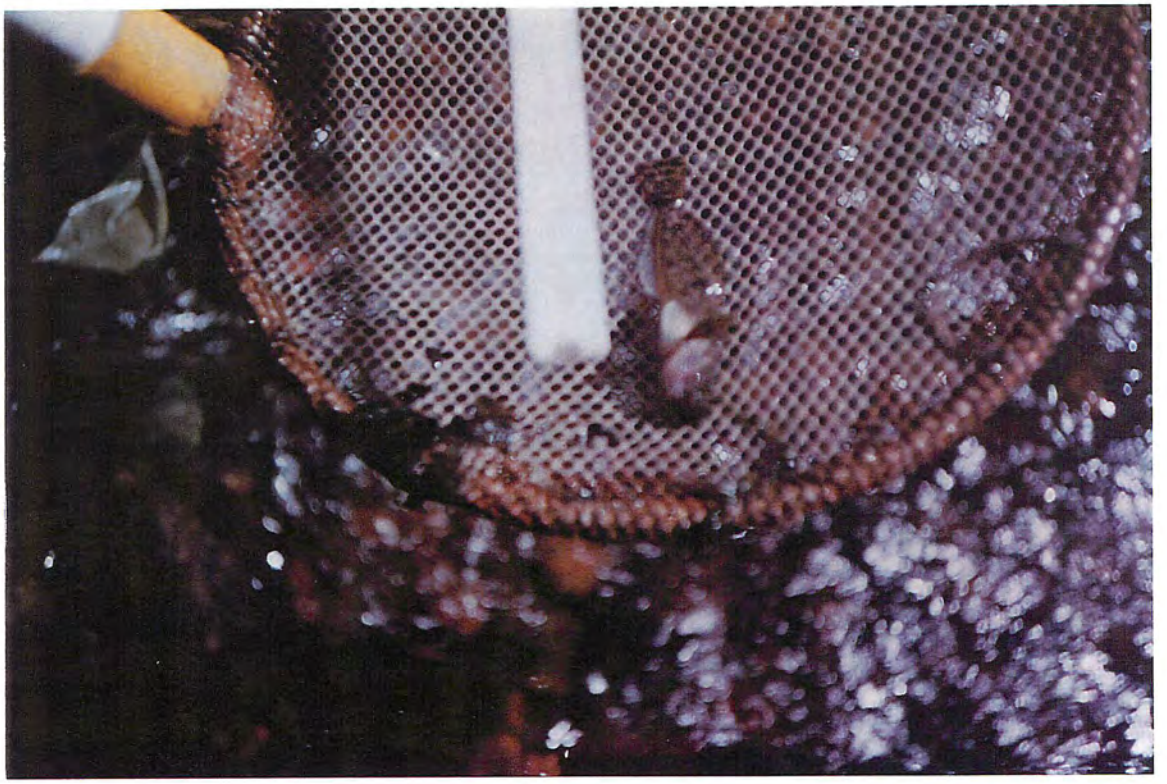

Photo #: W-G-8, 13-Aug-97
Site #: W175, Measuring fish with the meterstick

Photo #: W-G-9, 13-Aug-97
Site #: W175, Looking at a pond diversion

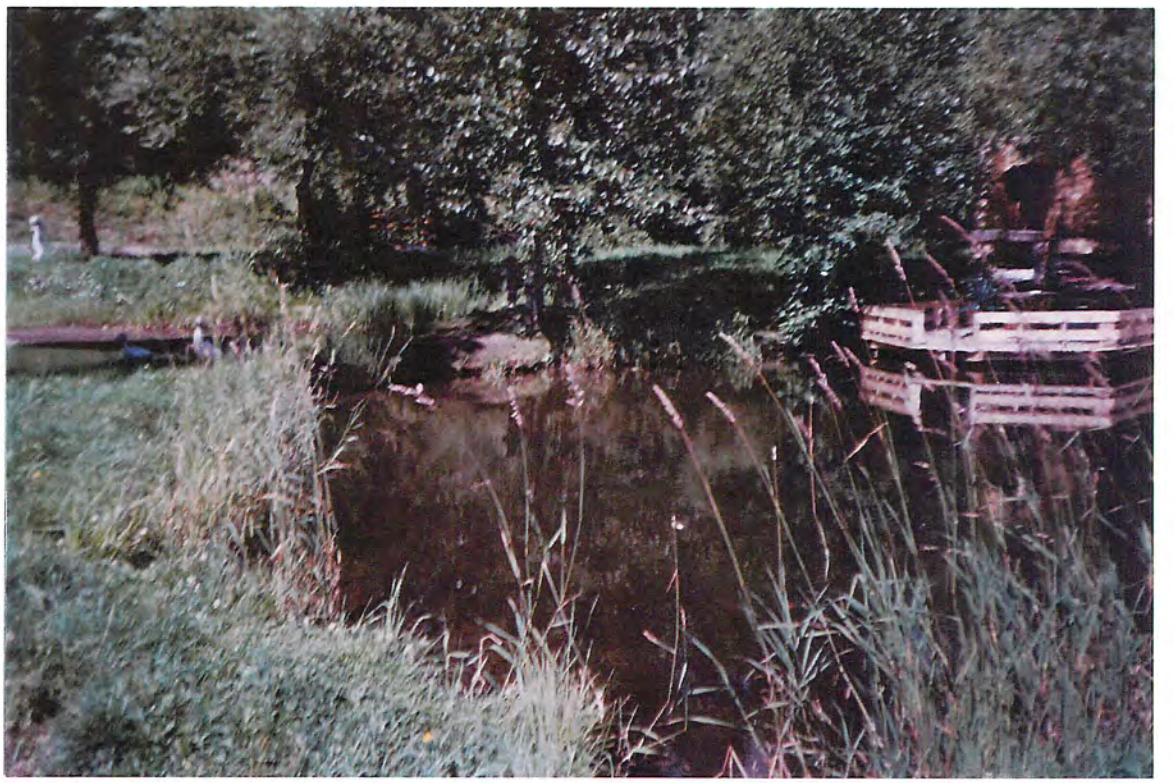

Photo #: W-G-10, 13-Aug-97
Site #: W175, Looking at a pond diversion

**DFO/MoELP Stream Survey Form**

**Site Number:** W180 **Reach No.:** 2

**Trib to Kathlyn Cr.**

TRITON Environmental Consultants Ltd.

**Location:** W180, Unit 14; 2km west of Kathlyn Lk. **Stream (Gaz.):** Unnamed **Watershed Code:** 048-6400-000-000-000-000-000-000-000-000-000-

**Map #:** 93 L 084 **U.T.M.:** 9 .6123 .60762 **Reach Length (km):** 2.1 MA **Length surveyed (m):** 100.0 GE **Date:** 14-Aug-97 **Time:** 9:00 **Agency:** TEC **Survey Crew:** KA \DD\ \ \ \ \ \ \ **Access:** V2 **Photos:** W-H-3,4 **Fish Card:** N Field ☒ Historical ☐ **Air Photos:**

## Channel Characteristics

| | | |
|---|---|---|
| Av. Chan. Width (m): | 1.8 | MS |
| Av. Wet. Width (m): | 1.8 | MS |
| Av. Max Riffle Depth (cm): | 9 | MS |
| Av. Max Pool Depth (cm): | 34 | MS |
| Gradient (%): | 25.0 | CL |
| Pool: 20 Riffle: 30 Run: 20 Other: | 30 | |
| % Side Channel: | 0-10 | GE |
| % Debris Area: | 5-15 | GE |
| %Stable: | 40 | GE |

**Specific Data**

| | | | | | |
|---|---|---|---|---|---|
| 1.6 | 1.4 | 1.9 | 1.8 | 1.9 | 2.0 |
| 1.4 | 1.6 | 2.0 | 1.7 | 1.9 | 2.1 |
| 11 | 12 | 4 | 7 | 9 | |
| 35 | 40 | 41 | 34 | 25 | 29 |

## Cover

Cover Total % : 30 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 25 | 30 | 0 | 0 | 15 | 30 |

Crown Closure % : 60 Aspect : NE

## Bed Material

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

D90 (cm): 26 Compaction: Medium

## Discharge

| | | |
|---|---|---|
| Wetted Width (m) : | 1.3 | MS |
| Mean Depth (m) : | 0.2 | MS |
| Mean Velocity (m/s) : | 0.36 | F |
| Discharge (m3/s) : | 0.07 | F |

## Banks

Height (m): 0.1

% Unstable: 25

Fines ☒ Gravels ☐ Larges ☐ Bedrock ☐

Confinement: OC

Valley : Channel Ratio 5-10

Stage: H Flood Signs Ht(m): 0.3

Bars (%): 0 pH: 7.4 Braided: Y

Water Temp. (°C): 5.0 02 (ppm):

Turb. (cm): Cond. (µmhos): 20

## Reach Symbol

(Fish)

(DV)

2 C 25.0 | 1630

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

## Obstructions

## Fish Summary

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

## Comments

C1: S3.

C2: LS=65%, RS=55%

C3: No fisheries sensitive zones noted.

C4: The electroshocking effort, using a Smithroot 12 B POW model set at 800V, was 319 seconds was 125 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 18.1 C.

C7: this site has steep gradient but also has deep pool and cutbank cover.

Photo #: W-H-3, 14-Aug-97
Site #: W180, Looking upstream at the channel

Photo #: W-H-4, 14-Aug-97
Site #: W180, Looking downstream at the channel

## 5.8 Owens Creek (460-2429-161) (93 L 094, 93 L 084)

### 5.81 Sensitive Habitats and Barriers

Owens Creek is 10.0 km in length and is fed by 20 tributaries. A 10 meter falls and a 10 meter cascade occur in reach 2 of Owens Creek. No sampling was carried out in reach 2 as access was limited by bad weather. No sensitive habitats were identified in this stream. Reach 1 of the mainstem has low gradient and is unconfined. The confinement and gradient increase in reach 2 and the channel is steep and quite confined in reach 3. The Owens Creek system was sampled at 2 locations, including reach 1 of the mainstem.

### 5.8.2 Fish Summary Tables and Stream Classification

The historical information indicates the presence Dolly Varden in reach 1 at the road crossing, just upstream from the mouth. Two sites on this system were electrofished, with Dolly Varden caught in reach 1 of the mainstem. Fish distribution is most likely limited by the 10 meter falls and the 10 meter cascade noted in reach 2. One of the tributaries to Owens Creek sampled in this inventory, was classified as an "NC" based on the absence of a defined channel in the sampling area. The other was classified as an S3 based on a an average channel width of 3.55 meters and the presence of fish habitat in the sampling areas. No fish were caught in this reach, located above a section of steep gradient at the confluence with the Owens mainstem. This reach has some good Dolly Varden rearing habitat and future sampling is recommended.

**DFO/MoELP Stream Survey Form**

**Site Number:** W230

**Reach No.: 1**

**Owens Cr.**

TRITON Environmental Consultants Ltd.

**Location:** W230, Unit 14; 2.6km west of Toboggan Cr.

**Stream (Gaz.):** Owens Creek

**Watershed Code:** 460-2429-161-000-000-000-000-000-000-000-000-0

**Map #:** 93 L 094 **U.T.M. :** 9 .6072 .60863

**Reach Length (km):** 3.5 MA **Length surveyed (m):** 100.0 GE

**Date:** 05-Sep-97 **Time:** 10:15 **Agency:** TEC **Access:** V2 **Fish Card:** N ☐ Field ☒ Historical ☐

**Survey Crew:** DD \JP \LE \ \ \ \ \ \ **Photos:** W-M-20,21,22,23,24 **Air Photos:**

## Channel Characteristics

| | | |
|---|---|---|
| Av. Chan. Width (m): | 5.7 | MS |
| Av. Wet. Width (m): | 3.1 | MS |
| Av. Max Riffle Depth (cm): | 7 | MS |
| Av. Max Pool Depth (cm): | 32 | MS |
| Gradient (%): | 10.0 | CL |
| Pool: 20 Riffle: 20 Run: 50 Other: 10 | | |
| % Side Channel: | 0-10 | GE |
| % Debris Area: | 5-15 | GE |
| %Stable: | 10 | GE |

### Specific Data

| | | | | | |
|---|---|---|---|---|---|
| 4.5 | 4.0 | 4.1 | 10.5 | 5.2 | 6.0 |
| 3.0 | 2.3 | 2.4 | 4.5 | 3.5 | 2.8 |
| 8 | 9 | 5 | 4 | 7 | 8 |
| 35 | 27 | 23 | 25 | 37 | 42 |

## Cover

Cover Total % : 50 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 30 | 10 | 40 | 0 | 20 | 0 |

Crown Closure % : 45 Aspect : NE

## Bed Material

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

D90 (cm): 30 Compaction: Medium

## Discharge

| | | |
|---|---|---|
| Wetted Width (m) : | 3.2 | MS |
| Mean Depth (m) : | 0.2 | MS |
| Mean Velocity (m/s) : | 0.35 | F |
| Discharge (m3/s) : | 0.17 | F |

## Banks

Height (m): 0.1

% Unstable: 40

Fines ☐ Gravels ☒ Larges ☐ Bedrock ☐

Confinement: FC

Valley : Channel Ratio 2-5

Stage: M Flood Signs Ht(m): 0.9

Bars (%): 30 pH: 8.0 Braided: Y

Water Temp. (°C): 6.0 02 (ppm):

Turb. (cm): Cond. (µmhos): 170

## Reach Symbol

(Fish)

DV

6 B 10.0 | 2440

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

## Obstructions

## Fish Summary

| C | Species | Number | Size Range (mm) | Life Phase | Use 1 | Use 2 | Use 3 | Method |
|---|---|---|---|---|---|---|---|---|
| | DV | 7 | 70-130 | J | R | | | EL |

## Comments

C1: S2.

C2: LS=20%, RS=15%

C3: No fisheries sensitive zones noted.

C4: The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 400V, was 242 seconds over 100 meters.

C5: No additional bank texture information.

C6: DO was not measured at this site, the water was clear to the bottom. The air temperature at this site was 7.0 C.

C7: This is a well shaded stream that contains good rearing habitat dominated by pool and boulder cover. The substrate is covered with periphyton which could indicate a good insect population for forage base. There is also some good spawning substrate in the deep runs.

Photo #: W-M-20, 05-Sep-97
Site #: W230, Looking across stream at a collapsed bridge

Photo #: W-M-21, 05-Sep-97
Site #: W230, Looking upstream at the channel

Photo #: W-M-22, 05-Sep-97
Site #: W230, Looking downstream at the channel and the collapsed bridge

Photo #: W-M-23, 05-Sep-97
Site #: W230, Measuring fish with the meterstick


Photo #: Y-32-1, 14/09/97
Site #: u/sW230, Barrier on Owen Cr.


Photo #: Y-32-2, 14/09/97
Site #: u/sW230, Barrier on Owen Cr.

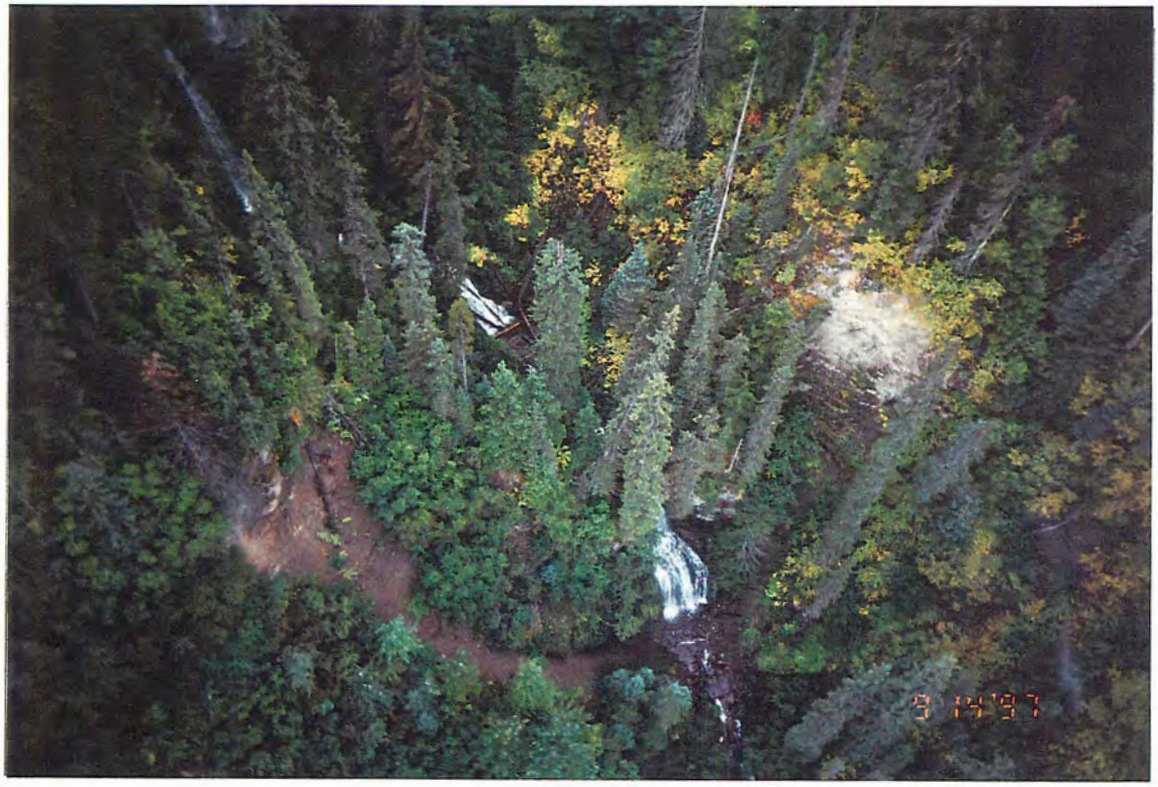


Photo #: Y-32-3, 14/09/97
Site #: u/sW230, 10m C on Owens Cr. N54 54 01W127 20 24


Photo #: Y-32-4, 14/09/97
Site #: u/sW230, 10m F on Owens Cr. N 54 54 01W127 20 24

**DFO/MoELP Stream Survey Form**

**Site Number:** Z64 **Reach No.:** 1

**Trib to Owens Cr.**

TRITON Environmental Consultants Ltd.

**Location:** Z64, Unit 14 **Stream (Gaz.):** Unnamed **Watershed Code:** 001-9300-000-000-000-000-000-000-000-000-000-

**Map #:** 93 L 084 **Reach Length (km):** 3.0 MW **Date:** 22-Jul-97 **Time:** 16:36 **Agency:** TEC **Access:** V2 **Fish Card:** N ☐ Field ☒ Historical ☐

**U.T.M. :** 9 .606883.6084083 **Length surveyed (m):** 100.0 GE **Survey Crew:** JP \KG\ \ \ \ \ \ \ **Photos:** Z-8-15,16 **Air Photos:**

## Channel Characteristics

| | | |
|---|---|---|
| Av. Chan. Width (m): | 3.5 | MS |
| Av. Wet. Width (m): | 2.3 | MS |
| Av. Max Riffle Depth (cm): | 10 | MS |
| Av. Max Pool Depth (cm): | 30 | MS |
| Gradient (%): | 12.0 | CL |
| Pool: 20 Riffle: 15 Run: 45 Other: 20 | | |
| % Side Channel: | 0-10 | GE |
| % Debris Area: | >15 | GE |
| %Stable: | 55 | GE |

**Specific Data**

| | | | | | |
|---|---|---|---|---|---|
| 3.2 | 4.8 | 2.8 | 3.2 | 3.5 | 3.8 |
| 1.8 | 2.5 | 2.4 | 2.8 | 2.6 | 1.8 |
| 8 | 9 | 12 | | | |
| 37 | 25 | 28 | | | |

## Cover

Cover Total % : 50 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 10 | 25 | 20 | 0 | 35 | 10 |

Crown Closure % : 60 Aspect : E

## Bed Material

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

D90 (cm): 30 Compaction: Medium

## Discharge

| | | |
|---|---|---|
| Wetted Width (m) : | 1.9 | MS |
| Mean Depth (m) : | 0.1 | MS |
| Mean Velocity (m/s) : | 0.70 | F |
| Discharge (m3/s) : | 0.10 | F |

## Banks

Height (m): 0.4

% Unstable: 0

Fines ☒ Gravels ☐ Larges ☐ Bedrock ☐

## Reach Symbol

(Fish)

(DV)

4 B 12.0 | 2530

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

Confinement: FC

Valley : Channel Ratio 2-5

Stage: M Flood Signs Ht(m):

Bars (%): 0 pH: 7.9 Braided: N

Water Temp. (°C): 9.0 02 (ppm):

Turb. (cm): Cond. (µmhos): 80

## Obstructions

## Fish Summary

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

## Comments

C1: S3.

C2: LS=54%, RS=34%

C3: No fisheries sensitive zones noted.

C4: The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 500V, was 99 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 14 C.

C7: This site has some nice rearing cover, but the gradient and the number of cascades may be limiting.

Photo #: Z-8-15, 22-Jul-97
Site #: Z64, Looking upstream at the channel

Photo #: Z-8-16, 22-Jul-97
Site #: Z64, Looking downstream at the channel

## 5.9 Powers Creek (460-3924-000) (93 L 065, 93 L 075)

### 5.9.1 Sensitive Habitats and Barriers

Powers Creek is 6.95 km in length and is fed by 8 tributaries. Reach 1 has low gradient and is quite confined for the first 900 meters. Beyond this point the channel is unconfined and has low gradient. Reach 2 undergoes an increase in gradient and confinement, while reaches 3 and 4 have moderate gradient and are unconfined. Two small lakes and a wetland identified as a fisheries sensitive zone were noted in reach 1. A falls was observed in reach 3, but the system has been classified as fish bearing above this barrier. Powers Creek was sampled at 4 locations including reaches 1 and 2 of the mainstem.

### 5.9.2 Fish Summary Tables and Stream Classification

No historical records were found and no fish were caught in the Powers Creek system, which was sampled twice in the mainstem and twice in 1 large tributary. The mainstem was electrofished twice and the large tributary was electrofished once. The mainstem was classified as an S3 in reaches 1 and 2 based on average channel widths of 4.09 meters and 2.10 meters respectively. The tributary was classified as an S3 based on average channel widths of 3.90 and 3.37 meters respectively. Most of the unsampled tributaries are S4 sized streams. This stream is a special candidate for resampling as no fish were caught despite the presence of some good rearing and potential spawning habitat in reach 1. A ground survey confirming the presence of a barrier in the first kilometer of this stream is recommended.

**DFO/MoELP Stream Survey Form**

**Site Number:** Y266

**Reach No.: 2**

**Powers Cr.**

TRITON Environmental Consultants Ltd.

**Location:** Y266, Unit 14 **Stream (Gaz.):** Powers Creek **Watershed Code:** 460-3924-000-000-000-000-000-000-000-000-000-0

**Map #:** 93 L 065 **Reach Length (km):** 1.1 MW **Date:** 15-Sep-97 **Time:** 10:13 **Agency:** TEC **Access:** H **Fish Card:** N Field ☒ Historical ☐

**U.T.M. :** 9 .619806.60613 **Length surveyed (m):** 100.0 GE **Survey Crew:** JP \FC \ \ \ \ \ \ **Photos:** Y-32-11,12,13 **Air Photos:**

## Channel Characteristics

| | | | | Specific Data | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C1 | Av. Chan. Width (m): | 2.1 | MS | 3.1 | 1.3 | 1.6 | 2.8 | 3.2 | 1.4 |
| C1 | Av. Wet. Width (m): | 0.5 | MS | 0.8 | 0.3 | 0.2 | 1.0 | 0.0 | 0.2 |
| | Av. Max Riffle Depth (cm): | 2 | MS | 2 | 3 | 3 | 2 | 1 | |
| | Av. Max Pool Depth (cm): | 16 | MS | 11 | 11 | 23 | 17 | 16 | |
| | Gradient (%): | 14.0 | CL | | | | | | |
| | Pool: 15 Riffle: 15 Run: 65 Other: 5 | | | | | | | | |
| | % Side Channel: | 0-10 | GE | | | | | | |
| | % Debris Area: | 5-15 | GE | | | | | | |
| | %Stable: | 30 | GE | | | | | | |

## Bed Material

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

D90 (cm): 60 Compaction: High

## Cover

Cover Total % : 20 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 10 | 25 | 40 | 0 | 15 | 10 |

Crown Closure % : 90 Aspect : NE

## Discharge

| | | |
|---|---|---|
| Wetted Width (m) : | 0.3 | MS |
| Mean Depth (m) : | 0.1 | MS |
| Mean Velocity (m/s) : | 0.19 | F |
| Discharge (m3/s) : | 0.00 | F |

## Reach Symbol

(Fish)

(CT) (DV)

2 C 14.0 | 1270

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

## Banks

Height (m): 0.2

% Unstable: 10

Fines ☒ Gravels ☐ Larges ☐ Bedrock ☐

Confinement: OC

Valley : Channel Ratio 5-10

Stage: L Flood Signs Ht(m): 0.4

Bars (%): 15 pH: 7.3 Braided: N

Water Temp. (°C): 10.0 02 (ppm):

Turb. (cm): Cond. (µmhos): 380

## Obstructions

## Fish Summary

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

## Comments

C1 S3

C2 LS = 45%, RS = 20%

C3 No fisheries sensitive zones noted.

C4 The electroshocking effort, using a Smithroot 12 B POW model, set at 1-5-500V, was 90 seconds over 100 meters.

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. The air temperature at this site was 9.C.

C7 This reach is mostly dry at the road crosssing. The habitat improves downstream, including a lot of boulder, pool and LOD cover. No suitable spawning habitat was noted.


Photo #: Y-32-11, 15/09/97
Site #: Y266, Looking upstream at the channel


Photo #: Y-32-12, 15/09/97
Site #: Y266, Looking downstream at the channel


Photo #: Y-32-13, 15/09/97
Site #: Y266, Looking across stream at the channel

**DFO/MoELP Stream Survey Form**

**Site Number:** Z52

**Reach No.: 1**

**Powers Cr.**

TRITON Environmental Consultants Ltd.

**Location:** Z52, Unit 14 , 3200m south or Seymour Lake | **Stream (Gaz.):** Powers Creek | **Watershed Code:** 460-3924-000-000-000-000-000-000-000-000-0

**Map #:** 93 L 075 | **Reach Length (km):** 3.3 MW | **Date:** 18-Jul-97 | **Time:** 14:58 | **Agency:** TEC | **Access:** V2 | **Fish Card:** N | **Field** ☒ **Historical** ☐

**U.T.M. :** 9 .6198 . 60640 | **Length surveyed (m):** 50.0 GE | **Survey Crew:** JP \KG\ \ \ \ \ \ \ | **Photos:** Z-7-7,8, | **Air Photos:**

## Channel Characteristics

| | | |
|---|---|---|
| Av. Chan. Width (m): | 4.1 | MS |
| Av. Wet. Width (m): | 2.4 | MS |
| Av. Max Riffle Depth (cm): | 9 | MS |
| Av. Max Pool Depth (cm): | 18 | MS |
| Gradient (%): | 2.0 | CL |
| Pool: 10 Riffle: 25 Run: 60 Other: | 5 | |
| % Side Channel: | 0 | GE |
| % Debris Area: | 5-15 | GE |
| %Stable: | 50 | GE |

*Specific Data*

| | | | | | |
|---|---|---|---|---|---|
| 4.0 | 4.0 | 3.6 | 5.0 | 4.0 | 4.0 |
| 2.5 | 1.6 | 2.2 | 3.7 | 1.7 | 2.9 |
| 10 | 4 | 12 | | | |
| 17 | 15 | 21 | 21 | | |

## Cover

Cover Total % : 40 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 5 | 15 | 25 | 0 | 40 | 15 |

Crown Closure % : 30 Aspect : SE

## Bed Material

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

D90 (cm): 49 Compaction: Medium

## Discharge

| | | |
|---|---|---|
| Wetted Width (m) : | 1.5 | MS |
| Mean Depth (m) : | 0.1 | MS |
| Mean Velocity (m/s) : | 0.16 | F |
| Discharge (m3/s) : | 0.02 | F |

## Banks

Height (m): 0.7

% Unstable: 10

Fines ☒ Gravels ☐ Larges ☐ Bedrock ☐

Confinement: FC

Valley : Channel Ratio 2-5

Stage: L Flood Signs Ht(m): 0.8

Bars (%): 20 pH: 7.7 Braided: Y

Water Temp. (°C): 13.0 02 (ppm):

Turb. (cm): Cond. (µmhos): 120

## Reach Symbol

(Fish)

(DV)

4 B 2.0 | 1450

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

## Obstructions

## Fish Summary

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

## Comments

C1 S3.

C2 LS=40%, RS=25%

C3 No fisheries sensitive zones noted.

C4 The electroshocking effort, using a Coffelt Mark 10 model, was over 100 meters at the confluence of Powers Cr. and a large tributary.

C5 No additional bank texture information.

C6 DO was not measured at this site, the water was clear to bottom. The mean air temperature on this day was 14.9 C.

C7 There is nice rearing cover and spawning sized substrate.

Photo #: Z-7-7, 18-Jul-97
Site #: Z52, Looking upstream at the channel

Photo #: Z-7-8, 18-Jul-97
Site #: Z52, Looking downstream at the channel

DFO/MoELP Stream Survey Form

**Site Number:** E309

**Reach No.:** 2

**Trib. to Powers Cr.**

TRITON Environmental Consultants Ltd.

**Location:** E309, Unit 14 | **Stream (Gaz.):** Unnamed | **Watershed Code:** 051-4600-000-000-000-000-000-000-000-000-000-

**Map #:** 93 L 075 | **U.T.M.:** 9 . 6170 .60639 | **Reach Length (km):** 1.2 MW | **Length surveyed (m):** 100.0 GE | **Survey Crew:** SJ \LE \ \ \ \ \ \ \ | **Date:** 15-Sep-97 | **Time:** 12:30 | **Agency:** TEC | **Access:** V2 | **Fish Card:** N | Field ☒ Historical ☐ | **Photos:** E-29-21,22 | **Air Photos:**

## Channel Characteristics

| | | |
|---|---|---|
| Av. Chan. Width (m): | 3.4 | MS |
| Av. Wet. Width (m): | 1.3 | MS |
| Av. Max Riffle Depth (cm): | 6 | MS |
| Av. Max Pool Depth (cm): | 27 | MS |
| Gradient (%): | 13.0 | CL |
| Pool: 10 Riffle: 35 Run: 50 Other: | 5 | |
| % Side Channel: | 0-10 | GE |
| % Debris Area: | 5-15 | GE |
| %Stable: | 0 | GE |

*Specific Data*

| | | | | | |
|---|---|---|---|---|---|
| 2.7 | 4.1 | 3.8 | 3.9 | 2.9 | 2.8 |
| 1.5 | 1.4 | 1.4 | 1.2 | 0.9 | 1.6 |
| 4 | 4 | 8 | 6 | 6 | |
| 32 | 34 | 29 | 19 | 19 | |

## Cover

Cover Total % : 10 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 40 | 5 | 30 | 0 | 10 | 15 |

Crown Closure % : 50 | Aspect : NE

## Bed Material

| | | | |
|---|---|---|---|
| Fines | Clay, silt, sand (<2mm): | 10 | 10 |
| Gravels | Small (2-16mm): | 10 | 5 |
| | Large (16-64mm): | | 5 |
| Larges | Sm. cobble (64-128mm): | 70 | 15 |
| | Lge cobble (128-256mm): | | 15 |
| | Bldr cobble (>256mm): | | 40 |
| Bedrock | | 10 | 10 |

N D90 (cm): | Compaction: High

## Discharge

| | | |
|---|---|---|
| Wetted Width (m) : | 0.5 | MS |
| Mean Depth (m) : | 0.1 | MS |
| Mean Velocity (m/s) : | 0.25 | F |
| Discharge (m3/s) : | 0.01 | F |

## Banks

Height (m): 0.3

% Unstable: 50

Fines ☐ Gravels ☐ Larges ☒ Bedrock ☐

## Reach Symbol

(Fish)

(DV)

3 B 13.0 | 1171

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

Confinement: FC

Valley : Channel Ratio 2-5

Stage: L | Flood Signs Ht(m): 0.7

Bars (%): 40 | pH: 8.0 | Braided: N

Water Temp. (°C): 8.5 | 02 (ppm):

Turb. (cm): | Cond. (µmhos): 100

## Obstructions

## Fish Summary

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

## Comments

C1: S3

C2: LS = 50%, RS = 120%

C3: No fisheries sensitive zones noted.

C4: The electroshocking effort, using a Smithroot 12 B POW model, set at I-5-500V, was 350 seconds over 125 meters.

C5: Fines, larges and bedrock make up the bank texture at this site.

C6: DO was not measured, the water was clear to the bottom. The air temperature at this site was 9.C.

C7: This reach has an angular shale, boulder substrate with small plunge pools below small cascades. No suitable spawning habitat was noted.


Photo #: E-29-21, 15-Sep-97
Site #: E309, Looking upstream at the channel, note the sharp angles of the substrate


Photo #: E-29-22, 15-Sep-97
Site #: E309, Looking downstream at the channel

**DFO/MoELP Stream Survey Form**

# Site Number: Z51

**Reach No.: 1**

## Trib. to Powers Cr.

TRITON Environmental Consultants Ltd.

**Location:** Z51, Unit 14 | **Stream (Gaz.):** Unnamed | **Watershed Code:** 051-4600-000-000-000-000-000-000-000-000-000-

**Map #:** 93 L 075 | **Reach Length (km):** 1.4 MW | **Date:** 18-Jul-97 | **Time:** 14:42 | **Agency:** TEC | **Access:** V2 | **Fish Card:** N | ☐ Field ☒ Historical ☐

**U.T.M.:** 9 .619700.6064080 | **Length surveyed (m):** 100.0 GE | **Survey Crew:** JL \KG\ \ \ \ \ \ \ | **Photos:** Z-7-5,6 | **Air Photos:**

## Channel Characteristics

| | | | |
|---|---|---|---|
| C1 | Av. Chan. Width (m): | 3.9 | MS |
| C1 | Av. Wet. Width (m): | 1.8 | MS |
| | Av. Max Riffle Depth (cm): | 5 | MS |
| | Av. Max Pool Depth (cm): | 44 | MS |
| | Gradient (%): | 1.0 | CL |
| | Pool: 20 Riffle: 10 Run: 70 Other: 0 | | |
| | % Side Channel: | 10-40 | GE |
| | % Debris Area: | >15 | GE |
| | %Stable: | 40 | GE |

**Specific Data**

| | | | | | |
|---|---|---|---|---|---|
| 4.4 | 4.0 | 4.0 | 3.9 | 2.5 | 3.5 |
| 1.3 | 2.7 | 2.2 | 1.8 | 1.2 | 1.2 |
| 6 | 6 | 3 | | | |
| 21 | 20 | 90 | | | |

## Cover

Cover Total %: 30 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 10 | 20 | 35 | 0 | 30 | 5 |

Crown Closure %: 35 | Aspect: N

## Bed Material

| | | | | |
|---|---|---|---|---|
| Fines | Clay, silt, sand (<2mm): | | 20 | 20 |
| Gravels | Small (2-16mm): | | 40 | 15 |
| | Large (16-64mm): | | | 25 |
| Larges | Sm. cobble (64-128mm): | | | 15 |
| | Lge cobble (128-256mm): | | 40 | 20 |
| | Bldr cobble (>256mm): | | | 5 |
| Bedrock | | | 0 | 0 |

D90 (cm): 22 | Compaction: Medium

## Discharge

| | | |
|---|---|---|
| Wetted Width (m): | 1.2 | MS |
| Mean Depth (m): | 0.1 | MS |
| Mean Velocity (m/s): | 0.39 | F |
| Discharge (m3/s): | 0.04 | F |

## Banks

Height (m): 0.4

% Unstable: 10

☐ Fines ☒ Gravels ☐ Larges ☐ Bedrock ☐

Confinement: FC

Valley : Channel Ratio: 2-5

Stage: L | Flood Signs Ht(m): 1.4

Bars (%): 15 | pH: 7.7 | Braided: Y

Water Temp. (°C): 15.0 | 02 (ppm):

Turb. (cm): | Cond. (µmhos): 120

## Reach Symbol

(Fish)

(RB)

4 B 1.0 | 2440

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

## Obstructions

## Fish Summary

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

## Comments

C1: S3. One additional measurment was taken for both channel and wetted widths, 5.1 and 2.0.

