Stream Classification and Fish Habitat Assessment of Several Tributaries within Whitesail and Buck Creek Operating Areas of Houston Forest Products Co.

Prepared for:
Houston Forest Products Company
P.O. Box 251
Burns Lake, BC
V0J 1E0

Prepared by:
Mac Jedrzejczyk R.P.Bio.
FINS Consulting Ltd.
4809 Hamer Ave.
Terrace, BC
V8G 2E5

December 01, 2004

Table of Contents

List of Tables

List of Figures

1. Introduction

1.1 Project Scope and Objectives

The purpose of this project was to confirm Forest Practices Code (FPC) stream classifications and fish habitat assessments for select streams located within the Houston Forest Product Co. (HFP) forest license.

1.2 Location and Access

All four streams identified for sampling within the HFP forest license are located within the Nadina Forest District. Of these, two were located in Whitesail Operating Area (OA) in the Upper Nechako Reservoir high level watershed group and two others within Buck Creek OA in the Upper Bulkley River high level watershed group. The location map (Figure 1) on the following page provides the general location of the study areas.

Drainages in the Whitesail OA are first order tributaries to the southern shore of eastern part of Tahtsa Reach. They were accessed from Houston B.C. via Morice R. Forest Service Road (FSR), Owen L. FSR, Owen East FSR, Ootsa-Nadina FSR, Wistaria Main FSR by 4X4 vehicle and than by boat from Andrews Bay.

Drainages within Buck Creek OA are first order tributaries to the left bank of Buck Creek. They were accessed from Houston B.C. via Buck Flats Road by 4X4 vehicle and then by foot from the nearest spur road.

2. Historical Information

Drainages within Whitesail and Buck Creek operating areas were never sampled before, however they were incorporated within the Reconnaissance (1:20,000) Fish and Fish Habitat Inventory projects conducted for HFP by SKR Consultants Ltd. in the 2001 and 2002 seasons respectively.
Streams within Whitesail OA were assigned interim locational point (ILP) numbers 50171 and 50172 and streams within Buck Creek OA were assigned ILP's 80198 and 80202 during pre-field phases of these inventories.

3. Methods

Methodology used throughout this project was consistent with the standards and methods outlined in the following publications:

- Forest Practices Code (FPC) of British Columbia Act (1995)
- Fish-stream Identification Guidebook, Second Edition (FSID) (FPC, 1998)
- Riparian Management Area Guidebook (FPC, 1995)

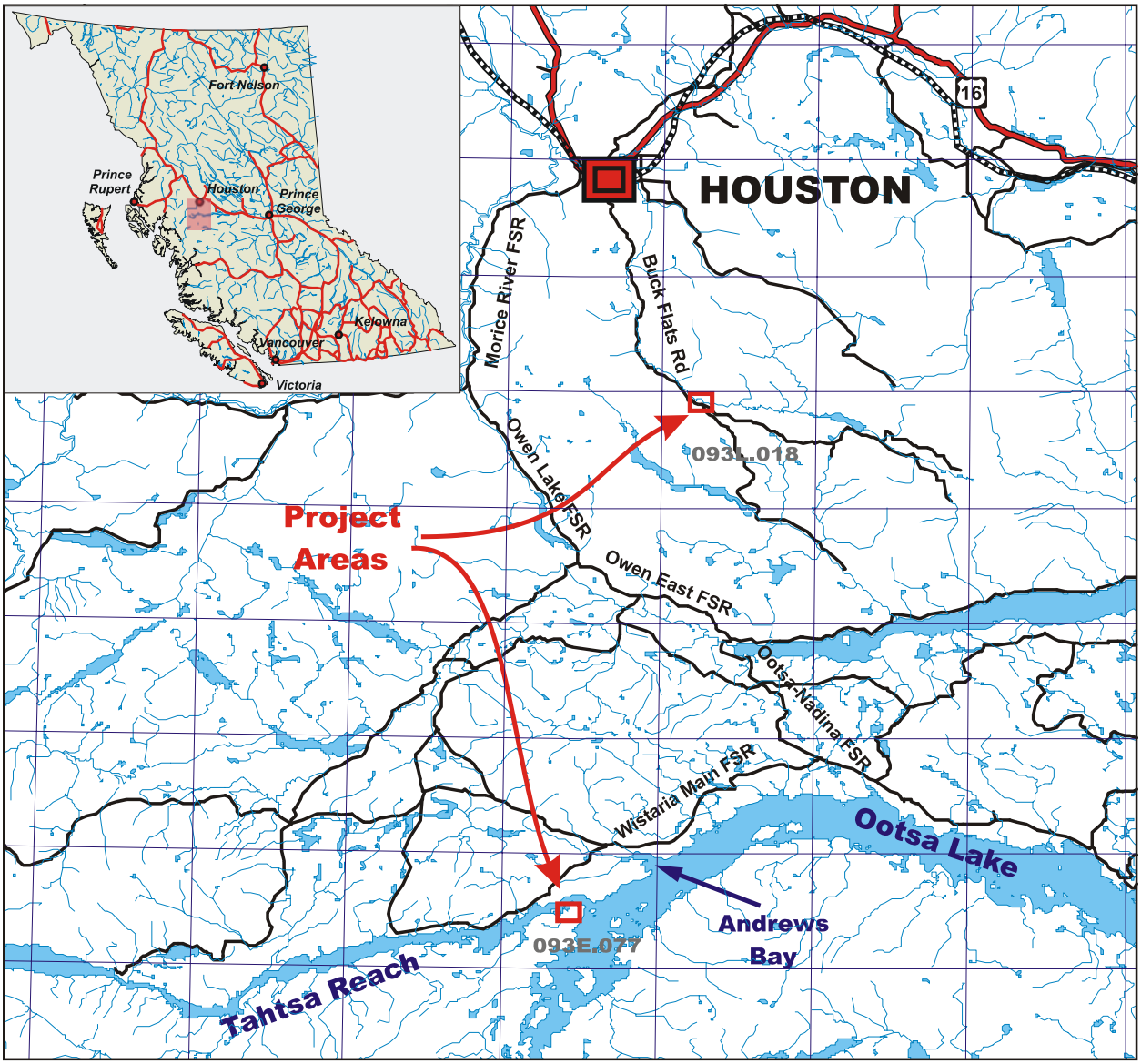


Figure 1: Location of Project Area.

4. Field Data Collection

Field data were collected on HFP designed Stream Assessment Site Cards as requested and on RISC Fish Collection Forms. Copies of all field cards are provided in Appendix II.

4.1 Fish Sampling

Electrofishing and visual observation were the methods used for fish sampling for this project.

4.2 Measurements

Stream channel and wetted widths were determined using a meter stick for smaller streams and a measuring tape for streams with channel widths greater than 1.0m. A minimum of six channel width measurements were made along each site at a distance of approximately 15-20m apart.

Stream depth measurements were determined using a meter stick. Stream gradient measurements were determined using an Abney level along several sections of the site. Site lengths were determined either by GPS or by hip chain. Stream water temperatures were determined using an alcohol thermometer while conductivity measurements were made using an Oakton portable meter, which was calibrated using standardized solutions.

