Reconnaissance (1:20,000) Fish and Fish Habitat Inventory
for the
Revelstoke Forest District

Prepared for:

Ministry of Environment, Lands & Parks
Kootenay Region
#401 Victoria Street
Nelson, B.C.
V1L 4K3

Prepared by:

John Addison, Peter Corbett
Mirkwood Ecological Consulting Ltd.
Box 138
Winlaw, B.C.
V0G 2J0

Approved by:

Peter Corbett, R.P. Bio

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Project Reference Information

Parent Watershed Names/Codes	Columbia River - 300-000000
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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

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1. Introduction

Mirkwood Ecological Consultants Ltd. were contracted by the Ministry of Environment, Lands and Parks (MELP) to conduct fish and fish habitat inventory of streams within the Revelstoke Forest District. Field work and reporting were completed in accordance with the format outlined by the MELP, Kootenay Region Interim Standards for 1997 Field Work. Results were used to determine stream classification as per the Forest Practice Code.

2. Study Area

Sampling targeted streams adjacent to proposed cutblocks identified in the 1997 - 2001 Forest Development Plan, throughout the Revelstoke Forest District of the Nelson Forest Region. All the selected streams assessed are tributaries of the Columbia River watershed in the northern Monashee and Selkirk Mountains. A list of sub drainages can be found in Table 1 below.

Table 1. Summary of study area watershed characteristics.

Stream Name	Watershed Code	Watershed Area (km2)	Total Stream Length (km)	Total Number of Reaches
Tangier Creek -Trib 1	360-495800-17000		3.20	3
Tangier Creek-Trib 2	360-495800-19100	20.91	3.60	3
Illecillewaet River-Trib 1	360-257775-00000	2.15	1.50	3
Illecillewaet River-Trib 2	360-240678-00000	1.02	1.75	3
Illecillewaet River-Trib 3	360-154547-00000	9.55	2.70	4
Greeley Creek	360-145200-00000	47.39	12.35	7
Illecillewaet River-Trib 4	360-131100-00000	5.91	5.95	4
Holyk Creek Trib	300-741700-38200-30000	2.67	2.00	2
Tonkawatla Creek Trib	300-752700-72237	3.27	1.15	2
Pingston Creek-Trib 1	300-719200-37830		0.70	2
Pingston Creek-Trib 2	300-719200-40800	15.60	6.70	8
Pingston Creek-Trib 2/1	300-719200-40800-02900		1.95	2
Blanket Creek Trib	300-743400-21684	5.87	2.95	3
Goldstream River-Trib 1	300-797600-55700	28.66	11.75	8
Goldstream River-Trib 1/1	300-797600-55700-22600	3.83	2.10	3
Brewster Creek Trib	300-797600-27200-20000	7.09	5.60	4
South Cranberry Creek	300-735400-63000	53.18	17.10	7
South Cranberry Trib	300-735400-63000-21400	4.07	3.35	5
Soards Creek-Trib 1	300-821700-30700	8.87	4.85	4
Soards Creek Trib 2	300-821700-40037	5.19	1.45	2
Caribou Creek	300-784900-08400	7.33	7.70	7
Downie Creek Trib	300-784900-33925	0.24	1.50	2
LaForme Creek	300-767500-00000	33.49	16.00	6
LaForme Creek Trib	300-767500-49100	4.04	2.65	3
Hoskins Creek-Trib 1	300-801400-40900	0.83	2.30	3
Hoskins Creek-Trib 2	300-801400-25400	1.32	1.90	3
Pat Creek-Trib 1	300-817100-81600	15.46	6.10	6
Pat Creek-Trib 2	300-817100-62800	4.58	4.40	4

Revelstoke is the largest populated center within the Revelstoke Forest District, situated at the confluence of the Columbia and the Illecillewaet Rivers. The village of Mica Creek is the principle settlement in the northern portion of the Revelstoke District.
An overview map (Figure 1 - Project Overview Map) shows the general drainage pattern, TRIM mapsheet orientation and sample site locations in the Revelstoke Forest District.

Figure 1 - Project Overview Map

3. Methods

Project procedures and methods followed according to those outlined in the Schedule A Services of the Revelstoke Forest District Fish Inventory (FRBC Project File KB96360-IN) and the standards outlined in 'Reconnaissance (1:20,000) Fish and Fish Habitat Inventory: Standards and Procedures'. (RIC, 1997). Relevant sections of the FPC 'Fish Stream Identification Guidebook' (BCFS / BCE, 1995a) and the 'Riparian Management Area Guidebook' (BCFS / BCE, 1995b) were also consulted and applied during the course of the project.

Site selection was based on streams adjacent to proposed cutblocks in the 1997 - 2001 Forest Development Plans. Streams that support bull trout (*Salvelinus confluentus*), known or suspected, were given the highest priority because these streams would have to be sampled before the September 15 sampling limit (due to bull trout spawning requirements / protection). After the sampling design was established, an interagency meeting between the Ministry of Forests and the Ministry of Environment, Lands and Parks and Mirkwood was arranged to confirm the selection of the streams to be sampled.

A comprehensive list of all sampling locations and their associated watershed code / ILP, survey dates, and sampling methods can be found in Table 2.

Table 2. - Summary of locations for streams sampled.

STREAM NAME	WATERSHED CODE	ILP	TRIM MAP #	SAMPLE DATE	SITE #	REACH SAMPLED	SAMPLING METHOD (S)
Tangier Creek Trib 1	360-495800-17000	ILP00003	82N011	97/08/26	1	1	EL
Tangier Creek Trib 2	360-495800-19100	ILP00001	82N021	97/08/26	1	1	EL
Illecillewaet River Trib 1	360-257775-00000	ILP00001	82N001	97/08/27	1	1	EL
Illecillewaet River Trib 2	360-240678-00000	ILP00004	82N001	97/08/27	1	1	VO
Illecillewaet River Trib 3	360-154547-00000	ILP00006	82M010	97/08/27	1	1	EL, MT, AG
Greeley Creek	360-145200-00000	ILP00005	82M010	97/08/27	1	1	EL
Illecillewaet River Trib 4	360-131100-00000	ILP00007	82M010	97/09/05	1	1	EL
	360-131100-00000	ILP00007	82M010	97/09/05	2	2	EL
	360-131100-00000	ILP00007	82M010	97/09/05	3	3	EL
Holyk Creek Trib	300-741700-38200-30000	ILP00005	82K081	97/08/28	1	1	VO
Tonkawatla Creek Trib	300-752700-72237	ILP00009	82L099	97/08/28	1	1	VO
Pingston Creek Trib 1	300-719200-37830	ILP00001	82L060	97/08/29	1	1	EL
Pingston Creek Trib 2	300-719200-40800	ILP00002	82L060	97/08/29	1	1	EL
Pingston Creek Trib 2/1	300-719200-40800-02900	ILP00006	82L060	97/08/29	1	1	EL
Blanket Creek Trib	300-743400-21684-00000	ILP00001	82L090	97/09/02	1	2	VO
Goldstream River Trib 1	300-797600-55700	ILP00031	82M059	97/09/03	1	1	EL

	300-797600-55700	ILP00031	82M059	97/09/03	2	3	EL
Goldstream River Trib 1/1	300-797600-55700-22600	ILP00038	82M059	97/09/03	1	1	VO
Brewster Creek Trib	300-797600-27200-22047	ILP00003	82M068	97/09/03	1	1	EL, MT, AG
South Cranberry Creek	300-735400-63000	ILP00007	82L080	97/09/04	1	3	EL
South Cranberry Trib	300-735400-63000-21400	ILP00002	82L080	97/09/04	1	1	EL
	300-735400-63000-21400	ILP00002	82L080	97/09/04	2	2	EL
Soards Creek Trib 1	300-821700-30700	ILP00001	82D007	97/09/10	1	1	EL
	300-821700-30700	ILP00001	82D007	97/09/10	2	2	EL
Soards Creek Trib 2	300-821700-40037	ILP00002	82D007	97/09/10	1	1	VO
Caribou Creek	300-784900-08400	ILP00004	82M048	97/09/09	1	2	EL
	300-784900-08400	ILP00004	82M048	97/09/10	2	2	EL
Downie Creek Trib	300-784900-33925	ILP00006	82M059	97/09/12	1	1	VO
LaForme Creek	300-767500-00000	ILP00001	82M030	97/09/11	1	2	EL
LaForme Creek Trib	300-767500-49100	ILP00004	82M030	97/09/11	1	1	EL
LaForme Creek Trib	300-767500-49100	ILP00004	82M030	97/09/11	2	2	EL
Hoskins Creek Trib 1	300-801400-40900	ILP00009	82M067	97/10/07	1	1	EL
Hoskins Creek Trib 2	300-801400-25400	ILP00006	82M067	97/10/07	1	1	VO
Pat Creek Trib 1	300-817100-81600	ILP00002	82M096	97/10/07	1	1	EL
Pat Creek Trib 2	300-817100-62800	ILP00001	82M096	97/10/07	1	1	EL

This project was completed under two separate contracts. The initial three phases of the contract; 1) Existing Data Review, 2) Map and Air Photo Analysis and 3) Sampling Design and Project Plan, combined the first contract. The second three phases; 4) Field Data Collection, 5) Data Compilation and 6) Report and Map Preparation combined the second contract. Both of these contracts were completed adhering to the 'Reconnaissance (1:20,000) Fish and Fish Habitat Inventory: Standards and Procedures' (May, 1997).

All sites within the study were "discretionary", and not selected through the random process normally followed in this type of inventory (RIC 1997).

Field sampling was initiated August 26, 1997 and continued through to October 10, 1997. Techniques used to sample streams included minnow trapping, electroshocking, and angling. Procedures for fish sampling included, sampling for 100 meters and if fish were not captured, another 100 meters or until habitat disappeared or became non-existent. In sampling locations without barriers, where no fish captures were encountered, a second method of either minnow trapping or angling was employed.