C2: LS= 9.5%, RS= 8%

C3: No fisheries sensitive zones noted.

C4: The electroshocking effort, using a Coffelt Mark 10 model, was 110 seconds over 100 meters.

C5: No additional bank texture information.

C6: DO was not measured at this site, the water was clear to bottom. The mean air temperature on this day was 14.9 C.

C7: Very low flow with some decent rearing habitat.


Photo #: Z-7-5, 18-Jul-97
Site #: Z51, Looking across stream at the channel


Photo #: Z-7-6, 18-Jul-97
Site #: Z51, Looking downstream at the channel

## 5.10 Seymour Creek (460-3738-000) (93 L 075)

### 5.10.1 Sensitive Habitats and Barriers

Seymour Creek is 11.76 km in length and is fed by 8 tributaries. No barriers were identified on this system by the field crews. Wetlands in direct contact with the channel were noted in the headwaters and in reach 3 and have been identified as fisheries sensitive zones. Reach 1 has low gradient, is unconfined and is crossed by 9 roads and the pipeline. Reach 2 is Seymour Lake. Reach 3 has low gradient and is unconfined and Reach 4 has steep gradient and is quite confined. Reach 5 has low gradient and is unconfined. Seymour Creek was sampled at 7 locations, including reach 1 of the mainstem.

### 5.10.2 Fish Summary Tables and Stream Classification

The historical information indicates the presence of peamouth chub, red sided shiner, northern squawfish, largescale sucker, prickly sculpin, longnose sucker, cutthroat trout and rainbow trout in Seymour Lake. Four sites were electroshocked in this system with fish caught at 1 and observed at another. Juvenile trout were visually observed in reach 1 and a sucker species and northern squawfish were captured in reach 1 at the outlet of Seymour Lake. Fish distribution is most likely limited to part of reach 4 of this stream, due to potential gradient and confinement problems. Lesions were observed on the suckers captured at the outlet of Seymour Lake and the water temperature was very high, 21°C. Intensive water quality sampling is recommended for this reach. The mainstem was classified as an S3 in reach 1 based on average channel width of 4.05 meters and the presence of suitable fish habitat. It was also classified as an S3 in reach 4. Three of the tributaries to this stream were classified as non fish bearing due to the lack of suitable fish habitat in the sampling areas (see Tables 3 and 4).

**DFO/MoELP Stream Survey Form** **Site Number: Z50** **Reach No.: 1**

**Seymour Cr.**

TRITON Environmental Consultants Ltd.

**Location:** Z50, Unit 14, Bulkley Valley Exhibition grounds **Stream (Gaz.):** Seymour Cr. **Watershed Code:** 460-3738-000-000-000-000-000-000-000-000-000-0

**Map #:** 93 L 075 **Reach Length (km):** 4.6 MW **Date:** 18-Jul-97 **Time:** 13:48 **Agency:** TEC **Access:** V2 **Fish Card:** N **Field** ☒ **Historical** ☐

**U.T.M.:** 9 619926 6070689 **Length surveyed (m):** 100.0 GE **Survey Crew:** JL \KG \ \ \ \ \ \ **Photos:** Z-7-3,4 **Air Photos:**

## Channel Characteristics

| | | |
|---|---|---|
| Av. Chan. Width (m): | 4.1 | MS |
| Av. Wet. Width (m): | 3.3 | MS |
| Av. Max Riffle Depth (cm): | 0 | MS |
| Av. Max Pool Depth (cm): | 28 | MS |
| Gradient (%): | 1.0 | CL |
| Pool: 5 Riffle: 0 Run: 95 Other: 0 | | |
| % Side Channel: | 0 | GE |
| % Debris Area: | >15 | GE |
| %Stable: | 30 | GE |

**Specific Data**

| | | | | | |
|---|---|---|---|---|---|
| 4.0 | 4.1 | 4.6 | 3.9 | 4.0 | 3.7 |
| 3.2 | 3.3 | 3.0 | 3.2 | 3.8 | 3.1 |
| 27 | 30 | 26 | | | |

## Cover

Cover Total %: 30 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 5 | 20 | 0 | 0 | 40 | 35 |

Crown Closure %: 45 Aspect: E

## Bed Material

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

D90 (cm): 15 Compaction: Low

## Discharge

| | | |
|---|---|---|
| Wetted Width (m): | 1.7 | MS |
| Mean Depth (m): | 0.0 | MS |
| Mean Velocity (m/s): | 0.51 | F |
| Discharge (m3/s): | 0.65 | F |

## Banks

Height (m): 0.7

% Unstable: 0

Fines ☒ Gravels ☐ Larges ☐ Bedrock ☐

Confinement: OC

Valley : Channel Ratio 5-10

Stage: L Flood Signs Hit(m): 0.8

Bars (%): 0 pH: 7.4 Braided: N

Water Temp. (°C): 9.0 02 (ppm):

Turb. (cm): Cond. (µmhos): 82

## Reach Symbol

(Fish)

(RB) TR

4 C 1.0 | 8110

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

## Obstructions

## Fish Summary

| C | Species | Number | Size Range (mm) | Life Phase | Use 1 | Use 2 | Use 3 | Method |
|---|---|---|---|---|---|---|---|---|
| | RB | 20 | 40-60 | J | R | | | VO |

## Comments

C1: S3.

C2: LS=32%, RS=7%

C3: No fisheries sensitive zones notes.

C4: The electroshocking effort, using a Smithroot 15 A model, was 600 seconds over 200 meters.

C5: No additional bank texture information.

C6: DO was not measured at this site, the water was clear to bottom. The air temperature at this site was 20 C.

C7: This reach provides rearing habitat, but the habitat itself is not very good.

Photo #: Z-7-3, 18-Jul-97
Site #: Z50, Looking upstream at the channel

Photo #: Z-7-4, 18-Jul-97
Site #: Z50, Looking downstream at the channel

**DFO/MoELP Stream Survey Form**

**Site Number:** Z47 **Reach No.: 1**

**Seymour Cr.**

TRITON Environmental Consultants Ltd.

**Location:** Z47, Unit 14, 200m west of Seymour Lk. **Stream (Gaz.):** Seymour Cr. **Watershed Code:** 460-3738-000-000-000-000-000-000-000-000-000-0

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Map #: | 93 L 075 | Reach Length (km): | 4.5 | MW | Date: | 15-Jul-97 | Time: | 16:30 | Agency: | TEC | Access: | V2 | Fish Card: | N | Field ☒ Historical ☐ |
| U.T.M. : | 9 .61936 .60674 | Length surveyed (m): | 100.0 | GE | Survey Crew: | SJ \KG\ \ \ \ \ \ \ | | | | | Photos: | Z-6-18,19,20,21,22 | Air Photos: | | |

## Channel Characteristics

| | | |
|---|---|---|
| Av. Chan. Width (m): | 3.2 | MS |
| Av. Wet. Width (m): | 1.8 | MS |
| Av. Max Riffle Depth (cm): | 8 | MS |
| Av. Max Pool Depth (cm): | 22 | MS |
| Gradient (%): | 4.0 | CL |
| Pool: 20 Riffle: 40 Run: 35 Other: | 5 | |
| % Side Channel: | 10-40 | GE |
| % Debris Area: | 5-15 | GE |
| %Stable: | 60 | GE |

*Specific Data*

| | | | | | |
|---|---|---|---|---|---|
| 3.5 | 3.2 | 5.5 | 2.2 | 2.1 | 2.6 |
| 2.5 | 2.3 | 2.0 | 1.1 | 1.5 | 1.2 |
| 5 | 6 | 12 | | | |
| 35 | 12 | 19 | | | |

## Bed Material

| | | | |
|---|---|---|---|
| Fines | Clay, silt, sand (<2mm): | 20 | 20 |
| Gravels | Small (2-16mm): | 40 | 10 |
| | Large (16-64mm): | | 30 |
| Larges | Sm. cobble (64-128mm): | 40 | 10 |
| | Lge cobble (128-256mm): | | 15 |
| | Bldr cobble (>256mm): | | 15 |
| Bedrock | | 0 | 0 |

D90 (cm): 25 Compaction: Medium

## Cover

Cover Total % : 50 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 10 | 20 | 15 | 5 | 40 | 10 |

Crown Closure % : 65 Aspect : N

## Discharge

| | | |
|---|---|---|
| Wetted Width (m) : | 0.8 | MS |
| Mean Depth (m) : | 0.4 | MS |
| Mean Velocity (m/s) : | 0.66 | F |
| Discharge (m3/s) : | 0.16 | F |

## Banks

Height (m): 0.5

% Unstable: 0

Fines ☒ Gravels ☐ Larges ☐ Bedrock ☐

## Reach Symbol

(Fish)

NSC SU

3 D 4.0 | 2440

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

Confinement: UC

Valley : Channel Ratio 10+

Stage: M Flood Signs Ht(m): 1

Bars (%): 15 pH: Braided: Y

Water Temp. (°C): 21.0 02 (ppm):

Turb. (cm): Cond. (µmhos):

## Obstructions

## Fish Summary

| C | Species | Number | Size Range (mm) | Life Phase | Use 1 | Use 2 | Use 3 | Method |
|---|---|---|---|---|---|---|---|---|
| | NSC | 1 | 280 | A | S | | | VO |
| | SU | 4 | 360 | A | S | | | VO |
| | SU | 15 | 25 | F | R | | | VO |

## Comments

C1: S3.

C2: LS= 1% , RS= 2%

C3: No fisheries sensitive zones noted.

C4: There was no electroshocking done, the fish were caught by hand.

C5: No additional bank texture information.

C6: DO was not measured at this site, the water was clear to bottom. The temperature on this day was 20 C.

C7: There are lesions noted on the suckers that were caught. Fry were noted to be in the stream. The water temperature was very high.

Photo #: Z-6-18, 15-Jul-97
Site #: Z47, Looking at a fish with lesions

Photo #: Z-6-19, 15-Jul-97
Site #: Z47, Looking at a fish with lesions

Photo #: Z-6-20, 15-Jul-97
Site #: Z47, Looking at a dead fish

Photo #: Z-6-21, 15-Jul-97
Site #: Z47, Looking downstream at the channel


Photo #: Z-6-22, 15-Jul-97
Site #: Z47, Looking upstream at the channel, on the other side of the road crossing

**DFO/MoELP Stream Survey Form**

# Site Number: Z25

**Reach No.: 2**

## Trib. to Seymour Cr

TRITON Environmental Consultants Ltd.

**Location:** Z25, Unit 14 **Stream (Gaz.):** Unnamed **Watershed Code:** 460-3738-000-000-000-000-000-000-000-000-000-0

**Map #:** 93 L 075 **Reach Length (km):** 1.1 MA **Date:** 11-Jul-97 **Time:** 15:45 **Agency:** TEC **Access:** V2 **Fish Card:** N Field ☒ Historical ☐

**U.T.M. :** 9 .61756 .6065869 **Length surveyed (m):** 110.0 GE **Survey Crew:** JP \KG\ \ \ \ \ \ \ **Photos:** Z-4-3,4,5 **Air Photos:**

## Channel Characteristics

| | | |
|---|---|---|
| Av. Chan. Width (m): | 2.8 | MS |
| Av. Wet. Width (m): | 1.5 | MS |
| Av. Max Riffle Depth (cm): | 7 | MS |
| Av. Max Pool Depth (cm): | 28 | MS |
| Gradient (%): | 10.0 | CL |
| Pool: 35 Riffle: 25 Run: 40 Other: | 0 | |
| % Side Channel: | 10-40 | GE |
| % Debris Area: | >15 | GE |
| %Stable: | 50 | GE |

*Specific Data*

| | | | | | |
|---|---|---|---|---|---|
| 3.3 | 2.4 | 3.2 | 2.6 | 3.2 | 2.0 |
| 2.1 | 1.4 | 1.0 | 1.2 | 1.9 | 1.3 |
| 8 | 9 | 7 | 7 | 5 | |
| 44 | 25 | 27 | 23 | 19 | |

## Cover

Cover Total % : 25 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 35 | 25 | 5 | 0 | 20 | 15 |

Crown Closure % : 40 Aspect : N

## Bed Material

| | | | |
|---|---|---|---|
| Fines | Clay, silt, sand (<2mm): | 20 | 20 |
| Gravels | Small (2-16mm): | 40 | 15 |
| | Large (16-64mm): | | 25 |
| Larges | Sm. cobble (64-128mm): | 40 | 15 |
| | Lge cobble (128-256mm): | | 20 |
| | Bldr cobble (>256mm): | | 5 |
| Bedrock | | 0 | 0 |

D90 (cm): 15 Compaction: High

## Discharge

| | | |
|---|---|---|
| Wetted Width (m) : | 0.4 | MS |
| Mean Depth (m) : | 0.0 | MS |
| Mean Velocity (m/s) : | 1.21 | F |
| Discharge (m3/s) : | 0.02 | F |

## Banks

Height (m): 0.2

% Unstable: 10

Fines ☒ Gravels ☐ Larges ☐ Bedrock ☐

## Reach Symbol

(Fish)

(DV)

3 D 10.0 | 2440

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

Confinement: UC

Valley : Channel Ratio 10+

Stage: L Flood Signs Ht(m): 0.8

Bars (%): 15 pH: 7.7 Braided: Y

Water Temp. (°C): 12.0 02 (ppm):

Turb. (cm): Cond. (µmhos): 70

## Obstructions

| C | Height (m) | Type | Location |
|---|---|---|---|
| | 1 | CV | 2.3 |

## Fish Summary

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

## Comments

C1: S3

C2: LS = 30%, RS = 33 %

C3: No fisheries sensitive zones noted.

C4: The electroshocking effort, using a Smithroot Type VII model, set at 400V, 60HZ, 6MS, was 206 seconds over 100 meters.

C5: No additional bank texture information.

C6: DO was not measured at this site, the water was clear to the bottom. The air temperature at this site was 25. C.

C7: This site could provide rearing habitat, up to the culvert, which is currently a barrier to fish passage upstream. Evidence of blowout was observed.

Photo #: Z-4-3, 11-Jul-97
Site #: Z25, Looking upstream at the channel, note the angularity of the cobble

Photo #: Z-4-4, 11-Jul-97
Site #: Z25, Looking downstream at the channel

Photo #: Z-4-5, 11-Jul-97
Site #: Z25, Looking upstream at a culvert barrier

**DFO/MoELP Stream Survey Form**

**Site Number:** E137

**Reach No.: 4**

**Trib. to Seymour Lk.**

TRITON Environmental Consultants Ltd.

**Location:** E137, Unit 14, 2.5km south of Dahlie Cr.

**Stream (Gaz.):** Unnamed

**Watershed Code:** 460-3738-000-000-000-000-000-000-000-000-000-0

**Map #:** 93 L 074 **Reach Length (km):** 1.9 MA **Date:** 28-Jul-97 **Time:** 14:00 **Agency:** TEC **Access:** V2 **Fish Card:** N Field ☒ Historical ☐

**U.T.M. :** 9 .6146 .60655 **Length surveyed (m):** 100.0 GE **Survey Crew:** JL \EM\ \ \ \ \ \ \ **Photos:** E-13-8,9 **Air Photos:**

## Channel Characteristics

| | | |
|---|---|---|
| Av. Chan. Width (m): | 2.2 | MS |
| Av. Wet. Width (m): | 2.2 | MS |
| Av. Max Riffle Depth (cm): | 2 | MS |
| Av. Max Pool Depth (cm): | 20 | MS |
| Gradient (%): | 1.0 | CL |
| Pool: 20 Riffle: 10 Run: 70 Other: 0 | | |
| % Side Channel: | >40 | GE |
| % Debris Area: | >15 | GE |
| %Stable: | 0 | GE |

*Specific Data*

| | | | | | |
|---|---|---|---|---|---|
| 0.9 | 2.0 | 1.6 | 3.0 | 3.2 | 2.3 |
| 0.9 | 2.0 | 1.7 | 3.0 | 3.2 | 2.5 |
| 2 | 2 | 1 | 3 | 2 | |
| 20 | 19 | 24 | 17 | 18 | |

## Cover

Cover Total % : 40 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 10 | 20 | 10 | 10 | 40 | 10 |

Crown Closure % : 80 Aspect : E

## Bed Material

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

D90 (cm): 20 Compaction: Medium

## Discharge

| | | |
|---|---|---|
| Wetted Width (m) : | 0.4 | MS |
| Mean Depth (m) : | 0.3 | MS |
| Mean Velocity (m/s) : | 0.01 | F |
| Discharge (m3/s) : | 0.00 | F |

## Banks

Height (m): 0.1

% Unstable: 0

Fines ☒ Gravels ☐ Larges ☐ Bedrock ☐

Confinement: UC

Valley : Channel Ratio 10+

Stage: M Flood Signs Ht(m): 0.2

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

Water Temp. (°C): 10.5 02 (ppm):

Turb. (cm): Cond. (µmhos): 60

## Reach Symbol

(Fish)

(DV)

2 D 1.0 | 7030

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

## Obstructions

## Fish Summary

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

## Comments

C1: S3.

C2: LS = 1%, RS = 1%

C3: No fisheries sensitive zones noted.

C4: The electroshocking effort was not recorded at this site.

C5: No additional bank texture information.

C6: DO was not measured, the water was clear to the bottom. The mean air temeprature on this day was 15.5.C.

C7: This reach is braided, the channel is often undefined and overgrown with alder. At the time of sampling the flow was limited to a series of isolated pools of stagnant water. Marginal rearing habitat was observed.


Photo #: E-13-8, 28-Jul-97
Site #: E137, Looking upstream at the channel, note dense alder cover


Photo #: E-13-9, 28-Jul-97
Site #: E137, Looking downstream at the channel, note dense alder cover

**DFO/MoELP Stream Survey Form**

**Site Number:** E308 **Reach No.: 2**

**Trib. to Seymour Lk.**

TRITON Environmental Consultants Ltd.

**Location:** E308, Unit 14 **Stream (Gaz.):** Unnamed **Watershed Code:** 051-6400-000-000-000-000-000-000-000-000-000-

**Map #:** 93 L 075 **Reach Length (km):** 2.4 MW **Date:** 15-Sep-97 **Time:** 11:30 **Agency:** TEC **Access:** V2 **Fish Card:** N Field ☒ Historical ☐

**U.T.M. :** 9 . 6180 .60655 **Length surveyed (m):** 100.0 GE **Survey Crew:** SJ \LE\ \ \ \ \ \ \ **Photos:** E-29-19,20 **Air Photos:**

## Channel Characteristics

| | | |
|---|---|---|
| Av. Chan. Width (m): | 0.6 | MS |
| Av. Wet. Width (m): | 0.0 | GE |
| Av. Max Riffle Depth (cm): | 0 | GE |
| Av. Max Pool Depth (cm): | 0 | GE |
| Gradient (%): | 21.0 | CL |
| N Pool: 0 Riffle: 0 Run: 0 Other: 0 | | |
| % Side Channel: | 0-10 | GE |
| % Debris Area: | >15 | GE |
| %Stable: | 0 | GE |

*Specific Data*

0.8 0.9 0.5 0.3 0.7 0.6

## Bed Material

| | | | |
|---|---|---|---|
| Fines | Clay, silt, sand (<2mm): | 20 | 20 |
| Gravels | Small (2-16mm): | 50 | 25 |
| | Large (16-64mm): | | 25 |
| Larges | Sm. cobble (64-128mm): | 30 | 10 |
| | Lge cobble (128-256mm): | | 10 |
| | Bldr cobble (>256mm): | | 10 |
| Bedrock | | 0 | 0 |

D90 (cm): 25 Compaction: High

## Cover

Cover Total % : 5 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 20 | 5 | 5 | 0 | 50 | 20 |

Crown Closure % : 15 Aspect : E

## Discharge

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

## Banks

Height (m): 0.1

% Unstable: 30

Fines ☒ Gravels ☐ Larges ☐ Bedrock ☐

Confinement: UC

Valley : Channel Ratio 10+

Stage: Dry Flood Signs Ht(m): 0.2

Bars (%): 100 pH: Braided: N

Water Temp. (°C): 02 (ppm):

Turb. (cm): Cond. (µmhos):

## Reach Symbol

(Fish)

NF

1 D 21.0 | 2530

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

## Obstructions

## Fish Summary

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

## Comments

C1 S6

C2 LS = 33%, RS = 35%

C3 No fisheries sensitive zones noted.

C4 This dry site was not electrofished.

C5 No additional bank texture information.

C6 Water quality was not measured, the air temperature at this site was 9.C.

C7 This small channel appears to be ephemeral, fed by runoff and snowmelt. It is not deeply incised in the bed.

C8 This reach has been classified as non fish bearing because no suitable spawning or rearing habitat was noted in the sampling area, which has steep gradient.


Photo #: E-29-19, 15-Sep-97
Site #: E308, Looking upstream at the channel


Photo #: E-29-20, 15-Sep-97
Site #: E308, Looking downstream at the channel

**DFO/MoELP Stream Survey Form**

**Site Number:** Z26 **Reach No.:** 1

**Trib. to Seymour Lk.**

TRITON Environmental Consultants Ltd.

**Location:** Z26, Unit 14 **Stream (Gaz.):** Unnamed **Watershed Code:** 051-6600-000-000-000-000-000-000-000-000-000-

**Map #:** 93 L 075 **Reach Length (km):** 1.1 MA **Date:** 11-Jul-97 **Time:** 16:57 **Agency:** TEC **Access:** V2 **Fish Card:** N **Field** ☒ **Historical** ☐

**U.T.M. :** 9 .617422.6066134 **Length surveyed (m):** 100.0 GE **Survey Crew:** JP\KG\ \ \ \ \ \ \ **Photos:** Z-4-6 **Air Photos:**

## Channel Characteristics

| | | |
|---|---|---|
| Av. Chan. Width (m): | 2.0 | MS |
| Av. Wet. Width (m): | 0.8 | MS |
| Av. Max Riffle Depth (cm): | 4 | MS |
| Av. Max Pool Depth (cm): | 13 | MS |
| Gradient (%): | 9.0 | CL |
| Pool: 10 Riffle: 25 Run: 60 Other: 5 | | |
| % Side Channel: | 0-10 | GE |
| % Debris Area: | >15 | GE |
| %Stable: | 30 | GE |

*Specific Data*

| | | | | | |
|---|---|---|---|---|---|
| 2.0 | 2.3 | 1.9 | 1.7 | 2.1 | 2.3 |
| 1.0 | 1.0 | 0.7 | 0.8 | 0.5 | 1.0 |
| 2 | 5 | 4 | | | |
| 14 | 13 | 13 | | | |

## Cover

Cover Total % : 45 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 0 | 10 | 0 | 10 | 75 | 5 |

Crown Closure % : 55 Aspect : NE

## Bed Material

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

D90 (cm): 15 Compaction: Medium

## Discharge

| | | |
|---|---|---|
| Wetted Width (m) : | 0.3 | MS |
| Mean Depth (m) : | 0.0 | MS |
| Mean Velocity (m/s) : | 0.33 | F |
| Discharge (m3/s) : | 0.00 | F |

## Banks

Height (m): 0.1

% Unstable: 5

Fines ☒ Gravels ☐ Larges ☐ Bedrock ☐

Confinement: OC

Valley : Channel Ratio 5-10

Stage: L Flood Signs Ht(m): 0.6

Bars (%): 5 pH: 7.2 Braided: Y

Water Temp. (°C): 11.0 02 (ppm):

Turb. (cm): Cond. (µmhos): 150

## Reach Symbol

(Fish)

NF

2 C 9.0 | 2440

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

## Obstructions

## Fish Summary

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

## Comments

C1: S6

C2: LS = 6% , RS = 15%

C3: No fisheries sensitive zones present.

C4: The electroshocking effort, using a Smithroot Type VII model, was 23 seconds over 30 meters. The channel was dry below the road crossing.

C5: No additional bank texture information.

C6: DO was not measured at this site, the water was clear to the bottom. The air temperature at this site was 20.C.

C7: This stream does not provide suitable fish habitat. It had recently flooded at the time of sampling.

Photo #: Z-4-6, 11-Jul-97
Site #: Z26, Looking upstream at the channel

**DFO/MoELP Stream Survey Form**

**Site Number:** Z46 **Reach No.: 1**

**Trib to Seymour Lk.**

TRITON Environmental Consultants Ltd.

**Location:** Z46, Unit 14 **Stream (Gaz.):** Unnamed **Watershed Code:** 051-6300-000-000-000-000-000-000-000-000-000-

**Map #:** 93 L 075 **Reach Length (km):** 0.6 MW **Date:** 15-Jul-97 **Time:** 15:16 **Agency:** TEC **Access:** V2 **Fish Card:** N Field ☒ Historical ☐

**U.T.M. :** 9 .61800 .60673 **Length surveyed (m):** 100.0 GE **Survey Crew:** KG \ JL\ \ \ \ \ \ \ **Photos:** Z-6-15,16,17 **Air Photos:**

## Channel Characteristics

| | | | |
|---|---|---|---|
| | Av. Chan. Width (m): | 1.2 | MS |
| C1 | Av. Wet. Width (m): | 0.0 | GE |
| C1 | Av. Max Riffle Depth (cm): | 0 | GE |
| C1 | Av. Max Pool Depth (cm): | 0 | GE |
| | Gradient (%): | 25.0 | CL |
| N | Pool: 0 Riffle: 0 Run: 0 Other: 0 | | |
| | % Side Channel: | 10-40 | GE |
| | % Debris Area: | >15 | GE |
| | %Stable: | 20 | GE |

**Specific Data**

1.4 1.4 1.2 1.2 0.8 1.0

## Cover

Cover Total % : 70 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 0 | 10 | 0 | 0 | 90 | 0 |

Crown Closure % : 55 Aspect : E

## Bed Material

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

D90 (cm): 27 Compaction: Medium

## Obstructions

| C | Height (m) | Type | Location |
|---|---|---|---|
| C1 | 1 | CV | 0.7 |

## Fish Summary

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

## Discharge

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

## Banks

Height (m): 0.1

% Unstable: 0

Fines ☒ Gravels ☐ Larges ☐ Bedrock ☐

Confinement: UC

Valley : Channel Ratio 10+

Stage: Dry Flood Signs Ht(m):

Bars (%): 0 pH: Braided: Y

Water Temp. (°C): 02 (ppm):

Turb. (cm): Cond. (µmhos):

## Reach Symbol

(Fish)

NF

I D 25.0 | 2440

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

## Comments

C1 S6.

C2 LS= 3% , RS= 4.5%

C3 No fisheries sensitive zones noted.

C4 No electroshocking was done, as creek was dry.

C5 No additional bank texture information.

C6 DO was not measured at this site, there was no water in the stream.

C7 A culvert has been placed high above the channel at this site. There is a cascade 130 cm below the culvert which dies out in a pool. The gradient is 55% above the road crossing. There is flow above the road, with a 6m falls followed by another 2m cascade.

Photo #: Z-6-15, 15-Jul-97
Site #: Z46, Looking downstream at the channel

Photo #: Z-6-16, 15-Jul-97
Site #: Z46, Looking upstream at the channel

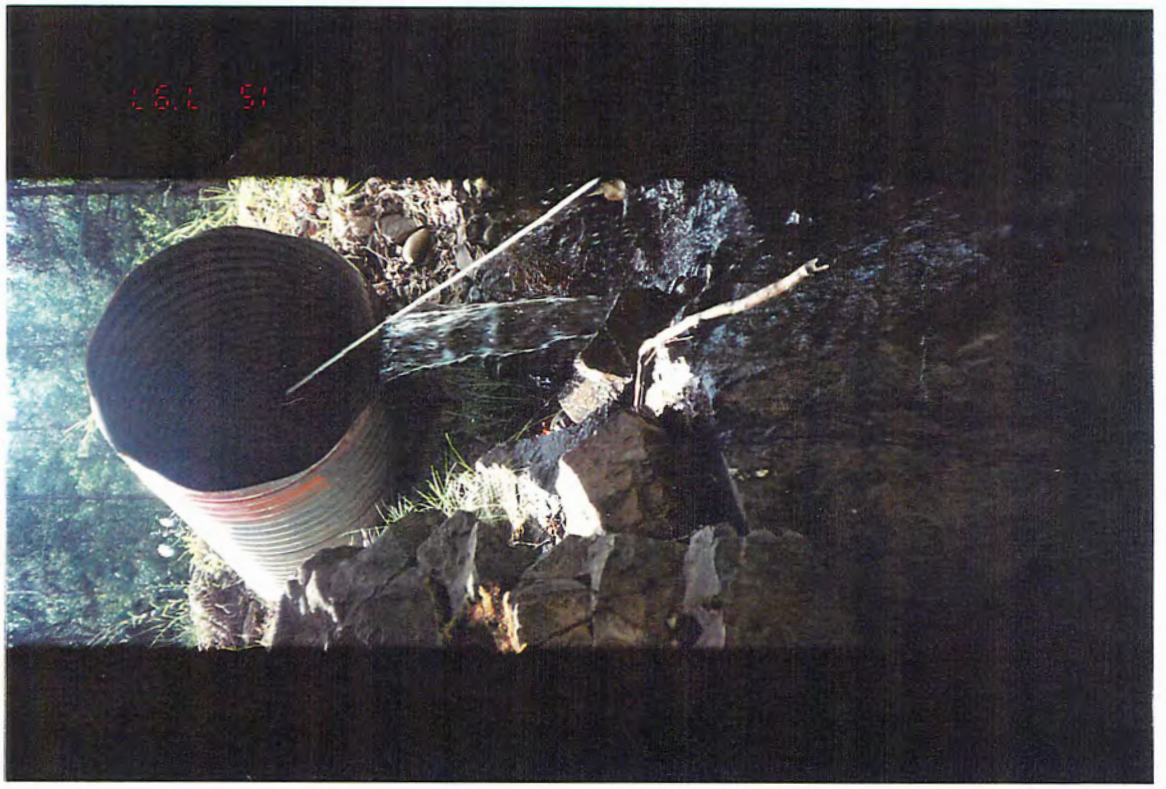

Photo #: Z-6-17, 15-Jul-97
Site #: Z46, Looking upstream at a culvert barrier

## 5.11 Simpson Creek (460-3454-267-278) (93 L 074, 93 L 075)

### 5.11.1 Sensitive Habitats and Barriers

Simpson Creek is 9.412 km in length and is fed by 8 tributaries. Reach 1 has low gradient and flows through an agricultural area. Reach 2 has medium to high gradient, approaching the upper limits of fish distribution. All reaches above 2 are characterized by steep gradient. No sensitive habitats or barriers were observed in this system, however potential cascades were noted on the TRIM sheet in reach 3 associated with steep gradient. The Simpson Creek system was sampled in 2 locations, including reach 1 of the mainstem.

### 5.11.2 Fish Summary Tables and Stream Classification

The historical information indicates the presence of rainbow trout, cutthroat trout, mountain whitefish and coho spawning 500m from the mouth and steelhead and coho spawning 1.2 km from the mouth. Fish were caught by electrofishing at 2 sites. Cutthroat trout and Dolly Varden were caught in reach 1 and cutthroat were caught in a tributary to reach 1. Reach 1 of the mainstem was classified as an S2 based on an average channel width of 9.65 meters and the presence of fish in the sampling area. The tributary was classified as S3 based on the average channel with of 2.02 meters and the presence of fish in the sampling area. The unsampled tributaries to the upper reaches of this stream would be classified as S5 and S6.

**DFO/MoELP Stream Survey Form**

**Site Number:** W174 **Reach No.: 1**

**Simpson Cr.**

TRITON Environmental Consultants Ltd.

**Location:** W174, Unit 14 **Stream (Gaz.):** Simpson Creek **Watershed Code:** 460-3454-267-278-000-000-000-000-000-000-000-0

**Map #:** 93 L 084 **Reach Length (km):** 2.8 MA **Date:** 13-Aug-97 **Time:** 9:45 **Agency:** TEC **Access:** V2 **Fish Card:** N Field ☒ Historical ☐

**U.T.M.:** 9 .6143 .60751 **Length surveyed (m):** 200.0 GE **Survey Crew:** KA \DD\ \ \ \ \ \ \ **Photos:** W-F-22,23,24,25 **Air Photos:**

## Channel Characteristics

| | | |
|---|---|---|
| Av. Chan. Width (m): | 9.7 | MS |
| Av. Wet. Width (m): | 5.8 | MS |
| Av. Max Riffle Depth (cm): | 19 | MS |
| Av. Max Pool Depth (cm): | 42 | MS |
| Gradient (%): | 11.0 | CL |
| Pool: 20 Riffle: 55 Run: 25 Other: 0 | | |
| % Side Channel: | 0-10 | GE |
| % Debris Area: | 5-15 | GE |
| %Stable: | 20 | GE |

*Specific Data*

| | | | | | |
|---|---|---|---|---|---|
| 9.0 | 10.0 | 12.4 | 8.0 | 9.1 | 9.4 |
| 6.2 | 6.3 | 7.2 | 5.0 | 4.5 | 5.3 |
| 18 | 27 | 25 | 12 | 19 | 12 |
| 43 | 27 | 50 | 33 | 59 | 37 |

## Cover

Cover Total % : 20 GE

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

Crown Closure % : 20 Aspect : NE

## Bed Material

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

D90 (cm): 41 Compaction: Medium

## Discharge

| | | |
|---|---|---|
| Wetted Width (m) : | 2.7 | MS |
| Mean Depth (m) : | 0.3 | MS |
| Mean Velocity (m/s) : | 0.56 | F |
| Discharge (m3/s) : | 0.34 | F |

## Banks

Height (m): 1.0

% Unstable: 30

Fines ☒ Gravels ☐ Larges ☐ Bedrock ☐

## Reach Symbol

(Fish)

CT DV

10 C 11.0 | 1360

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

Confinement: OC

Valley : Channel Ratio 5-10

Stage: M Flood Signs Ht(m): 1.9

Bars (%): 15 pH: 6.6 Braided: N

Water Temp. (°C): 9.0 02 (ppm):

Turb. (cm): Cond. (µmhos): 30

## Obstructions

## Fish Summary

| C | Species | Number | Size Range (mm) | Life Phase | Use 1 | Use 2 | Use 3 | Method |
|---|---|---|---|---|---|---|---|---|
| | DV | 1 | 135 | J | R | | | EL |
| | CT | 2 | 145-155 | J | R | | | EL |

## Comments

C1 S2.