4.3 Mapping

Mapping convention for this project follows the standards as recommended in the Fish-stream Identification (FSID) Guidebook, Second Edition (FPC, 1998). One map for each area has been produced for this project, adapted from 1:20 000 TRIM maps and HFP operational maps, and are included in Appendix I at the end of this report. The maps are on 8.5"x11" paper and are at a1:10,000 scale. The maps depict the stream network, base coordinates from the UTM grid and mapping symbols, as recommended in the FSID Guidebook as well as proposed roads and cutblocks. All site data has been presented on the maps using Site Summary Symbol, which is a modified version of a Reach Summary Symbol. The fish-bearing status of specific streams is represented on the maps using colour linework. Solid red lines indicate confirmed fish presence while dashed red lines indicate that fish presence has been inferred and is considered likely. Dashed blue lines indicate that fish absence has been inferred and fish absence is suspected in that reach, while solid blue lines indicate confirmed fish absence. Green lines indicate the presence of non classified drainage reaches at the surveyed site. These are discussed in further detail below in Section 4.5.

4.4 Stream and Site Referencing

All sampled streams retained their original reference identifier as assigned during their respective Reconnaissance Inventories ((ILP) number) for ease of referencing with prior projects in addition to watershed codes if those were available. Site numbers for this project have been assigned in an ascending order as they were surveyed.

4.5 No Visible Channel (NVC) Reaches

There are three types of situations in which a site assessment in the field can conclude a no visible channel designation. They include reaches where no drainage was present, reaches that were not a stream by FPC definition, or wetland-type reaches where there was no defined channel present. The type of NVC reach was noted in the comments on the site cards. NVC reaches received a "Non Classified Drainage" (NCD) FPC classification.

4.6 Photographs

Representative photographs and significant features are presented in Appendix III. They have been reduced in size so that multiple photos can be presented on one page. Each photo is labeled with stream identifier, reach number, site number, and direction in which the photo was taken.

4.7 Field Equipment

All sampling equipment specifications are listed below:

- 1 Smith-Root model 12B P.O.W. Backpack Electrofisher
- 1 Oakton TDSTestr3 conductivity meter (with 1413μS/cm solution)
- 1 Abney Level, alcohol thermometer, Silva compass
- 1 Pentax Zoom 90WR camera

- 1 Garmin GPS 12
- assorted other equipment including meter tape, hip chain, magnifying lens, meter stick
- 1 4X4 trucks equipped with Level 1 First Aid kit and 2 personal First Aid kits, as per WCB requirements
- 1 Quicksilver inflatable boat with 20hp jet motor

5. Results and Discussion

5.1 Approach Used to Determine Fish-bearing Status

The following section summarizes the information collected and conclusions reached for each sample site within the project area. This has been based both on interpretations and conclusions from the synthesis of data collected during previous inventories and from new information collected as part of this project. Historical information was used only as further supporting evidence in determining fish-bearing status.

Determining whether or not any fish use occurs in a specific reach is a complex process, involving much more than applying fish sampling results on a site-specific basis. Specifically, in applying a non fish-bearing status to a reach when fish are not captured in a sampling event, a more systematic process is required in order to provide an adequate rationale to support a conclusion of fish absence. Biological evaluation is used which factors in such considerations as historical sampling information, known fish distributions and behavior, barriers, gradients, invertebrate presence, habitat quality, and presence/absence of headwater lakes.

As a general rule, two conditions must usually exist in order for fish to inhabit a specific stream reach; 1) presence of fish habitat and 2) accessibility to that habitat. There are exceptions to this, such as presence of resident or adfluvial populations above barriers which otherwise block access, but these situations are considered on an individual basis when appropriate sampling can be undertaken to accurately determine fish presence under these circumstances.

Determining presence of fish habitat requires biological judgment but is based on many tangible factors. A “snapshot” method is used to determine presence of fish habitat at the time of sampling, but this is not sufficient when lack of water limits available habitat. Under these circumstances, a temporal approach is required which factors in the potential for fish habitat presence during a different flow period. In this manner, different habitat requirements for suspected fish species are also considered, such as potential seasonal use for rearing (i.e., higher flow rearing or refuge habitat) or spawning (i.e. suitable gravels, gradient and potential flow). Again, biological judgment is required to recognize this potential habitat, bearing in mind how the different flow regimes may affect the availability of this habitat. Moreover, the presence of potential overwintering or perennial habitat upstream in the watershed (i.e. lakes, wetlands, pools >0.5m deep) is also taken into account and has influence on the fish-bearing status of a specific reach. Existence of habitat or potential habitat, if present, is noted and described in the comments on the site cards.

Once presence of fish habitat has been established, it must be determined whether fish are capable of accessing this habitat. The presence of obstructions to fish in the form of falls, cascades, impassable gradients and lack of connectivity within a watershed may limit fish distribution within a watershed and must be evaluated. When questionable obstructions or soft barriers (i.e., beaver dams, wetlands, NVC reaches) are present, the process for determining

the presence of fish habitat upstream must be undertaken and combined with adequate sampling in order to determine fish use.

The fish-bearing status of a specific reach is dependent on the presence of fish habitat, the accessibility to that habitat and is supported by the results of fish sampling. The above process for determining fish presence is an overview of the variables evaluated before fish-bearing status can be accurately ascertained. This entire process is always supplemented by existing fisheries information and interpretations from map and air photo analysis.

Once a non-fish bearing conclusion has been established for a sampled reach, all reaches located upstream from that location are considered to be non fish-bearing. This is inherent in the process used to determine the non fish-bearing status. An overview of the process used in determining fish-bearing status is presented in a flowchart in Figure 2 on the following page.

