34560-27/MOR/SHEA V: 1 E: N SHEA CREEK -MORR- 460-600600-50800-00500-2830 93L03

Fish and fish habitat inventory projects by river or stream Fish - inventory and assessment - projects

1997-09-16 OPR SO 5y SR

FISH, WILDLIFE, HA Sched: 100701 ENVR-SKN04

FRBC RESOURCE INVENTORY PROGRAM

Reconnaissance (1:20,000 Scale) Fish and Fish Habitat Inventory in the Shea Creek Watershed

WSC: 460-600600-50800-00500-2830



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Reconnaissance (1:20,000 Scale) Fish and Fish Habitat Inventory in the Shea Creek Watershed

WSC: 460-600600-50800-00500-2830

Prepared for:

Northwood Pulp and Timber Ltd. P.O. Box 158 Houston, B.C., VOJ 2NO

Prepared by:

Triton Environmental Consultants Ltd. 413 Campbell Street Nanaimo B.C., V9R 3G8

June 1998



PROJECT SUMMARY INFORMATION

Project Reference Information

FDIS Project Number:

06-BABL-3085-0001-1998

MELP Project or Contract Number:

CSK-3085

FRBC Project Number:

SB97063-IN

Name of subcontractors:

n/a

Project Manager:

Scott Northrup, R.P.Bio.

Field crew:

T. Walker, D. Lawes, E. Nyhof, S. Toth

Data entry by:

Tina Walker, David Lawes

Report prepared by:

Tina Walker

Report edited by:

Scott Northrup, R.P.Bio.

GIS analysis by:

Western Geographic Information Systems

Voucher speceis ID:

Gordon Haas

n/a

Water analysis by: Fish aging by:

n/a

Watershed Information

Watershed Name:

Shea Creek

Watershed Code:

460-600600-50800-00500-2830

UTM at Mouth:

9.598320.6009659

Watershed Area:

19,510 ha (approx) 317 km

Total Stream Length:

Stream Order: NTS Map No.'s:

93 L/3; 93 L/4; 93 L/5

TRIM Map No.'s.:

93L.022; 93L.023; 93L.033

Biogeoclimatic Zone:

SBS, ESSF, Atc

Aerial Photographs:

30BCC96049 No 116 - 30BCC96063 No. 026

Sampling Design Summary

Total Number of Reaches:

482

Total Sample Sites:

47

Random Sample Sites:

30

Discretionary Sites:

17

Field Sampling Dates:

September 16-21, 1997

Fish Species Captured During Survey:

CAS, CO, CT, DV, RB, RSC

Fish Species Present in Watershed:

CAS, CO, CT, DV, LNC, MW, RB, RSC, ST

Disclaimer

"The Province has not accepted the contents of this product* for the purposes of the Forest Practices Code, and reserves the right to dispute the validity of summarized results. The province does not necessarily agree with the classification assigned to any individual stream reach, for use in logging plans, silviculture prescriptions or any other application."

* Product refers to the information detailed in the following pages of this report.

Acknowledgements

Funding for this inventory was provided by Forest Renewal BC - a partnership of forest companies, workers, environmental groups, First Nations, communities and government. Forest Renewal BC funding - from stumpage fees and royalties that forest companies pay for the right to harvest timber on Crown lands - is reinvested in the forests, forest workers, and forest communities.

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Appendix III	Phase Completion Reports
Appendix IV	Project Plan
Appendix V	FDIS Reach/Site Summary
Appendix VI	Fish Data Collection Forms
Appendix VII	Photodocumentation Forms and Thumbnail Photographs
Appendix VIII	Reach Forms and Site Forms (Volume II)

LIST OF ATTACHMENTS AVAILABLE AT MELP REGIONAL OFFICE

- 1. Project Overview Map
- 2. Inventory Maps
- 3. Distribution Maps
- 4. Photograph CD
- 5. Indexed Slides
- 6. Voucher Specimens

1.0 INTRODUCTION

Triton Environmental Consultants Ltd. (Triton Nanaimo) was retained by Northwood Pulp and Timber Ltd. (Northwood) to conduct a Reconnaissance (1:20 000 Scale) Fish and Fish Habitat Stream Inventory (inventory) in the Shea Creek watershed. The project was part of a larger inventory of three areas managed by Northwood in the Morice Timber Supply Area (TSA).

The project was funded by a Forest Renewal of British Columbia (FRBC) initiative to describe watershed-wide fish distribution and habitat characteristics for major watershed groups within the province of British Columbia. The inventory was intended to provide information regarding fish species characteristics, distributions and relative abundance, as well as stream reach biophysical data for interpretation of habitat sensitivity and capability for fish production within the Shea Creek watershed (Anonymous 1997b). The results of the inventory may be applied to initial Riparian Management Area (RMA) classification for forest development planning and watershed restoration and for the establishment of some landscape-level biodiversity objectives (Anonymous 1997b).

1.1 Study Objectives

The objectives of the study were to describe watershed wide fish distributions and to determine the extent of fish habitat within the watershed. Fish and fish habitat values were the primary components of the inventory.

The study involved:

- the identification, delineation and mapping of fish-bearing stream reaches and lakes using existing information and new information (field inventory);
- The identification and coding of all waterbodies within the watershed and;
- the identification and characterization of stream reaches utilizing topographic maps and aerial photographs, with confirmation via field sampling.

The results from the inventory were presented on 1:20 000 TRIM based maps and on BC Ministry of Environment, Lands and Parks (MELP) Field Data Information Summary (FDIS) data forms.

2.0 STUDY AREA

2.1 Location

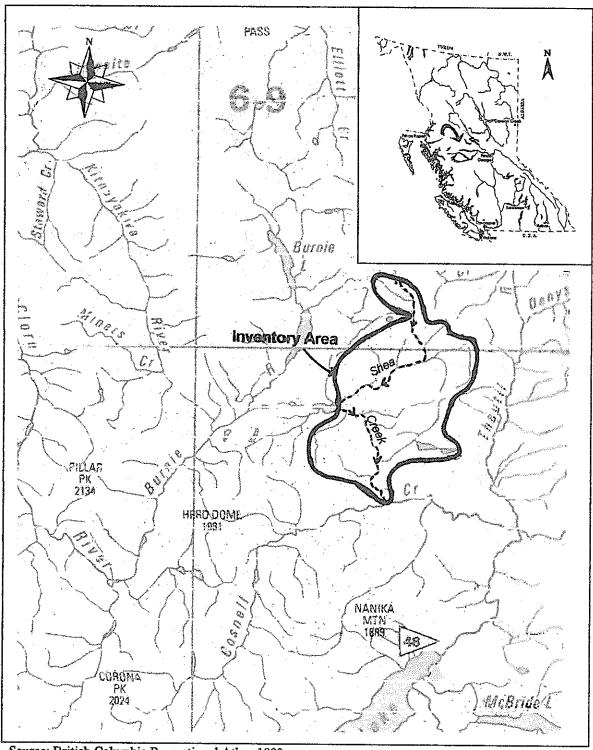
The Shea Creek watershed is located 55 km southwest of the town of Houston, BC. Shea Creek is a fifth order stream that flows south into Gosnell Creek, north of Nanika Mountain (FISS 1991) (Figure 1). Gosnell Creek is a major tributary to the Morice River.

The Shea Creek watershed lies within the Sub-Boreal Interior eco-province located east of the Coast Mountains and west of the Interior Plains (Demarchi, 1996). The watershed lies in the flat lowlands and rolling uplands of the Fraser Basin ecoregion, in the Babine Upland ecosection (Demarchi, 1996).

Demarchi (1996) describes the climate within the sub-boreal interior eco-province:

Prevailing westerly winds bring Pacific air to the area over the Coast Mountains by way of the low Kitimat Ranges or the higher Boundary Ranges. Much of this area is in a rain shadow...Summer surface heating leads to convective showers, and winter frontal systems result in precipitation that is evenly distributed throughout the year.

The biogeoclimatic zonation for the Shea Creek watershed is predominantly Sub-boreal Spruce (Demarchi, 1996). Engelmann Spruce - Subalpine Fir Zones occur on the middle slopes of mountains within the Shea Creek watershed and Alpine Tundra Zones occur on the upper mountain slopes (Demarchi. 1996).



Source: British Columbia Recreational Atlas, 1993

Scale: ~ 1:300 000

Figure 1. Shea Creek Inventory Area Location Map.

3.0 METHODS

The Inventory was completed in six phases as per the Reconnaissance (1:20 000) Fish and Fish Habitat Inventory manual:

- Phase 1: Existing Data Review
- Phase 2: Map and Air Photo Analysis
- Phase 3: Sampling Design and Project Plan
- Phase 4: Field Data Collection
- Phase 5: Data Compilation
- Phase 6: Report and Map preparation.

The methods employed for each phase of the project followed those outlined in the Reconnaissance Fish and Fish Habitat Inventory: Standards and Procedures, June 1997 (Anonymous 1997b).

3.1 Phase 1: Existing Data Review

Phase 1 involved a review of pertinent fisheries information and the production of interim maps to provide background information necessary for the planning phases of the inventory. Relevant stream and lake inventory reports, files, maps, summaries and aerial photographs were obtained from MELP Region 6 and Region 7, the Pacific Biological Station (PBS) (Department of Fisheries and Oceans (DFO)) and from Northwood.

The review also included the following information sources:

- Fisheries Information Summary System (FISS) database (DFO)
- Stream Information Summary System (SISS) database (MELP)
- 1: 50 000 National Topographic Series (NTS) maps
- Aquatic biophysical inventory maps (MELP)

- Stream classification maps/reports (Northwood)
- 1:20 000 Terrain Resource Information Management (TRIM) maps
- Licensee Forest Cover maps (1:20 000 scale) (Northwood)
- Forest Development Plan maps (1: 20 000 scale) (Northwood)
- Aerial photographs (1: 20 000 scale) (Northwood)
- Overview, Level 1 and Level 2 Fish Habitat Assessment (Watershed Restoration Projects (WRP)) (MELP)
- Other inventory and consultant reports
- BC Conservation Data Centre (CDC) summaries.

Background information obtained from these sources included:

- known fisheries values within the study area
- existing reach designations
- known locations of obstructions to fish migration
- known areas of sensitive fish habitat (FSZ's)
- identification of areas requiring priority assessment
- location of suitable access points.

A list of persons contacted and a bibliography of information sources was compiled (Appendix I and II).

The FISS database (1991) was the primary information source reviewed and this data was plotted on 1:20 000 scale TRIM maps relevant to the study area. Subsequent to the preparation of these maps other information sources were examined. Any of this latter information that was not documented by FISS was plotted on 1:50 000 NTS maps and recorded on FISS data compilation forms. Further, pertinent data from the additional sources of information were copied and forwarded to the Fisheries Inventory Specialist along with the 1:50 000 NTS maps and FISS data compilation forms.

TRIM based, 1:20 000 scale Interim maps were produced by combining existing drainage information from TRIM maps, Forest Cover maps and Forest Development Plan maps. All waterbodies, including lakes, wetlands and streams in the study area were identified. Interim Locator Points (ILPs) were assigned to each watercourse/waterbody which had not previously been assigned a watershed code or waterbody identifier. Universal Trans Mercator (UTMs) coordinates were measured and recorded for the confluences of each stream and the outlet of each lake using ARCInfo Unix version 7.2 software.

Numeric identifiers (NIDs) were assigned to features identified during the Phase I review and plotted on interim maps (NID is a unique number that links features and information on interim maps to the FDIS database to allow for quick data referencing).

Phase 1 deliverables included:

- list of contacts (Appendix I)
- bibliography of references used (Appendix II)
- FISS data maps and data compilation forms
- Interim maps
- ILP data sheets
- Phase 1 completion report (Appendix III).

All of the above items were submitted to Todd Mahon (the contract monitor) upon completion.

3.2 Phase 2: Map and Aerial Photograph Analysis

Phase 2 involved detailed map and aerial photograph interpretation. Project area boundaries and third and fourth order watershed boundaries were delineated on interim maps. Watershed characteristics (stream order, stream magnitude and basin type) for third and fourth order streams, as well as first and second order streams flowing into fourth order streams, were recorded in a basin classification table.

Map interpretation also included waterbody identification. The following definitions were used to determine the grouping of streams, lakes and wetlands:

- stream: a watercourse having an alluvial sediment bed, formed when water flows on a perennial or intermittent basis between continual definable streambanks (FPC Riparian Management Area Guidebook, Dec. 1995) (Anonymous 1995b).
- lake: an open body of water with a depth greater than 2 m and with less than 25 % of its surface area covered with wetland vegetation (Reconnaissance Fish and Fish Habitat Inventory, Standards and Procedures June 1997) (Anonymous 1997b).
- wetland: defined as an area where the water table is at, near or above the surface, or
 where soils are water saturated for a sufficient length of time so that excess water and
 resulting low oxygen are the principle determinants of vegetation and soil
 development (Reconnaissance Fish and Fish Habitat Inventory, Standards and
 Procedures June 1997) (Anonymous 1997b).

Maps and aerial photographs were also used to determine reach breaks for all streams within the project area. Reach breaks were determined using the following key characteristics:

- order
- channel pattern
- confinement
- gradient
- streambed and bank materials.

For survey purposes, lakes and wetlands were treated as separate reaches. Stream reaches were numbered sequentially upstream. Each reach break was subsequently assigned a NID.

The following reach characteristics were recorded in a Reach Table for each reach identified within the project area:

- order
- gradient
- channel pattern
- confinement
- anastamosed/braided channel
- basin type
- wetland
- features known to occur within the reach (culverts, beaver dams, falls).

Once the reach table was completed the sample size for stream reaches was determined using the following guidelines and the Reach Totals and Sample Size Sheet (Table 1).

Guidelines used for the site inventory sample size were:

• for lower gradient (less than 20 %) and small or medium streams (third order or lower), the sample size was based on the equation y=500x^{-0.8}, where x was

the number of reaches of a certain group, and y was the sampling proportion. (Anonymous 1997b).

• for higher gradient streams (between 20 and 30 %) or large streams (fourth order or higher), the sampling size was the lower of the results of the equation listed above or 10%. (Anonymous 1997b).

In addition to the guidelines, the following standards were observed for calculation of the minimum sample size of stream reaches:

- for low gradient or small/medium-sized streams, when the equation listed above results in a sample size less than 8, the sample size must be 8 (or total number if less than 8) (Anonymous, 1997b).
- for higher gradient streams (between 20 and 30%) or large size reaches, the sample size must be a minimum of two reaches (or all of them if there were less than 5) or a maximum of 25. (Anonymous, 1997b).
- high gradient streams (>30%) were sampled when warranted (e.g., when bull trout were suspected to occur in a reach with a 32 % gradient). Sampling in this group was based on professional judgment and the discretion of the contract monitor (Anonymous 1997b).

Table 1. Example of Reach Totals and Sample Size Table.

Gradient	Patter	n	Size			
			Small	Medium	Large	
	ST/EN	Ĺ	9	8	0	
1	IM/ME		0	18	4	
	AN/BR		0	2	1	
	ST/EN		8	23	_0_	
2	IM/MI		<u> </u>	<u> </u>	0	
	AN/BE		0	0	0_	
	COT TO 1			_		
	ST/EN		17	5		
3	IM/MI		0	0	0	
	AN/BE		0	0	0	
	ST/EN		27	0		
4	IM/ME	7	0	0	0	
	AN/BR		0	0	0	
	ALVIDE			V		
5	ST/EN		63	0	0	
	IM/ME		0	0	0	
	AN/BR		0	0	0	
				<u></u>		
		6	radient			
Gradient	Class		Gra	idient Range		
1				< 4 %		
2				% and < 8 %		
3_			> 8	% and < 20 %	<u> </u>	
4			> 20	$\frac{\%}{2}$ and $\frac{2}{3}$	0	
5			N //	> 30 %		
ST/EN	Entranal		Pattern	ainmana teres	rooches	
IM/ME	Irreguler/	Entrenched, straight and sinuous type reaches				
AN/BR	Irregular/tortuous meandering, and Anastamosed or braided reaches				anu	
		لكندن	Size	TCGCHCS	·. ·. · . · . · . · . · . · . · . · . ·	
Size CI	Size Class Order					
	Small			11		
Mediu				2 and 3		
Large				> 4		

Source: Anonymous 1997b

Note: the totals presented in this table are an example only. They are not relevant to this inventory.

Examples of Sample Size calculations as per the methods outlined in the Reconnaissance (1: 20 000) Fish and Fish Habitat Inventory, Standards and Procedures June 1997 (Anonymous 1997b) using Table 1 were:

 For lower gradient, medium-sized irregular meandering and meandering reaches:

Total number of reaches = 18
Sampling rate (%) =
$$500 \times (18)^{-0.8} = 500 \times 0.099 = 49.5\%$$

Sample Size = $(49.5/100) \times 18 = 8.9 = 9$

• For gradient class 4, small straight and entrenched streams:

Total number of reaches = 27
Sampling rate (%) = 10 %
Sample Size =
$$(10/100) \times 27 = 2.7 = 3$$

• For gradient class 3, medium-sized straight and entrenched reaches:

Total number of reaches = 5
Sampling rate (%) =
$$500 \times 5^{-0.8}$$
, however a, minimum sample size of 8 is required
Sample size = 5 (all)

Once sample sizes were determined, reaches to be sampled were identified and plotted on interim maps. Sample site selection was based on satisfying the numbers and types of stream reaches identified in the Sample Size Summary table. In addition, discretionary site selection was based on one or more of the following:

- proximity of stream reach to identified cutblocks
- site selection above and below barriers

- selection of sites to establish connectivity between sub-basins to determine
 fish utilization and that identify the upstream limits of fish distribution
- to ensure that all basin types and basin connectivity were adequately represented.

Forty-six (46) sample sites were selected in the Shea Creek inventory area under guidance from the information generated in the Reach Totals and Sample Size table and recommendations from the contract monitor, Northwood and the MELP Fisheries Inventory Specialist. Thirty-one (31) of these sample sites were selected on a discretionary basis and the remaining 15 were randomly selected. The random sample selection tool was not utilized for sample site selection, rather the Sample Size tables were used as a guide to select random sample sites.

The Reach Totals and Sample Size table initially generated 75 sample sites within the Shea Creek inventory area. Upon consultation with Mr. Paul Giroux, MELP's Fisheries Inventory Specialist for Region 6, the reach totals and sample size table for the Houston Tommy and Shea Creek study areas were combined. Mr. Giroux determined that the number of sample sites generated for each creek were too intense for a 1:20 000 scale reconnaissance inventory. As a result the individual reach tables for each creek were combined to generate one reach summary table and subsequently generated new sample totals. The combined totals were divided between the Houston Tommy Creek and Shea Creek watersheds based on watershed area.

None of the high gradient (>20%) stream reaches were selected by the contract monitor for sampling. Recent studies in the region indicate that bull trout (Salvelinus confluentus) and Dolly Varden char (S. malma) utilize habitat in streams having a gradient of no greater than 15 percent (Paul Giroux, pers. comm.).

Reach forms (a map/air photo based recording form designed to capture the physical information required to characterize a stream reach) were completed for each of the 47

sample sites. Reach forms are presented as Reach/Site summaries in Appendix V. Reach forms are presented in a separate, bound appendix (Appendix VIII; Volume II).

Lakes were designated as primary or secondary lakes based on their location and connectivity within watersheds and basin type, lake class and lake group were recorded on lake forms. Primary lakes play a dominant role in the watershed and generally possess the physical characteristics that are representative of most of the lakes within a group of lakes (Anonymous 1997b). Primary lakes often have the largest surface areas and/or are central in a cluster or chain of lakes (Anonymous 1997b).

The following deliverables for Phase 2 were submitted to the contract monitor:

- Basin Classification sheets
- Reach tables
- Lake tables
- Reach forms
- Phase 2 Completion Report.

The Phase 2 Completion report is included in Appendix III and Reach forms are included in a separate bound appendix (Appendix VIII).

3.3 Phase 3: Sampling Design and Project Plan

A project plan for the field portion of the project was developed and presented to the contract monitor. The project plan outlined the approach to be applied in field sampling, data collection and reporting, and an estimate of the time and cost required to conduct the inventory was provided. Sample sites selection and distribution was reviewed with the contract monitor, MELP's Fisheries Inventory Specialist and Triton's project manager and modified accordingly.

The following deliverables were submitted to the contract monitor:

- Fish sampling strategy for the inventory area
- Budget requirements for Phase 4
- Project plan for Phases 4 to 6 (Appendix IV)
- Phase 3 completion report (Appendix III)

3.4 Phase 4: Field Data Collection

The following sections describe the methods and approaches taken to complete field sampling and data collection. Field sampling was conducted between September 16 and 21, 1997.

3.4.1 Pre-field Preparation

Required fish collection permits from MELP and DFO were obtained prior to the commencement of field activities.

3.4.2 Field Procedures and Equipment

Field work was conducted by two field crews, each consisting of two people. In watersheds where road access was available, crews used a 4X4 crew cab and 'leap-frogged' from site to site. In watersheds where road access was unavailable crews were transported by a Bell Jet Ranger helicopter.

Each crew was equipped with the following:

- Smith-Root Model 12A backpack electrofisher
- electrofisher safety gear (leak proof waders, wading belts, Linesman's gloves, hat)
- minnow traps and bait

- backpacks
- clinometer
- compass
- hip chain
- 50 m tape
- metre stick
- VHF radio
- first aid kit
- water quality kit (hand held pH and conductivity meters)
- thermometer
- floating chip
- stop watch
- Canon waterproof camera and slide film
- voucher specimen container
- MELP Site cards
- MELP fish collection cards
- Triton photodocumentation forms
- field maps

3.4.3 Fish Species Sampling

Fish sampling efforts focused on reaches of <20 % gradient and followed the procedures outlined in the *Reconnaissance Fish and Fish Habitat Inventory: Standards and Procedures, June, 1997* (Anonymous 1997b) and the *Forest Practices Code Fish Stream Identification Guidebook, Dec. 1995* (Anonymous 1995a). A minimum of 100 m of stream length or a length equal to 10 bankfull widths (whichever was greater) was sampled at each sample site.

Fish presence, relative abundance and species diversity were evaluated by electroshocking at least 100 linear meters of representative habitat. In areas not suited for

electroshocking (deep pools and wetlands) and where return visits were practical, minnow traps baited with salmon roe were set and allowed to soak for a 24 hour period. Visual observations and angling were also used to document the presence of fish.

The following were collected and recorded on Fish Collection Forms at each sample site:

- species (identified using RIC's Field Key to Freshwater Fishes of BC).
- fork length (measured to the nearest mm)
- life-cycle stage
- a representative sample of any abnormal or unidentified fish or species of fish was preserved and submitted to the contract monitor.

The fish collection cards are presented in Appendix VI.

Following the initial sampling, follow-up sampling was recommended for specific sites within the study area. A written explanation detailing the areas of concern, the initial results of the survey and recommendations from the survey crew were composed and summarized in the Additional Sampling Recommendations table (Table 5).

For all reaches with non-fish bearing classifications a written explanation (Table 6: Non-Fish Bearing Status) was completed. The explanation focused on sampling methods utilized during the field program and included a summary of sampling effort, water quality parameters (conductivity and turbidity) and habitat characteristics.

3.4.4 Habitat (Site) Description

A site description was completed on Site Description forms for each reach (at fish sampling sites). The length of each sample site was between 100 and 300 m, or 10 bankfull widths (whichever was greater). The following data were collected at each sample site:

- site length (m)
- stream gradient (%)
- six individual channel width measurements (m)
- six individual wetted width measurements (m)
- six residual pool depth measurements (m)
- three individual bankfull depth measurements (m)
- flood signs (visual observation)
- water temperature (°C)
- pH
- conductivity (us)
- turbidity (visual observation)
- total instream cover for fish (%)
- individual instream cover types for fish(%)
- presence of large woody debris (LWD)(visual observation)
- distribution of LWD (visual observation)
- crown closure (visual observation (%))
- shape of left and right stream bank (visual observation)
- texture of stream banks (visual observation)
- riparian vegetation on left and right stream banks (none, grass, shrub, conifer, mixed, deciduous and wetland)
- stage of riparian vegetation (Initial, Shrub, Pole sapling, Young Forest, Mature Forest)
- composition of bed material (dominant and subdominant)
- D95 (cm)
- D (cm)
- channel morphology (riffle/pool, step/pool, cascade/pool)
- presence of disturbance indicators
- channel pattern (tortuous/irregular meandering, meandering, sinuous, straight)
- occurrence of islands and bars

- channel coupling (coupled, decoupled, partially coupled)
- channel confinement (entrenched, confined, occasionally confined, unconfined, not applicable)
- presence of features
- habitat type and quality rating (poor, fair, moderate, good)
- identification of fisheries sensitive zones (FSZ's)
- photo documentation
- wildlife observations
- comments.

The site cards are presented in a separate bound appendix (Appendix VIII). FDIS Reach/Site summaries are presented in Appendix V.