C2 LS=10%, RS=10%

C3 No fisheries sensitive zones noted.

C4 The electroshocking effort, using a Smithroot 12 B POW model set at 500V, was 573 seconds over 200 meters.

C5 No additional bank texture information.

C6 DO was not measured at this site, the water was clear to bottom. The air temperature at this site was 14.0 C.

C7 This creek has high velocity and limited cover. The fish were caught in boulder pools and under cutbanks.

Photo #: W-F-22, 13-Aug-97
Site #: W174, Looking upstream at the channel, note the rafted LOD

Photo #: W-F-23, 13-Aug-97
Site #: W174, Looking downstream at the channel

Photo #: W-F-24, 13-Aug-97
Site #: W174, Measuring fish with the meterstick

Photo #: W-F-25, 13-Aug-97
Site #: W174, Measuring fish with the meterstick

**DFO/MoELP Stream Survey Form**

**Site Number:** W173 **Reach No.: 1**

**Trib. to Simpson Cr.**

TRITON Environmental Consultants Ltd.

**Location:** W173, Unit 14 **Stream (Gaz.):** Unnamed **Watershed Code:** 048-7800-000-000-000-000-000-000-000-000-000-

**Map #:** 93 L 084 **Reach Length (km):** 1.4 MA **Date:** 13-Aug-97 **Time:** 9:10 **Agency:** TEC **Access:** V2 **Fish Card:** N Field ☒ Historical ☐

**U.T.M. :** 9 .6142 .60754 **Length surveyed (m):** 200.0 GE **Survey Crew:** KA \DD\ \ \ \ \ \ \ **Photos:** W-F-19,20,21 **Air Photos:**

## Channel Characteristics

| | | |
|---|---|---|
| Av. Chan. Width (m): | 2.0 | MS |
| Av. Wet. Width (m): | 1.3 | MS |
| Av. Max Riffle Depth (cm): | 3 | MS |
| Av. Max Pool Depth (cm): | 25 | MS |
| Gradient (%): | 4.0 | CL |
| Pool: 25 Riffle: 40 Run: 35 Other: | 0 | |
| % Side Channel: | 0 | GE |
| % Debris Area: | 0-5 | GE |
| %Stable: | 10 | GE |

*Specific Data*

| | | | | | |
|---|---|---|---|---|---|
| 3.3 | 1.2 | 2.5 | 2.0 | 1.6 | 1.5 |
| 1.5 | 1.1 | 1.6 | 1.2 | 1.1 | 1.3 |
| 2 | 3 | 2 | 5 | 4 | 3 |
| 33 | 24 | 15 | 33 | 22 | |

## Cover

Cover Total % : 25 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 40 | 0 | 0 | 0 | 40 | 20 |

Crown Closure % : 20 Aspect : NE

## Bed Material

| | | | |
|---|---|---|---|
| Fines | Clay, silt, sand (<2mm): | 10 | 10 |
| Gravels | Small (2-16mm): | 60 | 25 |
| | Large (16-64mm): | | 35 |
| Larges | Sm. cobble (64-128mm): | 30 | 20 |
| | Lge cobble (128-256mm): | | 10 |
| | Bldr cobble (>256mm): | | 0 |
| Bedrock | | 0 | 0 |

D90 (cm): 12 Compaction: Medium

## Discharge

| | | |
|---|---|---|
| Wetted Width (m) : | 1.0 | MS |
| Mean Depth (m) : | 0.0 | MS |
| Mean Velocity (m/s) : | 0.38 | F |
| Discharge (m3/s) : | 0.29 | F |

## Banks

Height (m): 0.1

% Unstable: 20

Fines ☒ Gravels ☐ Larges ☐ Bedrock ☐

Confinement: UC

Valley : Channel Ratio 10+

Stage: M Flood Signs Ht(m): 0.4

Bars (%): 0 pH: 6.8 Braided: N

Water Temp. (°C): 10.0 02 (ppm):

Turb. (cm): Cond. (µmhos): 30

## Reach Symbol

(Fish)

CT

2 D 4.0 | 1630

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

## Obstructions

## Fish Summary

| C | Species | Number | Size Range (mm) | Life Phase | Use 1 | Use 2 | Use 3 | Method |
|---|---|---|---|---|---|---|---|---|
| | CT | 3 | 80-93 | J | R | | | EL |
| | SA | 100 | 20-30 | F | R | | | VO |

## Comments

C1: S3.

C2: LS=6%, RS=5%

C3: No fisheries sensitive zones noted.

C4: The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 500V, was 169 seconds over 200 meters.

C5: No additional bank texture information.

C6: DO was not measured at this site, the water was clear to bottom. The air temperature at this site was 14.5 C.

C7: The creek parrallels the road, then flows through farmland. The habitat is limited below the road, but improves upstream. Boulders and step pool habitat were obsereved above the road. Aquatic insect food is abundant.

Photo #: W-F-19, 13-Aug-97
Site #: W173, Measuring cutthroat trout with the meterstick

Photo #: W-F-20, 13-Aug-97
Site #: W173, Looking upstream at the channel, note the cobble cover

Photo #: W-F-21, 13-Aug-97
Site #: W173, Looking downstream at the channel

## 5.12 Toboggan Creek (460-2429-000) (93 L 084)

### 5.12.1 Sensitive Habitats and Barriers

Toboggan Creek is 20.7 km in length and is fed by 44 unnamed tributaries. Reach 1 has low gradient and is typically unconfined. Reach 2 is quite confined and has moderately steep gradient. The tributaries to the upper reaches have extreme gradient. Reaches 3 and 5 have very steep gradient and reach 4 is Schufer Lake. Fisheries sensitive zones were noted on the southern shore of Toboggan Lake and coho spawning habitat was noted in the historical information just downstream of the hatchery in reach 1. Toboggan Creek is flanked by numerous roads, including highway 16, a railway and powerline. Agricultural activity is also prevalent in this area, particularly in association with Glass Creek, a tributary to Toboggan Lake. A 5 meter falls was noted at the reach 1 and 2 break and no fish were caught above this barrier. However, Dolly Varden were caught by electrofishing directly below the falls. Toboggan Creek was sampled at 12 locations, including reach 2 of the mainstem.

### 5.12.2 Fish Summary Tables and Stream Classification

Fisheries information exists for reach 1 of Toboggan Creek, where rainbow trout, lamprey, Dolly Varden, mountain whitefish and steelhead, coho, and pink spawning have been recorded. Dolly Varden were caught by electrofishing in reach 1, directly below the 5 meter falls. Coho and rainbow trout were caught by electrofishing in 2 unnamed tributaries to Toboggan Creek and Dolly Varden were caught by electrofishing in Owens Creek and Elliot Creek, both of which drain into the Toboggan mainstem.

Toboggan Creek was classified as an S2 in reach 2 based on an average channel width of 17.70 meters and the presence of fish habitat in the sampling area. The fish bearing tributaries were classified as S2 and S3 based on average channel widths 4.90 and 3.0 meters and the presence of fish in the sampling areas. The tributary to reach 1 sampled at Z62 has some great rearing habitat and the culvert at the road crossing is slightly damaged. The tributaries to the upper reaches of Toboggan Creek would be classified as non fish bearing due to extreme gradient.

**DFO/MoELP Stream Survey Form**

**Site Number:** E304 **Reach No.: 2**

**Toboggan Cr.**

TRITON Environmental Consultants Ltd.

**Location:** E304, Unit 14, 5km NW of Kath;y Lake. **Stream (Gaz.):** Toboggan Creek **Watershed Code:** 460-2429-000-000-000-000-000-000-000-000-000-0

**Map #:** 93 L 084 **Reach Length (km):** 3.4 MW **Date:** 14-Sep-97 **Time:** 9:30 **Agency:** TEC **Access:** V4 **Fish Card:** N Field ☒ Historical ☐

**U.T.M. :** 9 . 6105 .60790 **Length surveyed (m):** 150.0 GE **Survey Crew:** SJ \LE \ \ \ \ \ \ \ **Photos:** E-29-9,10,13 **Air Photos:**

## Channel Characteristics

| | | |
|---|---|---|
| Av. Chan. Width (m): | 17.7 | MS |
| Av. Wet. Width (m): | 8.5 | MS |
| Av. Max Riffle Depth (cm): | 16 | MS |
| Av. Max Pool Depth (cm): | 46 | MS |
| Gradient (%): | 9.0 | CL |
| Pool: 10 Riffle: 30 Run: 45 Other: 15 | | |
| % Side Channel: | 0-10 | GE |
| % Debris Area: | 5-15 | GE |
| %Stable: | 0 | GE |

**Specific Data**

| | | | | | |
|---|---|---|---|---|---|
| 17.1 | 18.2 | 16.5 | 18.9 | 19.2 | 16.3 |
| 9.2 | 8.2 | 8.7 | 7.9 | 7.7 | 9.4 |
| 18 | 13 | 15 | 19 | 21 | 12 |
| 38 | 52 | 47 | 43 | 57 | 41 |

## Bed Material

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

N D90 (cm): Compaction: High

## Cover

Cover Total % : 15 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 25 | 15 | 50 | 0 | 0 | 10 |

Crown Closure % : 0 Aspect : E

## Discharge

| | | |
|---|---|---|
| Wetted Width (m) : | 3.8 | MS |
| Mean Depth (m) : | 0.2 | MS |
| Mean Velocity (m/s) : | 1.08 | F |
| Discharge (m3/s) : | 0.62 | F |

## Banks

Height (m): 0.4

% Unstable: 30

Fines ☐ Gravels ☐ Larges ☒ Bedrock ☐

Confinement: OC

Valley : Channel Ratio 5-10

Stage: M Flood Signs Ht(m): 1.5

Bars (%): 75 pH: 7.4 Braided: Y

Water Temp. (°C): 6.0 02 (ppm):

Turb. (cm): Cond. (µmhos): 40

## Reach Symbol

(Fish)

(DV)

18 C 9.0 | 1261

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

## Obstructions

## Fish Summary

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

## Comments

C1 S2

C2 LS = 50%, RS = 50%

C3 No fisheries sensitive zones noted.

C4 The electroshocking effort, using a Smithroot 12 B POW model, set at I-5-400V, was 448 seconds over 200 meters.

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. The air temperature at this site was 9.C.

C7 This site has some good rearing cover in the form of pools, boulders and side channels. The gradient may preclude spawning.

C8 This site is located above a 5m falls. No fish were caught in this reach, however it has been classified as fish bearing. Dolly Varden were caught by the sampling crew below the 5m falls.


Photo #: E-29-9, 13-Sep-97
Site #: E304, Looking downstream at the channel, note the rafted debris


Photo #: E-29-10, 14-Sep-97
Site #: E304, Looking upstream at the channel

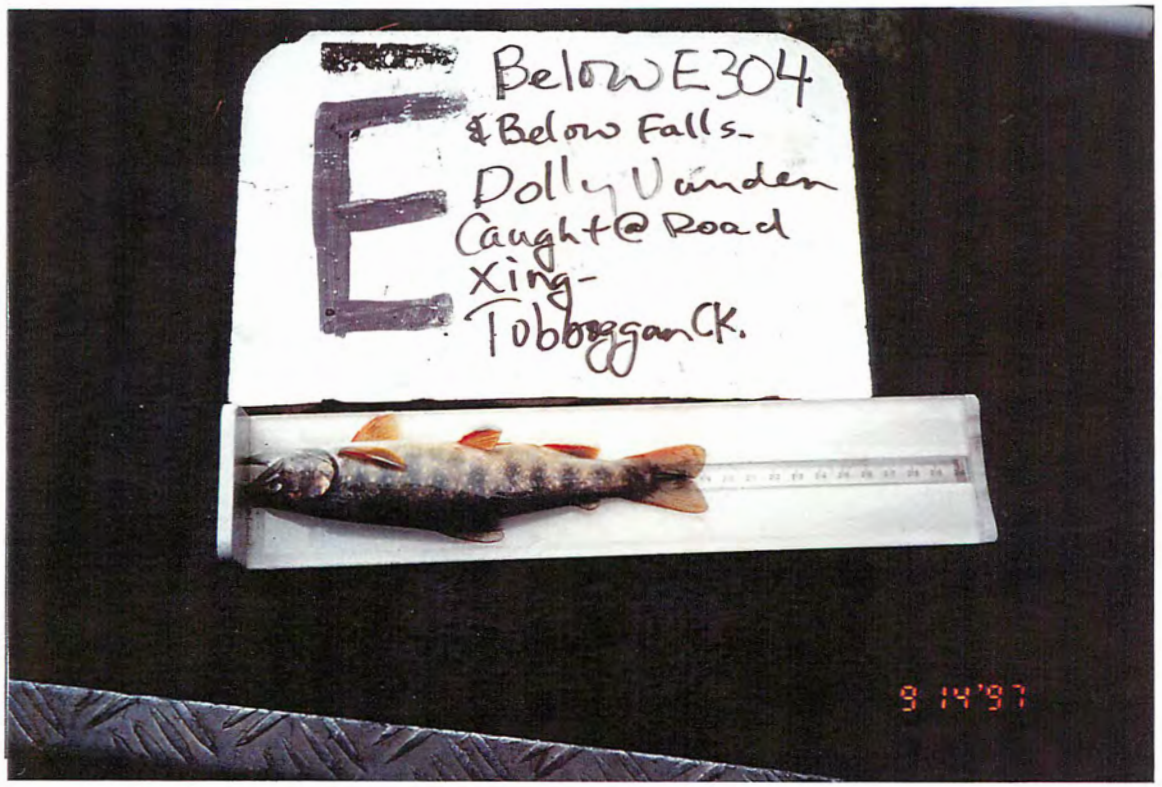


Photo #: E-29-13, 14-Sep-97
Site #: E304, Measuring Dolly Varden on the fishboard

**DFO/MoELP Stream Survey Form**

**Site Number:** E305

**Reach No.: 1**

**Trib. to Toboggan Cr.**

TRITON Environmental Consultants Ltd.

**Location:** E305, Unit 14, 5km NW of Kathly Lake. **Stream (Gaz.):** Unnamed **Watershed Code:** 047-6100-000-000-000-000-000-000-000-000-000-

**Map #:** 93 L 084 **Reach Length (km):** 3.0 MW **Date:** 14-Sep-97 **Time:** 11:30 **Agency:** TEC **Access:** V4 **Fish Card:** N Field ☒ Historical ☐

**U.T.M. :** 9 . 6170 . 60797 **Length surveyed (m):** 100.0 GE **Survey Crew:** SJ \LE \ \ \ \ \ \ \ **Photos:** E-29-11,12 **Air Photos:**

## Channel Characteristics

| | | |
|---|---|---|
| Av. Chan. Width (m): | 0.8 | MS |
| Av. Wet. Width (m): | 0.3 | MS |
| Av. Max Riffle Depth (cm): | 1 | MS |
| Av. Max Pool Depth (cm): | 7 | MS |
| Gradient (%): | 18.0 | CL |
| Pool: 10 Riffle: 10 Run: 80 Other: 0 | | |
| % Side Channel: | 0 | GE |
| % Debris Area: | >15 | GE |
| %Stable: | 5 | GE |

**Specific Data**

| | | | | | |
|---|---|---|---|---|---|
| 0.9 | 0.6 | 0.7 | 0.8 | 0.6 | 0.9 |
| 0.3 | 0.4 | 0.5 | 0.2 | 0.3 | 0.4 |
| 1 | 1 | | | | |
| 6 | 4 | 15 | 6 | 6 | |

## Cover

Cover Total % : 5 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 10 | 50 | 0 | 0 | 40 | 0 |

Crown Closure % : 40 Aspect : NW

## Bed Material

| | | | |
|---|---|---|---|
| Fines | Clay, silt, sand (<2mm): | 60 | 60 |
| Gravels | Small (2-16mm): | 40 | 20 |
| | Large (16-64mm): | | 20 |
| Larges | Sm. cobble (64-128mm): | 0 | 0 |
| | Lge cobble (128-256mm): | | 0 |
| | Bldr cobble (>256mm): | | 0 |
| Bedrock | | 0 | 0 |

D90 (cm): 7 Compaction: Medium

## Discharge

| | | | |
|---|---|---|---|
| N | Wetted Width (m) : | | |
| N | Mean Depth (m) : | | |
| N | Mean Velocity (m/s) : | | |
| C5 | Discharge (m3/s) : | | |

## Banks

Height (m): 0.1

% Unstable: 50

Fines ☒ Gravels ☐ Larges ☐ Bedrock ☐

## Reach Symbol

(Fish)

NF

1 C 18.0 | 6400

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

Confinement: OC

Valley : Channel Ratio 5-10

Stage: L Flood Signs Ht(m): 0.5

Bars (%): 0 pH: 7.6 Braided: N

Water Temp. (°C): 9.0 02 (ppm):

Turb. (cm): Cond. (µmhos): 110

## Obstructions

## Fish Summary

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

## Comments

C1 S6

C2 LS = 15%, RS = 70%

C3 No fisheries sensitive zones present.

C4 This site was not electrofished as too little water was in the channel at the time of sampling.

C5 Fines and gravels make up the bank texture at this site.

C6 DO was not measured, the water was clear to the bottom. The air temperature at this site was 9.C. The flow was too low to measure discharge at the time of sampling.

C7 This creek was almost dry at the time of sampling. This area was logged roughly 60 years ago and the second growth alder provides LOD. The gradient may preclude spawning, rearing habitat is limited to the odd pool at this flow stage.

Photo #: E-29-11, 14-Sep-97
Site #: E305, Looking downstream at the channel

Photo #: E-29-12, 14-Sep-97
Site #: E305, Looking upstream at the channel, heavily overgrown with devil's club

**DFO/MoELP Stream Survey Form**

**Site Number:** E310 **Reach No.: 1**

**Trib. to Toboggan Cr.**

TRITON Environmental Consultants Ltd.

**Location:** E310, Unit 14 **Stream (Gaz.):** Unnamed **Watershed Code:** 047-4900-000-000-000-000-000-000-000-000-000-

**Map #:** 93 L 084 **Reach Length (km):** 1.1 MW **Date:** 15-Sep-97 **Time:** 14:15 **Agency:** TEC **Access:** V2 **Fish Card:** N **Field** ☒ **Historical** ☐

**U.T.M. :** 9 .6114 6.0847 **Length surveyed (m):** 150.0 GE **Survey Crew:** SJ \LE\ \ \ \ \ \ \ **Photos:** E-29-23,24 **Air Photos:**

## Channel Characteristics

| | | |
|---|---|---|
| Av. Chan. Width (m): | 1.6 | MS |
| Av. Wet. Width (m): | 0.5 | MS |
| Av. Max Riffle Depth (cm): | 0 | MS |
| Av. Max Pool Depth (cm): | 19 | MS |
| Gradient (%): | 1.0 | CL |
| Pool: 5 Riffle: 0 Run: 95 Other: 0 | | |
| % Side Channel: | 0-10 | GE |
| % Debris Area: | >15 | GE |
| %Stable: | 0 | GE |

**Specific Data**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1.7 | 1.6 | 1.1 | 2.0 | 1.7 | 1.7 | |
| 0.9 | 1.0 | 0.9 | 0.0 | 0.0 | 0.0 | |
| 39 | 15 | 13 | 15 | 12 | | |

## Cover

Cover Total % : 25 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 0 | 15 | 0 | 0 | 85 | 0 |

Crown Closure % : 100 Aspect : W

## Bed Material

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

D90 (cm): 0 Compaction: Low

## Discharge

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

## Banks

Height (m): 0.3

% Unstable: 30

Fines ☒ Gravels ☐ Larges ☐ Bedrock ☐

## Reach Symbol

(Fish)

(DV)

2 D 1.0 | F

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

Confinement: UC

Valley : Channel Ratio 10+

Stage: Dry Flood Signs Ht(m): 0.4

Bars (%): 0 pH: Braided: N

Water Temp. (°C): 10.0 02 (ppm):

Turb. (cm): Cond. (µmhos):

## Obstructions

## Fish Summary

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

## Comments

C1: S3

C2: LS = 3%, RS = 4%

C3: No fisheries sensitive zones noted.

C4: This electroshocking effort, using a Smithroot 12 B POW model, set at I-5-200V, was 150 seconds over 100 meters. Isolated stagnant pools comprised the only available habitat for sampling.

C5: No additional bank texture information.

C6: Water quality could not be evaluated.

C7: This appears to be an ephemeral channel, with muddy substrate and isolated pools. No rearing or spawning habitat was noted. The creek is totally dry in the clearcut located 50 m upstream of highway 16.


Photo #: E-29-23, 15-Sep-97
Site #: E310, Looking upstream at the channel


Photo #: E-29-24, 15-Sep-97
Site #: E310, Looking downstream at the channel

**DFO/MoELP Stream Survey Form** **Site Number: E311** **Reach No.: 1**

**Trib. to Toboggan Cr.**

TRITON Environmental Consultants Ltd.

**Location:** E311, Unit 14 **Stream (Gaz.):** Unnamed **Watershed Code:** 047-5300-000-000-000-000-000-000-000-000-000-

**Map #:** 93 L 084 **Reach Length (km):** 1.0 MW **Date:** 15-Sep-97 **Time:** 16:50 **Agency:** TEC **Access:** V2 **Fish Card:** N Field ☒ Historical ☐

**U.T.M. :** 9 .6118 .60831 **Length surveyed (m):** 100.0 GE **Survey Crew:** SJ \LE \ \ \ \ \ \ \ **Photos:** E-30-1,2 **Air Photos:**

## Channel Characteristics

| | | |
|---|---|---|
| Av. Chan. Width (m): | 1.6 | MS |
| Av. Wet. Width (m): | 0.7 | MS |
| Av. Max Riffle Depth (cm): | 0 | MS |
| Av. Max Pool Depth (cm): | 9 | MS |
| Gradient (%): | 1.0 | CL |
| Pool: 5 Riffle: 0 Run: 95 Other: 0 | | |
| % Side Channel: | 0-10 | GE |
| % Debris Area: | >15 | GE |
| %Stable: | 0 | GE |

**Specific Data**

| | | | | | |
|---|---|---|---|---|---|
| 1.2 | 1.4 | 1.9 | 1.4 | 1.6 | 1.8 |
| 0.6 | 0.7 | 0.5 | 0.6 | 0.9 | 1.0 |
| 10 | 8 | 7 | 6 | 12 | |

## Cover

Cover Total % : 5 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 10 | 0 | 0 | 0 | 80 | 10 |

Crown Closure % : 30 Aspect : W

## Bed Material

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

D90 (cm): 0 Compaction: Low

## Discharge

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

## Banks

Height (m): 0.1

% Unstable: 30

Fines ☒ Gravels ☐ Larges ☐ Bedrock ☐

Confinement: UC

Valley : Channel Ratio 10+

Stage: L Flood Signs Ht(m): 0.4

Bars (%): 100 pH: Braided: N

Water Temp. (°C): 11.0 02 (ppm):

Turb. (cm): Cond. (µmhos):

## Reach Symbol

(Fish)

(DV)

2 D 1.0 | 9100

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

## Obstructions

## Fish Summary

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

## Comments

C1 S3

C2 LS = 6%, RS = 4%

C3 No fisheries sensitive zones noted.

C4 The electroshocking effort, using a Smithroot 12B POW model set at I-5-400V, was 101 seconds over 100 meters. Isolated pools comprised the only available habitat at the time of sampling.

C5 No additional bank texture information.

C6 Water quality was not evaluated.

C7 This is an ephemeral stream that carries spring runoff. No rearing habitat at this flow stage, the substrate is unsuitable for spawning.


Photo #: E-30-1, 15-Sep-97
Site #: E311, Looking upstream at the channel, heavily overgrown with vegetation

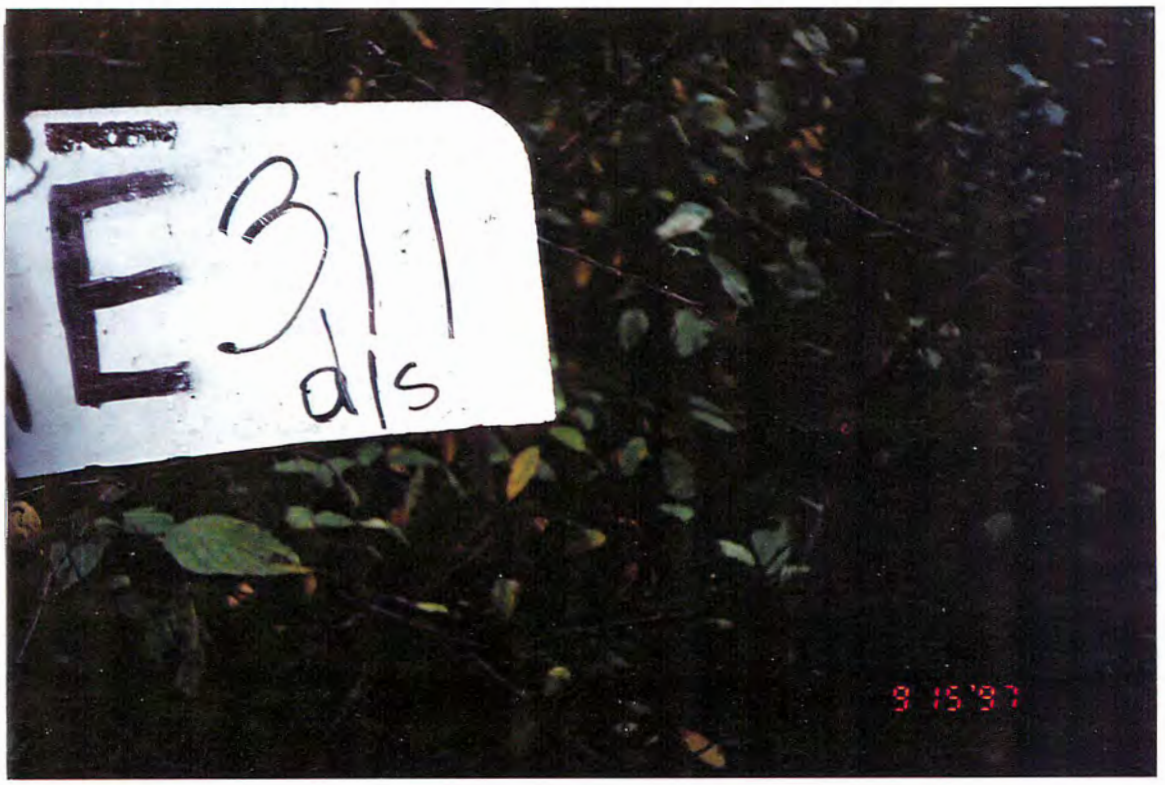


Photo #: E-30-2, 15-Sep-97
Site #: E311, Looking downstream at the channel

**DFO/MoELP Stream Survey Form** **Site Number:** W182 **Reach No.:** 4

**Trib. to Toboggan Cr.**

TRITON Environmental Consultants Ltd.

**Location:** W182, Unit 14 **Stream (Gaz.):** Unnamed **Watershed Code:** 047-4100-000-000-000-000-000-000-000-000-000-

**Map #:** 93 L 084 **Reach Length (km):** 1.7 MA **Date:** 14-Aug-97 **Time:** 13:45 **Agency:** TEC **Access:** V2 **Fish Card:** N ☐ Field ☒ Historical ☐

**U.T.M. :** 9 .6074 .60832 **Length surveyed (m):** 100.0 GE **Survey Crew:** KA \DD\ \ \ \ \ \ \ **Photos:** W-H-8,9 **Air Photos:**

## Channel Characteristics

| | | |
|---|---|---|
| Av. Chan. Width (m): | 1.9 | MS |
| Av. Wet. Width (m): | 1.5 | MS |
| Av. Max Riffle Depth (cm): | 2 | MS |
| Av. Max Pool Depth (cm): | 20 | MS |
| Gradient (%): | 2.0 | CL |
| Pool: 35 Riffle: 10 Run: 55 Other: 0 | | |
| % Side Channel: | 0-10 | GE |
| % Debris Area: | 5-15 | GE |
| %Stable: | 20 | GE |

*Specific Data*

| | | | | | |
|---|---|---|---|---|---|
| 1.8 | 4.0 | 1.2 | 1.5 | 1.4 | 1.5 |
| 1.7 | 1.8 | 1.2 | 1.5 | 1.2 | 1.4 |
| 3 | 3 | 1 | 2 | 3 | 2 |
| 20 | 22 | 16 | 17 | 27 | |

## Bed Material

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

D90 (cm): 6 Compaction: Medium

## Cover

Cover Total % : 30 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 25 | 15 | 0 | 0 | 30 | 30 |

Crown Closure % : 90 Aspect : SE

## Discharge

| | | |
|---|---|---|
| Wetted Width (m) : | 1.8 | MS |
| Mean Depth (m) : | 0.4 | MS |
| Mean Velocity (m/s) : | 0.10 | F |
| Discharge (m3/s) : | 0.05 | F |

## Banks

Height (m): 0.1

% Unstable: 20

Fines ☒ Gravels ☐ Larges ☐ Bedrock ☐

Confinement: UC

Valley : Channel Ratio 10+

Stage: M Flood Signs Ht(m): 0.3

Bars (%): 0 pH: 7.7 Braided: N

Water Temp. (°C): 9.0 02 (ppm):

Turb. (cm): Cond. (µmhos): 80

## Reach Symbol

(Fish)

(DV)

2 D 2.0 | 3610

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

## Obstructions

## Fish Summary

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

## Comments

C1: S3.

C2: LS= 14%, RS= 14%

C3: No fisheries sensitive zones noted.

C4: The electroshocking effort, using a Smithroot 12 B POW model set at 400V, was 195 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 18.1 C.

C7: This site has some dense alder cover and the substrate consists primarily of fines.

Photo #: W-H-8, 14-Aug-97
Site #: W182, Looking upstream at the channel

Photo #: W-H-9, 14-Aug-97
Site #: W182, Looking downstream at the channel

**DFO/MoELP Stream Survey Form**

**Site Number:** Z65 **Reach No.: 4**

**Trib to Toboggan Cr.**

TRITON Environmental Consultants Ltd.

**Location:** Z65, Unit 14 **Stream (Gaz.):** Unnamed **Watershed Code:** 047-4100-000-000-000-000-000-000-000-000-000-

**Map #:** 93 L 084 **Reach Length (km):** 1.7 MW **Date:** 22-Jul-97 **Time:** 17:23 **Agency:** TEC **Access:** V2 **Fish Card:** N **Field** ☒ **Historical** ☐

**U.T.M. :** 9 .607309.6083296 **Length surveyed (m):** 100.0 GE **Survey Crew:** JP \KG\ \ \ \ \ \ \ **Photos:** Z-8-17,18 **Air Photos:**

## Channel Characteristics

| | | |
|---|---|---|
| Av. Chan. Width (m): | 3.2 | MS |
| Av. Wet. Width (m): | 1.9 | MS |
| Av. Max Riffle Depth (cm): | 4 | MS |
| Av. Max Pool Depth (cm): | 22 | MS |
| Gradient (%): | 5.0 | CL |
| Pool: 15 Riffle: 20 Run: 60 Other: | 5 | |
| % Side Channel: | 10-40 | GE |
| % Debris Area: | >15 | GE |
| %Stable: | 65 | GE |

*Specific Data*

| | | | | | |
|---|---|---|---|---|---|
| 3.3 | 3.0 | 3.6 | 3.2 | 3.4 | 2.8 |
| 1.5 | 1.3 | 2.0 | 2.3 | 2.5 | 1.6 |
| 5 | 5 | 2 | | | |
| 27 | 20 | 19 | | | |

## Cover

Cover Total % : 35 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 10 | 45 | 0 | 0 | 35 | 10 |

Crown Closure % : 55 Aspect : E

## Bed Material

| | | | |
|---|---|---|---|
| Fines | Clay, silt, sand (<2mm): | 30 | 30 |
| Gravels | Small (2-16mm): | 40 | 15 |
| | Large (16-64mm): | | 25 |
| Larges | Sm. cobble (64-128mm): | 30 | 25 |
| | Lge cobble (128-256mm): | | 5 |
| | Bldr cobble (>256mm): | | 0 |
| Bedrock | | 0 | 0 |

D90 (cm): 11 Compaction: Medium

## Discharge

| | | |
|---|---|---|
| Wetted Width (m) : | 1.4 | MS |
| Mean Depth (m) : | 0.1 | MS |
| Mean Velocity (m/s) : | 0.55 | F |
| Discharge (m3/s) : | 0.06 | F |

## Banks

Height (m): 0.6

% Unstable: 0

Fines ☒ Gravels ☐ Larges ☐ Bedrock ☐

## Reach Symbol

(Fish)

(DV)

3 C 5.0 | 3430

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

Confinement: OC

Valley : Channel Ratio 5-10

Stage: L Flood Signs Ht(m):

Bars (%): 10 pH: 7.6 Braided: Y

Water Temp. (°C): 10.0 02 (ppm):

Turb. (cm): Cond. (µmhos): 90

## Obstructions

## Fish Summary

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

## Comments

C1: S3.

C2: LS=1%, RS=4%

C3: No fisheries sensitive zones noted.

C4: The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 500 V, was 110 seconds over 100 meters.

C5: No additional bank texture information.

C6: DO was not measured at this site, the water was clear to bottom. The mean air temperature on this day was 13.8 C.

C7: Some nice rearing cover was noted at this site, but it was difficult to electroshock in some areas because of the dense cover.

Photo #: Z-8-17, 22-Jul-97
Site #: Z65, Looking upstream at the channel

Photo #: Z-8-18, 22-Jul-97
Site #: Z65, Looking downstream at the channel

**DFO/MoELP Stream Survey Form**

**Site Number:** W229 **Reach No.: 1**

**Trib to Toboggan Cr.**

TRITON Environmental Consultants Ltd.

**Location:** W229, Unit 14; 0.7km west of Toboggan Cr. **Stream (Gaz.):** Unnamed **Watershed Code:** 001-9500-000-000-000-000-000-000-000-000-000-

**Map #:** 93 L 094 **Reach Length (km):** 1.7 MA **Date:** 05-Sep-97 **Time:** 8:55 **Agency:** TEC **Access:** V2 **Fish Card:** N Field ☒ Historical ☐

**U.T.M. :** 9 .6098 .60868 **Length surveyed (m):** 100.0 GE **Survey Crew:** DD \JP \LE \ \ \ \ \ \ **Photos:** W-M-18,19 **Air Photos:**

## Channel Characteristics

| | | |
|---|---|---|
| Av. Chan. Width (m): | 1.0 | MS |
| Av. Wet. Width (m): | 0.9 | MS |
| Av. Max Riffle Depth (cm): | 1 | MS |
| Av. Max Pool Depth (cm): | 13 | MS |
| Gradient (%): | 2.0 | CL |
| Pool: 30 Riffle: 10 Run: 60 Other: | 0 | |
| % Side Channel: | 0 | GE |
| % Debris Area: | 0-5 | GE |
| %Stable: | 75 | GE |

*Specific Data*

| | | | | | |
|---|---|---|---|---|---|
| 1.1 | 1.2 | 1.1 | 0.8 | 0.8 | 1.2 |
| 1.0 | 0.5 | 0.7 | 0.8 | 0.9 | 1.3 |
| 1 | 1 | 1 | 1 | 1 | 1 |
| 9 | 8 | 10 | 25 | 13 | |

## Cover

Cover Total % : 30 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 20 | 5 | 0 | 0 | 65 | 10 |

Crown Closure % : 75 Aspect : SE

## Bed Material

| | | | |
|---|---|---|---|
| Fines | Clay, silt, sand (<2mm): | 10 | 10 |
| Gravels | Small (2-16mm): | 50 | 20 |
| | Large (16-64mm): | | 30 |
| Larges | Sm. cobble (64-128mm): | 40 | 30 |
| | Lge cobble (128-256mm): | | 10 |
| | Bldr cobble (>256mm): | | 0 |
| Bedrock | | 0 | 0 |

D90 (cm): 10 Compaction: Medium

## Discharge

| | | |
|---|---|---|
| Wetted Width (m) : | 0.5 | MS |
| Mean Depth (m) : | 0.0 | MS |
| Mean Velocity (m/s) : | 0.06 | F |
| Discharge (m3/s) : | 0.02 | F |

## Banks

Height (m): 0.1

% Unstable: 10

Fines ☒ Gravels ☐ Larges ☐ Bedrock ☐

Confinement: UC

Valley : Channel Ratio 10+

Stage: L Flood Signs Ht(m): 0.7

Bars (%): 50 pH: 6.7 Braided: N

Water Temp. (°C): 6.5 02 (ppm):

Turb. (cm): Cond. (µmhos): 90

## Reach Symbol

(Fish)

(DV) (RB)

1 D 2.0 | 1540

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

## Obstructions

## Fish Summary

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

## Comments

C1: S4.

