



**JUVENILE STEELHEAD SURVEYS
IN THE KITWANGA, MORICE, SUSTUT
AND ZYMOETZ RIVERS 1991**

David Bustard & Associates

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Prepared by

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for

B.C. ENVIRONMENT

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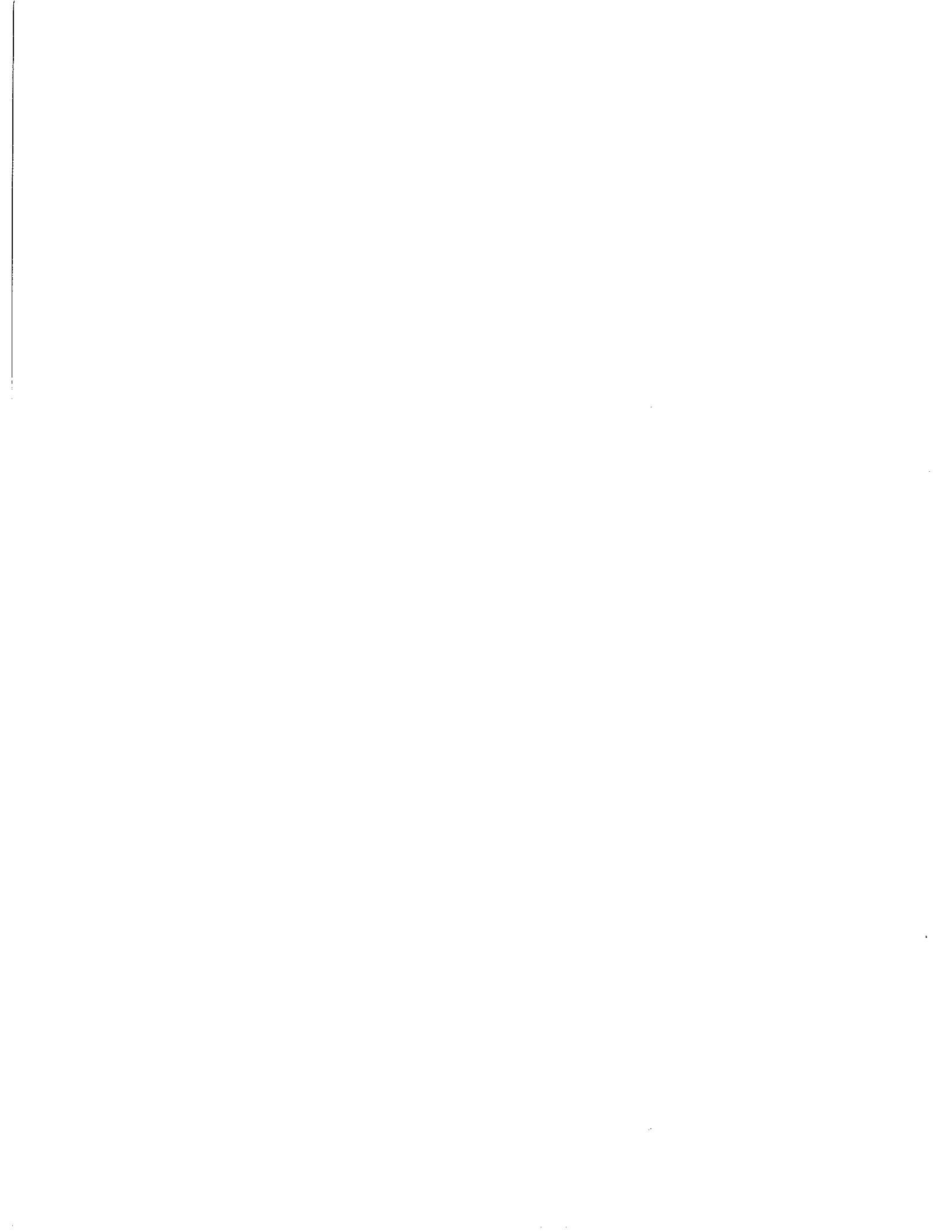


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1.0 INTRODUCTION

Surveys of juvenile steelhead fry and parr abundance were conducted on four steelhead systems tributary to the Skeena River in northwestern B.C. during August and September, 1991. The four systems assessed were the Kitwanga, Morice, Sustut and Zymoetz (Copper) rivers. The surveys were conducted under contract to B.C. Environment and were funded by the Habitat Conservation Fund. This report summarizes the results of the surveys. A separate appendix volume has been prepared presenting detailed location maps (1:50,000), site sketch maps, photographs of each site, and detailed habitat information as collected on MOE/DFO Stream Survey Forms. This appendix report is on file with B.C. Environment in Smithers.

1.1 BACKGROUND

There is a general concern for the status of Skeena River summer steelhead stocks - particularly for those runs that enter the Skeena early in the season during an intensive commercial fishery. B.C. Environment is concerned that interception of these early-run fish may be decimating this component of the steelhead stocks in the upper Skeena tributaries, in some instances to the point of near-extinction. Upper sections of the Sustut, Morice and Zymoetz rivers are areas where summer steelhead arrive in the upper river during August and early September and where this early component is threatened (B.C. Environment, data on file). These concerns are based on reports of very poor catches by anglers in these systems during August and September, poor results in the Department of Fishery and Oceans' test fishery index on the lower Skeena, and low adult escapement estimates at "index areas" such as in the upper Sustut where historical anecdotal evidence suggests numbers should be much higher (Bob Hooton, B.C. Environment, personal communication).

Establishing "index sites" to determine juvenile steelhead abundance estimates throughout these early-run tributaries provides a systematic basis for assessing the strength of past adult escapements to the river systems. At the same time, it offers a means of assessing whether existing habitat is seeded to carrying capacity. Repeated sampling of these sites over time can provide a valuable tool for assessing the condition of the steelhead stocks in these tributaries relative to their potential. However, juvenile assessments are unable to separate the "early-run" component from fish that may have moved into the upper river system later in the fall period.

Good background data describing juvenile steelhead abundances for the Morice River system was collected by B.C. Environment from

1980 to 1986 (Tredger 1981-87) and during the Kemano Completion Studies (Envirocon 1984). Although similar index site assessments were also conducted in the upper Sustut during the period 1983 to 1985 (Tredger 1986), sampling was conducted on a small number of sites limiting its suitability as an estimate of juvenile steelhead abundance. Data collected by Williams et al. (1985) and Shirvell (unpublished data, DFO, Pacific Biological Station) is of limited value as juvenile steelhead "index site" information due to the different techniques used in collecting the information. The Envirocon studies relied mainly on seining to delineate juvenile fish abundance in the Sustut, while Shirvell has used underwater diver observations. There are no historical juvenile steelhead data for the mainstem Zymoetz (downstream of McDonell Lake) and Kitwanga rivers.

1.2 STUDY OBJECTIVES

This study had the following objectives:

- 1.) To establish a network of index sites throughout the mainstem Kitwanga, Morice, Sustut and Zymoetz rivers to form the basis for annual estimation of juvenile steelhead fry and parr abundance. The network should emphasize the upper reaches of these systems but include sites lower in the river systems and a limited number of key tributary streams.
- 2.) To conduct quantitative estimates of juvenile steelhead abundance in these index sites.
- 3.) To compare these estimates to historical data where available, and to relate abundance estimates to those expected under full habitat utilization.

2.0 METHODS

Studies were conducted between mid-August and the first week of October. Assessments were conducted on the warmer systems first while surveys on the upper Morice and Sustut rivers were conducted in September since it was assumed fry emergence occurs later in these systems. A helicopter was used to access most sites in the Sustut, some Morice River tributaries, most upper mainstem Zymoetz River sites, and locations in the upper Clore River. A riverboat was used to access the upper Morice River locations, while all other sites were accessible by vehicle. Crew sizes ranged from two to four people.

Table 1 summarizes the number and location of sample sites conducted in the river systems. The column listing **PROPOSED** sites is the number identified in the initial proposal to B.C. Environment (107 sites). The **COMPLETED** column identifies the number that were in fact completed during the 1991 surveys (123 sites). Although the sites in the Kitsequecla River could not be

SYSTEM	PROPOSED	COMPLETED
KITWANGA	8	8
MORICE	38	39
SUSTUT	30	45
ZYMOETZ	25	31
KITSEGUECLA	6	0
TOTAL	107	123

sampled due to freshet conditions, additional sites were completed in the Sustut and Zymoetz rivers, so that a total of 16 more sites were sampled than proposed during the 1991 surveys.

Sample sites ranged in length from 12 m to 55 m, with a mean length of 22 m. Stopnets were used to enclose the sites. On smaller tributaries and sidechannels of the mainstem rivers, the nets were located at the top and bottom ends of the sites. In mainchannel locations, rebar and a minimum of 30 m of stopnet were used to enclose a section of the margin of the site out into the edge of fast water habitat.

Sample crews worked up and down through the site at least twice with a Coffelt gas-powered electroshocker. The two-step removal method was used to estimate fish populations from catches within these sites (Seber and LeCren 1967). If a suitable declining catch was not obtained, a third pass was made. All fish were sorted by species, counted, fork lengths measured to the nearest mm, and returned to the stream after sampling. At least 30 steelhead fry were measured at each site when available. A sample of weights from all fish species and a range of size classes was obtained from each system for biomass estimates. As well, scales were retained from a representative range of juvenile steelhead sizes for aging in each system.

Sample site areas were calculated from a length and a series of width measurements at each site. MOE/DFO Stream Survey Forms were completed for each site. This provided a basic description of the physical characteristics of the site including location maps. A photo record of each site was retained.

An effort was made to locate sample sites in locations similar to those utilized in other surveys. Although the locations were in approximately the same sections within a given reach, the exact site could often not be located because of inadequate descriptive information in previous index site reports. Reach breaks used in this study were derived from aquatic biophysical maps (Resource Analysis Branch) for all systems except the Morice River where the reach breaks presented in Tredger (1983) were used.

An effort was made to locate sample sites in what was judged to be the best available habitat for steelhead fry and parr. A four-class habitat suitability rating system for steelhead fry and parr based on the site physical features (water velocity, depth, bed material characteristics and cover) was developed and each index site was rated as shown in Table 2. During the data analysis, some comparisons were made grouping results for the sites that were considered good and excellent habitat. This is particularly important for parr, where many of the sites selected as good fry rearing habitat were unsuitable for steelhead parr rearing.

Table 2. Juvenile Steelhead Habitat Suitability Rating Criteria.	
STEEHEAD FRY	
EXCELLENT	Shallow (<50 cm) low velocity (<30 cm/sec) cobble\boulder sites with interstitial spaces for hiding and food production - often riffle locations.
GOOD	Similar to above but might include some smaller bed material with less interstitial spaces, higher water velocities, etc.
MODERATE	Limited habitat due to smaller bed material size, poor cover, higher velocities and deeper habitat, etc.
POOR	Generally unsuitable for fry rearing due to high water velocities, small bed material with no hiding spaces, poor cover, etc.
STEELHEAD PARR	
EXCELLENT	Deep (>15 cm) boulder or cobble bed material with moderate water velocity (<75 cm/sec). Large interstitial spaces or good adjacent cover within the site (eg, log jam).
GOOD	Similar to above but poorer cover and less suitable water velocities.
MODERATE	Either too fast or too slow water velocity with poorer cover (few interstitial spaces or lack of debris cover). Typically smaller bed material.
POOR	Unsuitable for parr rearing - typically water velocities are too slow and depths are shallow. In this study, many of the shallow riffle sites selected as good fry rearing offered poor parr rearing habitat.

3.0 RESULTS AND DISCUSSION

3.1 KITWANGA RIVER

Seven sample sites along the mainstem of the Kitwanga River and a single site in Moonlit Creek were located as shown in Figure 1. The mainstem sites comprised just under 700 m² of habitat and 133 m of river margin in five reaches (Table 3). The breakdown by site is presented in Appendix 1.

3.1.2 Kitwanga Catch Composition

A total of 1489 fish were estimated within the seven mainstem sample sites (Table 3). Steelhead fry dominated the catch (61.8%), followed by Dolly Varden (18.6%) and juvenile chinook (10.7%). Steelhead parr comprised a small percentage of the overall catch (2.2%), with none of the fish older than age 1+. Fry comprised a smaller proportion of the catch in Moonlit Creek (9.5%), and no parr were captured in the sample site.

	MAINSTEM KITWANGA		MOONLIT CREEK	
	N	%	N	%
Steelhead 0+	920	61.8	6	9.4
Steelhead 1+	33	2.2	0	0.0
Steelhead ≥2+	0	0.0	0	0.0
Chinook	159	10.7	8	12.5
Coho	35	2.3	0	0.0
Dolly Varden	278	18.6	50	78.1
Whitefish	11	0.8	0	0.0
Sculpins	54	3.6	0	0.0
TOTAL	1489		64	
AREA (m ²)	695		115	
LENGTH (m)	132.8		11.3	

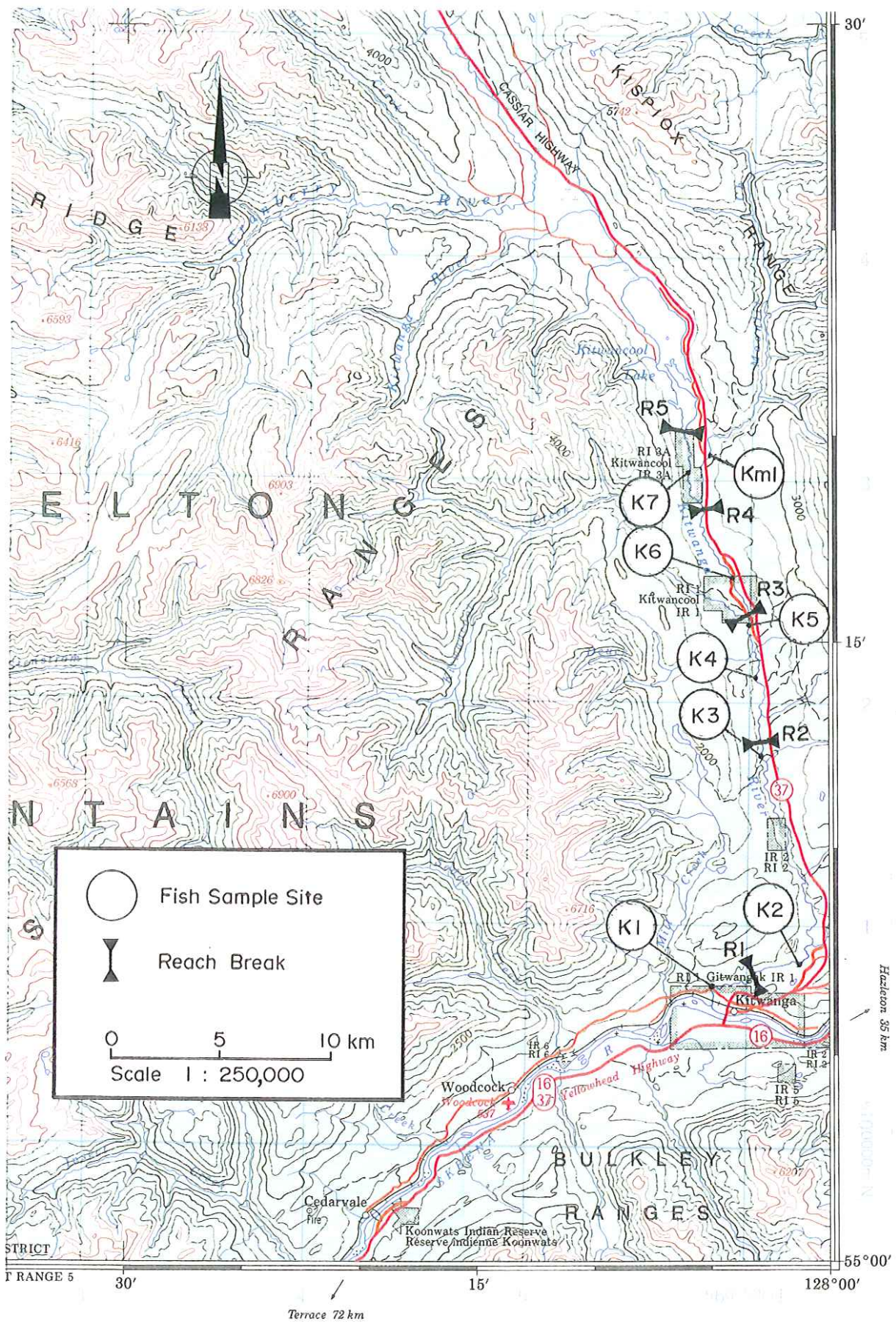


Figure 1. Location of Kitwanga River Juvenile Fish Sample Sites.

The Moonlit Creek fry were newly-emerged and it is assumed that emergence of all fry may not have been completed by the August 15 sample date in this tributary. It is assumed that these fry were steelhead, although their very small size (<28 mm - see Figure 2A) suggests that they may be the progeny of resident trout. Similarly, juvenile trout captured in the river section just downstream from Kitwanga Lake may have a resident trout component.