3.4.5 Wildlife Observations

Wildlife observations were noted and specific details recorded on the Site Cards. Aquatic invertebrates and macrophytes were described. Photographs were taken for further documentation and confirmation of wildlife observations.

3.4.6 Photographic Documentation

Photographs were used to provide extensive visual records at each sample site; at least two photographs (upstream/downstream perspective) were taken at each sample site. In addition, photographs were taken of key areas of interest (e.g., migration barriers, major erosion sites, fish samples, riparian conditions and any other unique features).

The photographs were documented accordingly on Site Cards, Fish Collection Cards and Photodocumentation Forms. Thumbnail photograph prints are presented in Appendix VII. Slides produced during the project are presented in a separate bound volume along with digital images presented on a CD ROM disk.

3.4.7 Field Data Compilation

Immediately following each field day, field crews met in the field office to compile field notes, review field data and summarize the field findings on hard copy maps. This system ensured that all field information was thoroughly documented while field work was still fresh with the crews and allowed for preliminary classifications to be available as required.

3.4.8 Phase 4 Deliverables

The following deliverables were submitted to the contract monitor:

- Site Forms
- Fish Collection Forms
- Phase 4 completion reports.

The Phase 4 completion report is included in Appendix III. The Site Forms are provided in a separate, bound appendix (Appendix VIII). Fish Collection Forms are presented in Appendix VI.

3.5 Phase 5: Data Compilation

Phase 5 was comprised of data entry (Site and Fish Collection Forms) into the MELP FDIS database. Interim locator points (ILPs) submitted during Phase 1 were converted to watershed codes and NID's were converted to UTM coordinates for mapping and georeferencing purposes. Photographs taken during the field portion of the project were developed, scanned, captioned and indexed in referenced binders.

Deliverables for Phase 5 included:

- electronic versions of the Reach Forms
- electronic versions of the Site Cards
- electronic versions of the Fish Collection Forms
- Photodocumentation indices
- Indexed photographic slides
- FISS update maps and data forms
- Phase 5 completion report.

The Phase 5 completion report is included in Appendix III. Indexed slides are presented in a separate, bound volume. 'Thumbnail' printouts are included in Appendix VII.

3.6 Phase 6: Reporting and Mapping

The final report and maps for all sub-basins in the study area were developed following the format outlined in Chapter 5 of the *Reconnaissance Fish and Fish Habitat Inventory:* Standards and Procedures (June, 1997) (Anonymous 1997b).

3.6.1 Reporting

The final report is a summary of background information and a discussion of problems and concerns with the implementation of the phased approach taken to conduct the inventory. The report focused on descriptions and justifications for non-sampled reaches, non-fish bearing reaches and reaches that require additional sampling.

3.6.2 Mapping

All maps were produced using the GIS software program ARCInfo Unix version 7.2. The final maps that were produced included:

- Hardcopy Project Overview map
- Hardcopy Inventory maps
- Hardcopy Distribution maps
- Digital copies of Project Overview, Inventory and Distribution maps.

3.6.3 Phase 6 Deliverables

The deliverables for Phase 6 included:

- Hardcopy Project Overview map
- Hardcopy Inventory maps
- Hardcopy Distribution maps
- Hardcopies of Project Overview, Inventory and Distribution maps
- Digital copies of Project Overview, Inventory and Distribution maps
- Hardcopy Final Report
- digital copies Final Report
- two Kodak Photo CD's of all photographs taken for the project
- Phase 6 Completion Report.

4.0 RESULTS

4.1 Existing Information

Coho salmon (Oncorhyncus kisutch), cutthroat trout (O. clarki), Dolly Varden char (Salvelinus malma), longnose dace (Rhinichthys cataracte), rainbow trout (O. mykiss), Rocky Mountain whitefish (Prosopium williamsoni) and steelhead (O. mykiss) have been observed in the Shea Creek mainstem (Tredger, 1983). Numerous habitat and fish distribution studies have been conducted along Shea Creek in the section of stream below Shea Lake (Bibliography; Appendix II). Steelhead fry were released into Shea Creek in 1984, 1985 and 1986 above and below the falls (9 km upstream) on the mainstem (FISS, 1991).

A lake survey in August, 1996 identified the following fish species as residents of Shea Lake: cutthroat trout, Dolly Varden char, mountain whitefish, Kokanee (O. nerka), prickly sculpin (Cottus asper), and redside shiner (Richardsonius balteatus) (DeGisi, 1997). A similar survey on West Julian Holland Lake identified only two species of fish as residents: cutthroat trout and Dolly Varden char (Salvelinus malma) (DeGisi, 1997).

The Wet'suwet'en First Nation was conducting a Level II WRP project in the Gosnell Creek watershed. Field visitation was scheduled for eleven sites within the watershed (Michell, 1996). The results of the WRP project are available at the Region 6 MELP office.

4.2 Survey Information

Table 2 provides an overview of the survey information compiled for to the Shea Creek watershed.

Table 2. Survey Information for the Shea Creek Watershed

Watershed	Namas		Shea Creek	-			
	Watershed Code:						
NTS Maps			460-60060-50800-00500-2830 93 L/3; 93 L/4; 93 L/5				
TRIM Maj			 	3L.023; 93L.0	22		
Watershed			19,510 ha (33		
	Alta:				Creek → Morice River→		
Drainage:			1				
77 - 4 - 1 37	L		22	ver → Skeena	Rivei		
	ber of Lakes:				,		
Total Strea				proximately)			
	ber of Reaches:		479	10.01.1005			
	ld Sampling Dates:			18-21, 1997			
	Sample Sites:	 	47				
	mple Sites:		30				
	ry Sample Sites:		17				
	es Located Along Pr	roposed Cutblock	31				
Boundaries		<u> </u>	,	~			
Fish in Mai	nstems	Gazetted N		Reach #	Species		
		Shea Cre	ек	3/16/20/24	CO/CT/DV/RB		
Fish in Trib	outaries:	TION OF THE		1 5 7 11			
Stream				Reach #	Species		
Name	460-600600-50800-0	0500 2020 2245 210	(01561)		70.17		
Unnamed				1	DV		
Unnamed	460-600600-50800	*** * * * * ***** * *** * ****** ** ****	`	2	CT		
Unnamed	460-600600-50800	` 	1	CO			
Unnamed	460-600600-50800	`'	1 3	CO/CT/DV			
Unnamed	460-600600-50800	<u>` </u>		CO/DV/RB			
Unnamed	460-600600-50800		1 1	CT/DV			
Unnamed	460-600600-50800		1 1	CT			
Unnamed				1	DV		
Unnamed				1	CT/DV		
Unnamed			1 1	CT/DV			
Unnamed	460-600600-50800		<u> </u>	1	DV		
Unnamed	460-600600-50800	-00500-2830-6320 (<u> </u>	1 1	CT/DV		

Note: CT= cutthroat trout, DV= Dolly Varden char, RB= rainbow trout, CO= coho salmon

4.3 Field Data

4.3.1 Site Cards

The Site Cards for the Shea Creek watershed were entered into MELP's FDIS database following the completion of Phase 4. The hard copies of the Site Cards are presented in a separate, bound appendix (Appendix VIII). FDIS Reach/Site Summary forms are presented in Appendix V.

4.3.2 Fish Collection Cards

The Fish Collection Cards were entered into MELP's FDIS database following the completion of Phase 4. The hard copies of the Fish Collection Cards are presented in Appendix VI.

4.4 Survey Comments

4.4.1 Problems

The Shea Creek watershed stream inventory was relatively problem free. Crew mobilization was very efficient as most sites were readily accessible either by road or by helicopter.

Many small, first order streams, selected through the Reach Sample Summary Table were described as No Visible Channel (5 of 20 first order sample sites), intermittent (2 of 20 first order sample sites) or were dewatered (2 of 20 first order sample sites). In many cases first order streams did not have alluvial channels and were likely spring run-off channels (created by snow melt).

Some difficulty was experienced in distinguishing between Dolly Varden and bull trout in the field. Voucher specimen were retained when Dolly Varden/bull trout were captured. Forest ecosystem specialist Andy Witt (pers. comm., 1997) indicated that the two species may exhibit a sympatric distribution within the watershed. However, the meristic characteristics used to differentiate between the two species did not identify any of the fish captured as bull trout (Table 3). This assessment was confirmed by Mr. Gordon Haas

Meristic counts were tallied and LDF's (Linear Discriminant Function - a multivariate statistical procedure used to maximize separation and identification between two or more

'known' groupings (Gordon Haas, pers comm.) were calculated for all Salvelinus species retained, according to literature obtained through the bull trout and Dolly Varden Identification Workshop. If a LDF less than zero was calculated then the subject fish was identified as a Dolly Varden, if a LDF greater than zero was calculated the subject fish was identified as a bull trout. Subsequently, all six of the samples taken were identified as Dolly Varden.

Table 3. Meristics Counts for Dolly Varden Char/Bull Trout Differentiation.

Fish Number	Number of Branchiostigal Rays	Number of Anal Fin Rays	Jaw Length	Standard Length	LDF
1	20	9	0.9	9	-3.849
2	21	9	1.1	9.9	-2.80444
3	22	10	1.2	13.1	-2.72229
4	23	10	1.4	11.7	-1.04556
5	23	10	1.1	9.8	-1.32214
6	22	9	1.1	9.5	-1.99989

4.4.2 Fish Comments

Since fish distribution within the Shea Creek mainstem was well documented, primarily the Shea Creek mainstem upstream of Shea Lake and tributaries to Shea Creek were inventoried.

Fish were captured at 16 of the 47 sample sites. Fifty percent of the sample sites where fish were captured were in third or fourth order streams and fifty percent of the samples sites where fish were captured were located in first and second order streams. The following table provides a summary of reaches in which fish were captured.

Table 4. Summary Of Fish Capture Locations in the Shea Creek Watershed

Stream Name/Identifier (WSC/ILP)	Reach Number	Site No.	Stream Order	Fish Species	Mean Length (mm)
Shea Creek (460-600600-50800-00500-2830)	3	208	-5	CO RB	51 99
Shea Creek (460-600600-50800-00500-2830)	16	227	4	CT DV	129 100
Shea Creek (460-600600-50800-00500-2830)	20	219	4	CT DV	85 115
Shea Creek (460-600600-50800-00500-2830)	24	210	4	CT DV	83 107
460-600600-50800-00500-2830-3745-318	1.	209	1.	DV	74.
460-600600-50800-00500-2830-2968	2	93	2	СT	64
460-600600-50800-00500-2830-2561	1	95	Ţ	CO	63
460-600600-50800-00500-2830-3452	.1	99	2	CO CT DV	61 65 95
460-600600-50800-00500-2830-2715	3	102	1	CO DV RB	95 120 120
460-600600-50800-00500-2830-2968-540	1	103	I	CT DV	56 38
460-600600-50800-00500-2830-398	1	108	.3	CT	55
460-600600-50800-00500-2830-5549	1	222	2	DV	81
460-600600-50800-00500-2830-4665	1	228	3	CT DV	67 74
460-600600-50800-00500-2830-4661	I	230	3	CT DV	87 91
460-600600-50800-00500-2830-5720	3	217	3	CAS RSC	65 29
460-600600-50800-00500-2830-4524	I	231	2	DV	81
460-600600-50800-00500-2830-6320	1	233	4	CT DV	106 107

Note: CAS = prickly sculpin, RSC = redside shiner, CO= coho salmon, RB= rainbow trout, CT= cutthroat trout, DV= Dolly Varden char

Juvenile coho salmon were captured in tributaries of Shea Creek up to Reach 8 (8.1 km upstream). Specifically in three unnamed streams (460-600600-50800-00500-2830-2561; 460-600600-50800-00500-2830-3452; 460-600600-50800-00500-2830-2715).

Cutthroat trout were captured in Reach 2 of an unnamed stream (460-600600-50800-00500-2830-2968; Site 93), approximately 100 m below a falling boundary for a proposed 1998 harvest block (GSNL 0J3). Reach 2 of this stream was dewatered but would be accessible to fish during higher flows. Cutthroat trout and Dolly Varden char were captured in an unnamed tributary (460-600600-50800-00500-2830-2968-540; Site

103) to the unnamed stream (460-600600-50800-00500-2830-2968). The unnamed tributary flows through the western half of harvest block GSNL 0J3.

Fish species identified in the Shea Creek mainstem upstream of Shea Lake (Reach 12) included cutthroat trout and Dolly Varden char. These species were captured as far upstream as Reach 24 (Sites 210, 219, 227). Dolly Varden were described as immature juveniles (FL range from 73-127 mm) and mature adults (FL from 124 to 155 mm). Cutthroat trout were captured as fry (FL 47 mm) and juveniles (FL 72-129 mm). Upstream of Reach 20, fish species sampling was not conducted in 1st and 2nd order tributaries to Shea Creek. Reach 1 of many of these tributaries was generally short (<200 m), confined and possessed gradient barriers (>15%).

Redside shiner and prickly sculpin were captured in a large, lake fed tributary to Reach 20 of Shea Creek (460-600600-50800-00500-2830-5720). Redside shiner and prickly sculpin were captured in Reach 3 (Site 217) of the tributary and no fish activity was observed in Reach 2 or Reach 4 (both are lakes). Surveys of these lakes would provide additional information regarding fish distribution and life history within the watershed.

Third order tributaries to Shea Creek, downstream of Reach 20, appear to support fish. Fish were captured/observed in the first reaches of these tributaries, usually within the floodplain area of Shea Creek. Gradient barriers (>20%) and falls (up to 25 m in height; Site 223) obstruct fish migration to the upper reaches of many of these tributaries.

Cutthroat trout and Dolly Varden char were captured in the upper reaches of Shea Creek (Reach 24; Site 210) and a 4th order tributary to Reach 24 (460-600600-50800-00500-2830-6320; Site 233). Fish likely occur throughout the upper Shea system as no barriers to fish migration were identified in the mainstem during a helicopter overflight. Due to a lack of road access, steep terrain and continuous forest cover, many of the upper reaches (upstream of Reach 24) and tributaries were inaccessible for sampling.

Fish captured throughout the system were primarily stream resident fish. Maturing Dolly Varden and cutthroat captured were less than 175 mm and 140 mm respectively. Adfluvial, or lake rearing populations likely occur in reaches adjacent to Shea Lake and the Julian Holland Lakes. Both these species were captured during lake surveys conducted in 1996 (DeGuisi and Schell 1997a; DeGuisi and Schell 1997b). Fish sampling was not conducted in the mainstem tributary to the Julian Holland lakes downstream of the lakes. Upstream of the lakes, cutthroat and Dolly Varden were immature and maturing and less than 75 mm fork length. Tributaries to Shea Creek upstream of Shea Lake were not included in the study area.

4.4.3 Habitat Comments

Shea Creek is a relatively low gradient stream confined by low-lying mountains. Anadromous fish habitat extends from the Shea/Gosnell Creek confluence to 10 km upstream. Resident fish habitat extends at least to Reach 24 and likely to Reach 25 although sampling was not conducted in Reach 25.

The availability of off-channel and side channel habitat is limited in the middle reaches of Shea Creek downstream of Shea Lake (Reaches 3-11). However, off-channel and side channel habitat is abundant in sections of Shea Creek upstream of Shea Lake (between reaches 12-20) within the floodplain. A side channel was observed at Site 95 (460-600600-50800-00500-2830-2715) in a tributary to Reach 2 of Shea Creek. This side channel would provide rearing habitat for coho salmon using the lower Shea system.

The confluences of most of Shea Creek's tributary streams provide suitable 'off-channel' rearing habitat for juvenile salmonids. In the mid to lower reaches of Shea Creek (from Reach 20 and downstream) the first reach of most tributary streams is accessible to fish. Accessibility to the upper reaches of tributaries, in this section of the watershed however, is dependent upon water level and flow stage. The upper reaches of tributaries do not appear to be accessible in low flows.

Tributary streams to Shea Creek that enter the mainstem upstream of Shea Lake appear to have limited connectivity to the mainstem. Typically the first 20 to 30 m of stream were accessible to fish. After that, gradient barriers and dewatered channels limited fish accessibility to these tributaries.

A general lack of large pool habitat may limit fish productivity within the Shea Creek watershed. Juvenile salmonid overwintering habitat and adult holding habitat were not common in this watershed.

4.4.4 Rehabilitation/Enhancement Opportunities

The reaches inventoried in the Shea Creek watershed were located in a relatively undisturbed section of the watershed. Three harvest blocks have recently been cut (approximately two years ago) in the lower 3.4 km (upstream of the Gosnell Creek confluence) of the watershed. A block was also cut in 1997 above the Shea Creek bridge. It would appear that forest harvesting occurred following the introduction of the Forest Practices Code, subsequently the impact on fish habitat is marginal.

The recent Forest Development Plan map (Northwood, 1997) indicated that forest harvest is planned for 1998, 1999 and 2000 within the Shea Creek inventory area. Consequently, rehabilitation opportunities should be explored after 1998 and 1999.

4.4.5 Additional Sampling Recommendations

A total of sixteen sites were identified for additional or follow-up sampling within the Shea Creek watershed. A summary of the amount of sampling effort, water quality and flow characteristics, seasonal habitat availability, the known presence of fish upstream/downstream, the location of any barriers to migration and recommendations for second trial sampling is shown in Table 5. In general, follow-up sampling was recommended for reaches where:

- low flow appeared to be the only factor deterring fish utilization;
- fish were captured in reaches downstream of the sample site;
- obstructions to fish migration had not been identified.

		1	-	1			
Site Number	ILP Number	Reach Number	Date Sampled	Time Sampled	mpling tions		
94	1595	2	97/08/18	17:35	EF)		
97	1476	1	97/09/19	13:00	EF)		
104	1596	1	97/09/20	9:25	-£F)		
105	1593	1	97/09/20	10:15	barriers to		
107	1600		97/09/20	11:35	; therefore 1 spring (EF)		
110	1554	2	97/09/20	15:10	un; conduct ne locations of -t (EF)		
111	1558	1	97/09/20	15:50	nd determine barriers (EF)		
211	1555	2	97/09/18	17:25	of fish during		
215	1714	1	97/09/19	13:17	ish presence/		
216	1703	1	97/09/19	13:40			-
218	1691	1	97/09/19	15:02	≆ flows to ₹)		
224	1649	1	97/09/21	9:45	ःr flows to -₹)		
226	1647	1	97/09/21	10:53	nnel habitat;		
229	1630	2	97/09/21	12:45	ring higher or absence of earn barrier		
233	1758	1	97/09/21	9:08	m with -&/ MT)		
217	1697	3	97/09/19	14:30	if accessible to		
Gener	al: NS=	not s	ampled, Na	$\lambda = not$	olly Varden, S	T= etaalba-	1
						ı — succinea(<u>, </u>
* all sa	imple s	ites w	ere open ar	d surve			

4.4.6 Non-Fish Bearing Status

Non-fish bearing status was assigned to 16 sites within the Shea Creek watershed. A summary of the sampling effort, water quality and flow characteristics, habitat quality, the known presence of fish upstream/downstream, the location of any barriers to migration, seasonal habitat availability as well as comments on the potential for seasonal fish use is shown in Table 6. Non-fish bearing status was assigned to reaches where:

- the stream was labeled a non-visible channel;
- the stream was deemed inaccessible from the mainstem and did not have a headwater lake;
- gradient barriers prevented fish migration further upstream and the stream did not have a headwater lake.

95 1606 1 97/09/19 10:\tream above barrier is inaccessible 96 1477 1 97/09/19 12:\text{no alluvial channel} \text{iream was likely dewatered prior to recent} 98 1480 1 97/09/19 13:\text{ains} 100 1553 2 97/09/19 16:\text{ to alluvial channel} 101 1469 2 97/09/19 17:\text{55% gradient barrier} 106 1593 3 97/09/20 11:\text{inlikely} 109 1552 1 97/09/20 13:\text{ so water, no channel. no water, no fish}					
Stream was likely dewatered prior to recent 98					
98 1480 1 97/09/19 13: ains 100 1553 2 97/09/19 16: to alluvial channel 101 1469 2 97/09/19 17: 55% gradient barrier 106 1593 3 97/09/20 11: mlikely 109 1552 1 97/09/20 13: to water, no channel, no water, no fish					
101 1469 2 97/09/19 17:55% gradient barrier 106 1593 3 97/09/20 11: inlikely 109 1552 1 97/09/20 13:50 water, no channel, no water, no fish					
106 1593 3 97/09/20 11: inlikely 109 1552 1 97/09/20 13:50 water, no channel, no water, no fish					
109 1552 1 97/09/20 13:50 water, no channel no water, no fish					
To the state of th					
ish observed feeding in wetland, but chan 112 1602 2 97/09/20 16: inlikely to be utilized by fish					
ish activity was not observed in lake, herefore seasonal fish of the stream use is 212 1712 1 97/09/19 11:2uspected					
213 1698 1 97/09/19 12:40 over winter habitat identified					
214 1699 1 97/09/19 12:3 ₁₀ connectivity to lake					
220 1683 1 97/09/19 14:2 _o fish access to mainstem (ILP 1708)					
alls are 25 m in height; no winter habitat 223 1659 2 97/09/21 12:1dentified					
15.5 % gradient over 30 m to Shea Creek 1648 1 97/09/21 10:2nainstem					
232 1702 97/09/21 10:2 ₁₀ discernible channel					
iumerous small cascades downstream, no 221 1717 3 97/09/20 9:5vinter habitat identified					
General: NS= not sampled, NA= not applical ation: S/S= spring/summer, W= winter					
Obstructions: G= gradient, F= falls, NI= nondace, CT= cutthroat trout					
*All sample sites were surveyed open a					

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APPENDIX I LIST OF CONTACTS

List of Key Contacts and Information Sources for the Northwoods Stream Inventory Project

Comments	requested forest cover maps and WRP contracts ongoing in area requested relevant Northwood fisheries information related to	stream class reports for two small openings received at September 2 meeting.	queried re: missing maps and flightline indices	• not in til 5:30	guidance throughout project	various stream inventory reports etc: Buck, Houston Tommy Creeks, Klo, Goosly Lake request for fish collection nermit	request for fish collection permit	 requested fisheries information pertaining to Toccha Lake area still looking but has not found anything associated with area, suggested trying other forest 	Equity Silver Mines reports (Buck Creek, Goosly Creek)	ordered FISS maps ordered missing FISS maps	SISS catalogues: Smithers 4D vol. 2, Prince George vol. 1
Date	July 28 July 29	guioguo	July 30	August 1	ongoing	July 29 July 31	July 3.1	July 31 August 1	July 29	August 1 August 11	July 30
Telephone Number	(250) 845 - 5277 (250) 845-5200	(250) 846 - 5449	(250) 564 - 9191	(250) 845 - 6249	(250) 847 - 7294	(250) 847 -7291	(250) 561 - 5534 fx 250-561-5367	(250) 561 - 5396	(250) 847-7290	(604) 602 - 0282	(250) 635-1494
Title	FRBC Coordinator	Implementation Contractor		Morice Forest Ecosystem Specialist	Regional Inventory Specialist	Fisheries Technician	Fisheries Technician	Habitat Biologist	Fisheries Biologist	Office staff	Fisheries Technician
Organization	Northwood Pulp & Timber Ltd.	WildFor Consultants Ltd.	Western Geographic	Morice Forest District	Ministry of Environment, Lands & Parks	Ministry of Environment, Lands & Parks	Department of Fisheries and Oceans	Department of Fisheries and Oceans, Prince George	Ministry of Environment, Lands & Parks; Smithers	Archtype Prints	Triton; Terrace
Name	Reg Heibert (Andrew Leffers)	Todd Mahon	John Rustad	Andy Witt	Paul Giroux	Sig Hatlevick	Bruce MacDonald	Catherine Martel	Dana Atagi	Stacy	Sam Buchanan

List of Key Contacts and Information Sources for the Northwoods Stream Inventory Project

Comments	away till August 5	• request for Tochcha, Friday, Hautete Lake data (nothing available)	 queried whether any work completed by firm in Tochcha Lake area 	queried whether any work completed hy firm in Northwood TSA	rare element occurrences, sub-basins to Skeena River watershed	ongoing Morice Watershed Restoration project	requested information re 1994 and 1995 sample sites; referred to Barry	• re: JA Taylor site locations - away until the 14	• Ich uchaneu message	Tochcha, Shea and Houston-Tommy	WRP work in the Buck watershed winter coho sampling in 1996 (DFO renort)	WRP reports ongoing WRP projects	Reconnaissance Lake Inventory reports for project area
Date	August 1	August 1	August 8	August 8	August 8	August 11	August 11	August 11 August 15	September 2	September	August	July 29 August 1	September 15
Telephone Number	(250) 565 - 6135	(250) 565 - 6852	(250) 562 - 5412	(250) 562 - 9155	(250) 356 - 0928	(250) 847 - 3630	(250) 656 - 0163	(250) 756 - 7038		Houston 845-2334 Burns Lake 692-3613	(250) 847-4674	(250) 847 - 7337	(250) 847 - 3575 (250) 847 - 2959 fax
Title	Watershed Restoration	Fisheries Habitat/Inventory Specialist	Consultant	Consultant	Assistant Data Manager		Consultant	Fisheries Technican, North Coast	Fisheries Biologist	Pilot	President	Watershed Restoration Technician	Fisheries Biologist
Organization	FRBC - Watershed Restoration; Prince George	Ministry of Environment, Lands & Parks; Prince George	Environmental Dynamics	Envirowest	British Columbia Data Conservation Centre	Wet'suwet'en Office of Heredotary Cheifs	J.A. Taylor & Associates	Department of Fisheries & Oceans, Nanaimo	Consultant	Westland Helicopter	SKR Environmental	FRBC - Watershed Restoration; Smithers	Consultant
Name	Andrew Wilson	Ted Zimmerman	Dwight Hickey	Jim Trask	Beth Rogers	Stephan Schug	J. A. Taylor	Barry Finnegan	Dave Bustard	Ed Chemenkoff	Regina Saimoto	Jeff Lough	Joeseph DeGisi

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APPENDIX III PHASE COMPLETION REPORTS

PROJECT PHASE COMPLETION REPORT

PHASE 1

Project Name: 1:20,000 Stream Inventory of the Morice Forest District

Project Code: 06-BABL-3085-0001-1998

Contract Number:

List of Deliverables Submitted

Deliverable Product	Received	Approved (QA)
ILP Maps (forwarded to MELP, Fisheries, Victoria)		
List of Contacts		
ILP Data Sheets		
Basin Classification Sheets		
Background Information Bibliography		

Activity Log

<u>Date</u>	Activity	Time Spent	
July 29, 1997	Stream and Lake file search @ MELP Smithers	10 h	
July 29-Aug	Requests for information	10 h	
7, 1997			
July 29, 1997	Request for FISS information	0.5 h	
Aug. 5-8, 1997	Assign ILP's, delineate watershed boundaries	60 h	
Aug 12, 1997	Update FISS, create contact list, bibliography	20 h	

Summary of Work Completed

A background data review was conducted to establish existing information within the Northwood Stream Inventory project areas. Reports and files referencing the Skeena River watershed (specifically the Morice and Bulkley Rivers) were identified and reviewed. These reports were obtained from the Ministry of Environment, Lands and Parks (MoELP), Region 6 office in Smithers, the Department of Fisheries and Oceans (DFO), Pacific Biologic Station Library, the BC Conservation Data Center and Triton's own libraries in Richmond and Terrace. A total of fifty-four reports were identified and 46 reviewed. A bibliography listing these reports was completed (see attachment).

