

# **Reconnaissance (1:20,000) Fish and Fish Habitat Inventory**

## **Subdrainages in the Bulkley River Watershed**

- **Crow Creek (WSC 460-917900)**
- **Maxan Creek (WSC 460-924300)**

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## Project Reference Information

<b>MELP Project Number</b>	BFP-C016-001-1999
<b>FRBC Project Number</b>	0000105
<b>FRBC Activity Number</b>	10437
<b>FDIS Project Number</b>	06-UNRS-100000072-1998
<b>FDIS Project WSC</b>	460
<b>FRBC Region</b>	Smithers Region
<b>MELP Region</b>	06
<b>FW Management Unit</b>	6-9 (Maxan and Crow) 6-8 (Broman sub-unit )
<b>DFO Sub-District</b>	4D
<b>Forest Region</b>	Prince Rupert
<b>Forest District</b>	Lakes Forest District
<b>Forest Licensee and Tenure #</b>	Babine Forest Products Company Forest Licences A-16823 and A-16825

## Watershed Information

See table on following page.

## Sampling Design Summary

<b>Total Number of Reaches</b>	377
<b>Random Sampling Sites</b>	4
<b>Discretionary Sample Sites</b>	67
<b>Total Sample Sites</b>	70
<b>Total Sample Sites (%)</b>	19
<b>Field Sampling Dates</b>	July 16 to October 26, 1998

## Subdrainage Watershed Reference Information<sup>1</sup>

Sub-Unit	Watershed Name	Subdrainage Watershed Code	UTM at Mouth	Watershed Area (km <sup>2</sup> )	Total of all Stream Lengths (km)	Stream Order	NTS Map(s)	TRIM Maps	BEC Zone	Fish Species Present
<b>BULK Watershed Group</b>										
Broman	Unnamed	ILP 50501	9.681950.6032760	2.5	2.82	1	93 L/8	93L.050	SBS	
Broman	Unnamed	ILP 40512	9.686660.6030150	2.1	2.30	1	93 L/8	93L.040, 93L.050	SBS	
Crow Foxy	Crow Creek	460-917900	9.685360.6030385	67.9	26.72	4	93 L/8	93L.040, 93L.039, 93L.029	SBS	CO PL RB
Broman	Unnamed	ILP 40513	9.685155.6030470	4.4	4.07	2	93 L/8	93L.040, 93L.050	SBS	
Maxan	Maxan Creek	460-924300	9.686665.6029780	233.1	197.73	5	93 K/4, 93 L/1, 93 L/8	93L.040, 93L.030, 93L.020, 93K.021, 93K.011	SBS	LSU RB

<sup>1</sup> Watershed Area and stream order have been determined for the entire subdrainage watershed, while total of all stream lengths refers only to those parts of the watershed that fell within the project boundaries under the scope of this contract. Specific information on project boundaries is presented in the report.

## Abbreviations Used in this Report

BGC	biogeoclimatic zone	m	meter
C	clear (not turbid)	mm	millimeter
C.	creek	M	moderate flow or moderate turbid
CAS	prickly sculpin ( <i>Cottus asper</i> )	MELP	Ministry of Environment, Lands and Parks
CD	compact disc	M/L	mainline
CO	coho salmon ( <i>Oncorhynchus kisutch</i> )	MT	minnow trap
Cond.	conductivity	NA	not applicable
CW	channel width	NFC	no fish captured
DFO	Department of Fisheries and Oceans	NFP	no fish present
Dist.	distance	NS	not sampled
Dpth	depth	NTS	National Topographic Survey
d/s	downstream	PCC	peamouth chub ( <i>Mylocheilus caurinus</i> )
EF	electrofishing	Prop	proposed
ESSF	Engelman Spruce-Subalpine Fir BGC	R.	river
FDIS	Field Data Information System	RB	rainbow trout ( <i>O. mykiss</i> )
FISS	Fisheries Information Summary System	Rd	road
FPC	Forest Practices Code	Rip	riparian
FRBC	Forest Renewal of British Columbia	sec	seconds
Grad	slope gradient	SBS	Sub-Boreal Spruce BGC
H	high flow	SK	sockeye salmon ( <i>O. nerka</i> )
Hz	Hertz	S6 - S2	riparian classes
ILP	Interim Locational Point	T	turbid
Info.	information	TRIM	Terrain Resource Information Management
km	kilometer	Turb	turbidity
L	low flow or lightly turbid	u/s	upstream
L.	lake	UTM	Universal Transverse Mercator coordinates
LKC	lake chub ( <i>Couesius plumbeus</i> )	V	volts
LSU	longnose sucker ( <i>Catostomus catostomus</i> )	WSC	watershed code
LWD	Large Woody Debris	µs	microseconds

## Contractor Information

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## **Disclaimer**

This product has been accepted as being in accordance with approved standards within the limits of Ministry quality assurance procedures. Users are cautioned that interpreted information on this product developed for the purposes of the Forest Practices Code Act and Regulations, for example stream classifications, is subject to review by a statutory decision maker for the purposes of determining whether or not to approve an operational plan.