3.1.2 Kitwanga Juvenile Steelhead Densities

Steelhead fry densities were highest at Site K2 (Photo 1) where they exceeded 2 fry/m². Fry densities averaged 1.4 fry/m² for the seven Kitwanga River sites and exceeded 1 fry/m² at all of the locations except Site K7 (Table 4). This site was located in the reach just downstream from Kitwanga Lake. Water temperatures during the mid-August sample date exceeded 21°C, and it is assumed that most steelhead fry drop out of this section into downstream reaches to avoid these higher water temperatures during the late summer. Water temperatures at Site K6 were less than 18°C on the same date, reflecting the cooling influence of Moonlit Creek.

SITE (REACH)	FRY/M ²	HABITAT ¹ SUITABILITY	PARR/M ²	HABITAT SUITABILITY
K1 (1)	1.28	M	.01	P
K2 (2)	2.32	E	.02	G
K3 (2)	1.59	M	.02	M
K4 (3)	1.55	E	.00	G
K5 (3)	1.54	E	.00	G
K6 (4)	1.42	M	.01	P
K7 (5)	0.32	M	.21	M
MEAN	1.43		.04	
MOONLIT CK Km1 (1)	0.05	M	.00	P

¹ E = Excellent G = Good M = Moderate P = Poor
See Table 2.

Densities of 1.4 fry/m² would fall into the **high** density category used by Hume and Parkinson (1987) in their fry stocking studies. These densities were found throughout the lower Kitwanga River, suggesting that the system was well-seeded with steelhead fry in 1991. Even sites that were rated as only **moderate** habitat had high densities of fry. It should be noted that the estimates were conducted in mid-August shortly after fry emergence, and that densities would be lower by September as fry size and spatial requirements increased.

Parr densities averaged 0.04 parr/m² and were generally very low in all reaches except just downstream of Kitwanga Lake. Some of these parr in the upper reach may have been derived from resident lake fish, although there is no means of determining this. Sites that were described as offering **good** potential rearing for parr such as Sites K4 and K5 (Photo 2) had no parr present (Table 4). The data suggest that despite abundant suitable parr habitat in the Kitwanga River, existing numbers are very low. This may reflect poor escapements into the system in 1988 and 1989. On the other hand, steelhead parr may move downstream into the Skeena River to rear, and may not utilize the Kitwanga River even following years of good fry recruitment. Repeated sampling at these locations in 1992 (following a year of adequate fry recruitment) may assist in determining the cause of low parr abundance.

3.1.3 Kitwanga Biomass Estimates

Total fish biomass at the sites ranged from 1.4 g/m² at Site K1 to 5.0 g/m² at Site K2. The average for the main river sites was 2.7 g/m². Steelhead fry mean biomass was 0.8 g/m² (31% of the overall site biomass) while steelhead parr biomass was 0.15 g/m² or approximately 5% of the overall site biomass (Table 5). The breakdown of biomass estimates for all species at each site is presented in Appendix 1.

3.1.4 Kitwanga Fish Size Estimates

Steelhead fry lengths for each reach, length-frequency and length-weight data are presented in Figure 2. The data show that fry in Reach 5, immediately downstream of Kitwanga Lake were distinctly larger than fry in the rest of the mainstem river, presumably reflecting a warmer and more productive rearing environment during the early portion of the summer. Downstream of the Moonlit Creek confluence, fry are on average 15 mm smaller than in the lake outlet area, while trout fry in Moonlit Creek were just emerging and averaged 10 mm smaller than in downstream areas in the Kitwanga River. It is assumed that some of the larger fry (>45 mm) shown in

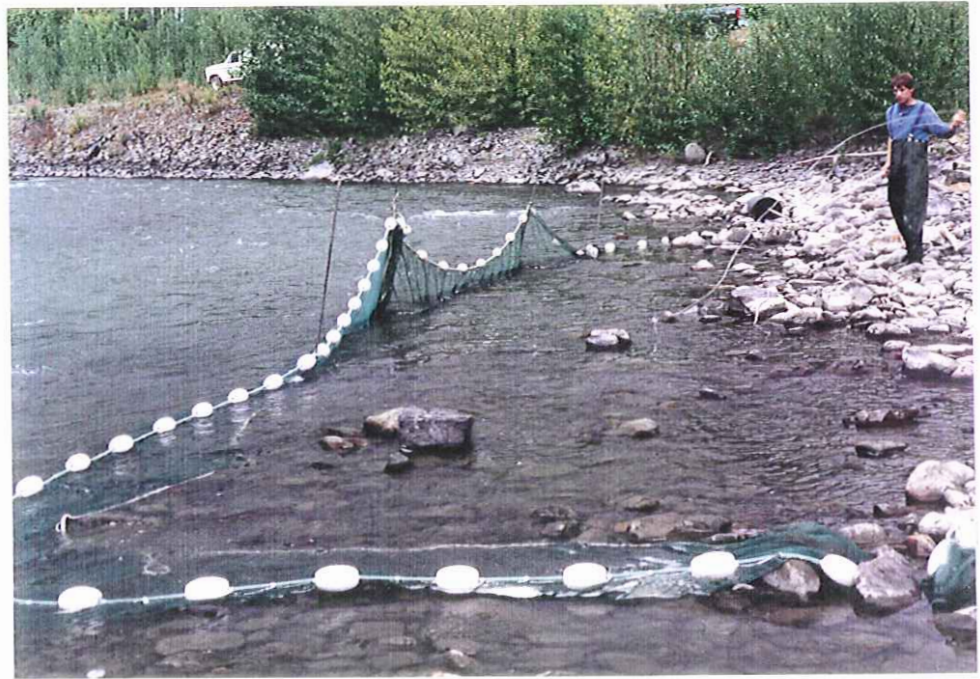


Photo 1. Site K2 in the lower Kitwanga River. This site was rated as excellent for steelhead fry and good for steelhead parr rearing. Fry densities exceeded 2 fry/m².



Photo 2. Site K4 in the mid-reaches of the Kitwanga River. This site was rated as excellent fry habitat (inside edge portion) and good for parr rearing (outside portion). No steelhead parr were captured at this site despite its apparently high capability.

Table 5. Summary of Juvenile Steelhead Biomass Estimates in the Kitwanga River Sample Sites.			
SITE (REACH)	FRY (g/m²)	PARR (g/m²)	ALL SPECIES (g/m²)
K1 (1)	0.79	0.05	1.35
K2 (2)	1.49	0.10	5.00
K3 (2)	0.63	0.08	2.67
K4 (3)	0.66	0.00	2.37
K5 (3)	0.88	0.00	2.17
K6 (4)	0.87	0.03	1.63
K7 (5)	0.56	0.79	3.77
MEAN	0.84	0.15	2.71
MOONLIT CK (Km1 (1))	0.01	0.00	0.82

Figure 2B are fish that had spent some time rearing in the lake outlet area prior to dropping downstream. Steelhead parr sizes are not presented since the sample size was small and mainly confined to Reach 5. These fish probably do not reflect sizes in most of the river. Five parr captured in the lower reaches ranged from 62 to 78 mm with an average fork length of 70.0 mm.

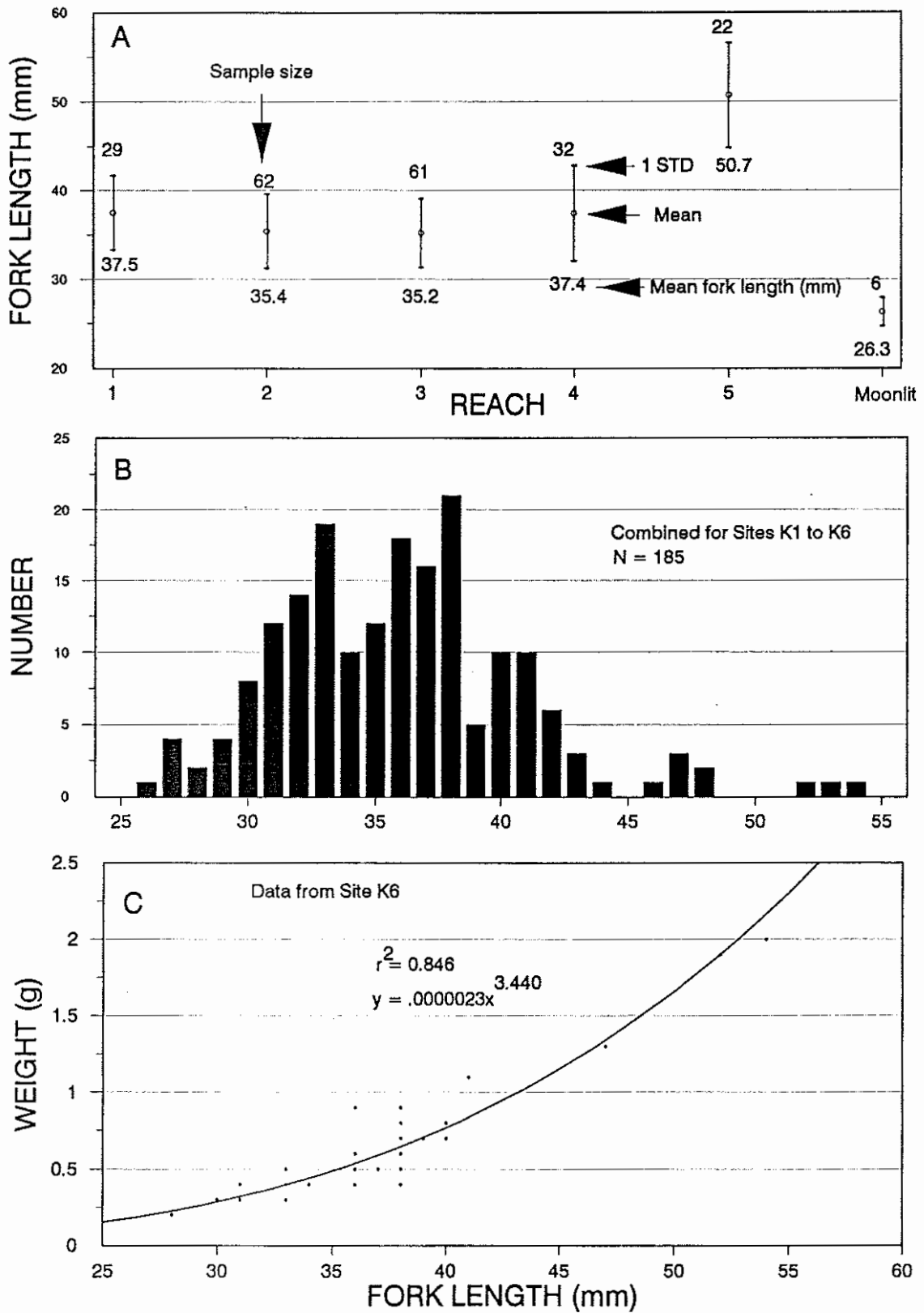


Figure 2. Length and Weight Summaries for Kitwanga River Steelhead Fry from August 15 to 19, 1991.

3.2 MORICE RIVER

A total of 39 sample sites were located in the Morice River watershed, including 22 on the mainstem river and 17 in tributary streams. Data from an additional nearby upper Bulkley River tributary site (Buck Creek) was sampled for a separate project (Bustard 1991) and is included in this report since this site has served as an index site in the past. All sample site locations are shown in Figure 3.

The mainstem sites comprised 3265 m² of habitat (487 m of margin) in the three upper reaches of the Morice River (Table 6). A total of 2831 m² of habitat (390 m of stream length) was sampled in seven tributaries. Specific site descriptions and catch data for each site is presented at the end of Appendix 2.

3.2.1 Morice Catch Composition

A total of 1988 fish was estimated within the 22 mainstem sample sites (Table 6). Steelhead fry (43.6%) were predominant in the catches, while steelhead parr comprised 8.8% of the overall catch. Chinook (20.0%) and coho (15.9%) were the other main species captured.

The combined tributary catch of fish was 2404 fish, predominantly steelhead fry (59.1%). Steelhead parr comprised 8.6% of the catch, while a lower percentage of the catch was comprised of coho (8.4%) and chinook (2.4%). Longnose dace, Dolly Varden and whitefish were more common in the tributary sites. Detailed information describing fish composition for each site, by reach and by tributary is presented in Appendix 2 Table 1.

3.2.2. Morice River Juvenile Steelhead Densities

Mainstem Morice River Fry Densities

Juvenile steelhead densities in the 22 mainstem sites are summarized in Table 7. Fry densities averaged 0.27 fry/m² for all of the sites combined. The distribution of the sites was weighted towards the top end of the Morice, with only two sites located in Reach 3 (Figure 3). Densities were highest in the lower reach (0.46 fry/m²) compared to an average of 0.25 fry/m² in the upper two reaches. Steelhead fry were present at all of the sites sampled and densities tended to fall within a narrow range of 0.1 - 0.5 fry/m².

There was little difference in fry densities between mainchannel and sidechannel locations in Reaches 1 and 2 (Table 8). Densities

were more than twice as high in those sample sites that were rated as good and excellent (0.30 fry/m² in 18 sites) compared to the combined catches in poor and moderate sites (0.14 fry/m² in 4 sites - Table 9).

Figure 4B compares mainstem Morice juvenile steelhead densities to historical data from Tredger (1981 to 1987). Data from all sites sampled were used to make these comparisons. The results suggest that mainstem fry densities were in the mid-range of levels obtained in the past. Fry densities were higher in 1985 and 1986. It should be noted that less than 400 m² of habitat was sampled during these two years, with much of the sampled area in Reach 3 where fry densities tended to be higher than in upper areas. As well, sampling from 1981 to 1986 was conducted during August, closer to emergence timing. This may have led to higher fry densities than if sampling had been conducted two to three weeks later.

Table 6. Catch Composition of Fish in the Morice River and Tributary Sample Sites.				
	MAINSTEM MORICE		TRIBUTARIES	
	N	%	N	%
Steelhead 0+	867	43.6	1420	59.1
Steelhead 1+	99	5.0	153	6.4
Steelhead ≥2+	75	3.8	53	2.2
Chinook	398	20.0	57	2.4
Coho	317	15.9	201	8.4
Dolly Varden	6	0.3	89	3.7
RM Whitefish	5	0.3	52	2.2
Sculpins sp.	69	3.5	1	0.0
LN Dace	152	7.7	365	15.2
Sucker sp.	0	0.0	13	0.5
TOTAL	1988		2404	
AREA (m ²)	3265		2831	
LENGTH (m)	487.2		389.8	

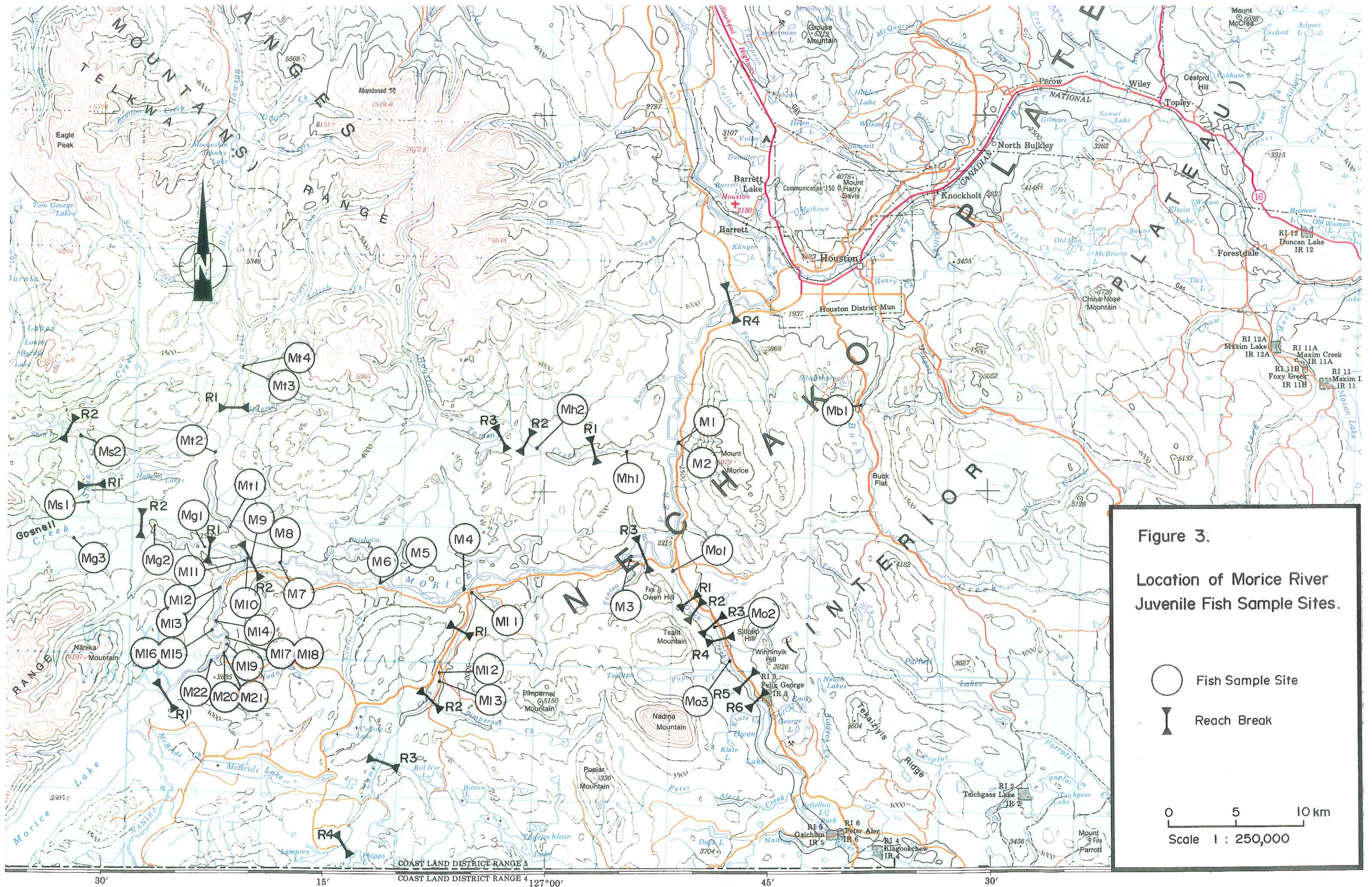


Figure 3.
Location of Morice River
Juvenile Fish Sample Sites.

