

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

Shovel/Maxan Sub-units Fish Inventory - 1999

WSC's:

180-374000-95200-01900-4090: Shovel C. Watershed
460-924300: Maxan C. Watershed

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Project Reference Information

FRBC Multi-Year Agreement Number	0000105	
MELP Project Number	BFP-C016-001-2000	
FRBC Activity Number	10437	
	Shovel C.	Maxan C.
FDIS Project Code:	2099	2102
FDIS Project WSC:	180-374000-95200-01900-4090	460-924300
FRBC Region	Smithers Region	Smithers Region
MELP Region	06 - Skeena	06 - Skeena
FW Management Unit	6-5	6-9
DFO Sub-District	29I	4D
First Nations Claim Areas	Carrier-Sekani Tribal Council	Carrier-Sekani Tribal Council/ Gitksan-Wet'suwet'en Tribal Council
Forest Region	Prince Rupert	
Forest District	Lakes Forest District	
Forest Licensee and Tenure #	Babine Forest Products Company Forest Licences A-16823 and A-16825	

Watershed Information (see Specific Watershed Reference Information on following page)

Watershed Group	FRAN & BULK	
Watershed Name	Shovel and Maxan Creek Watersheds	
Watershed Code	See following table	
UTM at Mouth	See following table	
Watershed Area (km²)	349	
Total of all Stream Lengths (km)	374	
Stream Order	See following table	
NTS Maps	93 K/3, 93 K/6, 93 L/1, 93 L/8	
TRIM Maps	93K.024, 93K.025, 93K.026, 93L.020, 93L.030, 93L.040	
BEC Zone	SBS	
Air Photos	<u>30BCC97147</u> : 127-145;	<u>30BCC96063</u> : 068-073
	<u>30BCC97146</u> : 58-72; 76-92	<u>30BCC96114</u> : 049-055; 167-173
	<u>30BCC97149</u> : 7-13	<u>30BCC96122</u> : 182-187
	<u>30BCC90062</u> : 102-104; 225-229	<u>30BCC96123</u> : 041-045
	<u>30BCB90097</u> : 17-23	

Sampling Design Summary

Total Number of Reaches	564
Random Sample Reaches	31
Discretionary Sample Reaches	61
Total Sample Reaches	92
% of Reaches Sampled	16.3

Field Sampling Dates October 10 to October 28, 1999

Specific Watershed Reference Information

Sub-Unit	Project Watershed Code	Watershed Name	Watershed Code	Sites	UTM at Mouth (Shovel Lake outlet and Maxan Lake outlet)	Watershed Area (km2)	Total of all Stream Lengths (km)	Stream Order	NTS Map(s)	TRIM Maps	BEC Zone	Fish Species Present
Major Watersheds (streams 4th order or greater)												
Shovel	180-374000-95200-01900-4090	Shovel Creek ¹	180-374000-95200-01900-4090	183-231	10.358460.6007540	108	199	5	93 K/3, 93 K/6	93K.024, 93K.025, 93K.026	SBS	CAS LSU MW RB
Maxan	460-924300	Maxan Creek ²	460-924300	232-275	10.297170.6023650	103	174	5	93 L/1, 93 L/8	93L.020, 93L.030, 93L.040	SBS	RB

¹ Includes only that portion of the watershed within the Shovel sub-unit. Comprises the watershed from Shovel Lake (including tributaries) to tributary –4090-7520, located 4.2km upstream from Hanson Lake

² Includes only left bank tributaries to Maxan C. upstream from Maxan Lake (including Maxan Lake tributaries). Right bank tributaries in this area completed in prior Reconnaissance Inventories.

Abbreviations Used in this Report

BGC	biogeoclimatic zone	MELP	Ministry of Environment, Lands and Parks
BB	burbot (<i>Lota lota</i>)	M/L	mainline
C	clear (not turbid)	MT	minnow trap
C.	creek	MW	mountain whitefish (<i>Prosopium williamsoni</i>)
CAS	prickly sculpin (<i>Cottus asper</i>)	NA	not applicable
CD	compact disc	NCD	not classified drainage
CO	coho salmon (<i>Oncorhynchus kisutch</i>)	NFC	no fish captured
Cond.	conductivity	NFP	no fish present
CPUE	catch per unit effort	NS	not sampled
CT	cutthroat trout (<i>O. clarki</i>)	NTS	National Topographic Survey
Cw	channel width	NVC	no visible channel
DFO	Department of Fisheries and Oceans	Prop	proposed
Dist.	distance	R.	river
d/s	downstream	RB	rainbow trout (<i>O. mykiss</i>)
EF	electrofishing	Rd	road
FDIS	Field Data Information System	Rip	riparian
FISS	Fisheries Information Summary System	RSS	regionally significant species
FPC	Forest Practices Code	S2 - S6	riparian classes
FRBC	Forest Renewal of British Columbia	s	seconds
FRIM	Reconnaissance (1:20,000) Fish and Fish Habitat Inventory: Standards and Procedures (Version 1.1)	S	small size stream
Grad	slope gradient	SBS	Sub-Boreal Spruce BGC
H	high flow	SK	sockeye salmon (<i>O. nerka</i>)
Hz	Hertz	S/S/I	straight, sinuous or irregular wandering channels
ILP	Interim Locational Point	Spp.	species
I/M/T	irregular meandering, meandering or tortuous meandering channels	ST/SI/IR	straight, sinuous or irregular wandering channels
IM/ME/TM	irregular meandering, meandering or tortuous meandering channels	T	turbid
Info.	information	TRIM	Terrain Resource Information Management
km	kilometer	Turb	turbidity
KO	kokanee (<i>O. nerka</i>)	u/s	upstream
L	low flow, lightly turbid or large size stream	UTM	Universal Transverse Mercator coordinates
L.	lake	V	volts
LKC	lake chub (<i>Couesius plumbeus</i>)	Wb	bankfull depth
LSU	longnose sucker (<i>Catostomus catostomus</i>)	WSC	watershed code
LWD	Large Woody Debris	µs	microseconds
m	meter	µS	microsimens
mm	millimeter	°C	temperature
M	moderate flow, moderate turbid or medium size stream	%	slope gradient

Contractor Information

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Acknowledgments

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List of Attachments Available at Regional MELP Office in Smithers

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 Album of all negatives uniquely labeled in plastic sleeves
- iv) 1 Indexed Copy of Photo CD's with numbered images and thumbnail references in each CD jacket

Attachment IV Field Data

- i) site cards, fish collection forms, individual fish data forms and field notes
- ii) field working maps

Attachment V 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 drainages within the Babine Lake watershed group. This is a continuation of a multi-year FRBC project commenced in 1996 for Babine Forest Products Company.

These inventories have a multi-phased approach with a total of six phases required to complete the inventory. Phases I through III are known as the pre-field phases and consist of 1) existing data review, 2) classification and sampling design and, 3) project plan. Phase IV consists of field data collection where site level fish and fish habitat data is collected for pre-determined reaches. Phases V and VI embody data compilation, mapping and reporting for the project. This report encompasses Phases V and VI of this project. However, the pre-field deliverables and project-planning document (available at the MELP Regional office in Smithers) are essential references for this report.

Specific watersheds assessed within this project area include the Shovel Creek watershed within the Shovel sub-unit and the Maxan Creek watershed in the Maxan sub-unit in the Babine Forest Products operating area (see “Watershed Reference Information” at the beginning of this report). No lakes were surveyed as part of this project.

1.2 Location

The Shovel Creek watershed is part of the Francois Lake (FRAN) high-level watershed group and is a major tributary to the Endako River east of Burns Lake. The Maxan Creek watershed is part of the Bulkley River (BULK) high-level watershed group and is a tributary to Bulkley Lake located northwest of Burns Lake. The location map (Figure 1) on the following page provides the general location of the study area.

1.2.1 Access

The predominant modes of access to reaches within the study area watersheds were by vehicle and by boat. Several Hanson Lake tributaries were accessed by boat, but most reaches within the project area were accessed by vehicle from various logging roads and cutblock spur roads.

Directions to the Shovel Creek watershed from Burns Lake is as follows:

- Drive east on Highway 16 for 21km to the Augier mainline (at the flashing yellow light)
- Turn left onto Augier road and drive to the Hannay road at the 7km board
- Turn right onto the Hannay road and follow it to the 29km board
- Turn right onto Hanson Lake road and follow this road for 3km at which point it crosses Shovel Creek in reach 4 below Hanson Lake.
- Reaches within this watershed were primarily accessed by vehicle via the Hannay, Hanson and Roof Creek roads