## **Acknowledgments**

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## **List of Attachments Available at MELP Office**

### **Attachment I          Planning Document**

- i) Phase Completion Report
- ii) Project budget break-down by phase
- iii) Project sampling design plan
- iv) Hardcopy and digital Reach Table
- v) Hardcopy and digital Lake Table
- vi) Hardcopy and digital copy of the random sample table
- vii) List of air photographs

### **Attachment II          Hardcopy FISS Update Data Forms and Maps**

### **Attachment III          Photodocumentation**

- i) Photodocumentation Form 1
- ii) Photo Summary Report printout from FDIS Database
- iii) Indexed Photo Album with labeled photographs
- iv) Indexed Album of all negatives uniquely labeled in plastic sleeves
- v) 2 Indexed Copies of Photo CD's with numbered images and thumbnail references in each CD jacket

### **Attachment IV          Field Data**

- i) site cards, lake forms, fish collection forms, individual fish data forms and field notes
- ii) field working maps
- iii) paper sounding trace from E-lines

### **Attachment V          Fish Scales**

- i) labeled envelope with scales
- ii) scales mounts

### **Attachment VI          Digital Data**

# **1. Introduction**

## **1.1 Project Scope and Objectives**

The objective of this project was to conduct a Reconnaissance (1:20,000) Fish and Fish Habitat Inventory in several subdrainages in the Bulkley River watershed. This included portions of the Crow and Maxan Creek watersheds in addition to three small tributaries to the Bulkley River below Bulkley Lake (see “Subdrainage Watershed Reference Information” at the beginning of this report). The watershed inventory boundaries are defined in more detail in the corresponding section in the Results and Discussion section of this report.

## **1.2 Location**

The surveyed subdrainages are located in the upper Bulkley River watershed, northwest of Burns Lake within the Lakes Forest District. All streams are within the Bulkley River (BULK) high level watershed group. The location map on the following page provides the general location of each of the study area watersheds.

### **1.2.1 Access**

Most of the reaches within these watersheds were located within well-roaded areas, with vehicle access being the predominant method of access for reach sampling. No helicopter or boat access was required. Individual reaches were usually accessed by foot from nearby logging roads and cutblock spur roads. Access to each watershed within this project area is explained in more detail in its corresponding section in Results and Discussion.

## **1.3 Logistics**

The major problem encountered throughout the course of the sampling that was common to all drainages within the project area was the effect of extreme low water levels on sampling effectiveness. Intermittent or dry channels were common, the very low water levels a result of the unusually dry summer. These conditions often precluded effective fish sampling. The presence and accessibility of fish habitat at higher flow conditions was usually considered in determining potential fish use in these situations. In addition, problems were encountered with the pH and conductivity meters used in the field sampling in that they failed or were producing questionable readings. Their use was abandoned about two thirds into the field sampling so that numerous sample sites lack this water chemistry data. No other logistical problems were encountered.



## **2. Resource Information**

Resource use within this area is dominated by forestry and agriculture activities within the study area watersheds. Logging was prevalent in the upper Crow and Maxan Creek watersheds while extensive agricultural use is present in the lower reaches of Crow Creek. More specific comments on resource use as it relates to each surveyed subdrainage are provided in the results section of this report.

## **3. Methods**

Methodology used throughout this project were consistent with the standards and methods as defined in the “Reconnaissance (1:20,000) Fish and Fish Habitat Inventory: Standards and Procedures (May 1998)” manual and all standards referenced therein. The pre-field phases for the Maxan Creek watershed were completed in the 1997 Reconnaissance Inventory, but phases IV to VI were completed under the scope of this contract. However, most left bank tributaries to Maxan Creek were excluded from the project area for this contract, which resulted in an alteration of the sampling plan. Additional discretionary sampling reaches were required in right bank tributaries to compensate for the lost reaches that had been planned in 1997.

### **Site Numbering Convention**

Site numbers for this project have been assigned in an upstream ascending order for all sampled reaches under the scope of this contract. Sampled reaches covered by this report include Sites 151 through 226. The structure of this report follows this same convention. Site numbers have been included in all tables that provide specific reach sampling information and on all photographs and photodocumentation indices.

### **Usage of ILP Numbers**

A naming convention for all ILP's has also been used in order to simplify stream referencing for this project, for streams requiring watershed codes. All 5-digit ILP numbers that have been assigned are unique within the entire project area. This was done to avoid confusion in ILP referencing throughout the project and having to reference the ILP map number each time the ILP is referenced. Every ILP created uses the last two digits of its ILP map, combined with its number on the map. That is, the first ILP on TRIM mapsheet 93K.052 would be ILP 52001. There was no overlap of mapsheet numbers among the different TRIM map series (i.e. 93E vs. 93F. vs. 93K vs. 93 L series). Relevant TRIM maps for each report are listed in the Project Reference Information of the reports. All streams with gazetted names will be referred to by those names in this report while all unnamed streams will be referred to by their watershed code or ILP number.

### **NVC (No Visible Channel) Reaches**

There were generally two types of situations in which site assessment in the field revealed no visible channel. They include reaches where no channel was present (or not a stream by FPC definition) or wetland-type reaches where there was no defined channel present, just wet, spongy ground where flow was generally percolating through the ground. These different types of NVC reaches were noted in the comments on the site cards and are summarized with all non fish-bearing reaches in the “Fish-Bearing Status: section of this report. It is expected that NVC channels would receive a “Non Classified Drainage (NCD) FPC classification.

