RECONNAISSANCE (1:20,000) FISH AND FISH HABITAT INVENTORY IN THE UPPER BUCK CREEK WATERSHED

WSC 460-636000

Prepared for:

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PROJECT REFERENCE INFORMATION

FDIS Project Number:	06-BULK-0103-0103-1999
MoELP Project Number:	NWD_C151_010_2000
FRBC Project Number:	10448
FRBC Region:	Skeena-Bulkley Region
MELP Region:	06
MELP District:	Skeena
FW Management Unit:	6-9
Fisheries Planning Unit:	North Coast
DFO Sub-district:	4D
Forest Region:	Prince Rupert
Forest District:	Morice
Forest Licensee and Tenure #:	Northwood Pulp and Timber Ltd., Morice TSA 20
First Nation Traditional Area:	Wet'suwet'en Nation, Broman Lake Band, Skin Tyee Band

WATERSHED INFORMATION

Watershed Group:	Bulkley River
Watershed Code:	460-636000-00000-00000-0000
UTM at Mouth:	9 667968 6006858
Watershed Area:	274.98 km^2
Total of All Stream Lengths:	411 km
Stream Order:	5 th
NTS Map:	93L/08, 93L/01
TRIM Map:	93L.019, 93L.018, 93L.020, 93L.038, 93L.028, 93L.039, 93L.029
BGC Zone:	SBS
Air Photos:	BCC96123 #123-136, 45-55 BCC96071 #21-35 BCC96050 #1-6, 137-145 BCC96114 #31-40 BCC96049 #208-211 BCC96156 #52-63

SAMPLE DESIGN SUMMARY

Total number of Reaches:	573
Random Sampling Sites:	54
Biased Sampling Sites:	51
Fish Sampling Sites:	9
Total Sampling Sites:	114
Sampling Intensity	20%
Field Sampling Dates:	August 17 - October 6, 1999
Fish Species Captured During Survey:	LNC; RB; RSC; WSU

CONTRACTOR INFORMATION

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DISCLAIMER

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

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

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ATTACHMENTS AVAILABLE AT MELP REGIONAL OFFICE

Attachment I	Planning Document
Attachment II	Field Notes
Attachment III	Collected Fish Aging Structures
Attachment IV	Photodocumentation
Attachment V	Digital Data
Attachment VI	Hardcopy FISS Update Data Forms

ACKNOWLEDGMENTS

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

1.0 INTRODUCTION

Triton Environmental Consultants Ltd. (Triton Terrace) was retained by Northwood Pulp and Timber Ltd. (Northwood) to conduct a Reconnaissance (1:20,000 scale) Fish and Fish Habitat Inventory in Northwood's Buck/Parrott operating area which is located within the Morice Timber Supply Area (T.S.A. 20).

This project commenced as a result of BC Fisheries and Ministry of Environment Lands and Parks (MELP) initiatives to gather information about fish distribution, population status, and the condition and capability of stream habitats (Anonymous, 1998). Forest Renewal of British Columbia (FRBC) funding and MELP supervision facilitated the commencement of this sample-based survey of the sub-basins outlined within the study area. The inventory provides information regarding the characteristics, the distributions and the relative abundance of fish species, as well as information on biophysical lake and stream data. This information can be used for the interpretation of habitat sensitivity and fish production capability (Anonymous, 1998). The results of the inventory may be applied to initial Riparian Management Area (RMA) and lake classification under the Forest Practices Code for forest development planning, watershed restoration, and for the establishment of some landscape-level biodiversity objectives (Anonymous 1998).

1.1 Study Objectives

Fish and fish habitat values were the primary components of the inventory:

- Fish
  - identify and map fish-bearing stream reaches and lakes using existing information and new field information (field inventory).
- Fish Habitat
  - identification and coding of all waterbodies.
  - identification and characterization of stream reaches utilizing topographic maps and aerial photographs, with confirmation via field sampling.

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

2.0 STUDY AREA

2.1 Location

Northwood's Buck/Parrott operating area is comprised of two major watersheds; Buck Creek (WSC 460-636000) and Parrott Creek (WSC 180-374000-95200-87600). The study area includes the entire upper Buck Creek watershed upstream of and including Klo

Creek (WSC 460-636000-72000). The Buck Study Area is outlined in Figure 1, and is located approximately 20 km southeast of Houston, BC.

The upper Buck Creek watershed is situated in the Central Interior Ecoprovince. The watershed lies in the broad rolling plateau that comprises the Fraser Plateau Ecoregion, in the Bulkley Basin Ecosection. The Bulkley Basin Ecosection is comprised of broad lowland areas with a rainshadow climate in the north (Campbell et al., 1990).

Demarchi (1996) describes the climate within the Central Interior Ecoprovince:

> *The area has a typically continental climate: cold winters, warm summers, and a precipitation maximum in late spring or early summer. The area lies in a rainshadow leeward of the Coast Mountains. There is intense surface heating and convective showers in summer and in winter there are frequent outbreaks of Arctic air.*
>
> *The biogeoclimatic zonation for the upper Buck Creek watershed is predominantly Sub-boreal Spruce. Engelmann Spruce - Subalpine Fir zones occur on the middle slopes and Alpine Tundra Zones occur on the upper mountain slopes.*

2.2 Access

Houston , the closest community to the study area, is situated approximately 20 km to the northwest of the study area. Sampling sites within the watershed were accessed by both road and air.

Directions from Houston to the northern portion of the study area are as follows:

- From Houston drive southwest 21 km on the Equity Mine Road into the headwaters of Klo Creek.
- Sample sites were accessed off the Equity Mine Road (21 km to 35 km) and by spur roads on either side of the Equity Mine Road.

Directions from Houston to the southern portion of the study area are as follows:

- From Houston drive south 30 km on the Buck Flats Road. At approximately 30 km stay left and follow the road east towards Goosly Lake.
- Drive 15 km east past the Goosly Lake junction into the southern portion of the study area.
- Sample sites were accessed off the mainline road and associated spur roads.

Sites located in the Buck Creek area that were not accessible by road were accessed by helicopter.

Fig.1

3.0 RESOURCE INFORMATION

Resource values within the Sub-boreal Spruce (SBS) biogeoclimatic zone include forest harvesting. Northwood has current logging operations within the study area. Most of the SBS has low capability for agriculture due to adverse climate, topography, bedrock, stoniness or poor drainage. Fur harvest from this zone is among the highest in the province.

A de-activated open-pit mine previously operated by Equity Silver Mines Ltd. has had an impact on the headwaters of the Buck Creek watershed. Continuing acid mine drainage problems and a major acid spill in November, 1981 (108 metric tons of sulphuric acid). Equity Mines conducted water quality monitoring of acid mine drainage over a ten year period dating from January 1985 to March 1986 inclusive (FHIIP, 1995, Stream Summary Catalogue). The traditional area of the Wet'suwet'en Nation, Broman Lake Band, and Skin Tyee Band lie within the study area.

In addition, the surrounding forested areas are used for hunting, hiking, and cross-country skiing. Snowmobiling is very popular within the study area. A community snowmobile cabin is maintained adjacent to the meadows surrounding Klo Creek.

The study area (located within the Central Interior ecoprovince) supports moose *(Alces alces)*, caribou (*Rangifer tarandus*), mule deer (*Odocoileus hemionus hemionus*), whitetail deer (*O. virginianus*) and mountain goat (*Oreamnos americanus*) habitats. In addition, black bears (*Ursus americanus*), wolves (*C. lupis*), fisher (*Martes pennanti*), and lynx (*Lynx canadensis*) are widely distributed throughout the ecoprovince. Common herptiles include the western garter snake (*Thamnophis elegans*), the spotted frog (*Rana pretiosa*) and the western toad (*Bufo boreas*) (Campbell et al., 1990). Ongoing mountain goat studies within the study area are being conducted by Wildfor Consultants Ltd. (Smithers) and Ardea (Terrace).

4.0 METHODS

The 1:20,000 Scale Fish Stream Identification inventory was completed in six phases:

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

The methods employed for each phase of the project followed those outlined in the *Reconnaissance (1:20 000) Fish and Fish Habitat Inventory: Standards and Procedures, April 1998* (Anonymous 1998). Alterations were made to the project plan in Phase 4 and are outlined in the sections below.

4.1 Field Data Collection

The following sections describe the methods and approaches taken to complete field sampling and data collection.

4.1.1 Pre-field Preparation

Stream reaches to be inventoried were identified by two methods: random sites generated by the FDIS planning tool and biased sites identified by Northwood and Triton. Bias sites were selected to address gaps within the randomly generated plan. The final sample site selection incorporated into the project plan was reviewed by John Brockley (Northwood), Todd Mahon (FRBC Coordinator), Paul Giroux (FIS, MELP Skeena Region 6), and Triton (Terrace) to ensure the sample sites met the requirements of Northwood, MELP and the FDIS planning model.

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

4.1.2 Field Procedures

All sampling procedures followed those outlined in the *Reconnaissance (1:20 000) Fish and Fish Habitat Inventory: Standards and Procedures, April 1998* (Anonymous 1998) and the *Forest Practices Code Fish Stream Identification Guidebook,* (Anonymous 1998).

Field work was conducted by three field crews each consisting of two people. In watersheds where road access was available, the crews used 4X4 pick-up trucks or ATV's to travel from site to site. In watersheds where road access was unavailable transportation was provided by Westland Helicopter's Bell Jet Ranger helicopter.

Prior to the commencement of field activities each crew was equipped with the following:

- Smith-Root Model 12A backpack electrofisher
- electrofisher safety gear (leak proof waders, wading belts, Linesman's gloves, hat with a brim, polarized sunglasses)
- minnow traps and bait
- backpacks
- clinometer

- compass
- hip chain
- 50 m tape
- meter stick
- VHF radio
- first aid kit
- water quality kit (hand held pH and conductivity meters)
- thermometer
- Canon waterproof camera and slide film
- voucher specimen container
- MELP Site cards
- MELP Fish collection forms
- MELP Individual fish data cards
- field maps

Fish sampling within stream reaches was conducted using three primary sampling techniques: electrofishing, minnow trapping and visual observation. Electrofishing is the most efficient method of sampling in shallow stream habitats and was the preferred sampling method for habitat types in small streams and shallow water. In these habitats and where using an additional sampling method would not provide additional information (i.e. species, relative abundance), it was the only fish sampling technique employed. In a few cases, minnow traps baited with salmon roe were employed in streams of greater depth and in ponded habitats. Visual observation was also used when other methods failed to catch fish. A combination of techniques were employed where the use of only one method would not have effectively sampled all habitats and in areas that were not suited to electroshocking (deep pools, wetlands, etc.). Where appropriate, and where return visits were practical, minnow traps baited with salmon roe were set and allowed to soak for a 24 hour period.