In the process of data collection and compilation consultant companies and government agencies were contacted. A list of contacts made during this process was completed (attached).

FISS maps were reviewed and compared with the data collected during the background review. Information that was not included on the FISS maps was subsequently transcribed to a corresponding 1:50 000 scale National Topographic Scale (NTS) map.

Three of the forty reports reviewed detailed information that was not documented on the current FISS maps. One FISS addition (WRP report written by Michell *et al*, 1996) was completed and transcribed on a NTS map and assigned a FISS reference number. This information will be forwarded to Gord Oliphant, MoELP, Victoria. FISS map updates will be submitted subsequent to the addition of field informatin for the project (Phase 5).

Two of the reports (Taylor, 1995 and 1996) reviewed contained new information but exact site location was not provided. Attempts have been made to obtain the site locations, unfortunately the contact person (Barry Finnegan, DFO) has been unavailable.

Existing FISS data was transcribed on to interim TRIM maps and assigned NID numbers. Thirty-four working TRIM mapsheets are being used for the project. Following is a list of working maps by watershed area:

\mathbf{A} 1	rea I	Number of working map				
•	Tochcha	15				
•	Shea Creek	3				
•	Houston-Tommy C	reek 5				
•	Buck Creek	11				

Summary of Phase Costs Professional Fees \$4,787.00

Disbursements \$800.00

Costs as per original budget.

Progress and Problems Summary

Phase 1 was completed as scheduled. Background information within FISS and other more recent sources was scant.

ILP assignment and UTM generation was conducted by Northwood's GIS subconsultant as the first phase of the project. Dave Gordon, Project Director, provided RIC standards for this work. ILP assignment was not consistent with RIC standards and UTM coordinates generated for Lakes were assigned to geographic centres as opposed to lake outlets. In future, ILP number assignment should be conducted by the inventory contractor and then forwarded to the GIS department for UTM coordinates and inclusion in the TRIM database. The stream length increments displayed on TRIM maps contributed to efficiencies in Phase 2.

Report Submitted By: Scott Northrup, R.P.Bio.	Date: August 20, 1997		
Phase Completion Approved:	Date:		
Comments:			

PROJECT PHASE COMPLETION REPORT

PHASE 2

Project Name: Reconnaissance (1:20,000 scale) fish and fish habitat stream inventory in the Morice Forest District for Northwood Pulp and Timber Ltd.

Project Code: 06-BABL-3085-0001-1998

Contract Number:

List of Deliverables Submitted

Deliverable Product	Received	Approved (QA)
Interim Maps		
Reach Tables		
Lake Tables		
FISS Updates		
Basin Classification Tables		

Activity Log

<u>Date</u>	Activity	Time Spent
August 13 22	Completing Reach Breaks and Basin Classification and Quality Control	290 hours
August 10 12, 19-24	Completing Reach Tables and Quality Control	52 hours
August 10 24	Completing Interim Maps and Quality Control	100 hours

Summary of Work Completed

Table 1. Number of Streams identified (by Order) and referenced, by Project Area.

	Number of Streams Identified and Referenced						
Project Area	1st Order	2nd Order	3rd Order	4th Order	5th Order		
Houston Tommy	301	55	10	3	0		
Shea Creek	164	42	10	3	0		
Tochcha	420	91	30	6	1		
Buck Creek	183	49	12	11	0		

<u>Table 2.</u> Number of reaches identified and completed reach cards.

	Number of Stream Reaches Identified	Number of Reach Cards Completed
Project Area		
Houston Tommy	641	incomplete
Shea Creek	474	incomplete

Tochcha	1150	incomplete
Buck Creek	698	incomplete

Summary of Phase Costs

Professional Fees \$15,888.00 Disbursements \$645.00

Overflight of watersheds not conducted as per the proposal after discussions with Paul Giroux, MELP Smithers. Additional time was contributed to reach break analysis.

Progress and Problems Summary

Separation of Phase 1 to 3 deliverables is difficult. Work on basin classification, ILP datasheets, reach breaks and reach tables requires use of maps and datasheets.

Time allocation for phases 1-3 was underestimated for the project. Part of this can be accounted for by the learning process; the implementation of the new standards is not familiar to most staff. The underestimation was a common problem with other contractors and other Triton offices. Time consuming tasks include reach break determination and data entry for reach tables. Much of this data will likely not be used for the field sampling phase of the project.

Late timing of the project required that some aspects of the planning phase be left until Phase 4 has been completed. The new standards are inflexible with respect to planning in such a short time frame. The importance of beginning field work during favorable weather was an important consideration during planning. A project start date deadline, adjusted for each region or area of the province, should be an MELP consideration for future contracts. Many of the needs and requirements, including background information, air photos, inventory maps and ministry personnel are not available in the short term.

Report Submitted By: Scott Northrup, R.P.Bio.		Date: Sept	ember 1, 1997
Phase Completion Appro	ved:	Date:	
Comments:			

PROJECT PHASE COMPLETION REPORT

PHASE 3

Project Name: Reconnaissance (1:20,000 scale) fish and fish habitat inventory in the

Morice Forest District for Northwood Pulp and Timber Ltd.

Project Code: 06-BABL-3085-0001-1998 Contract Number:

List of Deliverables Submitted

Deliverable Product	Received	Approved (QA)
Project Plan		
Interim Maps		
Reach Forms		
Crew and Equipment List		
Sample Site Selection Rationale		

Activity Log

<u>Date</u>	Activity	Time Spent
	Project Plan development	3.5 d
	Phase 3 meeting (Todd Mahon)	0.5 d
	Phase 3 meeting (Paul Giroux)	0.5 d

Summary of Work Completed

The number of sample sites proposed and a brief rational for sample site selection is provided in the project plan (attached).

A total of 226 sample sites were selected. Upon discussions with Todd Mahon, an additional 10 sites were included in the Tochcha operating area for total of 236 sites.

Sample site location was discretionary in all cases. Sample sites were assigned based on the requirements generated according to the Reach Sampling Summary table, sites that would describe basin wide fish distributions and satisfy Northwood's operational needs.

Summary of Phase Costs

As per the project proposal. Professional Fees \$3,380.00 Disbursements \$625

Progress and Problems Summary

Reach forms for 236 sample sites were not completed. MELP projects that the Reach form will be generated via a database printout in October. Completion of reach forms is to be completed once final sample sites are selected during field portion of project. Reach forms may change depending on field conditions.

Next Phase Project Plans and Constraints

Phase 4 (field) scheduled to commence on August 28, 1997.

Report Submitted By: Scott Northrup	Date: September 1, 1997
Phase Completion Approved:	Date:
Comments:	

PROJECT PHASE COMPLETION REPORT

PHASE 4

Project Name: 1:20,000 Reconnaissance Inventory of Fish and Fish Habitat in the Morice Forest District for Northwood Pulp and Timber Ltd.

Project Code: 06-BABL-3085-0001-1998 Contract Number:

List of Deliverables Submitted

Deliverable Product	Received	Approved (QA)
Site Cards		
Fish Cards		
Sampling Summary		

Activity Log

<u>Date</u>	Activity	Time Spent
	Gear up, travel, field work and gear down for stream inventory in the Shea, Houston-Tommy and Tochcha watersheds.	

Summary of Work Completed

234 stream reaches sampled

Fish stream identification was not completed for the project. Information required for stream classification was gathered and should be available for use by Northwood.

The total number of stream reaches sampled, the number of reaches sampled along cutblocks, and the number reaches where follow-up sampling is recommended are summarized by project area in the following table (Table 1).

Table 1. A summary of stream reaches sampled in each project area.

Project Area	Total Number of Reaches Sampled	Number of Reaches Sampled Near Cutblocks	Number of Reaches Recommended for Follow-up Sampling
Tochcha	115	57	42
Houston - Tommy	73	41	40
Shea	46	31	18
Total Reaches	234	129	100

Summary of Phase Costs Professional Fees \$46,823.49 Disbursements \$59,406.51

Progress and Problems Summary

The majority of first order streams identified during planning phases were small, intermittent or ephemeral drainages. A number of first order streams identified during planning were changed to 2nd order streams during the field survey. Although sampling of first order streams will indicate fish species presence/absence within the system, the bias towards these small watercourses was considered a poor use of project funds. The identification of reaches with fish and the upper distribution limits of fish was deemed more important.

Next Phase Project Plans and Constraints

Data compilation will commence October 1, 1997. The MELP FDIS data entry tool and fish entry tool are not yet available. Available versions have inherent problems causing costly time delays and staff downtime. Data entry must be complete prior to submission of interim maps and databases to the GIS subcontractor (Western).

Report Submitted By: Scott Northrup, R.P.Bio.	Date: October 14, 1997
Phase Completion Approved:	Date:
Comments:	

PROJECT PHASE COMPLETION REPORT: PHASE 5

Project Name: 1:20,000 Reconnaissance Fish and Fish Habitat Inventory in the Morice

Forest District for Northwood Pulp and Timber Ltd.

Project Code: 06-BABL-3085-0001-1998

Contract Number:

List of Deliverables Submitted

Deliverable Product	Received	Approved (QA)
Reach Forms		
Site Cards		
Fish Collection Forms		
Photodocumentation indices		
Indexed photographic slides		
FISS updates		
Phase 5 completion report.		

Activity Log

<u>Date</u>	Activity	Time Spent
Dec 1997	reach form completion	5 days
Jan 1998	site card entry	21 days
Jan 1998	fish collection form entry	15 days
Jan 1998	slide development/scanning/printing	7.5 days
Feb 1998	FISS data forms/mapping	5 days
Mar 1998	phase completion report	2.0 h

Summary of Work Completed

Field Samples Processed = 235

Data Cards By Database

FDIS

Houston Tommy 74 Shea 47

Tochcha 114

Fish Coll

Houston Tommy 33 Shea 29 Tochcha 63

PROJECT PHASE COMPLETION REPORT: PHASE 5

Photodocumentation

2 photographic slide binders 630 photographs catalogued 630 digital photographs scanned 2 CD's created.

FISS

FISS maps = 6FISS forms = 240

Summary of Phase Costs

Professional Fees \$10,845.00 Disbursements \$3,305.00

These figures are as quoted in the original budget. Estimate that 2 times the originally estimated effort was spent on this phase.

Progress and Problems Summary

The FDIS and Fish Collection tools were released in beta style versions. Numerous problems and short comings resulted in a myriad of lost person days during Phase 5. Continuous updates of each tool resulted in revisiting of databases once entered. Final (?) version of Fish Coll tool not released until February. FISS updates required a great deal of time to complete. Suggest not including FISS updates in inventory projects. Should be administered as a separate project as all inventory projects will be centrally located once submitted.

Next Phase Project Plans and Constraints

Deliverables for Phase 5 were constrained by close associations with deliverables for Phase 6. Although these two phase are described as Data Compilation and Reporting, respectively, many of the tasks are closely associated. The need for submission of Phase 5 deliverables should be coupled with Phase 6 deliverables to reduce the time spent on administratitively redundant tasks.

Report Submitted By: Scott Northrup, R.P.Bio.	Date: March 1998
Phase Completion Approved:	Date:
Comments:	

PROJECT PHASE COMPLETION REPORT

PHASE 6

Project Name: Reconnaissance (1:20,000 Scale) Fish and Fish Habitat Inventory in the Morice Forest District for Northwood Pulp and Timber Ltd.

Project Code: 06-BABL-3085-0001-1998

Contract Number:

List of Deliverables Submitted

Deliverable Product	Received	Approved (QA)
Project Overview Map		
Inventory Map		
Distribution Map		
Final reports (3)		
Photograph CD's		
Phase 6 completion report		

Activity Log

<u>Date</u>	Activity	Time Spent
Feb 1998	Photograph CD's	3 days
Feb 1998	Final reports (3)	25 days
March 1998	Inventory, Distribution, overview maps	3 weeks
March 1998	Phase completion report	2 hours

Summary of Work Completed

Length of Streams

2428 km

Total Reaches:

2273

Sample Site:

233

Reaches Adjacent to Cutblocks:

129

TRIM Sheets:

19

Summary of Phase Costs

Professional Fees \$18,207.00

Disbursements \$1,050.00

Costs as per original budget estimate. Estimate that Phase 5 and 6 in concert required twice the alloted effort originally outlined.

PROJECT PHASE COMPLETION REPORT: PHASE 6

Progress and Problems Summary

Mapping: GIS mapping standards and specifications were released prior to detailed routines being developed. Linking of fish collection data was not obvious and required additional effort.

Watershed codes were not received until March 1998. ILP maps were submitted to MELP in October 1997. The importation of WSC data was not straight forward and required a multitude of manual entries. The fish collection form (new version) was released in Feburary 1998 and required additional data imports.

Report formats and mapping products do not appear to be "forestry friendly". Descriptions of classified streams and locations within reaches of stream class boundaries are not obvious.

Report Submitted By: Scott Northrup	Date: March 15, 1998
Phase Completion Approved:	Date:
Comments:	

APPENDIX IV PROJECT PLAN



413 Campbell Street Nanaimo, B.C., Canada V9R 3G8 Telephone: 1 (250) 753-8339 Fax: 1 (250) 753-8349

Internet: triton@direct.ca

Reference:

2586/WP1400m

Wildfor Box 2962 Smithers, B.C. V0J 2N0

Attention:

Todd Mahon

Dear Mr. Mahon:

Northwood Pulp and Timber Reconnaissance Fish and Fish Habitat Inventory Re: Project Plan

Please find attached project deliverables for Phases 1-3 (planning phases) as outlined in the General Services Agreement for FRBC Stream Inventory.

The report is organized as follows;

- Phase 1 completion report
- Phase 2 completion report
- Project Plan for Phases 4-6
- Phase 3 completion report
- Phase 1 attachments
- Phase 2 attachments
- Phase 3 attachments

Phase 4 of the project will commence August 28, 1997. Should you have any questions or comments please do not hesitate to contact me at 753-8339.

Yours truly,

Triton Environmental Consultants Ltd.

Scott Northrup, R.P.Bio.

Project Biologist/Manager

Paul Giroux CC

MELP

attach

1. PROJECT PLAN

1.1 Phase 4: Field Data Collection

Following is an outline of our approach to the field work, clarification of specific sampling methodologies, and an estimate of the effort required. The following Sections describe the methodologies and approaches to complete field sampling, data collection and reporting.

1.1.1 Pre-Field Preparation

Pre-field preparations will entail both office activities and logistics planning in coordination with members of the project team, the Implementation Contractor and Northwood. Fish collection permits have been obtained from MELP and DFO as part of pre-field planning.

1.1.2 Equipment

Triton possesses the majority of field equipment necessary to complete the project. A rental vehicle (4X4 truck) and hand held radios have been secured prior to the commencement of Phase 4 (Field work).

1.1.3 Field Assessment

Field work will be conducted by two, 2 person field crews. Crew mobilization will take place using a variety of methods which will maximize the efficiency of the field program depending on specific access available within each watershed. In watersheds in which road access is available, crews will utilize a 4X4 crew cab pickup truck. Crews will work in tandem, 'leap-frogging' from reach to reach. In watersheds for which road access is unavailable crews will be mobilized by a Bell Jet Ranger helicopter. Crews will fly out to the watersheds together, and will complete site assessments by "leap-frogging" from site to site (large creek systems) or be dropped off at the downstream end of smaller systems. Triton has used each of these methods on numerous fish inventory studies, as it maximizes effort and cost efficiency and reduces the length of the field program. Each crew will be equipped with a Smith-Root Model 12A backpack electrofisher and other standard field gear (clinometer, hip chain, tape measure, VHF radio, first aid kit, etc.). Utilizing a combination of these methodologies will ensure that field efficiency is maximized and the project target of 5 sample sites/crew/day is attained.

1.1.4 Fish Species Sampling

Fish sampling efforts will focus on reaches of <20% gradient (>20% at the FRBC Coordinator, Regional Inventory Specialist and Project Manager's discretion (i.e. suspected bull trout presence)) and will follow the procedures outlined in the Reconnaissance Fish and Fish Habitat Inventory: Standards and Procedures (May 1997)

and the Forest Practice Code's Fish Stream Identification Guidebook. A minimum 100m of stream length or a length equal to 10 bankfull widths (whichever is greater) will be sampled in each identified reach. In addition, intermittent fish sampling may be conducted during travel between sample sites (in an upstream direction), upstream and downstream of barriers and within habitat features (pools, debris jams etc.) that are utilized by fish.

The presence, relative abundance and diversity of fish species will generally be evaluated through electroshocking of at least 100 linear metres of stream length. In areas where return visits are practical, minnow traps baited with salmon roe and allowed to soak for a 24 hour period may be used to supplement electroshocking data, or in areas that are not suited to electroshocking (deep pools, wetlands, active spawning areas, etc.). Other sampling methods, such as snorkeling, beach seining, and angling may be used where necessary, or where requested by the Project Monitor. Triton is fully outfitted with dry suits, beach seines, minnow traps, and other fish sampling equipment and can quickly deploy the appropriate sampling tools where needed.

All fish sampling data will be recorded on waterproof Fish Collection Forms. The following data and samples will be recorded and collected for fish caught at each sampling site:

- species (keyed out using RIC's Field Key to Freshwater Fishes of BC).
 Special attention will be given to documenting species at risk in Region 6.
- length to the nearest mm (fork length or total length depending on species) determined for 30 random samples of each fish species captured including the longest and shortest fish;
- life stage;
- a representative sample of any abnormal or unidentified fish or a species of fish out of its normal range will be preserved and submitted to the Implementation Contractor as will all non-game fish captured from each 2nd -4th order watershed.

For all reaches with non-fish bearing classification a written explanation supporting the classification will be submitted (Non-Fish Bearing Classification Report). The written explanation will be included in the final report. The discussion will focus on sampling methods utilized during the field program, water quality parameters including conductivity and turbidity and recommendations for follow-up sampling.

Follow-up sampling is recommended (Fish Stream Identification Guidebook) in order to establish fish absence in many cases. The need for a follow-up sample will be determined based on the results of the initial survey, recommendations from the survey team, and a data review by the Regional Inventory Specialist. In the field however, survey crews will note the areas of concern (i.e., intermittent or ephemeral channels and side channel habitat that constitute Fisheries Sensitive Zones in high water). The need for follow-up sampling will be determined by the Regional Inventory Specialist at a later date and actual sampling

will be completed using surplus funds from the existing contract or through a future contract.

1.1.5 Habitat (Site) Description

A reach description will be completed for each reach (at fish sampling sites), consistent with the Site Description form and entered into MELP's MS Access database as part of Phase 5. Each sampling site length will be 100 m, or >10 bankfull widths whichever is greater. The following data will be collected at each site:

- reach length
- site length
- stream gradient
- 6 individual channel width measurements
- estimates of the percentage areas of the different habitat units
- estimates of bed material size, by size class
- · compaction of bed materials
- measurements of stream cover / riparian vegetation and large organic debris
- measurements of bank instability
- channel confinement
- percentage of stream bars
- air temperature
- water temperature
- conductivity (ambient)
- flow (see 3.3.2.4 Water Quality)
- major features (fish passage barriers, log jams, LWD, beaver dams, clay slides, etc.)
- obvious fish habitat limitations or restoration opportunities
- preliminary identification of obvious Fisheries Sensitive Zones as per Fish-stream Identification Guidebook specifications.

1.1.6 Water Quality

Consistent with the terms outlined in Schedule A, Triton will sample water quality parameters in the field at each sample site. Parameters will be measured in the field in order to reduce laboratory costs and shipping and receiving requirements. Specifically, Triton proposes to measure air and water temperature using standard field thermometers, pH and conductivity using hand held meters, and turbidity using visual estimates. Water quality measurements (including flow estimates using a floating ball method) will be taken in each sampled reach as specified in the RFP.

1.1.7 Wildlife Observations

Wildlife observations will be noted and specific details recorded. Amphibians will be identified in the field. Abundant invertebrates will be described and field identified to

Order or Family (where practical), as will aquatic macrophytes. Photographs will be taken for further documentation and confirmation. Wildlife observations will be recorded on the Site Card with emphasis placed on species considered rare, endangered or threatened as defined by the Conservation Data Centre.

Triton will make extensive use of photography throughout the project. Photographs will be taken, as outlined in appropriate RIC standards, of each sample site (including downstream and upstream perspectives), of each feature identified and of representative or unidentifiable fish species. Photographs will be documented on Site Cards and Fish Collection Forms and Triton's Photodocumentation Form and presented in the report in a manner that meets RIC standards.

Through completion of Phases 1-3 we have identified specific reaches within each working Sample sites will be biased towards Northwood's priortized operational needs areas as follows (Table 1): area to be sampled.

operational needs areas as follows (2	Assessment
hads And Sub-Basin	as Priority Assessment Priority
operational needs areas as fono- Table 1. Watersheds And Sub-Basin	Map # 1/4
Watersheu	
Tochcha Drainage Shea Creek Drainage Creek Drainage	
Tomus O	
Buck Creek Drainage	hads provided the following same

The reach data analysis for all watersheds provided the following sampling regime (Table 2).

Planning for the field sampling portion of this project followed a balanced approach between Ministry of Environment, Lands and Parks (MELP) requirements and Northwood Pulp and Timber Ltd.'s (Northwood) operational needs. The criteria for sample site selection was discussed with MELP's Fisheries Inventory Specialist, Mr. Paul Giroux, and Northwood's Forest Renewal BC contractor, Mr. Todd Mahon, prior to final approval of the field sampling plan. Sample site selection was discretionary and sample sites were selected using the following criteria:

MELP's Reach Sampling Summary table for each watershed,

- existing fish species distribution data,
- strategies to determine fish distribution within each watershed,
- Northwood operational needs.

A brief description of the sampling program for each landscape unit is provided in the following sections.

1.1.9.1 Houston Tommy and Shea Creek Watersheds

The initial sampling plans for Houston Tommy and Shea Creek were revised following discussions with MELP's Fisheries Inventory Specialist, Paul Giroux. The reach summary tables for Houston Tommy and Shea Creek generated 101 and 87 samples sites, respectively. Mr. Giroux determined that the number of sample sites generated for each creek were too intense for a 1:20 000 scale reconnaissance inventory. As a result the individual reach data tables for each creek were combined to generate one reach summary table and subsequently generated new sample site totals. The combined number of sample sites was then split between Houston Tommy Creek and Shea Creek based on watershed area; 74 and 46 sample sites respectively.