4. Results and Discussion

4.1 Logistics

Many logistical problems were encountered through the duration of this study. The primary obstacle was the scope of the project, encompassing an entire Forest District with all the existing stream information to collect and disseminate, map and tabulate. This made the planning phase extremely difficult, if not unrealistic. A secondary obstacle in the initial planning phase was that there was no clear resolution for the selection of streams. There was a meeting, where a discussion between the Ministry of Forests and the Ministry of Environment, Lands and Parks was undertaken, to determine the criteria for selection of the streams to be sampled. However the eventual outcome of the stream selection changed several times even after the field sampling began. The focus of the problems was deciding upon the discretionary sites to be sampled. The concentration of sampling locations influenced by 1997/1998 cutting permits were within the Revelstoke Forest District Small Business Forest Enterprise Program Timber Sale License areas. Because of the number of Licensees operating within the Revelstoke Forest District, the Ministry of Forests did not want to be seen as biasing one licensee against another, so an attempt was made to disperse the sampling locations throughout the District. This was accomplished with great difficulty and at a large expense of time, as adjusting all the tables and forms required modification and rearranging.

There were other minor problems associated with this contract, some more limiting than others. The following is a list of these problems:

1. Weather was a factor but only affected those sites that were sampled in early October. Water temperatures were lower than required, however fish were captured at all sites with low temperatures, but in low numbers.

2. Access to a number of streams was limited. A number of streams which could normally be accessed via ferry had to be accessed by helicopter which was not anticipated. In addition, a number of these streams had no safe landing sites and therefore had to be dropped from the survey and new sites selected. These influenced both costs and time.

3. Water flows were limiting at four site locations (1) Illecillewaet River-Trib 2 - WC: 360-240678-00000, (2) Tonkawatla Creek Trib - WC: 300-752700-72237, (3) Blanket Creek Trib - WC: 300-743400-21684 and (4) Downie Creek - WC: 300-784900-33925. At all these sites minimal or no water flow was encountered, resulting in minimal site data collected.

4. The requirement to resample sites with an alternative sample method, when no fish were captured, presented a dilema most notably at helicopter access locations. It would require returning to the sample site a second time to collect a minnow trap. The additional costs reflected to meet this requirement would potentially increase the cost per site, significantly.

4.2 Fish Habitat, Distribution and Abundance

Tangier Creek Trib 1 (W.C.: 360-495800-17000)

This minor tributary of Tangier Creek has a low to moderate value fish habitat. Bull trout were captured within this tributary. Habitat was marginal for spawning. Rearing habitat was the primary use within the first reach, while the second reach was not fish bearing. The first reach has a stream width of 7.3 meters, a gradient of 19%, water temperature at the time of sampling was 12.5 degrees centigrade, with good (clear) water quality. Bull trout were the only species captured within this reach (see Fig. 3) but because mountain whitefish (*Prosopium williamsoni*) are known to inhabit Tangier Creek, we suspect this species could also be present at some time of the year. We doubt that any species would inhabit any portion of the second reach as a gradient barrier prevents fish passage beyond the first reach (see Fig. 4).

Tangier Creek Trib 2 (W.C.: 360-495800-19100)

Similar to other tributaries of Tangier Creek that were sampled, this stream also has a low to moderate capability to support fish. Again, bull trout were the only species captured and only within the first reach. The stream has an average channel width of 6 meters, a gradient of 17%, water temperature of 11 degrees centigrade with good (clear) water quality. Again, we suspect the presence of mountain whitefish and only to the end of the first reach, where a cascade barrier (gradient 30%) restricts fish passage upstream (see Fig. 7).

Illecillewaet River-Trib 1 (W.C.: 360-257775-00000)

This tributary of the Illecillewaet River has low fisheries habitat values. Only the first reach (for 70 meters) provides any usable habitat. Bull trout were captured within the first reach but again, we suspect other species (both rainbow trout (*Oncorhynchus mykiss gairdneri*) and mountain whitefish) to inhabit the first reach at different times of the year. The average channel width is approximately 3 meters, gradient 7%, water temperature was 10 degrees centigrade with good (clear) water quality. A gradient barrier (with 30% slopes - see Fig. 10) at the end of the first reach would restrict fish passage upstream.

Illecillewaet River-Trib 2 (W.C.: 360-240678-00000)

This tributary of the Illecillewaet River has limited capability to support fish, as the channel was devoid of water at the time of assessment (see Fig. 13). An average channel width of 1.3 meters with a gradient of 5%, indicates that there may be some habitat available during spring run-off, although there was no defined channel as the stream emptied into the Illecillewaet River A gradient barrier, approximately 25 meters from the confluence, would restrict fish passage upstream.

Illecillewaet River-Trib 3 (W.C.: 360-154547-00000)

This tributary of the Illecillewaet River provides limited fish habitat. The man-made channel provides minimal water , but rainbow trout were present for 70 meters up to a culvert barrier (see Fig. 15). This culvert barrier, which goes under a railway crossing and separates the channel and a slough, restricts fish passage upstream. The first reach has an average channel width of 1.1 meters, gradient of 2%, water temperature of 11 degrees C and good (clear) water quality. Minnow traps, angling and electroshocking were utilized to determine if fish were present within the slough above the culvert barrier.

Greeley Creek (W.C.: 360-145200-00000)

This stream is a large (4th order) tributary to the Illecillewaet River and a community watershed, and provides high value fish habitat. The first reach has high quality spawning and rearing habitat, as was evident from the numerous bull trout captures and one large (55cm) adult, pre-spawning adfluvial bull trout capture (see Fig. 16). This high quality habitat was evident by extensive coarse woody debris cover, which combined with a large boulder complexity creating excellent pool / riffle ratios (see Fig. 17 & 18). The average channel width was 13.5 meters with a gradient of 7%. Water temperature, at the time of sampling, was 10 degrees C. and the water quality was high. The extent of fish distribution throughout this drainage in unknown, as additional sampling is required in the upper reaches.

Illecillewaet River-Trib 4 (W.C.: 360-131100-00000)

This tributary of the Illecillewaet River provides moderate capability to support fish habitat. The first two reaches provide good habitat with rainbow trout captured throughout. Bull trout and mountain whitefish may also inhabit these reaches at different times of the year. In the first reach the average channel width is approximately 7 meters, gradient 14%, water temperature was 12 degrees centigrade with good (clear) water quality. Similarly the second reach has an average channel width of approximately 5 meters, a gradient of 14% and the water temperature was 12 degrees centigrade with good (clear) water quality. The third reach was similar to the second reach, but no fish were captured. We suspect that fish are present in this reach because no barrier to fish passage was observed. A two meter cascade / log jam, at the end of the third reach prevents upstream migration of fish, into the fourth reach (see Fig. 24).

Holyk Creek Trib (W.C.: 300-741700-38200-32844-00000)

This is a first order tributary of Holyk Creek. No fisheries habitat is available due to extreme gradients (>50%) extending from confluence upstream for over two hundred meters (see Fig. 26.).

Tonkawatla Creek Trib (W.C.: 300-752700-72237)

A minor 2nd order tributary of Tonkawatla Creek, this stream has limited capability to support fish. At the time of assessment, the tributary of the Tonkawatla Creek, which should have been sampled was thought to be a side channel of Tonkawatla Creek, because of the nature of the terrain (i.e. slough like, meandering, low water). The tributary that was assessed was a tributary of this tributary. It was found to have too little water flow to sample (see Fig.28), and a cascade barrier at the confluence with the main tributary would restrict fish passage upstream.

Pingston Creek-Trib 1 (W.C.: 300-719200-37830 00000)

This tributary of Pingston Creek has low to moderate habitat value. Although no fish were captured, we suspect fish presence within the first reach (especially during spring runoff). Average channel width was approximately 3 meters, while gradient was 12% and water temperature was 11 degrees C. A culvert barrier exists at the road crossing (see Fig. 33), but above the road a cascade barrier separates reach one from reach two.

Pingston Creek-Trib 2 (W.C.: 300-719200-40800-00000)

This tributary of Pingston Creek provides moderate to high fisheries values. As sampling was only conducted within the first reach, it is unknown what potential exists in the upper reaches. Rainbow trout were captured within the first reach and it is suspected that these trout are now a resident population that originally came from the stocked Pingston Lake (at the headwaters of Pingston Creek). Average stream width is ~ 13 meters, with a gradient of 8%. Water temperature was 6 degrees C at the time of sampling. Water quality was moderate, as glacial silt clouded the water. No obstructions were encountered over the course of the sample site. Good quality habitat is evident from the complexity of habitats, and good cover from boulders and coarse woody debris. Good pool / riffle ratios exist. (see Fig. 39 & 40).

Pingston Creek-Trib 2/1 (W.C.: 300-719200-40800 02900-00000)

This tributary has no capability to support fish. A major cascade of over 30% gradient exists at its confluence, as it flows into the first reach of the above tributary (see Fig. 34). Sampling produced no captures.

Blanket Creek Trib (W.C.: 300-743400-21684-00000)

This tributary has poor capability to support fish. Insufficient and intermittent water flow restricted sampling within this second reach (see Fig.41 & 43). The first reach was not sampled due to extreme gradient (map assessment of gradient was 28%).

Goldstream River Trib (W.C.: 300-797600-55700-00000)

This tributary of the Goldstream River provides moderate value for fisheries habitat within the first reach. Mountain whitefish and sculpin (see Fig.46 & 47) were captured within this reach, although we suspect the potential for cutthroat trout (*Oncorhynchus clarki lewisi*) to inhabit this reach at some point during the year. Previous studies have determined the existence of cutthroat trout in tributaries downstream and we suspect these cutthroat to be utilizing other tributaries of the Goldstream, although this theory has yet to be substantiated. Another sample location was established in the third reach with no fish captures. It is suspected that the second reach is a potential barrier to fish migration due to steep gradients (map assessment of gradient was 14%).

Goldstream River Trib (W.C.: 300-797600-55700-22600)

This stream is a tributary of the above creek and flows into its third reach. No fish were captured in the third reach of the above stream, therefore, no fish are considered present in this stream.