### **Appendix I Layout - FDIS Site Cards, Fish Forms and Photographs**

FDIS site card and fish form reports, as well as representative photographs for each sampled reach, are presented in Appendix I, arranged by site number. They are arranged as site card, followed by the corresponding fish form - the representative photos have been reduced in size so that multiple sites can be presented on one page. The pages of photos are placed in the appendix following their corresponding site cards and fish forms. Each photo is labelled with roll, frame, watershed code/ILP, reach and site numbers so that photo each photo can be easily cross-referenced in either the photo binder or the photo CD's.

### **Field Equipment**

The following is a list of field equipment used throughout reach sampling.

- 2 Smith-Root model 12B P.O.W. Backpack Electrofishers
- 50 Gee-type minnow traps
- 2 Hanna pHep 3 waterproof pH meters
- 2 Hanna DIST WP 3 conductivity meters
- 2 Suunto clinometers, alcohol thermometers, Silva compasses
- 2 Pentax Zoom 90WR cameras
- assorted other equipment including tight chains, hip chains, stop nets, dip nets, fishing rods, magnifying lenses
- 2 4X4 trucks equipped with Level 1 First Aid kits and 4 personal First Aid kits, as per WCB requirements
- 12'6" inflatable Quicksilver boat with Mariner 20 HP jet

## **4. Results and Discussion**

The following sections present information for each subdrainage as identified in the Project Reference Information section of this report. Biophysical information for these subdrainages is provided in tabular format in Subdrainage Watershed Reference Information at the beginning of this report. Discussions for each subdrainage are presented in different sections, while the Fish Bearing Status section presents data for reaches within all subdrainages covered by this report.

### **4.1 Small Tributaries to the Bulkley River (ILP 50501, 40512 and 40513) - Sites 151, 152, 164**

These small tributaries flow into the Bulkley River downstream from Bulkley Lake. Their entire watersheds fall within the overall project boundary under the scope of this contract.

#### **4.1.1 Access**

Access from Burns Lake to these watersheds is as follows:

- Drive west on Highway 16 for 27km and turn left onto Rose Lake cutoff road
- This road crosses reach 1 of ILP 40512 at 7.0km, reach 1 of ILP 40513 at 8.4km and reach 1 of ILP 50501 at 12.8km

#### **4.1.2 Resource Use**

Resource use within the area is dominated by logging activities and agricultural use. There is no recreational fisheries potential in these watersheds and limited overall recreational potential due to the location of the streams within cutblocks and private property.

#### **4.1.3 Habitat and Fish Distribution**

These three watersheds were very small (one 2<sup>nd</sup> order, two 1<sup>st</sup> order) and possessed no usable fish habitat. The three reaches surveyed were either dry with only a marginal trace of a channel present, or no channel was present at all. No fish species were found within these streams and no fisheries habitat potential existed.

#### **4.1.4 Fish Age, Size and Life History**

No fish use occurs within any of these streams. No spawning habitat is available in any of the surveyed reaches, and seasonal rearing for species from the Bulkley does not occur due to the lack of instream cover and rearing habitat potential. Further information on sampled reaches is available in the tables in Section 4.4. and in Appendix I.

## **4.2 Crow Creek (Watershed Code 460-917900) - Sites 153-163**

Crow Creek flows into the left bank of the Bulkley River approximately 1.1km downstream from Bulkley Lake. Only a small portion of the watershed was covered in this inventory under the scope of this contract. This includes the mainstem of Crow Creek to the end of reach 3 and three right bank tributary systems of Crow Creek within this section. These include ILP 40505, ILP 39501 and ILP 39503.

### **4.2.1 Access**

Access to the Crow Creek watershed from Burns Lake as follows:

- Drive west on Highway 16 for 27km and turn left onto Rose Lake cutoff road
- Follow this road for 8.0km then turn left onto a gated private road (need permission to enter from owner)
- Follow this road for 900m until you approach Crow Creek in reach 1

### **4.2.2 Resource Use**

Much of the Crow Creek watershed that is within the project area is located within woodlot W1529, although most of the cutblocks present in this area are at least 20 years old. There is also extensive agricultural use adjacent to Crow Creek in the lower reaches. Abundant cattle use is evident in the channel, which may have detrimental effects on fish and fish habitat in this watershed. Streams present in this watershed are generally too small to support any significant recreational angling opportunities.

### **4.2.3 Habitat and Fish Distribution**

Of the 11 surveyed reaches in this watershed, fish were found to be present only in reach 1 and reach 2 of Crow Creek. Rainbow trout, coho salmon and Pacific lamprey were present in reach 1 while only rainbow trout were encountered in reach 2. The best habitat for fish was accordingly found within these reaches. Spawning habitat for salmonids was especially prevalent in reach 1 in abundant suitable gravels, although the gravels were often intermixed with fines, reducing overall spawning habitat value. Some spawning habitat was available in reach 2 in scattered gravel pockets, but the substrate was dominated by larger cobbles that reduced spawning opportunity. Rearing and overwintering habitat was excellent for rainbow trout in both reaches, especially in deep pool and cutbank area habitat. There was more small woody debris cover in reach 1 than in reach 2, providing higher value rearing habitat for coho salmon.