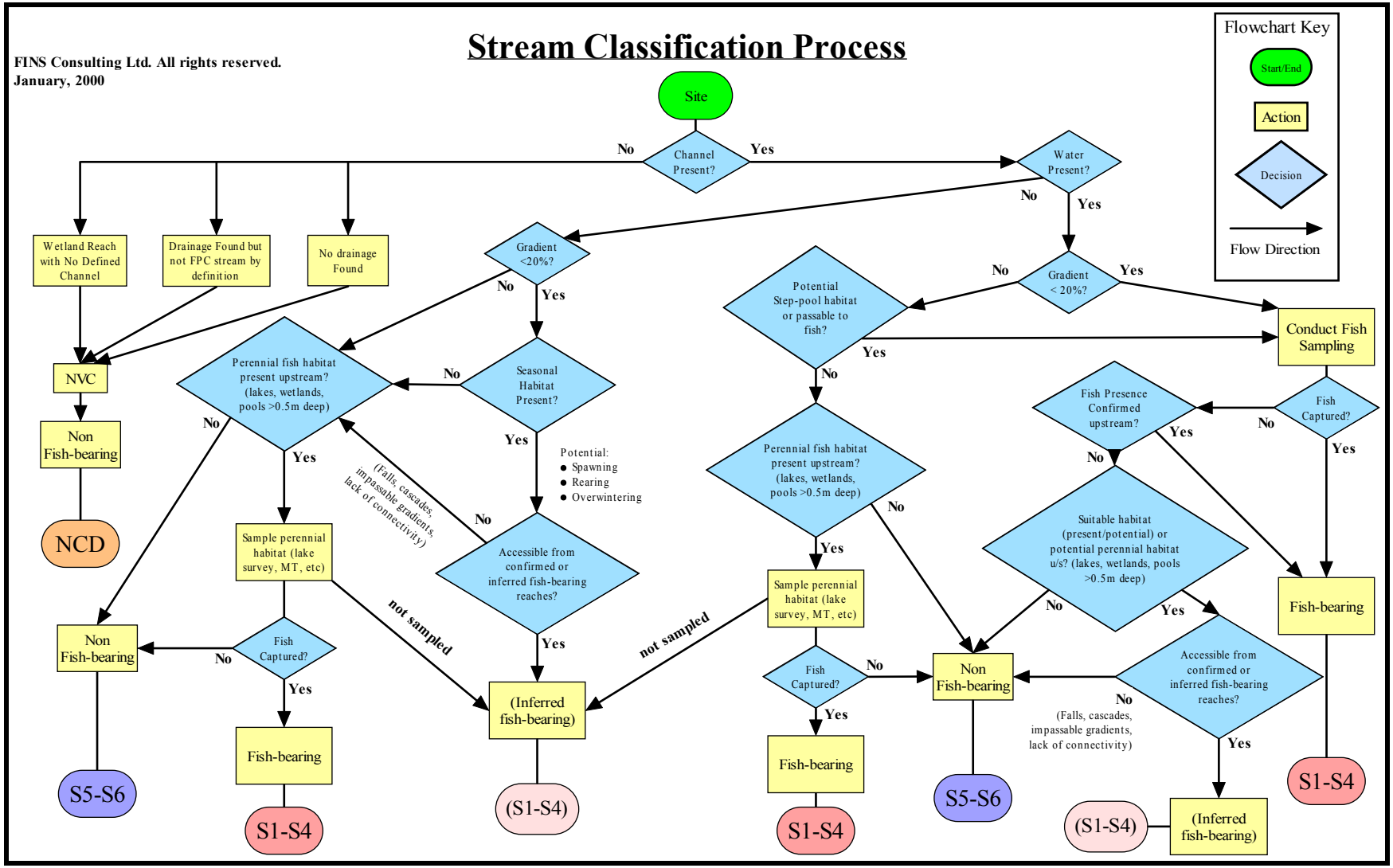


Figure 2: Flowchart of the stream classification process used in determining fish-bearing status of surveyed reaches

5.2 Summary of Sampling Results

Table 1 below provides stream sampling specifications and results undertaken in Whitesail and Buck Creek Operating Areas.

Table 1: Summary of stream sampling results in the Whitesail and Buck C. Operating Areas

Stream ILP	Reach #	FPC Class	Average Channel Width (m)	Average Wetted Width (m)	Average Bankfull Depth (m)	Average Gradient (%)	Sampling results and EF specs (Species/Sec./Length /Volt/Freq./Pulse)	Comments
WHITESAIL								
50171	1	**(S3)**	1.65	1.28	0.32	3	NFC/289/150/500/80/6	Small perennial stream with good RB rearing habitat available. Easily accessible from Ootsa L. Contains sufficient spawning habitat which could be utilized by astray RB. Potential of regular RB use in the future for spawning and rearing.
	2	**S6**	1.35	1.33	0.33	0.75	NFC/90/310/500/80/6	Wetland reach with approximately 20m section of forested area (hence FPC classification). Not suitable or preferred RB habitat. Channel exposed to sun, filled with organic substrate, which likely causes oxygen deficiency during winters or hot summers. No potential for RB migratory corridor due to the lack of RB habitat in reach upstream.
	3	**S6**	1.45	1.2	0.28	2.75	NFC/133/100/500/80/6	Shallow perennial stream flowing into 300m long wetland in reach 2. Lacks suitable RB habitat, no spawning substrate for RB, no fish present in the entire system in three sampling locations.
50172	1	**NCD**	NA	NA	NA	NA	NFC/131/180/400/80/6	No suitable fish habitat. Seasonal drainage with no continuous banks or fluvial substrate beyond 23m from mouth. Flows through a shrubby patch over organic steps, with some subterranean sections or disperses through shrubs.
BUCK CREEK								
80198	1	**S6**	0.8	0.68	0.37	20.75	NFC/38/100/500/80/6	Steep trickle with approximately 60% subterranean flow. Inaccessible to fish from mouth and contains no fish habitat to support fish use above cascade (34m long and 10.4m high).
80202	1	**S6**	1.43*	0.92*	0.42*	16.25	NFC/131/180/400/80/6	Moderately steep small stream with approximately 80% subterranean flow. Inaccessible from mouth due to 25m long and 5.4m high cascade. No suitable fish habitat above to support fish use.

* Channel measurements are not equidistant due to underground flow.

Detailed site-specific information is available on the field cards in the Appendices.

6. Bibliography

Province of British Columbia. 1998. Reconnaissance (1:20,000) Fish and Fish Habitat Inventory: Standards and Procedures. Version 1.1. RIC April 1998. B.C. Min. Fisheries. Fisheries Inventory Section. Victoria, B.C.

Province of British Columbia. 1998. Reconnaissance (1:20,000) Fish and Fish Habitat Inventory: Standards and Procedures. Version 1.1. RIC April 1998. Errata March 1999. B.C. Min. Fisheries. Fisheries Inventory Section. Victoria, B.C.

Province of British Columbia. 1998. Reconnaissance (1:20,000) Fish and Fish Habitat Inventory: Data Forms and User Notes. Version 1.1. RIC April 1998. B.C. Min. Fisheries. Fisheries Inventory Section. Victoria, B.C.

Province of British Columbia. 1998. Reconnaissance (1:20,000) Fish and Fish Habitat Inventory: Data Forms and User Notes. Version 1.1. RIC April 1998. Errata March 1999. B.C. Min. Fisheries. Fisheries Inventory Section. Victoria, B.C.

Province of British Columbia. 1998. Users Guide to the British Columbia Watershed/ Waterbody Identifier System. Version 2.2. RIC April 1998. B.C. Min. Fisheries. Fisheries Inventory Section. Victoria, B.C.

Province of British Columbia. 1997. Fish Collection Methods and Standards. Version 4.0. RIC January 1997. B.C. Min. Fisheries. Fisheries Inventory Section. Victoria, B.C..

Province of British Columbia. 1997. Fish Collection Methods and Standards. Version 4.0. RIC January 1997. Errata March 1999. B.C. Min. Fisheries. Fisheries Inventory Section. Victoria, B.C.

Province of British Columbia. 1998. Standards for Fish and Fish Habitat Maps. Version 2.0. RIC May 1998. B.C. Min. Fisheries. Fisheries Inventory Section. Victoria, B.C.

Province of British Columbia. 1998. Standards for Fish and Fish Habitat Maps. Version 2.0. RIC May 1998. Errata April 1999. B.C. Min. Fisheries. Fisheries Inventory Section. Victoria, B.C.

Province of British Columbia. 1995. Riparian Management Area Guidebook. Forest Practices Code Guidebook. B.C. Min. For., Victoria, B.C.

Province of British Columbia. 1998. Fish-stream Identification Guidebook Second Edition. Forest Practices Code Guidebook. B.C. Min. For., Victoria, B.C.

Province of British Columbia. 1999. Guidelines for Local Area Agreement Preparation: Skeena Region. Draft Version 2 - June 1999.