Reaches classified as a no visible channel (NVC) did not have a defined channel within the sampled reach. Unless otherwise stated NVC indicates "not a stream" according to the Forest Practices Code (NCD is used by the forest industry).

4.1.3 Field Data Compilation

Following each field day, field crews met to compile field notes, review field data and summarize the field findings onto hard copy maps. This system ensured that all information was thoroughly documented, allowing for preliminary stream classifications and changes to the sampling plan. Field crews were in constant contact with Paul Giroux

(Fisheries Inventory Specialist) and Andy Witt (Forest Ecosystem Specialist) when the originally proposed plan needed modifications. In most cases sites downstream of known fish bearing reaches were moved to reduce sampling redundancy, address potential barriers, identify species composition, establish fish distribution and provide additional sampling data.

5.0 RESULTS

5.1 Existing Information

FISS (1995) records indicate that kokanee (*Oncorhynchus nerka*), rainbow trout (*O. mykiss*), largescale sucker (*Catostomus macrocheilus*), longnose sucker (*C. columbianus)*, peamouth chub (*Mylocheilus caurinus*), redside shiner (*Richardsonius balteatus*), brassy minnow (*Hybognathus hankinsoni*), prickly sculpin (*Cottus asper*), and Rocky Mountain whitefish (*Prosopium williamsoni*) are present in the study area.

MoELP Skeena Region 6 Smithers files indicate, longnose sucker, longnose dace (*Rhinichthys cataractae*), Aleutian sculpin (*Cottus aleuticus*), and coarse scale sucker are known to inhabit the Klo Creek portion of the study area. Kokanee, rainbow trout and Rocky Mountain whitefish are also present in Goosly Lake (FHIIP, 1995).

5.2 Survey Information

Table 1 provides an overview of the survey information compiled for the Buck Study Area.

Table 1. Summary Survey Information for the Buck Study Area

Major Watershed Code:	460-636000-00000-00000-0000-0000-000-000-000-000-
Watershed Name:	Buck Creek
Drainage:	Buck Creek→Bulkley River→Skeena River
NTS Maps:	93L/08, 93L/01
TRIM Maps:	93L.019 93L.018 93L.020 93L.038 93L.028 93L.039 93L.029
Total Number of Lakes:	27
Total Number of Reaches:	573
Stream Field Sampling Dates:	August 17 - October 6, 1999
Number of Random Sites Sampled:	54
Number of Bias Sites Sampled:	51
Number of Fish Sampling Sites:	9
Total Number of Sampling Sites:	114

5.3 Field Data

5.3.1 Site Cards

Site Cards and Reach Forms were entered into MELP's FDIS database following the completion of the Phase 4 field inventory. Hard copy versions of the Reach Forms and Site Cards are presented in Appendix I.

5.3.2 Fish Collection Cards

The Fish Collection Forms were entered into MELP's FDIS database following the completion of the Phase 4 field inventory. A hard copy of the Fish Collection Forms are presented in Appendix I following the Reach/Site cards.

5.4 Survey Comments

5.4.1 Logistics

Weather conditions were variable over the field sampling dates. Heavy rain caused some turbidity and high water in several sample sites. Field crews left heavily turbid streams for later in the project, these turbid streams were then revisited when sampling conditions were favorable. Frequent precipitation over the sampling dates contributed to a low number of dry/intermittent streams. Only 6 of 105 sample sites were classified as dry/intermittent. Wet conditions caused poor driving on secondary roads and crews often had to use winches to make it through muddy sections of road. The use of an ATV was employed when conditions were favourable for, or walking distances were too great. No sites were dropped from the sample plan due to lack of access.

5.4.2 Fish Comments

Fish were captured in 35 of 114 sample locations. Table 2 (Fish Bearing Reaches in the Buck Study Area) provides a summary of the reaches in which fish were captured. Rainbow trout, white suckers, redside shiner, and longnose dace were captured in the study area. Figure 2 shows the length frequency distribution of rainbow trout captured within the study area. Figure 3 outlines the length at age relationship for a representative sample of rainbow trout captured within the study area.

Figure 2. Length frequency distribution for rainbow trout captured in the study area (n=221)

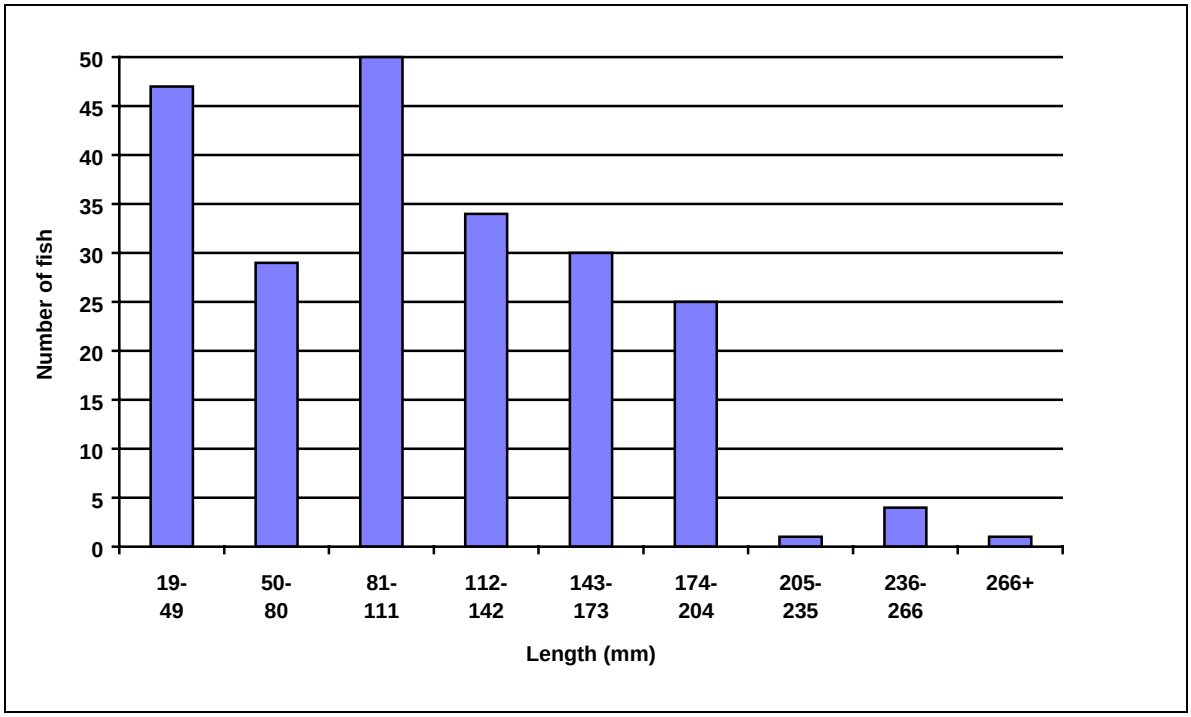

Figure 3. Length vs Age for rainbow trout captured within the Study Area (n=34)