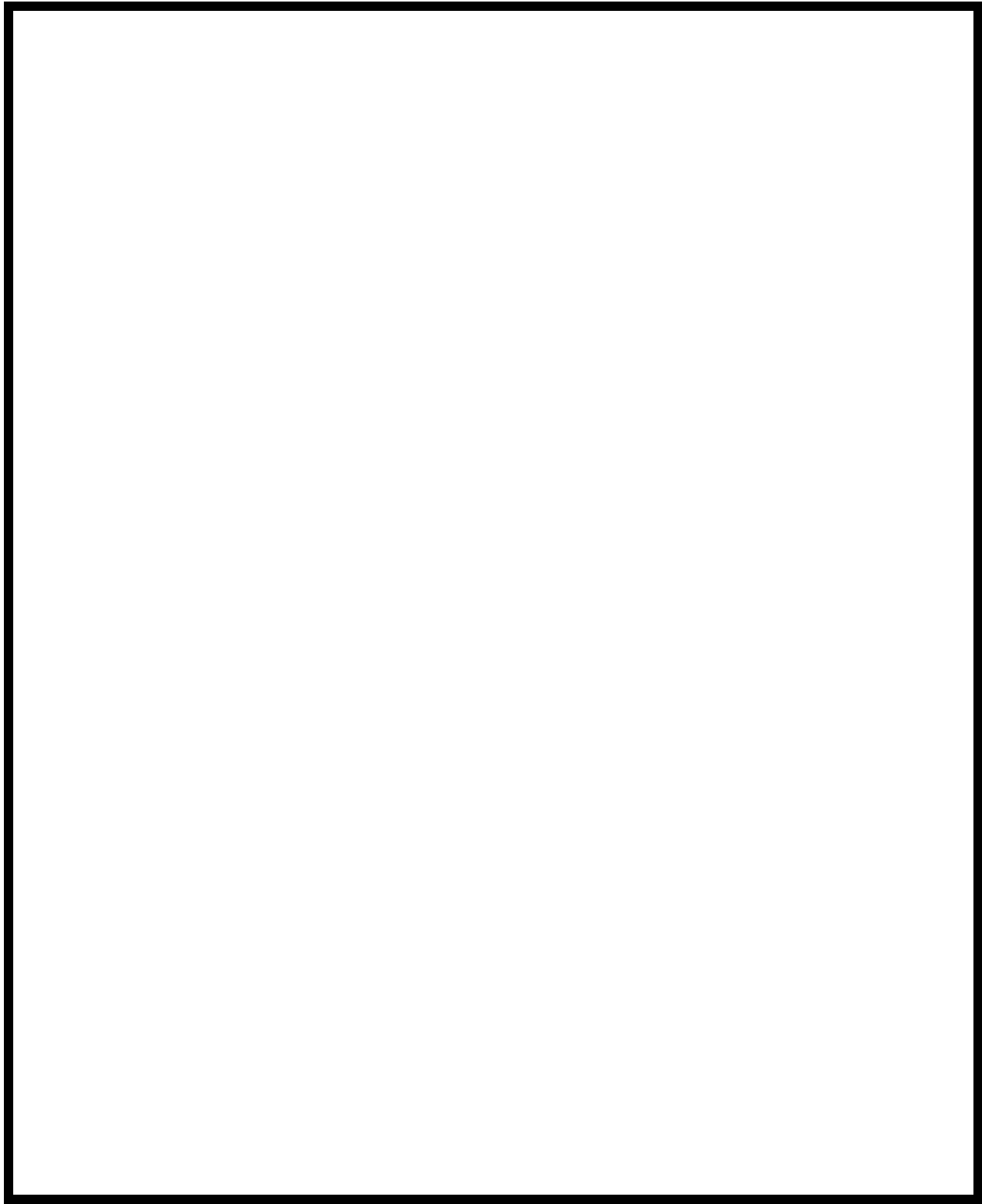


Figure 1: Location of project area. (Inset map shows the location within the province of British Columbia. Map scale is 1:600,000.)

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 to the Maxan Creek watershed from Burns Lake 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.

2. Resource Information

There are a variety of resources available within the watersheds selected for sampling:

1. The primary resource use within both the Maxan and Shovel Creek watersheds is forest management for timber extraction in Babine Forest Products operating area.
2. Both Maxan and Hanson lakes are accessible by vehicle and provide good sport fishing opportunities. A forest service recreation site is located on the northern end of Maxan Lake that provides boat-launching facilities. Other recreational opportunities include hiking and hunting.
3. The Shovel Creek watershed is located entirely within the Carrier-Sekani Tribal Council claim area while the Maxan Creek watershed is located within the Gitksan-Wet'suwet'en Tribal Council and Carrier-Sekani Tribal Council claim areas.
4. No significant wildlife use or impacts were noted within this area.
5. Historical information regarding fish presence was collected and presented in the planning report (FINS, 1999) and the results were incorporated into the interpretive maps for this project. Table 1 below summarizes historical fish presence within the selected watersheds.

Table 1: Historical information on fish presence within the project area watersheds

Stream Name	Fish Species	Dates
Shovel C.	CSU, KO, LKC, LSU, MW, RB, RSCRB	FISS – unknown
Maxan C.	BB, CAS, CO, CSU, LSU, LT, MW, NSC, PCC, RB, RSC, SK	FISS – unknown

* FISS = Fisheries Information Summary System

3. Methods

3.1 Project Plan and Alterations

Initial work, such as review of all existing information, preparation of fisheries information maps, location of stream features and selection of sample sites was completed during Phase 1-3 by FINS (Sept, 1999). The original planning report identified 97 reaches for sampling (37 random and 60 discretionary) within 563 total reaches in the study area. Upon completion of Phase 4, the actual number of sample sites was 92 (31 random and 61 discretionary). Sampling of six randomly selected reaches did not occur for several reasons. One of the reaches was determined to be non fish-bearing downstream in the watershed, one reach was substituted in the field with a reach that provided better opportunity to determine fish distribution in the system, and four reaches were inaccessible for sampling. Nine of the originally chosen discretionary sites were not sampled, six of which were located upstream of the extent of fish use determined for the watershed. Three of these reaches were substituted in the field with reaches that provided better opportunity to determine fish distribution in the system. Discretionary sample reaches were added in the field, chosen from a list of contingency sample reaches, so that all reach categories remained appropriately represented.

3.2 Reconnaissance Standards

Methodology used throughout this project was 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 (including all errata), and all standards referenced therein.

Fish Sampling

Electrofishing and visual observation were the primary methods used for fish sampling throughout the field portion of the project. These methods were to be supplemented by the use of minnow traps, when logistically feasible, when electrofishing was not effective or potentially harmful to fish (i.e. deep wetland channels, low water temperatures) and sampling results were inconclusive, but these circumstances did not occur.

The presence of bull trout and/or Dolly Varden char was expected in the Maxan Creek watershed. Sampling in this watershed therefore considered the different habitat requirements for these species, but none were encountered. However, the methodology for reconnaissance inventories of this type generally lacks the concentrated efforts within specific habitat types to target this species. Distribution of bull trout and Dolly Varden char would be better investigated in a separate inventory that could specifically focus on their habitat requirements.

Measurements

Stream channel and wetted widths were determined using a meter stick for smaller streams and a hip chain for streams with channel widths greater than 2.0m. A minimum of six channel width measurements were made along each site at a distance of approximately one channel width 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 hip chain or by ground estimate. Measurements of falls were

based on ground estimates or calculated using distance/ gradient while cascade heights and lengths were determined using a hip chain and Abney level. Vertical cascade height was calculated using the gradient and slope distance according to the formula:

$$\text{Height (m)} = \sin(\tan^{-1}(\text{gradient (\%)}) \times \text{slope distance (m)})$$

Stream water temperatures were determined using an alcohol thermometer while pH and conductivity measurements were made using Oakton portable meters, which were calibrated weekly using standardized solutions.

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 project. 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. ILP number assignments for the 1999 project begin at **700 to avoid overlapping of ILP numbers that were assigned in the 1997 and 1998 projects. That is, the first ILP on TRIM mapsheet 93K.061 would be ILP 61700. There was no overlap of mapsheet numbers among the different TRIM map series (i.e. 93K vs. 93 L series). 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 three types of situations in which site assessment in the field revealed no visible channel. 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. These different types of NVC reaches were noted in the comments on the site cards and are summarized in the "Fish-Bearing Status" section of this report. It is expected that NVC reaches would receive a "Non Classified Drainage (NCD) FPC classification.

Appendix I Layout - FDIS Reach/Site Summaries, Site Cards, Fish Forms and Photographs

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

referenced in the report, the FDIS database, the negative binder or the photo CD's. All photos were scanned onto CD's with high-resolution index prints enclosed in the CD's jacket (Attachment III).

Field Equipment

All sampling equipment specifications are listed below:

- 2 Smith-Root model 12B P.O.W. Backpack Electrofishers
- 50 Gee-type minnow traps
- 2 Oakton pHTestr2 pH meters (with pH 7 & 10 buffer solutions)
- 2 Oakton TDSTestr3 conductivity meters (with 1413 μ S/cm solution)
- 2 Abney Levels, alcohol thermometers, Silva compasses
- 2 Pentax Zoom 90WR cameras
- assorted other equipment including tight chains, hip chains, dip nets, fishing rods, magnifying lenses, meter sticks
- 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
- Dissecting kit

4. Results and Discussion

The following sections present information for watersheds as described in the Project Reference Information section of this report. Biophysical information for these watersheds is provided in tabular format in the Watershed Information and Specific Watershed Information sections at the beginning of this report. Both watersheds in this study area are part of separate 5th order basins within the Shovel and Maxan sub-units. The following sections provide a brief discussion regarding fish and fish habitat information for each of the above watersheds and are discussed separately below. Summarized information for all sampled reaches is presented in tabular format in the “Fish Bearing Status section” of this report while detailed site-specific information is available in the Appendices.

4.1 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 low water levels on sampling effectiveness. Intermittent or dry channels were common which often resulted in very limited sampling possibilities within the site due to the lack of sufficient water. However, presence and accessibility of fish habitat at higher flow conditions was considered in determining potential fish use. No other logistical problems were encountered.

4.2 Habitat and Fish Distribution

The presence of barriers to fish migration was confirmed in several streams within the project area. These are summarized in Table 2 below.

Table 2: Summary of historic and new barriers to fish migration found in the Shovel/Maxan sub-units

Stream Name	Watershed Code/ILP	TRIM Map	Reach	Site	Barrier Type	Height (m)	Length (m)	Verified in Field	Comments
	30002	93L.030	0.1	238	Cascade	2.8	11	Y	26% cascade over 11m, preceded and followed by two 1.5m falls without plunge pools. Impassable to all fish species. Located at the end of reach 0.1, 1.6km u/s from 460-924300-43400.
	460-924300-58800	93L.030	6	255	Falls	9		Y	Impassable to all fish species. Located within reach 6, 5.2km u/s from Maxan Creek.
	460-924300-74200	93L.020	6	268	Beaver Dam	1.3	60	Y	Possible obstruction to RB. Located within reach 6, 4.6km u/s from Maxan Creek.

4.2.1 Shovel Creek

Fish species encountered in this watershed include prickly sculpin, longnose sucker, rainbow trout and mountain whitefish. All of these species were present in the mainstem of Shovel Creek while only rainbow trout were found in tributaries. Of the tributaries, only two of the larger systems were found to contain rainbow trout. None were present in any of the 1st order streams.

Reaches 2 and 4 of Shovel Creek provide excellent overall fish habitat. Rearing for salmonids is excellent, primarily in areas with deep pool and small woody debris type cover in reach 2 and in

pools and areas containing large woody debris in reach 4. The abundance of very deep pools within both reaches also provides excellent overwintering habitat. Reach 4 also has excellent salmonid spawning habitat. Abundant suitable gravels and numerous deep holding pools are present throughout the reach, providing good spawning opportunities. Hundreds of spawning mountain whitefish were observed at the upper end of reach 4 in the 50m section immediately downstream from the Hanson Lake outlet.