SKR Consultants Ltd. 2001. Reconnaissance 1:20,000 Fish and Fish Habitat Inventory of the Tributaries to West Shore of Whitesail Reach, North Shore of Whitesail Lake and South Shore of Tahtsa Reach. March, 2001. Prepared for Houston Forest Products Co. by SKR Consultants Ltd., Smithers, B.C., Min. of Environment, Smithers, B.C.

SKR Consultants Ltd. 2002. Reconnaissance 1:20,000 Fish and Fish Habitat Inventory of the Lower Buck Creek Sub-basin, Downstream of Klo Creek. March, 2002. Prepared for Houston Forest Products Co. by SKR Consultants Ltd., Smithers, B.C., Min. of Environment, Smithers, B.C.

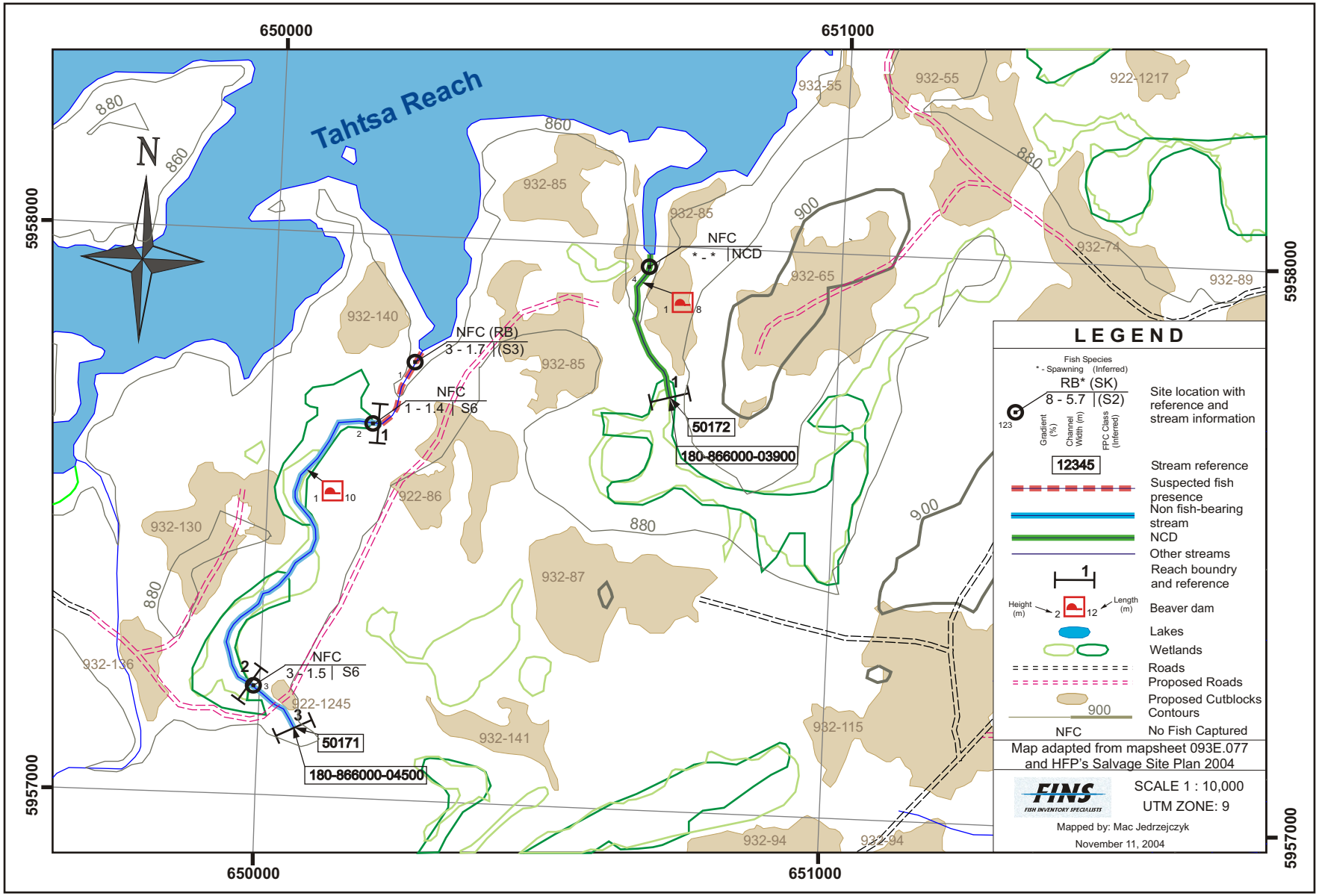
7. List of Appendices

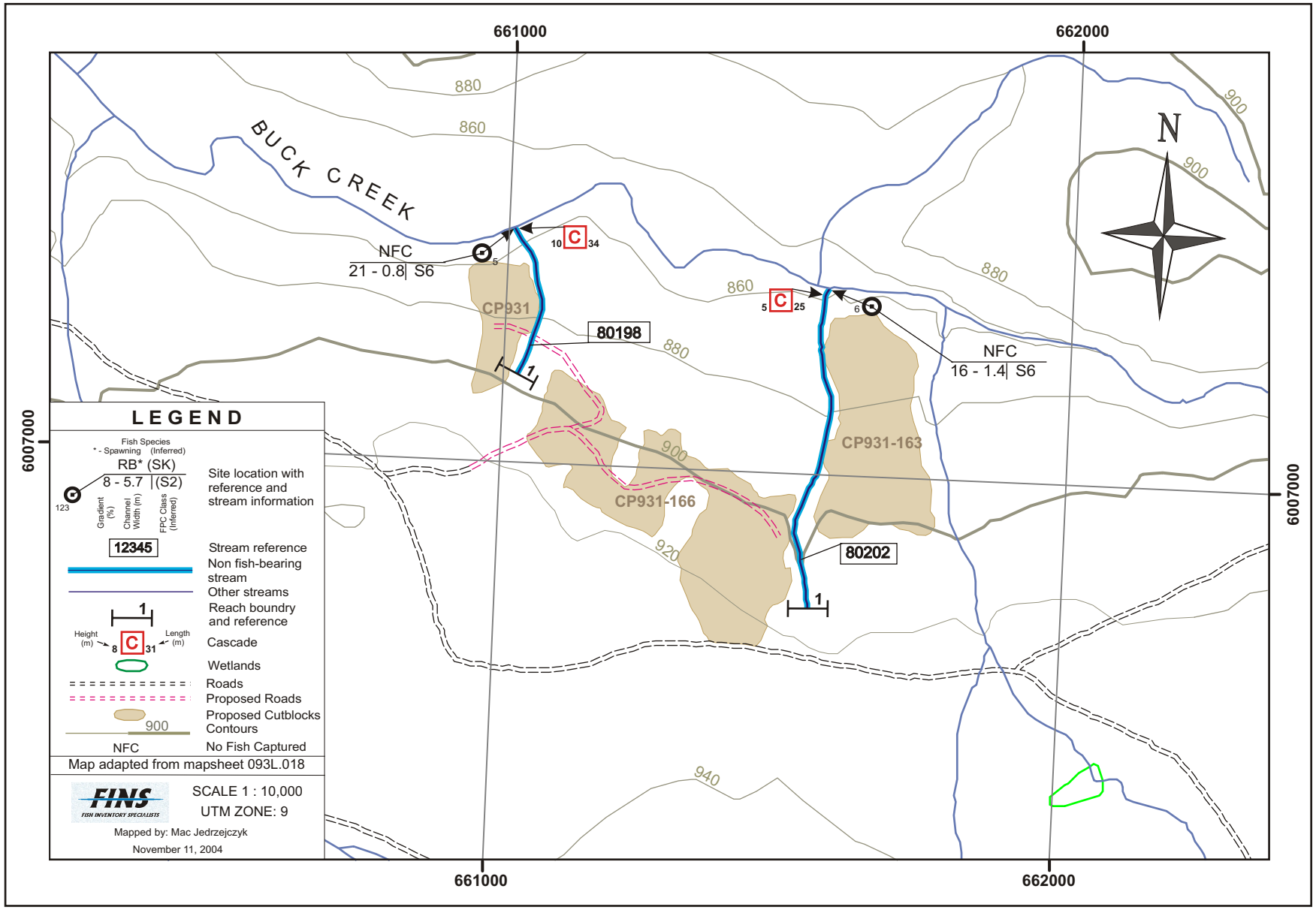
Appendix I: **Hardcopy Maps**

Appendix II: **Copies of Field Cards**

Appendix III: **Photographs**

Appendix I: Hardcopy Maps


650000
651000
5958000
5957000
Tahtsa Reach
N
880
860
900
932-55
922-1217
932-85
932-74
932-65
932-89
932-140
932-86
932-130
932-87
932-136
922-1245
932-141
932-115
932-94
NFC
* - * | NCD
NFC (RB)
3 - 1.7 | (S3)
NFC
1 - 1.4 | S6
NFC
3 - 1.5 | S6
50172
180-866000-03900
50171
180-866000-04500
LEGEND
Fish Species
* - Spawning (Inferred)
RB* (SK)
8 - 5.7 | (S2)
Gradient (%)
Channel Width (m)
FPC Class (Inferred)
Site location with reference and stream information
12345
Stream reference
Suspected fish presence
Non fish-bearing stream
NCD
Other streams
Reach boundry and reference
Height (m)
Length (m)
Beaver dam
Lakes
Wetlands
Roads
Proposed Roads
Proposed Cutblocks
Contours
NFC
No Fish Captured
Map adapted from mapsheet 093E.077 and HFP's Salvage Site Plan 2004
FINS
FISH INVENTORY SPECIALISTS
SCALE 1 : 10,000
UTM ZONE: 9
Mapped by: Mac Jedrzejczyk
November 11, 2004


661000
662000
6007000
BUCK CREEK
880
860
900
N
NFC
21 - 0.8 S6
5
10 C 34
CP931
80198
1
860
5 C 25
6
880
NFC
16 - 1.4 S6
CP931-163
CP931-166
900
920
80202
1
940
LEGEND
Fish Species
* - Spawning (Inferred)
RB* (SK)
8 - 5.7 (S2)
123
Gradient (%)
Channel Width (m)
FPC Class (Inferred)
Site location with reference and stream information
12345
Stream reference
Non fish-bearing stream
Other streams
Reach boundry and reference
Height (m)
C
Length (m)
8
31
Cascade
Wetlands
Roads
Proposed Roads
Proposed Cutblocks
900
Contours
NFC
No Fish Captured
Map adapted from mapsheet 093L.018
FINS
FISH INVENTORY SPECIALISTS
SCALE 1 : 10,000
UTM ZONE: 9
Mapped by: Mac Jedrzejczyk
November 11, 2004

Appendix II: Copies of Field Cards