C2: LS=7%, RS=10%

C3: No fisheries sensitive zones noted.

C4: The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 400V, was 162 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 11.0 C.

C7: At higher flows this stream would contain good rearing and fair spawning habitat. At the time of survey it was just a fine trickle between run and pools. About 70m downstream of the road crossing, there is a concrete culvert under rail road tracks.

Photo #: W-M-18, 05-Sep-97
Site #: W229, Looking upstream at the channel, note the dense riparian cover

Photo #: W-M-19, 05-Sep-97
Site #: W229, Looking downstream at the channel

**DFO/MoELP Stream Survey Form** **Site Number:** W233 **Reach No.:** 1

**Trib to Toboggan Cr.**

TRITON Environmental Consultants Ltd.

**Location:** W233, Unit 14; 0.3km east of Toboggan Cr. **Stream (Gaz.):** Unnamed **Watershed Code:** 001-9600-000-000-000-000-000-000-000-000-000-

**Map #:** 93 L 094 **Reach Length (km):** 2.0 MA **Date:** 05-Sep-97 **Time:** 13:30 **Agency:** TEC **Access:** V2 **Fish Card:** N Field ☒ Historical ☐

**U.T.M. :** 9 .6107 .60859 **Length surveyed (m):** 175.0 GE **Survey Crew:** DD \JP \LE \ \ \ \ \ \ **Photos:** W-N-2,3,4 **Air Photos:**

## Channel Characteristics

| | | | |
|---|---|---|---|
| | Av. Chan. Width (m): | 3.0 | GE |
| | Av. Wet. Width (m): | 3.0 | GE |
| N | Av. Max Riffle Depth (cm): | 0 | GE |
| N | Av. Max Pool Depth (cm): | 0 | GE |
| | Gradient (%): | 0.5 | CL |
| | Pool: 0 Riffle: 0 Run: 100 Other: 0 | | |
| | % Side Channel: | 10-40 | GE |
| | % Debris Area: | 5-15 | GE |
| | %Stable: | 50 | GE |

**Specific Data**

## Cover

Cover Total % : 100 GE

| | Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|---|
| C7 | 0 | 0 | 0 | 50 | 0 | 50 |

Crown Closure % : 10 Aspect : W

## Bed Material

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

N D90 (cm): 0 Compaction: Medium

## Obstructions

## Fish Summary

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

## Discharge

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

## Banks

Height (m): 0.1

% Unstable: 75

Fines ☒ Gravels ☐ Larges ☐ Bedrock ☐

## Comments

C1 S3. Too difficult to take measurements as the entire area was flooded due to beaver dams. Below the dams, the average channel width was 3.0 m.

C2 The side slopes were not measured at this site as area was flooded.

C3 CO was caught at the highway, so with the entire area being flooded the whole area is at least a fisheries sensitive zone.

C4 The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 300V, was 66 seconds over 20 meters.

C5 No additional bank texture information.

C6 DO was not measured at this site. The air temperature at this site was 11.0 C.

C7 Most of the cover for fish at this site is provided by deep runs. Upstream of Hwy 16 crossing, a large slough was dug by the land owner. Downstream of the highway a maze of beaver dams extends for 100 meters, creating a large flooded area.

## Reach Symbol

(Fish)

CO

3 D 0.5 | F

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

Confinement: UC

Valley : Channel Ratio 10+

Stage: Flood Flood Signs Ht(m): 0.5

Bars (%): 0 pH: 6.6 Braided: Y

Water Temp. (°C): 7.5 02 (ppm):

Turb. (cm): 10 Cond. (µmhos): 150

Photo #: W-N-2, 05-Sep-97
Site #: W233, Looking downstream at the channel

Photo #: W-N-3, 05-Sep-97
Site #: W233, Looking upstream at the channel

Photo #: W-N-4, 05-Sep-97
Site #: W233, Measuring fish with the meterstick

**DFO/MoELP Stream Survey Form**

**Site Number: Y73** **Reach No.: 1**

**Trib to Toboggan Cr.**

TRITON Environmental Consultants Ltd.

**Location:** Y73, Unit 14 **Stream (Gaz.):** Unnamed **Watershed Code:** 001-8300-000-000-000-000-000-000-000-000-000-

**Map #:** 93 L 094 **Reach Length (km):** 2.0 | MA **Date:** 23-Jul-97 **Time:** 13:05 **Agency:** TEC **Access:** V2 **Fish Card:** N **Field** ☒ **Historical** ☐

**U.T.M.:** 9 .6058 .60872 **Length surveyed (m):** 100.0 | GE **Survey Crew:** DD \SJ \JP \ \ \ \ \ \ **Photos:** Y-9-24,25 **Air Photos:**

## Channel Characteristics

| | | |
|---|---|---|
| Av. Chan. Width (m): | 2.0 | MS |
| Av. Wet. Width (m): | 0.8 | MS |
| Av. Max Riffle Depth (cm): | 1 | MS |
| Av. Max Pool Depth (cm): | 14 | MS |
| Gradient (%): | 4.0 | CL |
| Pool: 20 Riffle: 5 Run: 75 Other: 0 | | |
| % Side Channel: | 0 | GE |
| % Debris Area: | >15 | GE |
| %Stable: | 75 | GE |

*Specific Data*

| | | | | | |
|---|---|---|---|---|---|
| 2.0 | 2.0 | 1.8 | 1.9 | 2.0 | 2.0 |
| 0.7 | 0.7 | 0.9 | 0.7 | 0.6 | 1.0 |
| 1 | 1 | 1 | 2 | 1 | |
| 13 | 14 | 18 | 11 | 12 | |

## Bed Material

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

D90 (cm): 12 Compaction: Low

## Cover

Cover Total %: 15 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 30 | 20 | 5 | 5 | 40 | 0 |

Crown Closure %: 80 Aspect: E

## Discharge

| | | |
|---|---|---|
| Wetted Width (m): | 0.7 | MS |
| Mean Depth (m): | 0.1 | MS |
| Mean Velocity (m/s): | 0.10 | F |
| Discharge (m3/s): | 0.01 | F |

## Banks

Height (m): 0.1

% Unstable: 50

Fines ☒ Gravels ☐ Larges ☐ Bedrock ☐

Confinement: UC

Valley : Channel Ratio: 10+

Stage: L Flood Signs Ht(m): 0.4

Bars (%): 10 pH: 7.8 Braided: Y

Water Temp. (°C): 11.0 02 (ppm):

Turb. (cm): Cond. (µmhos):

## Reach Symbol

(Fish)

(CT) (RB)

2 D 4.0 | 9010

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

## Obstructions

## Fish Summary

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

## Comments

C1: S3.

C2: LS=10%, RS=10%

C3: No fisheries sensitive zones noted.

C4: The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 400V, was 128 seconds over 100 meters.

C5: No additional bank texture information.

C6: DO and conductivity were not measured at this site, the water was clear to bottom. The conductivity meter was not working. The air temperature at this site was 15.5 C.

C7: Even at higher flows this stream would have only limited rearing habitat of deep runs and pools. The stream is logged right down to the banks. Future sampling at higher flows in recommended.

Photo #: Y-9-24, 23/07/97
Site #: Y73, Looking upstream at the channel, note dense alder dominated riparian vegetation.

Photo #: Y-9-25, 23/07/97
Site #: Y73, Looking downstream at the channel.


Photo #: Y-9-24, 23/07/97
Site #: Y73, Looking upstream at the channel, note dense alder dominated riparian vegetation.


Photo #: Y-9-25, 23/07/97
Site #: Y73, Looking downstream at the channel.

**DFO/MoELP Stream Survey Form** **Site Number:** Y74 **Reach No.:** 2

**Trib to Toboggan Cr.**

TRITON Environmental Consultants Ltd.

**Location:** Y74, Unit 14 **Stream (Gaz.):** Unnamed **Watershed Code:** 001-8600-000-000-000-000-000-000-000-000-000-

**Map #:** 93 L 094 **Reach Length (km):** 2.5 | MA **Date:** 23-Jul-97 **Time:** 14:00 **Agency:** TEC **Access:** FT **Fish Card:** N **Field** ☒ **Historical** ☐

**U.T.M.:** 9 .6058 .60568 **Length surveyed (m):** 100.0 | GE **Survey Crew:** DD \SJ \JP \ \ \ \ \ \ **Photos:** Y-9-26, Y-10-1 **Air Photos:**

## Channel Characteristics

| | | | Specific Data | | | | | |
|---|---|---|---|---|---|---|---|---|
| Av. Chan. Width (m): | 1.8 | MS | 1.7 | 2.8 | 1.6 | 1.2 | 1.7 | 2.0 |
| Av. Wet. Width (m): | 0.8 | MS | 0.6 | 1.7 | 0.6 | 0.7 | 0.7 | 0.3 |
| Av. Max Riffle Depth (cm): | 1 | MS | 2 | 2 | 1 | 1 | 1 | |
| Av. Max Pool Depth (cm): | 9 | MS | 16 | 10 | 5 | 7 | 8 | |
| Gradient (%): | 5.5 | CL | | | | | | |

Pool: 10 Riffle: 10 Run: 80 Other: 0

% Side Channel: 0-10 GE

% Debris Area: 5-15 GE

%Stable: 20 GE

## Cover

Cover Total %: 15 GE

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

Crown Closure %: 80 Aspect: NE

## Bed Material

| | | | |
|---|---|---|---|
| Fines | Clay, silt, sand (<2mm): | 20 | 20 |
| Gravels | Small (2-16mm): | 20 | 10 |
| | Large (16-64mm): | | 10 |
| Larges | Sm. cobble (64-128mm): | 60 | 35 |
| | Lge cobble (128-256mm): | | 20 |
| | Bldr cobble (>256mm): | | 5 |
| Bedrock | | 0 | 0 |

D90 (cm): 10 Compaction: Medium

## Discharge

| | | |
|---|---|---|
| Wetted Width (m): | 0.1 | MS |
| Mean Depth (m): | 0.0 | MS |
| Mean Velocity (m/s): | 0.18 | F |
| Discharge (m3/s): | 0.01 | F |

## Banks

Height (m): 0.1

% Unstable: 25

Fines ☒ Gravels ☐ Larges ☐ Bedrock ☐

Confinement: UC

Valley : Channel Ratio 10+

Stage: L Flood Signs Ht(m): 0.4

Bars (%): 40 pH: 7.8 Braided: Y

Water Temp. (°C): 11.0 02 (ppm):

Turb. (cm): Cond. (µmhos):

## Reach Symbol

(Fish)

(RB) (CT)

2 D 6.0 | 2260

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

## Obstructions

## Fish Summary

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

## Comments

C1: S3.

C2: LS=15%, RS=15%

C3: No fisheries sensitive zones noted.

C4: The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 400V, was 72 seconds over 100 meters.

C5: No additional bank texture information.

C6: DO and conductivity were not measured at this site, the water was clear to bottom. The mean air temperature on this day was 16.5 C.

C7: At higher flows this stream would contain suitable rearing habitat. This sample site located at the confluence of several ground flows.


Photo #: Y-9-26, 23/07/97
Site #: Y74, Looking upstream at the channel.


Photo #: Y-10-1, 23/07/97
Site #: Y74, Looking downstream at the channel.

**DFO/MoELP Stream Survey Form**

**Site Number:** Y76 **Reach No.:** 1

**Trib to Toboggan Cr.**

TRITON Environmental Consultants Ltd.

**Location:** Y76, Unit 14 **Stream (Gaz.):** Unnamed **Watershed Code:** 001-8300-000-000-000-000-000-000-000-000-000-

**Map #:** 93 L 094 **Reach Length (km):** 2.2 | MA **Date:** 23-Jul-97 **Time:** 15:45 **Agency:** TEC **Access:** V2 **Fish Card:** N ☐ Field ☒ Historical ☐

**U.T.M.:** 9 .6085 .60875 **Length surveyed (m):** 200.0 | GE **Survey Crew:** DD\SJ\JP\ \ \ \ \ \ **Photos:** Y-10-5,6,7,8 **Air Photos:**

## Channel Characteristics

| | | | Specific Data | | | | | |
|---|---|---|---|---|---|---|---|---|
| Av. Chan. Width (m): | 5.9 | MS | 8.0 | 6.0 | 4.4 | 7.4 | 4.0 | 5.7 |
| Av. Wet. Width (m): | 1.4 | MS | 1.6 | 1.2 | 1.7 | 1.7 | 1.5 | 1.0 |
| Av. Max Riffle Depth (cm): | 3 | MS | 3 | 3 | 3 | 3 | 2 | |
| Av. Max Pool Depth (cm): | 30 | MS | 40 | 22 | 33 | 20 | 35 | |
| Gradient (%): | 2.0 | CL | | | | | | |

Pool: 10 Riffle: 20 Run: 70 Other: 0

| | | |
|---|---|---|
| % Side Channel: | 0 | GE |
| % Debris Area: | 0-5 | GE |
| %Stable: | 25 | GE |

## Cover

Cover Total %: 10 | GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 70 | 10 | 0 | 0 | 10 | 10 |

Crown Closure %: 10 Aspect: NW

## Bed Material

| | | | |
|---|---|---|---|
| Fines | Clay, silt, sand (<2mm): | 20 | 20 |
| Gravels | Small (2-16mm): | 70 | 30 |
| | Large (16-64mm): | | 40 |
| Larges | Sm. cobble (64-128mm): | 10 | 7 |
| | Lge cobble (128-256mm): | | 3 |
| | Bldr cobble (>256mm): | | 0 |
| Bedrock | | 0 | 0 |

D90 (cm): 5 Compaction: Medium

## Discharge

| | | |
|---|---|---|
| Wetted Width (m): | 0.9 | MS |
| Mean Depth (m): | 0.1 | MS |
| Mean Velocity (m/s): | 0.28 | F |
| Discharge (m3/s): | 0.02 | F |

## Reach Symbol

(Fish)

| CO | CT |
|---|---|
| 6 E 2.0 | 2710 |
| (Width, Valley: Channel, Slope) | (Bed Material) |

## Banks

Height (m): 0.1

% Unstable: 80

Fines ☒ Gravels ☐ Larges ☐ Bedrock ☐

Confinement: N/A

Valley : Channel Ratio N/A

Stage: M Flood Signs Ht(m): 0.8

Bars (%): 80 pH: 7.8 Braided: Y

Water Temp. (°C): 02 (ppm):

Turb. (cm): Cond. (µmhos):

## Obstructions

## Fish Summary

| C | Species | Number | Size Range (mm) | Life Phase | Use 1 | Use 2 | Use 3 | Method |
|---|---|---|---|---|---|---|---|---|
| | CO | 8 | 80-100 | J | R | | | EL |
| | CT | 1 | 200 | J | R | | | VO |

## Comments

C1: S2.

C2: LS=8%, RS=3%

C3: No fisheries sensitive zones noted.

C4: The electroshocking effort, using a Smithroot 12 B POW model set at I, 5, 400V, was 48 seconds over 30 meters.

C5: No additional bank texture information.

C6: DO, water temperature and conductivity were not measured at this site, the water was clear to bottom. The mean air temperature on this day was 11.1 C.

C7: This could be a very significant salmon spawning/rearing stream with some habitat restoration. At present, cattle have free run of the stream bed. The sampled area flows through a large pasture in which the riparian cover has been removed. This site lacks habitat complexity.


Photo #: Y-10-7, 23/07/97
Site #: Y76, CO on the fish board.


Photo #: Y-10-8, 24/07/97
Site #: Y76, CO on the fish board.


Photo #: Y-10-5, 23/07/97
Site #: Y76, Looking upstream at the channel, note the slumping bank.


Photo #: Y-10-6, 23/07/97
Site #: Y76, Looking downstream at the channel, note large gravel bar.

**DFO/MoELP Stream Survey Form** **Site Number:** Z62 **Reach No.:** 1

**Trib. to Toboggan Cr.**

TRITON Environmental Consultants Ltd.

**Location:** Z62, Unit 14 **Stream (Gaz.):** Unnamed **Watershed Code:** 047-4100-000-000-000-000-000-000-000-000-000-

**Map #:** 93 L 084 **Reach Length (km):** 2.7 MA **Date:** 22-Jul-97 **Time:** 15:20 **Agency:** TEC **Access:** V2 **Fish Card:** N Field ☒ Historical ☐

**U.T.M.:** 9 .61030 .608506 **Length surveyed (m):** 150.0 GE **Survey Crew:** KG\JP\ \ \ \ \ \ \ **Photos:** Z-8-5,6,7,8,9,10 **Air Photos:**

## Channel Characteristics

| | | | |
|---|---|---|---|
| C1 | Av. Chan. Width (m): | 4.9 | MS |
| C1 | Av. Wet. Width (m): | 3.1 | MS |
| | Av. Max Riffle Depth (cm): | 8 | MS |
| | Av. Max Pool Depth (cm): | 21 | MS |
| | Gradient (%): | 2.0 | CL |

Pool: 10 Riffle: 70 Run: 20 Other: 0

| | | |
|---|---|---|
| % Side Channel: | 10-40 | GE |
| % Debris Area: | 0-5 | GE |
| %Stable: | 10 | GE |

*Specific Data*

| | | | | | |
|---|---|---|---|---|---|
| 4.8 | 4.5 | 4.4 | 4.7 | 5.0 | 5.8 |
| 3.3 | 3.2 | 3.4 | 1.9 | 2.5 | 3.4 |
| 11 | 8 | 4 | | | |
| 16 | 22 | 24 | | | |

## Cover

Cover Total %: 30 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 10 | 10 | 0 | 0 | 80 | 0 |

Crown Closure %: 40 Aspect: NW

## Bed Material

| | | | |
|---|---|---|---|
| Fines | Clay, silt, sand (<2mm): | 20 | 20 |
| Gravels | Small (2-16mm): | 60 | 25 |
| | Large (16-64mm): | | 35 |
| Larges | Sm. cobble (64-128mm): | 20 | 20 |
| | Lge cobble (128-256mm): | | 0 |
| | Bldr cobble (>256mm): | | 0 |
| Bedrock | | 0 | 0 |

D90 (cm): 7 Compaction: Low

## Discharge

| | | |
|---|---|---|
| Wetted Width (m): | 2.7 | MS |
| Mean Depth (m): | 9.0 | MS |
| Mean Velocity (m/s): | 0.37 | F |
| Discharge (m3/s): | 6.74 | F |

## Banks

Height (m): 0.1

% Unstable: 0

Fines ☒ Gravels ☐ Larges ☐ Bedrock ☐

Confinement: OC

Valley : Channel Ratio 5-10

Stage: L Flood Signs Ht(m): 0.8

Bars (%): 25 pH: 7.4 Braided: Y

Water Temp. (°C): 13.5 02 (ppm):

Turb. (cm): Cond. (µmhos): 160

## Reach Symbol

(Fish)

CO RB

5 C 2.0 | 2620

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

## Obstructions

## Fish Summary

| C | Species | Number | Size Range (mm) | Life Phase | Use 1 | Use 2 | Use 3 | Method |
|---|---|---|---|---|---|---|---|---|
| | RB | 4 | 77-80 | J | R | | | EL |
| | CO | 3 | 80 | J | R | | | EL |

## Comments

C1: S2. Two additional measurements were taken for both the channel and wetted widths; 5.1 and 3.3, and 4.9 and 3.5.

C2: LS=1%, RS=5%

C3: No fisheries sensitive zones noted.

C4: The electroshocking effort, using a Smithroot 12 B POW, was 89 seconds over 100 meters.

C5: No additional bank texture information.

C6: DO was not measured at this site, the water was clear to bottom. The mean air temperature on this day was 13.8 C.

C7: There is some nice spwaning and rearing habitat at this site.

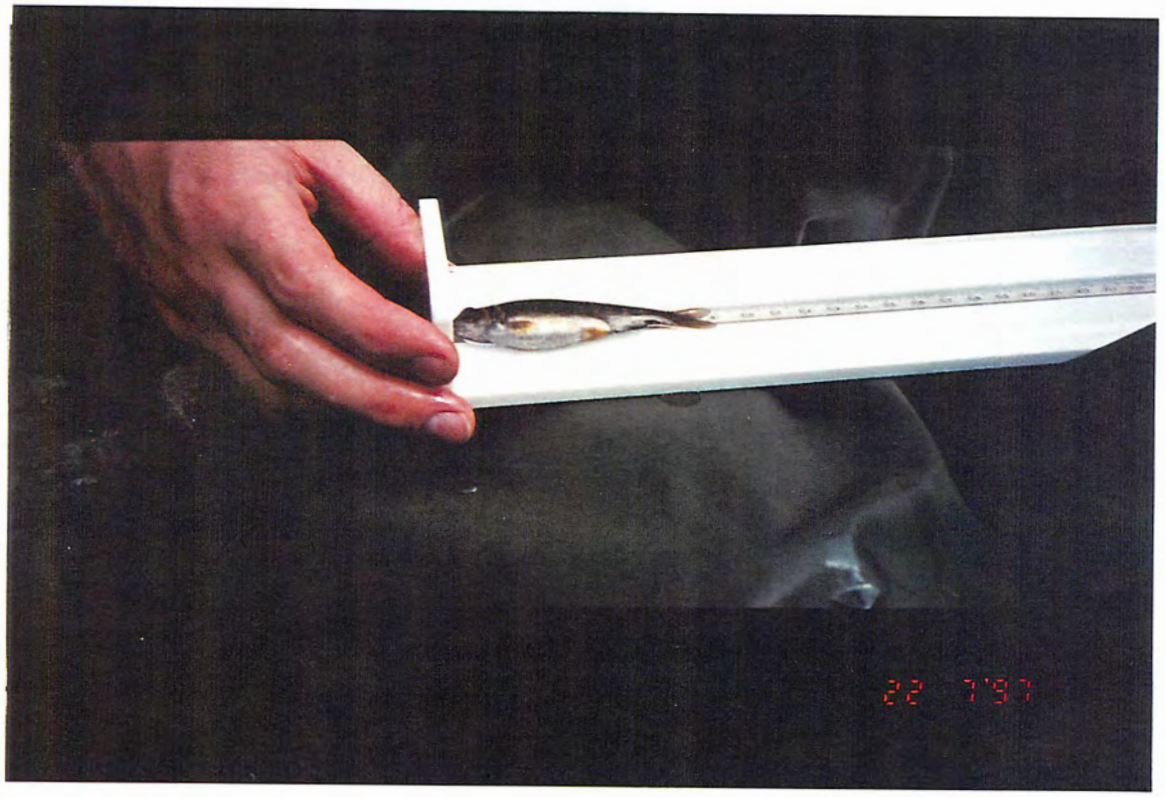

Photo #: Z-8-5, 22-Jul-97
Site #: Z62, Measuring fish on the fishboard

Photo #: Z-8-6, 22-Jul-97
Site #: Z62, Measuring fish on the fishboard

Photo #: Z-8-7, 22-Jul-97
Site #: Z62, Measuring fish on the fishboard

Photo #: Z-8-8, 22-Jul-97
Site #: Z62, Looking upstream at the channel


Photo #: Z-8-9, 22-Jul-97
Site #: Z62, Looking upstream at the channel, note the condition of the culvert


Photo #: Z-8-10, 22-Jul-97
Site #: Z62, Looking downstream at the channel

**DFO/MoELP Stream Survey Form**

**Site Number:** E312

**Reach No.: 0**

**Not a creek**

TRITON Environmental Consultants Ltd.

**Location:** E312, Unit 14 **Stream (Gaz.):** Unnamed **Watershed Code:** 048-3100-000-000-000-000-000-000-000-000-000-

**Map #:** 93 L 084 **Reach Length (km):** 0.0 GE **Date:** 15-Sep-97 **Time:** 15:10 **Agency:** TEC **Access:** V2 **Fish Card:** N Field ☒ Historical ☐

**U.T.M. :** 9 .6125 .60820 **Length surveyed (m):** 100.0 GE **Survey Crew:** SJ \LE \JL \ \ \ \ \ \ **Photos:** E-30-3,4 **Air Photos:**

## Channel Characteristics

| | | | |
|---|---|---|---|
| N | Av. Chan. Width (m): | 0.0 | GE |
| N | Av. Wet. Width (m): | 0.0 | GE |
| N | Av. Max Riffle Depth (cm): | 0 | GE |
| N | Av. Max Pool Depth (cm): | 0 | GE |
| | Gradient (%): | 3.0 | MA |
| N | Pool: 0 Riffle: 0 Run: 0 Other: 0 | | |
| N | % Side Channel: | | GE |
| N | % Debris Area: | 0 | GE |
| | %Stable: | | GE |

## Specific Data

## Bed Material

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

N D90 (cm): 0 Compaction: Low

## Cover

N Cover Total % : 0 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 |

N Crown Closure % : 0 N Aspect : W

## Discharge

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

## Banks

N Height (m): 0.0 % Unstable: 0

Fines ☐ Gravels ☐ Larges ☐ Bedrock ☐

Confinement: UC

Valley : Channel Ratio 10+

Stage: Dry N Flood Signs Ht(m):

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

N Water Temp. (°C): 02 (ppm):

Turb. (cm): Cond. (µmhos):

## Reach Symbol

(Fish)

NF

0 D 3.0 | F

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

## Obstructions

## Fish Summary

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

## Comments

C1 NC

C2 Side slopes not applicable.

C3 No fisheries sensitive zones noted.

C4 This site was not electrofished.

C5 Bank texture not applicable.

C6 Water quality could not be measured.

C7 This used to be a creek, but it flowed through a feedlot and was trampled out of existence by livestock. Below the highway the stream is actually a wetland.


Photo #: E-30-3, 15-Sep-97
Site #: E312, Looking upstream at the channel


Photo #: E-30-4, 15-Sep-97
Site #: E312, Looking at an "NC"

**DFO/MoELP Stream Survey Form**

**Site Number:** W179 **Reach No.: 0**

**Not a creek**

TRITON Environmental Consultants Ltd.

**Location:** W179, Unit 14 **Stream (Gaz.):** Unnamed **Watershed Code:** 048-6300-000-000-000-000-000-000-000-000-000-

**Map #:** 93 L 084 **Reach Length (km):** 0.0 MA **Date:** 13-Aug-97 **Time:** 17:05 **Agency:** TEC **Access:** V2 **Fish Card:** N Field ☒ Historical ☐

**U.T.M. :** 9 .6154 .60777 **Length surveyed (m):** 200.0 GE **Survey Crew:** KA \DD\ \ \ \ \ \ \ **Photos:** W-H-1,2 **Air Photos:**

## Channel Characteristics

| | | | |
|---|---|---|---|
| N | Av. Chan. Width (m): | 0.0 | GE |
| N | Av. Wet. Width (m): | 0.0 | GE |
| N | Av. Max Riffle Depth (cm): | 0 | GE |
| N | Av. Max Pool Depth (cm): | 0 | GE |
| N | Gradient (%): | 1.5 | MA |
| N | Pool: 0 Riffle: 0 Run: 0 Other: 0 | | |
| N | % Side Channel: | 0 | GE |
| N | % Debris Area: | 0 | GE |
| | %Stable: | 0 | GE |

**Specific Data**

## Cover

N Cover Total % : 0 GE

| | Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|---|
| N | 0 | 0 | 0 | 0 | 0 | 0 |

N Crown Closure % : 0 N Aspect : S

## Bed Material

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

N D90 (cm): 0 N Compaction:

## Discharge

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

## Banks

N Height (m): 0.0 % Unstable: 0

N Fines ☐ Gravels ☐ Larges ☐ Bedrock ☐

Confinement: N/A

Valley : Channel Ratio N/A

Stage: Dry N Flood Signs Ht(m): 0

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

N Water Temp. (°C): 02 (ppm):

Turb. (cm): Cond. (µmhos):

## Reach Symbol

(Fish)

NF

0 E 1.5 | 0000

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

## Obstructions

## Fish Summary

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

## Comments

C1 NC

C2 The side slopes were not measured at this site.

C3 No fisheries sensitive zones noted.

C4 This site was not electroshocked

C5 No additional bank texture information.

C6 Water quality was not evaluated at this site.

C7 There is no defined channel here, just seepage. There is a culvert at the highway, 700m SE of Kathlyn Lake Rd and another on a side road, but there is no creek. It seems to be occational drainage for the farm field on the NE side of the highway.

Photo #: W-H-1, 13-Aug-97
Site #: W179, Looking at an "NC"

Photo #: W-H-2, 13-Aug-97
Site #: W179, Looking at an "NC"

**DFO/MoELP Stream Survey Form**

**Site Number:** W231 **Reach No.: 0**

**Not a creek**

TRITON Environmental Consultants Ltd.

**Location:** W231, Unit 14; 2.3km west of Tobaggan Cr. **Stream (Gaz.):** Unnamed **Watershed Code:** 001-8900-000-000-000-000-000-000-000-000-000-

Map #: 93 L 094 Reach Length (km): 0.0 MA Date: 05-Sep-97 Time: 12:00 Agency: TEC Access: V2 Fish Card: N Field ☒ Historical ☐

U.T.M.: 9 .6081 .60863 Length surveyed (m): 100.0 GE Survey Crew: DD \JP \LE \ \ \ \ \ \ Photos: None Air Photos:

## Channel Characteristics

| | | | |
|---|---|---|---|
| N | Av. Chan. Width (m): | 0.0 | GE |
| N | Av. Wet. Width (m): | 0.0 | GE |
| N | Av. Max Riffle Depth (cm): | 0 | GE |
| N | Av. Max Pool Depth (cm): | 0 | GE |
| N | Gradient (%): | 11.0 | MA |
| N | Pool: 0 Riffle: 0 Run: 0 Other: 0 | | |
| N | % Side Channel: | 0 | GE |
| N | % Debris Area: | 0 | GE |
| | %Stable: | 0 | GE |

**Specific Data**

## Cover

N Cover Total % : 0 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 |

N Crown Closure % : 0 N Aspect : N

## Bed Material

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

N D90 (cm): 0 N Compaction:

## Discharge

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

## Banks

N Height (m): 0.0 % Unstable: 0

N Fines ☐ Gravels ☐ Larges ☐ Bedrock ☐

Confinement: N/A

Valley : Channel Ratio N/A

N Stage: Dry N Flood Signs Ht(m): 0

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

N Water Temp. (°C): 02 (ppm):

Turb. (cm): Cond. (µmhos):

## Reach Symbol

(Fish)

NF

0 E 11.0 | 0000

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

## Obstructions

## Fish Summary

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

## Comments

C1 NC.

C2 The side slopes were not measured at this site.

C3 No fisheries sensitive zones noted.

C4 This site was not electroshocked.

C5 No additional bank texture information.

C6 Water quality was not evaluated at this site. The air temperature at this site was 9.0 C.

C7 There was nothing here that even remotely resembled a creek. The UTM confirms that it was at the right location.

**DFO/MoELP Stream Survey Form** **Site Number:** W232 **Reach No.: 0**

**Not a creek**

TRITON Environmental Consultants Ltd.

**Location:** W232, Unit 14; 1.5km east of Toboggan Cr. **Stream (Gaz.):** Russell Brook **Watershed Code:** 001-8000-000-000-000-000-000-000-000-000-000-

**Map #:** 93 L 094 **Reach Length (km):** 0.0 MA **Date:** 05-Sep-97 **Time:** 13:00 **Agency:** TEC **Access:** V2 **Fish Card:** N Field ☒ Historical ☐

**U.T.M.:** 9 .6114 .60874 **Length surveyed (m):** 200.0 GE **Survey Crew:** DD \JP \LE \ \ \ \ \ \ **Photos:** W-M-25,W-N-1 **Air Photos:**

## Channel Characteristics

| | | | |
|---|---|---|---|
| N | Av. Chan. Width (m): | 0.0 | GE |
| N | Av. Wet. Width (m): | 0.0 | GE |
| N | Av. Max Riffle Depth (cm): | 0 | GE |
| N | Av. Max Pool Depth (cm): | 0 | GE |
| | Gradient (%): | 0.5 | CL |
| N | Pool: 0 Riffle: 0 Run: 0 Other: 0 | | |
| N | % Side Channel: | 0 | GE |
| N | % Debris Area: | 0 | GE |
| | %Stable: | 0 | GE |

**Specific Data**

## Cover

N Cover Total % : 0 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 |

N Crown Closure % : 0 Aspect : SW

## Bed Material

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

N D90 (cm): 0 Compaction: Low

## Discharge

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

## Banks

N Height (m): 0.1

% Unstable: 0

N Fines ☐ Gravels ☐ Larges ☐ Bedrock ☐

## Reach Symbol

(Fish)

NF

0 E 0.5 | F

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

Confinement: N/A

Valley : Channel Ratio N/A

N Stage: Dry N Flood Signs Ht(m): 0.2

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

N Water Temp. (°C): 02 (ppm):

Turb. (cm): Cond. (µmhos):

## Obstructions

## Fish Summary

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

## Comments

C1 NC

C2 LS=7%, RS=10%

C3 No fisheries sensitive zones noted.

C4 This site was not electrofished.

C5 No additional bank texture information.

C6 Water quality was not evaluated at this site.

C7 On the upstream side of a large culvert, the stream has been dug out to create a slough of approximatley 5m in width and 100m in length. This stream has been heavily impacted by this or previous owners. Irrigation or drainage channels border this field on two sides. This stream drains a swampy area according to the map. This is a slough with stagnant water full of duckweed and frogs. Downstream of the road is a small, grassy, dry channel of 1.0m.

C8 Many frogs were noted at this site.

Photo #: W-M-25, 05-Sep-97
Site #: W232, Looking upstream at the channel

Photo #: W-N-1, 05-Sep-97
Site #: W232, Looking upstream at the channel, overgrown with grasses

**DFO/MoELP Stream Survey Form** **Site Number:** W234 **Reach No.: 0**

**Not a creek**

TRITON Environmental Consultants Ltd.