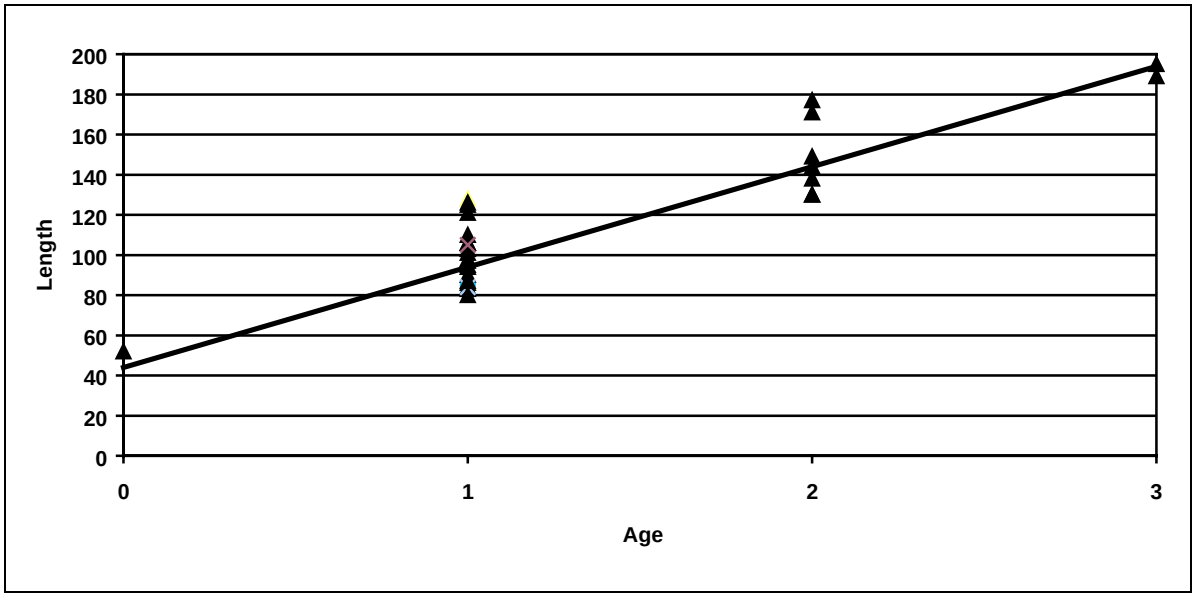

Table 2. Buck Creek Fish Capture Locations

Site	WSC/ILP	Reach	Order	Species	Stage	Number	Minimum Length (mm)	Maximum Length (mm)
285	636000-88700	3	2	RB	A	1	191	191
				RB	J	3	107	130
288	72000-35400	2	3	RB	J	1	131	131
369	636000-88600	1	2	RB	J	9	64	189
370	4175	1	2	RB	J	1	119	119
371	636000-88600	3	2	RB	J	1	165	165
433	72000-55000	1	2	RB	F	4	21	29
				RB	J	6	83	105
446	72000-39300	2	2	RB	J	8	121	177
600	72000-69300	2	4	RB	F	2	29	36
				RB	J	25	98	300
				RSC	A	1	79	79
				LNC	A	4	43	80
601	636000-72000	21	2	RB	J	2	52	52
602	72000-77700	1	3	RB	J	5	50	110
603	72000-77700	2	3	RB	J	3	117	123
604	4031	2	2	RB	J	2	165	171
607	4032	3	1	RB	J	8	74	97
				RB	A	5	101	138
613	72000-78600	8	2	RB	J	2	68	75
				RB	A	2	100	131
615	72000-69300	5	2	RB	J	12	150	200
624	39300-2740	2	2	RB	A	4	155	200
625	4109	1	1	RB	J	1	70	70
626	4109	2	1	RB	J	2	162	167
627	39300-2740	5	1	RB	A	22	100	250
629	4168	1	2	RB	A	1	126	126
630	460-636000	3	4	RB	F	26	25	35
				RB	J	13	79	127
631	4167	1	3	RB	F	2	35	35
				RB	J	2	86	90
634	4196	1	2	WSU	J	1	75	75
638	69300-8160	1	3	RB	J	2	89	96
639	69300-7270	2	2	RB	J	1	93	93
646	460-636000	4	3	RB	F	1	19	19
				RB	J	15	66	106
				RB	A	1	179	179
695	69300-8160	5	2	RB	J	3	72	103
696	69300-8160	6	2	RB	J	3	72	79
708	4188	1	2	RSC	J	1	65	65

Table 2. Buck Creek Fish Capture Locations

Site	WSC/ILP	Reach	Order	Species	Stage	Number	Minimum Length (mm)	Maximum Length (mm)
711	72000-21600	2	2	RB	J	5	124	129
712	636000-72000	6	5	RB	F	10	25	35
				RB	A	1	178	178
714	35400-9400	1	2	RB	J	2	130	195
715	72000-35400	2	3	RB	A	5	160	175
716	72000-35400	1	3	RB	A	3	155	165
717	4096	1	1	RB	F	2	34	35

Resident rainbow trout, the dominant fish species captured during this survey, have been found to utilize small to moderately large streams, which have moderate flows, gravel substrates, riffle pool morphology and shallow depths. Spawning occurs mainly from mid-April to late June with fry emergence occurring from mid-June to mid-August. Life expectancy can be as low as 3 or 4 years in many stream and lake populations (Scott & Crossman 1985). Rainbow trout were captured in most of the larger, lower gradient tributaries to Klo Creek and Buck Creek. All of the rainbow trout captured in the study area were ajacent to overwintering habitats. Juveniles and fry were captured in many of the tributary streams to Buck Creek, which indicates that rainbow trout may use these smaller streams for spawning and juvenile rearing.

One (1) white sucker was captured in the upper reaches of Buck Creek, above a small lake in Reach 11. This fish is most likely a lake resident which is utilizing the available stream habitat offered during the spring and summer months. White sucker are generally characterized as inhabiting shallow warm lakes and slower stream habitats. White sucker reach sexual maturity between 5 and 8 years and tend to spawn in slow shallow water with gravel substrates during the spring (early May to June). Adults do not create redds and deposit their eggs freely to adhere to the gravel substrates or to drift downstream to suitable substrates in slower water.

Several longnose dace were captured in a large tributary to Klo Creek. Longnose dace are know to inhabit swift flowing streams with boulder or gravel substrates. Relatively little is known about the spawning characteristics of the longnose dace although spawning is considered to take place in the spring or early summer (May to July) (Scott & Crossman 1985). The longnose dace captured within the study area are believed to be stream resident fish as no lakes are located near fish capture sites.

Redside shiner were captured in a large tributary to Klo Creek and in a tributary to Buck Creek. Redside shiner can tolerate a wide range of temperatures and trophic conditions and are generally known inhabit lakes, small ponds and moderately fast streams. Redside shiner live up to 7 years and reach sexual maturity in approximately 3 years. Spawning takes place in streams or lakes in the early summer (May to early August). No nest is built and the eggs are released to adhere to gravel, vegetation or other suitable substrates. The eggs hatch in 1-2 weeks and the fry emerge from the gravel 1-2 weeks later (Scott & Crossman 1985). The redside shiner captured within the Klo Creek drainage are most likely resident stream fish as there are no lakes in the immediate area.

Quantitative abundance figures were not generated in this study as sampling methods to determine abundance were not utilized. Rainbow trout were the most prevalent species and were captured in 33 of the 35 sites in which fish were found.

Field crews were constantly on the lookout for high value sport fishing opportunities within the study area. In an effort to reduce sampling redundancy field crews were often located on the smaller upslope streams which contain no high value sport fishing

opportunities. Sport fishing is conducted within the study area but without further examination our field crews could not determine whether they were high value or not.

5.4.3 Fish Habitat

Fish were captured in 1st to 5th order streams within the study area and fish distribution was generally associated with perennial fish habitat. Perennial habitat is defined as a stream, lake or other waterbody with water present continuously during a normal water year. Instream overwintering habitat was identified as containing residual pool depths greater than 0.5 m. Other overwintering habitat included wetlands with ponded water deeper than 0.5 m and lakes. Spawning habitat was characterized by the presence of suitable spawning substrates and adequate flows. Rearing habitat was characterized as containing stream habitat where fish can live and grow.

Fish bearing 1st order streams were not located far from perennial fish habitat. Field observations indicated that the ephemeral nature of these streams may limit or prevent their ability to sustain fish populations, particularly throughout the year. It is unlikely that these reaches are used seasonally (unless they flow into a major system i.e. 3rd or 4th order) due to the short duration of water flows and lack of suitable fish habitat.

The majority of fish bearing reaches were located within 2nd order streams due to good flows during sampling and modifications made in the field to the sampling plan. Modifications of the sampling plan reduced the amount of redundant sampling within 3rd and 4th order fish bearing basins.

No fish were captured in reaches with an average channel width of less than 0.98 m, or average gradient greater than 11.3%. Fish-bearing 1st and 2nd order streams had average channel widths of 1.30 m and 2.10 m. Fish-bearing 3rd and 4th order streams had average channel widths of 3.05 m and 6.53 m respectively.

Fisheries values within the project area are limited by the occurrence of high quality spawning and rearing habitats for rainbow trout. Klo Creek and Buck Creek are the major providers of high quality spawning and rearing habitats within the study area. The low number of lakes within the study area also establishes Klo Creek and Buck Creek as the dominant overwintering habitat. The general lack of deep pool habitats and limited perennial flow in smaller tributary streams limits the occurrence of suitable habitats for rainbow trout.

Fish species were captured in 35 of the 69 reaches classified as fish-bearing (Table 3). Thirteen (13) reaches in the fish bearing classification table were classified as fish bearing by default. It was determined that fish can access these reaches from downstream fish bearing waters, and further sampling is not recommended.

Table 3. Buck Creek Fish Bearing Table

Site	WSC/ILP	Reach	Width (m)	Gradient (%)	Species	Stream Class	Follow-up Sampling (y or n)	Comments
285	636000-88700	3	1.72	5.3	RB	S3	n	Poor spawning, no overwintering and moderate rearing habitat.
286	4188	6	1.43	6.5	NFC	S4*	y	Inferred fish bearing until resampling has been conducted.
287	636000-88700	4	1.85	14.3	NFC	S3*/S6	n	Cascade (1.5 m) prevents upstream fish migration. Sampling above the cascade confirms non fish bearing status.
288	72000-35400	2	1.85	5.3	RB	S3	n	Poor spawning and overwintering potential. High quality rearing habitat.
292	4015	2	0.45	5.2	NFC	S4*	y	Fish bearing based on access.
369	636000-88600	1	4.76	3.38	RB	S3	n	Moderate rearing and spawning habitat. No overwintering habitat observed.
370	4175	1	1.86	10	RB	S3	n	Poor rearing and spawning habitat. No overwintering habitat observed.
371	636000-88600	3	3.21	8.13	RB	S3/S5	n	Cascade (2 m) prevents upstream fish migration to this reach. Sampling above the cascade confirms non fish bearing status.
432	72000-55000	2	1.65	14.8	NFC	S3*/S6	n	High gradient (25%) section with a cascade (3 m) prevents upstream fish migration. Fish stream below this section based on access.
433	72000-55000	1	2.62	10.5	RB	S3	n	Moderate rearing, poor spawning, and no overwintering habitat.
443	35400-8720	1	1.03	7.5	NFC	S4*	y	Inferred fish bearing until resampling is conducted.
444	35400-9360	1	0.8	8.5	NFC	S4*/S6	n	Cascade (6.5 m) prevents upstream fish migration. Fish bearing based on access below the cascade.
445	4105	1	0.9	23	NFC	S4*/S6	n	Falls (2.2 m) prevent upstream fish migration.
446	72000-39300	2	4.47	3.6	RB	S3	n	Moderate rearing habitat, poor spawning habitat, and no overwintering habitat.
454	72000-39300	2	3.78	4.9	NFC	S3/S5	n	RB captured in lower portion of this reach. Cascade (6 m) prevents upstream migration into Reach 3.
462	72000-21600	5	1.73	14.8	NFC	S3*	y	Fish stream based on access or until resampling confirms fish presence or absence.
470	63600-93021	3	1.4	2.8	NFC	S4*	y	Inferred fish bearing until resampling has been conducted.
600	72000-69300	2	5.49	2	RB, RSC, LNC	S2	n	High quality rearing, spawning and overwintering habitat.
601	636000-72000	21	2.18	3.8	RB	S3	n	Good rearing habitat with poor spawning.
602	72000-77700	1	3.71	4.3	RB	S3	n	Poor rearing, spawning and overwintering habitat.
603	72000-77700	2	4.01	3.4	RB	S3/S5	n	Falls (2.5 m) prevent upstream fish migration.
604	4031	2	1.25	2.7	RB	S4	n	Poor rearing and spawning habitat. No overwintering habitat observed.
606	4030	3	2.64	1.8	NFC	S3*	y	Temporary barriers to fish migration were identified. Inferred fish bearing until resampling confirms fish presence or absence.
607	4032	3	1.23	3	RB	S4	n	Moderate rearing, spawning and overwintering potential.
608	4072	1	0.27	10.1	NFC	S4*/S6	n	The lower portion of the reach is fish bearing based on access. The portion of stream above the sample site is non fish bearing based on habitat characteristics.