houston FOREST PRODUCTS COMPANY

Stream Assessment Site Card

Stream Name (gaz.)	(local)	(road/block name/location)
Watershed Code 180866000045000		
ILP Map #	ILP# 50171	Reach # 1
Site # 1	Site UTM 09 650219 5957771 GP3	Site Length 150 HC
Date 20040901	Time 1200 Agency C016	Crew MJ HK Fish Form (Y) N

CHANNEL

	mthd	1	2	3	4	5	6	avg
Channel Width (m)	T	1.7	1.4	1.3	1.8	2.1	1.6	1.65
Wetted Width (m)	T	1.3	1.4	1.3	1.3	1.1	1.3	1.28
Bankfull Depth (W_bDp) (m)	MS	0.4	0.4	0.4	0.3	0.2	0.2	0.32
Res. Pool Depth (m)	MS	0.16	0.22	0.14	0.2			0.18
Gradient %	1: 3	2: 2	3: 4	4: 3	Avg 3.0			

Flow Stage: ☐Dry ☐Low ☒Mod ☐High

☐No Visible Channel ☐Dry/Int. ☐Dewatered ☐Tributaries

COVER

Cover Total ☐None ☐Low ☐Mod ☒High

Type	SWD	LWD	B	U	DP	OV	IV
Amt	T	T	T	D	S	S	S
Loc	P	P	P	P	P	P	P

LWD FNC N (F) A — DIST C (E)

INSTREAM VEG N A (M) V

RIP.VEG. N G (S) C D M W

STAGE INIT SHR PS YF MF (NA)

MORPHOLOGY

Bed Material Size (cm) C/G D95 (cm) 20 D (cm) 2 Morph. (RP) CP SP LC

Confinement EN CO FC (OC) UN NA

FEATURES

C	ID#	Type	Ht(m)	Lg (m)	Photo	Location	UTM
					R___ F___		
					R___ F___		
					R___ F___		
					R___ F___		

HFP Form Design Revised: April 11, 2003
EMS Document # EM-0307

Page 1 of 2

(1)

PHOTO DOCUMENTATION

Roll #	Frame #	Direction	Comments
1	1	U	Pelm
1	2	BD	Mece
1	3	D	Cam Beg

COMMENTS

C1	Stream Classification (S1-S6, NCD, FSZ)	S3
C2	Stream Classification Rationale	Small perennial stream with seasonal hab available, easily accessible from Dotse L. potential incidental use
C3	Perennial Habitat ☐Yes ☒No	No OW hab, too shallow
C4	Spawning Habitat ☒Yes ☐No	Small grav. patches present but likely unutilized
C5	Overwintering Habitat ☐Yes ☒No	- RB fry would have been present now
C6	Fish Sampling Required ☐Yes ☒No	
C7	Other Comments	low value fish hab

Page 2 of 2

(2)

FISH COLLECTION FORM

GAZETTED NAME	(local)	LAKE (STREAM) WETLAND	
WATERSHED CODE 180866000045000			
WATERBODY ID	ILP MAP #	ILP # 50171	SITE/LAKE CARD ATTACHED (Y) N
PROJECT ID	REACH # 1	D	FISH PERMIT # SM045885
DATE 20040901	AGENCY C016	CREW MJ HK	RE-SAMPLE

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	MTD / NO.	STREAM CONDITION TEMP	COND	TURB	COMMENTS
1			09 650219 5957771 GP3	EF 1	11	60	C	

FISH SUMMARY

SITE #	MTD / #	H / P	SPECIES	STAGE	AGE	TOTAL #	MIN LENGTH	MAX LENGTH	FISH ACT	COMMENTS
1	EF 1	1	NFC			0				

(3)

GEAR SPECIFICATIONS

C	SITE #	MTD / #	HAUL	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB.