The best habitat among the surveyed tributary reaches was available in the first reach of ILP 40505. This reach was accessible to fish from Crow Creek, but overall fish habitat was limited by poor water quality in the system. This reach may be used as refuge habitat for fish from Crow Creek during periods of high flow. The remaining surveyed tributary reaches had low fisheries potential, with habitat quality limited by poor water quality and the presence of beaver dams and wetlands which impede fish passage into upstream reaches.

#### 4.2.4 Fish Age, Size and Life History

Fish were present in only two of the sampled reaches in this watershed and because of the lack of data, it is difficult to accurately determine the life histories of the fish species encountered, except as it relates to the reaches sampled. The first two reaches of Crow Creek provide abundant and diverse fish habitat. Sufficient, perennial flow and suitable instream cover provide excellent overwintering opportunity for resident rainbow trout. Rearing habitat is also available to adfluvial and anadromous species which may enter the watershed from the Bulkley River. The abundant gravels and presence of juvenile coho salmon and Pacific lamprey in these reaches suggests the possible by these species for spawning.

The following table presents data for fish species encountered in this watershed.

**Table 1: Summary of length-at-age data from fish sampled in the Crow Creek watershed (WSC 460-917900)**

Stream Name	Watershed Code	Spp.	Stage	Number of Fish	Mean Length (mm)	Range of Lengths (mm)
Crow C.	460-917900	CO	J	1	73	73
		PL	J	1	193	193
		RB	F	3	30.3	25-33
			J	36	54.3	35-122
			A	5	148.0	132-180

Further information on sampled reaches is available in the tables in Section 4.4. and in Appendix I.

### 4.3 Maxan Creek (Watershed Code 460-924300) - Sites 165-226

Maxan Creek is a relatively large watershed (5<sup>th</sup> order) that flows north into the south shore of Bulkley Lake northwest of Burns Lake. Only a portion of the watershed was covered in this inventory under the scope of this contract. This includes the mainstem of Maxan Creek from its confluence with Foxy Creek to the headwaters of the watershed. Tributaries along this length of Maxan Creek within the project area included all streams that entered the right bank of Maxan Creek. All tributaries to Maxan Creek above unnamed stream -924300-90200 were also included in the project area.

#### 4.3.1 Access

The Maxan Creek watershed is well roaded and access to most reaches was by way of the Maxan, Thompson and Colleymount roads. Access to reaches for sampling was usually on foot from these roads and from cutblock spur roads. Access from Burns Lake to this watershed is as follows:

- Drive west on Highway 16 for 18.5km then turn left through Decker Lake Forest Products onto Maxan road.
- follow this road for 6km then turn right onto the Thompson road
- Follow this road for 10.5km at which point it crosses Maxan Creek below Maxan Lake in reach 1.



### 4.3.2 Resource Use

Resource use within the area is dominated by logging activities throughout the watershed. The numerous roads within the area provide good access for recreational purposes although the streams are generally too small to support significant angling opportunities. Rainbow trout are present in the headwater lakes but in very low numbers and, with the absence of boat launching facilities, it is unlikely that this lake would provide any high value sport fishing opportunity.

Historical fisheries information for the Maxan Creek watershed, obtained from FISS, includes the presence of the following species in the watershed (no specific locations):

Maxan Creek		Maxan Lake	
• rainbow trout	• chinook salmon	• mountain whitefish	• burbot
• prickly sculpin	• coho salmon	• northern squawfish	• coho salmon
• coarsescale sucker	• sockeye salmon	• peamouth chub	• coarsescale sucker
• longnose dace	• burbot	• rainbow trout	• prickly sculpin
• longnose sucker	• Dolly Varden char	• redbside shiner	• longnose sucker
• northern squawfish	• lake trout	• sockeye salmon	• lake trout
• peamouth chub	• mountain whitefish		
• redbside shiner			

### 4.3.3 Habitat and Fish Distribution

Rainbow trout and longnose sucker were the only species encountered in this inventory, and rainbow trout were only found in 7 of the 57 sampled reaches within this watershed. Of the remaining 50 sampled reaches, 5 had inferred rainbow trout use with confirmed use in upstream reaches, 5 had inferred use with a high probability of use by rainbow trout, 8 had inferred use with a low probability of use by rainbow trout and 32 of the sampled reaches were determined to be non fish-bearing.

Good rearing habitat for rainbow trout was available throughout the surveyed reaches of Maxan Creek to reach 14 (See report for John Brown Lake). Rainbow trout were present in the lake in reach 14, but no fish habitat is available above this reach. No significant spawning habitat was noted in Maxan Creek. Spawning by rainbow trout is likely opportunistic throughout the mainstem in scattered gravel pockets. Much of the mainstem is low gradient wetland type reaches with fines dominating the substrate type. Of the mainstem reaches, the best potential spawning habitat for rainbow trout was present in reach 6 and reach 12.