Table 3. Buck Creek Fish Bearing Table

Site	WSC/ILP	Reach	Width (m)	Gradient (%)	Species	Stream Class	Follow-up Sampling (y or n)	Comments
609	4074	1	0.24	7.9	NFC	S4*/S6	n	The lower 100 m of the reach is fish bearing based on access. The portion of stream above the sample site is non fish bearing based on habitat characteristics.
610	4077	1	0.85	1.3	NS	S4*	n	No barriers to upstream fish migration were identified. Fish stream based on access.
612	4080	1	1.7	2.3	NFC	S3*	y	No barriers to upstream fish migration were identified. Fish stream based on access.
613	72000-78600	8	1.97	2.6	RB	S3	n	Poor spawning and rearing habitat. No overwintering habitat observed.
614	4055	1	0.17	1.3	NS	S4*	n	No barriers to upstream fish migration were identified. Fish stream based on access.
615	72000-69300	5	3.5	1.9	RB	S3	n	Moderate rearing habitat, poor overwintering habitat and no spawning habitat.
616	4052	1	1.1	8	NFC	S4*	y	No barriers to upstream fish migration were identified. Inferred fish bearing based on access or until resampling is conducted.
623	4133	1	1.08	10.5	NFC	S4*	y	No barriers to upstream fish migration were identified. Inferred fish bearing based on access or until resampling is conducted.
624	39300-2740	2	1.77	2.88	RB	S3	n	High quality rearing habitat.
625	4109	1	1.54	1.3	RB	S3	n	No overwintering or spawning habitat observed. Moderate rearing potential.
626	4109	2	1.52	1.6	RB	S3	n	High quality rearing habitat, poor spawning and poor overwintering potential.
627	39300-2740	5	1.11	1.5	RB	S4	n	High quality rearing habitat.
628	4165	1	0.53	2.8	NS	S4*	n	No permanent barriers observed. Fish bearing based on access.
629	4168	1	2.35	3.7	RB	S3	n	Moderate rearing and spawning habitat. No overwintering habitat observed.
630	460-636000	3	7.58	1.8	RB	S2	n	High quality spawning and rearing habitat. Overwintering habitat abundant.
631	4167	1	2.3	5.4	RB	S3	n	Moderate rearing and spawning habitat. No overwintering habitat observed.
633	4167	2	3.13	4.8	NFC	S3*	y	Fish were observed jumping in a reservoir within this reach. Sampling efforts were unable to capture fish.
634	4196	1	1.52	4.4	WSU	S3*	y	Inferred fish bearing based on capture of non sport species and lack of permanent barriers.
636	636000-85000	1	1.65	3.5	NFC	S3*	y	Moderate rearing habitat.
637	636000-85000	2	1.7	12.5	NFC	S3*	y	Dewatered section in Reach 1 may prevent upstream fish migration to this reach. Inferred fish bearing until resampling conducted.
638	69300-8160	1	1.61	2.6	RB	S3	n	High quality rearing habitat.
639	69300-7270	2	1.08	8.3	RB	S3	n	Cascade (2.5 m) in the upper portion of this reach is a barrier to upstream fish migration.
641	4036	2	0.97	7.1	NFC	S4*	y	No spawning or overwintering habitat. Poor rearing habitat. Inferred fish bearing based on access.
646	460-636000	4	6.28	1.7	RB	S2	n	High quality spawning and rearing habitat. Overwintering habitat present.
650	636000-78200	2	1.03	7.5	NFC	S4*	y	Fish may access the lower portion of this reach.
651	78200-14402	1	1.58	9.3	NFC	S3*	y	Fish may access the lower portion of this reach.
694	4061	1	0.89	3.2	NFC	S4*	n	Fish stream based on access. Beaver dam is a temporary barrier to upstream fish migration.

Table 3. Buck Creek Fish Bearing Table

Site	WSC/ILP	Reach	Width (m)	Gradient (%)	Species	Stream Class	Follow-up Sampling (y or n)	Comments
695	69300-8160	5	1.55	7.3	RB	S3	n	Poor overwintering and spawning habitat. Moderate rearing habitat.
696	69300-8160	6	0.98	1	RB	S4	n	Poor overwintering and spawning habitat. Moderate rearing habitat.
697	4059	1	0.93	4.4	NFC	S4*/S6	n	Cascade (1.5 m) prevents upstream fish migration. Fish bearing based on access below cascade.
705	636000-95500	2	0.96	2.5	NFC	S4*/S6	n	Cascade (0.8 m) prevents upstream fish migration.
706	4188	3	2.3	6.3	NFC	S3*	y	Inferred fish bearing until resampling has been conducted.
708	4188	1	NA	NA	RSC	NA	n	Fish sampling site. Non sport species captured.
709	72000-27000	1	2.03	16.8	NFC	S3*	y	Inferred fish bearing until confirmed through resampling.
711	72000-21600	2	2.91	8.3	RB	S3	n	Low potential for spawning and overwintering. Moderate rearing habitat.
712	636000-72000	6	14.01	1	RB	S2	n	Good spawning, rearing and overwintering habitat.
713	35400-0940	2	0.63	8.8	NFC	S4*/S6	n	Fish may access lower 100 m of this reach during high flows. Above that point there is no connectivity and habitat is too poor to sustain fish.
714	35400-0940	1	1.5	1.9	RB	S3	n	No spawning habitat. Moderate rearing habitat and low overwintering potential.
715	72000-35400	2	2.57	5.3	RB	S3	n	Low spawning and overwintering potential. High quality rearing habitat.
716	72000-35400	1	2.13	3.1	RB	S3	n	Low spawning potential. High rearing potential and moderate overwintering habitat.
717	4096	1	1.08	11.3	RB	S4	n	No overwintering habitat. Low rearing and spawning potential.
718	4170	2	0.92	7	NFC	S4*	n	No barriers to upstream fish migration were identified. Fish stream based on access.
804	4038	2	1.72	4	NFC	S3*	y	Moderate spawning and rearing habitat. No overwintering habitat observed. Inferred fish bearing until resampling is conducted.
805	4038	1	0.4	1	NS	S4*	y	Inferred fish bearing until resampling conducted.

The fish bearing status of streams may be directly supported by sampling data or indirectly inferred based on fish captures in associated reaches, or habitat quality and the occurrence or lack of barriers to fish passage. For example, if the habitats within a given reach are suitable for rearing and/or spawning but no fish were captured and no barriers were observed, the reach would be classed as fish bearing. If the habitats were inadequate to provide suitable rearing habitat, or where barriers prevent fish from accessing and utilizing the reach, it would be classified as non-fish bearing.

Inferred fish bearing status was given to reaches not sampled, with the following criteria:

1) The average stream gradient was less than 20% (through map interpretation) and access to fish bearing waters is present.

2) Stream sections below a headwater lake.

High gradient, cascades and falls were the dominant physical barriers to upstream fish migration in the study area. No fish were captured above a physical barrier to upstream fish migration. Beaver dams often created temporary or soft barriers to upstream fish migration. Beaver activity above Reach 5 on Buck Creek has created numerous ponded sections of stream and temporary barriers to upstream fish migration. Only non sport fish species were captured in these ponds and associated tribs, above the beaver dams. Other features affecting fish habitat in the study area included: landslides, dams, dewatered stream sections, debris jams and culverts (Table 4).

5.4.4 Rehabilitation Opportunities

Seven (7) culverts (Table 4) were identified as barriers or partial barriers to upstream fish migration. In most cases a culvert outlet was perched above the outlet pool creating a barrier at low flows. Two (2) culverts were placed at angles that are too high, creating a water velocity barrier to upstream fish migration. Restoration of the natural watercourse through culvert removal is a possible restoration option where road access is no longer needed. Culvert replacement (downsetting) or outflow pool modifications can be used to restore access where road access is still required.

A 10 m dam (Table 4) located on Bessemer Creek was identified as a barrier to upstream fish migration. Removal of this dam or the installation of a fish ladder may allow fish to access available habitat upstream of the dam. The dam appears to be associated with the Equity Mines operation.

Table 4. Features in the Buck Creek Study Area

Site	ILP/ WSC	Reach #	Feature Type	Feature Height (m)	Feature Length (m)	Comment
285	636000-88700	3	CV	0.6	7	Perched culvert, barrier to upstream fish migration.
287	636000-88700	4	C	1.5	4	Barrier to upstream fish migration.
430	4120	1	C	3.2	4	Barrier to upstream fish migration.
432	72000-55000	2	C	3	5	Barrier to upstream fish migration.
432	72000-55000	2	LS	20	30	Landslide impacting stream.
444	35400-9360	1	C	6.5	8	Barrier to upstream fish migration.
445	4105	1	C	2	5	Cascade.
445	4105	1	F	2.2	0	Barrier to upstream fish migration.
601	636000-72000	21	CV			Culvert.
602	72000-77700	1	FLD		100	Dewatered section of stream.
603	72000-77700	2	F	2.5	0	Barrier to upstream fish migration.
604	4031	2	CV	1	8	Culvert is perched 20 cm. Partial barrier to fish migration.
621	4140	1	C	20	30	Average gradient is 39 % within cascade.
629	4168	1	CV	0.6	10	Culvert is perched 60 cm. Partial barrier to fish migration.
633	4167	2	D	10		Dam is an obstruction to fish migration. No possible upstream fish migration.
636	636000-85000	1	FLD		75	Dewatered section of stream.
639	69300-7270	2	C	2.5	9	Barrier to upstream fish migration.
641	4036	2	CV	0.2		Culvert is perched 20 cm. Partial barrier to fish migration.
646	460-636000	4	LS	6	6	Small section of bank slumping into the stream.
651	78200-14402	1	X	0.6	0	Debris jam below road crossing.
696	69300-8160	6	BD	0.4		Beaver dam.
697	4059	1	C	1.5	1	Barrier to upstream fish migration.
705	636000-95500	2	C	0.8	1	Barrier to upstream fish migration.
709	72000-27000	1	X	0.4	0	Debris jam.
716	72000-35400	1	C	2.5	8	Cascade does not prevent access to this reach.
369	636000-88600	1	CV	1.2	15	Culvert is a partial barrier to upstream fish migration.
369	636000-88600	1	LS	15	30	Landslide introducing sediment into watercourse.
369	636000-88600	1	X	1.5	20	Large woody debris jam.
370	4175	1	C	0.9	2	Cascade is a partial barrier to upstream fish migration.
370	4175	1	CV	0.2	10	Culvert is a velocity barrier.
370	4175	1	CV		10	Culvert is a velocity barrier.
371	636000-88600	3	C	2	1	Barrier to upstream fish migration.
454	72000-39300	2	C	1.5		Series of 1.5 m cascades.
454	72000-39300	2	C	6	4	Cascade is a barrier to upstream fish migration.