NET / TRAP SPECIFICATIONS

ELECTROFISHER SPECIFICATIONS

SITE #	MTD / #	PASS	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLTAGE	FREQ.	PULSE	MAKE	MODEL
1	EF 1	1	1200	1240	289	150	1.5	0	500	80	6	SR	12B

COMMENTS

(4)

Stream Assessment Site Card

Stream Name (gaz.)	(local) (road/block name/location)
Watershed Code	
ILP Map # 093L018	ILP# 80198 — Reach # 1
Site # 5	Site UTM 9 661008 6007409 GP3 — Site Length 100 HC
Date 2004 09 01	Time 1930 — Agency C016 — Crew MJ HK — Fish Form (Y) N

CHANNEL

	mthd	1	2	3	4	5	6	avg
Channel Width (m)	1.0	0.7	0.6	1.0	0.7	0.8		0.8
Wetted Width (m)	0.7	0.6	0.6	0.9	0.7	0.6		0.68
Bankfull Depth (W_bDp) (m)	0.3	0.4	0.4	0.4	0.4	0.3		0.37
Res. Pool Depth (m)	0	0						0

Gradient % 1 32 2 33 3 8 4 12 Avg 20.75

Flow Stage: ☐Dry ☐Low ☒Mod ☐High

☐No Visible Channel ☐Dry/Int. ☐Dewatered ☐Tributaries

COVER

Cover Total ☐None ☒Low ☐Mod ☐High

Type	SWD	LWD	B	U	DP	OV	IV
Amt	T	T	N	T	N	S	N
Loc	P	P		B		P	P

LWD FNC N (F) A — DIST C (E)

INSTREAM VEG (N) A M V

RIP.VEG. N G S (C) D M W

STAGE INIT SHR PS YF (MF) NA

MORPHOLOGY

Bed Material Size (cm) C/F D95 (cm) 12 D (cm) 6 — Morph. RP CP (SP) LC

Confinement EN (CO) FC OC UN NA

FEATURES

C	ID#	Type	Ht(m)	Lg (m)	Photo	Location	UTM
		C	10.4	34	R 2 F 11	@ mouth freq undergrowth	9 661008 6007409 GP3
					R F		
					R F		
					R F		

17

HFP Form Design Revised: April 11, 2003

PHOTO DOCUMENTATION

Roll #	Frame #	Direction	Comments
2	8	U	Cam bag
2	9	BD	↓
2	10	D	

COMMENTS

C1	Stream Classification (S1-S6, NCD, FSZ)	S6
C2	Stream Classification Rationale	steep trickle from mouth inaccessible to fish. freq (60%) shutes, flow, no habitat to support any fish use above steep D/S section
C3	Perennial Habitat ☐Yes ☒No	
C4	Spawning Habitat ☐Yes ☒No	
C5	Overwintering Habitat ☐Yes ☒No	
C6	Fish Sampling Required ☐Yes ☒No	
C7	Other Comments	

18

FISH COLLECTION FORM

GAZETTED NAME	(local) — LAKE (STREAM) WETLAND
WATERSHED CODE	
WATERBODY ID	ILP MAP # 093L018 — ILP # 80198 — SITE/LAKE CARD ATTACHED (Y) N
PROJECT ID	REACH # 1 D — FISH PERMIT # SM045885
DATE 2004 09 01	TO — AGENCY C016 — CREW MJ HK — RE-SAMPLE

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	MTD / NO.	TEMP	COND	TURB	COMMENTS
5			9 661008 6007409 GP3	EF 1	10	50	C	

FISH SUMMARY

SITE #	MTD / #	H / P	SPECIES	STAGE	AGE	TOTAL #	MIN. LENGTH	MAX LENGTH	FISH ACT.	COMMENTS
5	EF 1	1	NFC			0				

19

GEAR SPECIFICATIONS

NET / TRAP SPECIFICATIONS

C	SITE #	MTD / #	HAUL	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB.

ELECTROFISHER SPECIFICATIONS

SITE #	MTD / #	PASS	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLTAGE	FREQ	PULSE	MAKE	MODEL
5	EF 1	1	1930	1942	38	100	0.7	O	500	80	6	SR	12B

COMMENTS

Steep trickle

20

Stream Assessment Site Card

Stream Name (gaz.)	(local)	(road/block name/location)
Watershed Code 180866000039000		
ILP Map #	ILP# 50172	Reach # 1 -
Site # 4	Site UTM 9 650661 5957960 6P3	Site Length 180 MC
Date 20040921	Time 1500 Agency C016	Crew MJ HK Fish Form (Y) N

CHANNEL

	mthd	1	2	3	4	5	6	avg
Channel Width (m)	MS	0.9	1.4	0.8	1.2	NA		NA
Wetted Width (m)	MS	0.7	1.4	0.8	0.9	NA		NA
Bankfull Depth (W_bDp) (m)	MS	0.3	0.35	0.2	0.25	NA		NA
Res. Pool Depth (m)	MS	0.07	0.23	0.19				NA

Gradient % 1 13 2 0 3 1 4 ___ Avg NA

Flow Stage: ☐Dry ☐Low ☒Mod ☐High

☒No Visible Channel ☐Dry/Int. ☐Dewatered ☐Tributaries

COVER

Cover Total ☐None ☐Low ☐Mod ☐High NA

Type	SWD	LWD	B	U	DP	OV	IV
Amt		NA					
Loc							

LWD FNC N F A DIST C E

INSTREAM VEG N A M V

RIP.VEG. N G S C D M W

STAGE INIT SHR PS YF MF NA

(NA)

MORPHOLOGY

Bed Material Size (cm) D95 (cm) D (cm) NA Morph. RP CP SP LC

Confinement EN CO FC OC UN NA

FEATURES

C	ID#	Type	Ht(m)	Lg (m)	Photo	Location	UTM
		BD	1	8	R 2 F 4	23 m u/s from mouth	9 650643 5957936 6P3
					R F		
					R F		
					R F		

HFP Form Design Revised: April 11, 2003

(13)

PHOTO DOCUMENTATION

Roll #	Frame #	Direction	Comments
2	5	BD	Book - in steep section
2	6	U	Cambag - ~~steep sect~~ 0 above dispersion
2	7	X	HK - swampy flooded area

COMMENTS

C1	Stream Classification (S1-S6, NCD, FSZ)	NCD
C2	Stream Classification Rationale	Lacks continuous channel substrate past 23 m from mouth, seasonal (scaly algae present),
C3	Perennial Habitat ☐Yes ☒No	No channel for 90 m above
C4	Spawning Habitat ☐Yes ☒No	BD, then freq org. steps, flowing
C5	Overwintering Habitat ☐Yes ☒No	sub, no salmonid habitat
C6	Fish Sampling Required ☐Yes ☒No	not an FPC stream
C7	Other Comments	

(14)

FISH COLLECTION FORM

GAZETTED NAME	(local)	LAKE (STREAM) WETLAND
WATERSHED CODE 180866000039000		
WATERBODY ID	ILP MAP #	ILP # 50172 SITE/LAKE CARD ATTACHED (Y) N
PROJECT ID	REACH # 1 D	FISH PERMIT # SM045885
DATE 20040921	to	AGENCY C016 CREW MJ HK RE-SAMPLE