The best fish habitat among the surveyed tributary reaches was observed in unnamed stream - 924300-73300 which is a large system that enters Maxan Creek at the end of reach 3. This stream is a major flow contributor to Maxan Creek and offers excellent rearing habitat for rainbow trout. Some spawning habitat was noted in this stream in reach 2 and 2.1, but the substrate was generally too large and unsuitable for rainbow trout spawning. A 3.0m cascade obstruction is present at the end of reach 2.1 of this system, which impedes fish passage and may be a barrier to fish movement into upstream reaches. The cascade is located at the beginning of an inaccessible canyon which may contain further barriers to fish migration. A 5.0m falls is located at the end of reach 4 on this stream. These falls are a definite barrier to all fish species and mark the upper distribution limit for fish use in this tributary.

All remaining confirmed and inferred fish-bearing reaches possessed only marginal to fair fish habitat, with most habitat at the time of the survey available in the deeper isolated pools. Most reaches were intermittent offering only seasonal use by fish. Fish distribution limits on surveyed tributaries were usually due to an overall lack of any fish habitat or fisheries potential. However, a 4.7m high cascade barrier is present at the end of reach 2 of ILP 30040 which marks the upper distribution limit for fish use in this system.

#### 4.3.4 Fish Age, Size and Life History

Reach sampling in Maxan Creek commenced in reach 6 and only rainbow trout and longnose sucker were found in the watershed above this reach. Reach 6 is preceded by extensive low gradient wetland reaches with numerous beaver dams dispersed throughout, as identified in air photo interpretation. Downstream reaches of the mainstem were largely inaccessible for sampling being too deep to approach the channel. These reaches likely impede fish movement and use of the upper Maxan watershed by the numerous species present in Maxan Lake. Seasonal migration by juvenile and adult rainbow trout likely only occurs to a small extent, limited to migrations between easily accessible reaches. Most spawning and rearing by rainbow trout is likely occurring throughout the mainstem reaches of Maxan Creek, with seasonal movement possible into a few of the lower reaches of accessible tributaries. This movement probably does not occur to a large extent, given the lack of significant habitat in most of the surveyed tributaries.

The following table presents data for fish species encountered in this watershed.

**Table 2: Summary of length-at-age data from fish sampled in the Maxan Creek watershed (WSC 460-924300)**

Stream Name	Watershed Code	Spp.	Stage	Number of Fish	Mean Length (mm)	Range of Lengths (mm)
Maxan C.	460-924300	RB	F	4	31.8	30-34
			J	30	74.3	30-117
		LSU	F	9	27.8	20-32
			J	10	59.5	39-80

Further information on sampled reaches is available in the tables in Section 4.4. and in Appendix I.

## **4.4 Fish Bearing Status**

The following three sections summarize the fish-bearing status for all surveyed reaches within the Bulkley River watershed. The first section summarizes all surveyed reaches, the second section presents information for all non fish-bearing reaches, while the third section identifies reaches where follow-up sampling should be conducted.

### **4.4.1 Summary of all Surveyed Reaches**

Table 3 on the following pages summarizes all surveyed reaches in all subdrainages in the Bulkley River Watershed. In addition to confirmed fish-bearing reaches, non fish-bearing reaches and reaches requiring follow-up sampling have also been identified and summarized in this table. They are also discussed in further detail in the “Non Fish-bearing Reaches” and “Follow-up Sampling required” sections of this report.

### **4.4.2 Non Fish Bearing Reaches**

Table 4 summarizes all reaches that have been assigned a non fish-bearing FPC classification. Justification for the non fish-bearing classification is provided in the comments section of the table.

**Table 3: Summary of data from all surveyed reaches in subdrainages of the Bulkley River watershed**

Stream name	Watershed Code/ ILP	Reach	Site	Species	Channel		Proposed Riparian Class	Follow-up Sampling <sup>2</sup> (Y, N or blank)	Comments
					Width	Gradient			
<b>BULK Watershed Group</b>									
Subdrainage ILP 50501 (Broman Sub-Unit)									
	50501	1	151		NVC	NVC	NVC	N	
Subdrainage ILP 40512 (Broman Sub-Unit)									
	40512	1	152		1.6	5.0	S6	N	
Crow Creek - Subdrainage 460-917900 (Crow Foxy Sub-Unit)									
Crow C.	460-917900	1	153	CO PL RB	9.4	2.0	S2		
Crow C.	460-917900	2	154	RB	5.6	3.0	S2		
	40505	1	155		1.8	2.3	S3	Y	
	40505	4	156		2.3	3.6	S3	Y	
	40505	8	157		1.5	7.3	S6	N	
	40508	1	158		1.5	2.2	S6	N	
	39501	1	159		NVC	NVC	NVC	N	
	39503	1	160		0.6	0.8	S4	Y	
	39503	2	161		1.2	2.5	S4	Y	
	39504	1	162		0.6	2.5	S4	Y	
	39505	1	163		0.8	4.3	S4	Y	
Subdrainage ILP 40513 (Broman Sub-Unit)									
	40513	1	164		1.6	15.3	S6	N	
Maxan Creek - Subdrainage 460-924300 (Maxan Sub-Unit)									
Maxan C.	460-924300	6	165	RB	2.8	2.6	S3		RB confirmed in u/s reaches
Maxan C.	460-924300	7	166		1.6	0.7	S3		RB confirmed in u/s reaches
Maxan C.	460-924300	9	167		2.1	0.7	S3		Based on u/s channel widths, fish u/s
Maxan C.	460-924300	10	168	LSU	1.0	1.8	S3		RB use confirmed in lake u/s
Maxan C.	460-924300	12	169	LSU	1.5	1.9	S3		RB use confirmed in lake u/s
Maxan C.	460-924300	13	170	LSU	1.0	0.8	S4		RB use confirmed in lake u/s
Maxan C.	460-924300	15	171		NVC	NVC	NVC	N	