Rainbow trout were present in two of the larger tributaries to Shovel Creek. These include ILP 25774 and -4090-5670. Of these, ILP 25774 is larger and provides significant habitat for rainbow trout. Rainbow trout were present throughout the mainstem of ILP 25774 to reach 11 as well as in two of its tributaries, ILP 25777 and 25789. Excellent rearing habitat is available throughout the mainstem reaches of ILP 25774 within diverse and abundant cover. Pool type habitat predominates overall and consists of cascade pools, step pools and riffle pools /large woody debris within the various reaches. Rearing habitat is also excellent in both ILP 25777 and ILP 25789, mainly in step-pools in both streams. Overwintering habitat is excellent in abundant deep pool areas throughout the mainstem reaches of ILP 25774 up to reach 8, as well as in reach 4 of ILP 25777. The best spawning habitat is present in relatively long and uniform gravel sections within reaches 5 and 8 of ILP 25774 and in reach 4 of ILP 25777. However, rainbow trout spawning likely occurs on an opportunistic basis throughout these streams. Stream -4090-5670 is a direct tributary to Hanson Lake and provides good rearing, overwintering and spawning habitat throughout reach 1.

No physical barriers to fish distribution were encountered within the Shovel Creek watershed. Shovel Creek is a large and low gradient stream, easily accessible to fish over its entire length within the project area. Fish presence was not confirmed in ILP 25774 upstream from reach 11 although excellent habitat was present. It is suspected that a barrier is present in the system in the unsurveyed reaches downstream from reach 14. Fish absence was confirmed in reach 10 of ILP 25777 due to the lack of any suitable rainbow trout habitat. In addition, fish presence was not confirmed in this system in reach 8 which had excellent rainbow trout habitat, suggesting the possibility of a physical obstruction in the unsurveyed reaches between reach 4 and 8. In the rest of the Shovel Creek watershed, fish distribution was usually limited by lack of connectivity to fish bearing reaches, especially adjacent to Shovel Creek and Hanson Lake, and by lack of fish habitat in many of the smaller tributaries. In addition, both Shovel Creek and ILP 25774 flow through deep valleys with steep valley walls for much of their lengths. Many of their tributaries may be accessible to fish within the valley floor of these streams, but their distribution is probably limited by steep gradients upstream. Many reaches were sampled on top of these valley walls and although suitable habitat may have been present, no fish were encountered. Further sampling is required to determine the extent of fish use in these systems.

4.2.2 Maxan Creek

Rainbow trout was the only fish species encountered in this watershed. Other species are historically present within Maxan Creek (see Table 1), but the mainstem of Maxan Creek was not included in the project area. Discussion of fish and fish habitat therefore encompasses only tributaries, but also considers fish distribution from Maxan Creek. Of the tributaries, only four of the larger systems were found to contain rainbow trout, all of which were at least 3rd order. No fish were present in any of the surveyed 1st or 2nd order streams.

Rainbow trout were present in the –924300-43400 system including ILP 30002, the –924300-58800 system including stream –58800-15500, the -924300-72200 system and the –924300-74200 system. Rearing habitat within all of these streams is excellent, typically in abundant undercut bank and pool type cover. Overwintering habitat is varied, with the most significant occurring in reach 2 of –924300-58800, reach 1 of –924300-72200 and in reach 6 of –924300-74200. Most of this habitat is provided in deep pools and beaver impoundments. Overwintering habitat in other streams is generally limited by lack of notable deep pools. The best rainbow trout spawning habitat is present within the second reaches of –924300-58800 and its tributary, –58800-15500. Abundant suitable gravels, good flow and numerous holding areas are present in these reaches, providing excellent spawning opportunities.

Two physical barriers to fish distribution were encountered during the inventory in this area. In ILP 30002, a cascade 3m in height is present at the end of reach 0.1. This cascade is impassable to all species and marks the upstream distribution limit for rainbow trout in this system. No fish were captured in two reaches upstream from this point confirming fish absence upstream from reach 0.1, although good potential rainbow trout habitat was present. In creek –34749-5938, a gradient obstruction of 29% over 44m is present approximately 30m upstream from the mouth. Fish presence was not confirmed in the marginal rainbow trout habitat below this cascade. However, the 30m section near the mouth may be used as refuge habitat for fish from –924300-43400. The cascade is impassable and precludes rainbow trout access into upstream reaches. Both of these barriers are located on the eastern edge of a post-glacial lacustrine terrace that is bordered by the fluvial Maxan Creek valley on the east, and a steep mountain ridge on the west. Sampling conducted in several tributaries within this terrace area yielded no fish, even when excellent rainbow trout habitat was present. Negative fish sampling results and the geomorphological relief of the area suggest presence of potential obstructions to fish migration in reach 6 of –924300-43400, the upper section of reach 2 of –58800-15800, reach 3 of –924300-58800, reach 2 of –924300-72200 and in reach 3 of –74200-03400. Further sampling is required to determine the extent of fish use in these systems.

Rainbow trout distribution within the –924300-74200 watershed is likely limited by the extensive wetland complex in reach 7. It is suspected that rainbow trout do not migrate through this wetland – no fish were encountered in usable rainbow trout habitat in two reaches upstream from this wetland.

In the rest of the Maxan Creek watershed, fish distribution was usually limited by lack of connectivity to fish bearing reaches, especially in those reaches adjacent to the wetlands along Maxan Creek, and by absence of fish habitat in many of the smaller tributaries. In addition, both the –924300-43400 and –924300-74200 basins are located in deep valleys within the terrace area. Tributaries may be accessible to fish only within the valley floor of these systems, but fish distribution is probably limited by steep gradients at the valley walls.

4.3 Fish Stage, Size and Life History

Fork length and maturity level of all fish sampled were recorded on the individual fish data forms. The life stage (fry, juvenile, or adult) for each fish was determined in the field based on

length measurements, physical characteristics, and the habitat in which each fish was found. All captured fish appeared healthy and did not exhibit any external signs of disease. No voucher specimens or DNA samples were collected within this project area.

4.3.1 Shovel Creek

Insufficient numbers of prickly sculpin, longnose sucker and mountain whitefish were sampled within this watershed to provide any meaningful interpretation of fish stage, size and life histories for these species. However, these species were only present in the mainstem of Shovel Creek and given its large size and availability of excellent perennial habitat, it is likely that both fluvial and adfluvial populations are present. Adfluvial species likely migrate from both Shovel and Hanson lakes into Shovel Creek.

A total of 35 rainbow trout were sampled within this watershed and their abundance was relatively uniform throughout the watershed. Both adults and juveniles were represented in this sample in healthy proportion. No fry were present due to the lateness of the sampling, but the presence of small juveniles (35mm to 50mm) indicates that spawning had occurred earlier in the season.

Rainbow trout within the mainstem of Shovel Creek are likely present as both fluvial and adfluvial populations. Abundant and diverse perennial habitat is sufficient to support a fluvial population, while adfluvial rainbow trout from Shovel and Hanson lakes may use the stream for spawning and rearing.

All adult rainbow trout sampled were within the ILP 25774 watershed. Their small size likely indicates their fluvial origin. However, the watershed is accessible and may also be used by adfluvial populations from Shovel Lake.

The following table presents data for fish species encountered in this watershed. The CPUE column in the table indicates the number of fish captured per second of electrofishing. This data is extracted only from those reaches where the species were sampled.

Table 3: Summary of life stage, length and CPUE data from fish sampled within the Shovel Creek Watershed

Stream Name	Watershed Code	Spp.	Stage	Number of Fish	Mean Length (mm)	Range of Lengths (mm)	CPUE (# of fish/sec electrofishing)
Shovel C.	180-374000-95200-01900-4090	CAS	J	4	47.3	42-56	0.009
		CAS	A	2	100.0	88-112	0.009
		LSU	A	1	243	243	0.005
		MW	A	1	281	281	0.005
		RB	J	30	76.8	35-127	0.026
		RB	A	5	152.6	138-174	0.028

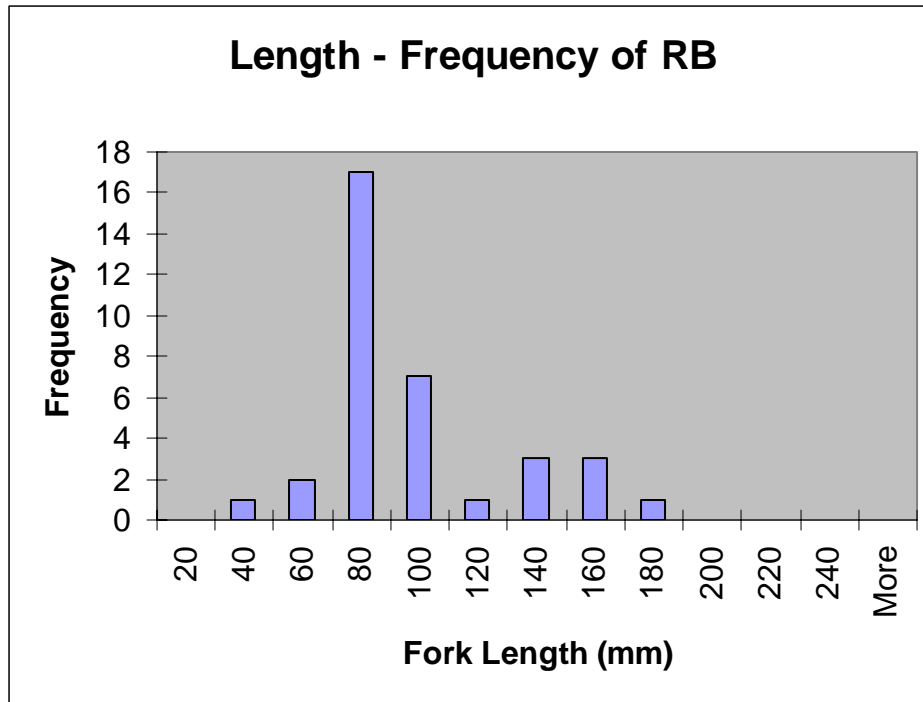


Figure 2: Length-frequency histogram of sampled rainbow trout from the Shovel Creek Watershed, October 10 to October 28, 1999

4.3.2 Maxan Creek

In comparison to the right bank tributaries of Maxan Creek surveyed in 1998 (FINS, 1999), left bank drainages appeared to be more productive and overall had considerably better habitat for rainbow trout.