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	MTD / NO.	STREAM CONDITION TEMP	CON	TURB	COMMENTS
4			9 650661 5957960 6P3	EF 1	12	100	C	

FISH SUMMARY

SITE #	MTD / #	H / P	SPECIES	STAGE	AGE	TOTAL #	MIN LENGTH	MAX LENGTH	FISH ACT	COMMENTS
4	EF 1	1	NFC			0				

(15)

GEAR SPECIFICATIONS — NET / TRAP SPECIFICATIONS

C	SITE #	MTD / #	HAUL	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

SITE #	MTD / #	PASS	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLTAGE	FREQ	PULSE	MAKE	MODEL
4	EF 1	1	1500	1525	131	180	1.0	0	400	80	6	SR	12B

COMMENTS

(16)

Stream Assessment Site Card

Stream Name (gaz.)	(local)	(road/block name/location)
Watershed Code 180866000945000		
ILP Map #	ILP# 50171	Reach # 3
Site # 3	Site UTM 9 649989 5957192 GP3	Site Length 100 | HC
Date 20040901	Time 1415 Agency C016	Crew MJ HK | Fish Form Y N

CHANNEL

	mthd	1	2	3	4	5	6	avg
Channel Width (m)	T	1.4	1.4	1.2	1.6	1.9	1.2	1.45
Wetted Width (m)	T	0.9	1.3	1.8	1.3	1.6	1.1	1.20
Bankfull Depth (W_bDp) (m)	MS	0.2	0.3	0.3	0.3	0.3	0.3	0.28
Res. Pool Depth (m)	MS	0.1	0.13	0.11				0.11

Gradient % 1 2 2 2 3 3 4 4 Avg 2.75

Flow Stage: ☐Dry ☐Low ☒Mod ☐High

☐No Visible Channel ☐Dry/Int. ☐Dewatered ☐Tributaries

COVER

Cover Total ☐None ☐Low ☐Mod ☒High

Type	SWD	LWD	B	U	DP	OV	IV
Amt	T	T	D	S	S	S	T
Loc	P	P	P	P	P	P	P

LWD FNC N (F) A — DIST C (E)

INSTREAM VEG N (A) M (V)

RIP.VEG. N G (S) C D M W

STAGE INIT SHR PS YF MF (NA)

MORPHOLOGY

Bed Material Size (cm) C/F D95 (cm) 8 D (cm) 1 Morph. (RP) CP SP LC

Confinement EN CO FC (OC) UN NA

FEATURES

C	ID#	Type	Ht(m)	Lg (m)	Photo	Location	UTM
					R F		
					R F		
					R F		
					R F		

9

PHOTO DOCUMENTATION

Roll #	Frame #	Direction	Comments
2	1	U	HK
2	2	BD	HK
2	3	D	HK

COMMENTS

C1	Stream Classification (S1-S6, NCD, FSZ)	S6
C2	Stream Classification Rationale	Above extensive W, no perennial hab, no spawning, no fish habitat
C3	Perennial Habitat ☐Yes ☒No	too shallow, but perennial flow
C4	Spawning Habitat ☐Yes ☒No	cobbles mixed with F & Org
C5	Overwintering Habitat ☐Yes ☒No	too shallow
C6	Fish Sampling Required ☐Yes ☒No	
C7	Other Comments	

Page 2 of 2

10

FISH COLLECTION FORM

GAZETTED NAME	(local)		LAKE (STREAM) WETLAND
WATERSHED CODE 180866000045000			
WATERBODY ID	ILP MAP #	ILP # 50171	SITE/LAKE CARD ATTACHED Y N
PROJECT ID	REACH # 3	D	FISH PERMIT # SM045885
DATE 20040901 to	AGENCY C016	CREW MJ HK	RE-SAMPLE

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	MTD / NO.	STREAM CONDITION TEMP	CON	TURB	COMMENTS
3			9 649989 5957182 GP3	EF 1	11	60	C	

FISH SUMMARY

SITE #	MTD / #	H / P	SPECIES	STAGE	AGE	TOTAL #	MIN LENGTH	MAX LENGTH	FISH ACT.	COMMENTS
3	EF 1	1	NFC			0				

11

GEAR SPECIFICATIONS

NET / TRAP SPECIFICATIONS

C	SITE #	MTD / #	HAUL	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB.

ELECTROFISHER SPECIFICATIONS

SITE #	MTD / #	PASS	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLTAGE	FREQ.	PULSE	MAKE	MODEL
3	EF 1	1	1415	1445	133	100	1.0	0	501	80	6	SR	12B

COMMENTS

12

Stream Assessment Site Card

Stream Name (gaz.)	(local)	(road/block name/location)	
Watershed Code	1 2 0 8 6 6 0 0 0 0 4 5 0 0		
ILP Map #	ILP# 50171	Reach # 2	
Site # 2	Site UTM 9 650183 5956?62 GPS	Site Length 310	HC
Date 20040901	Time 1315	Agency C016	Crew MJ HK	Fish Form (Y) N

CHANNEL

	mthd	1	2	3	4	5	6	avg
Channel Width (m)	T	1.8	1.7	0.9	0.7	1.4	1.6	1.35
Wetted Width (m)	T	1.8	1.7	0.8	0.7	1.4	1.6	1.33
Bankfull Depth (W_bDp) (m)	MS	0.7	0.6	0.1	0.2	0.2	0.2	0.33
Res. Pool Depth (m)	MS	N/A						0
Gradient %	1 0	2 0	3 2	4 1	Avg 0.75			

Flow Stage: ☐Dry ☐Low ☒Mod ☐High

☐No Visible Channel ☐Dry/Int ☐Dewatered ☐Tributaries

COVER

Cover Total ☐None ☐Low ☐Mod ☒High

Type	SWD	LWD	B	U	DP	OV	IV
Amt	T	N	N	T	S	R	S
Loc	P	P	P	P	P	R	P

LWD FNC (N) F A — DIST C E

INSTREAM VEG N A (M) (V)

RIP.VEG. N G S C D M (W)

STAGE INIT SHR PS YF MF (NA)

MORPHOLOGY

Bed Material Size (cm) F/O — D95 (cm) 0.1 — D (cm) 0.1 — Morph. RP CP SP (LC)

Confinement EN CO FC OC (UN) NA

FEATURES

C	ID#	Type	Ht(m)	Lg (m)	Photo	Location	UTM
		BD	1m	10 m	R 1 F 6		9 650073 5957599 56PS
					R F		
					R F		
					R F		

HFP Form Design Revised: April 11, 2003
EMS Document # EM-0307

(5)

PHOTO DOCUMENTATION

Roll #	Frame #	Direction	Comments
1	4	U	HK
1	5	BD	Probe
1	7	D	Com Yeg

COMMENTS

C1	Stream Classification (S1-S6, NCD, FSZ)		S6
C2	Stream Classification Rationale		No suitable RB hab. Grav found only ~ 20 m below BD u/s 20 m forested stretch explored channel to snu org in substrate potential O deficit in summer/winter
C3	Perennial Habitat	☐Yes ☒No	perennial stream
C4	Spawning Habitat	☐Yes ☒No	fines & organics in substr
C5	Overwintering Habitat	☐Yes ☒No	
C6	Fish Sampling Required	☐Yes ☒No	
C7	Other Comments		No fish habitat