Brewster Creek Trib (W.C.: 300-797600-27200-22047-00000)

Assessment of this stream determined that the channel was diverted below the main Forest Service Access Road, so that it would flow into Brewster Creek and not along its natural stream course. Sampling did not produce any fish captures through angling, minnow trapping or electrofishing. The man-made channel has an average channel with of 4 meters, a gradient of 2% with water temperatures of 11.5 degrees C. A three meter waterfall at the confluence with Brewster Creek (see Fig. 52) creates a barrier to fish migration upstream into this man-made channel.

South Cranberry Creek (W.C.: 300-735400-63000-00000)

South Cranberry Creek was sampled in the third reach and was determined to have moderate capability to support fish. Rainbow trout were captured in this reach. These fish may be migrants from Coursier Lake which has been stocked. The average channel width was 12 meters , the gradient 3% and the water temperature was 10 degrees C. Water quality was moderate (slightly silty) at the time of sampling. No obstructions were observed within this reach, other than the obvious barrier of the dam site creating Coursier Lake (see Fig. 57).

South Cranberry Creek Trib (W.C.: 300-735400-63000-21400-00000)

This tributary to South Cranberry Creek has low to moderate fisheries values. Rainbow trout were captured within the first reach. Average channel width was 9 meters, with an average gradient of 10%. The water temperature was 12 degrees C. with good, clear water quality at the time of sampling. A two meter falls / three meter cascade creates a barrier for fish movement up-

stream at the end of the first reach (see Fig. 60 & 61). Sampling within the second reach did not produce any fish.

Soards Creek Trib 1 (W.C.: 300-821700-30700-00000)

This tributary to Soards Creek provides moderate fish habitat. Rainbow trout were captured in the first reach. This stream provides rearing habitat for trout. Average channel width was 10 meters, gradient of 16% and water temperature was 8.5 degrees C. with good, clear water quality. A second sample was established upstream of the first reach break to determine the extent of fish presence. No fish were captured in the second reach. A gradient barrier (>30%) limits the upstream movement of fish (see Fig. 65 & 66).

Soards Creek Trib 2 (W.C.: 300-821700-40037-00000)

This tributary provides no capability to support fish. A major cascade of over 45% gradient exists at the confluence with the mainstem (see Fig. 69 & 70).

Caribou Creek (W.C.: 300-784900-08400-00000)

Caribou Creek is a tributary to the Downie Arm of the Revelstoke Reservoir. It provides moderate capability to support fish. Two sample sites were established in the second reach, at the first site rainbow trout were captured, but at the second site no fish were captured. At the end of the 2nd site a barrier (30 meter fall) would restrict any fish movement upstream (see Fig. 75).

Downie Creek Trib (W.C.: 300-784900-33925-00000)

This tributary provides no capability to support fish. No water was flowing at the time of assessment. This stream has an undefined channel and drops steeply into Downie Creek. No fish were present (see Fig. 77, 78 & 79).

LaForme Creek (W.C.: 300-767500-00000)

LaForme Creek has some of the highest capability to support fish. A significant bull trout population is present. It should receive special management consideration. The average channel width was 10 meters, gradient of 5% and water temperature of 8 degrees C. with a good, clear water quality. No obstructions were encountered and an aerial overview of the reaches above the sample site did not observe any significant obstructions until the headwaters of the drainage.

LaForme Creek Trib (W.C.: 300-767500-49100-00000)

This tributary to LaForme Creek provides moderate capability to support fish. The first reach produced the capture of bull trout, with no fish captured in the second reach. The average channel width was 8 meters, gradient 18% and water temperature of 9.5 degrees C. with good, clear

water quality. Numerous debris jams may prevent upstream migration of fish populations, although no defined gradient increase was observed (see Fig. 82-85).

Hoskins Creek-Trib 1 (W.C.: 300-801400-40900-00000)

This tributary to Hoskins Creek provides moderate fish habitat. Bull trout were captured in within the first 50 meters from the confluence with the Hoskins Creek mainstem. We believe, since this portion of the stream was more slough like (see Fig. 86), that the first 50 meters of habitat was an off-channel of the main Hoskins Creek channel. The tributary flows into this off-channel, having significantly different channel characteristics (see Fig. 87 &88), with the off-channel habitat creating better conditions for rearing juvenile fish. Average stream width was 3.8 meters, gradient 4 %, water temperature 5 degrees C., with clear water quality. No barriers were encountered within the first reach, but because fish were not being captured over the remainder of the site, a spring assessment would better determine the upper limits of fish distribution.

Hoskins Creek-Trib 2 (W.C.: 300-801400-25400-00000)

This tributary to Hoskins Creek provides no fish habitat. Steep gradients, minimal water flow and a steep drop off into the mainstem (see Fig. 89-91) characterize this stream. Average stream width was 3.2 meters, gradient of 27.5 %, water temperature of 5.6 degrees C., with clear water quality.

Pat Creek-Trib 1 (W.C.: 300-817100-81600-00000)

This tributary to Pat Creek provides moderate to high fish habitat. Rainbow trout were captured in the first reach. This tributary is similar in habitat complexity to the mainstem of Pat Creek (see Fig.92 - 95). Extensive coarse woody debris and large boulder fields create good pool / riffle ratios, thus providing the habitat complexity favoured by salmonids. Average stream width was 11.3 meters, gradient 8 %, water temperature 3 degrees C. (these low temperatures limited the capture success), with clear water quality. A steep cascade barrier was observed from the air between the second and third reaches.

Pat Creek-Trib 2 (W.C.: 300-817100-62800-00000)

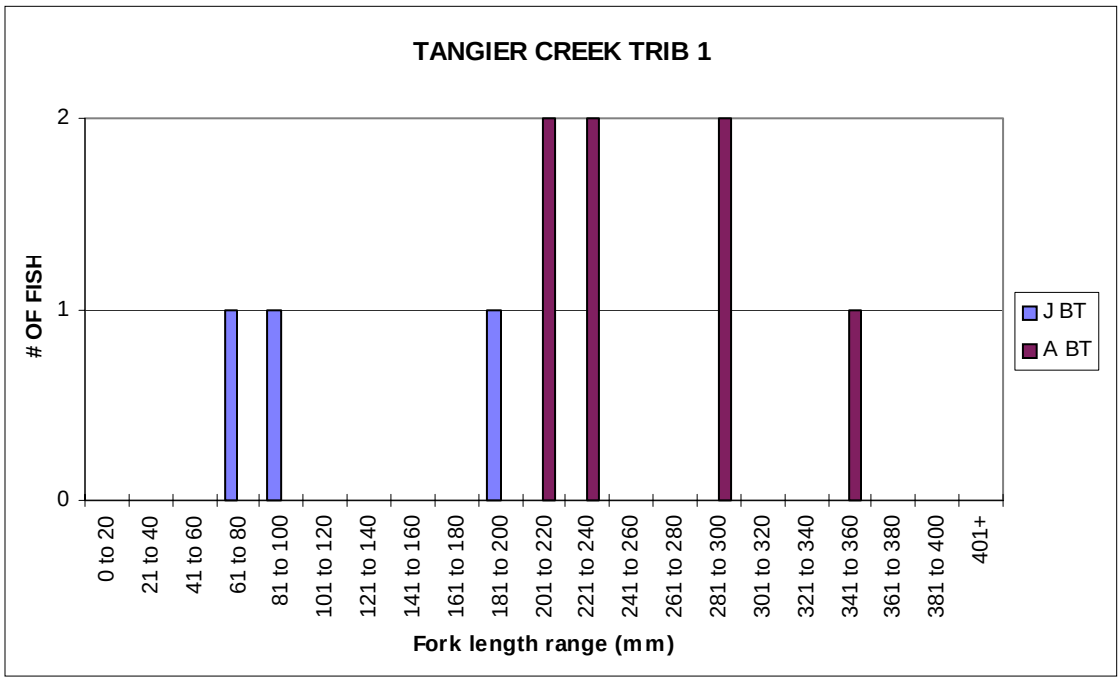
This tributary to Pat Creek provides minimal fish habitat. One rainbow trout was captured within the first reach. Average channel width was 6 meters, gradient 9% and the water temperature was 3 degrees C. with good, clear water quality. No barriers were observed within this reach, but it is recommended that a spring assessment be undertaken to determine the upper limit of fish distribution.

4.3 Fish Age, Size and Life History

Tangier Creek Trib 1 (W.C.: 360-495800-17000)

Bull trout were the only species captured within the first reach (see Fig. 3), with 10 fish captured between the size range of 78 to 350 mm. Juvenile and adult life stages were represented and we suspect that these bull trout are a resident population.

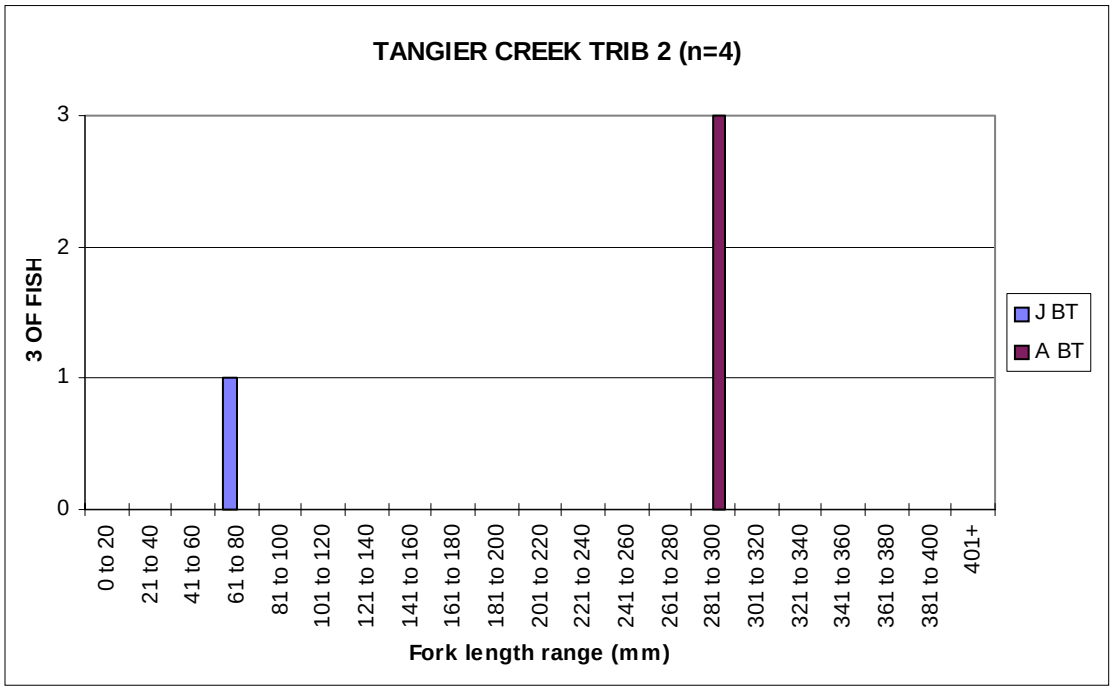
Stream	n	Stage	Species
Tangier Creek Trib 1	3	J	BT
WC: 360-495800-17000	7	A	BT



Tangier Creek Trib 2 (W.C.: 360-495800-19100)

Four bull trout were captured at this sample site (in 1st reach), ranging between 78 to 300 mm. Juvenile and adult life stages were represented and we suspect that these bull trout are a resident population.