A total of 70 rainbow trout were sampled within this watershed and their abundance was relatively high throughout the watershed, in comparison to the Shovel Creek drainage and data from 1998. Both adults and juveniles were represented in this sample in healthy proportion. Abundant numbers of fry were present in the second reaches of -924300-58800 and -58800-15500, suggesting occurrence of very late spawning in this watershed. No fry were present in other fish-bearing reaches, but the presence of small juveniles (31mm to 50mm) indicated that spawning had occurred earlier in the season in those systems.

Rainbow trout within this watershed are likely present as both fluvial and adfluvial populations. The extensive wetland reaches of Maxan Creek upstream from Maxan Lake likely do not contain significant spawning habitat and its rainbow trout population may seasonally migrate to the tributaries for spawning and rearing. However the abundant and diverse perennial habitat in systems -924300-58800 and -924300-74200 is sufficient to support their own fluvial populations, in addition to fluvial populations from Maxan Creek. Absence of suitable overwintering habitat in stream -924300-43400 likely limits its capabilities to support a fluvial

population of rainbow trout. It is more likely that the stream is utilized for spawning and rearing by adfluvial rainbow trout from Maxan Lake.

The following table presents data for fish species encountered in this watershed. The CPUE column in the table indicates the number of fish captured per second of electrofishing. This data is extracted only from those reaches where the species were sampled.

Table 4: Summary of life stage, length and CPUE data from fish sampled within the Maxan Creek Watershed

Stream Name	Watershed Code	Spp.	Stage	Number of Fish	Mean Length (mm)	Range of Lengths (mm)	CPUE (# of fish/sec electrofishing)
Maxan C.		RB	F	20	31.1	29-33	0.500
		RB	J	45	51.4	31-78	0.180
		RB	A	5	155.2	144-169	0.050

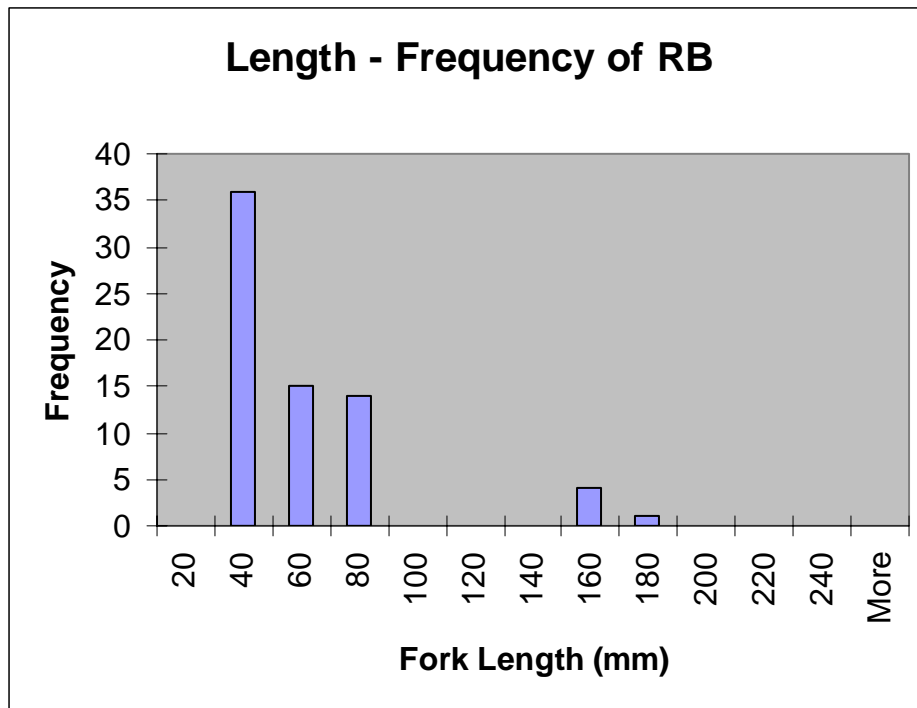


Figure 3: Length-frequency histogram of sampled rainbow trout from the Maxan Creek Watershed, October 10 to October 28, 1999

4.4 Significant Features and Fisheries Observations

4.4.1 Fish and Fish Habitat

The only significant fisheries observation within this project area that was not already documented in existing publications was the documentation of spawning mountain whitefish in reach 4 of Shovel Creek. Hundreds of spawning mountain whitefish were observed just downstream from the Hanson Lake outlet. This habitat is likely an important spawning area for Shovel Creek and Hanson Lake populations.

All streams within this area were too small to provide any significant sport fishing opportunities.

4.4.2 Habitat Protection Concerns

Three fisheries sensitive zones (FSZ) were identified within the Shovel/Maxan sub-units. Two of them were located in the Shovel Creek watershed in the first reach of ILP 25770 and ILP 25774. They were both wetland reaches containing numerous beaver impoundments that could provide important overwintering habitat for rainbow trout. The third FSZ was located within the Maxan Creek watershed in reach 1 of stream -924300-72200. This FSZ provides good potential overwintering and rearing habitat for rainbow trout in the watershed.

No other habitat protection concerns were identified in this area. No fish were captured in gradients greater than 20%, no restoration opportunities were noted and no problem culverts or unstable slopes were encountered.

4.5 Fish Bearing Status

The following three sections summarize the fish-bearing status for all surveyed reaches within the Shovel and Maxan sub-units. 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. An overview of the process used in determining fish-bearing status is presented in a flowchart in Figure 4 on the following page.

4.5.1 Summary of all Surveyed Reaches

Table 5 on the following pages summarizes all surveyed reaches in the Shovel and Maxan sub-units. 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.

Stream Classification Process

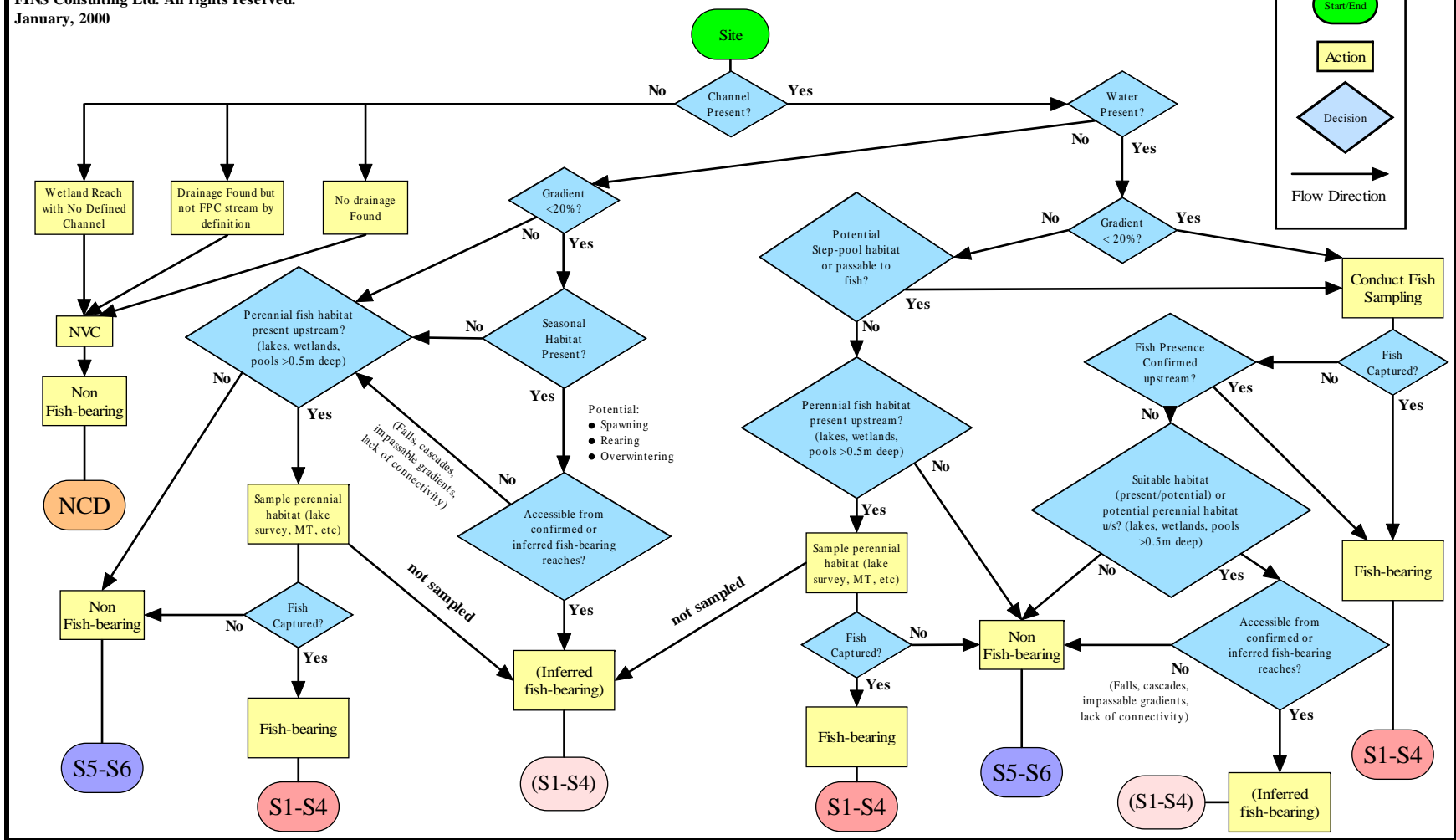


Figure 4: Flowchart of the stream classification process used in determining fish-bearing status of surveyed reaches