The specific sampling plans for Houston Tommy Creek and Shea Creek are outlined in the following sections.

1.1.9.2 Houston Tommy Watershed

The project area of Houston Tommy includes the Houston Tommy watershed and an unnamed Morice River tributary to the west of the Houston Tommy/Morice confluence. Houston Tommy is a fourth order watershed that drains into the Morice River. The unnamed tributary is a third order watershed that also drains into the Morice River.

Pink salmon (Onychorhyncus gorbuscha) have been observed in Reach 1 of Houston Tommy Creek and coho salmon (O. kisutch), Dolly Varden char (Salvelinus malma), rainbow trout (O. mykiss) and steelhead (O. mykiss) have been observed throughout the Houston Tommy mainstem to a set of falls at 17.6 km. Extensive habitat and fish distribution studies have occurred along this 17.6 km section of the Houston Tommy. Steelhead fry were released into Houston Tommy Creek over a period of four years (from 1983 through 1984).

Fish distribution within the unnamed watershed has not been documented, however coho and pink salmon, and steelhead have been observed in the Morice just upstream of the confluence of the unnamed creek with the Morice River.

A total of seventy-four sample sites were proposed; fifty-seven samples sites within the Houston Tommy watershed and seventeen in the unnamed watershed. As fish distribution in the lower Houston Tommy is well known three sample sites located above the falls on the Houston Tommy mainstem were proposed.

The Wet'suwet'en First Nation is conducting a Level II Watershed Restoration Program (WRP) project in the Houston Tommy watershed. Sixty sites have been selected for field visitation this year (Michell, 1996). Stephan Schug of the Wet'suwet'en First Nation was contacted but specific site locations were not provided. Mr. Schug did suggest that work would occur only in the road accessible areas of the watershed (Schug, pers comm). Subsequently, the WRP work did not alter the locations of sample sites for this project.

1.1.9.3 Shea Creek Watershed

The project area encompasses the Shea Creek, a sub-basin within the Gosnell Creek watershed. Shea Creek is a fifth order stream with important fisheries values.

Coho salmon, cutthroat trout (O. clarki), Dolly Varden char, long nose dace(Rhinichthys cataracte), rainbow trout (O. mykiss), rocky mountain whitefish (Prosopium williamsoni) and steelhead have been observed in the Shea Creek mainstem. Numerous habitat and fish distribution studies have been conducted along Shea Creek in the section of stream below Shea Lake. Steelhead fry were released into Shea Creek in 1984, 1985 and 1986.

In total forty-six sample sites were proposed for the Shea Creek area. As previous fisheries studies have not focused on the section of stream above Shea Lake three mainstem sample sites above the lake were selected. The remaining forty-three sample sites were situated along tributaries to Shea Creek.

The Wet'suwet'en First Nation is conducting a Level II WRP project in the Gosnell Creek watershed. Field visitation is scheduled for eleven sites within the watershed (Michell, 1996). It is not known how many sites, if any, are located in the Shea Creek sub-basin. Again, this work was not been factored into our project plan.

1.1.9.4 Tochcha Watersheds

The Tochcha project area is comprised of a large landscape unit that includes all watersheds that drain into the following lakes: Friday, Nakinilerak, Hautète, Natowite and Tochcha. Thirty third order streams, five fourth order streams and one fifth order stream were identified within the project area.

Existing fisheries information in this area was scant. Two lake surveys conducted by Joseph DeGisi in 1996 identified the following fish species presence in lakes draining into Hautète Creek: lake char (Salvelinus namaycush), Kokanee (O. nerka), mountain whitefish, rainbow trout, northern squawfish (Ptychocheilus oregonensis), prickly sculpin (Cottus asper), redside shiner (Richardsoni balteatus), longnose sucker, coarsescale sucker (Catostomus macrocheilus), peamouth chub (Mylocheilus caurinus) and longnose dace (DeGisi, 1997). A third lake survey conducted on an unnamed lake that drains into

Natowite Lake determined the presence of these fish species: rainbow trout, longnose sucker (Catostomus catostomus) and lake chub (Couesius plumbeus) (DeGisi, 1997). FISS records indicate the presence of northern squawfish, Kokanee, rainbow trout, and prickly sculpin in Nakinilerak Lake, northern squawfish in Friday Lake and rainbow trout, kokanee and mountain whitefish in Natowite.

A total of 119 sample sites were proposed: 109 samples sites were generated in the reach summary table and an additional ten sample sites were added by Northwood to address immediate operational needs. The additional ten sample sites were not included in the original project area boundaries, as specified by Northwood, due to a pre-planning oversight.

It was not determined whether any WRP projects are ongoing in any of the watersheds within this project area.

1.1.9.5 Buck Creek Watershed

The Buck Creek project area encompasses the Buck Creek watershed, a sub-basin within the Ramsay Creek watershed and a sub-basin within the Parrott Creek watershed. Buck Creek is a fourth order stream that flows into the Bulkley River. Both Ramsay and Parrott Creek are third order drainages that flow into the Bulkley River.

Chinook (O. tshawytscha), coho, Kokanee and pink salmon, rainbow trout and steelhead, longnose suckers, largescale suckers, mountain whitefish, redside shiners and peamouth chub are fish species known to utilize Buck Creek. A falls at 10 km on the creek limits further upstream migration for anadromous fish. Background research did not provide documentation as to the presence/absence of fish species in either Ramsay or Parrott Creek.

A total of 135 sample sites were generated by the Reach Summary Table for the Buck Creek project area. Ninety-six sample sites were proposed for the Buck Creek watershed, twenty-eight sample sites were proposed for the Parrott Creek sub-basin and eleven sample sites for the Ramsay Creek sub-basin.

Background research did not provide any indication of ongoing WRP projects in the Buck Creek watershed.

Phase 4 Deliverables

- Monthly progress reports
- Quarterly report
- Fish Collection Forms
- Voucher specimens
- Additional Sampling Requirements report
- Non-Fish Bearing Reach Status report
- Site Cards
- Photographs
- Phase 4 Completion Report (hardcopy and digital)

1.2 Phase 5: Data Compilation

The accurate and concise compilation of field notes, data, and photographs is essential to the successful completion of this project. Immediately following each field day, field crews will meet in the field office to compile field notes, provide a preliminary summary of the field findings on hard copy maps, prepare additional sampling requirement reports and non-fish bearing status reports (if required). This system ensures that all field information is thoroughly documented while field work is still fresh with the crews, and would allow for preliminary classifications to be available as required. It also allows for easy tracking of project progress.

The office portion of Phase 5 will entail entering hardcopy field notes and field forms into requisite electronic database forms including reach cards, site cards, fish collection forms and Photodocumentation form 1. ILP's, submitted during the initial phases will be

converted to watershed codes and NID's will be converted to UTM coordinates for mapping and georeferencing purposes. Photographs taken during the field season will be developed and captioned and coupled with Site Cards where applicable. Additional photographs will be indexed in referenced binders with Photodocumentation Cards and negatives.

Phase 5 Deliverables

- Reach Cards
- Site Cards
- Fish Collection forms
- Photodocumentation forms (1)
- Indexed photographic negatives
- FISS update maps and data forms
- Phase 5 Completion Report (hardcopy and digital)

1.3 Phase 6: Reporting and Mapping

Triton will prepare final reports and maps for all subbasins that meet the needs of MELP. Reports will be structured following the proposed report format outline presented in Chapter 5 of the Reconnaissance Fish and Fish Habitat Inventory: Standards and Procedures (May 1997).

Large appendices, including but not limited to, Site Cards and photographic appendices will be bound in separate volumes. The report format will endeavor to avoid re-iteration of field data on a reach by reach basis that may be represented in data appendices. Instead the anecdotal discussion format of the report will focus on descriptions and justifications for non-sampled reaches, non-fish bearing reaches and reaches where fish species were not captured but are likely to occur at other times of the year (follow-up sampling requirements). The report will also contain a summary of background information gathered and reviewed during the initial phases of the project.

1.3.1 GIS Mapping

GIS mapping requirements will be met by Northwood's GIS subcontractor, Western Geographic Information Systems. Interim working maps and associated databases will be forwarded to Western GIS upon completion Phase 5 data compilation works. Upon completion of the mapping requirements, Western GIS will submit the final hardcopy maps to the Triton project manager for editing and cross checking prior to submission of the draft mapping deliverable.

APPENDIX V FDIS REACH/SITE SUMMARY

FDIS REACH/SITE SUMMARY LEGEND

REACE	REACH ATTRIBUTES									
Bars		Setting		Riparian	ian	Exposed/	/p	Land Use		Τ-
;				Vegetation	ation	Eroded				
z	none	VF	valley floor	z	none	Z	4000	CI.		_
<u>D</u>	diagonal	MΛ	valley wall	Ö	prass	;>	initially o	Q C	none/natural	
PT	point	MP	mountain	· ·	charba	714	VISIOIS	A C	agricultural	
			plateau) 	Son and	<u> </u>	unkmown/not visible	a n	urban development	
S	channel side	N.	plain/large	ن د	coniferous			Į.	***************************************	
! i			plateau						Simming.	
Z,	junction	<u>D</u>	piedmont	X	mixed			מת		
MC	mid-channel			≯	wetland	4".1		A i	developed park/recreation	
DM	diamond			: <u> </u>	decidions			בן בן נ	logging, to banks	
ΔW	waves/dunes			1				H.	logging, with reserves	
R	not visible							 5	other	
TR	transverse									
SITE A	SITE ATTRIBUTES	CHANNEL	VEL	WATER	ER	COVER	2			 -
Access		Store			73.5					_
1011		Diago		Lurblanty	airy	Cover	•	LWD		_
r w	nxed wing aircraft		Low	£	turbid	SWD	small woody debris	Z	2020	_
王	helicopter	⋈	Medium	M	moderately	I.W.D	Pres moody dobat		ilone	
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V4	4 wheel drive		ŗ.	C	clear	١ (outher).	∢;	abundant	
T.	foot)		ر	cuidanks	n	unknown	
	1001					DP DP	deep pools	LWD Dist	st	-
A ! <	all terrain vehicle					20	Overhanging			
						· }	Vegetation	۔ ر	clumped	
						2	instream vegetation	ĹI		
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FDIS REACH/SITE SUMMARY LEGEND (cont'd.)

MORPHOLOGY	LOGY								
Bed Material	ial	Morphology	nology	Dietur	Disturbance Indicators	2			
ĹĿ	fines	200			Dance Indicators	bars		Pattern	
1	Ç.	<u> </u>	mme/poor	5	beaver dams	z	none	TM	tortuous
Ö	gravel	CP	cascade/	B1	abandoned channels	Ω	diagonal	ME	meanders regular
U	cobble	SP	step/pool	B2	eroding banks	P.	point	IM	meanders irregular
B	boulder			B3	avulsions	×	mid channel	띪	meanders irregular
R	bedrock			C.	extensive riffles/cascades	[-	francyorca	10	meanders
Islands		Confir	Confinement	2	minimal pool area	· 🗀	longitudinal	Z.	sinuous
Z	none	EN	entrenched	ខ	elevated mid channel bar	Compling	10	5	आ वाहिया।
ο,	occasional	ဥ	confined	2	multiple channel or braids	200	decombed		
-	ırregular	5 5	frequently	స	disturbed stone lines	PC	partially		
ĮT.	frequent	9	contined occasionally confined	ĪΩ	small woody debris	8	coupled coupled		
S	split .	3	unconfined	D2	large woody debris				
AN	anastamosing	N/A	not applicable	<u>D</u> 3	recently formed jams				
				S.	homogenous bed texture				
					sediment fingers				
				S 2	sediment wedges				
	j			\$ S	extensive bars				
FEATURES*	₹S.*			FISHE	FISHERIES SENSITIVE ZONES				
OB .	beaver dam	Į,	falls (>2 m)	TRIB	Tributaries	SWP/	swamp/		
ပ	cascade/ chute	ĽS	landslide/bank	SC	Side channel	SLG FL/BV	slough Flooded area/dammed	ımmed	
× C	culvert LWD jam	VB FLD	velocity barrier dewatering	FC	Flood channel		by beavers		

Triton Environmental Consultants Ltd.

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FDIS Reach/Site Summary	Reach #	Site#
Watershed Code: 460-600600-50800-00500-2830-2561	1— -000-000-000-	95 000-000-000
WATERSHED		
Gazetted Name Local Name	-	
ILP 1606 Map 93L.023 Reach# 1 Sample Type	В	
REACH ATTRIBUTES		
Length (km) 1.2 US Elev. Bars B N C DI C PT C S C JN C MC C DI	ишмрші	v∨ □ TR
DS Elev. Magnitude 1 Setting VF Riparian Veg. C		
Order 1 BGC Zone SBS Exposed/Eroded N Landuse	NO	
SITE ATTRIBUTES		
Site # UTM(Zone/East/North/Method) Site Lg Access Fish Crd? Date 95 150 H 18 1997/09/19	namage manage	
hamman hand hammad hamm		
C H A N N E L Mean Channel Width (m) 1.3 Mean Wetted Width (m) 1.3 Mean Residual Pool Dept	h (m) [0	4
- Accordance - Accordance	h (m) <u> </u>	
Stage L K M L H Dw L	Tribs.	
WATER	mus.	
Temp. 6.5 pH 6.9 Cond. 30 Turb. TTDMDLKC		
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COVER AND SERVICE DESCRIPTION TOTAL 40 % LWD A	DIST	
60 20 20 Iotal 40 % LWD A	" DIST	LE.
MORPHOLOGY		
BED MATERIAL Dominant: F Subdom: C DISTURBANCE O1 B1 B2 B3	D1 D 2 D	3
D95: 12 D (cm): 0.002 Morph: RP INDICATORS		9
	2 S3 S4 S	i5
Pattern SI Islands N Coupling DC Confinement OC	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
REACH FEATURES		
SITE FEATURES		
NID Map Roll Frame UTM NID # Type Ht. Lgth. No. No. (Zone/Easting/Northing)	C	omment
3061 93L.023 F 1.8 8 23 90 m upstream from confluence	ce	
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Gazetted Name	Local Name	
ILP	1480 Map 93L.023 Reach # 1 Sample Typ	B
The Application	REACHTATTRIBUTES	4.5
Length (km)	Bars X N 🗆 DI 🗆 PT 🗆 CS 🗀 JN 🗆 MC 🗀 E	M □ WD □ NV □ TR
DS Elev.	Magnitude 3 Setting VW Riparian Veg. M	
Order	2 BGC Zone SBS Exposed/Eroded N Landuse	NO
	SJITE#ATTRIBUTES	12. Sec. 17. 18. 18. 19. 19. 19. 19. 19. 19. 19. 19. 19. 19
	Zone/East/North/Method) Site Lg Access Fish Crd? Date	
98	100 H 1997/09/19	
100	CHANNEL :	
Mean Channel W	idth (m) 1.3 Mean Wetted Width (m) 1.2 Mean Residual Pool De	pth (m) 0.1
Mean Gradient	4.5 Mean Wb Depth 0.1 No Vis.Ch I	ntermitten 🗔
	Stage □ L 図 M □ H Dw □	Tribs. 🗔
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Temp. 7	рН 7.3 Cond. 30 Turb. 🗆 Т 🗆 М 🗆 L 🕱 С	
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	MORPHOLOGY	100 mg/mg/ 100 mg/mg/mg/ 100 mg/mg/ 100 mg/mg/ 100 mg/mg/ 100 mg/mg/ 100 mg/mg/ 100 mg/mg/ 100 mg/mg/mg/ 100 mg/mg/mg/mg/ 100 mg/mg/mg/mg/ 100 mg/mg/mg/mg/mg/mg/mg/mg/mg/mg/mg/mg/mg/m
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FDIS Reach/Site Summary 1 99
Watershed Code 460-600600-50800-00500-2830-3452-000-000-000-000-0
WATJERSHED
Gazetted Name Local Name
ILP 1572 Map 93L.023 Reach # 1 Sample Typ B
REACH/ATTRIBUTES
Length (km) 0.8 US Elev. Bars X N D D D PT D CS D JN D MC D DM D WD D NV D TR
DS Elev. Magnitude 4 Setting VW Riparian Veg. C
Order 2 BGC Zone SBS Exposed/Eroded N Landuse NO
SITE ATTRIBUTES
Site # UTM(Zone/East/North/Method) Site Lg Access Fish Crd? Date
99 100 H X 1997/09/19
CHANNEL
Mean Channel Width (m) 0.0 Mean Wetted Width (m) 0.0 Mean Residual Pool Depth (m) 0.0
Mean Gradient 0.5 Mean Wb Depth 0.0 No Vis.Ch ⊠ Intermitten □
Stage 🗷 L 🗆 M 🗆 H Dw 🗀 Tribs. 🗀

Temp. 8 pH 7.2 Cond. 50 Turb. ☐ T ☐ M ☐ L ⊠ C
COVER 19
COVER SWD LWD B C DP OV IV Total % LWD F DIST E
MORPHOLOGY
BED MATERIAL Dominant F Subdom: B DISTURBANCE O1 B1 B2 B3 D1 D2 D3
D95: 40 D (cm): 0.002 Morph NS INDICATORS
C1 C2 C3 C4 C5 S1 S2 S3 S4 S5
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WATERSHED
Gazetted Name Local Name
ILP 1469 Map 93L.023 Reach # 2 Sample Typ B
REACH ATTRIBUTES
Length (km) 0.4 US Elev. Bar's X N D D D D T CS D JN D MC D DM D WD NV NT TR
DS Elev. Magnitude Setting VW Riparian Veg. C
Order 2 BGC Zone SBS Exposed/Eroded N Landuse FR
SIJE ATTRIBUTES
Site # UTM(Zone/East/North/Method) Site Lg Access Fish Crd? Date
101 100 H ⊠ 1997/09/19
CHANNEL
Mean Channel Width (m) 2.4 Mean Wetted Width (m) 1.8 Mean Residual Pool Depth (m) 0.3
Mean Gradient 5.0 Mean Wb Depth 0.2 No Vis.Ch ☐ Intermitten ☐
Stage 🗆 L 🗷 M 🗆 H Dw 🗆 Tribs. 🗀
WATER
Temp. 6.5 pH 7.2 Cond. 30 Turb. ☐ T ☐ M ☐ L ☑ C
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50 50 50 MORPHOLOGY
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BED MATERIAL Dominant C Subdom: G DISTURBANCE O1 B1 B2 B3 D1 D2 D3
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	Watershed Code 460-600600-50800-00500-2830-2968-507-000-000-000-000-0
	WATERSHED
Gazetted Name	Local Name
ILP 1596 Map 931	3L.023 Reach # 1 Sample Typ B
	REACH ATTRIBUTES
Length (km) 0.7 US Elev.	Bars M N I DI I PT I CS I JN I MC I DM I WD I NV I TR
DS Elev. Magnitude	1 Setting VF Riparian Veg. C
Order 1 BGC Zone S	SBS Exposed/Eroded N Landuse FR
	SITE ATTRIBUTES
Site # UTM(Zone/East/North/Method)	Site Lg Access Fish Crd? Date
	100 H 🗵 1997/09/20
the state of the s	CHANNEL
Mean Channel Width (m) 1.3 Mean	in Wetted Width (m) 1.2 Mean Residual Pool Depth (m) 0.1
Mean Gradient 3.0 Mean Wb Dep	pth 0.1 No Vis.Ch □ Intermitten □
Stage 🗵 L	L 🗆 M 🖂 H Dw 🖂 Tribs. 🗔
and the second s	WATER
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COVER SWD LWD 13 C DP	OV IV Total 15 % LWD A DIST E
40 10	50
	MORPHOLOGY
BED MATERIAL Dominant G Subdon	m: C DISTURBANCE O1 B1 B2 B3 D1 D2 D3
D95: 20 D (cm): 4 Morph	INDICATORS
	C1 C2 C3 C4 C5 S1 S2 S3 S4 S5
Bars N D D P D M D T	
	oupling DC Confinement OC
	REACH FEATURES
	SITE FEATURES
	FSZ FSZ

	Reach #	Site#
FDIS Reach/Site Summary	2	105
Watershed Code 460-600600-50800-00500-2830-296		0-000-000-0
WATERSHED "	estat obeen be	
Gazetted Name Local Name		
ILP 1593 Map 93L.023 Reach # 2 Sample Typ	В	
REACH ATTRIBUTES		
Length (km) 1.1 US Elev. Bars X N DI D PT CS D JN D MC D	v □ wd □	NV □ TR
DS Elev. Magnitude 2 Setting VW Riparian Veg. C		
Order 2 BGC Zone SBS Exposed/Eroded N Landuse	NO	
SITE ATTRIBUTES		
Site # UTM(Zone/East/North/Method) Site Lg Access Fish Crd? Date		
105 200 H 口 1997/09/20		
CHANNEL		
Mean Channel Width (m) 1.7 Mean Wetted Width (m) 1.4 Mean Residual Pool Dep	th (m)	0.1
Mean Gradient 4.3 Mean Wb Depth 0.1 No Vis.Ch ☐ Int	termitten 🗔	- 100 - 100
Stage ⊠ L □ M □ H Dw □	Tribs. 🗔	
WATER		
Temp. 8 pH 7.1 Cond. 30 Turb. ☐ T ☐ M ☐ L ☑ C		
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MORPHOLOGY.		
	D. D.	
BED MATERIAL Dominant G Subdom: C DISTURBANCE O1 B1 B2 B3	D1 D2	
D95: 18 D (cm): 5 Morph RP C1 C2 C3 C4 C5 S1 S		S5
Pattern SI Islands N Coupling DC Confinement FC		
REACH FEATURES	26 St. 10 St.	
SITE FEATURES.	a service of	
No. 2 - Company of the Company of th		
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FDIS Reach/Site Summary	1	107
Watershed Code 460-600600-50800-00500-2830-296	8-433-596-000	-000-000-0
WATERSHED.		e de la composición
	4	**************************************
Gazetted Name Local Name		
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RIEACH (ATTRIBUTES		
Length (km) 0.2 US Elev. Bars ▼ N □ DI □ PT □ CS □ JN □ MC □ DI	u □ wd □	NV 🏻 TR
DS Elev. Magnitude 1 Setting VW Riparian Veg. C		
Order 1 BGC Zone SBS Exposed/Eroded N Landuse	FR	
Report Remission of the Control of t		
SITE ATTRIBUTES		
Site # UTM(Zone/East/North/Method) Site Lg Access Fish Crd? Date		
107		
CHANNEL		
Mean Channel Width (m) 0.0 Mean Wetted Width (m) 0.0 Mean Residual Pool Dep	th (m) 0	.0
Mean Gradient 0.0 Mean Wb Depth 0.0 No Vis.Ch ⊠ Int	ermitten 🗔	
Stage 🗆 L 🗆 M 🗆 H Dw 🗆	Tribs. 🎞	
Stage And L And IVI And III DW And	IIIDS. J	
WATER	375-375-6	
Temp. 7 pH 7.0 Cond. 30 Turb. □ T □ M □ L 🗷 C		
COVER		
	T DIGT	
COVER SWD LWD B C DR OV IV Total % LWD	DIST	<u></u>
MORPHOLOGY		15
BED MATERIAL Dominant F Subdom: DISTURBANCE O1 B1 B2 B3	D1 D2 [D3
D95: 0.002 D (cm): 0.002 Morph NS INDICATORS		Į į
	2 S3 S4 S	35
	. hand hand b.	Î
Pattern Islands N Coupling DC Confinement UN		
REACH FEATURES		
SITEFFEATURES		
F.S.Z.		
TRIB C SC FC SWP/SLG FL/BV C	V - 44 (SA) - 5 (SA)	

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Accompanying Reach or Site Comments?

Site#

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Accompanying Reach or Site Comments?

SWP/SLG ...

FL/BV

sc □

TRIB 🗀

FDIS Reach/Site Summary	Reach #	Site#
Watershed Code 460-600600-50800-00500-2830-4233	1 -000-000-000-	109 000-000 -0
- WATERSHED		
Gazetted Name Local Name		
ILP 1552 Map 93L.023 Reach # 1 Sample Typ	В	
REACHEATTRIBUTES		* * * * * * * * * * * * * * * * * * * *
Length (km) 0.5 US Elev. Bars ⊠ N □ DI □ PT □ CS □ JN □ MC □ DN	1 🗆 WD 🗆 N	IV 🏻 TR.
DS Elev. Magnitude 1 Setting VW Riparian Veg. C		
Order 1 BGC Zone SBS Exposed/Eroded N Landuse	FR	
SITE ATTRIBUTES	19.88	
Site # UTM(Zone/East/North/Method) Site Lg Access Fish Crd? Date 109 100 H 1997/09/20		
CHANNEL		
Mean Channel Width (m) 0.0 Mean Wetted Width (m) 0.0 Mean Residual Pool Dept	h (m) 0.0	
Mean Gradient 0.0 Mean Wb Depth 0.0 No Vis.Ch 🗵 Inte	ermitten 🗔	
Stage LLM H Dw D	Tribs. 🎞	
S. C. WATER		
Temp. pH Cond. Turb. T M L L C		
COVER:		2.4
COVER SWD LWD B C DP QV IV Total % LWD	DIST	
MORPHOLOGY		
BED MATERIAL Dominant Subdom: DISTURBANCE O1 B1 B2 B3	D1 D2 D3	3
D95: D (cm): Morph INDICATORS		
C1 C2 C3 C4 C5 S1 S2	2 S3 S4 S5	
	bed bud bed	i
Primaryanik Bassayanik Bassayanik Bassayanik		
** (REACH: FEATURES		
SITEDFEATURES		
TRIB SC FC SWP/SLG FL/BV T		

Accompanying Reach or Site Comments?