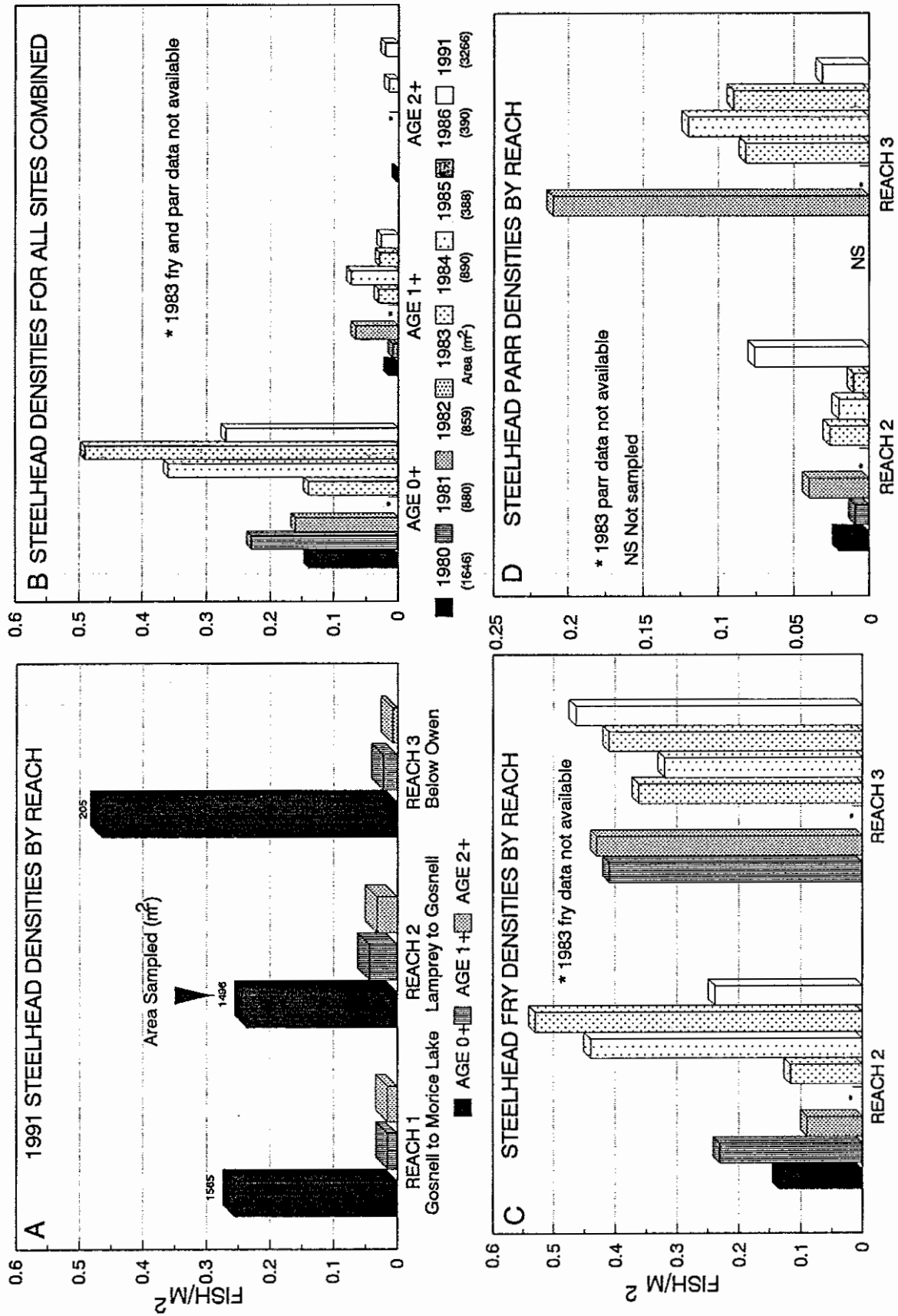


Figure 4. Summary of Juvenile Steelhead Densities in the Morice River from 1980 to 1991.

Table 7. Summary of Juvenile Steelhead Density Estimates in the Morice River Mainstem Sample Sites.

SITE (REACH)	FRY/M ²	HABITAT ² SUITABILITY	PARR/M ²	HABITAT SUITABILITY
M1 (3)	0.56	G	0.01	M
M2 (3)	0.36	G	0.05	G
REACH 3 mean	0.46		0.03	
M3 (2)	0.16	P	0.15	E
M4 (2)	0.28	G	0	P
M5 (2)	0.34	G	0.04	G
M6 (2)	0.26	G	0.32	E
M7 (2)	0.18	G	0	M
M8 (2)	0.21	M	0.08	G
M9 (2)	0.20	G	0.01	P
M10 (2)	0.28	G	0.01	P
REACH 2 mean	0.24		0.08	
M11 (1)	0.02	M	0	M
M12 (1)	0.48	G	0.02	P
M13 (1)	0.18	G	0.10	E
M14 (1)	0.23	G	0.09	G
M15 (1)	0.32	E	0.10	G
M16 (1)	0.46	G	0.02	P
M17 (1)	0.33	G	0.02	M
M18 (1)	0.17	M	0.03	M
M19 (1)	0.27	G	0	G
M20 (1)	0.19	G	0	M
M21 (1)	0.11	G	0	G
M22 (1)	0.33	G	0	P
REACH 1 mean	0.26		0.03	

² E = Excellent G = Good M = Moderate P = Poor
See Table 2.

Table 8. Summary of Juvenile Steelhead Catches in Sidechannels Compared to Mainstem Habitat in the Morice River.				
REACH	FRY/M ²		PARR/M ²	
	MAINCHANNEL	SIDCHANNEL	MAINCHANNEL	SIDCHANNEL
1	0.24	0.28	0.02	0.05
2	0.24	0.24	0.11	0.06

Table 9. Comparison of Juvenile Steelhead Densities for the Four Habitat Suitability Rating Categories in the Mainstem Morice River.				
SUITABILITY RATING	FRY/M ²	N	PARR/M ²	N
POOR	0.16	1	0.01	6
MODERATE	0.13	3	0.01	6
GOOD	0.30	17	0.05	7
EXCELLENT	0.32	1	0.19	3

Figure 4C compares fry densities in Reaches 2 and 3 over time. The data suggest that fry densities tend to be more variable in Reach 2 than in Reach 3 where densities have consistently been between 0.3 and 0.5 fry/m². Inadequate sample data is available to compare Reach 1 fry densities over time.

Mainstem Morice River Parr Densities

Steelhead parr densities for the 22 Morice River sites are summarized in Table 7. Parr densities averaged 0.05 parr/m² for all of the sites combined (0.03/m² age 1+ fish and 0.02/m² age ≥2+ fish). Parr densities were highest in Reach 2 sites (0.08 parr/m²), more than double the levels obtained in the other reaches.

There was a lot of variability in parr densities between sites reflecting differences in the quality of habitat. Many of the sample sites were selected based on their suitability for steelhead fry rearing. Often these sites provided rather poor parr rearing habitat (shallow, low velocity sites). If we omit the poor and moderate parr sites in calculating parr densities, and only include sites rated as good and excellent (i.e. those areas suitable for parr rearing) mean densities are 0.09 parr/m². An example of excellent parr habitat is shown in Photo 3.

Although data presented in Table 8 suggest there were differences between parr densities in mainchannel and sidechannel locations, if only **good** and **excellent** parr sites are considered, both types of habitat had similar densities of parr in the 0.1 parr/m² range.

Steelhead parr densities from past surveys (Tredger 1981 to 1987) are shown in Figures 4B and 4D. The data suggests that age 1+ parr densities were in the mid-range of those obtained in past sampling. However age 2+ parr densities were the highest sampled to date. Combined age 1+ and age 2+ parr densities were low in Reach 3 and high in Reach 2 compared to past sampling.

It should be emphasized that the 1991 data is based on substantially more sampling than past mainstem Morice surveys (Figure 4B), and techniques used in the past did not fully enclose sites and probably under-estimated parr densities. Since site selection plays a significant role in sampling for parr densities, these comparisons between years are quite limited, especially when only a few sites were sampled in a particular reach or during certain years. The Reach 3 data, in particular, is based on limited sampling of a small area during all years.

Morice Tributary Fry Densities

Juvenile steelhead densities in the 18 tributary sample sites are presented in Table 10. Average fry densities in Owen and Lamprey creeks exceeded 1 fry/m² at the sites sampled, indicating good recruitment into these two important steelhead tributaries of the Morice. Buck Creek, Shea Creek (a tributary to Gosnell), the Gosnell downstream of Shea Creek (Sites Mg1 and Mg2), and the lower Thautil River had moderate fry densities in the 0.3 to 0.6 fry/m² range. Fry densities were low in the upper Thautil River, the upper Gosnell and Houston Tommy creeks, all systems that have in the past had low steelhead fry abundance (Tredger 1981 to 1987).

Figure 5 compares juvenile densities in four of these streams to past data (Tredger 1981 to 1987) in reaches sampled in 1991. It should be noted that sample sites in Shea Creek and the Thautil River were not sampled during 1980, 1983 and 1986. Lamprey and Owen creeks have seven years of data for comparison.

The comparisons indicate that the 1991 steelhead fry densities were relatively high in all of the main tributaries. Levels in Lamprey Creek were only exceeded in 1986 following a year of relatively high spawner escapements. This was the last year that steelhead index surveys were conducted in the Morice. Owen Creek fry densities were the third highest recorded. Thautil River densities were twice as high as past years, while Shea Creek levels were also relatively strong. Comparisons in Buck Creek indicate fry

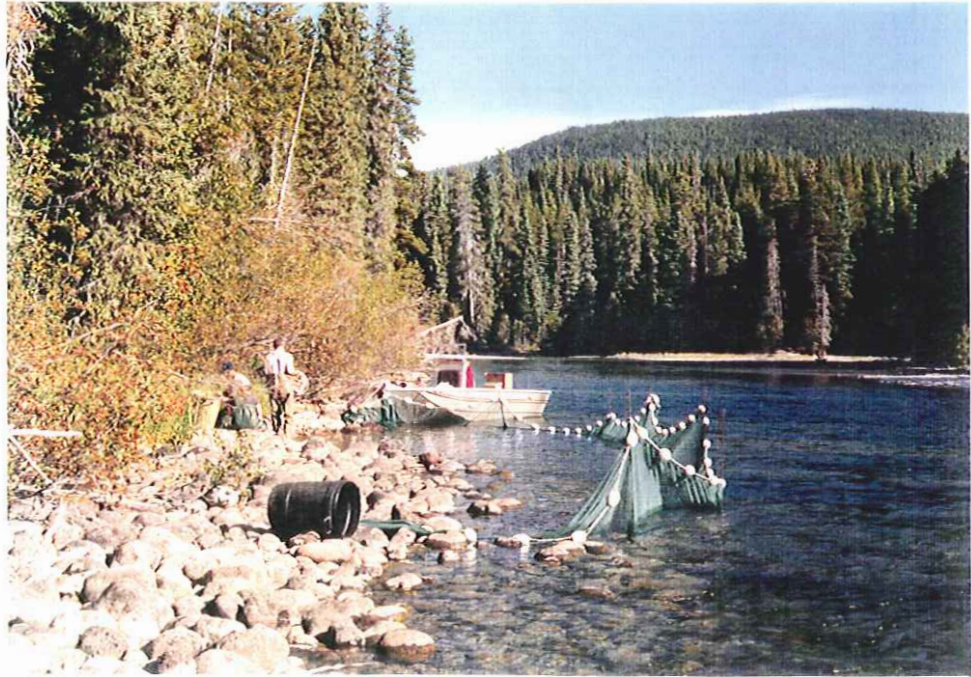


Photo 3. Site M13 in the upper reach of the Morice River. The edge of this large sidechannel was rated as excellent for steelhead parr rearing. Six age 2+ steelhead parr, 43 juvenile chinook and 27 coho juveniles were captured at this site.



Photo 4. Steelhead parr biomass in this log jam complex in Reach 2 of the Morice River exceeded 4 gm/m^2 .

Table 10. Summary of Juvenile Steelhead Density Estimates in the Morice River Tributary Sample Sites.				
SITE	FRY/M ²	HABITAT ³ SUITABILITY	PARR/M ²	HABITAT SUITABILITY
Mt1	0.38	G	0.07	M
Mt2	0.12	G	0.13	G
Mt3	0.18	M	0.05	G
Mt4	0.12	E	0.11	M
THAUTIL mean	0.20		0.09	
Mo1	1.16	G	0.04	P
Mo2	1.12	G	0.19	G
Mo3	1.34	G	0.10	G
OWEN mean	1.21		0.11	
Ml1	0.99	E	0.06	G
Ml2	0.14	P	0.05	M
Ml3	1.97	G	0.08	P
LAMPREY mean	1.04		0.06	
Mh1	0.00	M	0.04	E
Mh2	0.01	M	0.01	G
HOUSTON TOMMY mean	0.01		0.03	
Mb1 BUCK	0.45	M	0.08	G
Mg1	0.28	E	0.04	G
Mg2	0.55	G	0.05	P
Mg3	0.04	P	0.00	P
GOSNELL mean	0.29		0.03	
Ms1	0.56	G	0.10	G
Ms2	0.40	E	0.12	G
SHEA mean	0.48		0.11	

³ E = Excellent G = Good M = Moderate P = Poor
See Table 2.

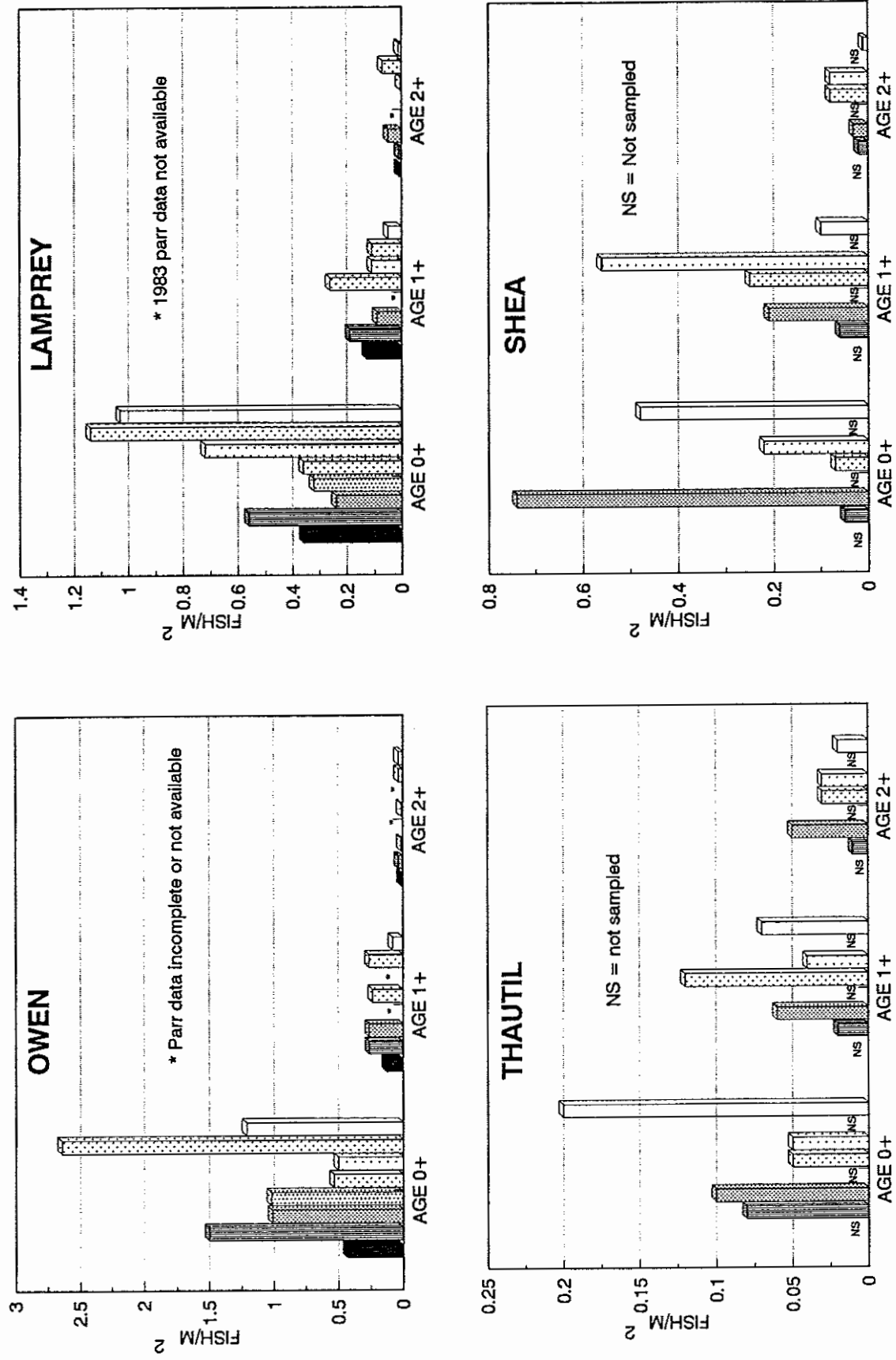


Figure 5. Summary of Juvenile Steelhead Densities in Four Morice Tributaries from 1980 to 1991.

densities (0.45 fry/m²) were the highest since 1987 (Bustard 1991).