Table 5: Summary of data from all surveyed reaches in the Shovel/Maxan Sub-units

Stream Name	Watershed Code	ILP	Reach	Site	Species	Channel		Proposed Riparian Class	Follow-up Sampling ³ (Y, N or blank)	Comments
						Width (m)	Grad (%)			
Shovel C.	180-374000-95200-01900-4090		2	183	CAS LSU RB	10.38	0.6	S2		
Shovel C.	180-374000-95200-01900-4090		4	184	CAS MW RB	9.73	3.3	S2		
		25764	2	185		NVC	6.8	NCD	N	
		25770	1	186			0.2	S2-S4	Y	S3 from upper reach measurements
		25770	3	187	NFC	1.64	5.1	S3	Y	Suspect obstruction in reach 2 downstream.
		25772	1	188		NVC		NCD	N	
		25774	1	189		9.17	0.3	S2		based on u/s sampling results
		25774	5	190	RB	8.47	4.3	S2		
		25774	6	191	RB	6.50	3.6	S2		
		25774	8	192	RB	5.73	0.8	S2		
		25774	11	193	RB	6.38	4.0	S2		
		25774	14	194	NFC	1.60	2.5	S3	Y	Shrimp presence suggests fish absence
		25774	15	195	NFC	3.75	0.9	S3	Y	Shrimp presence suggests fish absence
		25777	2	196	RB	3.52	6.3	S3		
		25777	4	197	RB	3.83	3.4	S3		
		25777	8	198	NFC	2.45	2.3	S3	Y	Presence of shrimp in water suggests fish absence
		25777	10	199		1.26	0.0	S6	N	Presence of shrimp in water suggests fish absence
		25778	2	200		0.42	5.3	S6	N	
		25779	4	201	NFC	0.46	3.6	S6	N	
		25782	1	202	NFC	0.66	2.9	S6	N	
		25789	1	203	RB	7.15	5.3	S3		
		25791	1	204	NFC	0.37	26.5	S6	N	

³ 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 or determine upstream fish distribution limit - 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

Table 5: Summary of data from all surveyed reaches in the Shovel/Maxan Sub-units

Stream Name	Watershed Code	ILP	Reach	Site	Species	Channel		Proposed Riparian Class	Follow-up Sampling ³ (Y, N or blank)	Comments
						Width (m)	Grad (%)			
		25792	3	205		NVC		NCD	N	
		25797	3	206	NFC	1.23	6.3	S4	Y	
		25797	4	207	NFC	1.45	2.8	S4	Y	
		25804	1	208		NVC		NCD	N	
		24715	2	209		NVC		NCD	N	
		25819	2	210		NVC		NCD	N	
		25823	1	211	NFC	0.73	1.5	S4	Y	
		25823	3	212	NFC	0.66	7.5	S6	N	Unlikely fish use due to steep gradient in reach 2 (from map)
		25825	1	213		NVC		NCD	N	
		25829	3	214		NVC		NCD	N	
		25830	1	215		0.90	1.5	S4	Y	
		25830	3	216	NFC	1.10	4.5	S6	N	Steep in reach 2 (from map)
		25837	4	218	NFC	0.80	3.5	S6	N	Inaccessible to fish due to steep gradient in lower reaches (from map), no resident potential.
		25838	2	219		NVC		NCD	N	
	180-374000-95200-01900-4090-5670		1	220	RB	1.02	7.5	S4		
		25844	1	221	NFC	1.04	0.8	S6	N	
		25849	1	222		NVC		NCD	N	
		25850	1	223		1.20	2.5	S4	Y	
		25850	2	224		1.82	4.8	S6	N	
		25850	3	225		1.32	7.5	S6	N	
		25850	6	226		1.22	16.0	S6	N	
		25853	1	227	NFC	0.62	1.0	S6	N	
		25853	2	228		NVC		NCD	N	
		25854	1	229		NVC	0.3	NCD	N	

Table 5: Summary of data from all surveyed reaches in the Shovel/Maxan Sub-units

Stream Name	Watershed Code	ILP	Reach	Site	Species	Channel		Proposed Riparian Class	Follow-up Sampling ³ (Y, N or blank)	Comments
						Width (m)	Grad (%)			
		25857	1	230		NVC	0.0	NCD	N	
		25862	2	231		NVC		NCD	N	
	460-924300-38740		1	232		NVC	1.0	NCD	N	
	460-924300-38740-42044		1	233		NVC		NCD	N	
	460-924300-40218		2	234	NFC	0.68	4.0	S6	N	Freshwater shrimp and lack of significant habitat indicates fish absence.
	460-924300-40218		3	235	NFC	0.22	1.5	S6	N	Presence of shrimp suggests fish absence.
	460-924300-43400		1	236	RB	3.12	1.5	S3		
	460-924300-43400		9	237	NFC	2.04	14.0	S3	Y	Obstruction may be present in lower unsampled reaches d/s.
		30002	0.1	238	RB	2.12	3.0	S3		
		30002	1	239	NFC	1.94	8.5	S6	N	
		30002	2	240	NFC	2.13	1.9	S6	N	
	460-924300-43400-34749-2755		1	241		NVC	6.8	NCD	N	
	460-924300-43400-34749-5938		1	242	NFC	0.44	18.8	S6	N	
	460-924300-43400-34749-7794		2	243	NFC	1.03	1.4	S4	Y	
	460-924300-43400-34749-7794		3	244	NFC	1.13	2.1	S4	Y	
	460-924300-43400-34749-8439		2	245		NVC		NCD	N	
	460-924300-43400-34749-9944-3012-287		1	246		0.65	6.0	S6	N	
	460-924300-47489		1	247		NVC		NCD	N	

Table 5: Summary of data from all surveyed reaches in the Shovel/Maxan Sub-units

Stream Name	Watershed Code	ILP	Reach	Site	Species	Channel		Proposed Riparian Class	Follow-up Sampling ³ (Y, N or blank)	Comments
						Width (m)	Grad (%)			
	460-924300-50223		7	248	NFC	0.48	1.2	S6	N	
	460-924300-50223-89170		1	249		NVC		NCD	N	
	460-924300-50223-89170		2	250	NFC	1.32	0.4	S6	N	no connection to fish-bearing water - NCD in Reach 1
	460-924300-50223-89170-9920		1	251		NVC	2.0	NCD	N	
	460-924300-50223-38274		1	252	NFC	0.40	0.2	S6	N	
	460-924300-58800		2	253	RB	3.43	2.8	S3		
	460-924300-58800		5	254	NFC	2.96	3.0	S3	Y	Suspect obstruction d/s in lower reaches (explains lack of fish?)
	460-924300-58800		6	255	NFC	3.24	7.0	S3	Y	Suspect obstruction d/s in lower reaches which would explain lack of fish presence here.
	460-924300-58800		7	256	NFC	1.38	17.5	S6	N	
	460-924300-58800-15500		2	257	RB	2.33	1.8	S3		
	460-924300-58800-15500-0859		4	258	NFC	2.07	11.3	S3	Y	Potential obstruction d/s (reach 3 or 4 in -58800)
	460-924300-58800-15500-5977		1	259		NVC	0.0	NCD	N	
	460-924300-58800-15500-5977		3	260		NVC		NCD	N	
	460-924300-64500-12509		2	261		NVC		NCD	N	
	460-924300-65818		1	262		NVC		NCD	N	
	460-924300-66291		1	263		NVC		NCD	N	
	460-924300-72200		1	264	RB	5.00	0.5	S3		

Table 5: Summary of data from all surveyed reaches in the Shovel/Maxan Sub-units

Stream Name	Watershed Code	ILP	Reach	Site	Species	Channel		Proposed Riparian Class	Follow-up Sampling ³ (Y, N or blank)	Comments
						Width (m)	Grad (%)			
	460-924300-72200-46534		5	265	NFC	0.72	11.0	S6	N	
	460-924300-74200		1	266		6.50	0.0	S2		
	460-924300-74200		5	267	RB	2.07	1.5	S3		
	460-924300-74200		6	268	RB	1.85	1.3	S3		
	460-924300-74200-03400		2	269		2.88	1.8	S3	Y	
	460-924300-74200-03400		3	270		3.42	1.8	S3	Y	
	460-924300-74200-30700		3	271	NFC	1.22	4.5	S4	Y	
	460-924300-74200-47982		1	272		NVC		NCD	N	
	460-924300-74200-50147		1	273		NVC		NCD	N	
	460-924300-74200-56300		1	274		2.08	0.0	S3	Y	Potential migration route to upper reaches (v. unlikely)
	460-924300-74200-56300-9181		1	275		0.88	0.0	S4	Y	very unlikely fish use

4.5.2 Non Fish-bearing Reaches

This section summarizes all surveyed reaches within this project area that have been recommended for a non fish-bearing FPC classification. This has been based on interpretations and conclusions from the synthesis of data collected during Phases I through IV of this inventory. In addition, sampling results from Reconnaissance Inventory data in similar watersheds (Babine Forest Products Co. 1997 through 1999 Reconnaissance Inventories) have also been incorporated into this section to provide comparisons between reaches with similar channel characteristics. Specifically, fish sampling results (% of reaches with fish captured) in reaches within the same size, gradient and pattern classes, as defined in FRIM. Each site has been placed into a specific gradient, channel pattern and size class (based on reach and site data) in order to compare it to the historical inventory results. This is by no means an absolute indication of fish presence, but rather a useful tool to provide a general comparison among the differing reach types. It has been used only as further supporting evidence for the non fish-bearing designation. Table 6 below summarizes this categorized information.

Table 6: Fish sampling results for categorized reach classes (from 1997 through 1999 inventory data)

Reach Gradient Class	Reach Pattern Type	Reach Size Class								
		Small (1 st order)			Medium (2 nd and 3 rd order)			Large (4 th and higher order)		
		Total # of Reaches	# of Reaches with Fish Capture	%	Total # of Reaches	# of Reaches with Fish Capture	%	Total # of Reaches	# of Reaches with Fish Capture	%
1 (≤4%)	ST/SI/IR	118	1	0.8	215	64	29.8	54	42	77.8
	IM/ME/TM	27	3	11.1	79	20	25.3	18	11	61.1
2 (>4% and ≤8%)	ST/SI/IR	93	1	1.1	125	31	24.8	19	12	63.2
	IM/ME/TM	8	0	0.0	0	0	0.0	0	0	0.0
3 (>8% and ≤20%)	ST/SI/IR	77	0	0.0	59	8	13.6	4	2	50.0
	IM/ME/TM	0	0	0.0	0	0	0.0	0	0	0.0
4 (>20% and ≤30%)	ST/SI/IR	32	0	0.0	12	0	0.0	1	0	0.0
	IM/ME/TM	0	0	0.0	0	0	0.0	0	0	0.0
5 (>30%)	ST/SI/IR	7	0	0.0	3	0	0.0	0	0	0.0
	IM/ME/TM	0	0	0.0	0	0	0.0	0	0	0.0

Determining whether or not 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 recommendation 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 known fish distributions and behavior, barriers, gradients, habitat quality, invertebrate presence, and presence/absence of headwater lakes. This process is summarized in the flowchart in Figure 4 above.