(6)

FISH COLLECTION FORM

GAZETTED NAME	(local)	LAKE (STREAM) WETLAND	
WATERSHED CODE	1 8 0 8 6 6 0 0 0 0 4 5 0 0		
WATERBODY ID	ILP MAP #	ILP # 50171	SITE/LAKE CARD ATTACHED (Y) N
PROJECT ID	REACH # 2 D		FISH PERMIT # SM045885
DATE 20040901	AGENCY C016	CREW MJ HK	RE-SAMPLE

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	MTD / NO.	STREAM CONDITION TEMP	CON	TURB	COMMENTS
2			9 650183 5956?62 GPS	EF 1	11	60	C	

FISH SUMMARY

SITE #	MTD / #	H / P	SPECIES	STAGE	AGE	TOTAL #	MIN LENGTH	MAX LENGTH	FISH ACT.	COMMENTS
2	EF 1	1	NFC			0				

(7)

GEAR SPECIFICATIONS — NET / TRAP SPECIFICATIONS

C	SITE #	MTD / #	HAUL	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

ELECTROFISHER SPECIFICATIONS

SITE #	MTD / #	PASS	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLTAGE	FREQ.	PULSE	MAKE	MODEL
2	EF 1	1	1315	1350	90	310	1	O	500	80	6	SR	12B

COMMENTS

(8)

Stream Assessment Site Card

Stream Name (gaz.)	(local)	(road/block name/location)	
Watershed Code			
ILP Map # 093L018	ILP# 80202	Reach # 1	
Site # 6	Site UTM 9 661536 6007322 GP3	Site Length 100 m	
Date 20040901	Time 2000	Agency C016	Crew MJ HK	Fish Form Y N

CHANNEL

	mthd	1	2	3	4	5	6	avg
Channel Width (m)	MS	1.1	0.6	0.5	1.4	0.9	1.9	1.43
Wetted Width (m)	MS	0.4	0.6	0.5	1.3	0.9	1.8	0.92
Bankfull Depth (W_bDp) (m)	MS	0.3	0.3	0.4	0.5	0.4	2.6	2.42
Res. Pool Depth (m)	MS	0	0					

Gradient % 1 22 2 18 3 14 4 11 Avg 16.25

Flow Stage: ☐Dry ☒Low ☐Mod ☐High
☐No Visible Channel ☐Dry/Int.
☐Dewatered ☐Tributaries

COVER

Cover Total ☐None ☒Low ☐Mod ☐High

Type	SWD	LWD	B	U	DP	OV	IV
Amt	N	T	S	D	N	S	N
Loc	P	P	P	P	P	P	P

LWD FNC N (F) A — DIST C (S)
INSTREAM VEG N A (M) V
RIP.VEG. N G (S) C D M W
STAGE INIT SHR PS YF MF (NA)

MORPHOLOGY

Bed Material Size (cm) C/G D95 (cm) 25 D (cm) 6 Morph. RP CP (SP) LC
Confinement EN (CO) FC OC UN NA

FEATURES

C	ID#	Type	Ht(m)	Lg (m)	Photo	Location	UTM
		C	5.4	25	R F	12 m from mouth impassable to all fish	9 661534 6007309 GP3
					R F		
					R F		
					R F		

(21)

HFP Form Design Revised: April 11, 2003

PHOTO DOCUMENTATION

Roll #	Frame #	Direction	Comments
2	11	U	Cam beg
2	12	D	Cam beg

COMMENTS

C1	Stream Classification (S1-S6, NCD, FSZ)	S6
C2	Stream Classification Rationale	steep & small trickle, with N 80% subterranean flow no fish habitat, inaccessible
C3	Perennial Habitat ☐Yes ☒No	from mouth d/s steep % (~25 m)
C4	Spawning Habitat ☐Yes ☒No	dispersion & subter. flow, no
C5	Overwintering Habitat ☐Yes ☒No	hab u/s to support fish use
C6	Fish Sampling Required ☐Yes ☒No	
C7	Other Comments	Freq. subter. flow - channel measurements w/n openings - not on equal distance basis

(22)

FISH COLLECTION FORM

GAZETTED NAME	(local)	LAKE (STREAM) WETLAND	
WATERSHED CODE			
WATERBODY ID	ILP MAP # 093L018	ILP # 80202	SITE/LAKE CARD ATTACHED (Y) N
PROJECT ID	REACH # 1	D	FISH PERMIT # SM045885
DATE 20040901	to	AGENCY C016	CREW MJ HK	RE-SAMPLE

SITE / METHOD

SITE #	NID MAP #	NID #	SITE UTM	MTD / NO.	STREAM CONDITION TEMP	CON	TURB	COMMENTS
6			9 661536 6007322 GP3	EF 1	10	50	C	

FISH SUMMARY

SITE #	MTD / #	H / P	SPECIES	STAGE	AGE	TOTAL #	MIN LENGTH	MAX LENGTH	FISH ACT	COMMENTS
6	EF 1	1	NFC			0				

(23)

GEAR SPECIFICATIONS

C	SITE #	MTD / #	HAUL	DATE IN	TIME IN	DATE OUT	TIME OUT	NET TYPE	LENGTH	DEPTH	MESH SIZE	SET	HAB

NET / TRAP SPECIFICATIONS

ELECTROFISHER SPECIFICATIONS

SITE #	MTD / #	PASS	TIME IN	TIME OUT	EF SEC	LENGTH	WIDTH	ENCL	VOLTAGE	FREQ.	PULSE	MAKE	MODEL
6	EF 1	1	2000	2015	29	100	0.8	O	500	80	6	SR	12B

COMMENTS

(24)

Appendix III: Photographs

Stream 180-866000-04500 (ILP 50171) Reach 1 Site 1 u/s view

Stream 180-866000-04500 (ILP 50171) Reach 1 Site 1 stream bed

Stream 180-866000-04500 (ILP 50171) Reach 1 Site 1 d/s view


Stream ILP 80198 Reach 1 Site 5 u/s view


Stream ILP 80198 Reach 1 Site 5 stream bed


Stream ILP 80198 Reach 1 Site 5 d/s view

Stream 180-866000-03900 (ILP 50172) Reach 1 Site 4 stream bed

Stream 180-866000-03900 (ILP 50172) Reach 1 Site 4 u/s view

Stream 180-866000-03900 (ILP 50172) Reach 1 Site 4 view across

Stream 180-866000-03900 (ILP 50172) Reach 1 Site 4 beaver dam

Stream 180-866000-04500 (ILP 50171) Reach 3 Site 3 u/s view

Stream 180-866000-04500 (ILP 50171) Reach 3 Site 3 stream bed

Stream 180-866000-04500 (ILP 50171) Reach 3 Site 3 d/s view

Stream 180-866000-04500 (ILP 50171) Reach 2 Site 2 u/s view

Stream 180-866000-04500 (ILP 50171) Reach 2 Site 2 stream bed

Stream 180-866000-04500 (ILP 50171) Reach 2 Site 2 d/s view

Stream 180-866000-04500 (ILP 50171) Reach 2 Site 2 Beaver dam

Stream ILP 80202 Reach 1 Site 6 u/s view

Stream ILP 80202 Reach 1 Site 6 d/s view