<sup>2</sup> Blank cell indicates confirmed fish presence with no follow up sampling required  
 "N" indicates a non fish-bearing reach- See "Non fish-bearing reaches" section  
 "Y" indicates an inferred fish-bearing reach with low probability of fish use - See "Follow-up Sampling Required" section  
 "Y" indicates an inferred fish-bearing reach with high probability of fish use - See "Follow-up Sampling Required" section

Stream name	Watershed Code/ ILP	Reach	Site	Species	Channel		Proposed Riparian Class	Follow-up Sampling <sup>2</sup> (Y, N or blank)	Comments	
					Width	Gradient				
	460-924300-36500	1	172			1.3	2.4	S4	Y	
	460-924300-36500	2	173			0.6	1.3	S4	Y	
	40005	1	174			0.7	1.1	S4	Y	
	40009	1	175			NVC	NVC	NVC	N	
	40011	1	176			0.5	3.6	S6	N	
	30020	1	177			0.6	11.8	S6	N	
	30022	1	178			1.0	4.6	S4	Y	
	30022	3	179			1.6	2.4	S4	Y	
	30029	1	180			NVC	NVC	NVC	N	
	30039	1	181			NVC	NVC	NVC	N	
	30040	2	182	RB		1.9	13.8	S3	N	
	30040	3	183			1.8	13.3	S6	N	
	460-924300-58900	2	184	RB		2.5	5.3	S3		
	460-924300-58900	3	185	RB		4.9	6.0	S3		
	30068	1	186			0.6	5.3	S6	N	
	30069	1	187			0.8	11.3	S4	Y	
	30070	1	188			0.4	4.0	S6	N	
	30073	1	189			NVC	NVC	NVC	N	
	460-924300-62900	1	190			0.7	2.0	S6	N	
	30081	1	191			NVC	NVC	NVC	N	
	460-924300-66900	2	192			1.0	22.5	S6	N	
	30091	1	193			NVC	NVC	NVC	N	
	30093	2	194			NVC	NVC	NVC	N	
	460-924300-73300	2	195	RB		3.5	1.8	S3		
	460-924300-73300	2.1	196	RB		3.7	4.0	S3		
	460-924300-73300	4	197			5.0	3.3	S3	Y	
	460-924300-73300	5	198			3.8	6.3	S5	N	
	460-924300-73300	8	199			2.2	1.9	S6	N	
	30110	1	200			0.8	29.3	S6	N	
	20016	1	201			0.3	11.3	S6	N	
	20017	1	202			0.8	2.7	S6	N	
	20018	2	203			1.1	2.8	S4	Y	
	20020	2	204			0.5	4.0	S6	N	
	20022	2	205			0.5	19.8	S6	N	
	20023	1	206			0.6	19.3	S6	N	
	20025	1	207			0.8	3.3	S4	Y	

Stream name	Watershed Code/ ILP	Reach	Site	Species	Channel		Proposed Riparian Class	Follow-up Sampling <sup>2</sup> (Y, N or blank)	Comments
					Width	Gradient			
	20026	1	208			NVC	NVC	N	
	460-924300-90200	1	209			1.6	S3	Y	
	460-924300-90200	3	210			1.7	S3	Y	
	460-924300-90200	4	211			1.1	S6	N	
	20028	1	212			0.6	S4	Y	
	460-924300-90900	1	213	RB		1.6	S3		
	460-924300-90900	5	214			NVC	NVC	N	
	460-924300-90900-37674	1	215			0.4	S4	Y	
	20031	1	220			0.7	S6	N	
	460-924300-96000	3	221	LSU		1.1	S6	N	
	20034	1	222			0.3	S6	N	
	20035	1	223			0.6	S6	N	
	20036	1	224			0.7	S6	N	
	20038	1	226			0.7	S6	N	