**Location:** W234, Unit 14; 0.5km south of Bulkley R. **Stream (Gaz.):** Russell Brook **Watershed Code:** 001-8000-000-000-000-000-000-000-000-000-000-

**Map #:** 93 L 094 **U.T.M.:** 9 .6085 .60897 **Reach Length (km):** 0.0 MA **Length surveyed (m):** 60.0 GE **Date:** 05-Sep-97 **Time:** 14:45 **Agency:** TEC **Survey Crew:** DD \P \LE \ \ \ \ \ \ **Access:** V2 **Fish Card:** N **Photos:** W-N-5 **Field** ☒ **Historical** ☐ **Air Photos:**

## Channel Characteristics

| | | | |
|---|---|---|---|
| N | Av. Chan. Width (m): | 0.0 | GE |
| N | Av. Wet. Width (m): | 0.0 | GE |
| N | Av. Max Riffle Depth (cm): | 0 | GE |
| N | Av. Max Pool Depth (cm): | 0 | GE |
| N | Gradient (%): | 1.0 | MA |
| N | Pool: 0 Riffle: 0 Run: 0 Other: 0 | | |
| N | % Side Channel: | 0 | GE |
| N | % Debris Area: | 0 | GE |
| | %Stable: | 0 | GE |

**Specific Data**

## Cover

N Cover Total % : 0 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 |

N Crown Closure % : 0 N Aspect : NW

## Bed Material

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

N D90 (cm): 0 N Compaction:

## Discharge

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

## Banks

N Height (m): 0.0

% Unstable: 0

N Fines ☐ Gravels ☐ Larges ☐ Bedrock ☐

## Reach Symbol

(Fish)

NF

0 E 1.0 | 0000

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

Confinement: N/A

Valley : Channel Ratio N/A

N Stage: Dry N Flood Signs Ht(m): 0

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

N Water Temp. (°C): 02 (ppm):

Turb. (cm): Cond. (µmhos):

## Obstructions

## Fish Summary

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

## Comments

C1 NC.

C2 The side slopes were not measured at this site.

C3 No fisheries sensitive zones noted.

C4 This site was not electrofished.

C5 No additional bank texture information.

C6 Water quality was not evaluated at this site.

C7 At the time of the survey there was no defined channel on either side of the road. Possibly past logging has had a serious impact upon the stream. This "stream" could be used for spring drainage and for increased precipitation events.

Photo #: W-N-5, 05-Sep-97
Site #: W234, Looking at an "NC"

**DFO/MoELP Stream Survey Form**

**Site Number:** Y274 **Reach No.: 0**

**Not a creek**

TRITON Environmental Consultants Ltd.

**Location:** Y274, Unit 14 **Stream (Gaz.):** Unnamed **Watershed Code:** 051-7800-000-000-000-000-000-000-000-000-000-

**Map #:** 93 L 074 **Reach Length (km):** 0.0 GE **Date:** 16-Sep-97 **Time:** 16:09 **Agency:** TEC **Access:** V4 **Fish Card:** N Field ☒ Historical ☐

**U.T.M.:** 9 614966 607375 **Length surveyed (m):** 200.0 GE **Survey Crew:** JP UL \ \ \ \ \ \ \ **Photos:** Y-33-15 **Air Photos:**

## Channel Characteristics

| | | | |
|---|---|---|---|
| C1 | Av. Chan. Width (m): | 0.0 | GE |
| N | Av. Wet. Width (m): | 0.0 | GE |
| N | Av. Max Riffle Depth (cm): | 0 | GE |
| N | Av. Max Pool Depth (cm): | 0 | GE |
| | Gradient (%): | 3.0 | MA |
| N | Pool: 0 Riffle: 0 Run: 0 Other: 0 | | |
| N | % Side Channel: | | GE |
| N | % Debris Area: 0 | | GE |
| | %Stable: | 0 | GE |

Specific Data

## Cover

N Cover Total % : 0 GE

| | Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|---|
| N | 0 | 0 | 0 | 0 | 0 | 0 |

N Crown Closure % : 0 N Aspect : E

## Bed Material

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

N D90 (cm): 0 N Compaction:

## Discharge

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

## Banks

N Height (m): 0.0

% Unstable: 0

N Fines ☐ Gravels ☐ Larges ☐ Bedrock ☐

## Reach Symbol

(Fish)

NF

0 E 3.0 | 0000

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

Confinement: N/A

Valley : Channel Ratio N/A

N Stage: Dry N Flood Signs Ht(m):

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

N Water Temp. (°C): 02 (ppm):

Turb. (cm): Cond. (µmhos):

## Obstructions

## Fish Summary

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

## Comments

C1 NC. The stream appears to have been diverted.

C2 Side slopes not applicable.

C3 No fisheries sensitive zones present.

C4 This site was not electrofished.

C5 Bank texture not applicable.

C6 Water quality not applicable.

C7 This site contains no fish habitat. An unmapped creek which may be the stream to be sampled was observed, but could not be accessed as it was on private property.


Photo #: Y-33-15, 16/09/97
Site #: Y274, Looking at an "NC"

**DFO/MoELP Stream Survey Form** **Site Number: Y75** **Reach No.: 0**

**Not a creek**

TRITON Environmental Consultants Ltd.

**Location:** Y75, Unit 14 **Stream (Gaz.):** Unnamed **Watershed Code:** 001-8400-000-000-000-000-000-000-000-000-000-

**Map #:** 93 L 094 **Reach Length (km):** 0.0 GE **Date:** 23-Jul-97 **Time:** 15:30 **Agency:** TEC **Access:** V2 **Fish Card:** N Field ☒ Historical ☐

**U.T.M. :** 9 .6076 .60878 **Length surveyed (m):** 110.0 GE **Survey Crew:** DD \SJ \JP \ \ \ \ \ \ **Photos:** Y-10-2,3,4 **Air Photos:**

## Channel Characteristics

| | | | |
|---|---|---|---|
| N | Av. Chan. Width (m): | 0.0 | GE |
| N | Av. Wet. Width (m): | 0.0 | GE |
| N | Av. Max Riffle Depth (cm): | 0 | GE |
| N | Av. Max Pool Depth (cm): | 0 | GE |
| N | Gradient (%): | 4.0 | MA |
| N | Pool: 0 Riffle: 0 Run: 0 Other: 0 | | |
| N | % Side Channel: | 0 | GE |
| N | % Debris Area: | 0 | GE |
| | %Stable: | 0 | GE |

*Specific Data*

## Cover

N Cover Total % : 0 GE

| Pool | LOD | Bldr | In Veg | O Veg | Ctbnk |
|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 |

N Crown Closure % : 0 N Aspect : SE

## Bed Material

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

N D90 (cm): 0 N Compaction:

## Discharge

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

## Banks

N Height (m): 0.0

% Unstable: 0

N Fines ☐ Gravels ☐ Larges ☐ Bedrock ☐

Confinement: N/A

Valley : Channel Ratio N/A

N Stage: Dry N Flood Signs Ht(m):

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

N Water Temp. (°C): 02 (ppm):

Turb. (cm): Cond. (µmhos):

## Reach Symbol

(Fish)

NF

0 E 4.0 | 0000

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

## Obstructions

## Fish Summary

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

## Comments

C1 NC.

C2 The side slopes were not measured at this site.

C3 No fisheries sensitive zones noted.

C4 This site was not electrofished.

C5 No additional bank texture information.

C6 Water quality was not evaluated at this site.

C7 A large pool with no defined channel was noted above the road. Below the road crossing, there is some semblance of a channel, likely caused by spring run-off. This channel disappears after about 200 m .

Photo #: Y-10-2, 23/07/97
Site #: Y75, Looking at a large pool.

Photo #: Y-10-3, 23/07/97
Site #: Y75, Small tadpoles.


Photo #: Y-10-4, 23/07/97
Site #: Y75, Large tadpole.

## 5.13 Fish Age, Growth and Other Observations

Fish catch data were compiled for all records that contained a discrete size measurement. These data were summarised and plotted in histograms by species, the results are presented in Figures 2a through 2j. Species caught in Working Unit 14 included rainbow trout, Dolly Varden, burbot, minnows, coho, cutthroat trout, lamprey, northern squawfish, salmon (general), and suckers (general). The following table summarises the numbers of fish caught in each size class.

**Table 8. Catch Data by Species and by Size Class (mm) in Working Unit 14**

| | RB | DV | BB | C | CO | CT | L | NSC | SA | SU |
|---|---|---|---|---|---|---|---|---|---|---|
| 0-25 | | | | | | | | | | 15 |
| 25-50 | | | | | 7 | | | | | |
| 50-75 | | | | | | 3 | | | | |
| 75-100 | 4 | 4 | | 1 | 11 | 9 | | | 1 | |
| 100-125 | | | | | | 3 | | | | |
| 125-150 | | 2 | | | | 10 | 1 | | | |
| 150-175 | | | | | | 2 | | | | |
| 175-200 | | 1 | 1 | | | 3 | | | | |
| 200-225 | | | | | | 3 | | | | |
| 225-250 | | | | | | 1 | | | | |
| 250-275 | | | | | | | | | | |
| 275-300 | | | | | | | | 1 | | |
| 300-325 | | | | | | | | | | |
| 325-350 | | | | | | | | | | |
| 350-375 | | | | | | | | | | 4 |
| 375-400 | | | | | | | | | | |
| 400-425 | | | | | | | | | | |
| 425-450 | | | | | | | | | | |
| 450-475 | | | | | | | | | | |
| 475-500 | | | | | | | | | | |
| >500 | | | | | | | | | | |

## 5.14 Rare and Endangered Species

No rare or endangered species were observed in this working unit.

## 5.15 Wildlife Observations

An unidentified frog species , as well as beaver ponds and dams were observed in working unit 14. Table 7 summarizes the wildlife and wildlife signs observed in this working area.

## 5.16 Recommendations for Future Sampling

A list of all sites for which future sampling is recommended in unit 14 is provided in Table 6. Future sampling is strongly recommended for the following reaches:

- reach 4 of Elliot Creek
- reach 2 of Owens Creek
- Z52, reach 1 of Powers Creek
- Z47, reach 1 of Dahlie Creek
- E304, reach 2 of Toboggan Creek
- W178, reach 1 of Glacier Gulch Creek
- Z61, reach 1 of Glass Creek

The upper reaches of the Owens and Elliot Creek systems were not sampled in this inventory due to access problems associated with both bad weather and terrain. Future sampling is recommended for these reaches as fish use is unlikely. The gradient and confinement in these areas appear to be problematic, but because these reaches have not been sampled the upper limit of fish distribution has not been determined for these streams.

Reach 2 of Toboggan Creek has been classified as fish bearing because abundant rearing habitat, including plunge pools, scour pools and LOD cover, was observed at the sample site. Fish presence is unlikely in this reach because of the impassable 5 meter falls downstream, but the habitat quality is such that it has been classified as fish bearing until follow up sampling confirms the absence of fish.

W178 on reach 1 of Glacier Gulch Creek was at high flow at the time of survey, and the water velocity and turbidity were high, reducing the effectiveness of electroshocking. As this reach is totally accessible and could provide Dolly Varden habitat, follow up sampling is recommended.

No fish were caught by electrofishing at site Z62 in reach 1 of Glass Creek. This stream has both deep run and instream vegetation cover and is accessible from fish bearing Toboggan Lake. Fish presence is expected in this reach and future sampling by minnow trapping is recommended. More detailed water quality sampling is also recommended for this stream, which is associated with agricultural development and may be subject to impacts from highway 16.

## 6.0 CONCLUSIONS AND RECOMMENDATIONS

Fish distribution in the watersheds inventoried in this working unit is limited by isolated barriers and by steep gradient in the upper reaches of systems like Seymour Creek, Chicken Lake Creek, Simpson Creek, Kathlyn Creek and Elliot Creek. Barriers were noted on Toboggan Creek and Owens Creek and represent the suspected upper limits of fish distribution in these streams. The Toboggan Creek and Kathlyn Creek systems are quite productive for fish, in spite of the impacts of intensive human development surrounding these watersheds. The historical information indicates that Toboggan Creek supports both coho and pink salmon spawning and Kathlyn Creek supports both spawning steelhead and coho spawning. A water quality monitoring program is strongly recommended for these systems, as they provide crucial habitat for Pacific Salmon species.

## 7.0 REFERENCES


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Haas, G.R. and JD McPhail. 1991. Systematics and distributions of Dolly Varden (Salvelinus malma) and bull trout (Salvelinus confluentus) in North America. Canadian Journal of Fisheries and Aquatic Sciences 48:2191-2211.

Province of British Columbia. 1996. Resource Inventory Committee (RIC): Fish Sampling Manual (Originally called Fish Collection, Preservation, Measurement and Enumeration Manual, RIC Draft 1994).

Province of British Columbia. 1995a. Forest Practices Code: Fish-stream Identification Guidebook, July 1995.

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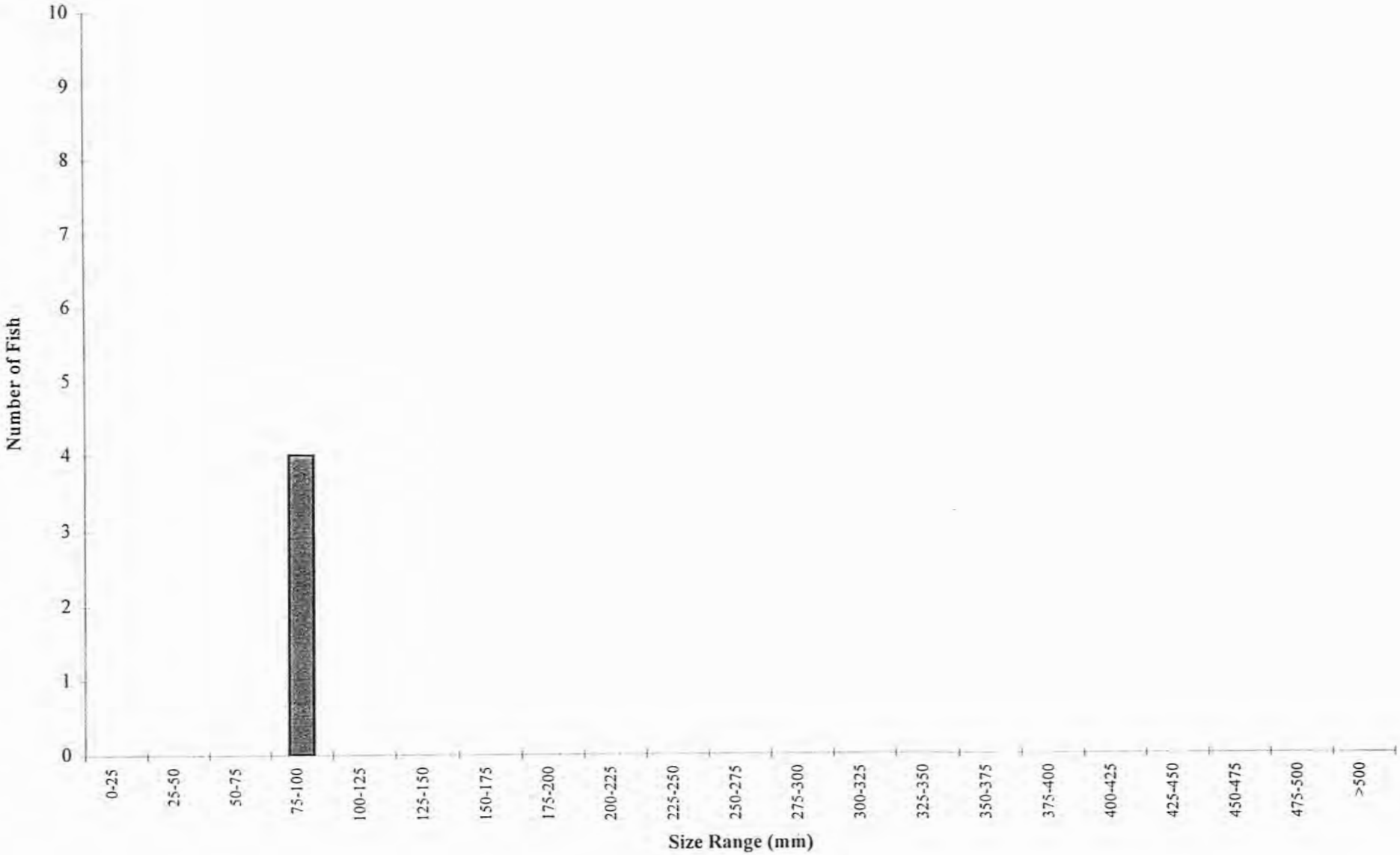
Province of British Columbia. 1995c. Gully Assessment Procedure Guidebook, April 1995.

Province of British Columbia. 1995d. Resource Inventory Committee (RIC): BC Standards, Specifications and Guidelines for Resource Surveys Using Global Positioning Systems (GPS) Technology.

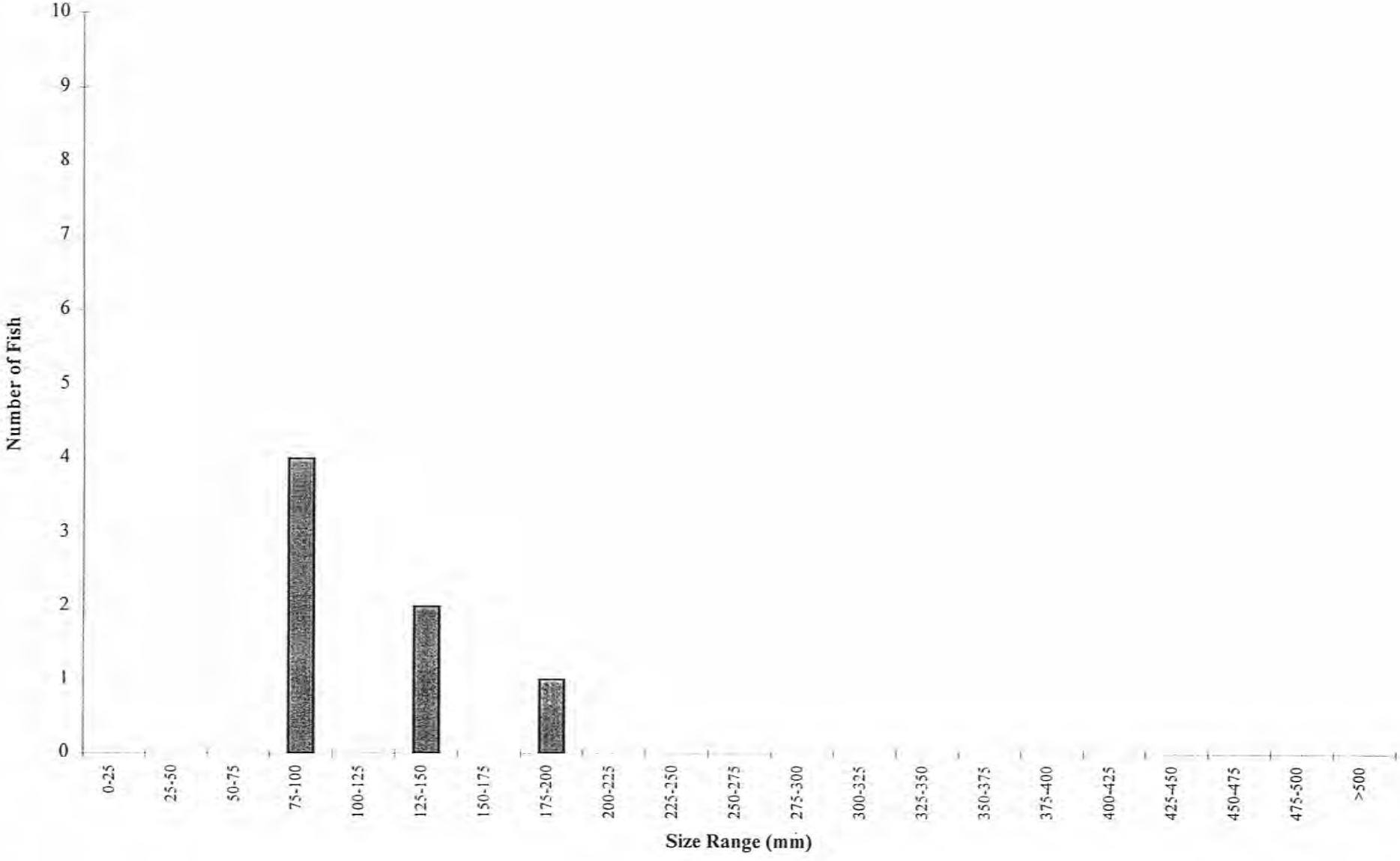
Province of British Columbia. 1993. Resource Inventory Committee (RIC): Field Key to the Freshwater Fishes of British Columbia.

Saimoto, R.S. 1996. Literature Review for Stream Inventory in the Bulkley Forest District.