Morice Tributary Parr Densities

The average parr densities in the tributary streams (Table 10) indicate that the Thautil River, Owen, Buck and Shea creeks all had parr densities near 0.1 parr/m². Lamprey Creek densities were lower (0.06 parr/m²).

Parr data for the Morice tributary streams collected during past surveys is summarized in Figure 5. The data indicates that both age 1+ and age 2+ parr numbers were lower than levels measured in past years in all systems except the Thautil River. Data from Owen, Lamprey and Shea creeks suggest that steelhead parr densities ranging from 0.2 to 0.3 parr/m² are probably more representative of the capability of these systems. The 1991 parr levels represent less than 50% of the parr utilization found during these previous surveys.

Parr densities in the Thautil were the highest for the three years of record and suggest that despite lower fry recruitment than the other tributaries, the Thautil is capable of providing rearing for significant numbers of steelhead parr. Fry levels in some of the other tributaries may be up to five times higher. Buck Creek parr densities of 0.09 parr/m² were very similar to levels since 1987 which have ranged from 0.09 to 0.15 parr/m² for this period despite nearly four-fold fluctuations in fry densities (Bustard 1991). Shea Creek parr densities were lower than 1982 levels.

The parr data suggests that several of the most productive steelhead tributaries such as Owen and Lamprey creeks are capable of supporting parr populations in the range of 0.2 to 0.3 parr/m² based on previous sampling in these systems. Levels in 1991 were below densities sampled in previous years.

3.2.3 Morice River Biomass Estimates

Total fish biomass in the mainstem Morice River averaged 1.8 g/m² with the highest estimates in sites in Reaches 2 and 3 (Table 11). Although most sites were less than 4 g/m², individual sites were higher such as a log jam complex in Reach 2 which exceeded 8 g/m². Steelhead fry mean biomass for all mainstem sites was 0.3 g/m² with the highest levels in the lowest reach. Parr biomass averaged 0.5 g/m² and was highest in Reach 2.

Total fish biomass in the tributaries was highest in Buck Creek, followed by Owen, Lamprey and Shea creeks where levels all

Table 11. Summary of Juvenile Steelhead Biomass Estimates in the Morice River Sample Sites.

SYSTEM (REACH)	FRY (g/m ²)	PARR (g/m ²)	ALL SPECIES (g/m ²)
MORICE (1)	0.30	0.59	1.43
MORICE (2)	0.22	1.13	2.44
MORICE (3)	0.68	0.24	2.25
MORICE mean	0.31	0.76	1.88
THAUTIL	0.23	0.84	1.48
OWEN	1.65	1.06	3.49
LAMPREY	1.25	0.50	2.56
GOSNELL	0.18	0.30	0.77
SHEA	0.34	0.83	2.26
BUCK	0.70	1.11	4.57
HOUSTON TOMMY	0.01	0.67	1.61

exceeded those in the Morice River. Average parr biomass in Reach 2 of the Morice was above levels obtained in the tributaries. This was strongly influenced by one log jam site (Site M6) where parr biomass was more than 4 g/m² (Photo 4). The detailed breakdown of biomass for all species at each site is presented in Appendix 2 Table 2.

3.2.4 Morice River Fish Size Estimates

Morice Mainstem

Steelhead fry mean fork lengths, length-frequency and length-weight data for the mainstem Morice River are shown in Figure 6. The data suggests fry and age 1+ steelhead were slightly larger in the upper reach (Reach 1) of the Morice than in Reach 2. Steelhead fry were largest in Reach 3. The age 1+ sample size in this reach was too small to provide a representative sample size.

Table 12 summarizes juvenile steelhead data collected during past surveys in Reach 2 of the Morice River - the main area of sampling during past years. Fry sizes in 1991 were larger than the mean of past years. However, the timing of sampling is an important factor when making these comparisons. Surveys were conducted two to three

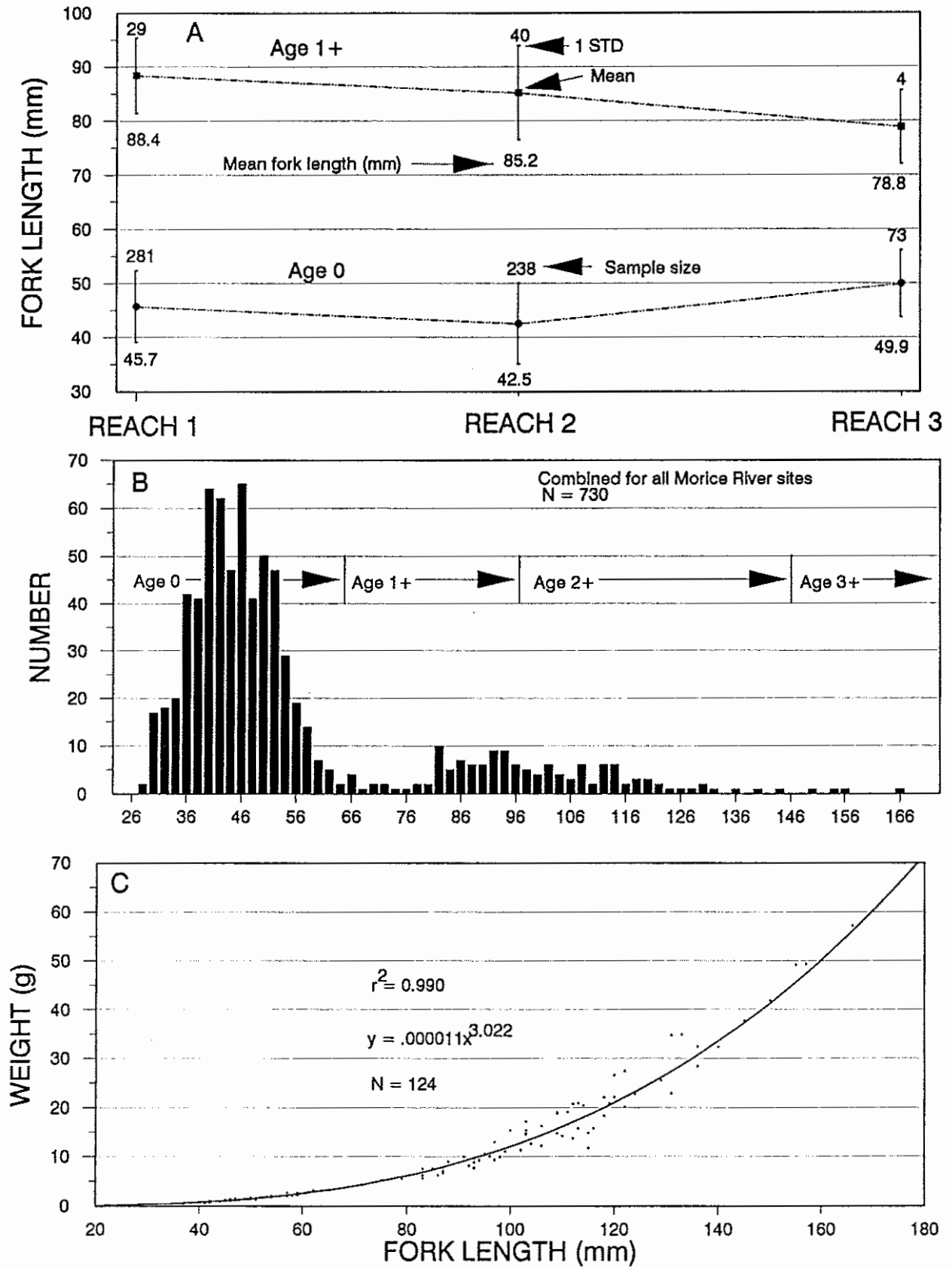


Figure 6. Length and Weight Summaries for Mainstem Morice River Steelhead for September 1991.

Table 12. Summary of Juvenile Steelhead Mean Fork Lengths and Weights in Reach 2 of the Morice River Compared to Past Sample Data.				
YEAR	AGE 0		AGE 1+	
	FORK LENGTH (mm)	WEIGHT (g)	FORK LENGTH (mm)	WEIGHT (g)
1979 ⁴	42.3	NA ⁵	NA	NA
1980 ⁶	42.8	0.87	81.8	6.04
1981	36.1	0.53	82.7	6.70
1982	35.5	0.52	76.0	4.85
1984	37.2	0.50	73.3	3.70
1985	34.2	0.45	NA	NA
1986	34.6	0.47	NA	NA
MEAN	37.5	0.56	78.4	5.32
1991	42.5	0.92	85.2	6.35

weeks earlier during the 1981 to 1986 surveys, and may account for the smaller fry sizes during these years. Mean age 1+ parr sizes were the largest to date. The sample size of age 1+ parr decreased during the period 1980 to 1986 as the number of index sites sampled was reduced over time.

Morice Tributaries

Steelhead fry mean fork lengths for five tributaries sampled during late August are shown in Figure 7. Data from sites sampled in September and early October are not included in this figure, to allow for comparisons to past data which was collected during late August.

⁴ Data from Envirocon (1984)

⁵ Inadequate sample size or data not available.

⁶ Data derived from Tredger 1980 to 1986 for those sites located in Reach 2 of the Morice River. Note sampling from 1981 to 1986 was conducted during late August. Sampling in 1979, 1980, and 1991 was conducted in September.

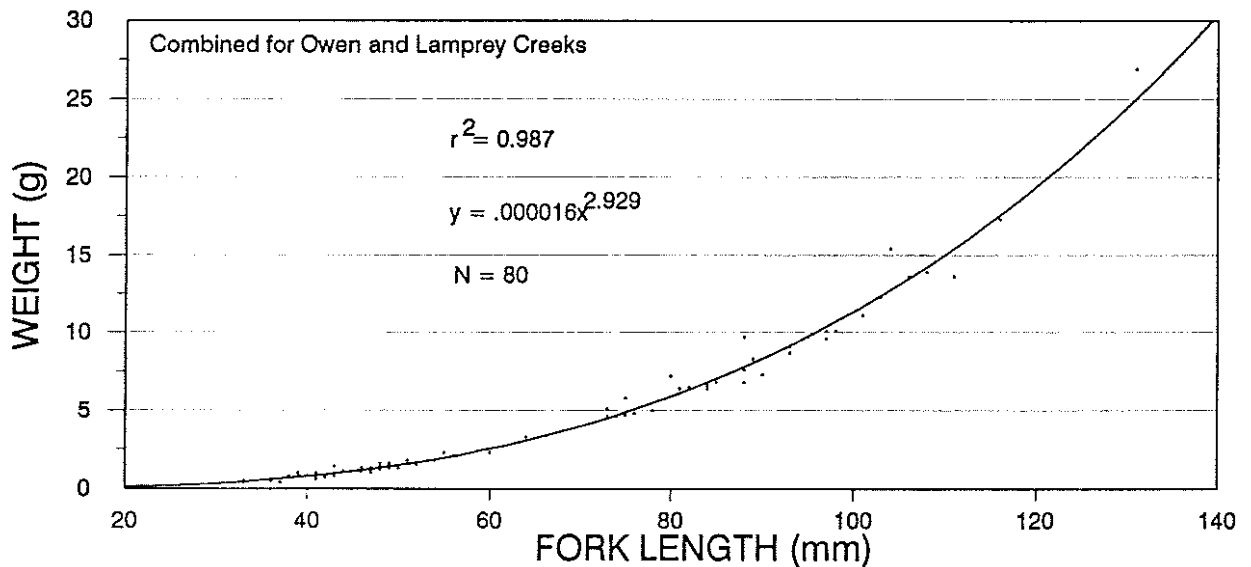
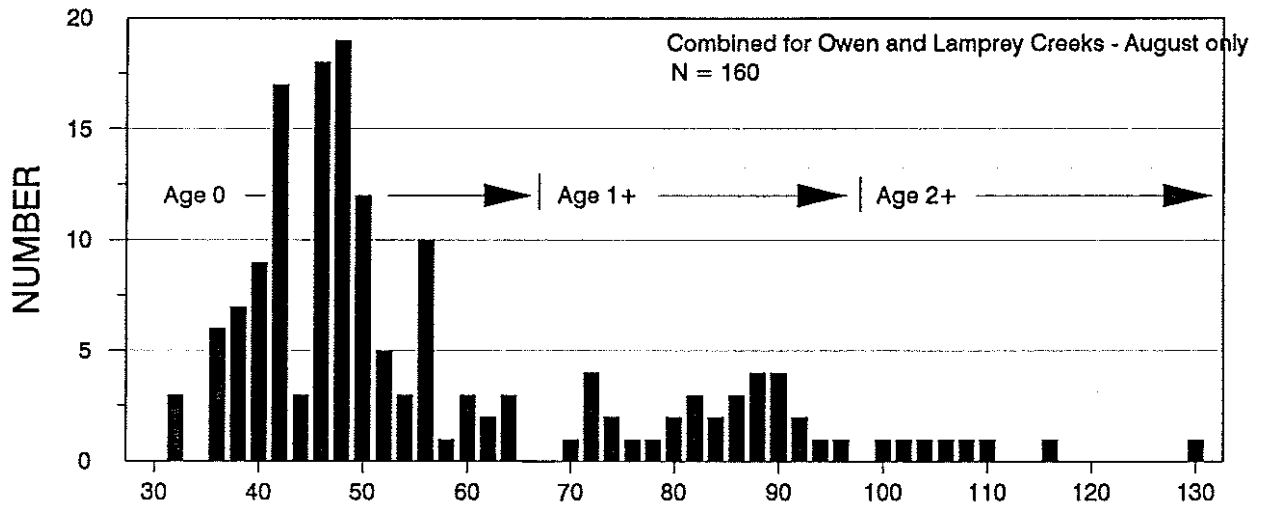
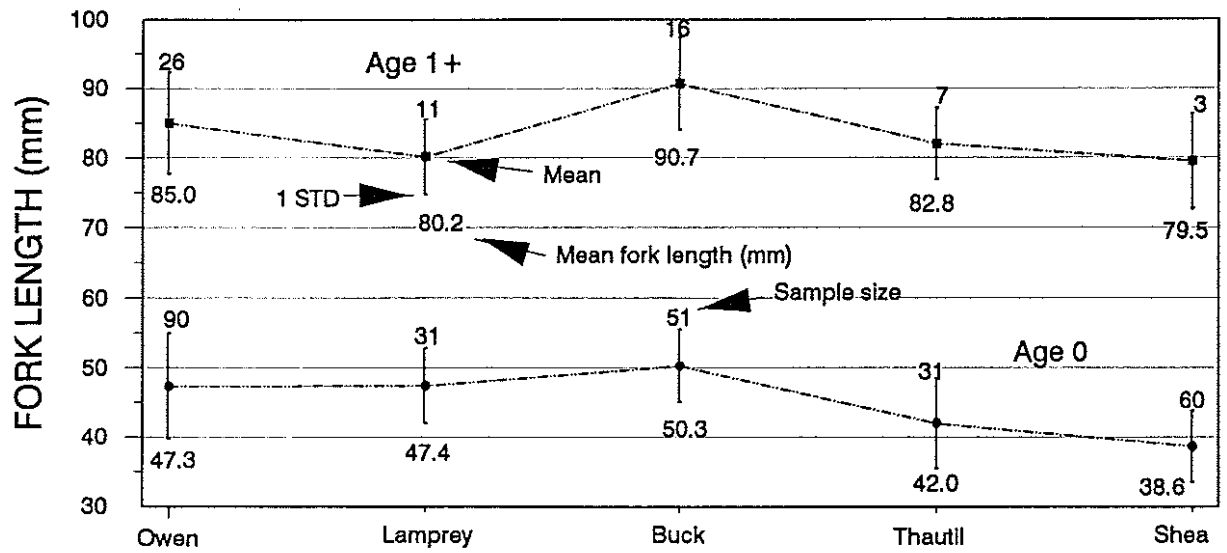


Figure 7. Length and Weight Summaries for Juvenile Steelhead in Morice River Tributaries for Late August 1991.