**Table 4 Summary of data from surveyed non-fish-bearing reaches in subdrainages of the Bulkley River Watershed**

Stream name	Watershed Code/ ILP	Reach	Site	Gradient (%)	Electrofishing Specifications			Comments	
					Dist (m)	Time (s)	Cond (uS)		Temp (C.)
<b>BULK Watershed Group</b>									
Subdrainage ILP 50501 (Broman Sub-Unit)									
	50501	1	151	NO VISIBLE CHANNEL				No trace of channel present over entire site - agricultural pasture. No fish habitat or fisheries potential.	
Subdrainage ILP 40512 (Broman Sub-Unit)									
	40512	1	152	5.0	4	5	132	5.5	No channel present at mouth - water disperses through ground. No fish habitat or fisheries potential.
Crow Creek - Subdrainage 460-917900 (Crow Foxy Sub-Unit)									
	40505	8	157	7.3	250	72	127	8.0	Seasonal and intermittent channel with no fish habitat or fisheries potential.
	40508	1	158	2.2					Seasonal, dry channel; flooded at high water. No fish habitat or fisheries potential.
	39501	1	159	NO VISIBLE CHANNEL					No channel present - slight depression in terrain with no fish habitat or fisheries potential.
Subdrainage ILP 40513 (Broman Sub-Unit)									
	40513	1	164	15.3					Dry, seasonal channel, 25% gradient at mouth and inaccessible to fish. No fish habitat or fisheries potential.
Maxan Creek - Subdrainage 460-924300 (Maxan Sub-Unit)									
Maxan C.	460-924300	15	171	NO VISIBLE CHANNEL					No channel present at mapped location.
	40009	1	175	NO VISIBLE CHANNEL					No defined channel present - runoff only? Lacks continuous banks and fluvial substrate, perennially vegetated. No fish habitat or fisheries potential.
	40011	1	176	3.6					Small, intermittent, dry seasonal channel, steep at mouth. No fish habitat or fisheries potential.
	30020	1	177	11.8	190	300	172	11.0	Tiny, shallow, seasonal and intermittent channel with no fish habitat or fisheries potential.
	30029	1	180	NO VISIBLE CHANNEL					Wetland reach with no defined channel present. No fish habitat or fisheries potential.
	30039	1	181	NO VISIBLE CHANNEL					Wetland reach with no defined channel present. No fish habitat or fisheries potential.
	30040	3	183	13.3	104	47	125	10.0	Trace of habitat present for RB, but isolated above 4.7m high cascade at end of reach 2 downstream. No fish present above cascade.
	30068	1	186	5.3	90	142	288	11.0	Intermittent shallow trickle over fines, channel deteriorates 50m upstream from mouth. No fish habitat or fisheries potential.

Stream name	Watershed Code/ ILP	Reach	Site	Gradient (%)	Electrofishing Specifications				Comments
					Dist (m)	Time (s)	Cond (uS)	Temp (C.)	
	30070	1	188	4.0	50	10	243	10.0	Tiny, very shallow channel with no usable fish habitat or fisheries potential.
	30073	1	189		NO VISIBLE CHANNEL				No channel present at mapped location. No usable fish habitat or fisheries potential.
	460-924300-62900	1	190	2.0	100	23	87	10.0	Small intermittent channel with no suitable fish habitat or fisheries potential.
	30081	1	191		NO VISIBLE CHANNEL				No channel present at mapped location. No usable fish habitat or fisheries potential.
	460-924300-66900	2	192	22.5	200	40	213	10.0	Too steep for fish use and isolated above 16m high cascade barrier at start of reach; no perennial flow to support resident RB population.
	30091	1	193		NO VISIBLE CHANNEL				No channel present at mapped location. No fish habitat or fisheries potential.
	30093	2	194		NO VISIBLE CHANNEL				No channel present at mapped location. No fish habitat or fisheries potential. "Channel" lacks continuous banks or fluvial substrate for 50m then totally disappears.
	460-924300-73300	5	198	6.3	426	375	254	11.0	Good habitat but isolated above 5m falls barrier at end of reach 4 downstream. No fish present above falls.
	460-924300-73300	8	199	1.9	233	186	251	13.0	Good habitat but isolated above 5m falls barrier at end of reach 4 downstream. No fish present above falls.
	30110	1	200	29.3					Small, intermittent and too steep for fish use.
	20016	1	201	11.3	80	39	423	12.0	Moderately steep, intermittent shallow trickle over fines with no fish habitat or fisheries potential. Deteriorates further 70m from mouth.
	20017	1	202	2.7	200	53	128	11.0	Tiny shallow trickle over fines with no fish habitat or fisheries potential.
	20020	2	204	4.0	175	138	172	10.0	Marginal habitat but isolated due to lack of channel and fish access in reach 1 downstream (observed, but no site)
	20022	2	205	19.8	300	130	173	11.0	Too steep for fish use and overall lack of fish habitat and fisheries potential. Also see comment for site 204.
	20023	1	206	19.3	90	10	157	10.0	Seasonal and intermittent trickle over fines, steep with no fish habitat or fisheries potential.
	20026	1	208		NO VISIBLE CHANNEL				No channel present - dry meltwater channel with no continuous banks or fluvial substrate. No fish habitat or fisheries potential.
	460-924300-90200	4	211	6.1	200	108	179	8.0	Moderate fish habitat but isolated above 15m high cascade barrier at lower boundary. No fish present above cascade.
	460-924300-90900	5	214		NO VISIBLE CHANNEL				No channel present. Lacks continuous banks and fluvial substrate. Isolated mudholes with no fish habitat or fisheries potential.
	20031	1	220	2.8	100	30	268	11.0	Intermittent channel with few isolated pools. Channel disperses at mouth into wetland surrounding lake. No fish habitat or fisheries potential.
	460-924300-96000	3	221	1.0	300	83	107	10.0	Wetland reach with turbid stagnant water and no salmonid habitat or potential.



Stream name	Watershed Code/ ILP	Reach	Site	Gradient (%)	Electrofishing Specifications				Comments
					Dist (m)	Time (s)	Cond (uS)	Temp (C.)	
	20034	1	222	0.5					Intermittent with seasonal trickle through wetland and no RB habitat or potential.
	20035	1	223	1.0					Tiny, seasonal, dry channel with no salmonid habitat or potential. Channel disappears 100m upstream from mouth
	20036	1	224	2.5					Small, seasonal dry channel with no potential RB habitat or use.
	20038	1	226	10.5	60	49	NS	4.0	Small, shallow, fan-type reach into lake at moderate gradient. Only one RB caught in lake survey downstream. Lacks suitable substrate for spawning in spring. No suitable fish habitat.