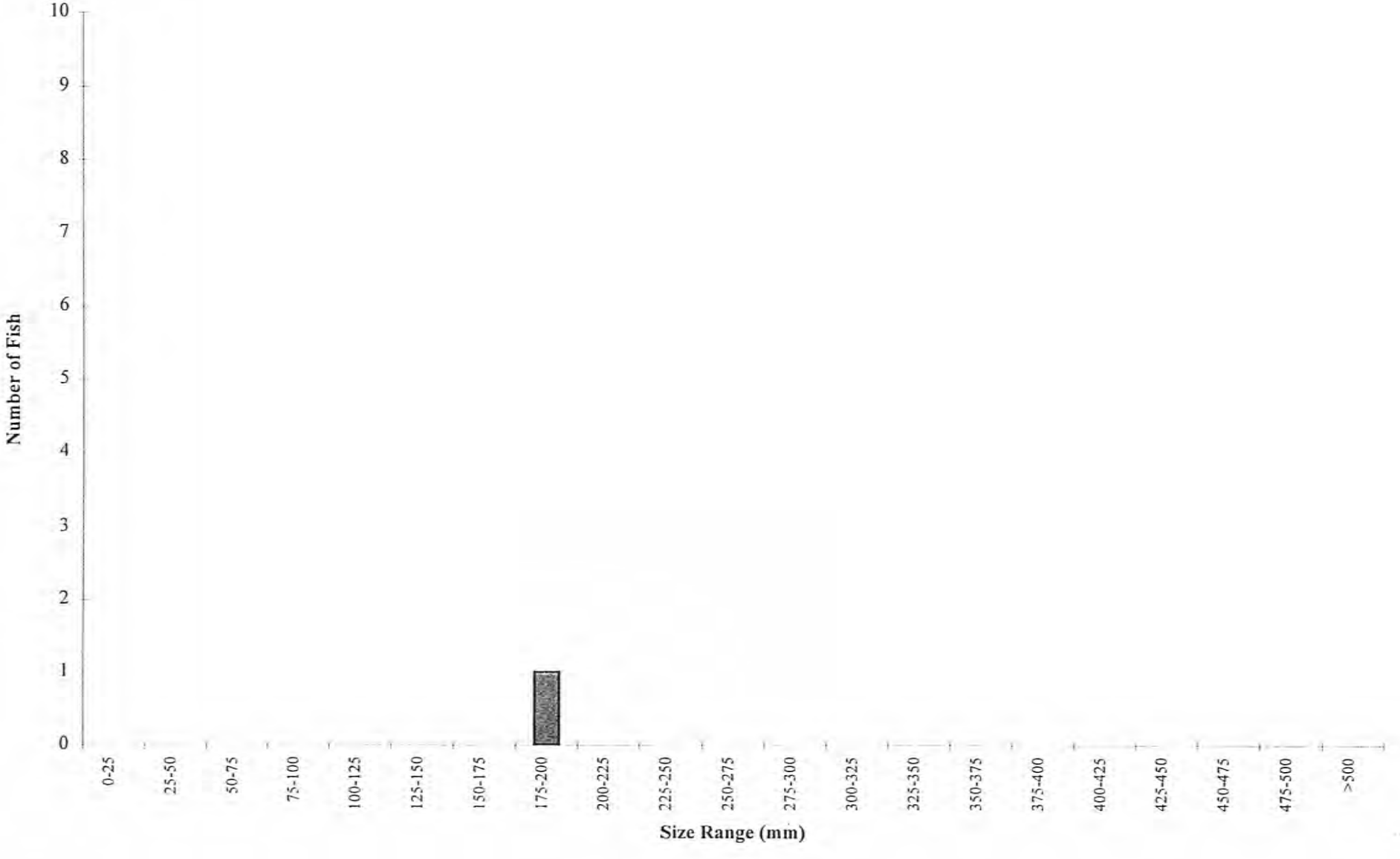
## Working Unit 14 - Rainbow Trout



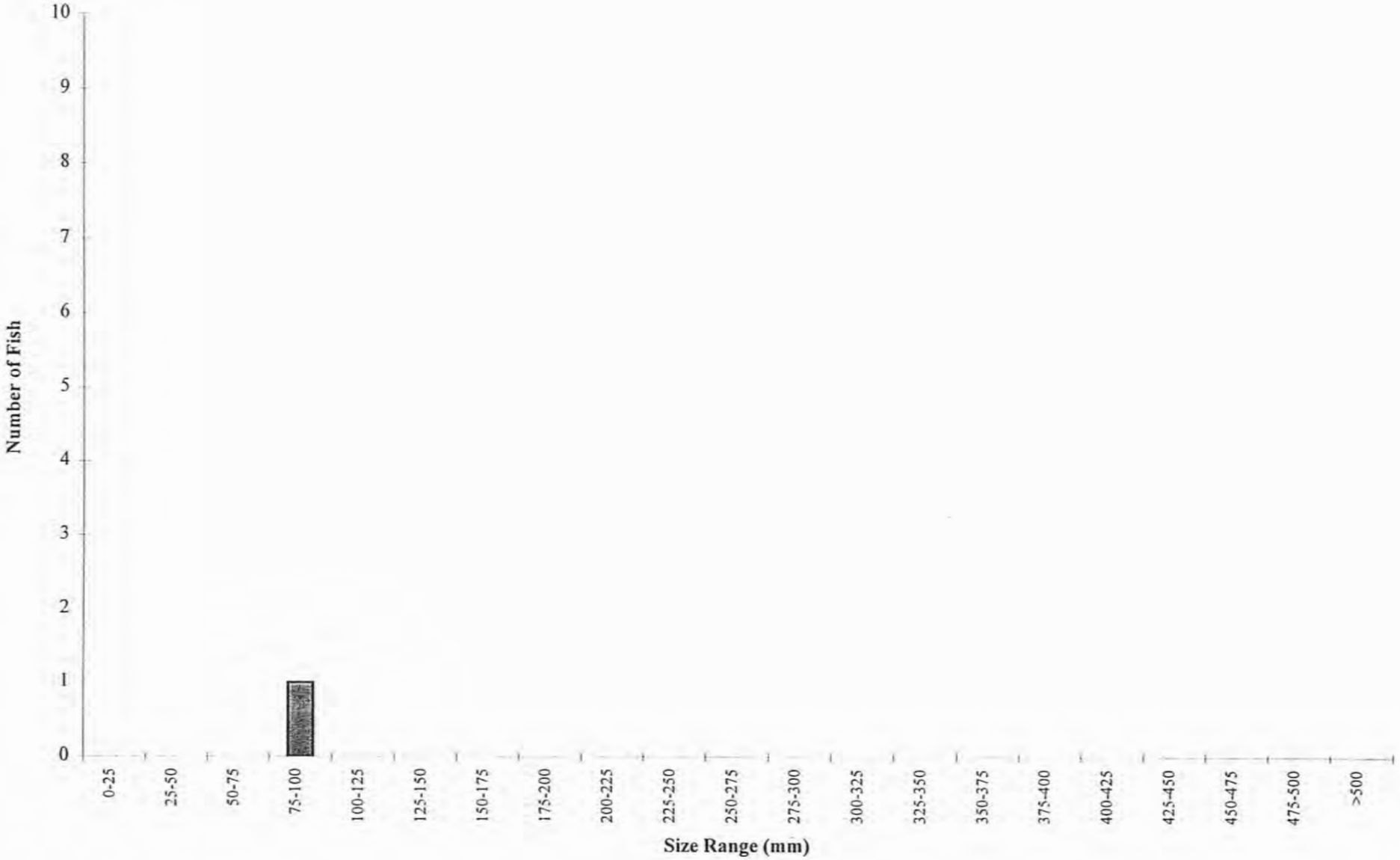
## Working Unit 14 - Dolly Varden



## Working Unit 14 - Burbot

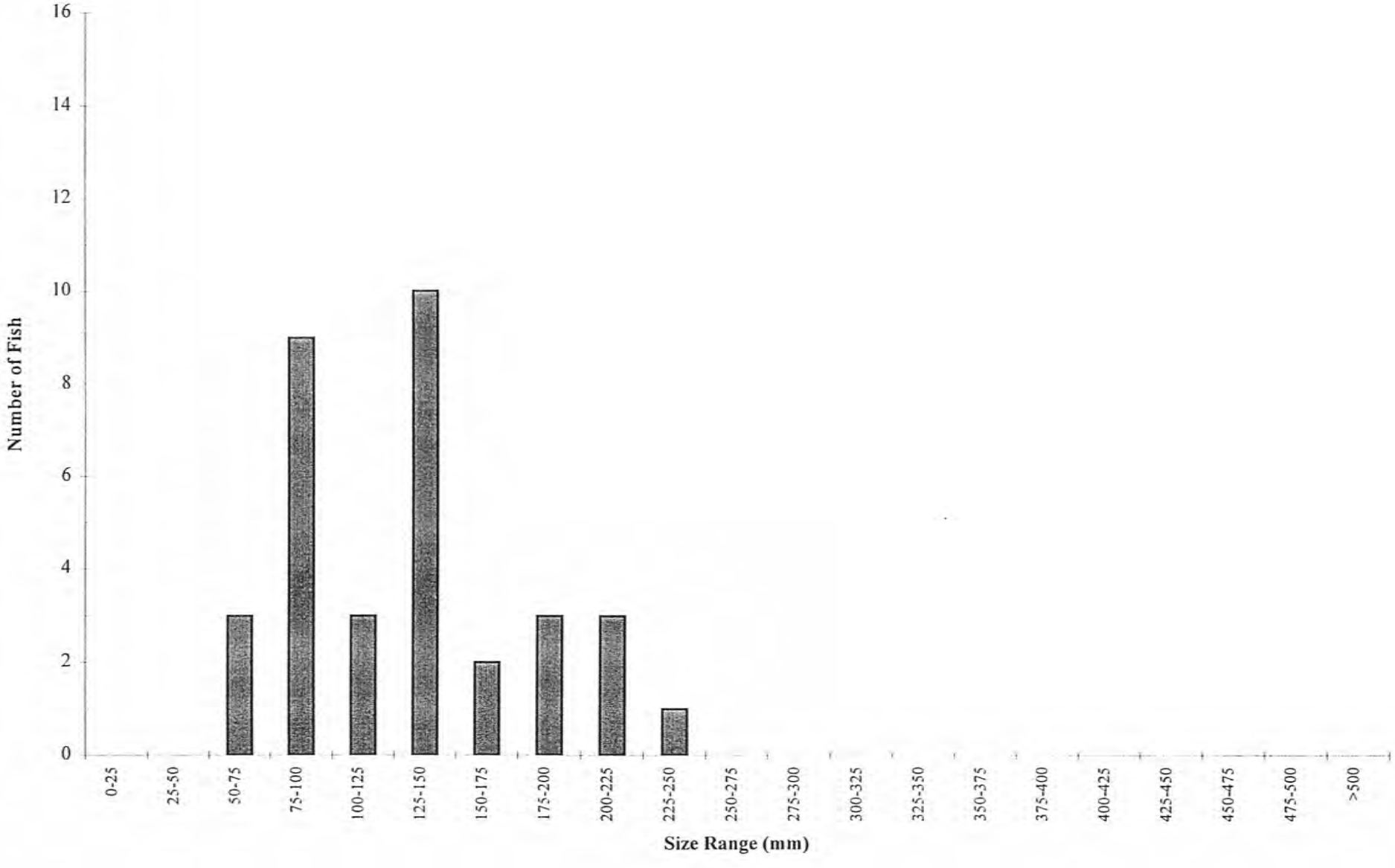


## Working Unit 14 - Minnows

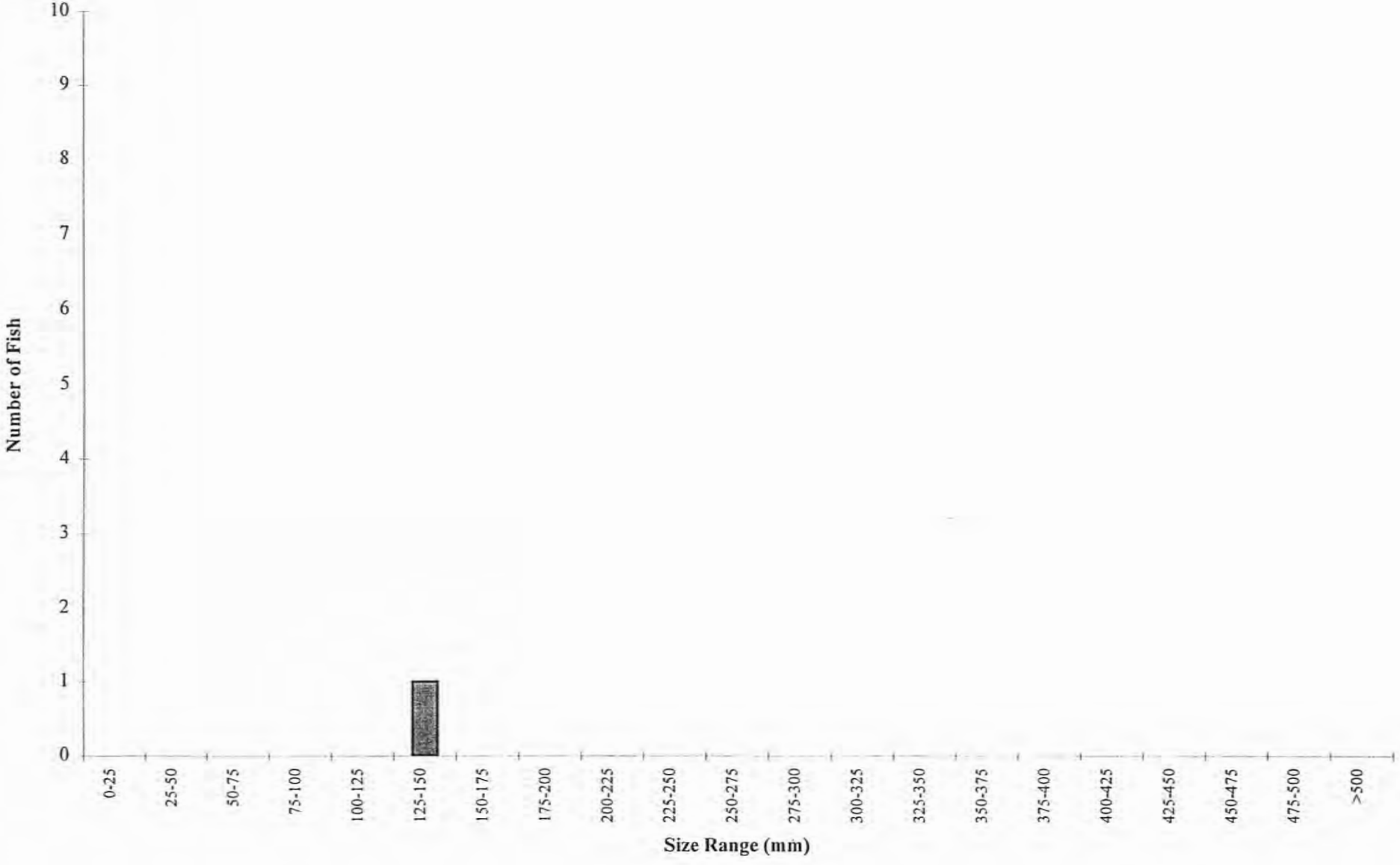


## Working Unit 14 - Coho

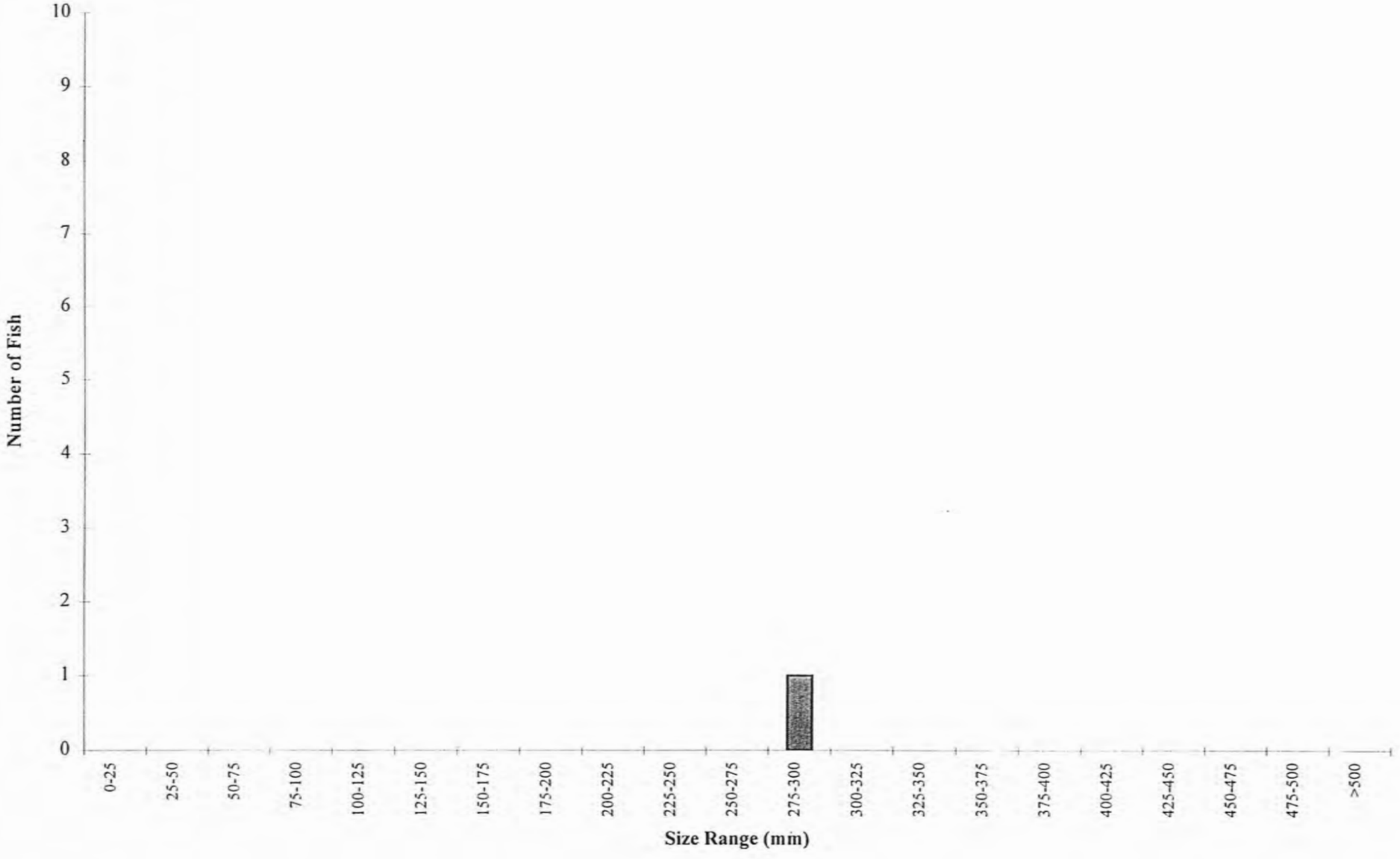
## Working Unit 14 - Cutthroat Trout



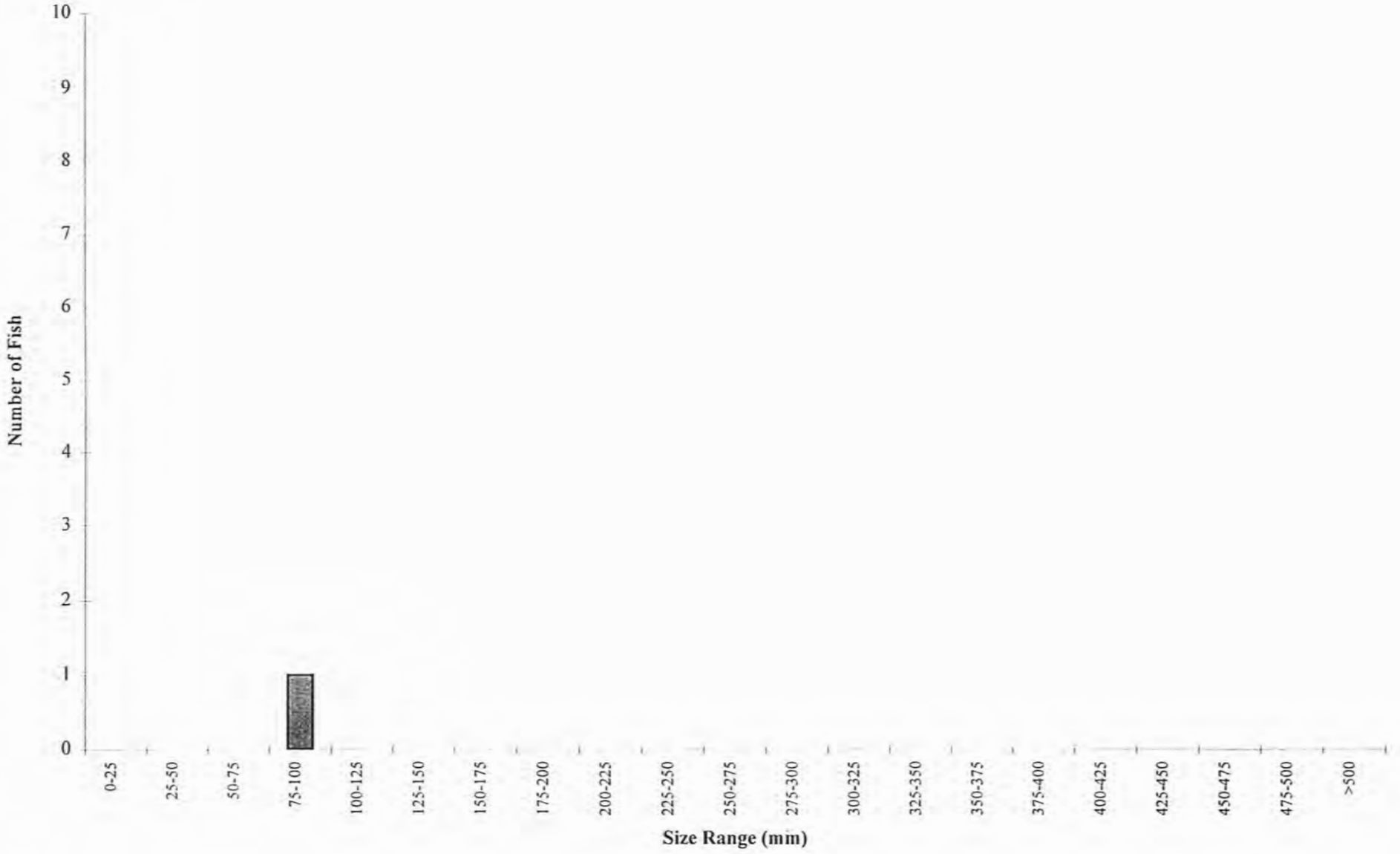
## Working Unit 14 - Lamprey



## Working Unit 14 - Northern Squawfish



## Working Unit 14 - Salmon



## Working Unit 14 - Sucker

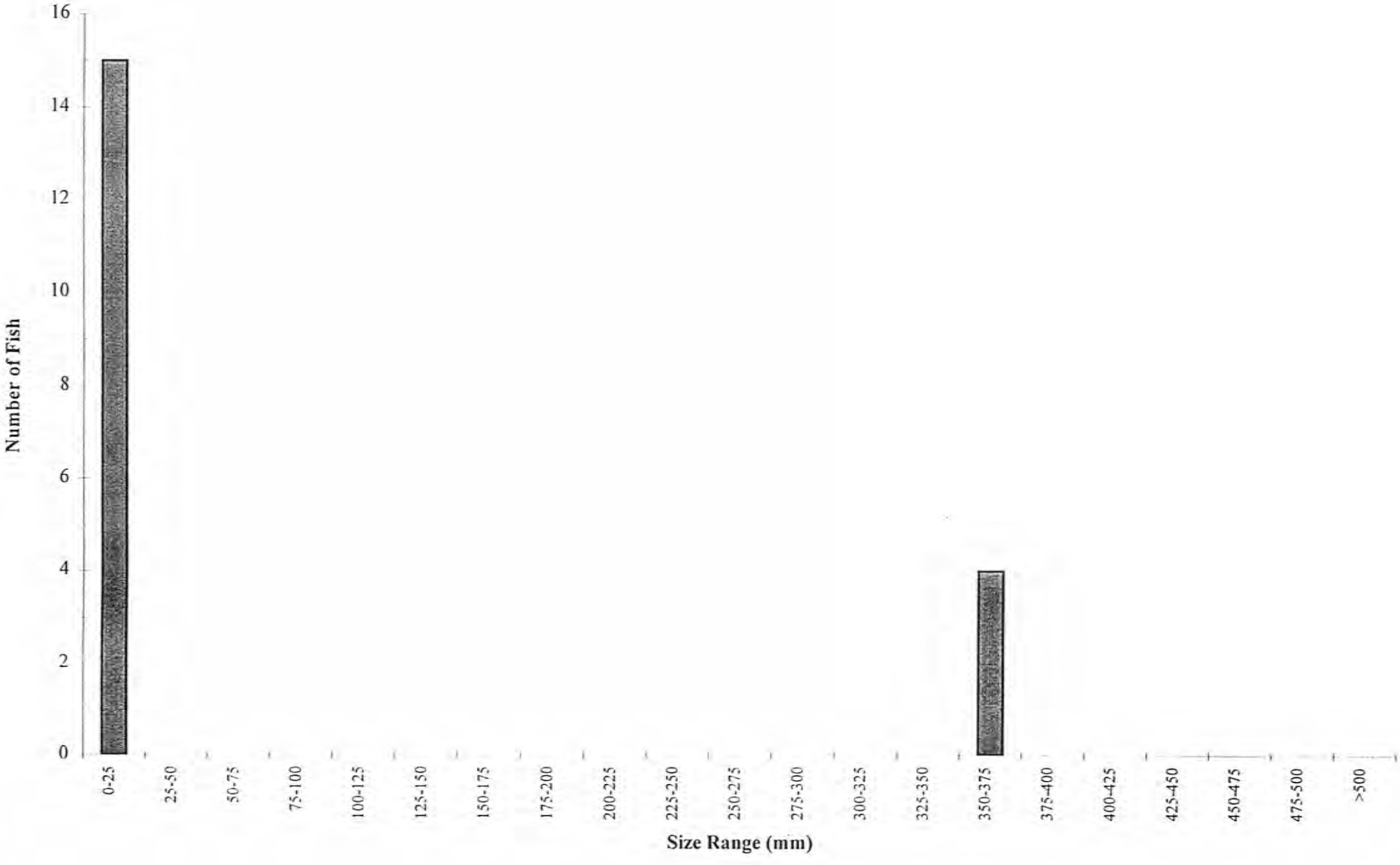


**Table 1. Riparian Management Areas and Stream Classification**

| | Channel Width(m) | Reserve Zone | Management Zone Width | Total RMA Width |
|---|---|---|---|---|
| **Fish Bearing** | | | | |
| S1 | >20.0 | 50 | 20 | 70 |
| S2 | >5.0-20.0 | 30 | 20 | 50 |
| S3 | 1.5-5.0 | 20 | 20 | 40 |
| S4 | <1.5 | 0 | 30 | 30 |
| | | | | |
| **Non Fish Bearing** | | | | |
| | | | | |
| S5 | >=3.0 | 0 | 30 | 30 |
| S6 | <3.0 | 0 | 20 | 20 |

**Table 2. Summary of Water Quality Data Collected in Working Unit 14 in 1997**

| Watershed Code | Stream "Local" | Location | Map # | UTM | Reach Number | Survey Date | Agency | pH | Temp (C) | Conductivity (umhos/cm) |
|---|---|---|---|---|---|---|---|---|---|---|
| 460-3454-000-000-000-000- | Trib. to Chicken Lake Cr. | E138, Unit 14 | 93 L 074 | 9 .6160 .60728 | 2 | 07/28/97 | TEC | 8.00 | 10.00 | 20.00 |
| 460-3454-267-616-000-000- | Club Cr. | Z66, Unit 14 | 93 L 084 | 9 .612352.6077636 | 3 | 07/22/97 | TEC | 8.10 | 8.50 | 30.00 |
| 460-3454-267-616-000-000- | Club Cr. | W176, Unit 14 | 93 L 084 | 9 .6143 .60769 | 1 | 08/13/97 | TEC | 6.90 | 10.00 | 20.00 |
| 460-3454-267-616-000-000- | Club Cr. | W177, Unit 14 | 93 L 084 | 9 .6136 .60775 | 2 | 08/13/97 | TEC | 6.70 | 10.00 | 20.00 |
| 460-3738-332-000-000-000- | Dahlie Cr. | Z49, Unit 14 | 93 L 075 | 9 .61896 .607112 | 1 | 07/18/97 | TEC | 7.70 | 13.00 | 100.00 |
| 460-2429-477-000-000-000- | Elliot Cr. | Z63, Unit 14 | 93 L 084 | 9 .60994 .608329 | 2 | 07/22/97 | TEC | 7.70 | 9.00 | 90.00 |
| 460-2429-477-000-000-000- | Elliot Cr. | W181, Unit 14 | 93 L 084 | 9 .6084 .60825 | 3 | 08/14/97 | TEC | 7.90 | 7.00 | 110.00 |
| 460-2429-515-000-000-000- | Glacier Gulch Cr. | W178, Unit 14 | 93 L 084 | 9 .6119 .60784 | 1 | 08/13/97 | TEC | 5.80 | 9.00 | 10.00 |
| 048-3200-000-000-000-000- | Trib. to Glacier Gulch Cr. | E306, Unit 14 | 93 L 084 | 9 .6117 .60785 | 1 | 09/14/97 | TEC | 7.32 | 9.00 | 40.00 |
| 048-5800-000-000-000-000- | Trib. to Glass Cr. | E313, Unit 14 | 93 L 084 | 9 .6141 .60804 | 1 | 09/15/97 | TEC | 7.00 | 9.00 | 110.00 |
| 460-2429-515-096-000-000- | Glass Creek | Z61, Unit 14 | 93 L 084 | 9 .613229.6081353 | 1 | 07/22/97 | TEC | 7.30 | 11.00 | 100.00 |
| 460-3454-267-000-000-000- | Kathlyn Cr. | W172, Unit 14 | 93 L 084 | 9 .6141 .60756 | 3 | 08/12/97 | TEC | 6.80 | 8.00 | 20.00 |
| 460-3454-267-000-000-000- | Kathlyn Cr. | Z48, Unit 14 | 93 L 085 | 9 .66162 .607408 | 1 | 07/18/97 | TEC | 7.40 | 11.00 | 40.00 |
| 048-6400-000-000-000-000- | Trib to Kathlyn Cr. | W180, Unit 14 | 93 L 084 | 9 .6123 .60762 | 2 | 08/14/97 | TEC | 7.40 | 5.00 | 20.00 |
| 048-6400-000-000-000-000- | Trib to Kathlyn Cr. | W175, Unit 14 | 93 L 084 | 9 .6144 .60760 | 1 | 08/13/97 | TEC | 6.90 | 9.00 | 20.00 |
| 460-2429-161-000-000-000- | Owens Cr. | W230, Unit 14 | 93 L 094 | 9 .6072 .60863 | 1 | 09/05/97 | TEC | 8.00 | 6.00 | 170.00 |
| 001-9300-000-000-000-000- | Trib to Owens Cr. | Z64, Unit 14 | 93 L 084 | 9 .606883.6084083 | 1 | 07/22/97 | TEC | 7.90 | 9.00 | 80.00 |
| 460-3924-000-000-000-000- | Powers Cr. | Z52, Unit 14 | 93 L 075 | 9 .6198 . 60640 | 1 | 07/18/97 | TEC | 7.70 | 13.00 | 120.00 |
| 460-3924-000-000-000-000- | Powers Cr. | Y266, Unit 14 | 93 L 065 | 9 .619806.60613 | 2 | 09/15/97 | TEC | 7.33 | 10.00 | 380.00 |
| 051-4600-000-000-000-000- | Trib. to Powers Cr. | E309, Unit 14 | 93 L 075 | 9 . 6170 .60639 | 2 | 09/15/97 | TEC | 7.95 | 8.50 | 100.00 |
| 051-4600-000-000-000-000- | Trib. to Powers Cr. | Z51, Unit 14 | 93 L 075 | 9 .619700.6064080 | 1 | 07/18/97 | TEC | 7.70 | 15.00 | 120.00 |
| 460-3738-000-000-000-000- | Trib. to Seymour Cr | Z25, Unit 14 | 93 L 075 | 9 .61756 .6065869 | 2 | 07/11/97 | TEC | 7.70 | 12.00 | 70.00 |
| 460-3738-000-000-000-000- | Seymour Cr. | Z47, Unit 14 | 93 L 075 | 9 .61936 .60674 | 1 | 07/15/97 | TEC | | 21.00 | |
| 460-3738-000-000-000-000- | Seymour Cr. | Z50, Unit 14 | 93 L 075 | 9 .619926.6070689 | 1 | 07/18/97 | TEC | 7.40 | 9.00 | 82.00 |
| 051-6300-000-000-000-000- | Trib to Seymour Lk. | Z46, Unit 14 | 93 L 075 | 9 .61800 .60673 | 1 | 07/15/97 | TEC | | | |
| 051-6400-000-000-000-000- | Trib. to Seymour Lk. | E308, Unit 14 | 93 L 075 | 9 . 6180 .60655 | 1 | 09/15/97 | TEC | | | |
| 051-6600-000-000-000-000- | Trib. to Seymour Lk. | Z26, Unit 14 | 93 L 075 | 9 .617422.6066134 | 1 | 07/11/97 | TEC | 7.20 | 11.00 | 150.00 |
| 460-3738-000-000-000-000- | Trib. to Seymour Lk. | E137, Unit 14 | 93 L 074 | 9 .6146 .60655 | 4 | 07/28/97 | TEC | 7.50 | 10.50 | 60.00 |
| 460-3454-267-278-000-000- | Trib. to Simpson Cr. | W174, Unit 14 | 93 L 084 | 9 .6143 .60751 | 1 | 08/13/97 | TEC | 6.60 | 9.00 | 30.00 |
| 048-7800-000-000-000-000- | Trib to Simpson Cr. | W173, Unit 14 | 93 L 084 | 9 .6142 .60754 | 1 | 08/13/97 | TEC | 6.80 | 10.00 | 30.00 |
| 460-2429-000-000-000-000- | Toboggan Cr. | E304, Unit 14 | 93 L 084 | 9 . 6105 .60790 | 2 | 09/14/97 | TEC | 7.40 | 6.00 | 40.00 |
| 047-4100-000-000-000-000- | Trib to Toboggan Cr. | Z65, Unit 14 | 93 L 084 | 9 .607309.6083296 | 4 | 07/22/97 | TEC | 7.60 | 10.00 | 90.00 |
| 001-8300-000-000-000-000- | Trib to Toboggan Cr. | Y73, Unit 14 | 93 L 094 | 9 .6058 .60872 | 1 | 07/23/97 | TEC | 7.80 | 11.00 | |
| 001-8600-000-000-000-000- | Trib to Toboggan Cr. | Y74, Unit 14 | 93 L 094 | 9 .6058 .60568 | 2 | 07/23/97 | TEC | 7.80 | 11.00 | |
| 001-8300-000-000-000-000- | Trib to Toboggan Cr. | Y76, Unit 14 | 93 L 094 | 9 .6085 .60875 | 1 | 07/23/97 | TEC | 7.80 | | |
| 001-9500-000-000-000-000- | Trib to Toboggan Cr. | W229, Unit 14 | 93 L 094 | 9 .6098 .60868 | 1 | 09/05/97 | TEC | 6.74 | 6.50 | 90.00 |
| 001-9600-000-000-000-000- | Trib to Toboggan Cr. | W233, Unit 14 | 93 L 094 | 9 .6107 .60859 | 1 | 09/05/97 | TEC | 6.60 | 7.50 | 150.00 |
| 047-4100-000-000-000-000- | Trib. to Toboggan Cr. | Z62, Unit 14 | 93 L 084 | 9 .61030 .608506 | 1 | 07/22/97 | TEC | 7.40 | 13.50 | 160.00 |

| Watershed Code | Stream "Local" | Location | Map # | UTM | Reach Number | Survey Date | Agency | pH | Temp. (C) | Conductivity (umhos/cm) |
|---|---|---|---|---|---|---|---|---|---|---|
| 047-6100-000-000-000-000- | Trib. to Toboggan Cr. | E305, Unit 14 | 93 L 084 | 9 . 6170 . 60797 | 1 | 09/14/97 | TEC | 7.57 | 9.00 | 110.00 |
| 047-4900-000-000-000-000- | Trib. to Toboggan Cr. | E310, Unit 14 | 93 L 075 | 9 .6422 .60847 | 1 | 09/15/97 | TEC | | 10.00 | |
| 047-5300-000-000-000-000- | Trib. to Toboggan Cr. | E311, Unit 14 | 93 L 084 | 9 .6118 .60831 | 1 | 09/15/97 | TEC | | 11.00 | |
| 047-4100-000-000-000-000- | Trib. to Toboggan Cr. | W182, Unit 14 | 93 L 084 | 9 .6074 .60832 | 3 | 08/14/97 | TEC | 7.70 | 9.00 | 80.00 |

**Table 3. Summary of Barriers Observed in Working Unit 14 in 1997**

| Watershed Code | Stream "Local" | Location | TRIM Number | UTM | Reach Number | Survey Date | Agency | Height (m) | Type | Distance from the Mouth (km) |
|---|---|---|---|---|---|---|---|---|---|---|
| 460-3454-000-000-000-000- | Trib. to Chicken Lake Cr. | E138, Unit 14 | 93 L 074 | 9 .6160 .60728 | 2 | 07/28/97 | TEC | 2.00 | C | 1.84 |
| 460-3738-000-000-000-000- | Trib. to Seymour Cr | Z25, Unit 14 | 93 L 075 | 9 .61756 .6065869 | 2 | 07/11/97 | TEC | 0.90 | CV | 2.35 |
| 051-6300-000-000-000-000- | Trib to Seymour Lk. | Z46, Unit 14 | 93 L 075 | 9 .61800 .60673 | 1 | 07/15/97 | TEC | 0.90 | CV | 0.70 |
| 460-2429-000-000-000-000- | Toboggan Cr | E304, Unit 14 | 93 L 084 | 9 . 6105 .60790 | 2 | 09/14/97 | TEC | 5.00 | F | 13.4 |

**Table 4. Summary of Site Data Collected in Working Unit 14 in 1997**

| Watershed Code | Stream "Local" | Location | Map # | UTM | Reach Number | Survey Date | Agency | Average Channel Width (m) | Gradient (%) | RS Species | Proposed Stream Class | Fishing Method |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 460-3454-000-000-000 | Chicken Lake Cr. | E138, Unit 14 | 93 L 074 | 9 .6160 .60728 | 2 | 07/28/97 | TEC | 3.83 | 6.00 | (DV) | S3 | EL |
| 460-3454-267-616-000 | Club Cr. | W176, Unit 14 | 93 L 084 | 9 .6143 .60769 | 1 | 08/13/97 | TEC | 5.10 | 2.00 | CT CO | S2. | EL |
| 460-3454-267-616-000 | Club Cr. | W177, Unit 14 | 93 L 084 | 9 .6136 .60775 | 2 | 08/13/97 | TEC | 7.42 | 3.00 | CO CT | S2. | EL |
| 460-3454-267-616-000 | Club Cr. | Z66, Unit 14 | 93 L 084 | 9 .612352.6077636 | 3 | 07/22/97 | TEC | 3.38 | 3.00 | (RB) | S3. No pools were | EL |
| 460-3738-332-000-000 | Dahlie Cr. | Z49, Unit 14 | 93 L 075 | 9 .61896 .607112 | 1 | 07/18/97 | TEC | 4.40 | 2.50 | (RB) (DV) | S3. One additional | EL |
| 460-2429-477-000-000 | Elliot Cr. | W181, Unit 14 | 93 L 084 | 9 .6084 .60825 | 3 | 08/14/97 | TEC | 6.25 | 12.00 | DV | S2. | EL |
| 460-2429-477-000-000 | Elliot Cr. | Z63, Unit 14 | 93 L 084 | 9 .60994 .608329 | 2 | 07/22/97 | TEC | 4.60 | 4.00 | DV | S3. One additional | EL |
| 460-2429-515-000-000 | Glacier Gulch Cr. | W178, Unit 14 | 93 L 084 | 9 .6119 .60784 | 1 | 08/13/97 | TEC | 15.75 | 9.00 | (DV) (CT) | S2. | EL |
| 048-3200-000-000-000 | Trib. to Glacier Gulch Cr. | E306, Unit 14 | 93 L 084 | 9 .6117 .60785 | 1 | 09/14/97 | TEC | 1.83 | 3.00 | DV | S3 | EL |
| 048-5800-000-000-000 | Trib. to Glass Cr. | E313, Unit 14 | 93 L 084 | 9 .6141 .60804 | 1 | 09/15/97 | TEC | 1.85 | 1.00 | (DV) | S3 | EL |
| 460-2429-515-096-000 | Glass Cr | Z61, Unit 14 | 93 L 084 | 9 .613229.6081353 | 1 | 07/22/97 | TEC | 3.15 | 0.50 | (DV) | S3. | EL |
| 460-3454-267-000-000 | Kathlyn Cr. | W172, Unit 14 | 93 L 084 | 9 .6141 .60756 | 3 | 08/12/97 | TEC | 5.25 | 8.00 | CT | S2. | EL |
| 460-3454-267-000-000 | Kathlyn Cr. | Z48, Unit 14 | 93 L 085 | 9 .66162 .607408 | 1 | 07/18/97 | TEC | 5.80 | 0.50 | PK ST | S2. One additional | VO |
| 048-6400-000-000-000 | Trib to Kathlyn Cr. | W175, Unit 14 | 93 L 084 | 9 .6144 .60760 | 1 | 08/13/97 | TEC | 2.68 | 4.00 | CT BB L CC | S3. | EL |
| 048-6400-000-000-000 | Trib to Kathlyn Cr. | W180, Unit 14 | 93 L 084 | 9 .6123 .60762 | 2 | 08/14/97 | TEC | 1.77 | 25.00 | (DV) | S3. | EL |
| 048-3100-000-000-000 | Not a creek | E312, Unit 14 | 93 L 084 | 9 .6125 .60820 | 0 | 09/15/97 | TEC | 0.00 | 3.00 | NF | NC | NA |
| 048-6300-000-000-000 | Not a creek | W179, Unit 14 | 93 L 084 | 9 .6154 .60777 | 0 | 08/13/97 | TEC | 0.00 | 1.50 | NF | NC | NA |
| 001-8900-000-000-000 | Not a creek | W231, Unit 14 | 93 L 094 | 9 .6081 .60863 | 0 | 09/05/97 | TEC | 0.00 | 11.00 | NF | NC. | NA |
| 001-8000-000-000-000 | Not a creek | W232, Unit 14 | 93 L 094 | 9 .6114 .60874 | 0 | 09/05/97 | TEC | 0.00 | 0.50 | NF | NC | NA |
| 001-8000-000-000-000 | Not a creek | W234, Unit 14 | 93 L 094 | 9 .6085 .60897 | 0 | 09/05/97 | TEC | 0.00 | 1.00 | NF | NC. | NA |
| 051-7800-000-000-000 | Not a creek | Y274, Unit 14 | 93 L 074 | 9 .614966.607375 | 0 | 09/16/97 | TEC | 0.00 | 3.00 | NF | NC. | NA |
| 001-8400-000-000-000 | Not a creek | Y75, Unit 14 | 93 L 094 | 9 .6076 .60878 | 0 | 07/23/97 | TEC | 0.00 | 4.00 | NF | NC. | NA |
| 460-2429-161-000-000 | Owens Cr. | W230, Unit 14 | 93 L 094 | 9 .6072 .60863 | 1 | 09/05/97 | TEC | 5.72 | 10.00 | DV | S2. | EL |
| 001-9300-000-000-000 | Trib to Owens Cr. | Z64, Unit 14 | 93 L 084 | 9 .606883.6084083 | 1 | 07/22/97 | TEC | 3.55 | 12.00 | (DV) | S3. | EL |
| 460-3924-000-000-000 | Powers Cr. | Y266, Unit 14 | 93 L 065 | 9 .619806.60613 | 2 | 09/15/97 | TEC | 2.10 | 14.00 | (CT) (DV) | S3 | EL |
| 460-3924-000-000-000 | Powers Cr. | Z52, Unit 14 | 93 L 075 | 9 .6198 . 60640 | 1 | 07/18/97 | TEC | 4.09 | 2.00 | (DV) | S3. | EL |
| 051-4600-000-000-000 | Trib. to Powers Cr. | E309, Unit 14 | 93 L 075 | 9 . 6170 .60639 | 2 | 09/15/97 | TEC | 3.37 | 13.00 | (DV) | S3 | EL |
| 051-4600-000-000-000 | Trib. to Powers Cr. | Z51, Unit 14 | 93 L 075 | 9 .619700.6064080 | 1 | 07/18/97 | TEC | 3.90 | 1.00 | (RB) | S3. One additional | VO |
| 460-3738-000-000-000 | Trib. to Seymour Cr | Z25, Unit 14 | 93 L 075 | 9 .61756 .6065869 | 2 | 07/11/97 | TEC | 2.78 | 10.00 | (DV) | S3 | EL |
| 460-3738-000-000-000 | Seymour Cr. | Z47, Unit 14 | 93 L 075 | 9 .61936 .60674 | 1 | 07/15/97 | TEC | 3.18 | 4.00 | NSC SU | S3. | VO |
| 460-3738-000-000-000 | Seymour Cr. | Z50, Unit 14 | 93 L 075 | 9 .619926.6070689 | 1 | 07/18/97 | TEC | 4.05 | 1.00 | (RB) TR | S3. | EL |
| 460-3738-000-000-000 | Trib. to Seymour Lk. | E137, Unit 14 | 93 L 074 | 9 .6146 .60655 | 4 | 07/28/97 | TEC | 2.17 | 1.00 | (DV) | S3. | EL |
| 051-6400-000-000-000 | Trib. to Seymour Lk. | E308, Unit 14 | 93 L 075 | 9 . 6180 .60655 | 1 | 09/15/97 | TEC | 0.63 | 21.00 | NF | S6 | NA |
| 051-6600-000-000-000 | Trib. to Seymour Lk. | Z26, Unit 14 | 93 L 075 | 9 .617422.6066134 | 1 | 07/11/97 | TEC | 2.05 | 9.00 | NF | S6 | EL |
| 051-6300-000-000-000 | Trib to Seymour Lk. | Z46, Unit 14 | 93 L 075 | 9 .61800 .60673 | 1 | 07/15/97 | TEC | 1.17 | 25.00 | NF | S6. | EL |

| Watershed Code | Stream "Local" | Location | Map # | UTM | Reach Number | Survey Date | Agency | Average Channel Width (m) | Gradient (%) | RS Species | Proposed Stream Class | Fishing Method |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 460-3454-267-278-000 | Simpson Cr | W174, Unit 14 | 93 L 084 | 9 .6143 .60751 | 1 | 08/13/97 | TEC | 9.65 | 11.00 | CT DV | S2. | EL |
| 048-7800-000-000-000 | Trib. to Simpson Cr. | W173, Unit 14 | 93 L 084 | 9 .6142 .60754 | 1 | 08/13/97 | TEC | 2.02 | 4.00 | CT | S3. | EL |
| 460-2429-000-000-000 | Toboggan Cr. | E304, Unit 14 | 93 L 084 | 9 . 6105 .60790 | 2 | 09/14/97 | TEC | 17.70 | 9.00 | (DV) | S2 | EL |
| 047-6100-000-000-000 | Trib. to Toboggan Cr. | E305, Unit 14 | 93 L 084 | 9 . 6170 . 60797 | 1 | 09/14/97 | TEC | 0.75 | 18.00 | NF | S6 | VO |
| 047-4900-000-000-000 | Trib. to Toboggan Cr. | E310, Unit 14 | 93 L 075 | 9 .6422 .60847 | 1 | 09/15/97 | TEC | 1.63 | 1.00 | (DV) | S3 | EL |
| 047-5300-000-000-000 | Trib. to Toboggan Cr. | E311, Unit 14 | 93 L 084 | 9 .6118 .60831 | 1 | 09/15/97 | TEC | 1.55 | 1.00 | (DV) | S3 | EL |
| 047-4100-000-000-000 | Trib. to Toboggan Cr. | W182, Unit 14 | 93 L 084 | 9 .6074 .60832 | 3 | 08/14/97 | TEC | 1.90 | 2.00 | (DV) | S3. | EL |
| 001-9500-000-000-000 | Trib to Toboggan Cr. | W229, Unit 14 | 93 L 094 | 9 .6098 .60868 | 1 | 09/05/97 | TEC | 1.03 | 2.00 | (DV) (RB) | S4. | EL |
| 001-9600-000-000-000 | Trib to Toboggan Cr. | W233, Unit 14 | 93 L 094 | 9 .6107 .60859 | 1 | 09/05/97 | TEC | 3.00 | 0.50 | CO | S3. Too difficult to | EL |
| 001-8300-000-000-000 | Trib to Toboggan Cr. | Y73, Unit 14 | 93 L 094 | 9 .6058 .60872 | 1 | 07/23/97 | TEC | 1.95 | 4.00 | (CT) (RB) | S3. | EL |
| 001-8600-000-000-000 | Trib to Toboggan Cr. | Y74, Unit 14 | 93 L 094 | 9 .6058 .60568 | 2 | 07/23/97 | TEC | 1.83 | 5.50 | (RB) (CT) | S3. | EL |
| 001-8300-000-000-000 | Trib to Toboggan Cr. | Y76, Unit 14 | 93 L 094 | 9 .6085 .60875 | 1 | 07/23/97 | TEC | 5.92 | 2.00 | CO CT | S2. | EL |
| 047-4100-000-000-000 | Trib. to Toboggan Cr. | Z62, Unit 14 | 93 L 084 | 9 .61030 .608506 | 1 | 07/22/97 | TEC | 4.90 | 2.00 | CO RB | S2. Two additional | EL |
| 047-4100-000-000-000 | Trib to Toboggan Cr. | Z65, Unit 14 | 93 L 084 | 9 .607309.6083296 | 4 | 07/22/97 | TEC | 3.22 | 5.00 | (DV) | S3. | EL |