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Reach #

	December 196 to 1 to		Reach #	Site#
FDIS Reach/Site Summary			2	110
the construction of the control of authors and the control of the	Watershed Code	460-600600-50800-00500-28	30-3745-000-000-000	-000-000-0
	WATERS	HED		
Gazetted Name	Local Na	me		
ILP 1554 Map 93	_023 Reach #	2 Sample	Тур В	
	REACH ATTR	IBUTES		
Length (km) 2 US Elev.	Bars 🔲 N 🗆 DI	□ PT □ CS □ JN ▼ MC	□ DM 図 WD □	v∨ □ TR
DS Elev. Magnitude	9 Setting VW	Riparian Veg.	С	
Order 3 BGC Zone S	BS Exposed/Eroded	N Landuse	FR	
in a few of market and a second of the secon	SITERATTRI	BUTES	and the same of the same	5.3
Site # UTM(Zone/East/North/Method)	Site Lg Acces	s Fish Crd? Date		
110	100 H	1997	09/20	
	CHANNE	EL.		
Mean Channel Width (m) 4.1 Mean	n Wetted Width (m)	0.0 Mean Residual Po	ol Depth (m) 0.	0
Mean Gradient 4.0 Mean Wb Dep	oth 0.5	No Vis.Ch □	Intermitten 🗔	
<u></u>	_ Дм Дн	Dw 🗵	Tribs. □	
		·		
	WATER 		Sept. Sep	20 01
Temp. pH Cond.	Turb.	птпмпгпс		
	'A' COVER		$P(x_i) = \{x_i \in X_i \mid x_i \in X_i\}$	
COVER SWD LWD B C DP 50 30 20	OV NV To	tal 35 % LWC	DIST	E
	MORPHOL	ŌĠY		* *- *- 2.1
BED MATERIAL Dominant G Subdom	INDICATOR		B3 D1 D2 D	3
D95: 15 D (cm): 4 Morph	SP	C1 C2 C3 C4 C5	S1 S2 S3 S4 S	55
Bars ON OD OP M OT	⊠L			
Pattern ME Islands N Co	oupling PC Co	nfinement FC		
	REACH FEAT	TURES	and the second	
	· SITE FEAT	JRES		
	FSZ			

Accompanying Reach or Site Comments?

Site#

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Accompanying Reach or Site Comments?

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FL/BV [

SWP/SLG

Reach #

Accompanying Reach or Site Comments?

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REACH FEATURES

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Accompanying Reach or Site Comments ? \square

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Accompanying Reach or Site Comments?

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TRIB 🗔

SWP/SLG □

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FDIS Reach/Site Summary

The second of th

Reach #

Site # 210

24.

Watershed Code

460-600600-50800-00500-2830-0000-000-000-000-000-0

WATER'SHED
Gazetted Name Shea Creek
ILP 1439 Map 93L.023 Reach # 24 Sample Typ B
REACH ATTRIBUTES
Length (km) 3.2 US Elev. Bars N M DI T T CS JN MC DM WD NV T
DS Elev. Magnitude 100 Setting VW Riparian Veg. C
Order 4 BGC Zone SBS Exposed/Eroded N Landuse NO
SITE ATTRIBUTES
Site # UTM(Zone/East/North/Method) Site Lg Access Fish Crd? Date 210
CHANNEL
Mean Channel Width (m) 15.9 Mean Wetted Width (m) 8.3 Mean Residual Pool Depth (m) 1.6
Mean Gradient 4.0 Mean Wb Depth 1.6 No Vis.Ch ☐ Intermitten ☐
Stage ⊠ L □ M □ H Dw □ Tribs. □
WATER
Temp. 8 pH 7.7 Cond. 40 Turb. □ T □ M □ L 🗷 C
Parategranes Communication Contraction and Con
GOVER
COVER SWD WD B C DP OV IV Total 40 % LWD F DIST E
COVER SWD AWD B C DP OV IV Total 40 % LWD F DIST E
COVER SWD AWD B C DP2 OV IV Total 40 % LWD F DIST E 10 30 30 10 15 5 **MORPHOLOGY BED MATERIAL Dominant NS Subdom: DISTURBANCE O1 B1 B2 B3 D1 D2 D3
COVER SWD LWD B C DP OV IV Total 40 % LWD F DIST E 10 30 30 10 15 5 MORPHOLOGY BED MATERIAL Dominant NS Subdom: DISTURBANCE INDICATORS DISTURBANCE INDICATORS DISTURBANCE
COVER SWD AWD 5 C DP2 OV IV Total 40 % LWD F DIST E 10 30 30 10 15 5 **MORPHOLOGY BED MATERIAL Dominant NS Subdom: DISTURBANCE INDICATORS DISTURBANCE INDICATORS DISTURBANCE C1 C2 C3 C4 C5 S1 S2 S3 S4 S5
COVER SWD AWD 5 C DP2 OV IV Total 40 % LWD F DIST E 10 30 30 10 15 5 **MORPHOLOGY BED MATERIAL Dominant NS Subdom: DISTURBANCE INDICATORS DISTURBANCE INDICATORS DISTURBANCE C1 C2 C3 C4 C5 S1 S2 S3 S4 S5
COVER SWD AVD B C DP OV IV Total 40 % LWD F DIST E 10 30 30 10 15 5 MORPHOLOGY BED MATERIAL Dominant NS Subdom: DISTURBANCE INDICATORS DISTURBANCE INDICATORS DISTURBANCE C1 C2 C3 C4 C5 S1 S2 S3 S4 S5 Bars D N D D D P D M D T D L
COVER SWD
COVER SWD LWD B C DP OV IV Total 40 % LWD F DIST E 10 30 30 10 15 5 MORPHOLOGY BED MATERIAL Dominant NS Subdom: DISTURBANCE INDICATORS DISTURBANCE INDICATORS DISTURBANCE
COVER SWD WD E C DP OV IV Total 40 % LWD F DIST E 10 30 30 10 15 5
COVER SWD LWD B C DP OV IV Total 40 % LWD F DIST E MORPHOLOGY
COVER SWD SWD B C DP OV IV Total 40 % LWD F DIST E 10 30 30 10 15 5
COVER SWD B C DP OV V Total 40 % LWD F DIST E 10 30 30 10 15 5

REACH FEATURES

ESZ, III

TRIB G SC FC SWP/SLG G FL/BV

Accompanying Reach or Site Comments?

CO

Confinement

REACH FEATURES

SITE FEATURES.

OC

Coupling

TRIB SC FC SWP/SLG FL/BV

Accompanying Reach or Site Comments?

Islands

Pattern

SI

A.C. S. C. FSZ

FL/BV 🗆

Reach #

Site #

Accompanying Reach or Site Comments?

FC 🗆

SWP/SLG

sc □

TRIB 🗆

A STATE OF THE STA	Reach # Site #
FDIS Reach/Site Summary	1 214
Watershed Code 460-600600-50800-00500-2830-572	20-628-000-000-000-000-0
WATERSHED	
Gazetted Name Local Name	
ILP 1699 Map 93L.033 Reach# 1 Sample Typ	В
REACH ATTRIBUTES	and the second s
Length (km) 0.75 US Elev. Bars ☒ N ☐ DI ☐ PT ☐ CS ☐ JN ☐ MC ☐ D	M UWD UNV UTR
DS Elev. Magnitude 2 Setting VW Riparian Veg. C	
Order 2 BGC Zone SBS Exposed/Eroded N Landuse	FR
SITE ATTRIBUTES	25 (10 No. 10 No
Site # UTM(Zone/East/North/Method) Site Lg Access Fish Crd? Date	
214 100 H 🗆 1997/09/19	
CHANNEL TE	7.0
Mean Channel Width (m) 0.0 Mean Wetted Width (m) 0.0 Mean Residual Pool Dep	oth (m) 0.0
Mean Gradient 0.0 Mean Wb Depth 0.0 No Vis.Ch ⊠ In	itermitten 🗆
Stage 🗆 L 🗆 M 🖂 H DW 🗆	Tribs. 🗔
"Zisa WATER	
Temp. pH Cond. Turb. T M L C	
Francisco Bosses Andrew Bosses	
COVER	
COVER SWD LWD B C DP OV IV Total % LWD	DIST
MORPHOLOGY	
BED MATERIAL Dominant Subdom: DISTURBANCE O1 B1 B2 B3	D1 D2 D3
D95: D (cm): Morph C1 C2 C3 C4 C5 S1 S	1
Pattern Islands Coupling Confinement	
REACHIFEATURES.	
SITE/FEATURES	
in the second of the second	
TRIB C SC FC SWP/SLG FL/BV C	

Accompanying Reach or Site Comments ? \square

Reach #

Site #

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Accompanying Reach or Site Comments?

EDIC Deservices	Reach #	Site#
FDIS Reach/Site Summary	1	216
Watershed Code 460-600600-50800-00500-2830-5720	-509-000-000	-000-000-0
WATERSHED TO THE STREET		77.75
Gazetted Name Local Name		
ILP 1703 Map 93L.033 Reach# 1 Sample Typ	В	
REACH ATTRIBUTES		
Length (km) 0.6 US Elev. Bars □ N ⊠ DI □ PT □ CS □ JN □ MC □ DN	ı □ wn □	NV 🗆 TR
DS Elev. Magnitude 2 Setting VW Riparian Veg. C	.,	
Order 2 BGC Zone SBS Exposed/Eroded N Landuse	FR	
to the second se		
SITE ATTRIBUTES		
Site # UTM(Zone/East/North/Method) Site Lg Access Fish Crd? Date 216 100 H 🗷 1997/09/19		
Mean Channel Width (m) 1.2 Mean Wetted Width (m) 0.8 Mean Residual Pool Dept	. L	.3
	ermitten 🚨	
Stage ▼ L □ M □ H Dw □	Tribs. 🗆	
· WATER '		
Temp. 7 pH 7.6 Cond. 90 Turb. ☐ T ☐ M ☐ L ⊠ C		
COVER SALES		
COVER SWD LWD B. C. DP. OV IV. Total 20 % LWD F	7 DIST	E
10 30 30 20 10	1 5.01	
MORPHOLOGY		
	D4 D0 F	
INDICATORS	D1 D2 D	J3
D95: 20 D (cm): 10 Morph RP C1 C2 C3 C4 C5 S1 S	2 S3 S4 S	S5
		1
Pattern SI Islands I Coupling PC Confinement FC		
REACH FEATURES		
SITE FEATURES		100 4,600
Control of the contro		
TRIB SC FC SWP/SLG FL/BV		

Accompanying Reach or Site Comments?

	The control of the co	The second secon	The state of the s	Reach # Site #
FDIS Reach	n/Site Summary			3 217
	Water	rshed Code 460-	600600-50800-00500-2830-5	720-000-000-000-000-0
	14-7-16-7-16-7-16-7-16-7-16-7-16-7-16-7-	WATERSHEL)	
Gazetted Name		Local Name		
ILP	1697 Map 93L.033	Reach# 3	Sample Typ	• B
		J		1
1			JTES	
Length (km)			PT CS DJN DMC D	•
DS Elev.		etting VF	Riparian Veg. W	
Order	2 BGC Zone SBS Ex	kposed/Eroded	N Landuse	FR
	e de la companya de l	ITE ATTRIBU	TES A	
	Zone/East/North/Method) Site	e Lg Access	Fish Crd? Date	
217		100 H	1997/09/1	9
1 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		CHANNEL		
Mean Channel Wi	idth (m) 0.0 Mean Wetter	1 Width (m) 0.0	Mean Residual Pool D	epth (m) 0.0
Mean Gradient	0.0 Mean Wb Depth	0.0	No Vis.Ch ⊠	Intermitten 🗀
	Stage 🗆 L 🗆 M	Пн	Dw 🕮	Tribs. 🗀
		· WATER		
			TENTLES	
Temp. 8	pH 7.6 Cond. 40	Turb.	тым Д L Д С	
		COVER		
COVER SWD	LWD B C DR OV	Total	25 % LWD	DIST
<u>L, l</u>	25 50	1 25		
		MORPHOLOG	Υ	
BED MATERIAL	. Dominant Subdom:	DISTURBANCE	O1 B1 B2 B3	D1 D2 D3
D95:	D (cm): Morph	INDICATORS		
Bare X N C		*** !	1 C2 C3 C4 C5 S1	52 53 54 55
Pattern M	Islands O Coupling	DC Confine		
Tattetti IIVI	lane de la constante de la con	Venezament.	planter in the second	
		ACH FEATUR		
	PARTIE TO SERVICE TO S	INTERFIE ATEUR E	S	1 Pro
		SEPARSIZION A		
TRIB 🔲 sc	EC SWE/SIG	EL/BV/		

Accompanying Reach or Site Comments ? \square

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	and the second second	interior in the control of the contr	Reach #	Site#
FDIS Reach/Site Summary			1.	218
	Watershed Code 4	160-600600-50800-00500-	2830-5720-280-000-000)-000-000-0
San Turney	WATERSH	ED		30.3
Gazetted Name	Local Nam	ne 🗀		
ILP 1691 Map 93L	.033 Reach #	1 Sam	ple Typ B	
the state of the second second second	REACHATTRI	BUTES		3 (0.74)
Length (km) 0.7 US Elev.	Bars [N 🗷 DI [□ PT □ CS □ JN □	MC II DM II WD II	NV 🗆 TR
DS Elev. Magnitude	5 Setting VW	Riparian Veg.	C	
Order 2 BGC Zone St	Exposed/Eroded	N Landuse	FR	
er i de la companya	SITE ATTRIB	UTES		
Site # UTM(Zone/East/North/Method)	Site Lg Access	Fish Crd? Da	te	
218	100 H	× 19	97/09/19	
the state of the s	CHANNE	L _o		1,000
Mean Channel Width (m) 1.9 Mean	Wetted Width (m)	0.9 Mean Residual	Pool Depth (m) 0	.2
Mean Gradient 8.5 Mean Wb Dept	th 0.1	No Vis.Ch □	Intermitten 🗔	•
Stage ⊠ L	Пм Пн	Dw 🗔	Tribs. 🗔	
	WATER			
Temp. 5 pH 7.6 Cond.	40 Turb.		С	
	COVER			
COVER SWD LWD B C DP 10 20 40	OV IV Tota	al 20 % L	WD F DIST	E
	MORPHOLO	GY		7.
BED MATERIAL Dominant C Subdom	DISTURBANCE INDICATORS		32 B3 D1 D2 [03
D95: 35 D (cm): 10 Morph		C1 C2 C3 C4 C5		· 1
Bars 🗆 N 🗷 D 🗆 P 🗷 M 🗅 T				1
	<u> </u>	finement FC		
	REACH FEAT	URES	e green	
	SITE FEATU	RES :: :::::::::::::::::::::::::::::::::		
	ESTANCE FROM			433
TRIB SC FC SWP/SLG		and the second s	The state of the s	

Accompanying Reach or Site Comments ? \square

FDIS Reach/Site Summary

Accompanying Reach or Site Comments ? \Box

Reach #

Site # 219

20.

Watershed Code

460-600600-50800-00500-2830-0000-000-000-000-000-000-0

WATERSHED
Gazetted Name Local Name Shea Creek
ILP 1439 Map 93L.023 Reach # 20 Sample Typ B
REACH ATTRIBUTES
Length (km) 0.8 US Elev. Bars N M DI T PT CS JN M MC DM WD NV TR
DS Elev. Magnitude 67 Setting VF Riparian Veg. M
Order 4 BGC Zone SBS Exposed/Eroded N Landuse NO
SI/TE/AT/T/RIBUTES
Site # UTM(Zone/East/North/Method) Site Lg Access Fish Crd? Date
219 200 H X 1997/09/19
CHANNEL
Mean Channel Width (m) 12.8 Mean Wetted Width (m) 9.1 Mean Residual Pool Depth (m) 1.3
Mean Gradient 2.5 Mean Wb Depth 0.6 No Vis.Ch ☐ Intermitten ☐
Stage 🗷 L 🗆 M 🗆 H 🛛 Dw 🖂 Tribs. 🖂
WATER
Temp. DH Cond. Turb. 口T口M 医 L 口 C
Temp. DH Cond. Turb. 口T口M 医 L 口 C
Temp. pH Cond. Turb. T T M X L C C O.V.E.R. COVER SWD LWD B G DR OV IV Total 30 % LWD F DIST E
Temp. pH Cond. Turb. □ T □ M ☒ L □ C COVER SWD WD S C DF OV IV Total 30 % LWD F DIST E 5 25 5 20 25 10 10 WD F DIST E DIST E *MORPHOLOGY
Temp. pH Cond. Turb. □ T □ M ☒ L □ C COVER COVER SWD EWD EWD F DIST E 5 25 5 20 25 10 10 WORPHIOLOGY BED MATERIAL Dominant C Subdom: C Subdom: C Subdom: C Subdom: DISTURBANCE INDICATORS 01 B1 B2 B3 D1 D2 D3 D95: 40 D (cm): 35 Morph RP Morph RP D
Temp. pH Cond. Turb. □ T □ M ☒ L □ C COVER COVER SWD WD S C DF OV IV Total 30 % LWD F DIST E SMORPHOLOGY SWD WD S C DF OV IV Total 30 % LWD F DIST E SMORPHOLOGY BED MATERIAL Dominant C Subdom: G DISTURBANCE O1 D1 D1 D2 D3 D95: 40 D (cm): 35 Morph RP C1 C2 C3 C4 C5 S1 S2 S3 S4 S5
Temp.
Temp. pH Cond. Turb. □ T □ M ☒ L □ C COVER: COVER SWD EWD E G DPR OV IV Total 30 % LWD F DIST E M.O.R.P.H.O.L.O.G.Y: BED MATERIAL Dominant C Subdom: G DISTURBANCE INDICATORS □ <td< td=""></td<>
Temp. pH Cond. Turb. ☐ T ☐ M ☑ L ☐ C COVER
Temp. pH Cond. Turb. □ T □ M ☒ L □ C COVER: COVER SWD EWD E G DPR OV IV Total 30 % LWD F DIST E M.O.R.P.H.O.L.O.G.Y: BED MATERIAL Dominant C Subdom: G DISTURBANCE INDICATORS □ <td< td=""></td<>
Temp. pH Cond. Turb. ☐ T ☐ M ☑ L ☐ C COVER

	Address of Agency and Agency A		Reach # Site #
FDIS Reach/Site Summary			1 220
	Watershed Code	460-600600-50800-00500-283	0-5720-078-000-000-000-000-0
	WATERS	HED.	
Gazetted Name	Local N	ame	
ILP 1683 Map 93L	.033 Reach#	1 Sample	Гур В
	REACHATT	RIBUTES	
Length (km) 1.1 US Elev.	Bars IX N □ D	□ PT □ CS □ JN □ MC	OM OWD NV OTR
DS Elev. Magnitude	5 Setting VV	Riparian Veg.	C
Order 2 BGC Zone SI	S Exposed/Erodeo	I N Landuse	FR
	—∕ SUTE ATTR	BUTES	
Site # UTM(Zone/East/North/Method)	Site Lg Acce		
220	100 H	□ 1997/0	9/19
Area and a second	CHANN	E/LY	
	Wetted Width (m)	0.0 Mean Residual Poo	l Depth (m) 0.0
Mean Gradient 50.0 Mean Wb Dep	th 0.0	No Vis.Ch □	Intermitten 🗔
		Dw 🗵	Tribs.
		·	
	WATE	R	
Temp. pH Cond.	Turb.	птпмпгпс	
	COVE		
COVER SWD LWD B C DP.	OV IV T	otal % LWD	DIST
	MORPHOL	OGY	
BED MATERIAL Dominant Subdon	1: DISTURBA	10	33 D1 D2 D3
D95: D (cm): Morph			1 1 1
Bars DN DD DP DM DT			\$1 \$2 \$3 \$4 \$5
	<u> </u>	onfinement	
Annual An	REACH FEA	TURES	
	SIME REAT		
	FSZ.		
TRIB SC FC SWP/SLG	;□ _{FL/BV} □		

Accompanying Reach or Site Comments ? \square

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And the second s			Reach#	Site #
FDIS Reach/Site Summary			• 3	221
A regulated to a control of the cont	Watershed Code	460-600600-50800-00500-2	2830-5907-000-000-000	-000-000-0
	e†β⊈WAπÈRS	HED.	6.4	10.00
Gazetted Name	Local N	ame		
ILP 1717 Map 93L.0	Reach #	3 Samp	le Тур В	
	PREACH ATT	RIBUTES	1000	100
Length (km) 0.9 US Elev.	☐ Bars 🗷 N 🗆 D	I□РТ□СЅ□JN□М	IC I DM I WD I	NV 🎞 TR
DS Elev. Magnitude 1	Setting M	Riparian Veg.	C	
Order 1 BGC Zone SB	Exposed/Erode	N Landuse	NO	
	SITE ATTR	IBUTES		E, 8 12 18 5
Site # UTM(Zone/East/North/Method)	Site Lg Acce		e 97/09/20	
	CHANN	EL L		
	Wetted Width (m)	0.4 Mean Residual F	Pool Depth (m)	.1]
		No Vis.Ch □	Intermitten 🗔	.,
Mean Gradient 24.0 Mean Wb Deptr	L.	Dw 🗔	Tribs.	
		R		the second of
Temp. 5.9 pH 7.6 Cond.	10 Turb.		<u>C</u>	
	, COVE	R. S. S.		1.3.4
COVER SWD LWD 55 G DP 10 30 10	OV 1V T	otal 30 % LV	VD F DIST	E
The second secon	MORPHOL	OGY		110000
BED MATERIAL Dominant C Subdom:			2 B3 D1 D2 E	03
D95: 25 D (cm): 20 Morph	CP INDICATOR	니 나		
Bars N C D C P C M C T I		C1 C2 C3 C4 C5	S1 S2 S3 S4 S	
	<u> </u>	onfinement CO	AND THE RESERVE TAX TAX THE RESERVE THE RE	
	REACH FEA	T,U:RES		
	SIME FEAT	U/R(E/S)		
NID Map Roll Frame NID # Type Ht. Lgth. No. No.	UTM (Zone/Easting/No	rthina)		Commen
3064 93L.033 C 0.3 40 5		numerous througho	ut	
	1 1			
	FSIZ			
TRIB SC FC SWP/SLG	□ _{FL/BV} □			

Accompanying Reach or Site Comments ? \square

Site #:

1

Watershed Code

460-600600-50800-00500-2830-5549-000-000-000-000-000-0

WATERSHED
Gazetted Name Local Name
ILP 1654 Map 93L.033 Reach# 1 Sample Typ B
⊋ REACH, ATTRIBUTES
Length (km) 1.05 US Elev. Bars ☐ N 図 DI ☐ PT ☐ CS ☐ JN 図 MC ☐ DM ☐ WD ☐ NV ☐ TR
DS Elev. Magnitude 5 Setting VW Riparian Veg. M
Order 2 BGC Zone SBS Exposed/Eroded N Landuse FR
SITE ATTRIBUTES
Site # UTM(Zone/East/North/Method) Site Lg Access Fish Crd? Date 222 100 H 🗵 1997/09/20
CHANNEL
Mean Channel Width (m) 2.0 Mean Wetted Width (m) 1.3 Mean Residual Pool Depth (m) 0.3
Mean Gradient 3.5 Mean Wb Depth 0.3 No Vis.Ch ☐ Intermitten ☐
Stage 🗷 L 🗆 M 🗆 H Dw 🗆 Tribs. 🗀
WATER
Temp. 7 pH 7.6 Cond. 30 Turb. □ T □ M 区 L □ C
COVER
COVER SWD LWD B C DF OV IV Total 30 % LWD F DIST E 5 50 5 30 10
MORPHOLOGY
BED MATERIAL Dominant G Subdom: C DISTURBANCE O1 B1 B2 B3 D1 D2 D3
D95: 51 D (cm): 12 Morph NS INDICATORS
D95: 51 D (cm): 12 Morph NS INDICATORS
D95: 51 D (cm): 12 Morph NS INDICATORS
D95: 51 D (cm): 12 Morph NS C1 C2 C3 C4 C5 S1 S2 S3 S4 S5 Bars D N M D D P M M D T D L
D95: 51 D (cm): 12 Morph NS INDICATORS □<
D95: 51 D (cm): 12 Morph NS C1 C2 C3 C4 C5 S1 S2 S3 S4 S5 Bars N N D P M T D L D D D D D D D D D D D D D D D D D
D95: 51 D (cm): 12 Morph NS C1 C2 C3 C4 C5 S1 S2 S3 S4 S5 Bars N D D P M D T D L D D D D D D D D D D D D D D D D

Site # 223

Watershed Code

460-600600-50800-00500-2830-5314-000-000-000-000-000-0

Valeshed Code 460-000000-00000-0000-000-000-000-000-00
WATERSHED
Gazetted Name Local Name
ILP 1659 Map 93L.033 Reach # 2 Sample Typ B
REACH ATTRIBUTES
Length (km) 0.8 US Elev. Bars ▼ N □ DI □ PT □ CS □ JN □ MC □ DM □ WD □ NV □ TR
DS Elev. Magnitude 9 Setting VW Riparian Veg. M
Order 3 BGC Zone SBS Exposed/Eroded N Landuse NO
SITE ATTRIBUTES
Site # UTM(Zone/East/North/Method) Site Lg Access Fish Crd? Date
223 100 H 🗷 1997/09/20
CHANNEL
Mean Channel Width (m) 1.4 Mean Wetted Width (m) 1.3 Mean Residual Pool Depth (m) 0.2
Mean Gradient 2.0 Mean Wb Depth 0.2 No Vis.Ch ☐ Intermitten ☐
Stage 🗷 L 🗆 M 🗆 H Dw 🗆 Tribs. 🗀
WATER
Temp. 7.2 pH 7.6 Cond. 0 Turb. □ T □ M □ L 区 C
COVER
COVER SWD LWD B G DP OV IV Total 15 % LWD N DIST NA
M O RIP H O LOGY
BED MATERIAL Dominant C Subdom: R DISTURBANCE O1 B1 B2 B3 D1 D2 D3
INDICATORS F F F F F F F F F F F F F F F F F F F
C1 C2 C3 C4 C5 S1 S2 S3 S4 S5
Pattern IR Islands N Coupling DC Confinement OC
REACH FEATURES
SITE FEATURES
NID Map Roll Frame UTM Commen NID # Type Ht. Lgth. No. No. (Zone/Easting/Northing)
3065 93L.033 F 25 19 24 25 m falls
resident of the second of the
TRIB C SC FC SWP/SLG FL/BV C

Accompanying Reach or Site Comments?