#### 4.4.3 Follow-up Sampling Required

Table 5 on the following page summarizes the need for follow-up sampling in reaches where fish presence has been inferred. The table doesn't include inferred fish-bearing reaches where fish presence was confirmed in upstream reaches. A level of confidence has also been included in the table to facilitate prioritization of the follow-up sampling process. Each reach has been assigned a priority number of either 1 or 2 where,

- **Priority 1:** unlikely fish use (marginal fish habitat at any time)
- **Priority 2:** likely fish use (fish habitat available or potentially available, easily accessible)

It is anticipated that follow-up sampling in Priority 1 reaches will result in a confirmation of fish absence in a reach, while sampling in Priority 2 reaches have a high probability of confirming fish presence. However, some discretion should be used in the follow-up sampling process. In some reaches, sampling conditions were not conducive to the capture of fish and more successful attempts at sampling may be made in bordering reaches that weren't sampled but may offer better habitat and thus a better probability of confirming fish presence in the system.

**Table 5: Follow-up sampling required for classification of inferred fish-bearing reaches in subdrainages of the Bulkley River Watershed**

Stream name	Watershed Code/ ILP	Reach	Site	Timing	Method	Priority	Comments
<b>BULK Watershed Group</b>							
<b>Crow Creek - Subdrainage 460-917900 (Crow Foxy Sub-Unit)</b>							
	40505	1	155	June	EF	2	Resample for RB at higher flow. Accessible from Crow Creek and potential refuge habitat near mouth
	40505	4	156	June	EF	1	Resample for RB at higher flow. BD's downstream may block access for fish from Crow Creek
	39503	1	160	June	MT	1	Resample for RB at higher flow to determine if BD at mouth is blocking fish access and use of this system
	39503	2	161	June	MT	1	Resample for RB at higher flow to determine fish presence above BD at mouth of ILP 39503
	39504	1	162	June	MT	1	Resample for RB at higher flow to determine fish presence above BD at mouth of ILP 39503
	39505	1	163	June	MT	1	Resample for RB at higher flow to determine fish presence above BD at mouth of ILP 39503
<b>Maxan Creek - Subdrainage 460-924300 (Maxan Sub-Unit)</b>							
	460-924300-36500	1	172	June	MT	2	Resample for RB. Moderate RB habitat and accessible from Maxan Lake d/s.
	460-924300-36500	2	173	June	MT	2	Resample for RB. Marginal RB habitat but accessible from Maxan Lake d/s.
	40005	1	174	June	EF	1	Resample for RB at higher flow. Marginal RB habitat but accessible from Maxan Creek
	30022	1	178	June	EF	2	Resample for RB at higher flow. Marginal RB habitat but accessible from Maxan Creek
	30022	3	179	June	EF	1	Resample for RB at higher flow. Marginal RB habitat but potentially accessible from Maxan Creek to end of this reach
	30069	1	187	June	EF	1	Resample for RB at higher flow. Poor RB habitat but accessible from Maxan Creek
	460-924300-73300	4	197	June	EF	1	Resample for RB in this reach and in reach 3 d/s (unsampled) to determine fish presence above 3m cascade at end of reach 2.1. Falls at end of this reach mark upper fish distribution limit.
	20018	2	203	June	EF	2	Resample for RB at higher flow. Marginal RB habitat but accessible from Maxan Creek.
	20025	1	207	June	EF	1	Resample for RB at higher flow. Marginal RB habitat and BD at mouth may impede access for fish from Maxan Creek
	460-924300-90200	1	209	June	MT	2	Resample for RB. Potential RB access and habitat at higher flow.
	460-924300-90200	3	210	June	MT	1	Resample for RB. Potential RB access and habitat at higher flow
	20028	1	212	June	EF	1	Resample for RB. Potential RB access and habitat at higher flow
	460-924300-90900-37674	1	215	June	MT	1	Resample for RB. Potential RB access and habitat at higher flow

## 5. Bibliography

Hancock, M.J., Leaney-East, A.J., Marshall, D.E. 1983. Catalogue of Salmon Streams and Spawning Escapements of Statistical Area 4 (Upper Skeena River). Canadian Data Report of Fisheries & Aquatic Sciences. No. 394.

AGRA Earth and Environmental Ltd. 1996. Part 3: Level I Fish Population and Riverine Habitat Assessment Maxan Watershed. February 1996. Prince George, B.C. iv + 25pp +Appendix 1.

Fish presence and distribution information within the project area was also obtained from FISS maps within the Smithers MELP regional library. These maps included: 93K/4, 93L/1 and 93L/8.

## **6. Appendices**

### **6.1 Appendix I: FDIS Site Card and Fish Form Reports and Representative Photographs**

### **6.2 Appendix II: Hardcopy maps**

**Reconnaissance (1:20,000) Fish and Fish Habitat  
Inventory**

**Subdrainages in the  
Bulkley River Watershed**

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