**Table 5. Summary of Non Fish Bearing Classifications Established in Working Unit 14 in 1997**

| Watershed Code | Stream "Local" | Location | Map # | UTM | Reach Number | Survey Date | Agency | Proposed Stream Class | Fishing Effort | Rationale |
|---|---|---|---|---|---|---|---|---|---|---|
| 051-6600-000-000-000 000-000-000-000-000- 000- | Trib. to Seymour Lk. | Z26, Unit 14 | 93 L 075 | 9 .617422.6 066134 | 1 | 07/11/97 | TEC | S6 | The electroshocking effort, using a Smithroot Type VII model, was 23 seconds over 30 meters. The channel was dry below the road crossing. | This reach was classified as non fish bearing due to the lack of suitable habitat in the sampling area. |
| 051-6300-000-000-000 000-000-000-000-000- 000- | Trib to Seymour Lk. | Z46, Unit 14 | 93 L 075 | 9 .61800 .60673 | 1 | 07/15/97 | TEC | S6. | No electroshocking was done, as creek was dry. | This reach was classified as non fish bearing due to steep gradient and the presence of a 6m and 2m falls |
| 051-6400-000-000-000 000-000-000-000-000- 000- | Trib. to Seymour Lk. | E308, Unit 14 | 93 L 075 | 9 . 6180 .60655 | 2 | 09/15/97 | TEC | S6 | This dry site was not electrofished. | This reach was classified as non fish bearing due to the lack of suitable habitat and the steep (21%)gradient in the sampling area. |
| 047-6100-000-000-000 000-000-000-000-000- 000- | Trib. to Toboggan Cr. | E305, Unit 14 | 93 L 084 | 9 . 6170 . 60797 | 1 | 09/14/97 | TEC | S6 | This site was not electrofished as too little water was in the channel at the time of sampling. | This reach was classified as non fish bearing due to the lack of suitable habitat and the steep (18%)gradient in the sampling area. |

**Table 6. Summary of Sites in Working Unit 14 for Which Future Sampling is Recommended**

| Watershed Code | Stream "Local" | Location | Map # | UTM | Reach Number | Survey Date | Agency | Average Channel Width (m) | Gradient (%) | Fish Species | Proposed Stream Class | Fishing Method |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 460-3454-000-000-000- | Trib. to Chicken Lake Cr. | E138, Unit 14 | 93 L 074 | 9 .6160 .60728 | 2 | 07/28/97 | TEC | 3.83 | 6.00 | (DV) | S3 | EL |
| 460-3454-267-616-000- | Club Cr. | Z66, Unit 14 | 93 L 084 | 9 .612352.6077636 | 3 | 07/22/97 | TEC | 3.38 | 3.00 | (RB) | S3 | EL |
| 460-3738-332-000-000- | Dahlie Cr. | Z49, Unit 14 | 93 L 075 | 9 .61896 .607112 | 1 | 07/18/97 | TEC | 4.40 | 2.50 | (RB) (DV) | S3 | EL |
| 460-2429-515-000-000- | Glacier Gulch Cr. | W178, Unit 14 | 93 L 084 | 9 .6119 .60784 | 1 | 08/13/97 | TEC | 15.75 | 9.00 | (DV) (CT) | S2 | EL |
| 048-5800-000-000-000- | Trib. to Glass Cr. | E313, Unit 14 | 93 L 084 | 9 .6141 .60804 | 1 | 09/15/97 | TEC | 1.85 | 1.00 | (DV) | S3 | EL |
| 460-2429-515-096-000- | Glass Creek | Z61, Unit 14 | 93 L 084 | 9 .613229.6081353 | 1 | 07/22/97 | TEC | 3.15 | 0.50 | (DV) | S3 | EL |
| 048-6400-000-000-000- | Trib to Kathlyn Cr. | W180, Unit 14 | 93 L 084 | 9 .6123 .60762 | 2 | 08/14/97 | TEC | 1.77 | 25.00 | (DV) | S3 | EL |
| 001-9300-000-000-000- | Trib to Owens Cr. | Z64, Unit 14 | 93 L 084 | 9 .606883.6084083 | 1 | 07/22/97 | TEC | 3.55 | 12.00 | (DV) | S3 | EL |
| 460-3924-000-000-000- | Powers Cr. | Y266, Unit 14 | 93 L 065 | 9 .619806.60613 | 2 | 09/15/97 | TEC | 2.10 | 14.00 | (CT) (DV) | S3 | EL |
| 460-3924-000-000-000- | Powers Cr. | Z52, Unit 14 | 93 L 075 | 9 .6198 . 60640 | 1 | 07/18/97 | TEC | 4.09 | 2.00 | (DV) | S3 | EL |
| 051-4600-000-000-000- | Trib. to Powers Cr. | E309, Unit 14 | 93 L 075 | 9 . 6170 .60639 | 2 | 09/15/97 | TEC | 3.37 | 13.00 | (DV) | S3 | EL |
| 051-4600-000-000-000- | Trib. to Powers Cr. | Z51, Unit 14 | 93 L 075 | 9 .619700.6064080 | 1 | 07/18/97 | TEC | 3.90 | 1.00 | (RB) | S3 | VO |
| 460-3738-000-000-000- | Trib. to Seymour Cr | Z25, Unit 14 | 93 L 075 | 9 .61756 .6065869 | 2 | 07/11/97 | TEC | 2.78 | 10.00 | (DV) | S3 | EL |
| 460-3738-000-000-000- | Trib. to Seymour Lk. | E137, Unit 14 | 93 L 074 | 9 .6146 .60655 | 4 | 07/28/97 | TEC | 2.17 | 1.00 | (DV) | S3 | EL |
| 460-2429-000-000-000- | Toboggan Cr. | E304, Unit 14 | 93 L 084 | 9 . 6105 .60790 | 2 | 09/14/97 | TEC | 17.70 | 9.00 | (DV) | S2 | EL |
| 001-8300-000-000-000- | Trib to Toboggan Cr. | Y73, Unit 14 | 93 L 094 | 9 .6058 .60872 | 1 | 07/23/97 | TEC | 1.95 | 4.00 | (CT) (RB) | S3 | EL |
| 047-4900-000-000-000- | Trib. to Toboggan Cr. | E310, Unit 14 | 93 L 075 | 9 .6422 .60847 | 1 | 09/15/97 | TEC | 1.63 | 1.00 | (DV) | S3 | EL |
| 047-5300-000-000-000- | Trib. to Toboggan Cr. | E311, Unit 14 | 93 L 084 | 9 .6118 .60831 | 1 | 09/15/97 | TEC | 1.55 | 1.00 | (DV) | S3 | EL |
| 047-4100-000-000-000- | Trib. to Toboggan Cr. | W182, Unit 14 | 93 L 084 | 9 .6074 .60832 | 3 | 08/14/97 | TEC | 1.90 | 2.00 | (DV) | S3 | EL |
| 047-4100-000-000-000- | Trib to Toboggan Cr. | Z65, Unit 14 | 93 L 084 | 9 .607309.6083296 | 4 | 07/22/97 | TEC | 3.22 | 5.00 | (DV) | S3 | EL |
| 001-9500-000-000-000- | Trib to Toboggan Cr. | W229, Unit 14 | 93 L 094 | 9 .6098 .60868 | 1 | 09/05/97 | TEC | 1.03 | 2.00 | (DV) (RB) | S4 | EL |
| 001-8600-000-000-000- | Trib to Toboggan Cr. | Y74, Unit 14 | 93 L 094 | 9 .6058 .60568 | 2 | 07/23/97 | TEC | 1.83 | 5.50 | (RB) (CT) | S3 | EL |

**Table 7. Summary of Wildlife and Wildlife Signs Observed in Working in 1997**

| Watershed Code | TRIM Number | Location | UTM | Reach Number | Survey Date | Agency | Comment |
|---|---|---|---|---|---|---|---|
| 460-3454-267-616-000-000-000-000-000-000-000-000 | 93 L 084 | W177, Unit 14 | 9 .6136 .60775 | 2 | 08/13/97 | TEC | The site consists of a series of beaver ponds, all of which were blowing out at the time of sampling. |
| 001-8000-000-000-000-000-000-000-000-000-000- | 93 L 094 | W232, Unit 14 | 9 .6114 .60874 | 0 | 09/05/97 | TEC | Many frogs were noted at this site. |
| 001-9600-000-000-000-000-000-000-000-000-000- | 93 L 094 | W233, Unit 14 | 9 .6107 .60859 | 1 | 09/05/97 | TEC | Downstream of the highway a maze of beaver dams extends for 100 meters, creating a large flooded area. |

# APPENDIX 1

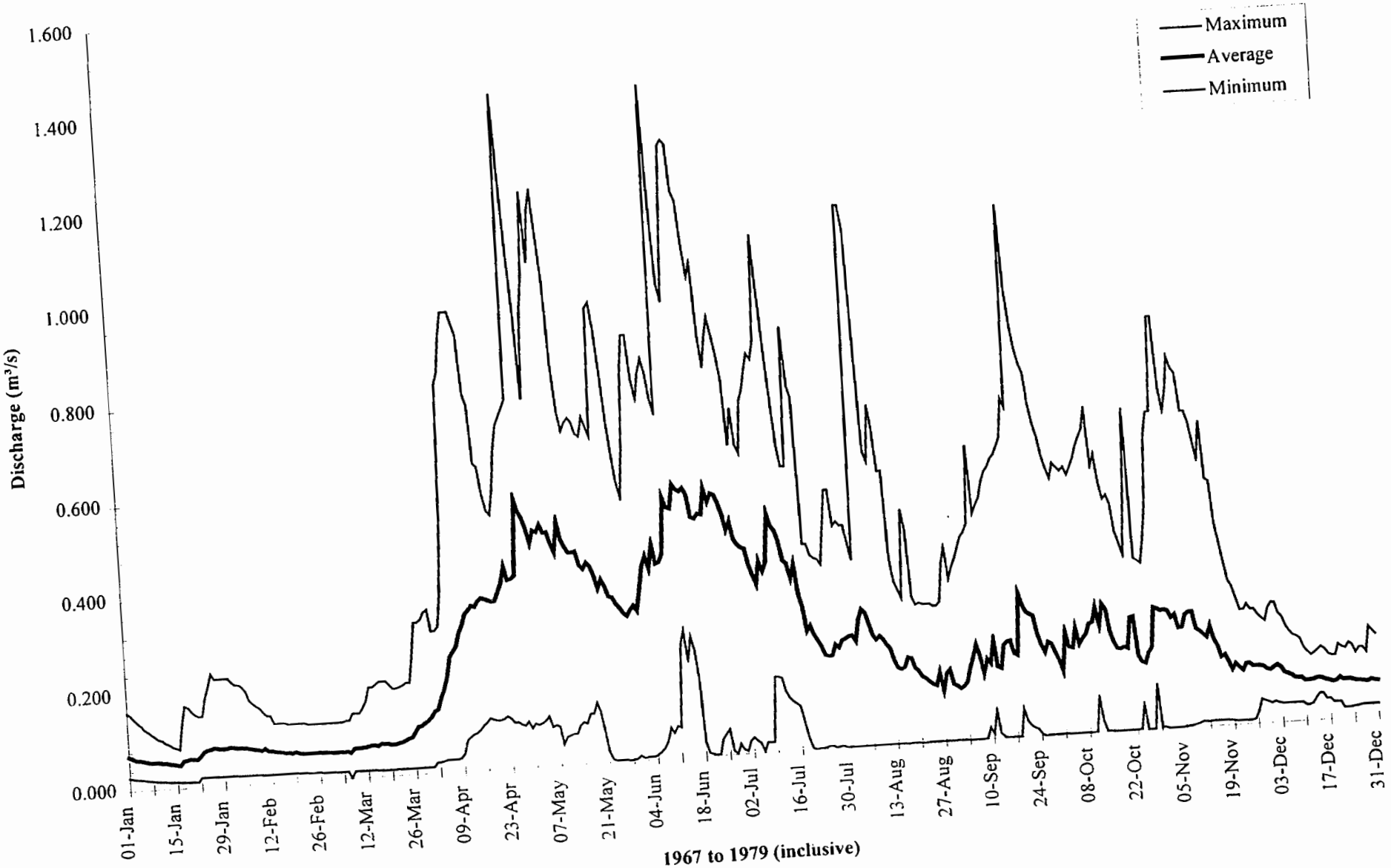
## Hydrological Data

**Station Number:** 08EE010
**Latitude:** 54:48:45N
**Longitude:** 127:12:05W
**Drainage Area (km²):** 24.6
**Station Name:** KATHLYN CREEK ABOVE SIMPSON CREEK

**MAD:** 0.223
**Min Mean Daily (All Records):** 0.000
**Max Mean Daily (All Records):** 1.42

| | Max. Instantaneous Discharge | Max. Daily Discharge | | Min. Daily Discharge | |
|---|---|---|---|---|---|
| 1967 | | 0.731 | 10-May | 0.003 | 26-Aug |
| 1968 | | 0.968 | 22-May | 0.048 | 31-Dec |
| 1969 | | 0.682 | 22-Oct | 0.018 | 09-Feb |
| 1970 | | 0.450 | 26-Jun | 0.045 | 08-May |
| 1971 | | 0.920 | 25-Jun | 0.025 | 18-Mar |
| 1972 | | 1.30 | 15-Jun | 0.040 | 08-Feb |
| 1973 | | 0.731 | 18-May | | |
| 1974 | | 0.801 | 28-Apr | 0.012 | 18-Jan |
| 1975 | | 1.04 | 21-Jun | | |
| 1976 | | 1.21 | 04-May | 0.010 | 03-Sep |
| 1977 | | 1.12 | 19-Sep | 0.000 | 20-Aug |
| 1978 | | | | 0.000 | 25-Sep |

## Mean Daily Discharges - KATHLYN CREEK ABOVE SIMPSON CREEK, 1967 to 1979 (inclusive)

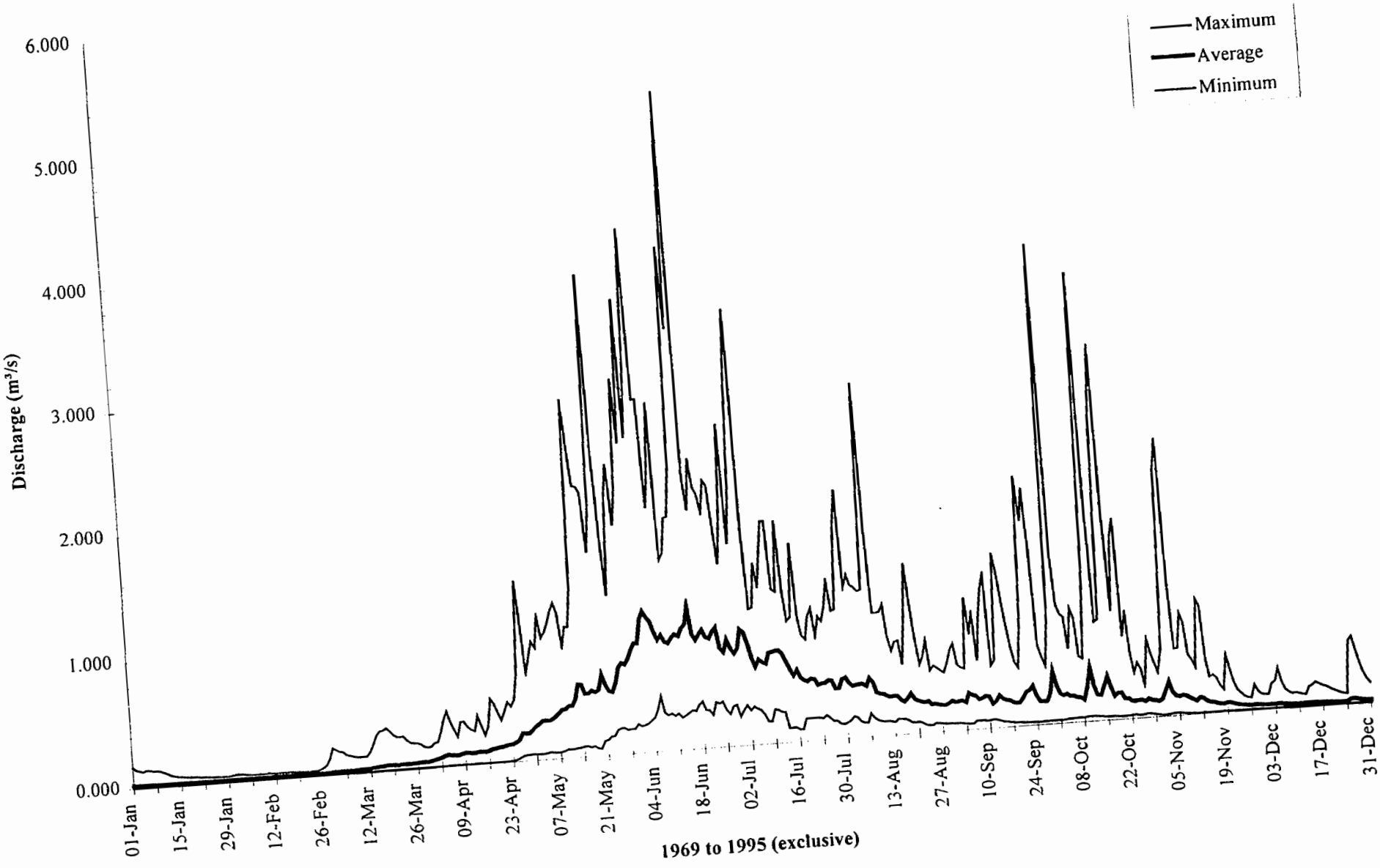


**Station Number:** 08EE012
**Latitude:** 54:48:36N
**Longitude:** 127:12:09W
**Drainage Area (km²):** 13.2
**Station Name:** SIMPSON CREEK AT THE MOUTH

**MAD:** 0.286
**Min Mean Daily (All Records):** 0.002
**Max Mean Daily (All Records):** 5.29

| | Max. Instantaneous Discharge | | | Max. Daily Discharge | | Min. Daily Discharge | |
|---|---|---|---|---|---|---|---|
| 1969 | | | | 1.85 | 10-Jun | | |
| 1970 | | | | 2.61 | 02-Jun | | |
| 1971 | | | | 2.09 | 23-Jun | | |
| 1974 | | | | 1.63 | 16-Oct | 0.013 | 23-Dec |
| 1975 | | | | 1.47 | 03-Jun | 0.010 | 11-Jan |
| 1976 | 2.69 | 4:25 | 18-Jun | 2.46 | 30-Jun | 0.012 | 22-Mar |
| 1977 | 2.40 | 0:51 | 09-Jul | 1.77 | 09-Jul | 0.007 | 12-Jan |
| 1978 | 5.07 | 23:10 | 01-Nov | 2.22 | 02-Nov | 0.004 | 19-Feb |
| 1979 | 2.09 | 22:13 | 02-Jun | 1.67 | 02-Jun | 0.003 | 14-Jan |
| 1980 | 1.54 | 19:25 | 12-May | 1.26 | 12-May | 0.002 | 22-Feb |
| 1981 | 3.60 | 17:05 | 25-May | 2.32 | 25-May | 0.010 | 05-Mar |
| 1982 | 3.78 | 19:43 | 27-Jun | 2.58 | 27-Jun | 0.005 | 06-Feb |
| 1983 | 6.38 | 10:14 | 02-Jun | 4.21 | 02-Jun | 0.007 | 01-Jan |
| 1984 | | | | 2.83 | 06-Aug | 0.002 | 14-Jan |
| 1985 | 3.74 | 5:23 | 30-Jun | 2.94 | 30-Jun | 0.006 | 07-Dec |
| 1986 | 9.48 | 6:33 | 15-Jun | 5.29 | 15-Jun | 0.002 | 16-Feb |
| 1987 | 2.39 | 10:26 | 21-Sep | 1.99 | 21-Sep | 0.011 | 31-Dec |
| 1988 | 9.55 | 2:29 | 29-Sep | 3.85 | 29-Sep | 0.005 | 19-Jan |
| 1989 | 2.61 | 22:19 | 04-Jun | 1.79 | 31-May | 0.007 | 05-Feb |
| 1990 | 4.67 | 20:51 | 03-Jun | 3.50 | 01-Jul | 0.011 | 21-Dec |
| 1991 | 4.34 | 5:05 | 15-Oct | 3.60 | 10-Oct | 0.011 | 01-Jan |
| 1992 | 5.25 | 20:23 | 13-Jun | 4.04 | 13-Jun | 0.017 | 31-Dec |
| 1993 | 5.95 | 15:28 | 20-May | 3.86 | 20-May | 0.014 | 13-Jan |
| 1994 | 2.30 | 22:39 | 23-Jun | 1.79 | 21-May | 0.011 | 29-Dec |
| 1995 | 3.00 | 18:39 | 14-May | 1.86 | 11-Jun | 0.009 | 09-Dec |

## Mean Daily Discharges - SIMPSON CREEK AT THE MOUTH, 1969 to 1995 (exclusive)



# APPENDIX 2

## Fish Data

**Appendix 2. Summary of Fish Data Collected in Working Unit 14 in 1997**

| Watershed Code | Stream "Local" | Location | Map # | UTM | Reach Number | Survey Date | Agency | Species | Number | Size Range | Life Phase | Fishing Method |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 460-3454-267-616-000-000-000 | Club Cr. | W176, Unit 14 | 93 L 084 | 9 .6143 .60769 | 1 | 08/13/97 | TEC | CT | 1.00 | 80 | J | VO |
| 460-3454-267-616-000-000-000 | Club Cr. | W176, Unit 14 | 93 L 084 | 9 .6143 .60769 | 1 | 08/13/97 | TEC | CT | 2.00 | 150-245 | A | EL |
| 460-3454-267-616-000-000-000 | Club Cr. | W176, Unit 14 | 93 L 084 | 9 .6143 .60769 | 1 | 08/13/97 | TEC | CO | 4.00 | 50 | J | EL |
| 460-3454-267-616-000-000-000 | Club Cr. | W176, Unit 14 | 93 L 084 | 9 .6143 .60769 | 1 | 08/13/97 | TEC | L | 1.00 | 130 | NA | EL |
| 460-3454-267-616-000-000-000 | Club Cr. | W177, Unit 14 | 93 L 084 | 9 .6136 .60775 | 2 | 08/13/97 | TEC | CO | 2.00 | 50-80 | F | EL |
| 460-3454-267-616-000-000-000 | Club Cr. | W177, Unit 14 | 93 L 084 | 9 .6136 .60775 | 2 | 08/13/97 | TEC | CT | 1.00 | 60 | J | EL |
| 460-2429-477-000-000-000-000 | Elliot Cr. | Z63, Unit 14 | 93 L 084 | 9 .60994 .608329 | 2 | 07/22/97 | TEC | DV | 5.00 | 95-115 | J | EL |
| 460-2429-477-000-000-000-000 | Elliot Cr. | W181, Unit 14 | 93 L 084 | 9 .6084 .60825 | 3 | 08/14/97 | TEC | DV | 2.00 | 95 | J | EL |
| 460-3454-267-000-000-000-000 | Kathlyn Cr. | Z48, Unit 14 | 93 L 085 | 9 .66162 .607408 | 1 | 07/18/97 | TEC | SA | 1.00 | 80 | J | VO |
| 460-3454-267-000-000-000-000 | Kathlyn Cr. | W172, Unit 14 | 93 L 084 | 9 .6141 .60756 | 3 | 08/12/97 | TEC | CT | 27.00 | 65-205 | NA | EL |
| 460-2429-161-000-000-000-000 | Owens Cr. | W230, Unit 14 | 93 L 094 | 9 .6072 .60863 | 1 | 09/05/97 | TEC | DV | 7.00 | 70-130 | J | EL |
| 460-3738-000-000-000-000-000 | Seymour Cr. | Z47, Unit 14 | 93 L 075 | 9 .61936 .60674 | 1 | 07/15/97 | TEC | NSC | 1.00 | 280 | A | VO |
| 460-3738-000-000-000-000-000 | Seymour Cr. | Z47, Unit 14 | 93 L 075 | 9 .61936 .60674 | 1 | 07/15/97 | TEC | SU | 4.00 | 360 | A | VO |
| 460-3738-000-000-000-000-000 | Seymour Cr. | Z47, Unit 14 | 93 L 075 | 9 .61936 .60674 | 1 | 07/15/97 | TEC | SU | 15.00 | 25 | F | VO |
| 460-3738-000-000-000-000-000 | Seymour Cr. | Z50, Unit 14 | 93 L 075 | 9 .619926.6070689 | 1 | 07/18/97 | TEC | RB | 20.00 | 40-60 | J | VO |
| 460-3454-267-278-000-000-000 | Simpson Cr | W174, Unit 14 | 93 L 084 | 9 .6143 .60751 | 1 | 08/13/97 | TEC | DV | 1.00 | 135 | J | EL |
| 460-3454-267-278-000-000-000 | Simpson Cr | W174, Unit 14 | 93 L 084 | 9 .6143 .60751 | 1 | 08/13/97 | TEC | CT | 2.00 | 145-155 | J | EL |
| 048-6400-000-000-000-000-000 | Trib to Kathlyn Cr. | W175, Unit 14 | 93 L 084 | 9 .6144 .60760 | 1 | 08/13/97 | TEC | CT | 48.00 | 70-180 | NA | EL |
| 048-6400-000-000-000-000-000 | Trib to Kathlyn Cr. | W175, Unit 14 | 93 L 084 | 9 .6144 .60760 | 1 | 08/13/97 | TEC | BB | 1.00 | 180 | NA | EL |
| 048-6400-000-000-000-000-000 | Trib to Kathlyn Cr. | W175, Unit 14 | 93 L 084 | 9 .6144 .60760 | 1 | 08/13/97 | TEC | C | 1.00 | 95 | NA | EL |
| 048-7800-000-000-000-000-000 | Trib to Simpson Cr. | W173, Unit 14 | 93 L 084 | 9 .6142 .60754 | 1 | 08/13/97 | TEC | CT | 3.00 | 80-93 | J | EL |
| 048-7800-000-000-000-000-000 | Trib to Simpson Cr. | W173, Unit 14 | 93 L 084 | 9 .6142 .60754 | 1 | 08/13/97 | TEC | SA | 100.00 | 20-30 | F | VO |
| 001-8300-000-000-000-000-000 | Trib to Toboggan Cr. | Y76, Unit 14 | 93 L 094 | 9 .6085 .60875 | 1 | 07/23/97 | TEC | CO | 8.00 | 80-100 | J | EL |
| 001-8300-000-000-000-000-000 | Trib to Toboggan Cr. | Y76, Unit 14 | 93 L 094 | 9 .6085 .60875 | 1 | 07/23/97 | TEC | CT | 1.00 | 200 | J | VO |
| 001-9600-000-000-000-000-000 | Trib to Toboggan Cr. | W233, Unit 14 | 93 L 094 | 9 .6107 .60859 | 1 | 09/05/97 | TEC | CO | 1.00 | 45 | J | EL |
| 048-3200-000-000-000-000-000 | Trib. to Glacier Gulch Cr. | E306, Unit 14 | 93 L 084 | 9 .6117 .60785 | 1 | 09/14/97 | TEC | DV | 1.00 | 180 | A | EL |
| 047-4100-000-000-000-000-000 | Trib. to Toboggan Cr. | Z62, Unit 14 | 93 L 084 | 9 .61030 .608506 | 1 | 07/22/97 | TEC | RB | 4.00 | 77-80 | J | EL |
| 047-4100-000-000-000-000-000 | Trib. to Toboggan Cr. | Z62, Unit 14 | 93 L 084 | 9 .61030 .608506 | 1 | 07/22/97 | TEC | CO | 3.00 | 80 | J | EL |

# APPENDIX 3

## Photodocumentation Summary

## Appendix 3. Photodocumentation Summary for Working Unit 14

| Group | Roll | Frame | Watershed Code | Survey Crew | Site Number | Unit Number | Agency | Survey Date | Stream "Local" | Map # | UTM Zone | UTM Northing | UTM Easting | Method | Reach Number | Aspect | Photo Direction | Photo Type | Scale Item | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | 13 | 8 | 46037380000000000000 | JL EM | E137 | Unit 14 | TEC | 28/07/97 | Trib. to Seymour Lk. | 93 L 074 | 9 | 6146000 | 606550 | GPS | 4 | W | Up | Ch | photoboard | Looking upstream at the channel, note dense alder cover |
| E | 13 | 9 | 46037380000000000000 | JL EM | E137 | Unit 14 | TEC | 28/07/97 | Trib. to Seymour Lk. | 93 L 074 | 9 | 6146000 | 606550 | GPS | 4 | E | Dn | Ve | photoboard | Looking downstream at the channel, note dense alder cover |
| E | 13 | 10 | 46034540000000000000 | JL EM | E138 | Unit 14 | TEC | 28/07/97 | Chicken Lake Cr. | 93 L 074 | 9 | 6160000 | 607280 | GPS | 2 | E | Up | Ch | photoboard | Looking upstream at the channel, note boulder and cobble cover |
| E | 13 | 11 | 46034540000000000000 | JL EM | E138 | Unit 14 | TEC | 28/07/97 | Chicken Lake Cr. | 93 L 074 | 9 | 6160000 | 607280 | GPS | 2 | W | Dn | Ch | photoboard | Looking downstream at the channel, note cobble cover |
| E | 13 | 12 | 46034540000000000000 | JL EM | E138 | Unit 14 | TEC | 28/07/97 | Chicken Lake Cr. | 93 L 074 | 9 | 6160000 | 607280 | GPS | 2 | E | Up | Ch | NA | Looking upstream at a 2m cascade |
| E | 29 | 13 | 46024290000000000000 | SJ LE | E304 | Unit 14 | TEC | 14/09/97 | Toboggan Cr. | 93 L 084 | 9 | 6105000 | 607900 | GPS | 2 | NA | NA | Fi | photoboard, fishboard | Measuring Dolly Varden on the fishboard |
| E | 29 | 9 | 46024290000000000000 | SJ LE | E304 | Unit 14 | TEC | 13/09/97 | Toboggan Cr. | 93 L 084 | 9 | 6105000 | 607900 | GPS | 2 | E | Dn | Ch | photoboard | Looking downstream at the channel, note the rafted debris |
| E | 29 | 10 | 46024290000000000000 | SJ LE | E304 | Unit 14 | TEC | 14/09/97 | Toboggan Cr. | 93 L 084 | 9 | 6105000 | 607900 | GPS | 2 | W | Up | Ch | photoboard | Looking upstream at the channel |
| E | 29 | 11 | 04761000000000000000 | SJ LE | E305 | Unit 14 | TEC | 14/09/97 | Trib. to Toboggan Cr. | 93 L 084 | 9 | 6170000 | 607970 | GPS | 1 | NW | Dn | Ch | photoboard, crew member | Looking downstream at the channel |
| E | 29 | 12 | 04761000000000000000 | SJ LE | E305 | Unit 14 | TEC | 14/09/97 | Trib. to Toboggan Cr. | 93 L 084 | 9 | 6170000 | 607970 | GPS | 1 | SE | Up | Ch | photoboard, crew member | Looking upstream at the channel, heavily overgrown with devil's club |
| E | 29 | 15 | 04832000000000000000 | SJ LE | E306 | Unit 14 | TEC | 14/09/97 | Trib. to Glacier Gulch Cr | 93 L 084 | 9 | 6117000 | 607850 | GPS | 1 | NE | Dn | Ch | photoboard, crew member | Looking downstream at the channel |
| E | 29 | 14 | 04832000000000000000 | SJ LE | E306 | Unit 14 | TEC | 14/09/97 | Trib. to Glacier Gulch Cr | 93 L 084 | 9 | 6117000 | 607850 | GPS | 1 | SW | Up | Ch | photoboard, crew member | Looking upstream at the channel |
| E | 29 | 16 | 04832000000000000000 | SJ LE | E306 | Unit 14 | TEC | 14/09/97 | Trib. to Glacier Gulch Cr | 93 L 084 | 9 | 6117000 | 607850 | GPS | 1 | NA | NA | Fi | photoboard, fishboard | Measuring Dolly Varden on the fishboard |
| E | 29 | 20 | 05164000000000000000 | SJ LE | E308 | Unit 14 | TEC | 15/09/97 | Trib. to Seymour Lk. | 93 L 075 | 9 | 6180000 | 606550 | GPS | 2 | E | Dn | Ve | photoboard, crew member | Looking downstream at the channel |
| E | 29 | 19 | 05164000000000000000 | SJ LE | E308 | Unit 14 | TEC | 15/09/97 | Trib. to Seymour Lk. | 93 L 075 | 9 | 6180000 | 606550 | GPS | 2 | W | Up | Ve | photoboard, crew member | Looking upstream at the channel |
| E | 29 | 21 | 05146000000000000000 | SJ LE | E309 | Unit 14 | TEC | 15/09/97 | Trib. to Powers Cr. | 93 L 075 | 9 | 6170000 | 606390 | GPS | 2 | SW | Up | Ch | photoboard, crew member | Looking upstream at the channel, note the sharp angles of the substrate |
| E | 29 | 22 | 05146000000000000000 | SJ LE | E309 | Unit 14 | TEC | 15/09/97 | Trib. to Powers Cr. | 93 L 075 | 9 | 6170000 | 606390 | GPS | 2 | NE | Dn | Ch | photoboard | Looking downstream at the channel |
| E | 29 | 23 | 04749000000000000000 | SJ LE | E310 | Unit 14 | TEC | 15/09/97 | Trib. to Toboggan Cr. | 93 L 084 | 9 | 6114000 | 608470 | GPS | 1 | E | Up | Ve | photoboard | Looking upstream at the channel |
| E | 29 | 24 | 04749000000000000000 | SJ LE | E310 | Unit 14 | TEC | 15/09/97 | Trib. to Toboggan Cr. | 93 L 084 | 9 | 6114000 | 608470 | GPS | 1 | W | Dn | Ve | photoboard | Looking downstream at the channel |
| E | 30 | 2 | 04753000000000000000 | SJ LE | E311 | Unit 14 | TEC | 15/09/97 | Trib. to Toboggan Cr. | 93 L 084 | 9 | 6118000 | 608310 | GPS | 1 | W | Dn | Ve | photoboard | Looking downstream at the channel |