Stream	n	Stage	Species
Tangier Creek Trib 2	1	J	BT
WC: 360-495800-19100	3	A	BT



Illecillewaet River-Trib 1 (W.C.: 360-257775-00000)

Bull trout were captured, within the first reach, but because the habitat was so limiting only two captures were made, both small fry measuring 52mm in length.

Illecillewaet River-Trib 2 (W.C.: 360-240678-00000)

No fish were captured, as channel was devoid of water, at the time of sampling.

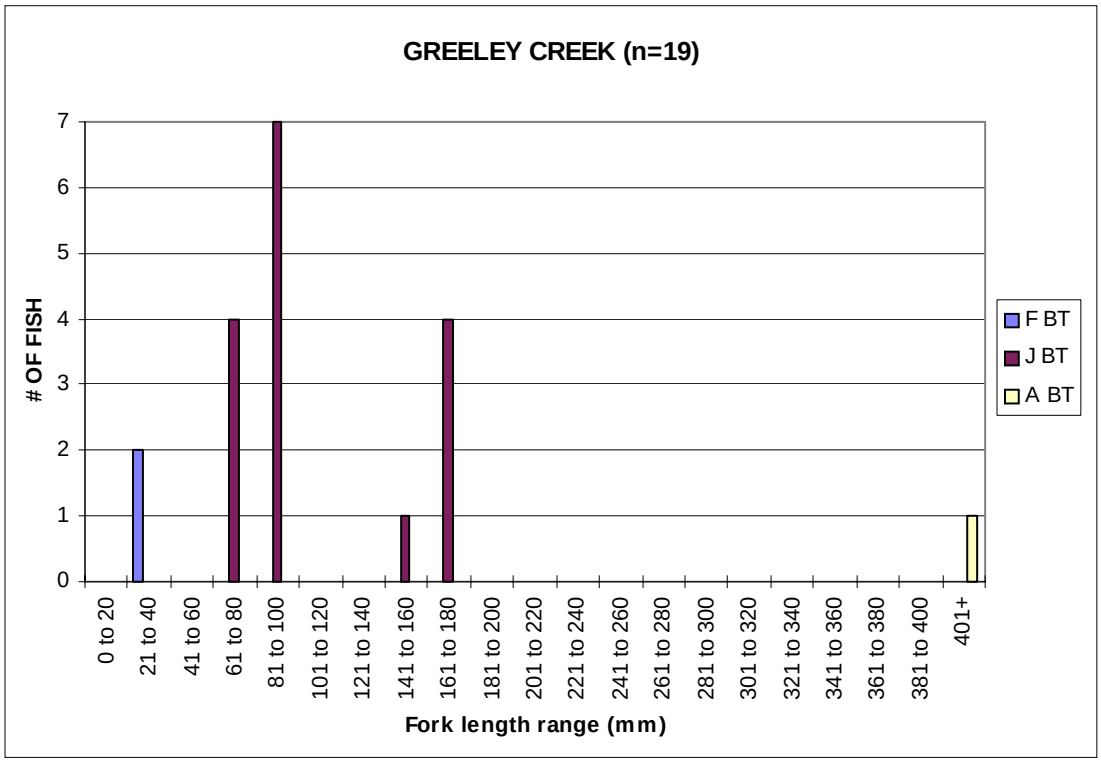
Illecillewaet River-Trib 3 (W.C.: 360-154547-00000)

Three rainbow trout were captured within the 1st reach, between the sizes of 40 to 100mm, representing fry and juvenile life stages.

Greeley Creek (W.C.: 360-145200-00000)

Nineteen bull trout were captured, with one large (55cm) pre-spawning adfluvial adult bull trout captured (see Fig. 16). All life stages were represented, but no resident adults were captured, leading us to believe the population is likely adfluvial, using the stream for spawning and rearing.

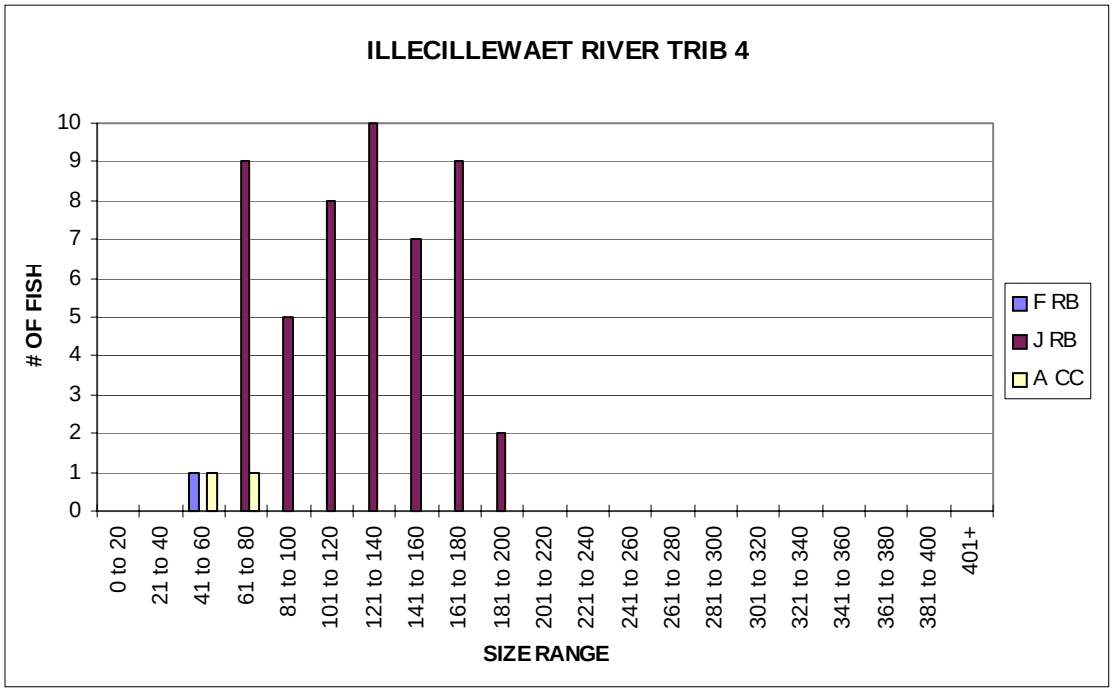
Stream	n	Stage	Species
Greeley Creek	2	F	BT
WC: 360-145200-00000	16	J	BT
	1	A	BT



Illecillewaet River-Trib 4 (W.C.: 360-131100-00000)

Forty-two rainbow trout and two sculpin were captured within the 1st and 2nd reaches. Although no fish were captured in the third reach, we suspect fish to inhabit this reach because there was no obvious barrier for upstream movement. We suspect that the fish captured within these reaches are a resident population of the Illecillewaet River and use this stream for rearing. This is supported by the lack of adult fish captured at the time of sampling.

Stream	n	Stage	Species
Illecillawaet River Trib 4	1	F	RB
WC: 360-131100-00000	50	J	RB
	2	A	CC



Holyk Creek Trib (W.C.: 300-741700-38200-32844-00000)

No fish were captured, as the channel was excessively steep (>50%).

Tonkawatla Creel Trib (W.C.: 300-752700-72237-00000)

No fish were captured, as the channel was devoid of habitat as a result of limited water flow.

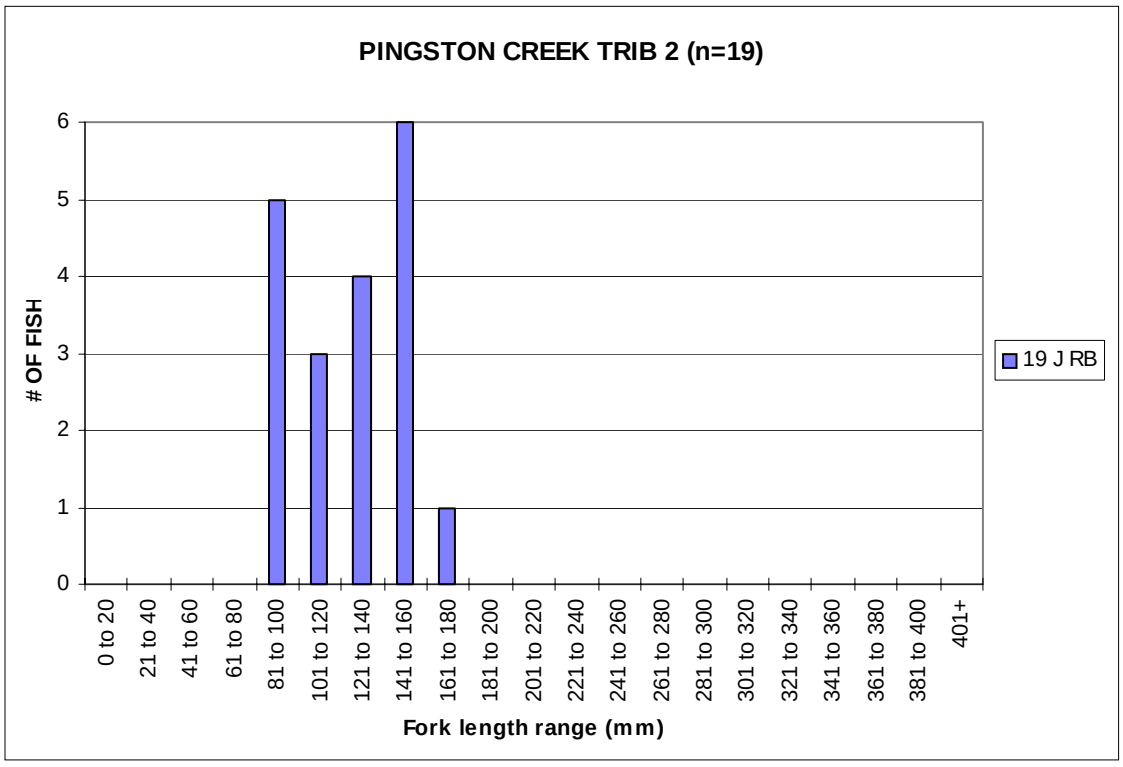
Pingston Creek-Trib 1 (W.C.: 300-719200-37830 00000)

Although no fish were captured, we suspect fish presence within the first reach (especially during spring runoff). This is supported by the known existence of a rainbow trout population in Pingston Creek.