The summary suggests that steelhead fry are largest in Buck, Lamprey and Owen creeks, compared to the Thautil River and Shea Creek. Presumably steelhead in the lower elevation tributaries emerge earlier and put on growth prior to fry that emerge in the Thautil River and Shea Creek. All of the systems except the Thautil are lake-headed. It is interesting to note that steelhead fry sampled in two Lamprey Creek sites in early October were the same mean size (47.4 mm) as fry sampled during late August, suggesting little growth during the low-flow period of September 1991. On the other hand, steelhead fry sampled during the first week of October in the Thautil (where low-flows are not a problem for steelhead fry rearing) were on average nearly 8 mm larger than those sampled in late August (49.6 mm compared to 42.0 mm).

The larger size of Buck and Owen creek fish carries through to the age 1+ group. Lamprey age 1+ fish tend to be smaller possibly reflecting low-flow conditions leading to high temperatures and crowding that persist in this creek during many years. Although Reach 2 steelhead fry were smaller than Owen Creek fry, there was no size difference in the age 1+ fish (Figures 6 and 7).

Table 13 compares August fry and parr sizes in Owen and Lamprey creeks to past estimates. Fry in both systems were larger than the mean of past years, while age 1+ parr were smaller.

Table 13. Summary of Juvenile Steelhead Mean Fork Lengths and Weights in Lamprey and Owen Creeks Compared to Past Sample Data ⁷ .				
YEAR	AGE 0		AGE 1+	
	FORK LENGTH (mm)	WEIGHT (g)	FORK LENGTH (mm)	WEIGHT (g)
OWEN CREEK				
1980	50.5	1.38	92.0 ⁸	8.37
1981	45.4	1.01	91.7	8.29
1982	47.0	1.12	80.1	5.53
1983	44.8	1.03	88.0	7.60
1984	45.5	0.93	89.5	7.11
1985	46.1	1.15	85.2	7.07
1986	44.4	1.01	82.6	6.39
MEAN	46.2	1.09	87.0	7.19
1991	47.3	1.34	84.2	6.93
LAMPREY CREEK				
1980	47.8	1.17	87.5	7.20
1981	39.0	0.64	78.4	5.18
1982	41.1	0.75	75.4	4.61
1983	46.3	1.12	83.1	6.37
1984	44.9	0.86	84.7	5.72
1985	40.0	0.74	88.2	8.28
1986	41.8	0.85	82.4	6.21
MEAN	43.0	0.88	82.8	6.22
1991	47.4	1.22	80.2	5.87

⁷ Data from Tredger (1981 to 1986) calculated from summaries. 1991 data is for late August sampling only.

⁸ Note - the break-off from age 1+ to age 2+ was higher in 1981, 1982 and 1985 than during other years. Therefore age 1+ fish included more larger parr than subsequent years. These differences may reflect different scale readers for fish aging.

3.3 SUSTUT RIVER

A total of 45 sample sites were located in the Sustut River watershed, including 30 on the mainstem of the Sustut and an additional 15 in tributaries including Johanson Creek (8 sites) and the Bear River (2 sites). All sample site locations are shown in Figure 8.

The mainstem sites comprised 4282 m² of habitat (671 m of margin) in the 7 reaches of the Sustut to its confluence with the Skeena River. A total of 2355 m² of habitat (375 m of stream margin) was sampled in the tributaries. Specific site descriptions and catch data for each site is presented at the end of Appendix 3.

3.3.1 Sustut Catch Composition

Only 704 fish were estimated in the 30 mainstem Sustut fish sample sites (Table 14). Steelhead fry were most predominant (56.1%), while steelhead parr comprised 5.4 % of the overall catch. Juvenile chinook (28.8%) and Dolly Varden (5.8%) were the other main species captured. Juvenile coho were present at four of the mainstem sites and comprised 2.6% of the catch. Since effort was focussed on sampling the better steelhead habitat, pool areas with debris cover and off-channel habitat that might receive higher use by coho juveniles were not sampled.

The combined tributary catch of fish was 273 fish, predominantly steelhead fry (31.9%) and Dolly Varden (41.0%). Steelhead fry catches were mainly in the Bear River with a small number captured in Johanson Creek and a single fry in Moosevale Creek. No steelhead fry were captured in Two Lakes Creek, a stream previously identified as a steelhead rearing area by Williams et al. (1985). Steelhead parr comprised just under 10% of the overall tributary catch and were present in Johanson Creek and two of its tributaries, particularly Unnamed Creek A (Figure 8).

Detailed information summarizing the numbers of all fish captured at each site in the mainstem and tributaries is presented in Appendix 3 Table 1.

3.3.2 Sustut River Juvenile Steelhead Densities

Mainstem Sustut River Fry Densities

Juvenile steelhead densities in 30 mainstem sites of the Sustut River are summarized in Table 15. Fry densities averaged 0.13 fry/m² for all of the sites combined. Highest densities were found in Reach 5 located in the vicinity of Moosevale Creek (Figure 9A).

Table 14. Catch Composition of Fish in the Sustut River and Tributary Sample Sites.				
	MAINSTEM SUSTUT		TRIBUTARIES ⁹	
	N	%	N	%
Steelhead 0+	395	56.1	87	31.9
Steelhead 1+	27	3.8	16	5.9
Steelhead ≥2+	11	1.6	11	4.0
Chinook	203	28.8	25	9.2
Coho	18	2.6	12	4.4
Dolly Varden	41	5.8	112	41.0
RM Whitefish	8	1.1	7	2.6
LN Dace	0	0.0	3	1.1
Burbot	1	0.1	0	0.0
TOTAL	704		273	
AREA (m ²)	4282		2355	
LENGTH (m)	670.8		375.2	

This area was identified as an area of higher steelhead fry abundance by Williams et al. (1985). Although steelhead fry were present in all but two of the sample sites, densities were less than 0.1 fry/m² at many of the sites, particularly in the Sustut River upstream of the Bear River confluence to the top end of Reach 4 (Figure 8). Densities did not exceed 0.4 fry/m² at any of the Sustut River sites.

Fry densities were twice as high in the 14 mainchannel sites that were sampled in the Sustut compared to the 16 sidechannel locations (Table 16). This pattern occurred both above and below the Bear River confluence.

Williams et al. (1985) operated inclined plane traps in the Bear Sustut confluence area in 1985. A downstream movement of steelhead

⁹ Includes Bear, Johanson (and two unnamed tributaries to Johanson Creek), Two Lakes and Moosevale Creek sites.

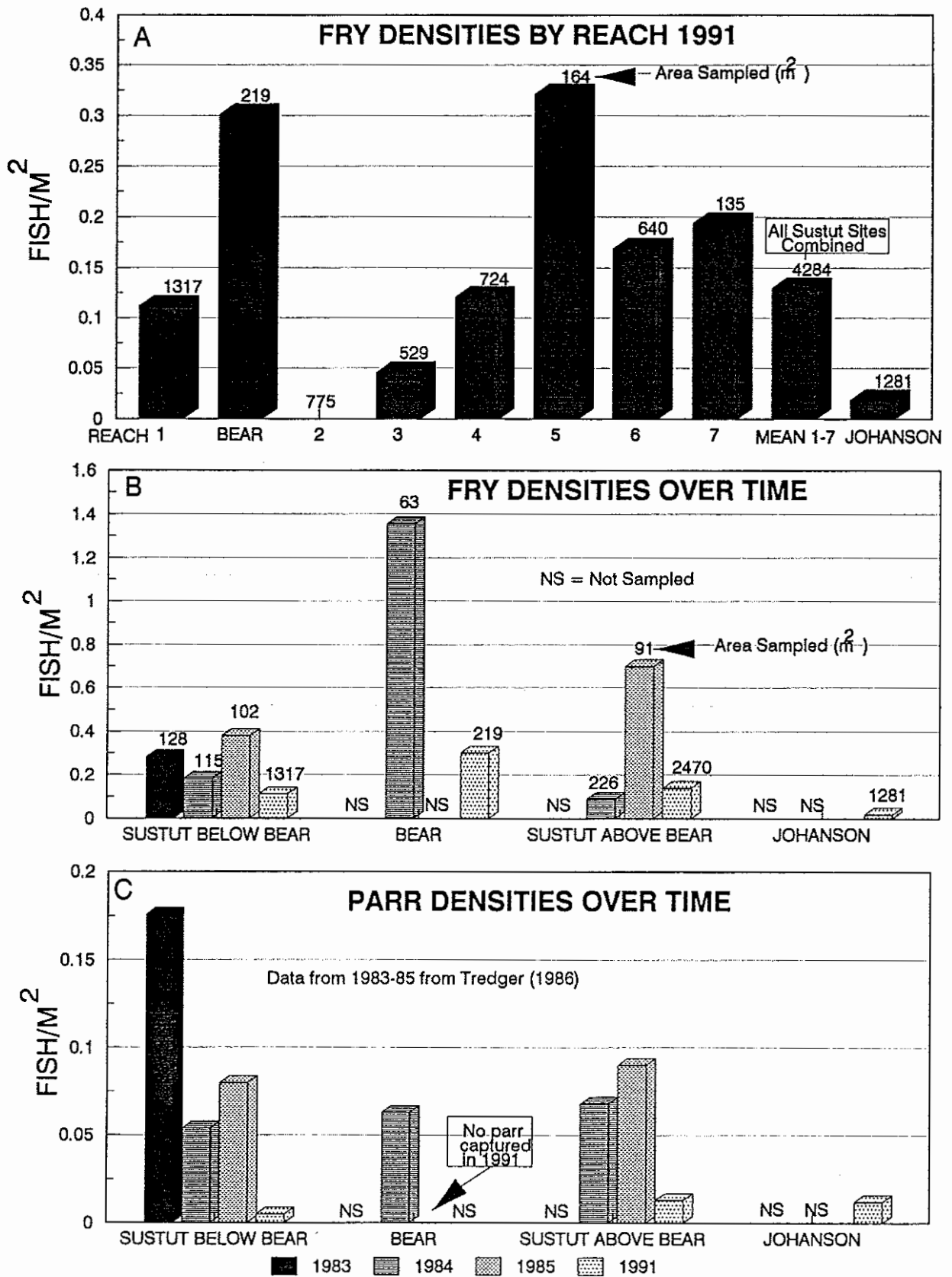


Figure 9. Comparison of Steelhead Fry and Parr Catches Over Time and by Reach in the Sustut River and Tributaries.

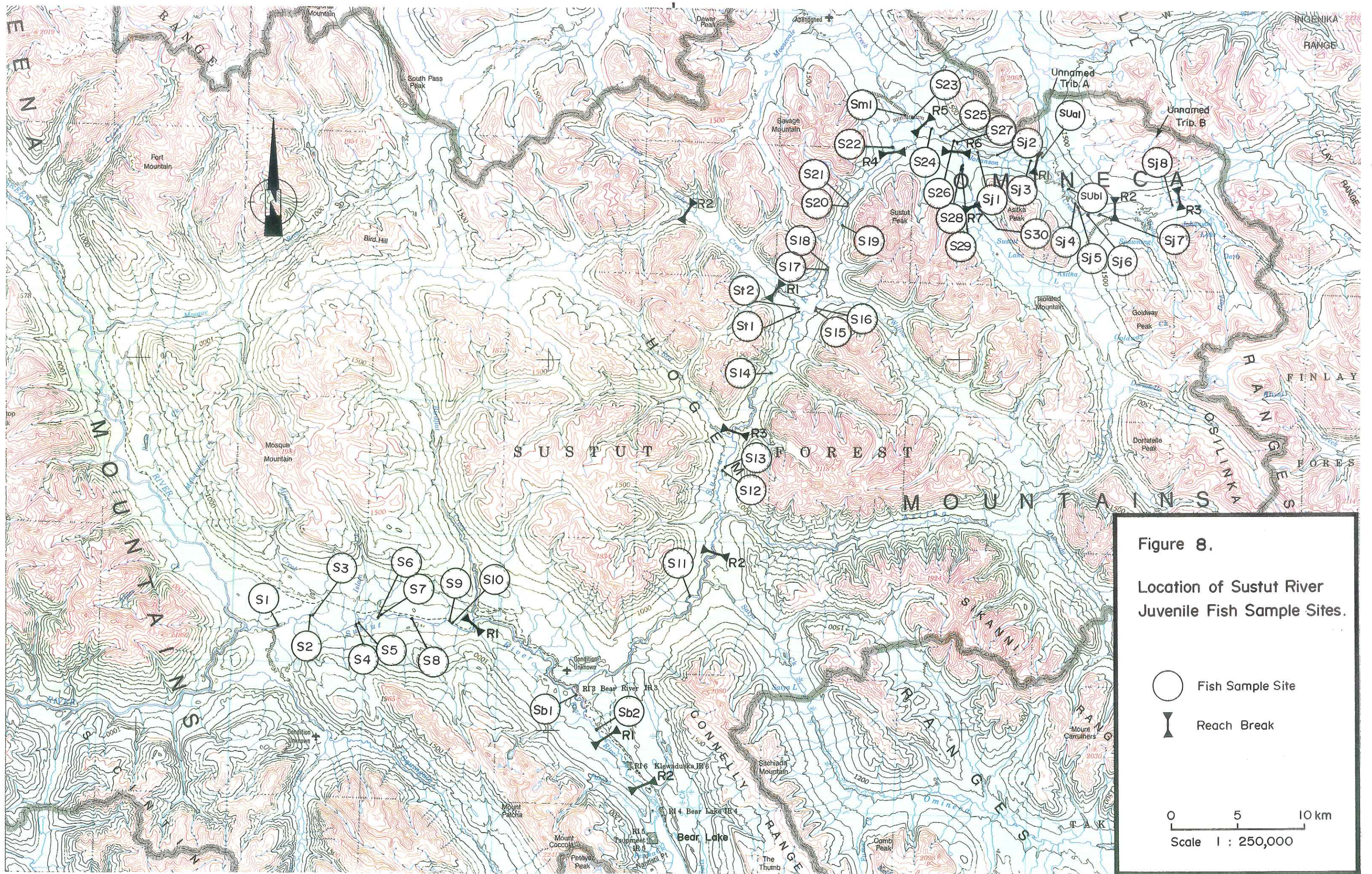


Figure 8.
 Location of Sustut River
 Juvenile Fish Sample Sites.

- Fish Sample Site
- ⊥ Reach Break

0 5 10 km
 Scale 1 : 250,000

Table 15. Summary of Juvenile Steelhead Density Estimates in the Mainstem of the Sustut River.				
SITE (REACH)	FRY/M ²	HABITAT ¹⁰ SUITABILITY	PARR/M ²	HABITAT SUITABILITY
S1 (1)	.11	G	0	M
S2 (1)	.01	G	0	M
S3 (1)	.06	G	0	G
S4 (1)	.27	E	.02	E
S5 (1)	.02	M	0	P
S6 (1)	.11	E	0	M
S7 (1)	.08	M	.01	M
S8 (1)	.18	G	0	E
S9 (1)	.25	E	.02	M
S10 (1)	.04	M	0	E
REACH 1 mean	.11		.005	
S11 (2)	0	M	<.01	E
S12 (3)	.01	G	0	P
S13 (3)	.04	G	0	G
S14 (3)	.06	M	0	M
S15 (3)	.08	M	0	M
S16 (3)	.04	E	.01	P
REACH 3 mean	.05		.002	
S17 (4)	.26	M	.02	M
S18 (4)	.12	G	0	M
S19 (4)	.14	E	.06	E
S20 (4)	.06	E	.01	E
S21 (4)	.02	E	.03	E
REACH 4 mean	.12		.024	

¹⁰ E = Excellent G = Good M = Moderate P = Poor
See Table 2.

Table 15 (cont'd). Summary of Juvenile Steelhead Density Estimates in the Mainstem of the Sustut River.				
SITE (REACH)	FRY/M ²	HABITAT ¹¹ SUITABILITY	PARR/M ²	HABITAT SUITABILITY
S22 (5)	.32	M	0	M
S23 (5)	.32	G	0	G
REACH 5 mean	.32		0	
S24 (6)	.11	E	0	M
S25 (6)	.19	E	0	P
S26 (6)	.34	E	.02	M
S27 (6)	.04	M	0	M
REACH 6 mean	.17		.004	
S28 (7)	.37	M	.03	G
S29 (7)	.22	M	.06	M
S30 (7)	0	P	0	M
REACH 7 mean	.19		.031	
MEAN REACH 1-7	.13		.010	

fry out of the Bear River into the Sustut occurred shortly after emergence in late July and early August, while virtually no steelhead fry were trapped moving downstream from the Sustut above the Bear River confluence. These steelhead fry moving out of the Bear River are presumably an important source of fry recruitment to the Sustut River downstream of the Bear confluence (Reach 1). It is not known whether some spawning may occur in this lower reach of the Sustut.

There was little apparent difference in fry densities in sites that were rated moderate, good or excellent (Table 17). The sample size of poor fry sites was too small for comparison.

Figure 9B compares mainstem Sustut River fry densities to historical data from Tredger (1986 and file data). It is important to note that the area sampled from 1983 to 1985 was very small and provides a poor representation of the overall river. The data

¹¹ E = Excellent G = Good M = Moderate P = Poor
See Table 2.