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 judgement 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 judgement 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 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.

Table 7 on the following page is a summary of all surveyed reaches within this project area that have been recommended for a non fish-bearing designation. The table includes relevant site-specific data, historical information and comments that provide a brief rationale to support the interpretation. The table is simply a summary of the interpretation, and not meant to be a reiteration of the data it summarizes. This data is available in the appendices included in this report.

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.

Table 7: Summary of data from surveyed non-fish-bearing reaches in the Shovel/Maxan Sub-units

Stream name	Watershed Code	ILP	Reach	Site	Date	Cw (m)	Wb (m)	Grad (%)	Expected Species	FPC	Sampling Specs			Stream Conditions				Categorized Historical Information (1997 - 1999 Site Data Sampling Results)				Comments
											Method	(m)	(s)	Flow	(°C)	(µS)	Turb	Grad Class	Pattern Class	Size Class	% of reaches with fish captured	
		25764	2	185	10/11/99	NVC		6.8		NCD								2	S/S/I	M	24.8	Not a stream by FPC definition. No continuous channel bed - just vegetated meltwater channel with no fluvial substrate.
		25772	1	188	10/11/99	NVC				NCD								1	S/S/I	S	0.8	Not a stream by FPC definition. No continuous channel bed - water disperses in fluvial valley near Shovel C.
		25777	10	199	10/13/99	1.26	0.93	0.0	RB	S6			H	2	50	C	1	S/S/I	M	29.8	No RB habitat - stagnant water in organic fines in wetland reach. Presence of Gammaridae indicates fish absence. NFC in 2 sites in system in vicinity. No suitable RB spawning habitat. No potential overwinter habitat observed and no lakes/wetlands u/s in system to provide perennial habitat. **Fish-bearing reaches in this category (64 of 215 surveyed - see Table 6) had CW>0.8m and Wb>0.17m. Substrate was either fines (in LC morphology) or gravels and cobbles. Cover was moderate to abundant and flow was either intermittent or permanent. Morphology was generally riffle-pool.	
		25778	2	200	10/13/99	0.42	0.13	5.3	RB	S6			L	4	70	C	2	S/S/I	S	1.1	No RB habitat - tiny, shallow ephemeral reach. No suitable RB spawning habitat, lacks sufficient instream cover for potential RB rearing at higher flow. No potential overwinter habitat observed and no lakes/wetlands u/s in system to provide perennial habitat. ** Only 1 reach (of 93 surveyed - see Table 6) that contained fish in this category - ILP 52002 reach 1 (site 26) in 1997 inventory (ILP 52001 report), which flowed directly into a confirmed fish-bearing reach where RB were abundant. This reach had water, abundant cover, and gravels in the substrate, a channel width of 4.6m and Wb depth of 0.55m. Water in this stream during low flow period is supplied by large wetland complex u/s n reach 2.	

Table 7: Summary of data from surveyed non-fish-bearing reaches in the Shovel/Maxan Sub-units

Stream name	Watershed Code	ILP	Reach	Site	Date	Cw (m)	Wb (m)	Grad (%)	Expected Species	FPC	Sampling Specs			Stream Conditions				Categorized Historical Information (1997 - 1999 Site Data Sampling Results)				Comments
											Method	(m)	(s)	Flow	(°C)	(µS)	Turb	Grad Class	Pattern Class	Size Class	% of reaches with fish captured	
		25779	4	201	10/14/99	0.46	0.17	3.6	RB	S6	EF	120	83	M	3	90	C	1	S/S/I	S	0.8	No RB habitat - tiny, shallow, exposed channel. No suitable RB spawning habitat, lacks sufficient instream cover for potential RB rearing at higher flow. No potential overwinter habitat observed and no lakes/wetlands u/s in system to provide perennial habitat. ** Only 1 reach (of 118 surveyed - see Table 6) that contained fish in this category - ILP 12522 reach 1 (site 11) in 1998 inventory (Nechako report), which flowed directly into a confirmed fish-bearing reach where RB were abundant. However, RB were found in ILP 12522 only for the first 30m near mouth before habitat deteriorated and no fish were captured. This stream had water, abundant cover, and gravels in the substrate, a channel width of 0.7m and Wb depth of 0.33m.
		25782	1	202	10/14/99	0.66	0.1	2.9	RB	S6	EF	100	33	M	3	50	C	1	S/S/I	S	0.8	No RB habitat - tiny, shallow. No suitable RB spawning habitat, lacks sufficient instream cover for potential RB rearing at higher flow. No potential overwinter habitat observed and no lakes/wetlands u/s in system to provide perennial habitat. ** Only 1 reach (of 118 surveyed - see Table 6) that contained fish in this category - ILP 12522 reach 1 (site 11) in 1998 inventory (Nechako report), which flowed directly into a confirmed fish-bearing reach where RB were abundant. However, RB were found in ILP 12522 only for the first 30m near mouth before habitat deteriorated and no fish were captured. This stream had water, abundant cover, and gravels in the substrate, a channel width of 0.7m and Wb depth of 0.33m.
		25791	1	204	10/12/99	0.37	0.2	26.5	RB	S6	EF	5	19	M	3	130	C	4	S/S/I	S	0	No RB habitat - tiny, shallow, ephemeral and too steep for fish use. No potential overwinter habitat observed and no lakes/wetlands u/s in system to provide perennial habitat
		25792	3	205	10/14/99	NVC				NCD								1	S/S/I	S	0.8	No drainage found at mapped location.
		25804	1	208	10/12/99	NVC				NCD								1	S/S/I	S	0.8	No drainage found at mapped location.
		24715	2	209	10/12/99	NVC				NCD								3	S/S/I	S	0	No drainage found at mapped location.
		25819	2	210	10/10/99	NVC				NCD								3	S/S/I	S	0	No drainage found at mapped location

Table 7: Summary of data from surveyed non-fish-bearing reaches in the Shovel/Maxan Sub-units

Stream name	Watershed Code	ILP	Reach	Site	Date	Cw (m)	Wb (m)	Grad (%)	Expected Species	FPC	Sampling Specs			Stream Conditions				Categorized Historical Information (1997 - 1999 Site Data Sampling Results)				Comments
											Method	(m)	(s)	Flow	(°C)	(µS)	Turb	Grad Class	Pattern Class	Size Class	% of reaches with fish captured	
		25823	3	212	10/10/99	0.66	0.17	7.5	RB	S6	EF	110	117	M	4	50	C	2	S/S/I	M	24.8	No RB habitat - tiny, shallow, moderately steep. Reach 2 d/s is steep (19% from map). NFC in 2 sites in system. No suitable RB spawning habitat, lacks sufficient instream cover for potential RB rearing at higher flow. No potential overwinter habitat observed and no lakes/wetlands u/s in system to provide perennial habitat. **Fish-bearing reaches in this category (31 of 125 surveyed - see Table 6) had CW>1.0m and Wb>0.13m. Substrate was gravels and cobbles. Cover was moderate to abundant and diverse and flow was either intermittent or permanent. Morphology was riffle-pool, step-pool or cascade-pool.
		25825	1	213	10/10/99	NVC				NCD								3	S/S/I	S	0	No channel present at mapped location.
		25829	3	214	10/11/99	NVC				NCD								1	S/S/I	S	0.8	No channel present at mapped location.
		25830	3	216	10/10/99	1.10	0.13	4.5	RB	S6	EF	100	32	M	4	100	C	2	S/S/I	S	1.1	No RB habitat - shallow, small with no instream cover. Steep in reach 2 (16% from map). Dry in reach 1 d/s. No potential overwinter habitat observed and no lakes/wetlands u/s in system to provide perennial habitat. ** Only 1 reach (of 93 surveyed - see Table 6) that contained fish in this category - ILP 52002 reach 1 (site 26) in 1997 inventory (ILP 52001 report), which flowed directly into a confirmed fish-bearing reach where RB were abundant. This reach had water, abundant cover, and gravels in the substrate, a channel width of 4.6m and Wb depth of 0.55m. Water in this stream during low flow period is supplied by large wetland complex u/s n reach 2.

Table 7: Summary of data from surveyed non-fish-bearing reaches in the Shovel/Maxan Sub-units

Stream name	Watershed Code	ILP	Reach	Site	Date	Cw (m)	Wb (m)	Grad (%)	Expected Species	FPC	Sampling Specs			Stream Conditions				Categorized Historical Information (1997 - 1999 Site Data Sampling Results)				Comments
											Method	(m)	(s)	Flow	(°C)	(µS)	Turb	Grad Class	Pattern Class	Size Class	% of reaches with fish captured	
		25837	4	218	10/10/99	0.80	0.17	3.5	RB	S6	EF	120	107	M	3	50	C	1	S/S/I	S	0.8	No RB habitat - shallow, small with no instream cover. Steep in reach 2 (24% from map). No suitable RB spawning habitat, lacks sufficient instream cover for potential RB rearing at higher flow. No potential overwinter habitat observed and no lakes/wetlands u/s in system to provide perennial habitat. ** Only 1 reach (of 118 surveyed - see Table 6) that contained fish in this category - ILP 12522 reach 1 (site 11) in 1998 inventory (Nechako report), which flowed directly into a confirmed fish-bearing reach where RB were abundant. However, RB were found in ILP 12522 only for the first 30m near mouth before habitat deteriorated and no fish were captured. This stream had water, abundant cover, and gravels in the substrate, a channel width of 0.7m and Wb depth of 0.33m.
		25838	2	219	10/11/99	NVC				NCD								2	S/S/I	S	1.1	Not a stream by FPC definition. Dry gully with no trace of drainage.
		25844	1	221	10/10/99	1.04	0.2	0.8	RB	S6	EF	100	133	M	4	40	L	1	S/S/I	S	0.8	No RB habitat - channel filled with orange algae, stagnant water. Shallow, exposed channel. No suitable RB spawning habitat, lacks sufficient instream cover for potential RB rearing at higher flow. No potential overwinter habitat observed and no lakes/wetlands u/s in system to provide perennial habitat. ** Only 1 reach (of 118 surveyed - see Table 6) that contained fish in this category - ILP 12522 reach 1 (site 11) in 1998 inventory (Nechako report), which flowed directly into a confirmed fish-bearing reach where RB were abundant. However, RB were found in ILP 12522 only for the first 30m near mouth before habitat deteriorated and no fish were captured. This stream had water, abundant cover, and gravels in the substrate, a channel width of 0.7m and Wb depth of 0.33m.
		25849	1	222	10/21/99	NVC				NCD								3	S/S/I	S	0	No channel present at mapped location. Likely disperses in fluvial fan u/s?