Pingston Creek-Trib 2 (W.C.: 300-719200-40800-00000)

Rainbow trout were captured within the first reach and it is suspected that these trout are a resident population of Pingston Creek that have managed to escape downstream from the stocked Pingston Lake, at the headwaters of Pingston Creek. This tributary provides primarily rearing habitat.

Stream	n	Stage	Species
Pingston Creek Trib	19	J	RB
WC: 300-719200-40800			



Pingston Creek-Trib 2/1 (W.C.: 300-719200-40800 02900-00000)

No fish were captured, as the channel was excessively steep.

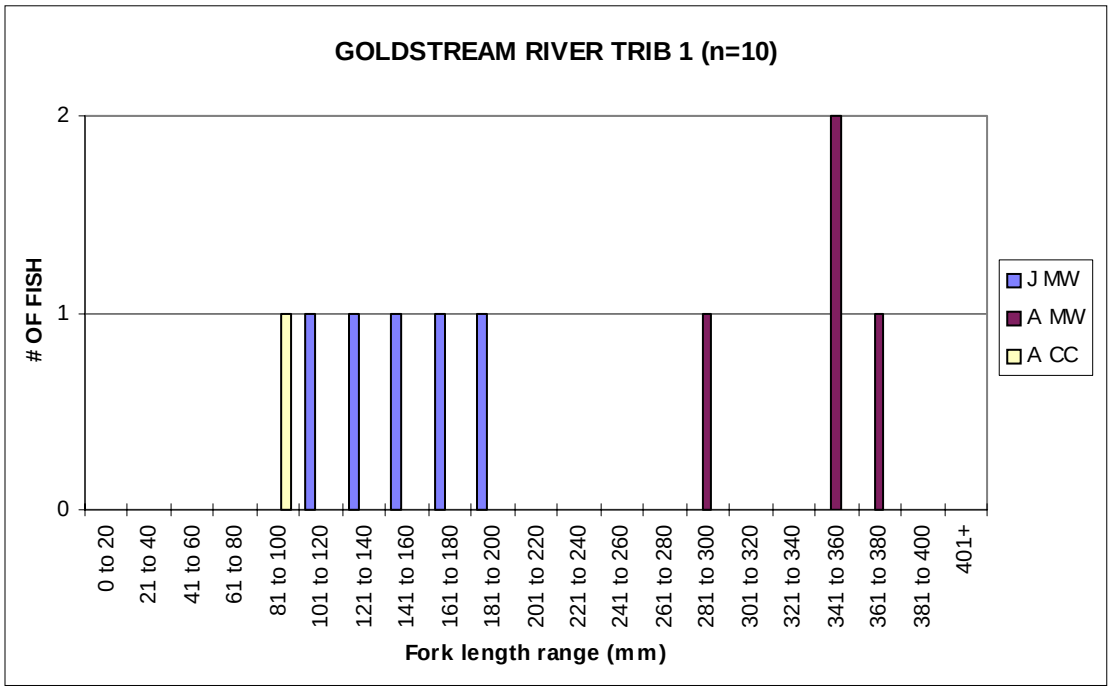
Blanket Creek Trib (W.C.: 300-743400-21684-00000)

No fish were captured, as the channel was devoid of habitat as a result of limited water flow.

Goldstream River Trib 1 (W.C.: 300-797600-55700-00000)

Mountain whitefish and sculpin (see Fig.46 & 47) were captured within the first reach, and we suspect the potential for cutthroat trout to inhabit this reach at some point during the year.

Stream	n	Stage	Species
Goldstream River Trib 1	5	J	MW
WC: 300-797600-55700	4	A	MW
	1	A	CC



Goldstream River Trib 1/1 (W.C.: 300-797600-55700-22600)

This stream is a tributary of the above creek and flows into its third reach. No fish were captured in the third reach of the above stream, therefore, no fish are considered present in this stream.

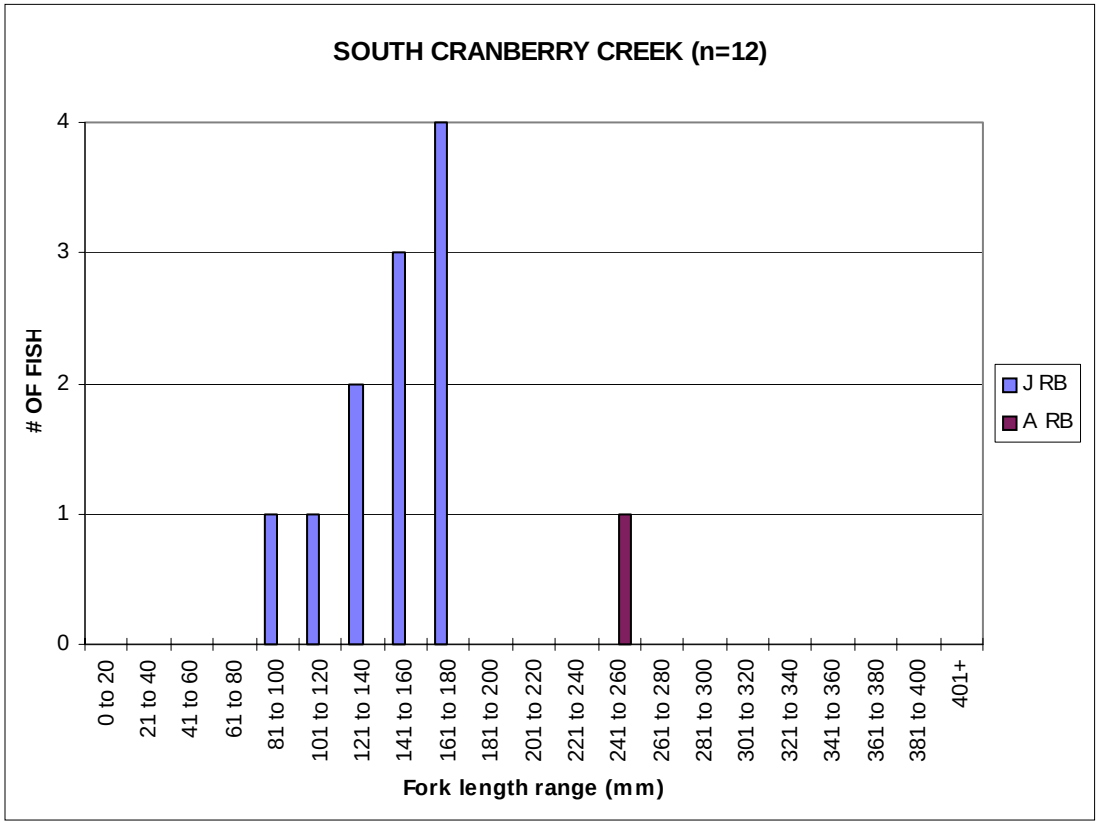
Brewster Creek Trib (W.C.: 300-797600-27200-22047-00000)

Assessment of this creek determined that below the main Forest Service Access Road the channel was diverted so it would flow into Brewster Creek and not its natural stream course. Sampling did not produce any fish captures through angling, minnow trapping or electrofishing.

South Cranberry Creek (W.C.: 300-735400-63000-00000)

Rainbow trout were captured in the third reach. These fish are likely a resident population resulting from fish migrating from Coursier Lake, which is stocked.

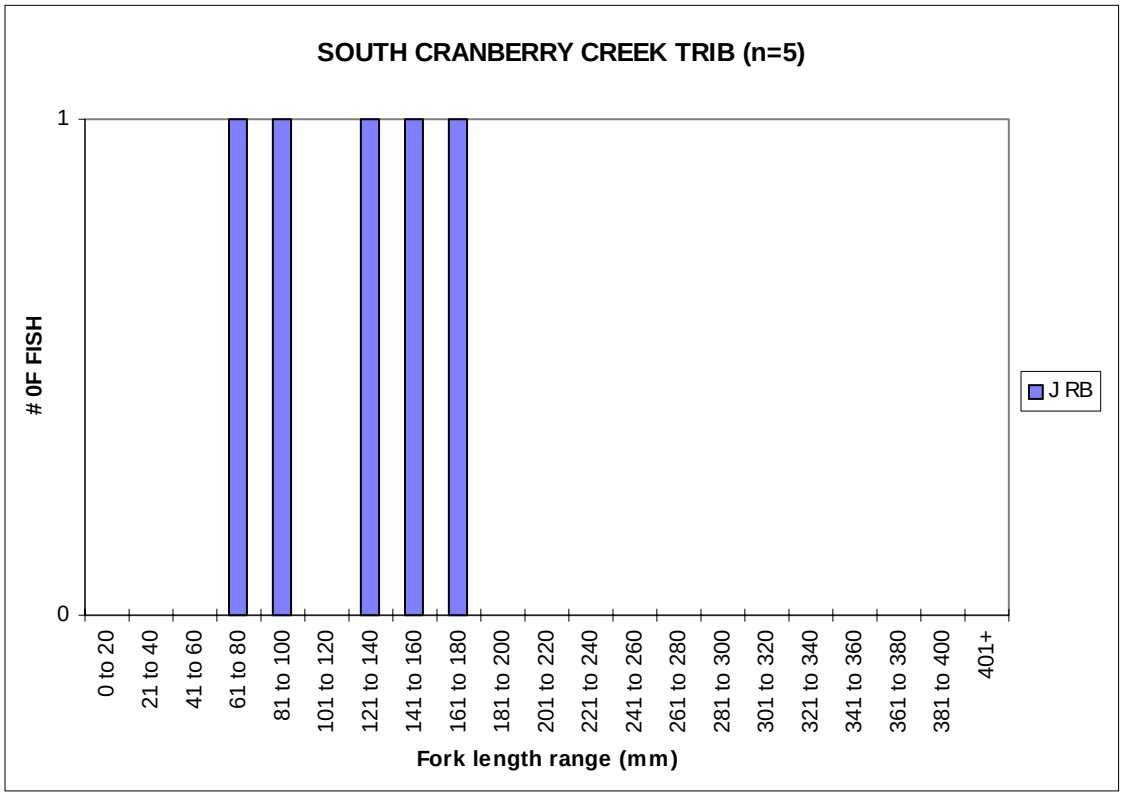
Stream	n	Stage	Species
South Cranberry Creek	11	J	RB
WC: 300-735400-63000	1	A	RB