Table 16. Summary of Juvenile Steelhead Catches in Sidechannels Compared to Mainstem Habitat in the Sustut River.				
REACH	FRY/M ²		PARR/M ²	
	MAINCHANNEL	SIDCHANNEL	MAINCHANNEL	SIDCHANNEL
SUSTUT BELOW BEAR	0.16 (n=3)	0.08 (n=8)	.006	.004
SUSTUT ABOVE BEAR	0.19 (n= 11)	0.08 (n=8)	.008	.019

Table 17. Comparison of Juvenile Steelhead Densities for the Four Habitat Suitability Rating Categories in the Sustut River.				
SUITABILITY RATING	FRY/M ²	N	PARR/M ²	N
POOR	0.0	1	.002	4
MODERATE	0.14	11	.008	15
GOOD	0.10	8	.008	4
EXCELLENT	0.15	10	.017	7

typically represents catches from a single site. Keeping these limitations in mind, the comparisons do suggest that fry densities in 1991 in the Sustut River below the Bear confluence are in the range of 50% or less of levels measured during other years. Densities upstream of the Bear River confluence in 1991 were higher than levels obtained in 1984 but far lower than the 1985 densities of 0.7 fry/m². The 1985 estimates are for a single site located in the Moosevale Creek confluence (Reach 5) where the highest densities of steelhead fry were found in 1991 (Figure 9A). The total area sampled in these earlier sample sites is insufficient to provide comfortable comparisons due to the high variability of densities between sites in the Sustut River.

Mainstem Sustut River Parr Densities

Steelhead parr densities for the Sustut River mainstem (30 sites) are summarized in Table 15. Parr densities averaged 0.010 parr/m² for all of the sites combined (.008 age 1+ parr/m² and .002 age 2+

parr/m²). Although parr densities were low at all sites, Reaches 4 and 7 (Figure 8) had notably higher parr densities than the other sections (0.02-0.03 parr/m² range).

Parr densities were low in both sidechannels and mainchannel locations in the Sustut (Table 16). Densities were higher in the sidechannel locations in the Sustut above the Bear confluence than in mainchannel locations.

If we omit the sites rated as **poor** or **moderate** for parr rearing, and only include the sites rated as **good** or **excellent**, then mean parr densities increase slightly to 0.014 parr/m². These densities are still far below what would be expected for sites where the habitat is most suited for steelhead parr rearing (eg, Photo 5).

Limited steelhead parr data presented in Tredger (1986) suggests that parr densities in the past have been more than five times higher than the 1991 estimates for the Sustut River above and below the Bear River confluence (0.05-0.17 parr/m² range - Figure 9C). Again, the total area sampled in making these estimates is less than 10% of the area sampled in 1991. However, this data from the mid-1980's suggests that present parr densities in the Sustut River are extremely low relative to estimates made during these earlier surveys, and that parr densities are far below the potential of the system.

Night-time snorkel observations conducted by Shirvell (unpublished data, DFO, Pacific Biological Station) in the upper Sustut River (excluding Johanson Creek sites) provides an opportunity of examining a second method of assessing juvenile steelhead abundance in this system during the fall of 1991. Shirvell observed 306 rainbow (mixture of fry and parr) in 576 m of the upper Sustut from Moosevale Creek to upstream of the Johanson Creek confluence during early October 1991 (0.53 fish/lineal m of stream - estimated as 3-m width along edge). He also observed 70 rainbow in 454 m of stream in the confluence area during early September (0.15 rainbow/lineal m of stream). This compares to a total of 172 juvenile rainbow (5 parr) captured in 184 m of stream margin by electrofishing during this study (0.93 fish/lineal m).

Shirvell estimated that approximately one-half of the rainbow observed were parr. It is probable that the snorkel observations are biased towards parr observations since fry are hard to observe in the shallow areas typically utilized, while electrofishing surveys are biased towards steelhead fry due to the difficulty of effectively sampling some of the deeper fast water preferred by parr.



Photo 5. Site S11 in Reach 2 of the Sustut River. This large sidechannel (775 m²) was rated as moderate suitability for steelhead fry and excellent for parr. Three steelhead parr and no fry were captured in the entire sample site.



Photo 6. Site S_j2 in Johanson Creek had sections rated as excellent for steelhead fry and parr. Only two steelhead fry and three parr were captured in the entire site.

Sustut River Tributary Fry Densities

Juvenile steelhead densities in 15 tributary sample sites are presented in Table 18. Steelhead fry densities were highest in the two Bear River sample sites (0.30 fry/m²). All other tributaries had either no steelhead fry present (Two Lake Creek and two unnamed tributaries to Johanson Creek) or low densities (Moosevale and Johanson creeks). Fry densities in eight sites in Johanson Creek

Table 18. Summary of Juvenile Steelhead Density Estimates in Tributaries of the Sustut River.				
SITE	FRY/M ²	HABITAT ¹² SUITABILITY	PARR/M ²	HABITAT SUITABILITY
Sb1	.29	E	0	E
Sb2	.31	E	0	M
BEAR	.30		0	
St1	0	E	0	E
St2	0	E	0	M
Two Lake	0		0	
Moosevale	.01	M	.02	G
Sj1	0	E	0	M
Sj2	.02	E	.02	E
Sj3	0	G	0	G
Sj4	0	P	.06	E
Sj5	.03	E	0	P
Sj6	.01	M	.0	M
Sj7	.01	P	.01	E
Sj8	.09	E	0	M
JOHANSON	.02		.012	
Unnamed A	0	P	.06	E
Unnamed B	0	G	.01	E

¹² E = Excellent G = Good M = Moderate P = Poor
See Table 2.

(mean of 0.02 fry/m²) were approximately 10% of steelhead fry densities measured in the upper reaches of the Sustut (Reaches 5,6 and 7 - Table 15 and Figure 9A). These low densities occurred in areas that had potentially excellent rearing habitat (Photo 6).

Steelhead fry densities in the Bear River were considerably lower than the 1.35 fry/m² sampled in 1984 (Figure 9B). It should be noted that the 1984 sample was for a small area and had a poor declining catch that may have resulted in a higher fry estimate than was, in fact, present. Williams et al. (1985) estimated steelhead fry densities in the Bear River during late August ranging from 0.13 to 1.3 fry/m². Their estimates relied on seining.

Sustut River Tributary Parr Densities

Steelhead parr densities were low in all Sustut River tributaries (Table 18). The highest densities were obtained in an unnamed tributary to Johanson Creek (Unnamed A in Figure 8) and at Site S_{j4} in Johanson Creek (Figure 8) where densities were 0.06 parr/m².

No comparable data from past sampling is available for Johanson Creek. Shirvell (unpublished data, DFO, Pacific Biological Station) reports observing 17 rainbow (mixture of parr and fry) during night snorkelling in a 183 m length of Johanson Creek in early October 1991 (0.09 fish/lineal m). This compares to our sampling of 20 fry and 13 parr in a 200 m length of Johanson Creek (0.16 fish/lineal m for all Johanson Creek sites combined - Appendix 3 Table 1).

There is virtually no past estimates of fish densities for the tributary streams. A single site was sampled on the Bear in 1984, and steelhead parr were present in low abundance (Figure 9C). None were sampled in the two Bear River sites in 1991. The sampling conducted by Williams et al. (1985) is not considered suitable for comparison since they could not effectively sample steelhead parr habitat in the Bear River by seining.

Shirvell (unpublished information, DFO, Pacific Biological Station), observed 15 rainbow parr during night snorkel observations in the Bear River during September 1991. This is based on nearly two hours of snorkelling in two sections totalling just over 450 m in length. Similarly, Shirvell only captured a single rainbow parr in 22 minnow traps set overnight in the Bear River on September 10-12, 1991. These observations suggest that parr were present in the Bear River in 1991, but in low abundance.

3.3.3 Sustut River Biomass Estimates

Biomass estimates for all species combined and for steelhead juveniles was low in all sites. For example, total fish biomass in the mainstem Sustut River averaged 0.4 g/m² with little variability between reaches (Table 19). Steelhead fry biomass averaged 0.1 g/m² and was highest in Reach 5, while steelhead parr biomass was 0.1 g/m², and up to 0.4 g/m² in the top end of the Sustut River.

The Bear River had the highest overall biomass for all fish species combined of 1.1 g/m², with steelhead fry biomass of 0.2 g/m². While overall fish biomass in Johanson Creek was similar to the mean for the Sustut River, both fry and parr biomass were slightly less. The detailed breakdown for all species at each site is presented in Appendix 3 Table 2.

SYSTEM (REACH)	FRY (g/m ²)	PARR (g/m ²)	ALL SPECIES (g/m ²)
SUSTUT (1)	0.09	0.03	0.38
SUSTUT (2)	0	0.13	0.43
SUSTUT (3)	0.05	0.01	0.28
SUSTUT (4)	0.14	0.18	0.39
SUSTUT (5)	0.31	0	0.58
SUSTUT (6)	0.15	0.03	0.43
SUSTUT (7)	0.14	0.42	0.65
REACHES 1-7	0.12	0.09	0.41
BEAR	0.22	0	1.13
JOHANSON	0.08	0.04	0.41

3.3.4 Sustut River Fish Size Estimates

Steelhead fry mean fork lengths, length-frequency, and length-weight data for the mainstem Sustut River are shown in Figure 10. The data has been combined for those sites located upstream of the Bear River confluence with the Sustut and those located downstream. As well, mean fork lengths of the Bear River and Johanson Creek samples are shown in Figure 10A for comparison.

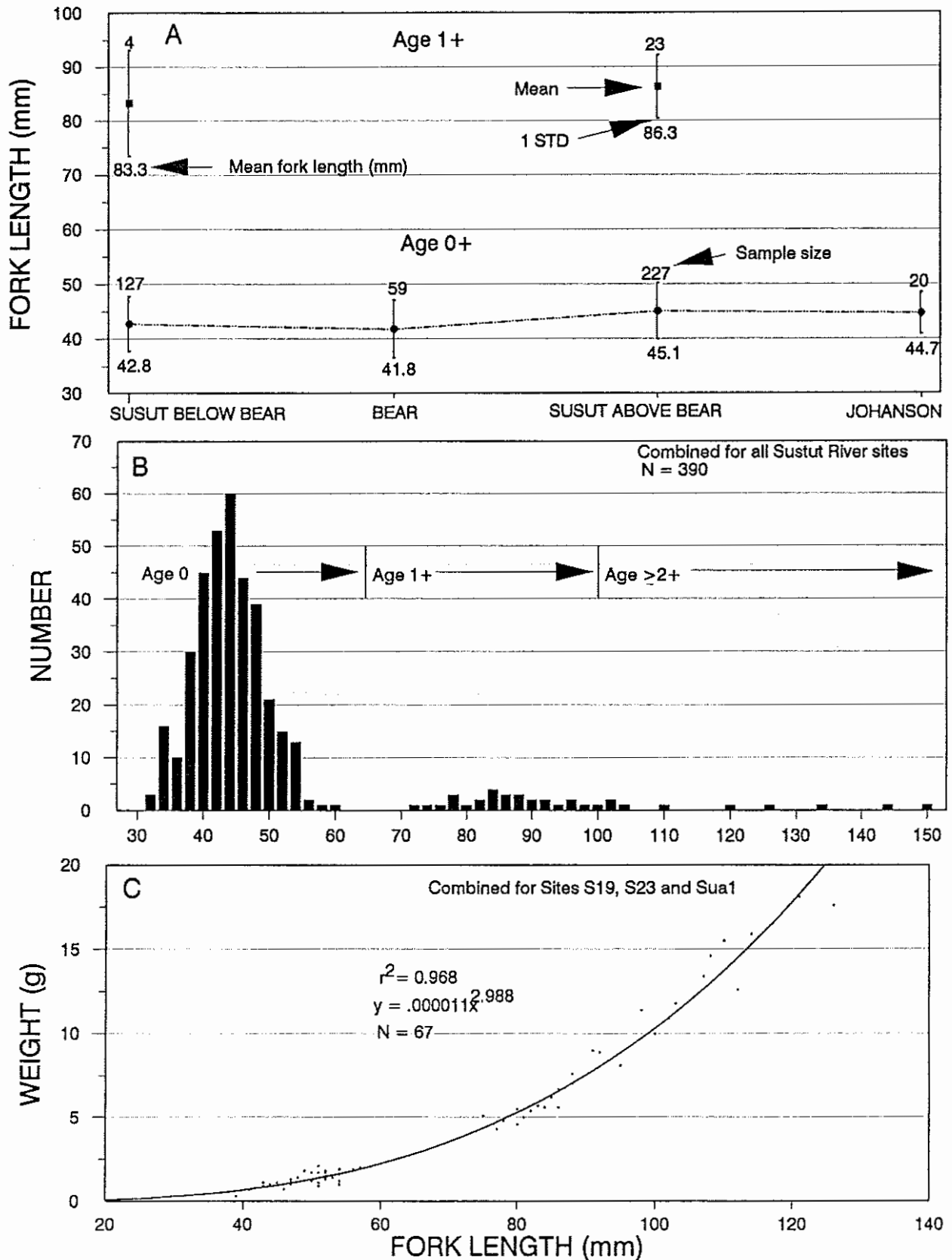


Figure 10. Length and Weight Summaries for Mainstem Sustut River Steelhead for September 1991.

Steelhead fry in the Sustut downstream of the Bear were, on average, over 2 mm smaller than fry sampled upstream of the Bear River. The lower Sustut fry were closer in size to Bear River steelhead fry, which is where many of the fry in the lower reach may have originated. The upper Sustut fry were very close in size to a sample of fry from Johanson Creek. It is surprising to find that fry located in the upper higher elevation sections of the Sustut River are larger than those located in the lower elevation sections. Although parr sizes are shown in Figure 10A, the sample size is too small to allow for meaningful comparisons.

Table 20 summarizes past sample data describing steelhead fry sizes in the Sustut River derived from Tredger (1986). This data suggests that mean fry sizes were, on average, larger in 1991 than the mean for past years. The differences in fry lengths noted in 1991 between sites located upstream of the Bear River confluence and sites located downstream is not apparent in data collected during past years.

Table 20. Summary of Steelhead Fry Mean Fork Lengths and Weights in the Sustut River Compared to Past Sample Data.				
YEAR	SUSTUT BELOW BEAR		SUSTUT ABOVE BEAR	
	FORK LENGTH (mm)	WEIGHT (g)	FORK LENGTH (mm)	WEIGHT (g)
1983 ¹³	39.4	0.58	NA ¹⁴	NA
1984	41.2	0.65	41.1	0.67
1985	41.1	0.79	40.5	0.75
MEAN	40.6	0.67	40.8	0.71
1991	42.8	0.81	45.1	0.95

¹³ Data from 1983-1985 provided by Dave Tredger, B.C. Environment, Victoria. Sampling was conducted during late September or early October.

¹⁴ No sampling was conducted on the Sustut River upstream of the Bear confluence in 1983.

3.4 ZYMOETZ RIVER

A total of 31 sample sites were located in the Zymoetz River watershed including 19 sites on the mainstem river between the Clore River confluence and McDonell Lake and seven sites on the Clore River. Additional tributary sites were located on Thomas and Trapline creeks (Clore tributaries), and Treasure, Coal and Sandstone creeks (mainstem Zymoetz River tributaries). All sample site locations are shown in Figure 11.

The mainstem Zymoetz River sites comprised 2469 m² of habitat (383 m of margin) in the three upper reaches (Table 21). An additional 825 m² of habitat (152 m of margin) was sampled throughout the Clore to its confluence with the Burnie River. As well, 442 m² was sampled in the various tributaries (Appendix 4 Table 1). Specific site descriptions and catch data for each site are presented at the end of Appendix 4.

3.4.1 Zymoetz River Catch Composition

Steelhead fry comprised 77.3% of the 1737 fish estimated within the mainstem Zymoetz sample sites, while steelhead parr comprised just under 11% of the total catch (Table 21). Chinook juveniles comprised 4.0% of the total, but were not found in sites upstream of Treasure Creek. Similarly, prickly sculpins comprised 3.6% of the mainstem Zymoetz catch but were only present in sample sites located within 2 km of McDonell Lake. Coho juveniles, present in low abundance (1.8% of catch), were captured in four of the mainstem sites.

Steelhead juveniles also dominated the Clore River samples with fry comprising 82.1% of the estimates and steelhead parr an additional 7.6%. Coho were not captured in the Clore mainstem but were present in Trapline Creek. Chinook were captured as far upstream as Site C5 (Figure 11) and in Thomas Creek. It is assumed that rainbow juveniles captured at Site C7 were steelhead, although there is an impressive canyon section in the Clore River just downstream of this site that may restrict steelhead access into the upper river. Dolly Varden (4.9% of the catch) were more common in the Clore River sites than in the Zymoetz sample sites.

The catch composition for the individual Zymoetz and Clore river tributaries is summarized in Appendix 4 Table 1. Both cutthroat and rainbow fry were present in Sandstone and Coal creeks and there was some difficulty in separating the newly-emerged fry by species. It is assumed that most of the Sandstone Creek fry were cutthroat and most Coal Creek fry were steelhead, based on fry characteristics and the species of parr present at the sample sites. Tredger (1984) reported steelhead fry at sites in Coal

Figure 11.