Table 7: Summary of data from surveyed non-fish-bearing reaches in the Shovel/Maxan Sub-units

Stream name	Watershed Code	ILP	Reach	Site	Date	Cw (m)	Wb (m)	Grad (%)	Expected Species	FPC	Sampling Specs			Stream Conditions				Categorized Historical Information (1997 - 1999 Site Data Sampling Results)				Comments
											Method	(m)	(s)	Flow	(°C)	(µS)	Turb	Grad Class	Pattern Class	Size Class	% of reaches with fish captured	
		25850	2	224	10/21/99	1.82	0.67	4.8	RB	S6				L				2	S/S/I	M	24.8	No RB habitat - channel totally dry. Lacks potential instream cover for RB rearing at higher flow. Scoured channel, no suitable spawning habitat for RB. No potential overwinter habitat observed and no lakes/wetlands u/s in system to provide perennial habitat. 4 sites in system and all dry. **Fish-bearing reaches in this category (31 of 125 surveyed - see Table 6) had CW>1.0m and Wb>0.13m. Substrate was gravels and cobbles. Cover was moderate to abundant and diverse and flow was either intermittent or permanent. Morphology was riffle-pool, step-pool or cascade-pool.
		25850	3	225	10/10/99	1.32	0.67	7.5	RB	S6				L				2	S/S/I	M	24.8	No RB habitat - channel totally dry. Lacks potential instream cover for RB rearing at higher flow. Scoured channel, no suitable spawning habitat for RB. No potential overwinter habitat observed and no lakes/wetlands u/s in system to provide perennial habitat. 4 sites in system and all dry. **Fish-bearing reaches in this category (31 of 125 surveyed - see Table 6) had CW>1.0m and Wb>0.13m. Substrate was gravels and cobbles. Cover was moderate to abundant and diverse and flow was either intermittent or permanent. Morphology was riffle-pool, step-pool or cascade-pool.
		25850	6	226	10/10/99	1.22	0.4	16.0	RB	S6				L	4	40	C	3	S/S/I	S	0	No RB habitat - intermittent flow percolating through cobbles. Steep (16%), lacks potential instream cover for RB rearing at higher flow. No suitable spawning habitat for RB. No potential overwinter habitat observed and no lakes/wetlands u/s in system to provide perennial habitat. 4 sites in system and all dry.

Table 7: Summary of data from surveyed non-fish-bearing reaches in the Shovel/Maxan Sub-units

Stream name	Watershed Code	ILP	Reach	Site	Date	Cw (m)	Wb (m)	Grad (%)	Expected Species	FPC	Sampling Specs			Stream Conditions				Categorized Historical Information (1997 - 1999 Site Data Sampling Results)				Comments
											Method	(m)	(s)	Flow	(°C)	(µS)	Turb	Grad Class	Pattern Class	Size Class	% of reaches with fish captured	
		25853	1	227	10/21/99	0.62	0.17	1.0	RB	S6	EF	165	182	L	5	60	C	1	S/S/I	M	29.8	No RB habitat - small, shallow, fines. Channel disperses in wetland surrounding Hanson L. No connectivity. No suitable spawning habitat for RB. No potential overwinter habitat observed and no lakes/wetlands u/s in system to provide perennial habitat. **Fish-bearing reaches in this category (64 of 215 surveyed - see Table 6) had CW>0.8m and Wb>0.17m. Substrate was either fines (in LC morphology) or gravels and cobbles. Cover was moderate to abundant and flow was either intermittent or permanent. Morphology was generally riffle-pool.
		25853	2	228	10/10/99	NVC				NCD								3	S/S/I	S	0	No channel present at mapped location.
		25854	1	229	10/21/99	NVC		0.3		NCD								1	S/S/I	S	0.8	Not a stream by FPC definition. Organic, disconnected pools in wetland surrounding Hanson L. No continuous channel bed.
		25857	1	230	10/10/99	NVC		0.0		NCD								1	S/S/I	M	29.8	Not a stream by FPC definition. Organic, disconnected stagnant water filled with algae in wetland adjacent to Shovel C. No continuous channel bed
		25862	2	231	10/10/99	NVC				NCD								4	S/S/I	M	0	No channel present at mapped location. Just a dry gully.
	460-924300-38740		1	232	10/23/99	NVC		1.0		NCD								1	S/S/I	M	29.8	Not a stream by FPC definition. No continuous channel bed, no fluvial substrate.
	460-924300-38740-42044		1	233	10/23/99	NVC				NCD								1	S/S/I	S	0.8	No channel present at mapped location.

Table 7: Summary of data from surveyed non-fish-bearing reaches in the Shovel/Maxan Sub-units

Stream name	Watershed Code	ILP	Reach	Site	Date	Cw (m)	Wb (m)	Grad (%)	Expected Species	FPC	Sampling Specs			Stream Conditions				Categorized Historical Information (1997 - 1999 Site Data Sampling Results)				Comments
											Method	(m)	(s)	Flow	(°C)	(µS)	Turb	Grad Class	Pattern Class	Size Class	% of reaches with fish captured	
	460-924300-40218		2	234	10/23/99	0.68	0.13	4.0	RB	S6	EF	100	107	L	5	80	C	1	S/S/I	S	0.8	No RB habitat - tiny, shallow with no instream cover. NFC in 2 sites in system with Gammaridae abundant in both sites indicating fish absence. No potential spawning or overwintering habitat observed. Lacks sufficient potential instream cover for RB rearing at higher flow. ** Only 1 reach (of 118 surveyed - see Table 6) that contained fish in this category - ILP 12522 reach 1 (site 11) in 1998 inventory (Nechako report), which flowed directly into a confirmed fish-bearing reach where RB were abundant. However, RB were found in ILP 12522 only for the first 30m near mouth before habitat deteriorated and no fish were captured. This stream had water, abundant cover, and gravels in the substrate, a channel width of 0.7m and Wb depth of 0.33m.
	460-924300-40218		3	235	10/23/99	0.22	0.1	1.5	RB	S6	EF	80	79	M	6	80	C	1	S/S/I	S	0.8	No RB habitat - tiny, shallow muddy creek with no instream cover. NFC in 2 sites in system with Gammaridae abundant in both sites indicating fish absence. No potential spawning or overwintering habitat observed. Lacks sufficient potential instream cover for RB rearing at higher flow. ** Only 1 reach (of 118 surveyed - see Table 6) that contained fish in this category - ILP 12522 reach 1 (site 11) in 1998 inventory (Nechako report), which flowed directly into a confirmed fish-bearing reach where RB were abundant. However, RB were found in ILP 12522 only for the first 30m near mouth before habitat deteriorated and no fish were captured. This stream had water, abundant cover, and gravels in the substrate, a channel width of 0.7m and Wb depth of 0.33m.
		30002	1	239	10/23/99	1.94	0.47	8.5	RB	S6	EF	200	253	M	4	90	C	2	S/S/I	M	24.8	3m high cascade and series of falls at end of reach 0.1 d/s blocks fish passage. No fish populations present above the cascade. NFC in 2 sites above the cascade.
		30002	2	240	10/24/99	2.13	0.2	1.9	RB	S6	EF	150	233	L	4	100	C	1	S/S/I	M	29.8	3m high cascade and series of falls at end of reach 0.1 d/s blocks fish passage. No fish populations present above the cascade. NFC in 2 sites above the cascade.

Table 7: Summary of data from surveyed non-fish-bearing reaches in the Shovel/Maxan Sub-units

Stream name	Watershed Code	ILP	Reach	Site	Date	Cw (m)	Wb (m)	Grad (%)	Expected Species	FPC	Sampling Specs			Stream Conditions				Categorized Historical Information (1997 - 1999 Site Data Sampling Results)				Comments
											Method	(m)	(s)	Flow	(°C)	(µS)	Turb	Grad Class	Pattern Class	Size Class	% of reaches with fish captured	
460-924300-43400-34749-2755			1	241	10/23/99	NVC		6.8		NCD								2	S/S/I	S	1.1	Not a stream by FPC definition. No continuous channel bed - dry gully with only runoff flow.
460-924300-43400-34749-5938			1	242	10/25/99	0.44	0.33	18.8	RB	S6	EF	180	43	L	4	80	L	3	S/S/I	S	0	No RB habitat - tiny, shallow and steep with no instream cover except as possible refuge habitat for 30m near mouth before gradient rises to 29%. Lacks potential instream cover for RB rearing at higher flow. No suitable spawning habitat for RB. No potential overwinter habitat observed and no lakes/wetlands u/s in system to provide perennial habitat.
460-924300-43400-34749-8439			2	245	10/25/99	NVC				NCD								2	S/S/I	S	1.1	No channel present at mapped location.
460-924300-43400-34749-9944-3012-287			1	246	10/24/99	0.65	0.13	6.0	RB	S6				L	4	70	C	2	S/S/I	M	24.8	No RB habitat - not enough water to sample. Small, shallow, intermittent flow. Lacks potential instream cover for RB rearing at higher flow. No suitable spawning habitat for RB. No potential overwinter habitat observed and no lakes/wetlands u/s in system to provide perennial habitat. **Fish-bearing reaches in this category (31 of 125 surveyed - see Table 6) had CW>1.0m and Wb>0.13m. Substrate was gravels and cobbles. Cover was moderate to abundant and diverse and flow was either intermittent or permanent. Morphology was riffle-pool, step-pool or cascade-pool.
460-924300-47489			1	247	10/26/99	NVC				NCD								3	S/S/I	S	0	No channel present by FPC definition. No continuous channel bed.