South Cranberry Creek Trib (W.C.: 300-735400-63000-21400-00000)

Rainbow trout were captured within the first reach. Sampling within the second reach did not produce any fish. These fish are utilizing this tributary for rearing purposes. Spawning may occur in this tributary in the spring based on habitat characteristics determined at the time of assessment.

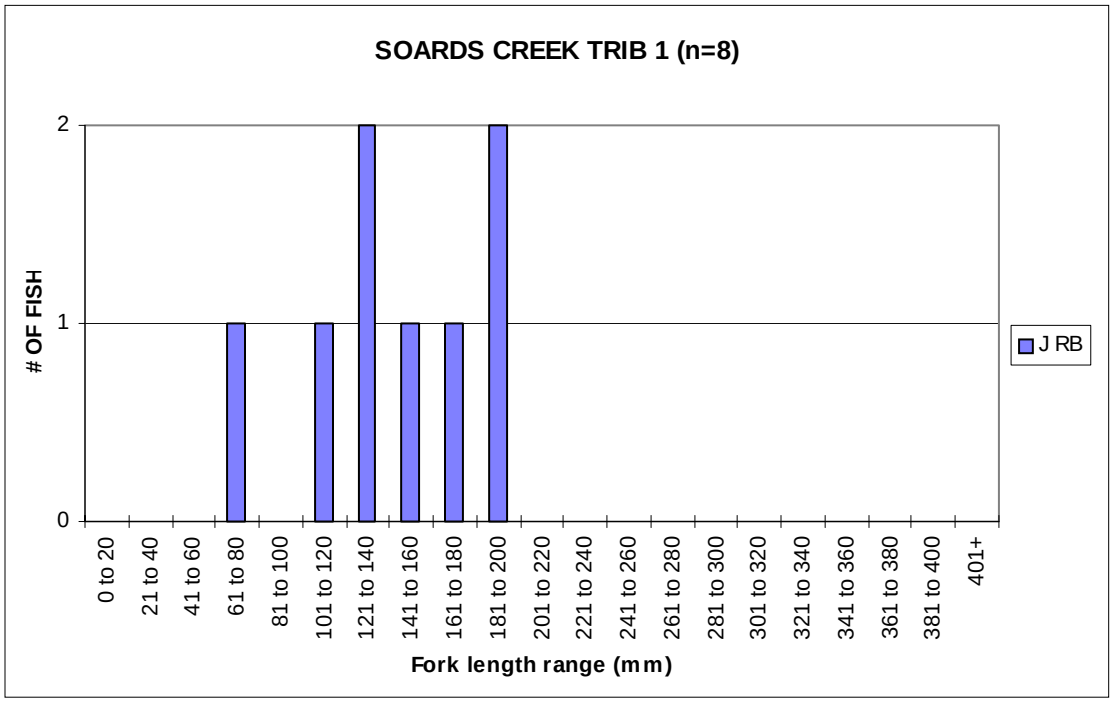
Stream	n	Stage	Species
South Cranberry Trib	5	J	RB
WC: 300-735400-63000-21400			



Soards Creek-Trib 1 (W.C.: 300-821700-30700-00000)

Nine rainbow trout were captured in the first reach. It is suspected that these fish are residents of Soards Creek and are utilizing this reach for rearing.

Stream	n	Stage	Species
Soards Creek Trib	8	J	RB
WC: 300-821700-30700			



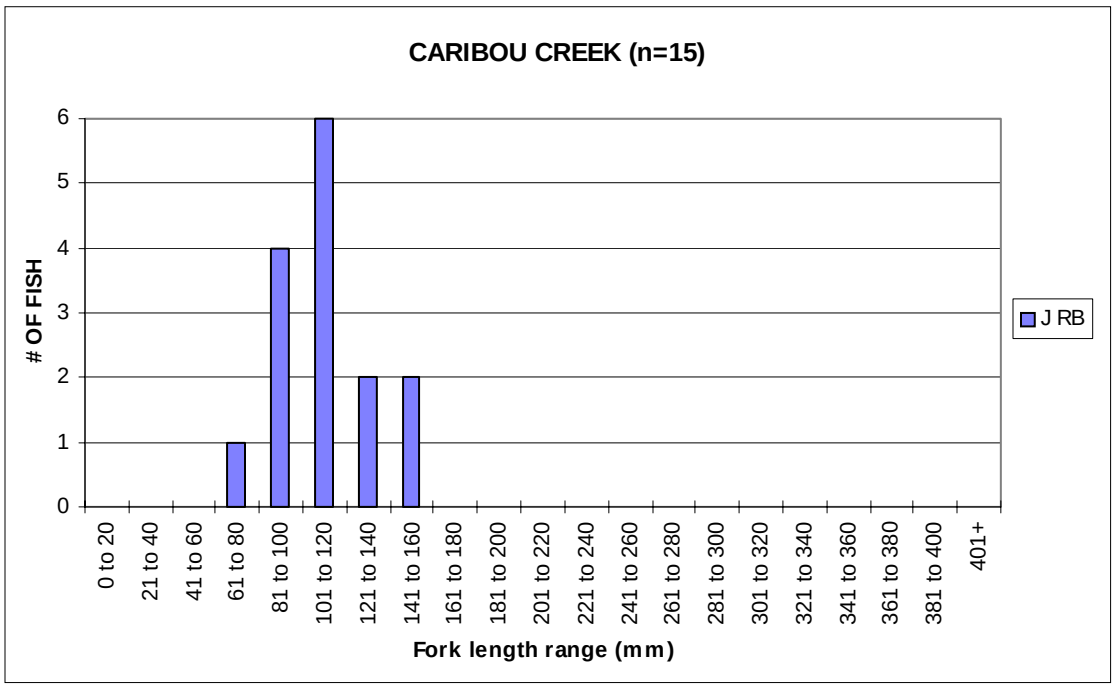
Soards Creek-Trib 2 (W.C.: 300-821700-40037-00000)

No fish were captured, as the channel was devoid of habitat as a result of low water flow.

Caribou Creek (W.C.: 300-784900-08400-00000)

Two sample sites were established in the second reach. Fifteen juvenile rainbow trout were captured at the first site, while no fish were captured at the second site. It is suspected that these fish are part of a resident population.

Stream	n	Stage	Species
Caribou Creek	15	J	RB
WC: 300-784900-08400			



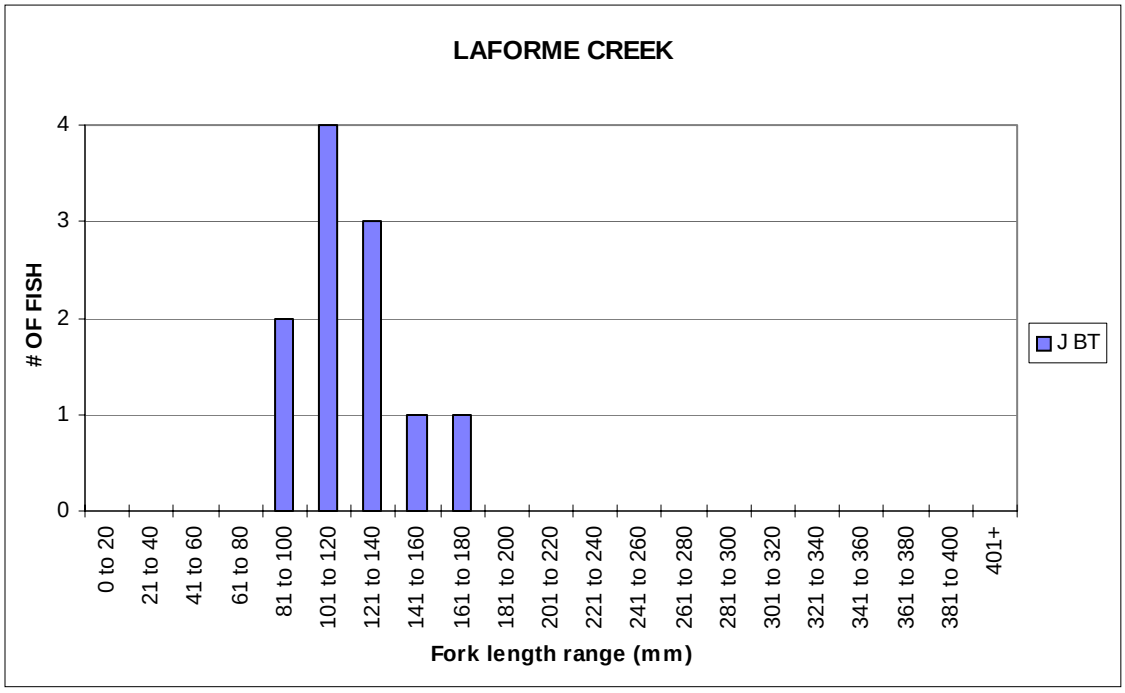
Downie Creek Trib (W.C.: 300-784900-33925-00000)

No fish were captured, as the channel was dry at the time of sampling.