FDIS Reach/Site Summary	Reach # Site #
•	1 224
Watershed Code 460-600600-50800-00500-2830-503	88-000-000-000-000-0
WATERSHED	The state of the s
Gazetted Name Local Name	
ILP 1649 Map 93L.033 Reach# 1 Sample Typ	В
REACH ATTRIBUTES	
Length (km) 0.8 US Elev. Bars □ N ☒ DI ☒ PT □ CS □ JN □ MC □ D	M □ WD □ NV □ TR
DS Elev. Magnitude 2 Setting VW Riparian Veg. M	
Order 2 BGC Zone SBS Exposed/Eroded N Landuse	FR
SITE ATTRIBUTES	
Site # UTM(Zone/East/North/Method) Site Lg Access Fish Crd? Date	
224 100 H 🗵 1997/09/21	
CHANNEL	
Mean Channel Width (m) 2.2 Mean Wetted Width (m) 1.2 Mean Residual Pool Dep	oth (m) 0.2
Mean Gradient 8.3 Mean Wb Depth 0.2 No Vis.Ch ☐ In	termitten 🗔
Stage ⊠ L □ M □ H Dw □	Tribs. 🗔
WATER	Set and the set
WATER Temp. 5.5 pH 8.3 Cond. 10 Turb. □ T □ M □ L 図 C	
Temp. 5.5 pH 8.3 Cond. 10 Turb. ☐ T ☐ M ☐ L ☒ C	
Temp. 5.5 pH 8.3 Cond. 10 Turb. ☐ T ☐ M ☐ L ☑ C	DIST
Temp. 5.5 pH 8.3 Cond. 10 Turb. ☐ T ☐ M ☐ L ☒ C	DIST E
Temp. 5.5 pH 8.3 Cond. 10 Turb. T T M L L C C COVER SWD LWD B G DP OV V Total 25 % LWD F	DIST E
Temp. 5.5 pH 8.3 Cond. 10 Turb. □ T □ M □ L 区 COVER SWD WD B G DP OV IV Total 25 % LWD F M*O,R P.H.O/L O/G Y. BED MATERIAL Dominant G Subdom: C DISTURBANCE O1 B1 B2 B3	D1 D2 D3
Temp. 5.5 pH 8.3 Cond. 10 Turb.	D1 D2 D3
Temp. 5.5 pH 8.3 Cond. 10 Turb.	D1 D2 D3
Temp. 5.5 pH 8.3 Cond. 10 Turb.	D1 D2 D3 □ □ □ S2 S3 S4 S5
Temp. 5.5 pH 8.3 Cond. 10 Turb. □	D1 D2 D3 □ □ □ S2 S3 S4 S5 □ □ □ □
Temp. 5.5 pH 8.3 Cond. 10 Turb. T M L C C CO V E R COVER SWD WD B C DP OV V Total 25 % LWD F M O,R P.H O L O G Y BED MATERIAL Dominant G Subdom: C DISTURBANCE O1 B1 B2 B3 INDICATORS D D D D D D D Bars D X D X P D M D T D D D D D Pattern SI Islands N Coupling PC Confinement FC REACH FEATURES	D1 D2 D3 □ □ □ S2 S3 S4 S5 □ □ □ □
Temp. 5.5 pH 8.3 Cond. 10 Turb. T M L E C COVER SWP WD B G DP OV V Total 25 % LWD F 10 30 50 10	D1 D2 D3 □ □ □ S2 S3 S4 S5 □ □ □ □
Temp. 5.5 pH 8.3 Cond. 10 Turb. T M L C COVER SWD WD B C DP OV IV Total 25 % LWD F MORPHOLOGY BED MATERIAL Dominant G Subdom: C DISTURBANCE O1 B1 B2 B3 INDICATORS C DISTURBANCE O1 B1 B2 B3 INDICATORS C C C C C C C C REACH FEATURES NID Map Roll Frame UTM NID # Type Ht. Lgth. No. No. (Zone/Easting/Northing)	D1 D2 D3 □ □ □ S2 S3 S4 S5 □ □ □ □ Commen
Temp. 5.5 pH 8.3 Cond. 10 Turb. T M L E C COVER SWP WD B G DP OV V Total 25 % LWD F 10 30 50 10	D1 D2 D3 □ □ □ S2 S3 S4 S5 □ □ □ □ Commen
Temp. 5.5 pH 8.3 Cond. 10 Turb. T M L C COVER SWD WD B C DP OV IV Total 25 % LWD F MORPHOLOGY BED MATERIAL Dominant G Subdom: C DISTURBANCE O1 B1 B2 B3 INDICATORS C DISTURBANCE O1 B1 B2 B3 INDICATORS C C C C C C C C REACH FEATURES NID Map Roll Frame UTM NID # Type Ht. Lgth. No. No. (Zone/Easting/Northing)	D1 D2 D3 □ □ □ S2 S3 S4 S5 □ □ □ □ Commen

Accompanying Reach or Site Comments?

Announcement of the control of the c	Reach # Site #
FDIS Reach/Site Summary	1 225
Watershed Code 460-600600-50800-00500-2830-503	1-000-000-000-000-000-0
WA'TERSHED ESTA	
Gazetted Name Local Name	
ILP 1648 Map 93L.033 Reach # 1 Sample Typ	В
REACH ATTRIBUTES	
Length (km) 2.4 US Elev. Bars N N DI N PT CS D JN D MC D	M □ WD □ NV □ TR
DS Elev. Magnitude 1 Setting VW Riparian Veg. C	
Order 1 BGC Zone SBS Exposed/Eroded N Landuse	FR
SITE ATTRIBUTES	
Site # UTM(Zone/East/North/Method) Site Lg Access Fish Crd? Date 225	
CHANNEL TO STATE OF THE STATE O	
Mean Channel Width (m) 1.2 Mean Wetted Width (m) 0.9 Mean Residual Pool Dep	th (m) 0.2
Mean Gradient 42.5 Mean Wb Depth 0.2 No Vis.Ch Ini	termitten 🗔
Stage ⊠ L □ M □ H Dw □	Tribs. 🗔
. WA⊤ER	
Temp. 6.5 pH 8.1 Cond. 30 Turb. ☐ T ☐ M ☐ L ☑ C	
COVER	The Francisco (Francisco)
COVER SWD LWD B 6 DP QV IV Total 20 % LWD F 20 30 10 30 10	DIST E
MORPHOLOGY	
BED MATERIAL Dominant C Subdom: R DISTURBANCE O1 B1 B2 B3	D1 D2 D3
D95: 25 D (cm): 25 Morph CP INDICATORS D D D D	
C1 C2 C3 C4 C5 S1 S	S2 S3 S4 S5
Pattern SI Islands N Coupling PC Confinement FC	
REACH FEATURES	
S/LTE FEATURES NID Map Roll Frame UTM NID # Type Ht. Lgth. No. No. (Zone/Easting/Northing)	Commen
3066 93L.033 C 0.5 20 12 numerous cascades through	lower 50 m
The state of the s	
TRIB SC SC FC SWP/SLG FL/BV	

Accompanying Reach or Site Comments? □

FDIS Reach/Site Summary	Reach #	Site #
Watershed Code 460-600600-50800-00500-2830-486	1 37-000-000-000	226 -000-000-0
WAIT/ERSIHED.		
Gazetted Name Local Name		
ILP 1647 Map 93L.033 Reach # 1 Sample Typ	В	
REACH ATTRIBUTES		
Length (km) 0.8 US Elev. Bars ☒ N ☐ DI ☐ PT ☐ CS ☐ JN ☐ MC ☐ D	M □ WD □	NV 🗆 TR
DS Elev. Magnitude 1 Setting VW Riparian Veg. M		
Order 1 BGC Zone SBS Exposed/Eroded N Landuse	FR	
SITE ATTRIBUTES		er e
Site # UTM(Zone/East/North/Method) Site Lg Access Fish Crd? Date 226		
CHANNEL		
Mean Channel Width (m) 0.0 Mean Wetted Width (m) 0.0 Mean Residual Pool De	oth (m) 0.	0
Mean Gradient 0.0 Mean Wb Depth 0.0 No Vis.Ch ⊠ Ir	termitten 🗔	000 4 04
Stage □ L □ M □ H Dw □	Tribs. 🗔	
WATER:		
Temp. 6 pH 8.3 Cond. 20 Turb. □ T 🗷 M 🗆 L 🗀 C		
COVER		
COVER SWD LWD B C DP OV IV Total % LWD	DIST	
MORPHOLOGY .		
BED MATERIAL Dominant Subdom: DISTURBANCE O1 B1 B2 B3	D1 D2 D	3
D95: D (cm): Morph INDICATORS		
· · · · · · · · · · · · · · · · · · ·	S2 S3 S4 S	. 1
Pattern SI Islands Coupling Confinement UN	-4 64 51, 5	~!
REACH FEATURES		
SITE FEATURES		
FSZ		
TRIB SC FC SWP/SLG FL/BV		

Accompanying Reach or Site Comments?

SITE FEATURES

FL/BV

SECTION OF THE SECTIO

Accompanying Reach or Site Comments?

FC □

SWP/SLG

sc 🎞

TRIB 🗔

		Reach# Site#
FDIS Reach	/Site Summary	1 228
	Watershed Code 460-600600-50800-00500-2830-460	65-000-000-000-000-000-0
	WATERSHED	
Gazetted Name	Local Name	
ILP	1630 Map 93L.033 Reach # 1 Sample Typ	В
1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	REACH ATTRIBUTES	
Length (km)	.2 US Elev. Bars □ N 🗷 DI □ PT □ CS □ JN □ MC □ E	DM.□WD□NV□TR
DS Elev.	Magnitude 16 Setting VW Riparian Veg. M	
Order	3 BGC Zone SBS Exposed/Eroded N Landuse	FR
	SITE ATTRIBUTES	
	Zone/East/North/Method) Site Lg Access Fish Crd? Date	
228	100 H 🗷 1997/09/21	
	CHANNEL	
Mean Channel Wi	dth (m) 2.0 Mean Wetted Width (m) 1.2 Mean Residual Pool De	pth (m) 0.1
Mean Gradient	3.8 Mean Wb Depth 0.2 No Vis.Ch I	ntermitten 🗔
	Stage ISIL □ M □ H Dw □	Tribs. 🗀
	WATER	
Temp. 7.6	pH 8.2 Cond. 20 Turb. ☐ T ☐ M ☐ L 🕱 C	
	COVER	
COVER SWD	WD B C DP OV IV Total 20 % LWD 10 65 20 5	F DIST E
7 T	MORPHOLOGY .	
BED MATERIAL		D1 D2 D3
D95: 36	D (cm): 20 Morph RP INDICATORS	
	C1 C2 C3 C4 C5 S1	S2 S3 S4 S5
- 10		
Pattern SI	Islands N Coupling DC Confinement OC	
	Islands N Coupling DC Confinement OC REACH FEATURES	
Pattern SI	Islands N Coupling DC Confinement OC REACH FEATURES SITE FEATURES	
Pattern SI	Islands N Coupling DC Confinement OC REACH FEATURES SITE FEATURES ESZ	

Accompanying Reach or Site Comments ? \boxtimes

FDIS Reach/Site Summary			2 229
	Watershed Code	460-600600-50800-00500-2830-4	565-000-000-000-000-000-0
		SHED	
Gazetted Name	Local	Name	
ILP 1630 Map 93L	033 Reach #	2 Sample Typ	B
Section 1	REACHTATT	RIBUTES	
Length (km) 0,9 US Elev.	Bars ⊠ N □ C	DI 🗆 PT 🗆 CS 🗀 JN 🗆 MC 🗀	DM I WD I NV II TR
DS Elev. Magnitude 1	2 Setting V	W Riparian Veg. M	J
Order 3 BGC Zone SI	S Exposed/Erode	d N Landuse	NO
	/SITE ATTR	IBUTES	
Site # UTM(Zone/East/North/Method)	Site Lg Acce		
229] 100 H	1997/09/2	21
	CHANI	A STATE OF THE PARTY OF THE PAR	
Mean Channel Width (m) 1.2 Mear	Wetted Width (m)	0.9 Mean Residual Pool D	epth (m) 0.2
Mean Gradient 4.3 Mean Wb Dep	th 0.2	No Vis.Ch □	Intermitten. 🗔
Stage 🗵 L	Пм Пн	Dw □	Tribs. 🗖
	WATE	R	4.74
Temp. 7.9 pH 8.1 Cond.	10 Turb.	<u> ПТ ПМ 🗷 ГП</u> С	
	COVE	R.: 174-41	
COVER SWD LWD B G DP	OV IV	Total 20 % LWD	F DIST E
5 10 50 25	10	English committee for	Provided assettioned.
	MORPHO	LOGY	100
BED MATERIAL Dominant B Subdor			D1 D2 D3
D95: 50 D (cm): 35 Morph	CP INDICATO		
Bars 🗷 N 🖂 D 🖂 P 🖂 M 🖂 T		C1 C2 C3 C4 C5 S1	S2 S3 S4 S5
	<u> </u>	Confinement CO	
<u> </u>	REACH FE	I service services	
	SHTEXFEA		
NID Map Roll Fran	ne UTM		Commen
NID # Type Ht. Lgth. No. No. 3067 93L.033 F 3 20 23		at bottom of reach	
3067 93L.033 F 3 20 23		at some of roads	
	FSZ		
TRIB SC FC SWP/SLO	s□ FL/BV□		

Accompanying Reach or Site Comments ? \Box

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Reach #

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Accompanying Reach or Site Comments?

FL/BV 🗆

Reach #

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Accompanying Reach or Site Comments?

SWP/SLG

	Reach # Site #
FDIS Reach/Site Summary	1 232
Watershed Code 460-600600-50800-00500-2830-5720	-337-000-000-000-000-0
- WATERSHED	
Gazetted Name Local Name	
ILP 1702 Map 93L.033 Reach # 1 Sample Typ	В
REACH ATTRIBUTES	
Length (km) 0.7 US Elev. Bars ▼ N □ DI □ PT □ CS □ JN □ MC □ DN	ı □ wd □ nv □ TR
DS Elev. Magnitude 1 Setting VW Riparian Veg. C	
Order 1 BGC Zone SBS Exposed/Eroded N Landuse	FR
#SITE ATTRIBUTES	1.50 (1.53)
Site # UTM(Zone/East/North/Method) Site Lg Access Fish Crd? Date	
CHANNEL	
Mean Channel Width (m) 0.0 Mean Wetted Width (m) 0.0 Mean Residual Pool Dept	th (m) 0.0
	ermitten 🗔
Stage IL IM IH Dw I	Tribs. 🗆
WATER	
Temp. pH Cond. Turb. DT DM DL C	
SECTION COVER	
COVER SWD LWD B C DP OV V Total % LWD	DIST
MORPHOLOGY	100
BED MATERIAL Dominant Subdom: DISTURBANCE O1 B1 B2 B3	D1 D2 D3
D95: D (cm): Morph INDICATORS C1 C2 C3 C4 C5 S1 S	
Pattern Islands Coupling Confinement	المستخبر المستحدين المستحدين المستحدد المستحدد المستحدد المستحدد المستحدد المستحدد المستحدد المستحدد المستحدد
REACH FEATURES	
STATE STATE OF EATURES	
ACL CARGOS PROBESZOUS PROBLEM CONTROL	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
TRIB C SC FC SWP/SLG FL/BV	

Accompanying Reach or Site Comments?

FSZ

FL/BV 🗆

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Accompanying Reach or Site Comments?

FC □

sc 🗆

SWP/SLG 🗆

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TRIB 🗔

93L.033

APPENDIX VI FISH COLLECTION DATA FORMS

A. Location Referencing

Shea Creek **Gazetted Name** Watrshed Cod

(BCGS/NTS) Map # 093L023 Reach #3

460600600508000050028300000000000000000000 WBID # 0
Interim Locational ID: Project ID 06BABL308500011998
p # 093L023 Locational Point 1439

B. Survey Information

Fish Collection Permit 34770-20 Agenc C151 Survey Dat 1997/09/16 to 1997/09/16 **General Comments** Crew DL /EN/

C. Station Identification and Conditions

	Turb	
	Vis	
	Con	40
	Temp	10.9
	ina	
Contraction of the Contraction o	*	
	Method	Ш
	Site	208 EI

D. Fish Summary

10TP Site Meth # H/P Species Stage Age Tot # Min Lgth Max Lgth Fish Act 208 EF 1 1 CO F 10 40 78 R R	ļ			:				1				Color Control and	
EF 1 RB J 2 93 105 EF 1 1 CO F 10 40 78	anı	Site	Meth	#	Ì	Species	Stage	Age	#	Min Lath	Max Lath	Fish Act	
EF 1 1 CO F 10 40 78		208		۳-	-	RB	7		2	93	105	ĸ	
		208		۳-	Ψ-	8	ட		10	40	78	œ	

E. Gear Specifications

Site Meth # H/P D in T in D Out T Out EF Sec EF Lgth EF Wdth Encl Nt Typ Lgth Dpth Mesh IN Sz Set Hab Voit Freq Pul Make Model Amith-Rout Polvidar Polvidar		Model	POW-124
EF Wdth Enc! Nt Typ Lgth Dpth Mesh IN Sz Set Hab Volt Freq Pul		Make	Smith-Boot
Site Meth # H/P D In T In D Out T Out EF Sec EF Lgth EF Wdth Enc! Nt Typ Lgth Dpth Mesh IN Sz Set Hab V 208 EF 1 1 09/16 09/16 360 200 20 O		oft Freq Pul	- 00
Site Meth # H/P D In T In D Out T Out EF Sec EF Lgth EF Wdth Encl Nt Typ Lgth Dpth Mesh I 208 EF 1 1 09/16 09/16 360 200 20 O O		N Sz Set Hab V	
Site Meth # H/P D N T N D Out T Out EF Sec EF Lgth EF Wdth Encl Nt Typ Lgtl 208 EF 1 1 09/16 09/16 360 200 20 O		n Doth Mesh	
Site Meth # H/P D In T In D Out T Out EF Sec EF Lgth EF Wath E 208 EF 1 1 09/16 09/16 20 20 20	CARROLL TO THE STATE OF THE PROPERTY OF THE PR	ncl Nt Typ Lgtl	
Site Meth # H/P D T n D Out T Out EF Sec EF 208 EF 1 1 09/16 09/16 360 20	manufacture of the second of t	EF Wd	
Site Meth # H/P D In T In D Out T 0 208 EF 1 1 09/16 09/16		ut EF Sec EF L	
Site Meth # H/P D In T 208 EF 1 1 09/16 1		In DOut TO	09/16
Site Meth # 208 EF 1		H/P D In T	1 09/16
		Site Meth #	

Site Meth	# 	H/P	Species	Lath	Wat	Sex	Mat	Age Str	Age Smp # Age Vouch # Gen Str	Age	Vouch #	Gen Str	Gen Smp#	Comments	Roll	ŭ	
^=		-	8	45				*******									7
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208 EF	-	1	8	40	-	1	Σ							THE PROPERTY OF THE PROPERTY O	Calculation of the Control of the Co		
		-	8	78			Σ		Commence of Commence about a design of the commence of the com						Village of the Control of the Contro	-	<u> </u>
		,	8	28			≥						2	AND THE PROPERTY OF THE PROPER	The state of the s		_
		-	RB	93			Σ		TO A TOTAL TO THE PART AND THE			The state of the s		The second secon	Andrew Market State of the Angelon State of the State of	-	1
	1	-	00	25			Ξ	ļ	enterprotestation of premium carry a chain on the schamman color of many decimination and the	ŧ	The same of the sa		The same of the sa	and and the second common property of the second se	A VENEZATOR CONT. ACT CONTROL TO THE WORK OF THE WORK OF THE CONTROL TO CONTR	-	T
	-	•	RB	105	A PART OF THE PART		Ξ	and the same of th	AND	#	æ			A AND THE PROPERTY OF THE PROP	A CONTRACT OF THE PARTY OF THE	-	j
		-	8	64	The second secon	-	Σ	A CONTRACTOR OF THE PARTY OF TH	Marin Ville & North and we will be a Ville Marine (Wilderstein) was a second or or		Market Ma			The second secon		-	(
	-	-	8	49	The second secon	-	Σ	MATTER IN PLANTA AND AND AND AND AND AND AND AND AND AN	AND THE PERSON OF THE PERSON O		dimensional designation of the second			A CANADA A CAMBANA MANADA MANA	The second secon		1
	•	•	S	αV		Carlo and Carlo	M	Management to Automorphism concepts	And the control of th	-					With the state of		į

A. Location Referencing

Gazetted Name Unnamed

Project ID 06BABL308500011998 Locational Point 1561 460600600500500283037453180000000000000 WBID # 0 Interim Locational ID: Watrshed Cod Reach #1

(BCGS/NTS) Map # 93L.023

B. Survey Information

Fish Collection Permit 34770-20 Survey Dat 1997/09/18 to 1997/09/18 Agenc C151

General Comments Crew DL /EN/

C. Station Identification and Conditions

Site	Method	#	UTM Coordinates	Temp		Cou	Vis	Turb	š
209	Ш	·		6.2	4	0			Š

D. Fish Summary

Fish Act	æ	C	~
Max Lgth	120	94	51
Min Lgth		9	46
ot #	ţ	11	5
Age			
Stage	٧	7	ч
Species	20	2	20
H/P	Ļ	-	-
#	-	Ψ.	-
Meth	뮴	Ħ	EF
Site	209	209	209
Turb			

E. Gear Specifications

Model	TYPE VII
Make	Smith-Root
'n	5
F Lgth EF Wdth Encl Nt Typ Lgth Dpth Mesh IN Sz Set Hab Volt Freq Pul Make Model	9 09 009
gth Dpth Mesh	
Vdth Encl Nt Typ L	0 0
ாய	300 150
Site Meth # H/P D in T in D Out T Out EF Sec	09/18
H/P D In T	1 09/18
#	_
ite Meth	209 EF
S	7

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A. Location Referencing

Gazetted Name Shea Creek

Watrshed Cod 4606006005080000500283000000000000000000000 WBID # 0

Reach #24 Interim Locational ID: (BCGS/NTS) Map # 93L.033

Project ID 06BABL308500011998 Locational Point 1439

B. Survey Information

Survey Dat 1997/09/19 to 1997/09/19 Agenc C151

Crew DL /EN/ General Comments

Fish Collection Permit 34770-20

C. Station Identification and Conditions

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D. Fish Summary
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Max Lath		107	105
Min Lath	47		97
Tot#	-	-	7
Age			
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Species	CI	2	CT
H/P	-	-	-
#	1	-	-
Meth	EF	EF	핌
Site	210	210	210
Turb			