Location of Zymoetz River Juvenile Fish Sample Sites.

-  Fish Sample Site
-  Reach Break

0 5 10 km
Scale 1 : 250,000

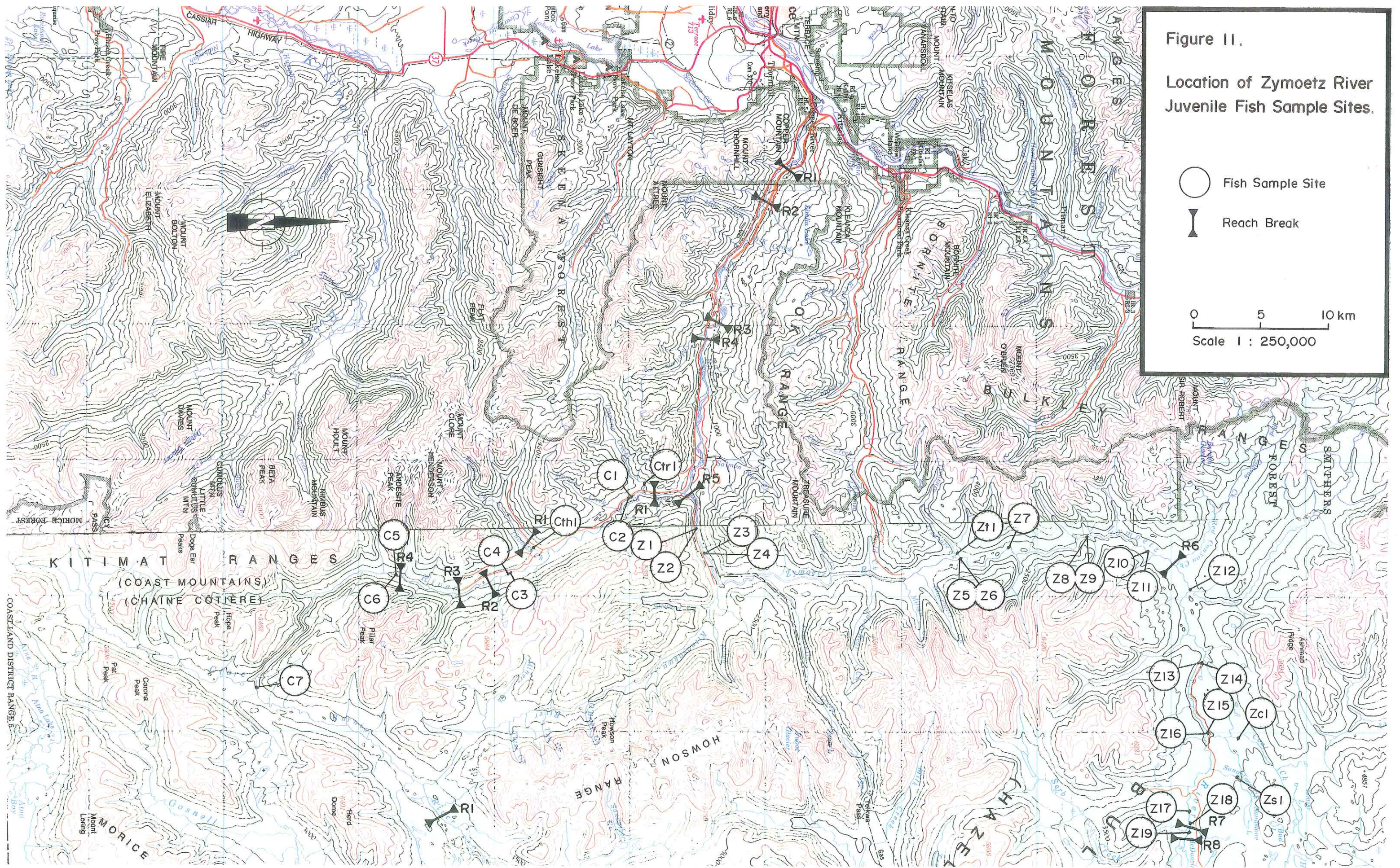


Table 21. Catch Composition of Fish in the Zymoetz and Clore River Sample Sites.				
	MAINSTEM ZYMOETZ		CLORE RIVER	
	N	%	N	%
Steelhead 0+	1341	77.3	369	82.1
Steelhead 1+	131	7.5	17	3.8
Steelhead $\geq 2+$	60	3.4	17	3.8
Chinook	70	4.0	20	4.5
Coho	32	1.8	0	0
Dolly Varden	12	0.7	22	4.9
RM Whitefish	7	0.4	3	0.7
Sculpins sp.	63	3.6	0	0
LN Dace	21	1.2	0	0
Cutthroat	0	0	1	0.2
TOTAL	1737		449	
AREA (m ²)	2469		825	
LENGTH (m)	382.6		152.2	

Creek and a mix of steelhead and cutthroat trout fry in Sandstone Creek depending upon sample site location.

3.4.2 Zymoetz River Juvenile Steelhead Densities

Zymoetz River Fry Densities

Juvenile steelhead densities in the 19 mainstem sites are summarized in Table 22. Fry densities averaged 0.58 fry/m² for all of the sites combined. Densities were highest in Reach 7 (0.68 fry/m²) and lowest in Reach 8 (0.40 fry/m²). It should be noted that only a single sample site was located in Reach 8, a short section of river located from the outlet of McDonnell Lake to the Serb River confluence. Three of the mainstem sites had fry densities exceeding 1.0 fry/m².

Table 22. Summary of Juvenile Steelhead Density Estimates in the Zymoetz River Mainstem Sample Sites.				
SITE (REACH)	FRY/M ²	HABITAT ¹⁵ SUITABILITY	PARR/M ²	HABITAT SUITABILITY
Z1 (6)	1.40	G	0.07	M
Z2 (6)	0.37	G	0.06	P
Z3 (6)	0.17	M	0.15	E
Z4 (6)	0.21	G	0.06	G
Z5 (6)	0.26	G	0.04	M
Z6 (6)	0.40	G	0.14	E
Z7 (6)	0.37	G	0.14	E
Z8 (6)	0.48	E	0.08	G
Z9 (6)	1.13	G	0.20	E
Z10 (6)	0.62	G	0.07	E
Z11 (6)	0.51	M	0.05	G
REACH 6 _{mean}	0.54		0.10	
Z12 (7)	0.89	G	0.03	E
Z13 (7)	1.05	E	0.02	G
Z14 (7)	0.91	G	0.03	P
Z15 (7)	0.45	M	0	P
Z16 (7)	0.78	G	0.06	P
Z17 (7)	0.26	M	0	P
Z18 (7)	0.43	G	0	P
REACH 7 _{mean}	0.68		0.02	
Z19 (8)	0.40	G	0.02	P

¹⁵ E = Excellent G = Good M = Moderate P = Poor
See Table 2.

There was little difference in fry densities between sites located in the mainchannel and sidechannel locations of the Zymoetz (Table 23). Of the 19 sites sampled in the Zymoetz, 15 were rated as good or excellent fry habitat, four were rated as moderate and no poor sites were sampled. Fry densities in the sites rated as good and excellent were approximately double the levels obtained in the moderate sites (Table 24).

Although there has been some juvenile steelhead sampling conducted during past years in the Zymoetz River upstream of McDonnell Lake, there are no past sample data for mainstem sites downstream from McDonnell Lake for comparison.

Table 23. Summary of Juvenile Steelhead Catches in Sidechannels Compared to Mainstem Habitat in the Zymoetz River.				
REACH	FRY/M ²		PARR/M ²	
	MAINCHANNEL	SIDECHANNEL	MAINCHANNEL	SIDECHANNEL
	ALL SITES COMBINED			
6-8	0.62	0.54	0.05	0.08
	GOOD AND EXCELLENT SITES ONLY			
6-8	0.69	0.60	0.09	0.10

Table 24. Comparison of Juvenile Steelhead Densities in the Zymoetz River for the Four Habitat Suitability Rating Categories.				
SUITABILITY RATING	FRY/M ²	N	PARR/M ²	N
POOR		0	0.02	7
MODERATE	0.35	4	0.05	2
GOOD	0.63	13	0.05	4
EXCELLENT	0.76	2	0.12	6

Zymoetz River Parr Densities

Steelhead parr densities for the mainstem Zymoetz River sites are summarized in Table 22. Parr densities averaged 0.06 parr/m² for all of the sites combined (0.047/m² age 1+ fish and 0.017/m² combined age 2+ and age 3+ fish). Parr densities were highest in Reach 6 sample sites where they were present at all of the sites sampled (Photos 7 and 8).

Steelhead parr densities were considerably lower in the Zymoetz River upstream of Red Canyon Creek. Many of the sites sampled in the upper river were rated as **poor** for parr. However, Sites Z13 and Z12 were rated **good** and **excellent** and parr levels were low at these sites as well. As in the other systems sample sites were often selected because they appeared to offer good fry habitat.

Although parr densities appeared to be higher in sidechannels than in mainchannel locations if the results for all sites are combined, there was little difference between channel types if only the results from sampling the **good** and **excellent** sites are included in the comparisons (Table 23). Parr densities in these sites averaged 0.1 parr/m², and were nearly twice as high for the sites rated **excellent** as in the **good** and **moderate** sites.

Zymoetz River Tributary Fry Densities

Fry densities in tributaries to the Zymoetz River are summarized in Table 25. The main tributary sampling was conducted in the Clore River where fry densities averaged 0.44 fry/m² for all of the sites combined. Fry densities ranged from 0.3 to 0.7 fry/m² in the Clore as far upstream as Sites C5 and C6 (Figure 11). At the one site upstream of the large canyon in Reach 5, fry densities dropped off to 0.06 fry/m².

Both Trapline Creek (lower Clore tributary) and Coal Creek (upper Zymoetz tributary) had fry densities exceeding 1 fry/m² and appear to be important juvenile steelhead rearing streams. Tredger (1984) sampled Coal Creek in late August 1982 and reported steelhead fry densities from 0.4 to 2.1 fry/m² depending upon site location. Steelhead fry densities in Treasure Creek were low compared to these two systems and no steelhead fry were captured in the Thomas Creek site.

Zymoetz River Tributary Parr Densities

Steelhead parr densities in the Clore River averaged 0.04 parr/m², and were highest at the uppermost site, a sidechannel located near the Burnie River confluence (Table 25). The parr catch was



Photo 7. Site Z3 in Reach 6 of the Zymoetz River. This large sidechannel was rated as excellent for steelhead parr rearing. Parr densities were 0.15 parr/m².



Photo 8. Site Z9 in the upper end of Reach 6. This site was rated as good for steelhead fry and excellent for parr. Fry densities exceeded 1 fry/m² while parr densities were 0.20 parr/m².

comprised of approximately equal numbers of age 1+ and a mix of age 2+ and 3+ fish. These densities were slightly more than 50% of the level measured in the mainstem Zymoetz River.

Trapline and Coal creeks had parr densities in the 0.1 to 0.2 parr/m² range, while steelhead parr densities in the other tributaries were very low. Tredger (1984) reported steelhead parr densities in two Coal Creek sites ranged from 0.03 to 0.28 parr/m².

Table 25. Summary of Juvenile Steelhead Density Estimates in Tributaries of the Zymoetz River.				
SITE	FRY/M ²	HABITAT ¹⁶ SUITABILITY	PARR/M ²	HABITAT SUITABILITY
C1	0.43	G	0.02	M
C2	0.34	G	0.03	G
C3	0.46	G	0.03	M
C4	0.66	G	0.02	P
C5	0.44	G	0.04	G
C6	0.70	G	0.04	P
C7	0.06	G	0.08	G
CLOREmean	0.44		0.04	
TRAPLINE	1.18	G	0.15	G
THOMAS	0	P	0.02	P
TREASURE	0.15	M	0.01	G
COAL	1.77 ¹⁷	G	0.11	G
SANDSTONE	0.69 ¹⁷	G	0	G

¹⁶ E = Excellent G = Good M = Moderate P = Poor
See Table 2.

¹⁷ Mixture of rainbow and cutthroat fry at these sites. Suspect mainly rainbow in Coal and cutthroat in Sandstone Creek.

3.4.3 Zymoetz River Biomass Estimates

Total fish biomass estimates in the mainstem Zymoetz River ranged from 0.8 g/m² in Reach 7 to 4.3 g/m² in Reach 8 (below McDonnell Lake), and averaged 1.6 g/m² for all of the mainstem sites combined (Table 26). Much of the biomass in Reach 8 is the result of a large number of sculpins captured in the lake outlet area. Steelhead fry biomass averaged 0.5 g/m² for all of the sites combined, and was similar for the three reaches sampled.

Steelhead parr biomass was substantially higher in Reach 6 of the Zymoetz (1 g/m²) compared to the two upper reaches (0.1 g/m²). Much of this difference resulted from the presence of older age classes of steelhead parr (age 2+ and 3+ fish) in the lower reach (Appendix 4 Table 2).

Tributary biomass was high in Trapline and Coal creeks (Table 26). Steelhead fry biomass was 1.5 g/m² and 2.2 g/m² in these two tributaries respectively. Biomass of steelhead fry, parr and total fish was lower in the Clore than in the mainstem Zymoetz for all sites combined. The detailed breakdown for all species by site is summarized in Appendix 4 Table 2.

SYSTEM (REACH)	FRY (g/m ²)	PARR (g/m ²)	ALL SPECIES (g/m ²)
ZYMOETZ (6)	0.53	0.98	1.89
ZYMOETZ (7)	0.48	0.13	0.85
ZYMOETZ (8)	0.64	0.08	4.27
REACHES 6-8	0.52	0.62	1.63
CLORE	0.32	0.53	1.09
TRAPLINE	1.51	1.55	3.30
THOMAS	0	0.15	1.02
TREASURE	0.16	0.14	0.44
COAL	2.20	0.81	3.75

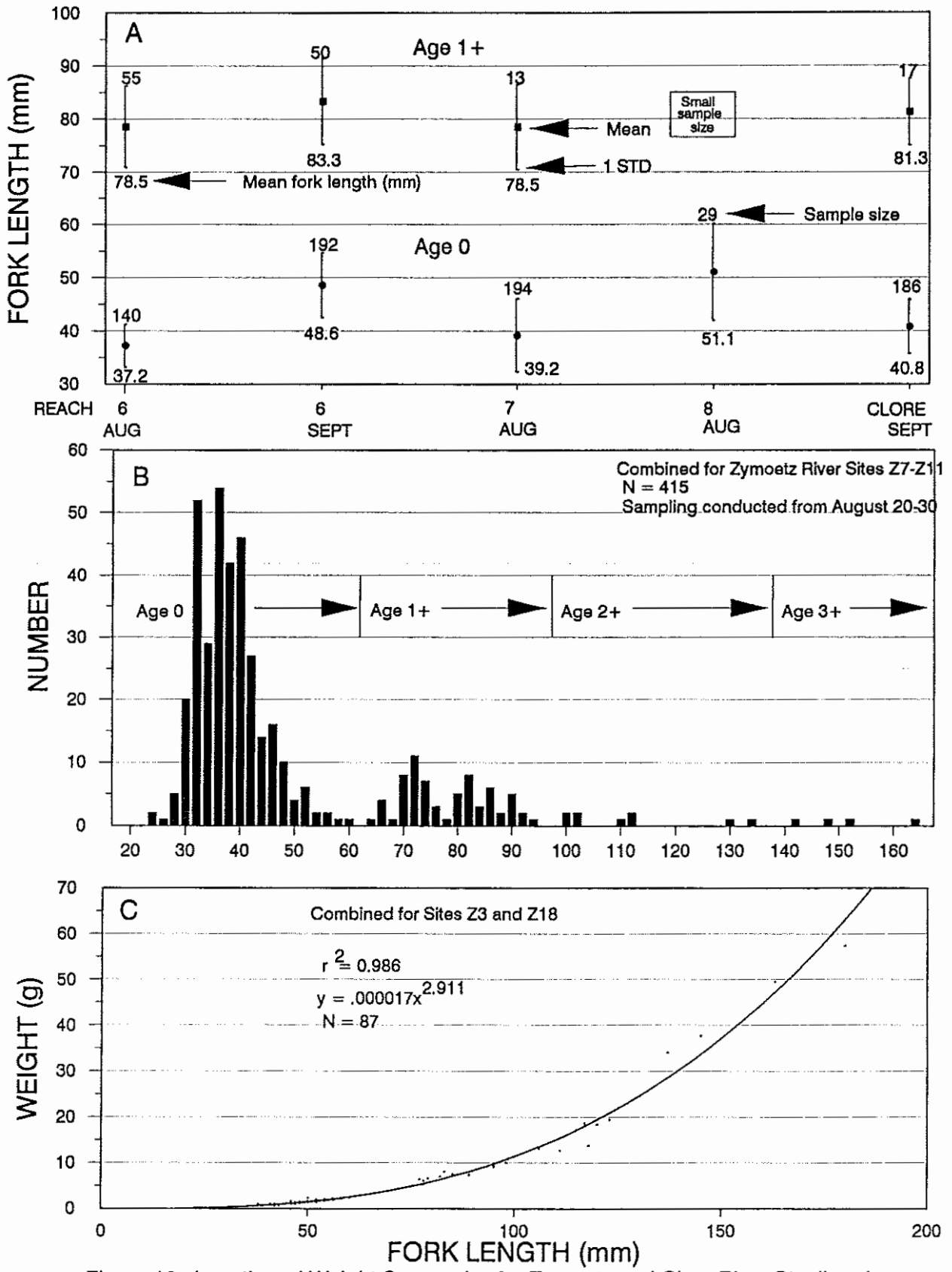


Figure 12. Length and Weight Summaries for Zymoetz and Clore River Steelhead for August and September 1991.