Unstable slopes were identified at 3 sample locations (Table 4). Two (2) landslides (WSC 636000-88600 (Reach 1) and WSC 72000-55000 (Reach 2)) introduced sediment directly into the stream. Both slides were initiated as a result of natural stream erosion of steep unstable banks. Bank stabilization and rehabilitation is not an option for these landslides. Forest harvesting activities should be planned to protect riparian areas upstream and downstream of these slides in order to minimize the chance of future bank failures and maintain the integrity of the natural stream course. Natural bank slumping was identified on Reach 4 of Buck Creek. Bank stabilization and rehabilitation of this bank slump would not be appropriate due to the fine soil texture and the natural growth of willow (*Salix sp*.) in this area.

Beaver activity is relatively extensive in the project area and may act to limit or reduce habitat values for salmonids, however remedial action is not appropriate in this case. Trapping beaver, blowing dams etc., are short term actions and would not generate any long-term benefits to fish.

5.4.5 Fisheries Sensitive Zones

A spring located at the top of Reach 5 WSC 39300-2740 can be characterized as being valuable fish habitat. This spring flows up into a small open body of water (40 m x 20 m) approximately 2 m in depth. This spring offers perennial habitat and potential overwintering habitat for resident rainbows. Resource planning in the area should take into account the fisheries value of the spring and establish adequate reserves in order to maintain its integrity.

5.4.6 Additional Sampling Recommendations

Twenty (20) reaches were recommended for additional sampling (Table 5). Additional sampling will clarify fish presence/absence and establish if any barriers exist in downstream reaches. No sport fish were captured in reaches recommended for additional sampling.

Most of the reaches selected for additional sampling represent small tributaries with limited habitat values, and most exhibit ephemeral flows. Based on additional efforts in the past, these reaches often provide limited values for salmonids, and even under optimal conditions, fish are often present at low densities and are not always captured. The reaches selected for additional sampling were required by default due to a lack of water, or negative sampling results. The lack of barriers and gradients less than 20% also increased the additional sampling number. As it is not practical, or necessary, to resample every reach selected in the additional sampling table, additional sampling sites should be selected strategically to optimize additional sampling results.

Table 5. Buck Creek Additional Sampling Table

Site	ILP/WSC	Reach	Width (m)	Gradient (%)	Species	Stream Class	Comments	Additional Sampling Recommendations
286	4188	6	1.43	6.5	NFC	S4*	Inferred fish bearing until resampling has been conducted.	Second pass sampling in Reach 2 or 3.
292	4015	2	0.45	5.2	NFC	S4*	Fish bearing based on access.	Additional sampling in Reach 1 to confirm fish access.
443	35400-8720	1	1.03	7.5	NFC	S4*	Inferred fish bearing until resampling is conducted.	Second pass sampling to confirm fish presence or absence.
462	72000-21600	5	1.73	14.8	NFC	S3*	No barriers were identified. Fish stream based on access or until resampling confirms fish presence or absence.	Additional sampling in Reach 3 or 4.
470	63600-93021	3	1.4	2.8	NFC	S4*	Inferred fish bearing until resampling has been conducted.	Additional sampling of Reach 1 or 2 (wetland) to confirm fish access to this reach.
606	4030	3	2.64	1.8	NFC	S3*	Temporary barriers to fish migration were identified. Inferred fish bearing until resampling confirms fish presence or absence.	Additional sampling of Reach 1 or 2 (wetland) to confirm fish access.
612	4080	1	1.7	2.3	NFC	S3*	No barriers to upstream fish migration were identified. Fish stream based on access.	Second pass sampling to confirm fish presence or absence.
616	4052	1	1.1	8	NFC	S4*	No barriers to upstream fish migration were identified. Inferred fish bearing based on access.	Second pass sampling to confirm fish presence or absence.
623	4133	1	1.08	10.5	NFC	S4*	No barriers to upstream fish migration were identified. Inferred fish bearing based on access.	Second pass sampling to confirm fish presence or absence.
633	4167	2	3.13	4.8	NFC	S3*	Fish were observed jumping in a reservoir within this reach. Sampling efforts were unable to capture fish.	Second pass sampling to confirm fish presence or absence.
634	4196	1	1.52	4.4	WSU	S3*	Inferred fish bearing based on capture of non sport species and lack of permanent barriers.	Additional sampling in Reach 10 or 12 of WSC 460-636000 to confirm presence or absence of sport fish.
636	636000-85000	1	1.65	3.5	NFC	S3*	Spawning habitat abundant. Moderate rearing habitat. No overwintering habitat.	Second pass sampling to confirm fish presence or absence.
637	636000-85000	2	1.7	12.5	NFC	S3*	Dewatered section in Reach 1 may prevent upstream fish migration to this reach. Inferred fish bearing until resampling conducted.	Second pass sampling to confirm fish presence or absence.
641	4036	2	0.97	7.1	NFC	S4*	No spawning or overwintering habitat. Poor rearing habitat. Inferred fish bearing based on access or until resampling is conducted.	Second pass sampling to confirm fish presence or absence.
650	636000-78200	2	1.03	7.5	NFC	S4*	Fish may access the lower portion of this reach.	Additional sampling in Reach 1 to assess fish access to this reach.
651	78200-14402	1	1.58	9.3	NFC	S3*	Fish may access lower portion of this reach.	Second pass sampling in lower 200 m of this reach.
706	4188	3	2.3	6.3	NFC	S3*	Inferred fish bearing until resampling has been conducted.	Second pass sampling to confirm fish presence or absence.
709	72000-27000	1	2.03	16.8	NFC	S3*	Inferred fish bearing until confirmed through resampling.	Second pass sampling to confirm fish presence or absence.
804	4038	2	1.72	4	NFC	S3*	Moderate spawning and rearing habitat. No overwintering habitat observed. Inferred fish bearing until resampling conducted.	Second pass sampling to confirm fish presence or absence.

Table 5. Buck Creek Additional Sampling Table

Site	ILP/WSC	Reach	Width (m)	Gradient (%)	Species	Stream Class	Comments	Additional Sampling Recommendations
805	4038	1	0.4	1	NS	S4*	No fish habitat although fish may use this reach to access upstream reaches. Inferred fish bearing until resampling conducted.	Second pass sampling to confirm fish presence or absence.

The timing of additional sampling efforts is critical to ensuring optimal conditions and maximizing the potential for fish to occur. In particular, additional sampling should be conducted in the spring immediately following peak runoff, which usually occurs in the early part of May. Reaches classified as inferred fish bearing and selected for additional sampling could also be deferred by accepting this default classification, however the reaches selected for additional sampling would contribute valuable information to aid in determining fish presence and distribution for future stream classification work.

5.4.7 Non-Fish Bearing Status

A non-fish bearing status was assigned to 49 of the 114 sample sites within the study area (Table 6). A non-fish bearing classification has been assigned to all sampled reaches within the non-fish bearing table. Non-fish bearing classifications are associated with reaches that lack suitable habitat to sustain salmonids or are inaccessible to fish. Non-fish bearing status was assigned to reaches where:

- The stream was labeled a non-visible channel containing no potential fish habitat;
- The stream was deemed inaccessible from fish bearing waters and did not have perennial fish habitat;
- Gradient prevented upstream fish migration and the stream did not have perennial fish habitat upstream;
- Permanent barriers (cascades, falls, etc.) prevented upstream fish migration and the stream did not have perennial fish habitat upstream;
- No fish habitat was present;
- The stream lacked a continuous definable channel.

Inferred non- fish bearing status was given to reaches with the following criteria:

- The average stream gradient was greater than or equal to 20% (through map interpretation) with no headwater lake present;
- Reaches above a stream section with an gradient greater than or equal to 20% (through map interpretation) with no headwater lake present.

Often the non fish bearing status of stream reaches with average gradients less than 20% is usually supported with evidence concerning the accessibility to potential fish bearing water. Obvious barriers such as falls, cascades and high gradient sections are measured and adequate sampling is conducted above the potential barrier to confirm that the portion of stream above the barrier is non fish bearing. Many of the headwater reaches and smaller streams reaches draw from such a small watershed area that they lack sufficient discharge volume required to develop significant channels and habitat complexity. These reaches are often ephemeral, containing shallow water depths, subsurface flows, lack significant pools, and have a predominance of organic and fine substrates.