E. Gear Specifications

Model	TYPE VII
th EF Woth Encl Nt Typ Lgth Dpth Mesh IN Sz Set Hab Volt Freg Pul Make Model	Smith-Root
Hab Volt Fred Pul	600 60 5
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h Encl Nt Typ Lgth	0
. Lg	10 170 17
D Out T Out EF	09/19
Site Meth # H/P Din Tin Dout TOut EF Sec EF	1 1 09/19
Site Meth	210 EF

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	e	210	210	210	210
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A. Location Referencing

 Gazetted Name
 Unnamed
 Alias

 Watrshed Cod
 460600600508000050028305720509000000000000
 WBID # 0

Interim Locational ID: Project ID 06BABL308500011998

Locational Point 1703

B. Survey Information Survey Dat 1997/09/19 to

to 1997/09/19 Agenc C151 Fish Collection Permit 34770-20

C. Station Identification and Conditions

(BCGS/NTS) Map # 93L.033

Reach #1

 Site
 Method
 #
 UTM Coordinates
 Temp
 Con
 Vis

 216
 EF
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 7.6

D. Fish Summary

General Comments

Crew DL /EN/

H/P | Species | Stage | Age | Tot # | Min Lgth | Max Lgth | Fish Act * Site Meth 216 EF Turb

E. Gear Specifications

TYPE VII Model Smith-Root # H/P D in T in D Out T Out EF Sec EF Lgth EF Wdth Encl Nt Typ Lgth Dpth Mesh IN Sz Set Hab Volt Freq Pul 1 09/19 09/19 200 150 1.5 O 80 5 Site Meth 216 EF

F, Individual Fish Data

ቷ Roll Comments | H/P | Species | Lgth | Wgt | Sex | Mat | Age Str | Age Smp # | Age | Vouch # | Gen Str | Gen Smp # * Site Meth

A. Location Referencing

 Gazetted Name
 Unnamed
 Alius

 Watrshed Cod
 46060060050800005002830572000000000000000
 WBID # 0

 Reach # 3
 Interim Locational ID:
 Project ID 06BABL308500011998

 Locational Point 1697
 Locational Point 1697

B. Survey Information

Fish Collection Permit 34770-20 Survey Dat 1997/09/19 to 1997/09/19 Agenc C151 Crew DL /EN/

General Comments

C. Station Identification and Conditions

Site	Method	#	UTM Coordinates	Temp	င်္ပ	Vis	Turb
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D. Fish Summary

Fish Act		
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Min Lath		23
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Stage	r	ŗ
Species	CAS	RSC
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Site Meth # H/P	ם	Щ
Site	217	217
Turb		
Vis		
Con Vis Turb	40	

E. Gear Specifications

Model	TYPE VII
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一亩	600 200
Site Meth # H/P D in T in D Out T Out EF Sec	61/60
Thub	09/19
# H/P	1
Meth	<u>ш</u>
Site	217

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	Wgt			
	Lgth	65	35	23
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	Site	217	217	217

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Fish Data Collection Form

A. Location Referencing

Gazetted Name Unnamed

46060060050800005002830572028000000000000000 WBID# 0 Watrshed Cod Reach #1

Interim Locational ID: (BCGS/NTS) Map # 93L.033

Project ID 06BABL308500011998 Locational Point 1691

B. Survey Information

Fish Collection Permit 34770-20 to 1997/09/19 Agenc C151

General Comments

Survey Dat 1997/09/19

Crew DL /EN/

G. Station Identification and Conditions

Turb Vis Con 8 Temp UTM Coordinates # Method Н Site 218

HIP Species Stage Age Tot# Min Lgth Max Lgth Fish Act D. Fish Summary # Site Meth 218 EF

E. Gear Specifications

TYPE VII Model Smith-Root
 Site | Meth
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F. Individual Fish Data

냰 Roll Comments Wgt | Sex | Mat | Age Str | Age Smp # | Age | Vouch # | Gen Str | Gen Smp # # H/P Species Lgth Site | Meth 218 EF

A. Location Referencing

Gazetted Name Shea Creek

Watrshed Cod 46060060050800005002830000000000000000000 WBID # 0

Reach #20 Interim Locational ID: Project ID 06BABL308500011998

Reach #20 Interim Locationa (BCGS/NTS) Map # 93L.033

C. Station Identification and Conditions

Locational Point 1439

B. Survey Information

Survey Dat 1997/09/19 to 1997/09/19 Agenc C151 Crew DL /EN/ Fish Collection Permit. 34770-20

General Comments

Survey Dat 1997/0: Grew DL /EN/ D. Fish Summary

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Temp

UTM Coordinates

Site Method 219 EF

			A Committee of the Comm									
Vis	Turb	Site	Meth	#	H/P	Species Stage	Stage	Age	Tot#	Min Lath	Stage Age Tot # Min Lgth Max Lgth Fish Act	Fish Act
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E. Gear Specifications

Model	TYPE VII
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ite Meth # H/P D In T In D Out T Out EF Sec EF Lo	EF
Site	219

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A. Location Referencing

Gazetted Name Unnamed
Watrshed Cod 000-1758-000-000-000-000-0

000-1758-000-000-000-000-000-000-000-000-000 V Interim Locational ID: Project ID 06BABL30

)-000-000-000-000-000 WBID # 0 Project ID 06BABL308500011998 Locational Point 1758

B. Survey Information

Survey Dat 1997/09/20 to 1997/09/20 Agenc C151

Grew DL /EN/ Fish Collection Permit 34770-20

General Comments

Not in original study area.

C. Station Identification and Conditions

(BCGS/NTS) Map # 93L.033

Reach #1

Site	Method	*	UTM Coordinates	Temp	Con	Υis	Vis Turb
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D. Fish Summary

Fish Act	œ	R	8	æ
Max Lath	39	104	140	175
Min Lath		75		
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Species Stage	S	P	ದ	2
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#	-		-	-
Meth	EF	出	出	딤
Site	233	233	233	233
Turb				
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E. Gear Specifications

A CONTRACTOR OF THE CONTRACTOR	Model	TYPE VII
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	Meth	EF	齿	L H	H	出
	Site	233	233	233	233	233

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Fish Data Collection Form

A. Location Referencing

Gazetted Name Unnamed Watrshed Cod

460600600508000050028305907000000000000000000 WBID # 0 Interim Locational ID: Project ID 06BABL308500011998 Reach #3

(BCGS/NTS) Map # 93L.033

Locational Point 1717

B. Survey Information

Survey Dat 1997/09/20 Crew DL /EN/

General Comments

34770-20 to 1997/09/20 Agenc C151 Fish Collection Permit

C. Station Identification and Conditions

Site	Method	*	UTM Coord	linates Temp (Con	Con Vis Turb	Turb	Site
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D. Fish Summary

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E. Gear Specifications

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Fred Pul Make	Smith-Root
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Site	221

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A. Location Referencing

Gazetted Name Unnamed

4606006005080000500283055490000000000000000 WBID # 0
Interim Locational ID: Project ID 06BABL308500011998
0 # 93L.033
Locational Point 1654 Watrshed Cod Reach #1

(BCGS/NTS) Map # 93L.033

B. Survey Information

Survey Dat 1997/09/20 to 1997/09/20 Agenc C151

Crew DL /EN/ Fish Collection Permit 34770-20 General Comments

C. Station Identification and Conditions

D. Fish Summary

Vis	Turb	Site	Meth	#	H/P	Species	Stage	Age	Tot #	Min Lath	Min Lgth Max Lgth Fish Act	Fish Act	
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E. Gear Specifications

	Model	TYPE VII
	Make	Smith-Root
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And the second second second	Site	222	222	222	222	222

A. Location Referencing

Gazetted Name Unnamed

4606006005080000500283053140000000000000000 WBID # 0 Watrshed Cod

Locational Point 1659

B. Survey Information

Fish Collection Permit to 1997/09/20 Agenc C151 Survey Dat 1997/09/20 Crew DL /EN/

34770-20

General Comments

Project ID 06BABL308500011998 Interim Locational ID: (BCGS/NTS) Map # 93L.033 Reach #2

D. Fish Summary

Vis

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UTM Coordinates

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Method Ш

Site 223

G. Station Identification and Conditions

Species Stage Age Tot# Min Lgth Max Lgth Fish Act # H/P Site Meth 223 EF Turb

E. Gear Specifications

TYPE VII Model Smith-Root
 Site
 Meth
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 H/P
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 D Out
 T Out
 EF Sec
 EF Lgth
 Er Wdth
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F. Individual Fish Data

ቷ Roll Comments # H/P Species Lgth Wgt Sex Mat Age Str Age Smp# Age Vouch# Gen Str Gen Smp# Site Meth 223 EF

A. Location Referencing

460600600508000500283050380000000000000000 WBID # 0 Interim Locational ID: Project ID 06BABL308500011998 Gazetted Name Unnamed Watrshed Cod

(BCGS/NTS) Map # 93L.033 Reach #1

Locational Point 1649

B. Survey Information

to 1997/09/21 Agenc C151 Survey Dat 1997/09/21 General Comments Crew DL /EN/

Fish Collection Permit 34770-20

C. Station Identification and Conditions

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D. Fish Summary

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E. Gear Specifications

Model	TYPE VII
Make	Smith-Root
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Site Meth # H/P Din T	EF 1 1 09/21
Site	224

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Ē	Site Meth # H/P Species Lgth Wgt Sex Mat	7/4
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A. Location Referencing

Shea Creek Gazetted Name Watrshed Cod

Reach #16

(BCGS/NTS) Map # 93L.033

B. Survey Information

Survey Dat 1997/09/21 Crew DL /EN/

General Comments

Agenc C151 to 1997/09/21

Fish Collection Permit 34770-20

C. Station Identification and Conditions

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D. Fish Summary

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Turb	Site	Meth	#	H/P	Species	Stage	Age	Tot#	Min Lath	Max Lath	Fish Act	
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	227	EF	· V	-	ರ	7		-	The second secon	129	a	

E. Gear Specifications

	Model	TYPE VII
	Make	Smith-Root
	Lgth Dpth Mesh IN Sz Set Hab Volt Freq Pul	400 60 2
	Wdth Encl Nt Typ	13 0
	Out EF Sec EF L	09/21 300 200
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	Site Meth # H/P Din T	7 EF 1 1 09/2
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Gen Smo # Comments Roll	NAME OF THE PARTY		THE CONTROL OF THE PROPERTY OF		The second secon	TO THE POST OF THE	THE PROPERTY OF THE PROPERTY O		
Age Smp # Age Vouch # Gen Str Gen Smp #							Water Control of the	And the second s	THE PROPERTY OF THE PROPERTY O
Gen Str						The state of the s	The property with the party with the	and an experimental and an experimental and the state of	management of the control of the con
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Age Str			-		Common of the co		-		
Sex Mat	≧	Σ	≊	≊	Ξ	Ξ	Ξ	Σ	N
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Meth #	EF 1	臣	日	EF 1	EF 1	EF 1	田	EF 1	臣
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A. Location Referencing

Gazetted Name Unnamed Watrshed Cod

4606006005080000500283046650000000000000000 WBID# 0 Interim Locational ID:

Project ID 06BABL308500011998 Locational Point 1630

B. Survey Information

Fish Collection Permit 34770-20 General Comments

Survey Dat 1997/09/21 to 1997/09/21 Agenc C151 Crew DL /EN/

C. Station Identification and Conditions

(BCGS/NTS) Map # 93L.033

Reach #1

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D. Fish Summary
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Fish Act	œ	œ	œ
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Min	74	97	37
Tot #	Ψ-	-	_
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Stage	_	7	ΙL
Species	Δ	占	占
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Meth #	田 上	F	EF 1
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E. Gear Specifications

Model	POW-12A
Make	Smith-Root
Set Hab Voit Fred Pul Make Make	500 60 2
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Site Meth # 14/P D in T in D Out T Out EF Sec EF Lgth EF Wdth Enc Nt Typ Lgth Dpth	2 0
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Site M	228 EF

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A. Location Referencing

4606006005080000500283046650000000000000000 WBID # 0 Gazetted Name Unnamed Watrshed Cod

Interim Locational ID: (BCGS/NTS) Map # 93L,033 Reach #2

Project ID 06BABL308500011998 Locational Point 1630

B. Survey Information

General Comments Crew DL /EN/

Survey Dat 1997/09/21

Fish Collection Permit 34770-20 to 1997/09/21 Agenc C151

C. Station Identification and Conditions

D. Fish Summary

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#	UTM Coordinates	Temp	Con	Vis	Turb	Site	Meth	#	Η	Species	Stade	Age	Tot #	Min Lath	Max L	ath Fi	sh Act
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E. Gear Specificati

Model	TYPE VII
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red	99
Set Hab Volt F	200
h Mesh IN Sz	MATERIAL STATES
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T Out EF Se	187
T In DOut	09/21
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Site Meth # H/P Din Tin Dout Tout EF Sec EF Lgth	229 EF

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	Site	229

A. Location Referencing

Gazetted Name Unnamed Watrshed Cod

Reach #1

(BCGS/NTS) Map # 93L.033

4606006005008000500283046610000000000000000 WBID # 0 Interim Locational ID: Project ID 06BABL308500011998 p # 93L.033 Locational Point 1622

B. Survey Information

to 1997/09/21 Agenc C151 Survey Dat 1997/09/21 Crew DL /EN/

Fish Collection Permit 34770-20

General Comments

C. Station Identification and Conditions

Site	Method	#	UTM Coordinates	Temp	Con	Vis	Turb
230	出	-		7.9	30		

D, Fish Summary

	we	
Fish Act	œ	~
Vis Turb Site Meth # H/P Species Stage Age Tot # Min Lgth Max Lgth Fish Act	109	
Min Lgth	73	87
Tot #	2	-
Age		
Stage	ſ	-
Species	20	ರ
H/P	-	-
#	-	-
Meth	EF	EF
Site	230	230
Turb		
Vis		

E. Gear Specifications

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	Lgth Dpth	
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	EF LC	100
	Out TOut EF Sec EF Lgth	260
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	Site Meth # H/P	-
	#	1
	Meth	230 EF
	Site	230

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TO COURT BY MAN AND AND ADDRESS OF THE PARTY	te F	****		
	ŝ	230	230	230

A. Location Referencing

46060060050800005002830452400000000000000000 WBID # 0 Gazetted Name Unnamed Watrshed Cod

Interim Locational ID: Reach #1

(BCGS/NTS) Map # 93L.033

Project ID 06BABL308500011998 Locational Point 1709

B. Survey Information

Fish Collection Permit 34770-20 Survey Dat 1997/09/21 Crew DL /EN/

to 1997/09/21 Agenc C151

General Comments

C. Station Identification and Conditions

	Turb	
	Vis	- Charles
	Con	10
	Temp	8
	UTM Coordinates	
	#	-
- 5	Method	ш
	Site	231

D. Fish Summary

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Fish A	œ	œ
Max Lgth	109	29
Min Lath	92	41
Tot #	5	7
Age		
Stage	٦	ட
Species	20	2
H/P	~	Ψ.
# ±	-	-
Meth	EF	EF
Site	231	231
Turb		

E. Gear Specifications

	Model	TYPE VII
	Make	Smith-Root
West and the second	l Pul	2
STATE OF THE PERSON NAMED IN	Freq P	0
		500 60
Section 1	Hab Volt	20
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	gth Dpth Mesh IN Sz So	
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Water State of the	incl	0
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A CONTRACTOR	EF Wdt	က
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A CONTRACTOR AND A CONT		
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Secretary sections	n Th	MIT 71.7
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Charles No day	#	~
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Str Age Smp# Age Vouch # Gen Str Gen Smp# Comments Roll Fr	Toronto and the state of the st						
Gen Smp #	T Victoria	CONTRACT THE COUNTY AND ADVANCE AND ADVANCE AND ADVANCED AS A CONTRACT AS A					
Gen Str							
Vouch #						O COLONIA DE LA	
Age							
Str Age Smp # Age Vouch # Gen Str Gen Smp							
Sex Mat Age Str						Σ	
Wgt							
Lgth	29	86	76	109	83	41	94
Species	Ճ	ል	2	2	ձ	ձ	2
H/P	,		-	-	-	-	-
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Meth	Ш	Ш	Щ	in T	ᇤ	Ľ.	Ш
Site	231	231	231	231	231	231	231

A. Location Referencing

Gazetted Name Unnamed

406600600508000050028302968000000000000000000 WBID # 0 Interim Locational ID: Watrshed Cod

(BCGS/NTS) Map # 93L.023

Project ID 06BABL308500011998

B. Survey Information

Fish Collection Permit to 1997/09/18 Agenc C151 Survey Dat 1997/09/18 Crew ST /TW/

34770-20

Locational Point 1595

General Comments

C. Station Identification and Conditions

Site Method	Method	#	UTM Coordinates	Temp (. ~	Vis	n Vis Turb	Site
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D. Fish Summary

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Turb	Site	Meth	#	Η/P	Species	Stage	Age	Tot #	Min Lath	Max Lgth	Fish Act
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	93	Ш	-	-	ნ	7		က	22	95	œ

E. Gear Specifications

Model	POW-12A
	Smith-Root
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EF Wath Enc Nt Typ Lgth Dpth Mesh	
n EF Wdth Enc	0
Din Tin DOut TOut EF Sec EF Lgtt	550 150
D Out T Out	09/18
# H/P Din Tin	1 1 09/18
Weth	出
Site	83

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	Roll			The second secon			-	The state of the s	ACTION OF PERSONS ASSESSED.
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	Vouch #		A						
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	Age Smp #								
A Landard Concessor Space Authority	Age Str								,
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000000000000000000000000000000000000000	Sex				ngen ge				
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and the state of the state of	Site	93	93	93	93	93	83	93	8
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A. Location Referencing

46060060050800005002830289500000000000000000 WBID# 0 Gazetted Name Unnamed Watrshed Cod

Interim Locational ID: (BCGS/NTS) Map # 93L.023 Reach #1

Project ID 06BABL308500011998 Locational Point 1606

B. Survey Information

Fish Collection Permit 34770-20 Agenc C151 to 1997/09/19 Survey Dat 1997/09/19

Crew ST /TW/

General Comments no fish above the barrier

C. Station Identification and Conditions

Method		UTM Coordinates	Temp	Con	Vis	Turb	Site
EF 1	1		6.5	30			95

D. Fish Summary

Fish Act	R	œ
Max Lgth		
H/P Species Stage Age Tot # Min Lgth Max Lgth Fish Act	45	80
Tot#	-	
Age		
Stage	Ü.	٦
Species	တ	8
H/P	-	Ţ
#	<u>.</u>	Ψ-
Meth	EF	EF
Site	95	92
Turb		
Vis		
Con	30	

E. Gear Specifications

Model	POW-12A
Make Model.	Smith-Root
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h IN Sz Set Hab Volt Freq P	
opth Mes	
EF Wdth Encl Nt Typ Lgth C	0
Sec EF Lgth EF	262 150
D Out T Out EF	09/19
Site Meth # H/P D ln T ln	09/19
# H/P	+
Site Meth	95 EF

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	Site	95	95 EF
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20 Page

A. Location Referencing

Gazetted Name Unnamed

4606006005080000500283032660000000000000000 WBID # 0 Watrshed Cod

Interim Locational ID: (BCGS/NTS) Map # 93L,023 Reach #1

Project ID 06BABL308500011998 Locational Point 1480

B. Survey Information

Fish Collection Permit 34770-20 Agenc C151 to 1997/09/19 Crew TW /ST/

Survey Dat 1997/09/19

General Comments

C. Station Identification and Conditions

Site	Method	*	UTM Coordinates	Temp	Con	Vis	Turb	Site
98	Ш	~		7	30			86

D. Fish Summary

Fish Act	
Max Lath	
Min Lath	
re Tot #	
Stage Ac	
Species	
HP	
#	1
Meth	EF
Site	86
Turb	
Vis	
Con	99

E. Gear Specifications

Model	POW-12A
Make	Smith-Root
t Hab Volt Fred Pul Make Model	500 60 6
yp Lgth Dpth Mesh IN Sz Se	
/dth Encl Nt T	2 0
Out EF Sec EF Lgth EF W	282 100
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Li.	Site	88

A. Location Referencing

46060060050800005002830345200000000000000000 WBID # 0
Interim Locational ID: Project ID 06BABL308500011998
p # 93L.023
Locational Point 1572 Gazetted Name Unnamed Watrshed Cod Reach #1

(BCGS/NTS) Map # 93L,023

B. Survey Information

Fish Collection Permit 34770-20 Survey Dat 1997/09/19 Crew ST/TW/ General Comments

Agenc C151 to 1997/09/19

G. Station Identification and Conditions

Site	Method	#	U M Coordinates	lemp	פ	NIS.	ını
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D. Fish Summary

Fish Act	œ	œ	œ	œ	œ
Max Lgth	65	09	130	8	89
Min Lgth				- 80	45
Tot#	1	-	- -	4	5
Age					
Stage	ŗ	7	∢	7	ட
Species	CT	2	Ճ	8	පි
H/P	τ-	,	-	-	1
#	-	-	٦	γ	-
Meth	EF	ш	出	出	出
Site	66	66	66	66	66
Turb					
	-22				

E. Gear Specifications

Model	POW-12A
n EF Wdth Enc Nt Typ Lgth Dpth Mesh IN Sz Set Hab Volt Fred Pul Make Model	Smith-Root
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eq P	0
t Fr	9 (
Vol	09
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Meth # H/P D in T in D Out T Out EF Sec EF Lgth	4
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Site	8

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Roll														J. 144			
Comments																	
Gen Smp #																	
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Nouch #																	
Age Smp # Age Vouch # Gen Str																	
Age Str		**************************************													e table n	, A	
Sex Mat	≧	Σ	≥	≥	Σ	Σ	≊	≅	Σ	Σ	≅	≅	2	Σ	Σ	Ξ	1
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Lgth	45	52	20	65	22	50	55	90	80	85	රි	40	8	20	85	55	007
Species	8	8	පි	ธ	8	8	8	8	ဝ	8	8	8	2	8	8	8	Ĉ
H/P	***	~	r	-	-	-	-	-	-	-	-	-	Υ	-	-	-	•
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Fish Collection Permit 34770-20 to 1997/09/19 Agenc C151 B. Survey Information Survey Dat 1997/09/19 General Comments Crew TW/ST/ Project ID 06BABL308500011998 46060060050800005002830279800000000000000000 WBID # 0 Locational Point 1469 Interim Locational ID: A. Location Referencing (BCGS/NTS) Map # 93L.023 Gazetted Name Unnamed Watrshed God Reach #2

C. Station Identification and Conditions

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Stage | Age | Tot # | Min Lgth | Max Lgth | Fish Act

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F Roll Comments # H/P Species Lgth Wgt Sex Mat Age Str Age Smp # Age Vouch # Gen Str Gen Smp # F. Individual Fish Data Site Meth

A. Location Referencing

Gazetted Name Unnamed Watrshed Cod

(BCGS/NTS) Map # 93L.023 Reach #3

B. Survey Information

Fish Collection Permit 34770-20 to 1997/09/19 Agenc C151 Survey Dat 1997/09/19 Crew TW /ST/

General Comments

460600600508000500283027150000000000000000 WBID # 0
Interim Locational ID: Project ID 06BABL308500011998

1 93L.023 Locational Point 1468

C. Station Identification and Conditions

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D. Fish Summary

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E. Gear Specifications

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Site Meth # H	102 EF 1

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A. Location Referencing

Gazetted Name Unnamed

460600600508000050028302968540000000000000000 WBID # 0 Watrshed Cod Reach #1

(BCGS/NTS) Map # 93L.023

Interim Locational ID:

Project ID 06BABL308500011998 Locational Point 1597

B. Survey Information

34770-20 Fish Collection Permit to 1997/09/20 Agenc C151 Survey Dat 1997/09/20 Crew TW/ST/

General Comments

fished mainstem (1588)and confluence(1597) likely acessible in spring

C. Station Identification and Conditions

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D. Fish Summary

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E. Gear Specifications

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A. Location Referencing

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Interim Locational ID: (BCGS/NTS) Map # 93L.023 Reach #1

Project ID 06BABL308500011998 Locational Point 1488

B. Survey Information

Fish Collection Permit 34770-20 to 1997/09/20 Agenc C151 Survey Dat 1997/09/20 Crew TW/ST/

General Comments no fish after 30 m

Tot # Min Lgth Max Lgth Stage Age Species $^{\circ}$ # H/P Site Meth Turb Vis Con 4 Temp **UTM Coordinates** C. Station Identification and Conditions ** Method ΕE Site 108

D. Fish Summary

Fish Act

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A. Location Referencing

Gazetted Name Unnamed

46060060050050005002830296850700000000000000 WBID# 0 Interim Locational ID: Watrshed Cod Reach #1

(BCGS/NTS) Map # 93L.023

Project ID 06BABL308500011998

Locational Point 1596

B. Survey Information

to 1997/09/20 Agenc C151 Survey Dat 1997/09/20 Crew ST//tw/

General Comments

34770-20 Fish Collection Permit

C. Station Identification and Conditions

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D. Fish Summary

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E. Gear Specifications

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Fish Data Collection Form

A. Location Referencing

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Interim Locational ID: (BCGS/NTS) Map # 93L.023 Reach #2