LaForme Creek (W.C.: 300-767500-00000)

Eleven juvenile bull trout were captured in the second reach, although we suspect that numerous more escaped due to fast moving water and poor visibility. Because of the excellent habitat and significant bull trout populations, we recommend that this stream be considered for special management (supported by past sampling results).

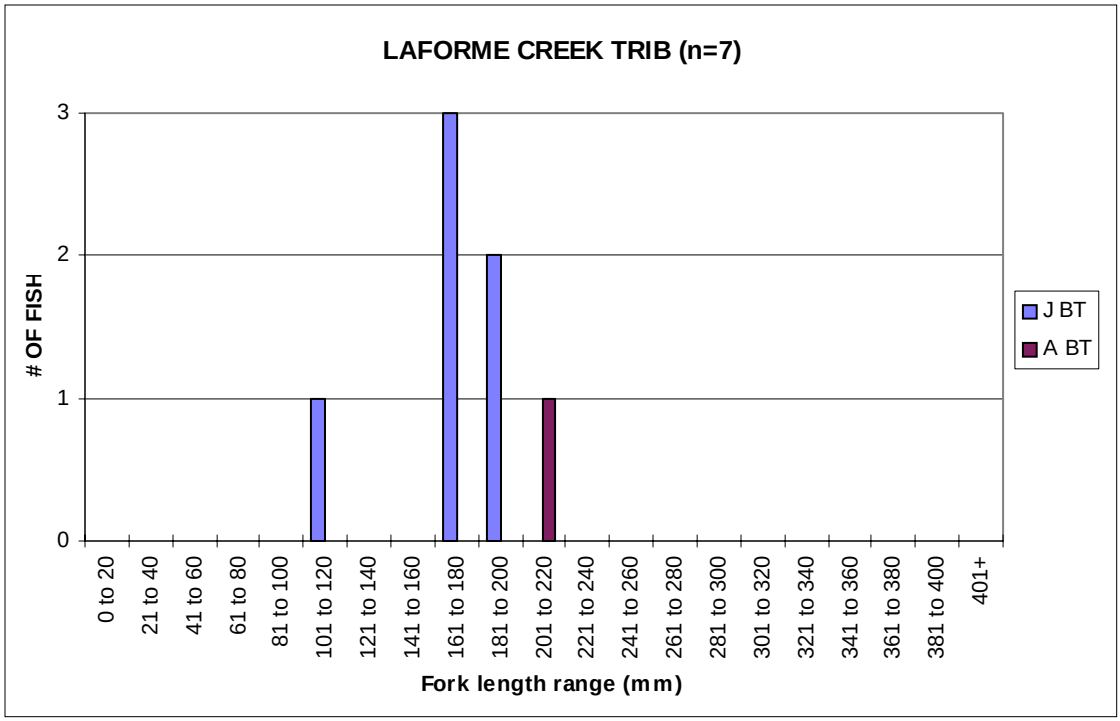
Stream	n	Stage	Species
LaForme Creek	11	J	BT
WC: 300-767500-00000			



LaForme Creek Trib(W.C.: 300-767500-49100-00000)

The first reach produced the capture of seven juvenile bull trout. Increasing gradients and numerous debris jams limits the upstream fish movement. It is suspected that these fish are part of a resident population of the main LaForme Creek and utilize this tributary as escapement habitat (during poor water condition) and for rearing. Spawning may occur but no evidence of adults were present at the time of sampling.

Stream	n	Stage	Species
LaForme Creek Trib	7	J	BT
WC: 300-767500-49100			



Hoskins Creek-Trib 1 (W.C.: 300-801400-40900-00000)

Two juvenile bull trout were captured in the first reach. Cold water conditions were the probable cause of a poor capture success. These fish were captured in off channel habitat and provides good rearing and escapement habitat opportunities.

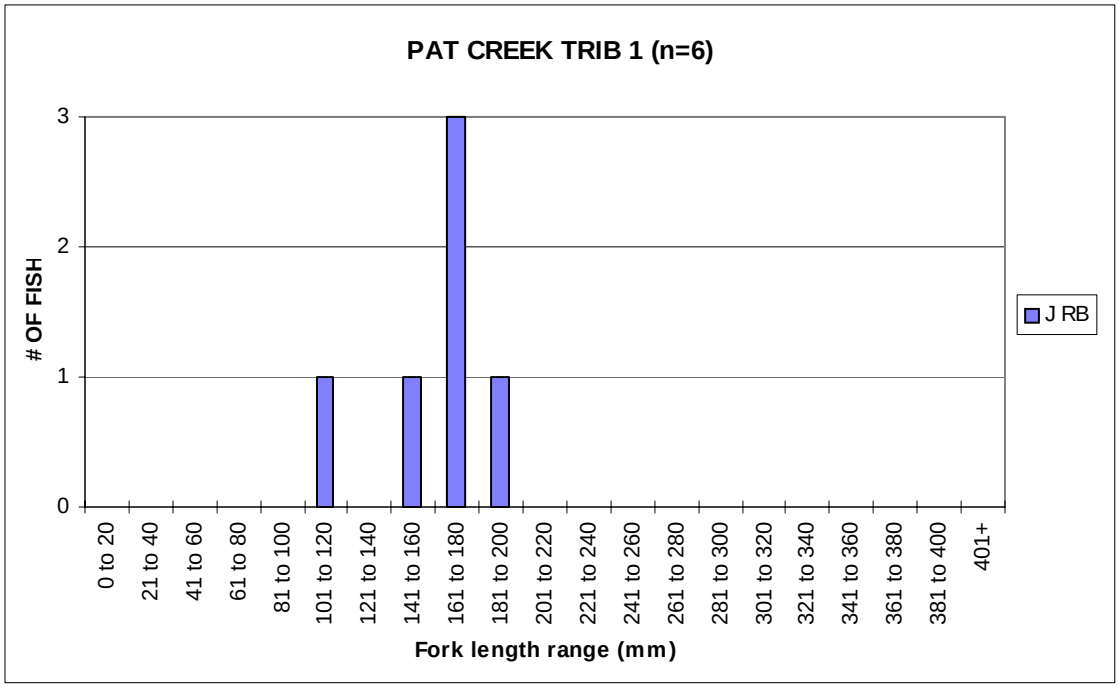
Hoskins Creek-Trib 2 (W.C.: 300-801400-25400-00000)

No fish were captured, as the channel was devoid of habitat as a result of limited water flow.

Pat Creek-Trib 1 (W.C.: 300-817100-81600-00000)

Six juvenile rainbow trout were captured in the first reach. It is suspected that these fish are a resident population of Pat Creek and were utilizing this habitat for rearing.

Stream	n	Stage	Species
Pat Creek Trib 1	6	J	RB
WC: 300-817100-81600			



Pat Creek-Trib 2 (W.C.: 300-817100-62800-00000)

One juvenile rainbow trout was captured within the first reach. Although low temperatures prevented a better capture success, we suspect this tributary has moderate rearing habitat value.

The following four sampled streams have the best spawning and rearing habitats with the highest populations of fish captures. These streams should be considered for special management.

1. **Greeley Creek (W.C.: 360-145200-00000)**
2. **Pingston Creek-Trib 2 (W.C.: 300-719200-40800-00000)**
3. **LaForme Creek (W.C.: 300-767500-00000)**
4. **Pat Creek-Trib 1 (W.C.: 300-817100-81600-00000)**

4.4 Fish Bearing Status

The following table summarizes the data for fish bearing reaches found within the study area.

Table 3 - Summary of data for fish bearing reaches.

STREAM NAME	WATERSHED CODE	REACH (ES)	SPECIES	CHANNEL WIDTH (m)	SITE GRADIENT (%)	PROPOSED RIPARIAN CLASS	COMMENTS
Tangier Creek Trib 1	360-495800-17000	1	BT	7.3	19.5	S2	upper limit of fish distribution limited by gradient/cascade barrier
Tangier Creek Trib 2	360-495800-19100	1	BT	5.9	17.0	S2	upper limit of fish distribution limited by gradient/cascade barrier
Illecillewaet River Trib 1	360-257775-00000	1	BT	3.3	6.5	S3	marginal habitat in the 1st reach
Illecillewaet River Trib 3	360-154547-00000	1	RB	1.1	2.0	S4	marginal habitat in the 1st reach
Greeley Creek	360-145200-00000	1	BT	13.5	7.0	S2	good habitat in 1st reach, but upper limit of fish distribution undetermined
Illecillewaet River Trib 4	360-131100-00000	1	RB, CC	5.7	14.0	S2	moderate habitat in 1st reach
Illecillewaet River Trib 4	360-131100-00000	2	RB	4.9	14.0	S2	moderate habitat in 2nd reach
Illecillewaet River Trib 4	360-131100-00000	3	RB	6.2	17.0	S2	fair habitat in 3rd reach
Pingston Creek Trib 1	300-719200-37830	1	RB	12.9	7.5	S2	good habitat in 1st reach
Pingston Creek Trib 2	300-719200-40800	1	RB	12.9	7.5	S2	good habitat in 1st reach
Goldstream River Trib	300-797600-55700	1	MW, CC	14.6	2.0	S2	good habitat in 1st reach, barrier within the second reach
South Cranberry Creek	300-735400-63000	3	RB	12.1	3.0	S2	all reaches downstream of (stocked) Coursier Lake are considered fish bearing
South Cranberry Trib	300-735400-63000-21400	1	RB	8.9	10.0	S2	fish captured for the 1st 200m from confluence
Soards Creek Trib 1	300-821700-30700	1	RB	10.3	16.5	S2	upper limit of fish distribution limited by gradient barrier
Caribou Creek	300-784900-08400	2	RB	5.9	12.0	S2	good habitat throughout 1st and 2nd reaches
LaForme Creek	300-767500-00000	2	BT	9.8	5.0	S2	Good habitat throughout extent of drainage
LaForme Creek Trib	300-767500-49100	1	BT	8.0	17.5	S2	upper limit of fish distribution may vary dependent on water flows
Hoskins Creek Trib 1	300-801400-40900	1	BT	3.8	4.0	S3	lower end of 1st reach may be off channel habitat of mainstem
Pat Creek Trib 1	300-817100-81600	1	RB	11.3	8.0	S2	Cascade barrier visible from air @ reach 2/3 break
Pat Creek Trib 2	300-817100-62800	1	RB	6.0	9.0	S2	upper limit of fish distribution undetermined

The following table summarizes the data for non-fish bearing reaches found within the study area.