Table 6. Buck Creek Non Fish Bearing Table

Site	WSC/ILP	Reach	Width (m)	Gradient (%)	Stream Class	Electrofishing Specifications				Other Methods		Comments
						Dist. (m)	Time (s)	Cond (uS)	Temp (C)	Type	Effort	
287	636000-88700	4	1.85	14.3	S3*/S6	100	892	20	6	NA	NA	Bedrock cascade (1.5/3.5 m) with high gradient section (>25%/50 m) prevents upstream fish migration. Sampling above the cascade (2 sites) indicates non-fish presence. Monoculture 100-200 mm adult rainbow captured below cascade.
289	4155	1	NA	12.5	NVC	NA	NA	NA	NA	NA	NA	No visible channel. No evidence of surface scour, ponded water or fluvial substrates.
290	4160	2	0.97	26.3	S6	259	478	60	7	NA	NA	Gradient prevents access to this reach. Sampling indicates this reach is non fish bearing.
291	4168	4	1	33	S6	NA	NA	NA	NA	NA	NA	Gradient prevents access to this reach. Highly ephemeral stream.
293	4020	3	0.5	6.5	S6	NA	NA	NA	NA	NA	NA	No spawning, rearing or overwintering habitat. Residual pool depth <3 cm (average). No connectivity (no surface or subsurface connection) to fish bearing water.
371	636000-88600	3	3.21	8.13	S3/S5	300	983	40	8	NA	NA	Bedrock cascade (2/1 m) prevents upstream fish migration to this reach. Sampling above the cascade (2 sites) indicates non fish presence. Monoculture 100-200 mm adult rainbow captured below cascade.
372	4205	1	0.93	21.88	S6	150	215	40	8	NA	NA	Stream does not flow into fish bearing water. 2/1 m cascade (downstream) prevents fish access.
430	4120	1	1.14	7.3	S6	500	529	60	6	NA	NA	Stream does not flow into fish bearing waters. Sampling within reach indicates this stream is non fish bearing. 25%/100 m and bedrock cascade (3/5 m) prevent upstream fish migration for monoculture rainbow.
432	72000-55000	2	1.65	14.8	S3*/S6	600	899	70	7	NA	NA	High gradient (25%/100 m) section with cascade (3/1 m) prevents upstream fish migration to monoculture rainbows. Fish stream below this section based on access.
434	4105	2	0.81	5	S6	300	346	60	8	NA	NA	Falls (2.2 m) and bedrock cascade (2/5 m) prevent upstream access to this reach for monoculture rainbows. Sampling above falls and cascade (2 sites) confirms non fish bearing status.
435	4107	1	0.4	15.3	S6	NA	NA	NA	NA	NA	NA	Ephemeral stream with sections of subsurface flow and NVC. No connectivity (no surface or subsurface connection to fish bearing waters).
444	35400-9360	1	0.8	8.5	S4*/S6	300	461	70	6	NA	NA	Bedrock cascade (6.5/8 m) prevents upstream fish migration for adult monoculture rainbows. Sampling above cascade (200 m) confirms non fish bearing status. Below the cascade is fish bearing based on access.
445	4105	1	0.9	23	S4*/S6	200	200	60	6	NA	NA	Falls (2.2 m) prevent upstream fish migration. Sampling above falls (2 sites) confirms non fish bearing status. Monoculture rainbows present downstream.
447	4102	1	0.64	44.5	S6	200	98	40	7	NA	NA	Gradient too high to allow fish passage. No fish captured within reach.
454	72000-39300	2	3.78	4.9	S3/S5	200	297	70	5	NA	NA	Bedrock cascade (6/4 m) prevents upstream fish migration into Reach 3. Sampling upstream of cascade (2 sites) confirms non fish presence. Monoculture RB were captured in the lower portion of this reach (downstream of cascade).
458	4135	2	0.57	7.8	S6	NA	NA	NA	NA	NA	NA	Ephemeral stream with no connectivity (no surface or subsurface connection). Stream flows (subsurface) through a dry meadow to fish bearing waters. Small catchment and no overwintering habitat.
459	4031	2	NA	1.5	NVC	NA	NA	NA	NA	NA	NA	No visible channel. No potential fish habitat.
460	4025	2	0.6	4.5	S6	NA	NA	NA	NA	NA	NA	No rearing, spawning or overwintering habitat. Residual pool depth <7 cm. Subsurface sections. Discontinuous channel and a dry meadow downstream (>100 m long).
461	4126	1	1.72	21.8	S6	400	461	50	5	NA	NA	Gradient prevents fish access to this reach. Sampling indicates this stream is non fish bearing.

Table 6. Buck Creek Non Fish Bearing Table

Site	WSC/ILP	Reach	Width (m)	Gradient (%)	Stream Class	Electrofishing Specifications				Other Methods		Comments
						Dist. (m)	Time (s)	Cond (uS)	Temp (C)	Type	Effort	
464	4210	1	0.65	10.8	S6	300	206	60	5	NA	NA	Gradient (>20%/100 m) in the downstream portion of reach prevents fish access. Sampling upstream of gradient confirms non fish presence.
468	4183	3	0.53	21.5	S6	NA	NA	NA	NA	NA	NA	Gradient and lack of fish habitat.
469	4183	1	0.56	2.9	S6	NA	NA	NA	NA	NA	NA	No connectivity (no surface or subsurface connection) to fish bearing water. Sections of subsurface flow and NVC throughout 400 m site. Habitat characteristics too poor to sustain fish. Ephemeral stream with 100% fines and a heavily vegetated channel.
603	72000-77700	2	4.01	3.4	S3/S5	200	304	40	9	NA	NA	Falls (2.5 m) prevent upstream fish migration. Sampling upstream of the falls (7 sites) confirms non fish bearing status. Monoculture rainbow (110-150 mm) captured downstream of falls.
605	4027	3	NA	2.1	NVC	NA	NA	NA	NA	NA	NA	No visible channel. No evidence of surface scour or fluvial substrates. Should be classified as a wetland with possible fish access.
608	4072	1	0.27	10.1	S4*/S6	500	139	11	15	NA	NA	The lower portion of the reach is fish bearing based on access. The portion of stream above the sample site is non fish bearing based on habitat characteristics. Fines, pool depth <10 cm, channel width, subsurface flows and a discontinuous channel.
609	4074	1	0.24	7.9	S4*/S6	300	245	80	14	NA	NA	Lower 100 m of this reach is fish bearing based on possible access. The portion of stream above the sample site is non fish bearing based on; no fish habitat, channel width, discontinuous channel, heavily vegetated channel and multiple small barriers.
611	4077	2	NA	5	NVC	NA	NA	NA	NA	NA	NA	No visible channel. No evidence of surface scour or fluvial substrates. No potential fish habitat.
617	72000-77700	6	0.96	2.3	S6	1500	642	50	8	MT	1	Falls (2.5 m) in Reach 2 prevents upstream fish migration to this reach.
618	72000-77700	9	0.94	1.6	S6	200	149	50	8	NA	NA	Falls (2.5 m) in Reach 2 prevents upstream fish migration to this reach.
619	77700-6590	1	1.83	3.1	S6	450	380	60	8	MT	2	Falls (2.5 m) on the downstream mainstem prevent upstream fish migration to this reach.
620	72000-77700	3	4.07	5.6	S5	1000	801	50	7	NA	NA	Falls (2.5 m) in Reach 2 prevents upstream fish migration to this reach.
621	4140	1	0.62	22.8	S6	NA	NA	NA	NA	NA	NA	Falls (2.5 m) on the downstream mainstem prevent upstream fish migration to this reach. Reach was dry at time of sampling.
622	4139	2	1.01	7.3	S6	250	404	30	9	NA	NA	Falls (2.5 m) on the downstream mainstem prevent upstream fish migration to this reach.
632	4215	2	0.2	15	S6	NA	NA	NA	NA	NA	NA	Heavily vegetated channel with sections of subsurface flow and isolated pools. Sections of NVC. No connectivity (no surface or subsurface connection) to fish bearing water. High gradient and narrow channel width make this stream non fish bearing.
635	4192	1	1.2	5.4	S6	300	95	130	5	NA	NA	Ephemeral stream with no connectivity. Discontinuous channel, subsurface flows, vegetated channel, fines, numerous debris accumulations and no overwintering or spawning habitat.
640	69300-7270	3	0.89	3	S6	100	244	30	11	NA	NA	No spawning habitat, poor rearing habitat and no overwintering habitat. Falls (1 m) and bedrock cascade (2.5/9 m) in Reach 2 prevents upstream fish migration for monoculture rainbow trout. Sampling upstream (3 sites) confirms non fish bearing status.

Table 6. Buck Creek Non Fish Bearing Table

Site	WSC/ILP	Reach	Width (m)	Gradient (%)	Stream Class	Electrofishing Specifications				Other Methods		Comments
						Dist. (m)	Time (s)	Cond (uS)	Temp (C)	Type	Effort	
642	4034	2	1	11.9	S6	150	139	40	6	NA	NA	No connectivity (no surface or subsurface connection) to fish bearing water. Channel is heavily braided in the downstream portion of reach. Numerous small cascades due to high gradient. No possible fish access through this section.
643	4166	2	NA	8	NVC	NA	NA	NA	NA	NA	NA	No visible channel. No potential fish habitat. No evidence of surface scour. Rooted vegetation across depression.
644	636000-83300	1	NA	3.5	NVC	NA	NA	NA	NA	NA	NA	No visible channel. No potential fish habitat. No evidence of surface scour and no connectivity to fish bearing water.
645	4179	1	NA	1.6	NVC	NA	NA	NA	NA	NA	NA	No visible channel. No evidence of surface scour, standing water or potential fish habitat.
647	4014	3	NA	0.9	NVC	NA	NA	NA	NA	NA	NA	No visible channel. No potential fish habitat. No evidence of surface scour or fluvial substrates.
648	4007	1	0.83	2.1	S6	150	307	120	7	NA	NA	Isolated pools, multiple small LWD barriers, heavily vegetated channel and 100% fine substrates. Highly ephemeral. No spawning or overwintering habitat. No connectivity (no surface or subsurface connection) discontinuous channel.
649	4004	1	0.82	4.8	S6	150	298	80	9	NA	NA	No spawning, rearing or overwintering habitat. Numerous small barriers with no pool habitat. Heavily vegetated channel. Highly ephemeral, high content of fines, no refuge habitat for adults or juveniles. Sections lacking evidence of overland flow.
697	4059	1	0.93	4.4	S4*/S6	100	187	50	4	NA	NA	Bedrock cascade (1.5/.8 m) prevents upstream fish migration. Fish bearing based on access below cascade (monoculture rainbow trout). Sampling above cascade confirms non fish bearing status.
705	636000-95500	2	0.96	2.5	S4*/S6	200	352	70	7	NA	NA	Cascade (0.8/0.8 m) prevents upstream fish migration (monoculture 100-200 mm rainbow). Sampling above cascade (200 m) confirms non fish bearing status.
713	35400-0940	2	0.63	8.8	S4*/S6	100	107	60	6	NA	NA	Fish may access lower 100 m of this reach. Above that point there is no surface or subsurface connection. Habitat is too poor to sustain fish, discontinuous channel, high accumulation of fines, numerous barriers, subsurface flows and no pool habitat.
800	72000-39300	3	2.47	2.5	S6	250	450	40	4	NA	NA	Falls (6 m) in Reach 2 prevent upstream fish migration to this reach for monoculture 100-200 mm rainbow. Sampling above falls (2 sites) confirms this reach as non fish bearing.
803	4126	2	2.95	34.5	S6	250	240	110	4	NA	NA	Gradient prevents access to this reach. No overwintering habitat present.
858	4024	2	0.6	5.3	S6	NA	NA	NA	NA	NA	NA	Ephemeral stream with no connectivity (no surface or subsurface connection) to fish bearing waters. Heavily braided channel and dry meadow downstream.