Project ID 06BABL08500011998 Locational Point 1593

B. Survey Information

Fish Collection Permit to 1997/09/20 Agenc C151 Survey Dat 1997/09/20 Crew St//tw/

34770-20

General Comments

recommend spring sampling

C. Station Identification and Conditions

D. Fish Summary

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A. Location Referencing

Gazetted Name Unnamed Watrshed Cod

Reach #1

Project ID 06BABL308500011998

B. Survey Information

Fish Collection Permit to 1997/09/20 Agenc C151 Survey Dat 1997/09/20

34770-20

General Comments Crew ST /TW/

406600600500200005002830374517700000000000000 WBID # 0 Locational Point 1558 Interim Locational ID: (BCGS/NTS) Map # 93L.023 D. Fish Summary

Temp

UTM Coordinates

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Method Щ

Site 111

C. Station Identification and Conditions

H/P Species Stage Age Tot # Min Lgth Max Lgth Fish Act Site Meth Turb Vis Con 70

E. Gear Specifications

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A. Location Referencing

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Interim Locational ID: (BCGS/NTS) Map # 93L,023 C. Station Identification and Conditions

Project ID 06BABL308500011998 Locational Point 1648

B. Survey Information

Fish Collection Permit to 1997/09/21 Agenc C151 General Comments Crew DL//EN/

34770-20

Survey Dat 1997/09/21

D. Fish Summary

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APPENDIX VII

PHOTODOCUMENTATION FORMS AND THUMBNAIL PHOTOGRAPHS

PHOTO SURVEY FORM 1 - EQUIPMENT DETAILS

Survey start date:

97/08/29

Agency Triton
Crew: ST/TW

Survey end date:

97/09/21

DL/EN

CAMERA#1

Make & Model:	Canon Sureshot A1		Lense	s: A
Format:	135mm film Other film:	N/A	Digital	Still Video
Resolution (for d	igital and video cameras):	N/A		
Output file type (for digital and video came	ras):	N/A	

CAMERA #2

Make & Model:	Ricoh RW1			Lenses	: A	
Format:	135mm film	Other film:	N/A	Digital	Still Video	
Resolution (for d	igital and vide	o cameras):	N/A			
Output file type (for digital and	video camer	as):	N/A		

LENSES

Focal length (mm)	Focal length (mm)
A Standard	D
В	E
С	F

ROLL AND/OR BATCH DETAILS

Rol# or	Camera	Output	For film cameras:	
Batch#	#	medium	Film type	ISO
1	1	slides	colour	400
2	1	slides	colour	400
3	1	slides	colour	400
4	1	slides	colour	400
5	1	slides	colour	400
6	1	slides	colour	400
7	1	slides	colour	400
8	1	slides	colour	400
9	1	slides	colour	400
10	1	slides	colour	400
11	2	slides	colour	400
12	2	slides	colour	400
13	2	slides	colour	400
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77 01	712	460-600600-50800-00500-2830-5720-682	25		<u> </u>	27	T.S.	· ^_	analogo benara	070 01

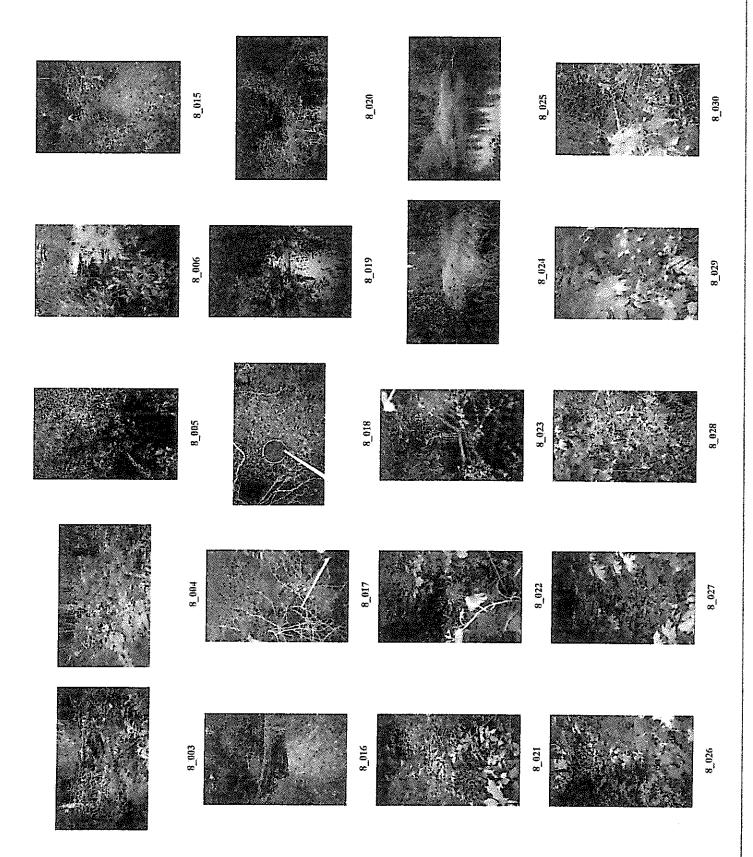
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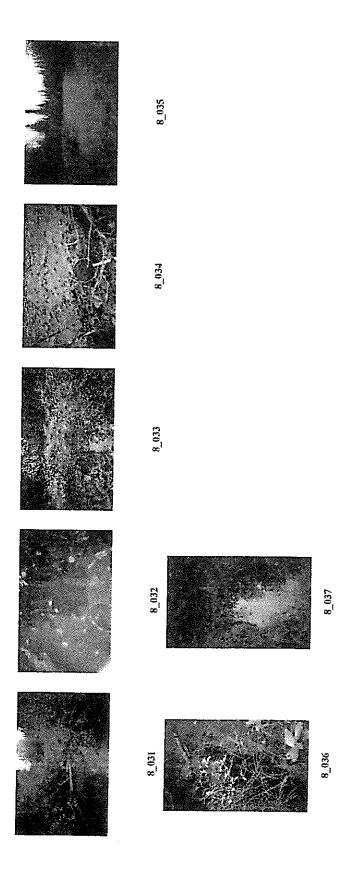
					1001	יייקטי יי מנייזונים בסמכי דטט-טעמעט-טעסטרטטטטטטטטטטטטטטטטטטטטטטטטטטטטטטטט	-00000-00	0.50	Z
<u>ا</u>		Site #	Reach #	Roll#	Frame#	Focal Lgh	Direction	on Comments	CD Image #
8691		2.13	_	8	28	ST		dry vegetated channel - note had material	000 01
8691		213	_	8	29	ST	⊃	drychannel - alluvium mesent	10,020
669		214	_	∞	30	ST		RMA flaveed area	16_029
6691		214	_	<u>∞</u>	3	ST	Q	no Visible channel	10,030
-1		215	-	<u>8</u>	32	ST	ח	very little flow	160_01
1714		215	-	18	33	ST	Ω	minimal flow	18 032
1703		216	-	81	34	ST		substitute flow	10 033
1703		216		81	35	ST	=	pravels and minimal flow	18_034
1703	460-600600-50800-00500-2830-5720-509	216	<u></u>	<u>×</u>	36	ST	0	I.W. and smaching channel	18 035
439	460-600600-50800-00500-2830	217	12	61	-	TS	=	instream vecelation wetland	18 036
1136		217	12	6	. 2	15) C	instream vegetation door shound	100 61
169	460-600600-50800-00500-2830-5720-280	218	_	161	۳).	LS	1 =	houlder/ riffle	700 61
1691	460-600600-50800-00500-2830-5720-280	218	-	61	ব	ST	0	I WD	500 61
169		218	-	51	۲C	SL	=	Creek Channel with overhanding seasons	19,004
681	460-600600-50800-00500-2830	219	30	5	و	S.	.=	loo lam and tenied offis	500 63
1439		219	20	61	r,	ST) C	riffle and Dave	900 61
8:9	460-600600-50800-00500-2830-4665-698	220		-61	- 00	ST	1 =	no 50 % 60 m off maintain	/00_61
638		220	++**	6:1	6	ST	ı, ⊐	nool fed by subsurface flow	800 61
838		220	_	6	10	ST		Daye dayen stone	600 61
1130		210	54	<u>c</u>	=	ST	_ >	riffle with faree boulders	010,281
436	•	210	24	61	12	ST	×	eroding bank on left hank	10 01
65		240	15 <u>C</u>	16	<u>:</u>	ST	۵	LWD and boulders	210_01
1436		210	24	61	4	ST	Ď	LWD accumulation	510 61
7.00	460-600600-50800-00500-2830-6320	233		61	15	ST	×	eroding left bank	10_014
1758	•	233		61	91	ST	n	failed bank, LWD, Cascade	210_01
758		233		61	17	ST	Q	Dave, riffle-pool habitat	12_010
7 7	460-600600-50800-00500-2830-5907	221	'n	61	18	ST	Q	gradient = 24 %	810 01
717	460-606600-50800-00500-2830-5907	221	ιn	61	16	ST	Ω	towards headwater meadow	10.010
702	460-600600-50800-00500-2830-5720-337	232	JF-11	61	20	ST	Þ	wer area - channel	10 01
702	460-600600-50800-00500-2830-5720-337	232		16	21	ST	_	wet area ~ feeding	0.20_01
707	460-600600-50800-00500-2830-5720-337	232		6.1	22	ST	Ð.	wet area	150_61
559	460-600600-50800-00500-2830-5549	222		6]	23	ST)	small pool aveascade	19,022
1034	460-600600-50800-00500-2830-5549	222	7	61	24	ST	Ω	wd and cobble in channel	19 074
6:0	460-600600-50800-00500-2830-5314	223	7	61	25	ST)	falls	19 025
609	460-600600-50800-00500-2830-5314	223	CI	61	26	ST	D	riparian vegetation	920_01
600	460-600600-50800-00500-2830-5314	223	CI	19	27	ST	Q	channel meandering through mossy boulders	720_61
n/a	n/a	n/a	n/a	61	28	ST	Ω	downstream view from creek CL	19 028
n/a	1)/a	n/a	u/u	61	30	ST	>	from 1 B to P B /5502 close on D D	70
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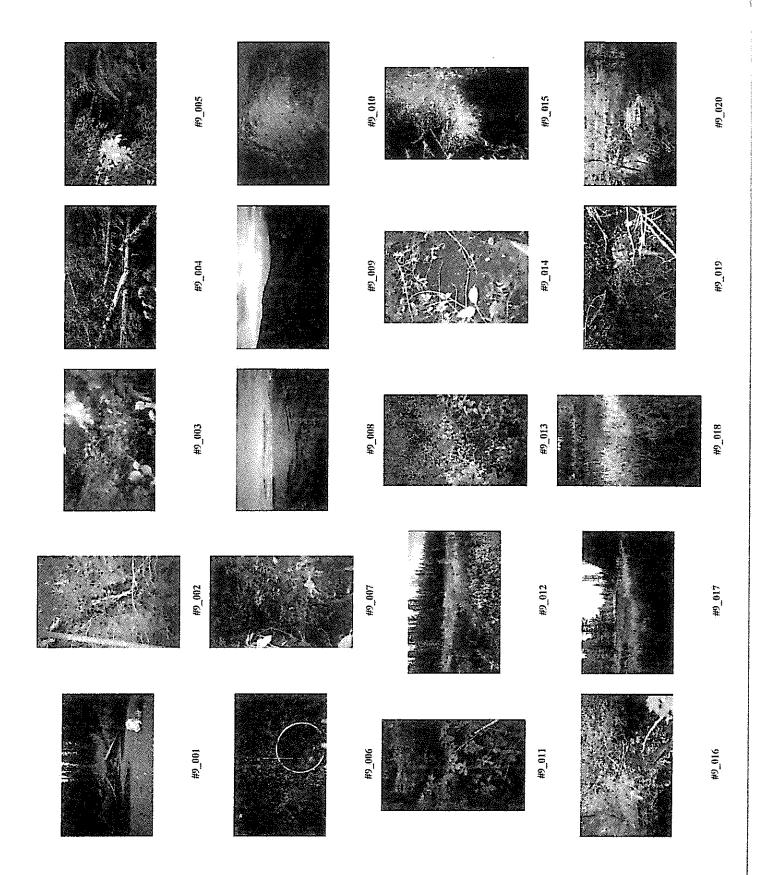
Triton Environmental Consultants Ltd.

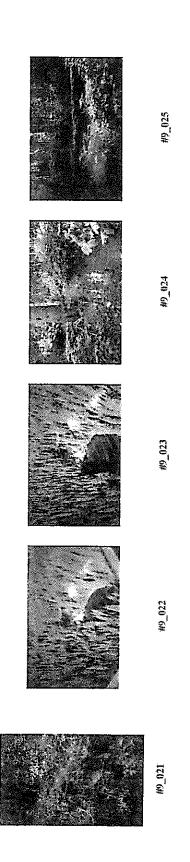
			: May		111	mile mentance code, too-doodoor-pool-bol-bol-	7-00-00-0		
ILP.	WSC	Site #	Reach #	Roll#	Frame#	Focal Lgh	Direction	Comments	CD Image#
n/a	in/a	n/a	n/a:	61	31	ST		uostream view from creek Cl	10 031
n/a	n/a	n/a	п/а	61	32	ST	Ω	DS view from creek CL.	10 03
n/a	n/a	n/a	11/a	61	33	ST	Д	from CL to edge of right of way	10 033
n/a	n/a	n/a	n/a	61	34	ST	Ω	upstream view from creek CL	19 034
ii/a	n/a	n/a	n/a	61	35	ST	Δ	downstream view from creek Cl	10 03
n/a	11/3	ភ/ព	n/a	61	36	ST	×	right of way	19 035
n/a	11/a	n/a	n/a	20	_	ST)	cascades and LWD	100.00
n/a	n/a	п/а	n/a	20	7	ST	Ω	cascades and LWD.	20 003
6+91	n/a	n/a	n/a	20	m	ST	Ω	heavy alder cover/cascades	20 007
1649	n/a	<u>n/n</u>	n/a	20	4	ST	n	heavy alder cover/cascades	20 02
	n/a	n/a	n/a	20	S	ST		salmonberry	20 004
	460-600600-50800-00500-2830-5038	224	- .	20	9	ST	n	(alls 1m 50 upstream of mainstem (Shea)	200 OC
	460-600600-50800-00500-2830-5038	224	_	20	7	ST	Ω	cascade pool habitat downstream from falls	20 002
	460-600600-50800-00500-2830-5038	224	-	20	99	ST	ב	small cascade 10 m upstream from mainstem (0,3M)	20 008
~	460-600600-50800-00500-2830-5038	224	-	20	6	ST	Q	connection to mainstern accessible to fish	20 00
n/a	11/3	n/a		20	01	ST	n	upstream view - travel to sample site	20_010
	n/a	n/a	-	20	=	ST	×	bank view - travel to sample site	110.00
	460-600600-50800-00500-2830-5031	225		20	12	ST	1	Dave up steen slope from coofficers	110_02 CIO OC
	460-600600:50800-00500-2830-5031	225	_	20	13	ST	- Ω	confluence	10 OC
	460-600600-50800-00500-2830-4887	226		20	<u> </u>	ST		30 m unstraint of main creek coenes offschannel bakina	07 OC
	460-600600-50800-00500-2830-4887	226		20	15	ST		dry channel	20 05
	460-600600-50800-00500-2830	227	je 9j	50	16	ST	D	gravel bar typical riffle	210_00
	460-600600-50800-00500-2830	227	16	20	17	ST	Ω	boulder barff.WD typical in reach	20 000
	460-600600-50800-00500-2830-4665	228	_	20	18	ST	Ω	confluence with mainstem	410 02
	460-600600-50800-00500-2830-4665	228	_	20	6	ST	Ω	cobble riffle. Dave's boot	20 018
	460-600600-50800-00500-2830-4665	228	_	20	20	ST	Ω	straight high bank, cobble/riffle	20_02
	460-600600-50800-00500-2830-4665	229	2	20	21	ST	Ω	cobble/boulder riffle tynical of reach	100.05
	460-600600-50800-00500-2830-4665	229	7.	20	22	ST	Ω	riparian vegetation, cobble/riffle	20_021
	460-600600-50800-00500-2830-4665	229	61	20	23	ST	Ω	barrier = waterfall	220_02
-	460-600600-50800-00500-2830-4661	230	_	20	24	ST	Ω	eroded bank	20_02
	460-600600-50800-00500-2830-4661	230	-	20	25	ST)	boulder riffle and riparian venetation	20 02 20 0C
	460-600,600-50800-00,500-2830-4524	231	_	20	56	ST	. 1	channel dewaters at 75 m	20.02 20.05
	460-600600-50800-00500-2830-4524	231	-	20	27	ST	Ω	cascade over LWD	20_020
_	460-600600-50800-00500-2830-4524	231	-	20	28	ST	Ü	cascade over LWD	20_02
n/a	n/a	n/a	n/a	20	52	ST	i	DL/EN hamming it up for the folks back home	20 00
n/a	n/a	n/a	n/a	20	30	ST	i	acrial - glacier	20 030
n/a	i)/a	n/a	n/a	20	31	ST	ļ	aerial - glacier	20 031
n/a	n/a	n/a	n/a	20	32	ST		aeriai - glacier	20 03

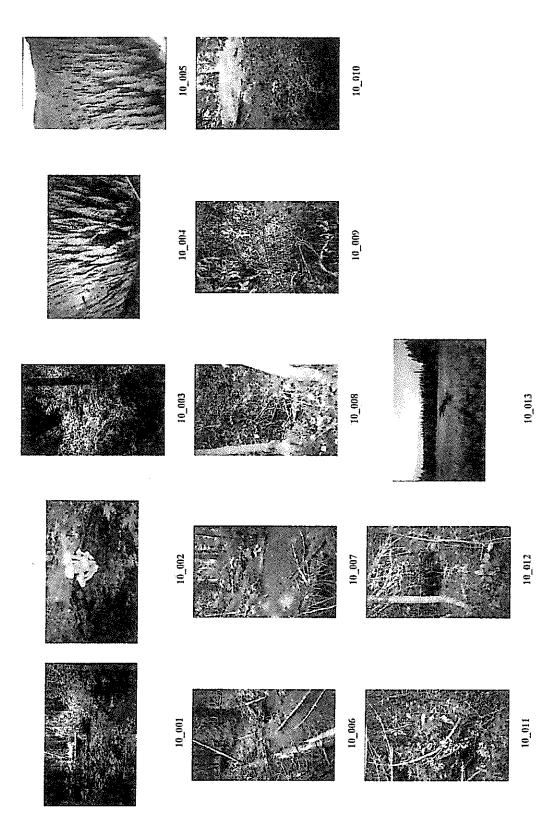
Triton Environmental Consultants Ltd.

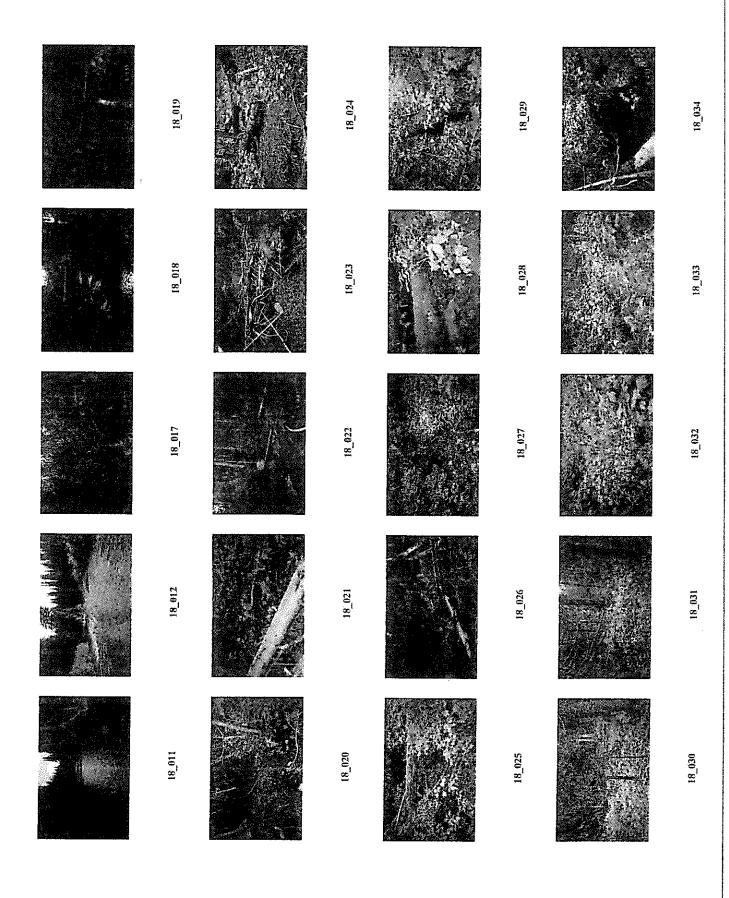










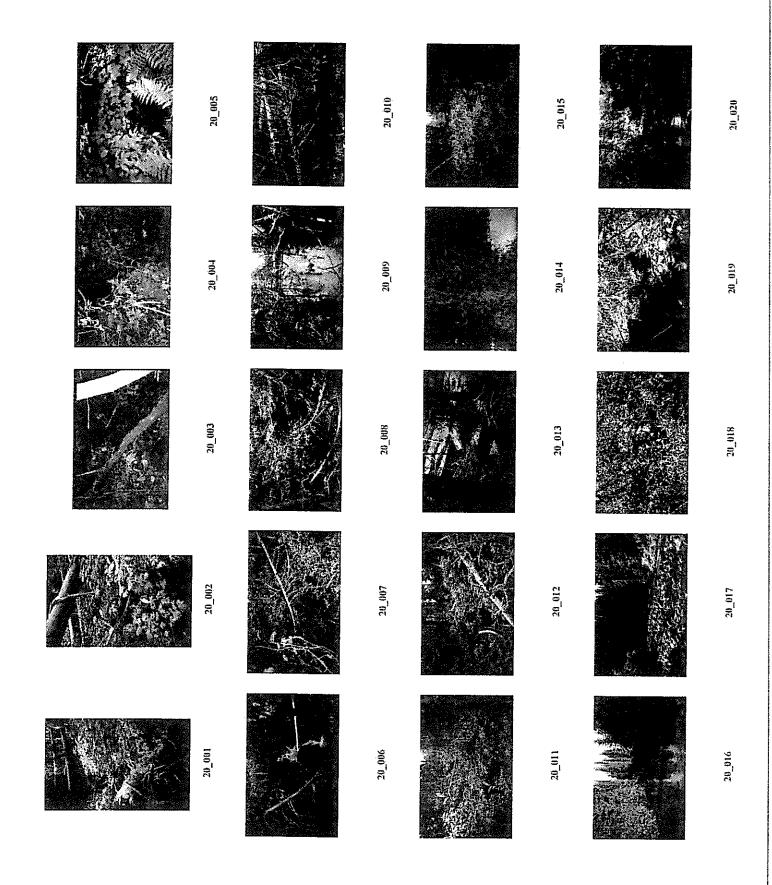


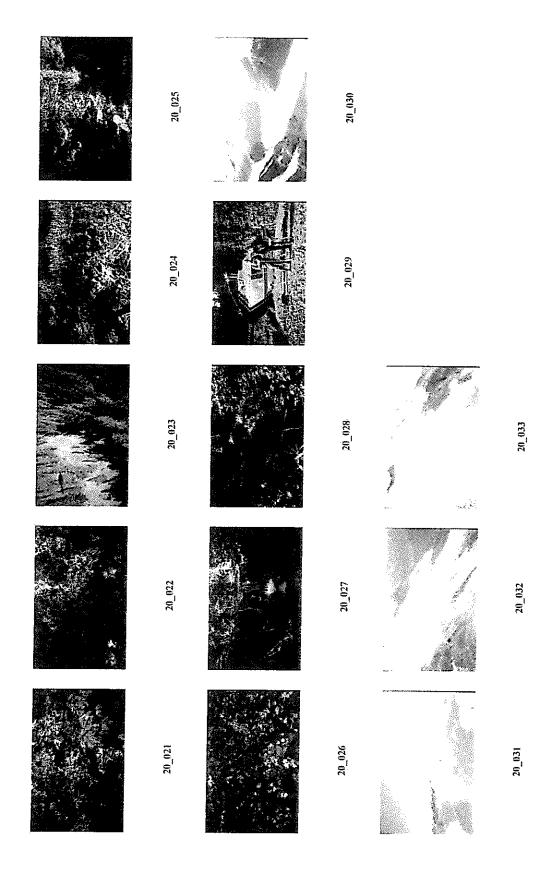




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