| Group | Roll | Frame | Watershed Code | Survey Crew | Site Number | Unit Number | Agency | Survey Date | Stream "Local" | Map # | UTM Zone | UTM Northing | UTM Easting | Method | Reach Number | Aspect | Photo Direction | Photo Type | Scale Item | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | 30 | 1 | 0475300000000000000 | SJ LE | E311 | Unit 14 | TEC | 15/09/97 | Trib. to Toboggan Cr. | 93 L 084 | 9 | 6118000 | 608310 | GPS | 1 | E | Up | Ve | photoboard, crew member | Looking upstream at the channel, heavily overgrown with vegetation |
| E | 30 | 4 | 0483100000000000000 | SJ LE JL | E312 | Unit 14 | TEC | 15/09/97 | Not a creek | 93 L 084 | 9 | 6125000 | 608200 | GPS | 0 | NA | NA | Ve | photoboard | Looking at an "NC" |
| E | 30 | 3 | 0483100000000000000 | SJ LE JL | E312 | Unit 14 | TEC | 15/09/97 | Not a creek | 93 L 084 | 9 | 6125000 | 608200 | GPS | 0 | W | Dn | Ve | photoboard, crew member | Looking upstream at the channel |
| E | 30 | 6 | 0485800000000000000 | SJ LE | E313 | Unit 14 | TEC | 15/09/97 | Trib. to Glass Cr. | 93 L 084 | 9 | 6141000 | 608040 | GPS | 1 | NW | Dn | Ch | photoboard, crew member | Looking downstream at the channel |
| E | 30 | 5 | 0485800000000000000 | SJ LE | E313 | Unit 14 | TEC | 15/09/97 | Trib. to Glass Cr. | 93 L 084 | 9 | 6141000 | 608040 | GPS | 1 | SE | Up | Ch | photoboard, crew member | Looking upstream at the channel |
| W | F | 17 | 46034542670000000000 | KA DD | W172 | Unit 14 | TEC | 12/08/97 | Kathlyn Cr. | 93 L 084 | 9 | 6141000 | 607560 | GPS | 3 | NA | NA | Fi | meterstick | Measuring cutthroat trout with the meterstick |
| W | F | 16 | 46034542670000000000 | KA DD | W172 | Unit 14 | TEC | 12/08/97 | Kathlyn Cr. | 93 L 084 | 9 | 6141000 | 607560 | GPS | 3 | NE | Dn | Ch | photoboard | Looking downstream at the channel, note the LOD cover |
| W | F | 15 | 46034542670000000000 | KA DD | W172 | Unit 14 | TEC | 12/08/97 | Kathlyn Cr. | 93 L 084 | 9 | 6141000 | 607560 | GPS | 3 | SW | Up | Ch | photoboard, crew member | Looking upstream at the channel |
| W | F | 18 | 46034542670000000000 | KA DD | W172 | Unit 14 | TEC | 12/08/97 | Kathlyn Cr. | 93 L 084 | 9 | 6141000 | 607560 | GPS | 3 | NA | NA | Fi | meterstick | Measuring cutthroat trout with the meterstick |
| W | F | 19 | 0487800000000000000 | KA DD | W173 | Unit 14 | TEC | 13/08/97 | Trib. to Simpson Cr. | 93 L 084 | 9 | 6142000 | 607540 | GPS | 1 | NA | NA | Fi | meterstick | Measuring cutthroat trout with the meterstick |
| W | F | 20 | 0487800000000000000 | KA DD | W173 | Unit 14 | TEC | 13/08/97 | Trib. to Simpson Cr. | 93 L 084 | 9 | 6142000 | 607540 | GPS | 1 | SW | Up | Ch | crew member | Looking upstream at the channel, note the cobble cover |
| W | F | 21 | 0487800000000000000 | KA DD | W173 | Unit 14 | TEC | 13/08/97 | Trib. to Simpson Cr. | 93 L 084 | 9 | 6142000 | 607540 | GPS | 1 | NE | Dn | Ch | NA | Looking downstream at the channel |
| W | F | 25 | 46034542672780000000 | KA DD | W174 | Unit 14 | TEC | 13/08/97 | Simpson Cr. | 93 L 084 | 9 | 6143000 | 607510 | GPS | 1 | NA | NA | Fi | meterstick | Measuring fish with the meterstick |
| W | F | 22 | 46034542672780000000 | KA DD | W174 | Unit 14 | TEC | 13/08/97 | Simpson Cr. | 93 L 084 | 9 | 6143000 | 607510 | GPS | 1 | SW | Up | Ch | meterstick | Looking upstream at the channel, note the rafted LOD |
| W | F | 23 | 46034542672780000000 | KA DD | W174 | Unit 14 | TEC | 13/08/97 | Simpson Cr. | 93 L 084 | 9 | 6143000 | 607510 | GPS | 1 | NE | Dn | Ch | NA | Looking downstream at the channel |
| W | F | 24 | 46034542672780000000 | KA DD | W174 | Unit 14 | TEC | 13/08/97 | Simpson Cr. | 93 L 084 | 9 | 6143000 | 607510 | GPS | 1 | NA | NA | Fi | meterstick | Measuring fish with the meterstick |
| W | G | 9 | 0486400000000000000 | KA DD | W175 | Unit 14 | TEC | 13/08/97 | Trib to Kathlyn Cr. | 93 L 084 | 9 | 6144000 | 607600 | GPS | 1 | NA | NA | O | crew member | Looking at a pond diversion |
| W | G | 8 | 0486400000000000000 | KA DD | W175 | Unit 14 | TEC | 13/08/97 | Trib to Kathlyn Cr. | 93 L 084 | 9 | 6144000 | 607600 | GPS | 1 | NA | NA | Fi | meterstick | Measuring fish with the meterstick |
| W | G | 7 | 0486400000000000000 | KA DD | W175 | Unit 14 | TEC | 13/08/97 | Trib to Kathlyn Cr. | 93 L 084 | 9 | 6144000 | 607600 | GPS | 1 | NA | NA | Fi | meterstick | Measuring fish with the meterstick |
| W | G | 5 | 0486400000000000000 | KA DD | W175 | Unit 14 | TEC | 13/08/97 | Trib to Kathlyn Cr. | 93 L 084 | 9 | 6144000 | 607600 | GPS | 1 | NA | NA | Fi | meterstick | Measuring fish with the meterstick |
| W | G | 4 | 0486400000000000000 | KA DD | W175 | Unit 14 | TEC | 13/08/97 | Trib to Kathlyn Cr. | 93 L 084 | 9 | 6144000 | 607600 | GPS | 1 | NA | NA | Fi | meterstick | Measuring fish with the meterstick |
| W | G | 1A | 0486400000000000000 | KA DD | W175 | Unit 14 | TEC | 13/08/97 | Trib to Kathlyn Cr. | 93 L 084 | 9 | 6144000 | 607600 | GPS | 1 | SE | Dn | Ch | NA | Looking downstream at the channel (photo overexposed) |
| W | G | 1 | 0486400000000000000 | KA DD | W175 | Unit 14 | TEC | 13/08/97 | Trib to Kathlyn Cr. | 93 L 084 | 9 | 6144000 | 607600 | GPS | 1 | SE | Dn | Ch | NA | Looking downstream at the channel |
| W | G | 10 | 0486400000000000000 | KA DD | W175 | Unit 14 | TEC | 13/08/97 | Trib to Kathlyn Cr. | 93 L 084 | 9 | 6144000 | 607600 | GPS | 1 | NA | NA | O | NA | Looking at a pond diversion |
| W | G | 14 | 46034542676160000000 | KA DD | W176 | Unit 14 | TEC | 13/08/97 | Club Cr. | 93 L 084 | 9 | 6143000 | 607690 | GPS | 1 | NA | NA | Fi | meterstick | Measuring fish with the meterstick |
| W | G | 15 | 46034542676160000000 | KA DD | W176 | Unit 14 | TEC | 13/08/97 | Club Cr. | 93 L 084 | 9 | 6143000 | 607690 | GPS | 1 | NA | NA | Fi | meterstick | Measuring fish with the meterstick |
| W | G | 18 | 46034542676160000000 | KA DD | W176 | Unit 14 | TEC | 13/08/97 | Club Cr. | 93 L 084 | 9 | 6143000 | 607690 | GPS | 1 | NA | NA | Fi | book | Looking at a lamprey in the plastic bag |

| Group | Roll | Frame | Watershed Code | Survey Crew | Site Number | Unit Number | Agency | Survey Date | Stream "Local" | Map # | UTM Zone | UTM Northing | UTM Easting | Method | Reach Number | Aspect | Photo Direction | Photo Type | Scale Item | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W | G | 16 | 46034542676160000000 | KA DD | W176 | Unit 14 | TEC | 13/08/97 | Club Cr. | 93 L 084 | 9 | 6143000 | 607690 | GPS | 1 | NA | NA | Fi | meterstick | Measuring fish with the meterstick (fish mostly covered by meterstick) |
| W | G | 12 | 46034542676160000000 | KA DD | W176 | Unit 14 | TEC | 13/08/97 | Club Cr. | 93 L 084 | 9 | 6143000 | 607690 | GPS | 1 | NE | Dn | Ch | NA | Looking downstream at a flooding channel |
| W | G | 17 | 46034542676160000000 | KA DD | W176 | Unit 14 | TEC | 13/08/97 | Club Cr. | 93 L 084 | 9 | 6143000 | 607690 | GPS | 1 | NA | NA | Fi | book | Looking at a lamprey in the plastic bag |
| W | G | 11 | 46034542676160000000 | KA DD | W176 | Unit 14 | TEC | 13/08/97 | Club Cr. | 93 L 084 | 9 | 6143000 | 607690 | GPS | 1 | SW | Up | Ch | NA | Looking upstream at a flooding channel |
| W | G | 13 | 46034542676160000000 | KA DD | W176 | Unit 14 | TEC | 13/08/97 | Club Cr. | 93 L 084 | 9 | 6143000 | 607690 | GPS | 1 | NA | NA | Fi | meterstick | Measuring fish with the meterstick |
| W | G | 19 | 46034542676160000000 | KA DD | W177 | Unit 14 | TEC | 13/08/97 | Club Cr. | 93 L 084 | 9 | 6136000 | 607750 | GPS | 2 | NW | Up | Ch | NA | Looking upstream at the channel, note the dead tree in the center |
| W | G | 20 | 46034542676160000000 | KA DD | W177 | Unit 14 | TEC | 13/08/97 | Club Cr. | 93 L 084 | 9 | 6136000 | 607750 | GPS | 2 | SE | Dn | Ch | NA | Looking downstream at the channel, note the highly turbid water |
| W | G | 21 | 46034542676160000000 | KA DD | W177 | Unit 14 | TEC | 13/08/97 | Club Cr. | 93 L 084 | 9 | 6136000 | 607750 | GPS | 2 | NA | NA | O | hand | NA |
| W | G | 22 | 46034542676160000000 | KA DD | W177 | Unit 14 | TEC | 13/08/97 | Club Cr. | 93 L 084 | 9 | 6136000 | 607750 | GPS | 2 | NA | NA | O | hand | NA |
| W | G | 23 | 46034542676160000000 | KA DD | W177 | Unit 14 | TEC | 13/08/97 | Club Cr. | 93 L 084 | 9 | 6136000 | 607750 | GPS | 2 | NA | NA | Fi | meterstick | Measuring fish with the meterstick |
| W | G | 25 | 46024295150000000000 | KA DD | W178 | Unit 14 | TEC | 13/08/97 | Glacier Gulch Cr. | 93 L 084 | 9 | 6119000 | 607840 | GPS | 1 | N | Dn | Ch | NA | Looking downstream at the channel |
| W | G | 24 | 46024295150000000000 | KA DD | W178 | Unit 14 | TEC | 13/08/97 | Glacier Gulch Cr. | 93 L 084 | 9 | 6119000 | 607840 | GPS | 1 | S | Up | Ch | NA | Looking upstream at the channel |
| W | H | 1 | 04863000000000000000 | KA DD | W179 | Unit 14 | TEC | 13/08/97 | Not a creek | 93 L 084 | 9 | 6154000 | 607770 | GPS | 0 | NA | NA | O | fieldbook | Looking at an "NC" |
| W | H | 2 | 04863000000000000000 | KA DD | W179 | Unit 14 | TEC | 13/08/97 | Not a creek | 93 L 084 | 9 | 6154000 | 607770 | GPS | 0 | NA | NA | O | NA | Looking at an "NC" |
| W | H | 3 | 04864000000000000000 | KA DD | W180 | Unit 14 | TEC | 14/08/97 | Trib to Kathlyn Cr. | 93 L 084 | 9 | 6123000 | 607620 | GPS | 2 | SW | Up | Ch | tape, water bottle | Looking upstream at the channel |
| W | H | 4 | 04864000000000000000 | KA DD | W180 | Unit 14 | TEC | 14/08/97 | Trib to Kathlyn Cr. | 93 L 084 | 9 | 6123000 | 607620 | GPS | 2 | NE | Dn | Ch | NA | Looking downstream at the channel |
| W | H | 5 | 46024294770000000000 | KA DD | W181 | Unit 14 | TEC | 14/08/97 | Elliot Cr. | 93 L 084 | 9 | 6084000 | 608250 | GPS | 3 | W | Up | Ch | NA | Looking upstream at the channel, note the abundant LOD |
| W | H | 6 | 46024294770000000000 | KA DD | W181 | Unit 14 | TEC | 14/08/97 | Elliot Cr. | 93 L 084 | 9 | 6084000 | 608250 | GPS | 3 | E | Dn | Ch | NA | Looking downstream at the channel |
| W | H | 7 | 46024294770000000000 | KA DD | W181 | Unit 14 | TEC | 14/08/97 | Elliot Cr. | 93 L 084 | 9 | 6084000 | 608250 | GPS | 3 | NA | NA | Fi | meterstick | Measuring fish with the meterstick |
| W | H | 9 | 04741000000000000000 | KA DD | W182 | Unit 14 | TEC | 14/08/97 | Trib. to Toboggan Cr. | 93 L 084 | 9 | 6074000 | 608320 | GPS | 4 | SE | Dn | Ch | NA | Looking downstream at the channel |
| W | H | 8 | 04741000000000000000 | KA DD | W182 | Unit 14 | TEC | 14/08/97 | Trib. to Toboggan Cr. | 93 L 084 | 9 | 6074000 | 608320 | GPS | 4 | NW | Up | Ch | NA | Looking upstream at the channel |
| W | M | 18 | 00195000000000000000 | DD JP L | W229 | Unit 14 | TEC | 05/09/97 | Trib to Toboggan Cr. | 93 L 094 | 9 | 6098000 | 608680 | GPS | 1 | NW | Up | Ch | crew member | Looking upstream at the channel, note the dense riparian cover |
| W | M | 19 | 00195000000000000000 | DD JP L | W229 | Unit 14 | TEC | 05/09/97 | Trib to Toboggan Cr. | 93 L 094 | 9 | 6098000 | 608680 | GPS | 1 | SE | Dn | Ch | crew member | Looking downstream at the channel |
| W | M | 22 | 46024291610000000000 | DD JP L | W230 | Unit 14 | TEC | 05/09/97 | Owens Cr. | 93 L 094 | 9 | 6072000 | 608630 | GPS | 1 | NE | Dn | Ch | crew member | Looking downstream at the channel and the collapsed bridge |
| W | M | 23 | 46024291610000000000 | DD JP L | W230 | Unit 14 | TEC | 05/09/97 | Owens Cr. | 93 L 094 | 9 | 6072000 | 608630 | GPS | 1 | NA | NA | Fi | meterstick | Measuring fish with the meterstick |
| W | M | 21 | 46024291610000000000 | DD JP L | W230 | Unit 14 | TEC | 05/09/97 | Owens Cr. | 93 L 094 | 9 | 6072000 | 608630 | GPS | 1 | SW | Up | Ch | crew member | Looking upstream at the channel |
| W | M | 20 | 46024291610000000000 | DD JP L | W230 | Unit 14 | TEC | 05/09/97 | Owens Cr. | 93 L 094 | 9 | 6072000 | 608630 | GPS | 1 | NW | X | Ch | crew member | Looking across stream at a collapsed bridge |
| W | M | 24 | 46024291610000000000 | DD JP L | W230 | Unit 14 | TEC | 05/09/97 | Owens Cr. | 93 L 094 | 9 | 6072000 | 608630 | GPS | 1 | NA | NA | Fi | meterstick | Measuring fish with the meterstick |
| W | M | 25 | 00180000000000000000 | DD JP L | W232 | Unit 14 | TEC | 05/09/97 | Not a creek | 93 L 094 | 9 | 6114000 | 608740 | GPS | 0 | SE | Up | Ch | crew members | Looking upstream at the channel |
| W | N | 1 | 00180000000000000000 | DD JP L | W232 | Unit 14 | TEC | 05/09/97 | Not a creek | 93 L 094 | 9 | 6114000 | 608740 | GPS | 0 | NW | Dn | Ch | NA | Looking upstream at the channel, overgrown with grasses |
| W | N | 2 | 00196000000000000000 | DD JP L | W233 | Unit 14 | TEC | 05/09/97 | Trib to Toboggan Cr. | 93 L 094 | 9 | 6107000 | 608590 | GPS | 1 | W | Dn | Ch | crew member | Looking downstream at the channel |
| W | N | 3 | 00196000000000000000 | DD JP L | W233 | Unit 14 | TEC | 05/09/97 | Trib to Toboggan Cr. | 93 L 094 | 9 | 6107000 | 608590 | GPS | 1 | E | Up | Ch | NA | Looking upstream at the channel |

| Group | Roll | Frame | Watershed Code | Survey Crew | Site Number | Unit Number | Agency | Survey Date | Stream "Local" | Map # | UTM Zone | UTM Northing | UTM Easting | Method | Reach Number | Aspect | Photo Direction | Photo Type | Scale Item | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W | N | 4 | 00196000000000000000 | DD JP L | W233 | Unit 14 | TEC | 05/09/97 | Trib to Toboggan Cr. | 93 L 094 | 9 | 6107000 | 608590 | GPS | 1 | NA | NA | Fi | meterstick | Measuring fish with the meterstick |
| W | N | 5 | 00180000000000000000 | DD JP L | W234 | Unit 14 | TEC | 05/09/97 | Not a creek | 93 L 094 | 9 | 6085000 | 608970 | GPS | 0 | NA | NA | O | crew member | Looking at an "NC" |
| Y | 9 | 25 | 00183000000000000000 | DD SJ JP | Y73 | Unit 14 | TEC | 23/07/97 | Trib to Toboggan Cr. | 93 L 094 | 9 | 6058000 | 608720 | GPS | 1 | E | Dn | Ch | photoboard | Looking downstream at the channel. |
| Y | 9 | 24 | 00183000000000000000 | DD SJ JP | Y73 | Unit 14 | TEC | 23/07/97 | Trib to Toboggan Cr. | 93 L 094 | 9 | 6058000 | 608720 | GPS | 1 | W | Up | Ch | photoboard | Looking upstream at the channel, note dense alder dominated riparian vegetation. |
| Y | 9 | 26 | 00186000000000000000 | DD SJ JP | Y74 | Unit 14 | TEC | 23/07/97 | Trib to Toboggan Cr. | 93 L 094 | 9 | 6058000 | 605680 | GPS | 2 | SW | Up | Ch | photoboard | Looking upstream at the channel. |
| Y | 10 | 1 | 00186000000000000000 | DD SJ JP | Y74 | Unit 14 | TEC | 23/07/97 | Trib to Toboggan Cr. | 93 L 094 | 9 | 6058000 | 605680 | GPS | 2 | NE | Dn | Ch | photoboard, crew member | Looking downstream at the channel. |
| Y | 10 | 4 | 00184000000000000000 | DD SJ JP | Y75 | Unit 14 | TEC | 23/07/97 | Not a creek | 93 L 094 | 9 | 6076000 | 608780 | GPS | 0 | NA | NA | NA | hand | Large tadpole. |
| Y | 10 | 3 | 00184000000000000000 | DD SJ JP | Y75 | Unit 14 | TEC | 23/07/97 | Not a creek | 93 L 094 | 9 | 6076000 | 608780 | GPS | 0 | NA | NA | NA | hands | Small tadpoles. |
| Y | 10 | 2 | 00184000000000000000 | DD SJ JP | Y75 | Unit 14 | TEC | 23/07/97 | Not a creek | 93 L 094 | 9 | 6076000 | 608780 | GPS | 0 | NA | NA | Ch | crew members | Looking at a large pool. |
| Y | 10 | 8 | 00183000000000000000 | DD SJ JP | Y76 | Unit 14 | TEC | 24/07/97 | Trib to Toboggan Cr. | 93 L 094 | 9 | 6085000 | 608750 | GPS | 1 | NA | NA | Fi | photoboard, fishboard | CO on the fish board. |
| Y | 10 | 7 | 00183000000000000000 | DD SJ JP | Y76 | Unit 14 | TEC | 23/07/97 | Trib to Toboggan Cr. | 93 L 094 | 9 | 6085000 | 608750 | GPS | 1 | NA | NA | Fi | photoboard, fishboard | CO on the fish board. |
| Y | 10 | 6 | 00183000000000000000 | DD SJ JP | Y76 | Unit 14 | TEC | 23/07/97 | Trib to Toboggan Cr. | 93 L 094 | 9 | 6085000 | 608750 | GPS | 1 | NW | Dn | Ch | photoboard, crew member | Looking downstream at the channel, note large gravel bar. |
| Y | 10 | 5 | 00183000000000000000 | DD SJ JP | Y76 | Unit 14 | TEC | 23/07/97 | Trib to Toboggan Cr. | 93 L 094 | 9 | 6085000 | 608750 | GPS | 1 | SE | Up | Ch | photo board | Looking upstream at the channel, note the slumping bank. |
| Y | 32 | 13 | 4603924000000000000 | JP FC | Y266 | Unit 14 | TEC | 15/09/97 | Powers Cr. | 93 L 065 | 9 | 6198060 | 606130 | GPS | 2 | NA | NA | Ch | NA | Looking across stream at the channel |
| Y | 32 | 12 | 4603924000000000000 | JP FC | Y266 | Unit 14 | TEC | 15/09/97 | Powers Cr. | 93 L 065 | 9 | 6198060 | 606130 | GPS | 2 | NE | Dn | Ch | photoboard | Looking downstream at the channel |
| Y | 32 | 11 | 4603924000000000000 | JP FC | Y266 | Unit 14 | TEC | 15/09/97 | Powers Cr. | 93 L 065 | 9 | 6198060 | 606130 | GPS | 2 | SW | Up | Ch | photoboard | Looking upstream at the channel |
| Y | 33 | 15 | 0517800000000000000 | JP JL | Y274 | Unit 14 | TEC | 16/09/97 | Not a creek | 93 L 074 | 9 | 6149660 | 607375 | GPS | 0 | NA | NA | NA | photoboard, crew member | Looking at an "NC" |
| Y | 9 | 22 | 00203000000000000000 | DD SJ JP | Y72 | Unit 14 | TEC | 23/07/97 | Trib to Toboggan Cr. | 93 L 094 | 9 | 6046000 | 608740 | 2 | N | Up | Ch | photobo | Looking upstream at the channel and LOD. | |
| Y | 9 | 23 | 00203000000000000000 | DD SJ JP | Y72 | Unit 14 | TEC | 23/07/97 | Trib to Toboggan Cr. | 93 L 094 | 9 | 6046000 | 608740 | 2 | W | Dn | Ch | photobo | Looking downstream at the channel. | |
| Z | 4 | 5 | 4603738000000000000 | JP KG | Z25 | Unit 14 | TEC | 11/07/97 | Trib. to Seymour Cr | 93 L 075 | 9 | 6175600 | 606586 | GPS | 2 | S | Up | Ch | NA | Looking upstream at a culvert barrier |
| Z | 4 | 4 | 4603738000000000000 | JP KG | Z25 | Unit 14 | TEC | 11/07/97 | Trib. to Seymour Cr | 93 L 075 | 9 | 6175600 | 606586 | GPS | 2 | N | Dn | Ch | photoboard, hat | Looking downstream at the channel |
| Z | 4 | 3 | 4603738000000000000 | JP KG | Z25 | Unit 14 | TEC | 11/07/97 | Trib. to Seymour Cr | 93 L 075 | 9 | 6175600 | 606586 | GPS | 2 | S | Up | Ch | photoboard | Looking upstream at the channel, note the angularity of the cobble |
| Z | 4 | 6 | 0516600000000000000 | JP KG | Z26 | Unit 14 | TEC | 11/07/97 | Trib. to Seymour Lk. | 93 L 075 | 9 | 6174220 | 606613 | GPS | 1 | NW | Up | Ch | photoboard | Looking upstream at the channel |
| Z | 6 | 15 | 0516300000000000000 | KG JL | Z46 | Unit 14 | TEC | 15/07/97 | Trib to Seymour Lk. | 93 L 075 | 9 | 6180000 | 606730 | GPS | 1 | E | Dn | Ch | crew member | Looking downstream at the channel |
| Z | 6 | 16 | 0516300000000000000 | KG JL | Z46 | Unit 14 | TEC | 15/07/97 | Trib to Seymour Lk. | 93 L 075 | 9 | 6180000 | 606730 | GPS | 1 | W | Up | Ch | crew member | Looking upstream at the channel |
| Z | 6 | 17 | 0516300000000000000 | KG JL | Z46 | Unit 14 | TEC | 15/07/97 | Trib to Seymour Lk. | 93 L 075 | 9 | 6180000 | 606730 | GPS | 1 | E | Up | Ch | meterstick | Looking upstream at a culvert barrier |

| Group | Roll | Frame | Watershed Code | Survey Crew | Site Number | Unit Number | Agency | Survey Date | Stream "Local" | Map # | UTM Zone | UTM Northing | UTM Easting | Method | Reach Number | Aspect | Photo Direction | Photo Type | Scale Item | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Z | 6 | 22 | 46037380000000000000 | SJ KG | Z47 | Unit 14 | TEC | 15/07/97 | Seymour Cr. | 93 L 075 | 9 | 6193600 | 606740 | GPS | 1 | W | Up | Ch | crew member | Looking upstream at the channel, on the other side of the road crossing |
| Z | 6 | 21 | 46037380000000000000 | SJ KG | Z47 | Unit 14 | TEC | 15/07/97 | Seymour Cr. | 93 L 075 | 9 | 6193600 | 606740 | GPS | 1 | N | Dn | Ch | meterstick | Looking downstream at the channel |
| Z | 6 | 20 | 46037380000000000000 | SJ KG | Z47 | Unit 14 | TEC | 15/07/97 | Seymour Cr. | 93 L 075 | 9 | 6193600 | 606740 | GPS | 1 | NA | NA | Fi | fieldbook | Looking at a dead fish |
| Z | 6 | 18 | 46037380000000000000 | SJ KG | Z47 | Unit 14 | TEC | 15/07/97 | Seymour Cr. | 93 L 075 | 9 | 6193600 | 606740 | GPS | 1 | NA | NA | Fi | crew member | Looking at a fish with lesions |
| Z | 6 | 19 | 46037380000000000000 | SJ KG | Z47 | Unit 14 | TEC | 15/07/97 | Seymour Cr. | 93 L 075 | 9 | 6193600 | 606740 | GPS | 1 | NA | NA | Fi | crew member | Looking at a fish with lesions |
| Z | 6 | 23 | 46034542670000000000 | JL KG | Z48 | Unit 14 | TEC | 18/07/97 | Kathlyn Cr. | 93 L 085 | 9 | 6616200 | 607408 | GPS | 1 | S | Dn | Ch | photoboard, crew member | Looking downstream at the channel |
| Z | 6 | 24 | 46034542670000000000 | JL KG | Z48 | Unit 14 | TEC | 18/07/97 | Kathlyn Cr. | 93 L 085 | 9 | 6616200 | 607408 | GPS | 1 | N | Up | Ch | photoboard, crew member | Looking upstream at the channel |
| Z | 6 | 25 | 46037383320000000000 | JLKG | Z49 | Unit 14 | TEC | 18/07/97 | Dahlie Cr. | 93 L 075 | 9 | 6189600 | 607112 | GPS | 1 | N | Dn | Ch | crew member | Looking downstream at the channel, note the dense alder cover |
| Z | 7 | 1 | 46037383320000000000 | JLKG | Z49 | Unit 14 | TEC | 18/07/97 | Dahlie Cr. | 93 L 075 | 9 | 6189600 | 607112 | GPS | 1 | S | Up | Ch | flagging tape | Looking upstream at the channel |
| Z | 7 | 2 | 46037383320000000000 | JLKG | Z49 | Unit 14 | TEC | 18/07/97 | Dahlie Cr. | 93 L 075 | 9 | 6189600 | 607112 | GPS | 1 | | X | Ch | NA | Looking across stream at the channel |
| Z | 7 | 5 | 05146000000000000000 | JL KG | Z51 | Unit 14 | TEC | 18/07/97 | Trib. to Powers Cr. | 93 L 075 | 9 | 6197000 | 606408 | GPS | 1 | | X | Ch | meterstick | Looking across stream at the channel |
| Z | 7 | 6 | 05146000000000000000 | JL KG | Z51 | Unit 14 | TEC | 18/07/97 | Trib. to Powers Cr. | 93 L 075 | 9 | 6197000 | 606408 | GPS | 1 | N | Dn | Ch | hat | Looking downstream at the channel |
| Z | 8 | 4 | 46024295150960000000 | JP KG | Z61 | Unit 14 | TEC | 22/07/97 | Glass Creek | 93 L 084 | 9 | 6132290 | 608135 | GPS | 1 | SE | Up | Ch | culvert | Looking upstream at the channel |
| Z | 8 | 3 | 46024295150960000000 | JP KG | Z61 | Unit 14 | TEC | 22/07/97 | Glass Creek | 93 L 084 | 9 | 6132290 | 608135 | GPS | 1 | NW | Dn | Ch | photoboard, crew member | Looking downstream at the channel |
| Z | 8 | 8 | 04741000000000000000 | KG JP | Z62 | Unit 14 | TEC | 22/07/97 | Trib. to Toboggan Cr. | 93 L 084 | 9 | 6103000 | 608506 | GPS | 1 | SE | Up | Ch | photoboard, crew member | Looking upstream at the channel |
| Z | 8 | 7 | 04741000000000000000 | KG JP | Z62 | Unit 14 | TEC | 22/07/97 | Trib. to Toboggan Cr. | 93 L 084 | 9 | 6103000 | 608506 | GPS | 1 | NA | NA | Fi | photoboard, fishboard | Measuring fish on the fishboard |
| Z | 8 | 9 | 04741000000000000000 | KG JP | Z62 | Unit 14 | TEC | 22/07/97 | Trib. to Toboggan Cr. | 93 L 084 | 9 | 6103000 | 608506 | GPS | 1 | SE | Up | Ch | culvert | Looking upstream at the channel, note the condition of the culvert |
| Z | 8 | 10 | 04741000000000000000 | KG JP | Z62 | Unit 14 | TEC | 22/07/97 | Trib. to Toboggan Cr. | 93 L 084 | 9 | 6103000 | 608506 | GPS | 1 | NW | Dn | Ch | photoboard, crew member | Looking downstream at the channel |
| Z | 8 | 6 | 04741000000000000000 | KG JP | Z62 | Unit 14 | TEC | 22/07/97 | Trib. to Toboggan Cr. | 93 L 084 | 9 | 6103000 | 608506 | GPS | 1 | NA | NA | Fi | photoboard, fishboard | Measuring fish on the fishboard |
| Z | 8 | 5 | 04741000000000000000 | KG JP | Z62 | Unit 14 | TEC | 22/07/97 | Trib. to Toboggan Cr. | 93 L 084 | 9 | 6103000 | 608506 | GPS | 1 | NA | NA | Fi | photoboard, fishboard | Measuring fish on the fishboard |
| Z | 8 | 11 | 46024294770000000000 | KG JP | Z63 | Unit 14 | TEC | 22/07/97 | Elliot Cr. | 93 L 084 | 9 | 6099400 | 608329 | GPS | 2 | NA | NA | Fi | photoboard, fishboard | Measuring fish on the fishboard |
| Z | 8 | 12 | 46024294770000000000 | KG JP | Z63 | Unit 14 | TEC | 22/07/97 | Elliot Cr. | 93 L 084 | 9 | 6099400 | 608329 | GPS | 2 | NA | NA | Fi | photoboard, fishboard | Measuring DV on the fishboard |
| Z | 8 | 13 | 46024294770000000000 | KG JP | Z63 | Unit 14 | TEC | 22/07/97 | Elliot Cr. | 93 L 084 | 9 | 6099400 | 608329 | GPS | 2 | SW | Up | Ch | NA | Looking upstream at the channel |
| Z | 8 | 14 | 46024294770000000000 | KG JP | Z63 | Unit 14 | TEC | 22/07/97 | Elliot Cr. | 93 L 084 | 9 | 6099400 | 608329 | GPS | 2 | NE | Dn | Ch | flagging tape | Looking downstream at the channel |
| Z | 8 | 15 | 00193000000000000000 | JP KG | Z64 | Unit 14 | TEC | 22/07/97 | Trib to Owens Cr. | 93 L 084 | 9 | 6068830 | 608408 | GPS | 1 | W | Up | Ch | photoboard, crew member | Looking upstream at the channel |

| Group | Roll | Frame | Watershed Code | Survey Crew | Site Number | Unit Number | Agency | Survey Date | Stream "Local" | Map # | UTM Zone | UTM Northing | UTM Easting | Method | Reach Number | Aspect | Photo Direction | Photo Type | Scale Item | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Z | 8 | 16 | 00193000000000000000 | JP KG | Z64 | Unit 14 | TEC | 22/07/97 | Trib to Owens Cr. | 93 L 084 | 9 | 6068830 | 608408 | GPS | 1 | E | Dn | Ch | photoboard, crew member | Looking downstream at the channel |
| Z | 8 | 17 | 04741000000000000000 | JP KG | Z65 | Unit 14 | TEC | 22/07/97 | Trib to Toboggan Cr. | 93 L 084 | 9 | 6073090 | 608329 | GPS | 4 | W | Up | Ch | flagging tape | Looking upstream at the channel |
| Z | 8 | 18 | 04741000000000000000 | JP KG | Z65 | Unit 14 | TEC | 22/07/97 | Trib to Toboggan Cr. | 93 L 084 | 9 | 6073090 | 608329 | GPS | 4 | E | Dn | Ch | NA | Looking downstream at the channel |
| Z | 8 | 19 | 46034542676160000000 | JP KG | Z66 | Unit 14 | TEC | 22/07/97 | Club Cr. | 93 L 084 | 9 | 6123520 | 607763 | GPS | 3 | E | Dn | Ch | photoboard, crew member | Looking downstream at the channel, note the highly turbid water |
| Z | 8 | 20 | 46034542676160000000 | JP KG | Z66 | Unit 14 | TEC | 22/07/97 | Club Cr. | 93 L 084 | 9 | 6123520 | 607763 | GPS | 3 | W | Up | Ch | photoboard, crew member | Looking upstream at the channel |
| Z | 8 | 21 | 46034542676160000000 | JP KG | Z66 | Unit 14 | TEC | 22/07/97 | Club Cr. | 93 L 084 | 9 | 6123520 | 607763 | GPS | 3 | | X | Ch | crew member | Looking across stream at the channel |
| Z | 7 | 8 | 46039240000000000000 | JP KG | Z52 | Unit 14 | TEC | 18/07/97 | Powers Cr. | 93 L 075 | 9 | 6198000 | 606400 | GPS | 1 | SE | Dn | Ch | NA | Looking downstream at the channel |
| Z | 7 | 7 | 46039240000000000000 | JP KG | Z52 | Unit 14 | TEC | 18/07/97 | Powers Cr. | 93 L 075 | 9 | 6198000 | 606400 | GPS | 1 | S | Up | Ch | crew member | Looking upstream at the channel |