Insufficient discharge often results in a lack of connectivity between the channelized portion of stream and downstream watercourses. Lack of connectivity can be described as the channelized portion of stream being isolated from downstream watercourses in which no surface connection or subsurface channel exists to join the two at any time of the year. Evidence of no surface connection includes a lack of surface scour, no alluvial substrates, no evidence of surface ponding or seasonal flooding. These small streams with no connectivity to fish bearing waters were adequately sampled upstream of the loss of connectivity to verify that the lack of connectivity prevents fish from accessing the potential habitat upstream.

Reaches that are classified as NVC are not streams due to the fact that they do not posses the criteria necessary to classify them as such. The reaches classified as NVC are largely drainages that are mapped incorrectly and no stream exists where the map indicates. NVC may be seepage areas or are watercourses which lack evidence of surface scour, contain no continuous definable channel, lack alluvium deposits, and exhibit no evidence of extensive ponding. Wetlands with extensive ponding and wetlands that lack surface water are both considered NVC as they do not possess stream channels or properties of streams. It should be recognized that a NVC classification does not necessarily mean that the reach is not fish bearing unless otherwise stated. For example, a ponded wetland reach could sustain fish but be classified NVC due to the lack of a continuous definable channel and fluvial substrates. In cases where ponded wetland reaches (NVC) are identified as fish bearing they should not be treated as streams because they do not meet the criteria of a stream. They should be managed to maintain the integrity of the fisheries resources identified within that reach. In most cases the level of concern is low with respect to protecting fish habitats sustained within NVC reaches due to the poor habitat values (for salmonids) associated with wetland habitats. However, the maintenance of fish passage is a concern.

6.0 STREAM CLASSIFICATION SUMMARY

Table 7 provides a summary of stream inventory information collected during the project.

Tab.7

Table 7. Buck Creek Study Area Stream Class Summary

Site	ILP/WSC	Reach	Map Number	Width (m)	Gradient (%)	Species	Stream Class	Comments
285	636000-88700	3	93L.019	1.72	5.3	RB	S3	Poor spawning, no overwintering and moderate rearing habitats.
286	4188	6	93L.019	1.43	6.5	NFC	S4*	Inferred fish bearing until resampling has been conducted.
287	636000-88700	4	93L.019	1.85	14.3	NFC	S3*/S6	Cascade (1.5 m) prevents upstream fish migration. Sampling upstream of cascade, confirms non fish bearing status.
288	72000-35400	2	93L.028	1.85	5.3	RB	S3	Poor spawning and overwintering potential. High quality rearing habitat.
289	4155	1	93L.019	NA	12.5	NA	NVC	No visible channel. No evidence of surface scour, ponded water, or fluvial substrates.
290	4160	2	93L.019	0.97	26.3	NFC	S6	Gradient prevents access to this reach. Sampling indicates this reach is non fish bearing.
291	4168	4	93L.019	1	33	NS	S6	Gradient prevents access to this reach. Ephemeral stream.
292	4015	2	93L.019	0.45	5.2	NFC	S4*	Fish bearing based on access.
293	4020	3	93L.019	0.5	6.5	NS	S6	No spawning, rearing or overwintering habitat. No connectivity to fish bearing water.
369	636000-88600	1	93L.019	4.76	3.38	RB	S3	Moderate rearing and spawning habitat. No overwintering habitat observed.
370	4175	1	93L.019	1.86	10	RB	S3	Poor rearing habitat.
371	636000-88600	3	93L.019	3.21	8.13	RB	S3/S5	Cascade (2 m) prevents upstream fish migration to this reach.
372	4205	1	93L.019	0.93	21.88	NFC	S6	Stream does not flow into fish bearing water.
430	4120	1	93L.028	1.14	7.3	NFC	S6	Stream does not flow into fish bearing waters.
431	72000-55000	3	93L.028	NA	NA	NFC	NA	Fish sampling site.
432	72000-55000	2	93L.028	1.65	14.8	NFC	S3*/S6	High gradient (25 %) section with a cascade (3 m) prevents upstream fish migration. Fish stream below this section based on access.
433	72000-55000	1	93L.028	2.62	10.5	RB	S3	Moderate rearing habitat, poor spawning habitat, and no overwintering habitat.
434	4105	2	93L.028	0.81	5	NFC	S6	Falls (2.2 m) prevent upstream access to this reach. Sampling above the falls indicates the portion of stream above the falls is non fish bearing.
435	4107	1	93L.028	0.4	15.3	NS	S6	Ephemeral stream with sections of subsurface flow and NVC. No connectivity. Habitat too poor to sustain fish.
443	35400-8720	1	93L.028	1.03	7.5	NFC	S4*	Inferred fish bearing until resampling is conducted.
444	35400-9360	1	93L.028	0.8	8.5	NFC	S4*/S6	Cascade (6.5 m) prevents upstream fish migration. Sampling above the cascade indicates that this section of stream is non fish bearing. Fish bearing based on access below the cascade.
445	4105	1	93L.028	0.9	23	NFC	S4*/S6	Falls (2.2 m) prevent upstream fish migration. Sampling above the falls confirms non fish bearing status.

Table 7. Buck Creek Study Area Stream Class Summary

Site	ILP/WSC	Reach	Map Number	Width (m)	Gradient (%)	Species	Stream Class	Comments
446	72000-39300	2	93L.028	4.47	3.6	RB	S3	Moderate rearing habitat, poor spawning habitat, and no overwintering habitat.
447	4102	1	93L.028	0.64	44.5	NFC	S6	Gradient too high to allow fish passage. No overwintering habitat present and no fish caught within reach.
454	72000-39300	2	93L.028	3.78	4.9	NFC	S3/S5	Excellent rearing habitat, poor spawning habitat, and overwintering habitat present. RB captured in lower portion of this reach. Fish bearing based on access. Cascade (6 m) prevents upstream migration into Reach 3.
458	4135	2	93L.029	0.57	7.8	NS	S6	Ephemeral stream with no connectivity to fish bearing waters.
459	4031	2	93L.029	NA	1.5	NA	NVC	No visible channel. No potential fish habitat.
460	4025	2	93L.029	0.6	4.5	NS	S6	No rearing, spawning or overwintering habitat. No access to fish bearing water. Channel fans out before entering dry meadow downstream.
461	4126	1	93L.029	1.72	21.8	NFC	S6	Gradient prevents fish access to this reach. Sampling indicates this stream is non fish bearing.
462	72000-21600	5	93L.029	1.73	14.8	NFC	S3*	Fish stream based on access or until resampling confirms fish presence or absence.
463	72000-21600	6	93L.029	NA	NA	NFC	NA	Fish sampling site.
464	4210	1	93L.019	0.65	10.8	NFC	S6	Gradient (>20%) in the downstream portion of reach prevents fish access.
468	4183	3	93L.019	0.53	21.5	NS	S6	Gradient and lack of fish habitat. Ephemeral stream with no access to this reach.
469	4183	1	93L.019	0.56	2.9	NS	S6	No connectivity to fish bearing water. Channel fans out with sections of subsurface flow and NVC.
470	636000-93021	3	93L.019	1.4	2.8	NFC	S4*	Inferred fish bearing until resampling has been conducted.
600	72000-69300	2	93L.028	5.49	2	RB, RSC, LNC	S2	High quality rearing, spawning and overwintering habitat.
601	636000-72000	21	93L.029	2.18	3.8	RB	S3	No overwintering or spawning habitat. Good cover for rearing.
602	72000-77700	1	93L.029	3.71	4.3	RB	S3	Poor rearing, spawning and overwintering habitat.
603	72000-77700	2	93L.029	4.01	3.4	RB	S3/S5	Falls (2.5 m) prevent upstream fish migration. Sampling upstream of the falls confirms non fish bearing status.
604	4031	2	93L.028	1.25	2.7	RB	S4	Poor rearing and spawning habitat. No overwintering habitat.