Table 4- Summary of data for non-fish bearing reaches.

STREAM NAME	WATERSHED CODE	REACH (ES)	GRADIENT (%)	PROPOSED RIPARIAN CLASS	Electrofishing Specs.				Other Methods		FOLLOW-UP SAMPLING (y or n)	COMMENTS
					DIST (m)	TIME (s)	COND (umhos/cm)	TEMP (C)	TYPE	EFFORT		
Tangier Creek Trib 1	**360-495800-17000**	**2+**	**44 (M)**	**S5**	**0**	**0**	**160**	**12.5**	**NONE**	**0**	**N**	**cascade/falls barrier at end of 1st reach**
Tangier Creek Trib 2	**360-495800-19100**	**2+**	**21 (M)**	**S5**	**0**	**0**	**103**	**11.0**	**NONE**	**0**	**N**	**cascade barrier at end of 1st reach**
Illecillawaet River Trib 1	**360-257775-00000**	**2+**	**17 (M)**	**S6**	**100**	**340**	**103**	**10.0**	**NONE**	**0**	**N**	**cascade barrier in 1st reach**
Illecillewaet River Trib 2	**360-240678-00000**	**1+**	**14 (M)**	**(S6)**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**0**	**Y**	**dewatered or intermittent channel**
Illecillewaet River Trib 3	**360-154547-00000**	**2+**	**9 (M)**	**S6**	**100**	**163**	**126**	**11.0**	**MT,AG**	**YES**	**N**	**Culvert barrier in 1st reach**
Illecillewaet River Trib 4	**360-131100-00000**	**4+**	**18 (M)**	**S5**	**0**	**0**	**41**	**12.0**	**NONE**	**0**	**N**	**3m falls at end of 3rd reach**
Holyk Creek Trib	**300-741700-38200-32844**	**1+**	**58 (C)**	**S6**	**0**	**0**	**164**	**9.0**	**VO**	**0**	**N**	**Gradients averaged >50% for over 200 meters**
Tonkawatla Creek Trib	**300-752700-72237**	**1+**	**unk**	**(S6)**	**0**	**0**	**131**	**9.0**	**VO**	**0**	**Y**	**Low water & intermittent flow with no available fish habitat**
Pingston Creek Trib 1	**300-719200-37830**	**2+**	**31 (M)**	**S5**	**0**	**0**	**80**	**11.0**	**NONE**	**0**	**N**	**Culvert barrier in 1st reach**
Pingston Creek Trib 2/1	**300-719200-40800-02900**	**1+**	**35 (C)**	**S5**	**100**	**150**	**50**	**10.5**	**NONE**	**0**	**N**	**No fish habitat - gradient in excess of 50%**
Blanket Creek Trib	**300-743400-21684**	**1+**	**28 (M)**	**(S5)**	**0**	**0**	**141**	**12.5**	**VO**	**0**	**Y**	**Low water & intermittent flow with no available fish habitat**
Goldstream River Trib	**300-797600-557000**	**3**	**3 (C)**	**S5**	**252**	**365**	**320**	**9.0**	**NONE**	**0**	**N**	**Suspect that gradient/barrier exist within 2nd reach**
Goldstream River Trib	**300-797600-55700-22600**	**1+**	**10.5 (C)**	**S5**	**0**	**0**	**N/A**	**9.0**	**VO**	**0**	**N**	**No fish suspected as mainstem did not produce any captures**
Brewster Creek Trib	**300-797600-27200-22047**	**1+**	**2 (C)**	**S5**	**100**	**190**	**176**	**11.5**	**MT, AG**	**YES**	**N**	**30% cascade/barrier at the confluence with Brewster Creek**
South Cranberry Trib	**300-735400-63000-21400**	**2+**	**16 (C)**	**S5**	**200**	**379**	**180**	**11.0**	**NONE**	**0**	**N**	**400 meters to road/bridge, after which gradients increase to 25%+**
Soards Creek Trib 1	**300-821700-30700**	**2**	**29.5 (C)**	**S5**	**200**	**374**	**84**	**8.0**	**NONE**	**0**	**N**	**>30% cascade extends over 150 meter of this site**
Soards Creek Trib	**300-821700-40037**	**1+**	**46 (C)**	**S5**	**0**	**0**	**102**	**10.0**	**VO**	**0**	**N**	**No fish habitat -**

2												**gradient in excess of 50%**
Caribou Creek	**300-784900-08400**	**3+**	**18 (M)**	**S5**	**0**	**0**	**N/A**	**10.0**	**NONE**	**0**	**N**	**30 m falls at the end of 2nd reach**
Downie Creek Trib	**300-784900-33925**	**1+**	**20 (C)**	**S6**	**0**	**0**	**N/A**	**N/A**	**VO**	**0**	**N**	**No water in channel at time of sampling**
LaForme Creek Trib	**300-767500-49100**	**2+**	**27 (C)**	**S5**	**150**	**294**	**78**	**9.5**	**NONE**	**0**	**N**	**Reach 1/2 break is a series of small falls (<2m), after which gradients increase to (>25%)**
Hoskins Creek Trib 2	**300-801400-25400**	**1+**	**27.5 (C)**	**S6**	**0**	**0**	**132**	**5.6**	**VO**	**0**	**N**	**No fish habitat - gradient in excess of 50%**
Pat Creek Trib 1	**300-817100-81600**	**3+**	**8 (M)**	**(S5)**	**0**	**0**	**N/A**	**3.0**	**NONE**	**0**	**Y**	**Cascade barrier visible from air @ reach 2/3 break**
Pat Creek Trib 2	**300-817100-62800**	**2+**	**40 (M)**	**(S5)**	**0**	**0**	**N/A**	**3.0**	**NONE**	**0**	**Y**	**Barrier not confirmed, recommend further sampling - low densities and low water temperatures**

The following table outlines the follow-up sampling required to confirm non-fish bearing reaches found with the study area.

Table 5- Follow-up sampling required to confirm non-fish bearing reaches.

STREAM NAME	WATERSHED CODE	REACH	TIMING	METHODS	COMMENTS/RECOMENDATIONS
Illecillewaet River-Trib 2	360-240678-00000	1+	AUG 1-SEPT 15	EL,MT	Potential for fish habitat during spring freshet - spring sample if warranted
Greeley Creek	360-145200-00000	2+	AUG 1-SEPT 15	EL,MT,AG	Extent of fish presence unknown above 1st reach - further sampling required
Tonkawatla Creek Trib	300-752700-72237	1+	JUN 1-SEPT 15	EL,MT	Low water conditions with marginal habitat - spring sample if warranted
Pingston Creek-Trib 2	300-719200-40800	2+	AUG 1-APR 15	EL,MT	Extent of fish presence unknown above 1st reach - further sampling required
Hoskins Creek-Trib 1	300-801400-40900	2+	JUN 1-SEPT 15	EL,MT	Recommend Additional Sampling to determine extent of fish presence - Low densities with low temperatures
Pat Creek-Trib 1	300-817100-81600	2+	AUG 1-APR 15	EL,MT	Barrier not confirmed, recommend further sampling - low densities and low water temperatures
Pat Creek-Trib 2	300-817100-62800	2+	AUG 1-APR 15	EL,MT	Barrier not confirmed, recommend further sampling - low densities and low water temperatures

4.5 Significant Features and Resource Values

4.5.1 Fish and Fish Habitat

Of the 35 sites sampled, only Greeley Creek and LaForme Creek stand out as having significant fish habitat. Being higher order streams, their habitat is more diverse and serves all life stages for bull trout, which are provincially blue listed. In addition, Greeley Creek is also a Community Watershed. LaForme Creek has been previously recognized in the 1994 sampling program as having high value and may maintain a unique resident population of bull trout in its upper reaches which is supported by spring fed headwaters. The lower reaches of LaForme Creek also provides riverine habitat for adfluvial bull trout.

4.5.2 Habitat Protection Concerns

In general terms, based on several years of study in the Revelstoke area, it would appear that small tributary streams are very critical for refuge and rearing, filling the niche that off-channel habitat provides for coastal river systems. This should be recognized and these smaller order streams may require larger buffers than are presently designated under the FPC in areas with slope instability.

No evidence of slope instabilities or other special concerns were evident at the 35 sites that were sampled during the 1997 field season. However, inherent instabilities were noted in Holyk Creek which is likely the key spawning and rearing habitat for the cutthroat trout in the Akolkolex River, which is generally acknowledged as the best trout stream in the Revelstoke Forest District. The slopes of Holyk Creek are presently being harvested.

There is also potential for disturbing the spring source of LaForme Creek, however, there are no plans at this time to be operating anywhere near the headwaters of the creek.

4.5.3 Enhancement and Rehabilitation Opportunities

A number of poor culvert installations were noted at several of the study sites. These should be investigated and incorporated into a district wide plan to address these concerns across the landscape.

4.5.4 Other Resources

The Revelstoke Forest District has a long history of resource extraction. Forestry and mining have been significant for many years. Hydro-electric development has been a more recent occurrence and has caused the most significant impacts regarding fish habitat. Other less consumptive resource users in the area include hiking, mountaineering, heli-skiing, ski touring, mountain biking, snowmobiling, kayaking and recreational angling. The Kootenay/Boundary Land Use Plan is presently attempting to address all of these resource uses to ensure compatible use of Crown Land.

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Appendix I - FDIS Summary and Photographs

Appendix II - Photo Documentation

Appendix III - Original Field Notes

Appendix IV - Maps

Appendix V - Digital GIS, FDIS Reach, Site and Fish Data