Table 7: Summary of data from surveyed non-fish-bearing reaches in the Shovel/Maxan Sub-units

Stream name	Watershed Code	ILP	Reach	Site	Date	Cw (m)	Wb (m)	Grad (%)	Expected Species	FPC	Sampling Specs			Stream Conditions				Categorized Historical Information (1997 - 1999 Site Data Sampling Results)				Comments
											Method	(m)	(s)	Flow	(°C)	(µS)	Turb	Grad Class	Pattern Class	Size Class	% of reaches with fish captured	
460-924300-50223			7	248	10/26/99	0.48	0.13	1.2	RB	S6	EF	100	163	M	4	100	C	1	S/S/I	S	0.8	No RB habitat- tiny, muddy creek draining wetland. Channel filled with instream vegetation. Lacks potential instream cover for RB rearing at higher flow. No suitable spawning habitat for RB. No potential overwinter habitat observed and no lakes/wetlands u/s in system to provide perennial habitat. 5 sites in system with no fish present. ** Only 1 reach (of 118 surveyed - see Table 6) that contained fish in this category - ILP 12522 reach 1 (site 11) in 1998 inventory (Nechako report), which flowed directly into a confirmed fish-bearing reach where RB were abundant. However, RB were found in ILP 12522 only for the first 30m near mouth before habitat deteriorated and no fish were captured. This stream had water, abundant cover, and gravels in the substrate, a channel width of 0.7m and Wb depth of 0.33m.
460-924300-50223-89170			1	249	10/26/99	NVC				NCD								2	S/S/I	M	24.8	No channel present at mapped location.
460-924300-50223-89170			2	250	10/26/99	1.32	0.13	0.4	RB	S6	EF	150	163	M	4	40	C	1	I/M/T	S	11.1	No RB habitat- Channel filled with instream vegetation and orange algae. Water acidic (pH 6.8). Marginal FPC stream. Lacks potential instream cover for RB rearing at higher flow. No suitable spawning habitat for RB. No potential overwinter habitat observed and no lakes/wetlands u/s in system to provide perennial habitat. 5 sites in system with no fish present. **Fish-bearing reaches in this category (3 of 27 surveyed - see Table 6) had CW>0.9m and Wb>0.32m. Substrate was either fines (in LC morphology) or gravels. Cover was abundant and flow was permanent. These reaches flowed directly into confirmed fish-bearing reaches.
460-924300-50223-89170-9920			1	251	10/26/99	NVC		2.0		NCD								1	S/S/I	S	0.8	Not a stream by FPC definition. No continuous channel bed - mossy valley joining two wetland reaches with runoff flow only.

Table 7: Summary of data from surveyed non-fish-bearing reaches in the Shovel/Maxan Sub-units

Stream name	Watershed Code	ILP	Reach	Site	Date	Cw (m)	Wb (m)	Grad (%)	Expected Species	FPC	Sampling Specs			Stream Conditions				Categorized Historical Information (1997 - 1999 Site Data Sampling Results)				Comments
											Method	(m)	(s)	Flow	(°C)	(µS)	Turb	Grad Class	Pattern Class	Size Class	% of reaches with fish captured	
460-924300-50223-38274			1	252	10/26/99	0.40	0.23	0.2	RB	S6	EF	130	162	M	4	70	L	1	I/M/T	S	11.1	No RB habitat - incised, shallow, muddy, tiny and exposed channel filled with instream vegetation and algae. Likely seasonal. Lacks potential instream cover for RB rearing at higher flow. No suitable spawning habitat for RB. No potential overwinter habitat observed and no lakes/wetlands u/s in system to provide perennial habitat. 5 sites in system with no fish present. **Fish-bearing reaches in this category (3 of 27 surveyed - see Table 6) had CW>0.9m and Wb>0.32m. Substrate was either fines (in LC morphology) or gravels. Cover was abundant and flow was permanent. These reaches flowed directly into confirmed fish-bearing reaches.
460-924300-58800			7	256	10/24/99	1.38	0.53	17.5	RB	S6	EF	140	122	L	4	50	C	3	S/S/I	M	13.6	9m falls in reach 6 d/s block fish passage. No fish populations present above the falls. NFC above the falls and NFC in 3 sites in system.
460-924300-58800-15500-5977			1	259	10/24/99	NVC		0.0		NCD								1	S/S/I	S	0.8	No channel present by FPC definition. Twinberry/alder patch.
460-924300-58800-15500-5977			3	260	10/24/99	NVC				NCD								3	S/S/I	S	0	No drainage present at mapped location.
460-924300-64500-12509			2	261	10/26/99	NVC				NCD								2	S/S/I	S	1.1	Not a stream by FPC definition. No continuous channel bed - mossy valley floor.
460-924300-65818			1	262	10/26/99	NVC				NCD								1	I/M/T	S	11.1	No channel present by FPC definition. Part of wetland along Maxan C. No channel observed in reach 2.
460-924300-66291			1	263	10/20/99	NVC				NCD								1	I/M/T	S	11.1	Not a stream by FPC definition - willow shrub wetland along Maxan C. with no defined channel bed.
460-924300-72200-46534			5	265	10/24/99	0.72	0.17	11.0	RB	S6	EF	100	42	L	4	40	C	3	S/S/I	S	0	No RB habitat - tiny, moderately steep, shallow with no instream cover for fish habitat. Lacks potential instream cover for RB rearing at higher flow. No suitable spawning habitat for RB. No potential overwinter habitat observed and no lakes/wetlands u/s in system to provide perennial habitat.
460-924300-74200-47982			1	272	10/27/99	NVC				NCD								1	I/M/T	S	11.1	No channel present by FPC definition. Water dissipates in swamp with isolated mudholes and no continuous channel bed. No connectivity to parent stream -924300-74200.
460-924300-74200-50147			1	273	10/27/99	NVC				NCD								1	S/S/I	S	0.8	Not a channel by FPC definition - willow, hardhack wetland with no continuous channel bed.

4.5.3 Follow-up Sampling Required

Table 8 on the following page summarizes the need for follow-up sampling in sampled 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 of year or isolated by obstruction with insufficient sampling to confirm a non fish-bearing status)
- **Priority 2:** likely fish use (fish habitat available or potentially available and easily accessible from confirmed or inferred fish-bearing reaches)

The interpretive maps reflect this prioritization process. A dashed blue line has been used to indicate that fish presence has been inferred but that fish absence is suspected in that reach. Priority 1 reaches fall within this criteria. A dashed red line has been used to indicate that fish presence has been inferred and is considered likely. Priority 2 reaches fall within this criteria.

Not all inferred fish-bearing reaches have been designated for follow-up sampling. Reaches where the inferred fish-bearing designation is considered unlikely to change, regardless of the results of the follow-up sampling (i.e. habitat available and easily accessible), have not been placed in this table. Rather, the follow-up sampling is intended to focus on those streams where potential habitat exists and must be evaluated during a different time of year, and those streams where sampling conducted was considered to be insufficient to classify the reach as non-fish bearing.

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 8: Follow-up sampling required for classification of inferred fish-bearing reaches in the Shovel/Maxan Sub-units

Stream Name	Watershed Code	ILP	Reach	Site	Timing	Method	Priority	Comments
		25770	1	186	June/July	EF	1	Determine RB presence/absence and u/s distribution limit. Sample reach 2.
		25770	3	187	June/July	EF	1	Determine RB presence/absence and u/s distribution limit. Suspected obstruction in reach 2. Sample reach 2.
		25774	14	194	June/July	EF	1	Determine RB u/s distribution limit. Suspected obstruction between reach 11 and 14. Sample reach 12 and 13.
		25774	15	195	June/July	EF	1	Determine RB u/s distribution limit. Suspected obstruction between reach 11 and 14. Sample reach 12 and 13.
		25777	8	198	June/July	EF	1	Determine RB u/s distribution limit. Suspected obstruction between reach 4 and 8. Sample reach 5, 6 and 7.
		25797	3	206	June/July	EF	1	Determine RB u/s distribution limit. Suspected obstruction between reach 4 and 8. Sample reach 5, 6 and 7.
		25797	4	207	June/July	EF	1	Determine RB presence/absence and u/s distribution limit. Suspected obstruction in reach 1. Sample reach 1.
		25830	1	215	June/July	EF	1	Determine RB presence/absence and u/s distribution limit. Suspected obstruction in reach 2. Sample reach 1 and 2.
		25850	1	223	June/July	EF	1	Determine rearing/spawning habitat use by RB.
	460-924300-43400		9	237	June/July	EF	1	Determine RB u/s distribution limit. Suspected obstruction between reach 5 and 8. Sample reach 6, 7 and 8.
	460-924300-43400-34749-7794		2	243	June/July	EF	1	Determine RB presence/absence and u/s distribution limit. Suspected obstruction in reach 1. Sample reach 1.
	460-924300-43400-34749-7794		3	244	June/July	EF	1	Determine RB presence/absence and u/s distribution limit. Suspected obstruction in reach 1. Sample reach 1.
	460-924300-58800		5	254	June/July	EF	1	Determine RB u/s distribution limit. Suspected obstruction in reach 3 Sample reach 3.
	460-924300-58800		6	255	June/July	EF	1	Determine RB u/s distribution limit. Suspected obstruction in reach 3 Sample reach 3.
	460-924300-58800-15500-0859		4	258	June/July	EF	1	Determine RB u/s distribution limit. Potential obstruction d/s in reach 3 of -924300-58800.
	460-924300-74200-03400		2	269	June/July	EF	1	Determine RB presence/absence and u/s distribution limit. Potential beaver impoundments in reach 1. Sample system from reach 1.
	460-924300-74200-03400		3	270	June/July	EF	1	Determine RB presence/absence and u/s distribution limit. Potential beaver impoundments in reach 1. Sample system from reach 1.
	460-924300-74200-30700		3	271	June/July	EF	1	Determine RB presence/absence and u/s distribution limit. Suspected obstruction in reach 1. Sample reach 1.
	460-924300-74200-56300		1	274	June/July	EF/MT	1	Determine RB presence/absence and u/s distribution limit.
	460-924300-74200-56300-9181		1	275	June/July	EF/MT	1	Determine RB presence/absence and u/s distribution limit.

		25823	1	211			2	Determine RB presence/absence and u/s distribution limit.
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6. List of Appendices

Appendix I: FDIS Reach/Site Summary, Site Card and Fish Form Reports and Representative Photographs

Appendix II: Hardcopy maps

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

Shovel/Maxan Sub-units Fish Inventory - 1999

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