Table 7. Buck Creek Study Area Stream Class Summary

Site	ILP/WSC	Reach	Map Number	Width (m)	Gradient (%)	Species	Stream Class	Comments
605	4027	3	93L.029	NA	2.1	NA	NVC	No visible channel. This is not a stream. No evidence of surface scour or fluvial substrates. Should be classified as a wetland with possible fish access.
606	4030	3	93L.029	2.64	1.8	NFC	S3*	Temporary barriers to fish migration were identified. Inferred fish bearing until resampling confirms fish presence or absence.
607	4032	3	93L.028	1.23	3	RB	S4	Moderate rearing, spawning and overwintering potential.
608	4072	1	93L.029	0.27	10.1	NFC	S4*/S6	The lower portion of the reach is fish bearing based on access. The portion of stream above the sample site is non fish bearing based on habitat characteristics.
609	4074	1	93L.029	0.24	7.9	NFC	S4*/S6	The lower 100 m of the reach is fish bearing based on access. The portion of stream above the sample site is non fish bearing based on habitat characteristics.
610	4077	1	93L.039	0.85	1.3	NS	S4*	No barriers to upstream fish migration were identified. Fish stream based on access.
611	4077	2	93L.039	NA	5	NA	NVC	No visible channel. No evidence of surface scour or fluvial substrates. No potential fish habitat.
612	4080	1	93L.039	1.7	2.3	NFC	S3*	No barriers to upstream fish migration were identified. Fish stream based on access.
613	72000-78600	8	93L.039	1.97	2.6	RB	S3	Poor spawning and rearing habitat. No overwintering habitat observed.
614	4055	1	93L.038	0.17	1.3	NS	S4*	No barriers to upstream fish migration were identified. Fish stream based on access.
615	72000-69300	5	93L.038	3.5	1.9	RB	S3	Moderate rearing habitat, poor overwintering habitat and no spawning potential.
616	4052	1	93L.038	1.1	8	NFC	S4*	No barriers to upstream fish migration were identified. Inferred fish bearing based on access or until resampling is conducted.
617	72000-77700	6	93L.029	0.96	2.3	NFC	S6	Falls (2.5 m) in Reach 2 prevent upstream fish migration to this reach.
618	72000-77700	9	93L.029	0.94	1.6	NFC	S6	Falls (2.5 m) in Reach 2 prevent upstream fish migration to this reach.
619	77700-6590	1	93L.029	1.83	3.1	NFC	S6	Falls (2.5 m) on the downstream mainstem prevent upstream fish migration to this reach.
620	72000-77700	3	93L.029	4.07	5.6	NFC	S5	Falls (2.5 m) in Reach 2 prevent upstream fish migration to this reach.
621	4140	1	93L.029	0.62	22.8	NS	S6	Falls (2.5 m) on the downstream mainstem prevent upstream fish migration to this reach.
622	4139	2	93L.029	1.01	7.3	NFC	S6	Falls (2.5 m) on the downstream mainstem prevent upstream fish migration to this reach.
623	4133	1	93L.029	1.08	10.5	NFC	S4*	No barriers to upstream fish migration were identified. Inferred fish bearing based on access or until resampling is conducted.
624	39300-2740	2	93L.028	1.77	2.88	RB	S3	High quality rearing habitat.

Table 7. Buck Creek Study Area Stream Class Summary

Site	ILP/WSC	Reach	Map Number	Width (m)	Gradient (%)	Species	Stream Class	Comments
625	4109	1	93L.028	1.54	1.3	RB	S3	No overwintering or spawning habitat observed, moderate rearing potential.
626	4109	2	93L.028	1.52	1.6	RB	S3	High quality rearing habitat, with poor spawning and poor overwintering potential.
627	39300-2740	5	93L.028	1.11	1.5	RB	S4	Poor spawning and rearing potential. High quality rearing habitat.
628	4165	1	93L.019	0.53	2.8	NS	S4*	Connected to fish bearing water. No permanent barriers observed. Fish bearing based on access.
629	4168	1	93L.019	2.35	3.7	RB	S3	Moderate rearing and spawning habitat. No overwintering habitat observed.
630	460-636000	3	93L.019	7.58	1.8	RB	S2	High quality spawning and rearing habitat. Overwintering habitat abundant.
631	4167	1	93L.019	2.3	5.4	RB	S3	Moderate rearing and spawning habitat. No overwintering habitat observed.
632	4215	2	93L.019	0.2	15	NS	S6	Vegetated channel with sections of subsurface flow and isolated pools. Sections of NVC. No connectivity to fish bearing water.
633	4167	2	93L.019	3.13	4.8	NFC	S3*	Fish were observed jumping in a reservoir within this reach. Sampling efforts were unable to capture fish.
634	4196	1	93L.020	1.52	4.4	WSU	S3*	Inferred fish bearing based on capture of non sport species and lack of permanent barriers.
635	4192	1	93L.019	1.2	5.4	NFC	S6	Ephemeral stream with no connectivity.
636	636000-85000	1	93L.019	1.65	3.5	NFC	S3*	Spawning habitat abundant. Moderate rearing habitat. No overwintering habitat.
637	636000-85000	2	93L.019	1.7	12.5	NFC	S3*	Dewatered section in Reach 1 may prevent upstream fish migration to this reach. Inferred fish bearing until resampling conducted.
638	69300-8160	1	93L.038	1.61	2.6	RB	S3	High quality rearing habitat.
639	69300-7270	2	93L.038	1.08	8.3	RB	S3	Cascade (2.5 m) in the upper portion of this reach is a barrier to upstream fish migration.
640	69300-7270	3	93L.038	0.89	3	NFC	S6	Cascade (2.5 m) in Reach 2 prevents upstream fish migration.
641	4036	2	93L.038	0.97	7.1	NFC	S4*	Inferred fish bearing based on access or until resampling is conducted.
642	4034	2	93L.038	1	11.9	NFC	S6	No connectivity to fish bearing water. Channel is braided in the downstream portion of reach. No possible fish access through this section.
643	4166	2	93L.019	NA	8	NA	NVC	No visible channel. No potential fish habitat. No evidence of surface scour. Rooted vegetation across depression.
644	636000-83300	1	93L.019	NA	3.5	NA	NVC	No visible channel. No potential fish habitat. No evidence of surface scour and no connectivity to fish bearing water.
645	4179	1	93L.019	NA	1.6	NA	NVC	No visible channel. No evidence of surface scour or potential fish habitat.

Table 7. Buck Creek Study Area Stream Class Summary

Site	ILP/WSC	Reach	Map Number	Width (m)	Gradient (%)	Species	Stream Class	Comments
646	460-636000	4	93L.019	6.28	1.7	RB	S2	High quality spawning and rearing habitat.
647	4014	3	93L.019	NA	0.9	NA	NVC	No visible channel. No potential fish habitat. No evidence of surface scour, or fluvial substrates.
648	4007	1	93L.019	0.83	2.1	NFC	S6	Isolated pools, multiple small LWD barriers and a heavily vegetated channel. Ephemeral stream, with no spawning or overwintering habitat.
649	4004	1	93L.019	0.82	4.8	NFC	S6	No spawning, rearing or overwintering habitat. Highly ephemeral stream.
650	636000-78200	2	93L.019	1.03	7.5	NFC	S4*	Fish may access the lower portion of this reach.
651	78200-14402	1	93L.019	1.58	9.3	NFC	S3*	Fish may access the lower portion of this reach.
652	69300-7270	4	93L.038	NA	NA	NFC	NA	Lake was sampled with minnow traps
694	4061	1	93L.038	0.89	3.2	NFC	S4*	Fish stream based on access. A beaver dam is a temporary barrier to upstream fish migration.
695	69300-8160	5	93L.038	1.55	7.3	RB	S3	Poor overwintering and spawning habitat. Moderate rearing habitat.
696	69300-8160	6	93L.038	0.98	1	RB	S4	Poor overwintering and spawning habitat. Moderate rearing habitat.
697	4059	1	93L.038	0.93	4.4	NFC	S4*/S6	Cascade (1.5 m) prevents upstream fish migration. Fish bearing based on access below cascade.
698	69300-8160	7	93L.038	NA	NA	NFC	NA	Fish sampling site.
705	636000-95500	2	93L.019	0.96	2.5	NFC	S4*/S6	Cascade (0.8 m) prevents upstream fish migration. Sampling above cascade confirms non fish bearing status.
706	4188	3	93L.019	2.3	6.3	NFC	S3*	Inferred fish bearing until resampling has been conducted.
707	4188	2	93L.019	NA	NA	NFC	NA	Fish sampling site.
708	4188	1	93L.019	NA	NA	RSC	NA	Fish sampling site. Non sport species captured.
709	72000-27000	1	93L.028	2.03	16.8	NFC	S3*	Inferred fish bearing until resampling has been conducted.
710	72000-21600	1	93L.028	NA	NA	NFC	NA	Fish sampling site.
711	72000-21600	2	93L.028	2.91	8.3	RB	S3	Low potential for spawning and overwintering. Moderate rearing habitat.
712	636000-72000	6	93L.028	14.01	1	RB	S2	Good spawning, rearing and overwintering habitat.
713	35400-0940	2	93L.028	0.63	8.8	NFC	S4*/S6	Fish may access lower 100 m of this reach during high flows. Above that point there is no connectivity and habitat is too poor to sustain fish.
714	35400-0940	1	93L.028	1.5	1.9	RB	S3	No spawning, moderate rearing and low overwintering potential.
715	72000-35400	2	93L.028	2.57	5.3	RB	S3	High quality rearing habitat.
716	72000-35400	1	93L.028	2.13	3.1	RB	S3	High quality rearing habitat.

Table 7. Buck Creek Study Area Stream Class Summary

Site	ILP/WSC	Reach	Map Number	Width (m)	Gradient (%)	Species	Stream Class	Comments
717	4096	1	93L.028	1.08	11.3	RB	S4	No overwintering habitat. Low rearing and spawning potential.
718	4170	2	93L.019	0.92	7	NFC	S4*	No barriers to upstream fish migration were identified. Fish stream based on access.
800	72000-39300	3	93L.028	2.47	2.5	NFC	S6	Falls (6 m) in Reach 2 prevent upstream fish migration to this reach. Sampling above falls confirms non fish bearing status.
803	4126	2	93L.029	2.95	34.5	NFC	S6	Gradient (>30%) prevents access to this reach. No overwintering habitat present.
804	4038	2	93L.038	1.72	4	NFC	S3*	Moderate spawning and rearing habitat. No overwintering habitat observed. Inferred fish bearing until resampling conducted.
805	4038	1	93L.038	0.4	1	NS	S4*	Inferred fish bearing until resampling is conducted.
858	4024	2	93L.029	0.6	5.3	NS	S6	Ephemeral stream with no connectivity to fish bearing waters.
862	72000-39300	5	93L.028	NA	NA	NFC	NA	Fish sampling site.
863	636000-88700	4	93L.019	NA	NA	NFC	NA	Fish sampling site.

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APPENDIX I

Reach Cards/Site Cards/Fish Collection Forms and Photographs

APPENDIX II

Project Overview Map

APPENDIX III

Project Maps

APPENDIX IV

Fisheries Interpretive Maps