3.4.4 Zymoetz River Fish Size Estimates

Steelhead fry mean fork lengths, length-frequency and length-weight data for the mainstem Zymoetz River are shown in Figure 12. The data comparing the three reaches (Figure 12A) has been separated into those sites that were sampled during the latter half of August and sites that were sampled in later September since there was over a 10 mm difference in fry lengths between the two periods in both Reaches 6 and 7. Steelhead fry in Reach 8 (lake outlet area) were on average 13 mm larger than fry in the other two reaches during late August. Although steelhead fry were slightly smaller in Reach 6 than Reach 7 in August, age 1+ parr mean sizes were no different.

Steelhead fry in the Clore River were on average 8 mm smaller than their counterparts in Reach 6 of the Zymoetz River during the same sample period (Figure 12A). Clore River age 1+ parr were slightly smaller than Reach 6 parr, based on a small sample size of parr. Trapline Creek steelhead fry sampled in September (mean fork length 48.1 mm) were similar to fry sizes in Reach 6 of the Zymoetz. Coal Creek fry sampled in August (mean fork length 41.5 mm) were slightly larger than their counterparts in the main Zymoetz. Information describing tributary fish sizes is presented in the individual sample sheets at the end of Appendix 4.

4.0 CONCLUSIONS

4.1 STEELHEAD FRY DENSITIES

A summary of steelhead fry and parr densities estimated in the four main study streams and selected tributaries is shown in Figure 13. Highest steelhead fry densities were found in the Kitwanga River and in several tributaries of the Morice River such as Owen and Lamprey creeks, where fry densities exceeded 1 fry/m². Fry densities in the mainstem Zymoetz (0.6 fry/m²) and Morice (0.3 fry/m²) were considerably higher than the Sustut (0.1 fry/m²).

Since the Kitwanga River fry density estimates were conducted shortly after emergence, some of the high densities measured in this system may reflect the short time between emergence and sampling. However, mean steelhead fry biomass in the Kitwanga (0.84 g/m²) was considerably higher than the other mainstem systems which ranged from a low of 0.12 g/m² in the Sustut to 0.52 g/m² in the Zymoetz. Only productive small tributaries where there was evidence of crowding due to low flows (eg, Lamprey and Owen creeks) had higher fry biomass. This suggests that the Kitwanga River is an important steelhead fry production area during at least some years. The lack of parr in the Kitwanga raises the question of whether the fry leave the Kitwanga River and move into the Skeena River to rear. Alternatively, the high fry production from this system may only occur in some years when there are adequate escapements into the system.

Fry were present in moderate densities in nearly all of the sites sampled in the Morice and Zymoetz rivers, irrespective of reach. Sample sites rated as **good** or **excellent** fry habitat had densities approximately double the levels found in the sites rated as **poor** or **moderate** suitability. Nearly all of the poor quality habitat sites had fry densities exceeding 0.1 fry/m² suggesting that fry were well distributed throughout the entire mainstem in these systems.

Fry densities in the mainstem Morice River in 1991 were in the mid-range of levels measured since 1980 (Figure 4B). Steelhead fry densities in the Morice tributary streams in 1991 were relatively high compared to measurements conducted in the 1980's (Figure 5).

There is no comparable data collected during past sampling programs for the Zymoetz or Clore rivers. As a general comment, fry densities in the Zymoetz were approximately double those measured in the Morice. The Zymoetz has a slightly higher gradient with larger bed material, and is most comparable to Reach 3 of the Morice, where fry densities have consistently been nearly double the densities found in Reach 2 of the Morice (Figure 4C). Since total alkalinity estimates for all of the study streams fall within

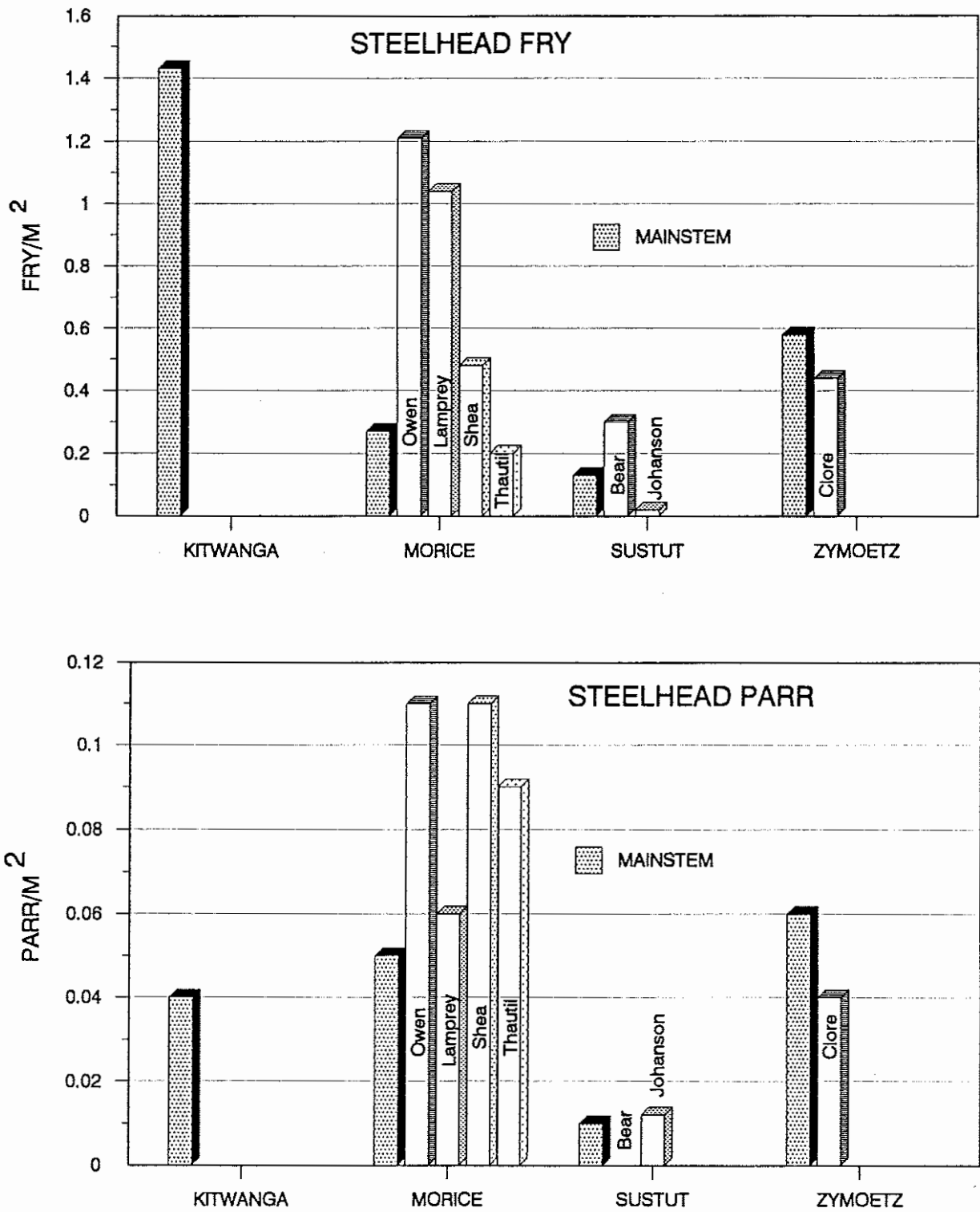


Figure 13. Summary of Steelhead Fry and Parr Densities in Mainstem and Selected Tributaries of Upper Skeena Study Streams.

the range of 10-21 mg/l (Colin Spence, B.C. Environment, Smithers, personal comm.), potential differences in site productivity based on water quality differences may not be as significant in determining fish densities as differences in the physical habitat characteristics and adult escapements in the mainstem rivers.

Fry densities in the Sustut River and tributaries were very low and generally sporadic throughout the system. Many sites that were rated as potentially good or excellent fry rearing sites in the Sustut River and Johanson Creek in the vicinity of the main steelhead spawning areas had fry densities less than 0.1 fry/m². This irregular and sparse distribution of fry suggests that the mainstem Sustut was seeded well below its potential capability for steelhead fry rearing. Although fry densities in the Bear River were in the 0.3 fry/m² range, the lack of fry in the Sustut downstream of the Bear and limited past sampling data for the Bear River indicate higher fry densities were present in other years, and suggests that fry production in the Bear in 1991 was insufficient to seed the lower reach of the Sustut River. Fry densities in this lower reach were 50% or less of levels measured during limited sampling in three previous years (Figure 9C).

There is no definitive estimate of what densities of steelhead fry are required to adequately seed these Skeena River tributaries. Studies conducted by Hume and Parkinson (1987) suggested that fry densities higher than 0.4 to 0.7 fry/m² did not yield higher autumn fry or parr densities. These estimates were for a stocked population of steelhead in a coastal stream, and may not apply to wild steelhead in the interior.

The 1991 juvenile sampling program was conducted within 1-2 months of fry emergence. Mainstem fish have typically not been exposed to any significant events such as floods, severe low flows, or ice conditions prior to sampling, and it is assumed that the fry densities reflect egg deposition and hence the strength of the spawning run.

4.2 STEELHEAD PARR DENSITIES

The fry densities that are derived during the index site sampling may be most valuable in establishing a measure of the strength of the previous year's spawning escapement. On the other hand, the abundance of steelhead parr provides the best index of what the potential of the system is for producing smolts. For example, Ward and Slaney (in prep.) suggest that fry to age 1+ parr survival appears to be density dependent in the Keogh River. Smolt yield from the system has been relatively stable, despite wide fluctuations in fry abundance over the years of study.

Steelhead parr densities for the four Skeena systems (Figure 13) indicate that levels in the Morice and Zymoetz systems were considerably higher than in the Sustut River and tributaries.

Although Kitwanga River parr densities were only slightly lower than the Morice and Zymoetz rivers (Figure 13), the estimates are deceptive. Nearly all Kitwanga steelhead parr were captured in the uppermost reach, and the lower reaches had very low densities despite abundant suitable habitat. The data suggests poor recruitment into the system during the previous two years, although there is no good past sample data for this system to provide an index of what parr densities might be expected if the system is adequately seeded.

The Morice River parr densities (0.05 parr/m²) were considerably higher in Reach 2 and lower in Reach 3 than past sample estimates (Figure 4D). There is difficulty in making comparisons between years in large rivers such as the mainstem Morice unless the sample sites and techniques are carefully repeated. Many sites sampled prior to 1991 were not totally enclosed, probably leading to underestimates. Similarly, site disturbance during net installation in the 1991 sampling along with the inability to adequately sample the really complex sites (eg, large log jams) probably causes similar underestimates of parr abundance in these reaches. As well, the Reach 3 comparisons are limited because they are based on a small sample area.

Parr densities in the Zymoetz River averaged 0.06 parr/m² (Figure 13), very similar to the Morice estimates. Parr densities increased as sampling proceeded downstream on the Zymoetz. Clore River densities were lower (0.04 parr/m²).

There is no background data on the mainstem Zymoetz for comparison, so the potential of the system for parr production cannot be assessed until several years of data are collected at the same locations. The preliminary results suggest adequate seeding by steelhead fry throughout the system, but under-utilization of available parr habitat upstream of Red Canyon Creek.

The Sustut River parr densities (0.01 parr/m²) were extremely low irrespective of channel type, location on the river, and quality of the rearing habitat. Limited data from past studies suggests that parr densities have been more than five times higher than the 1991 estimates for the Sustut River above and below the Bear River confluence.

In both the mainstem Morice and the Zymoetz there was a lot of variability in parr densities between sites, presumably reflecting differences in the quality of the habitat. Many of the sites were selected based on their suitability for steelhead fry rearing. If

only those sites that are considered most suitable for parr rearing (good and excellent) are included in the estimates, then parr densities nearly double to 0.1 parr/m², or very close to the biostandards for steelhead parr (Slaney 1980 as reported in Adams and White (1990)). Data derived from Ward and Slaney (in prep.) suggest that the average for three years of age 1+ and 2+ parr densities is 0.06 parr/m², close to the levels measured in the Morice and Zymoetz rivers.

The more erratic distribution of parr than fry in large rivers such as the Morice, Sustut and Zymoetz suggests that to effectively sample the parr populations, more effort should be directed towards sampling those sites that are most suited for parr rearing and less effort is probably required to determine a reasonable estimate of fry densities. As a general comment, large sidechannels (5-10 m across) that can be effectively blocked at their top and bottom ends using nets and rebar often provide good parr rearing habitat that can be effectively sampled. These locations probably provide the best index sites over the long-term since they can be enclosed with the least amount of site disturbance during the net installation.

Parr densities in smaller tributary streams are more easily estimated and probably more reliable than in mainstem sites. Density estimates in Owen, Buck, Shea, Trapline and Coal creeks and the Thautil River were all in the range of 0.1 parr/m² in the 1991 surveys. Parr densities in Lamprey Creek were lower (0.06 parr/m²).

While these levels appear to be in the range of the biostandards for steelhead, results from sampling during other years in the Morice tributaries suggest that creeks such as Owen, Lamprey and Shea are capable of supporting parr densities in the range of 0.2 to 0.3 parr/m² (Figure 5), and that 1991 parr densities in the Morice tributaries may be at levels of 50% or less of the potential of these systems for parr rearing.

It is not known whether the lower parr densities in 1991 reflect poor recruitment or are the result of an exodus of larger fish from the system due to the low flow conditions that occurred 1991. Of the main steelhead tributaries to the Morice, Lamprey Creek appears to experience the most significant dewatering during dry years. For example Pimpernel Creek, a Lamprey tributary, was dry in the lower end during the 1991 sample period. Leider et al. (1986) monitored an exodus of presmolt steelhead from a tributary stream into downstream mainstem habitat, and suggest this movement reflects lack of suitable rearing habitat for parr in the tributary. Similar movements may occur in Morice tributaries, particularly during years of very low late summer flows. Such movements would result in higher mainstem and lower tributary parr densities.

On the other hand, test fishery index data suggests a weak spawner escapement in 1989 (Data on file, B.C. Environment, Smithers). Sampling in Buck Creek in 1990 indicated a very poor fry recruitment to this system (Bustard 1991). This was the only site in the vicinity of the Morice that was sampled during 1990. This data suggests that the Morice tributaries were under-recruited in 1990 resulting in the relatively low parr estimates in 1991.

4.3 JUVENILE STEELHEAD SIZE ESTIMATES

Fry size was found to be an important determinant of eventual smolt age in the Keogh River studies (Ward and Slaney in prep.). This study provided the opportunity to collect a considerable database of fry and age 1+ parr sizes in the various systems. It is assumed that the differences in fry sizes reflect factors such as different timing of emergence, differences in the timing of sampling, and productivity differences (nutrients and temperature regime) within the various systems. Table 27 summarizes the results for the main river systems and a few tributaries. More detailed information can be found within the individual system results.

SYSTEM	AGE 0	AGE 1+
MORICE MAINSTEM	42.5	85.2
LAMPREY ¹⁸	47.4	80.2
OWEN	47.3	84.2
SUSTUT BELOW BEAR	42.8	NA ¹⁹
SUSTUT ABOVE BEAR	45.1	86.3
ZYMOETZ MAINSTEM	48.6	83.3
CLORE	40.8	81.3

¹⁸ Late August sampling was conducted in Lamprey and Owen creeks.

¹⁹ Inadequate sample size.

One of the most interesting results of the comparison of sizes is that steelhead fry in the upper Sustut were larger than those in the Sustut downstream of the Bear. In fact, these fry were also larger than fry captured in the mainstem Morice River sampled during the same period. Presumably, steelhead fry emergence occurs relatively early in the upper Sustut, despite its high elevation, late spawning, and short period suitable for growth. Rapid water temperature increases in the headwater lake areas and long daylight in this system during the early summer may account for an earlier emergence. This difference in fry sizes did not show up in limited sampling conducted during other years (Table 20).

Limited data is available outlining the timing of steelhead fry emergence in several northern interior streams. The data that is available suggest emergence occurs from late July in the warmer tributaries through to late August. For example, 80% of steelhead emergence in the mainstem Morice River had occurred by August 19 (Envirocon 1984). Williams et al. (1985) report that steelhead fry emergence in the Bear River was virtually complete by August 6.

Both fry and age 1+ parr sizes in the Morice were large relative to past sample data (Table 12). There are problems with this comparison due to differences in timing of sampling and small sample sizes in some of the earlier data. Parr in Morice tributaries such as Owen and Lamprey were slightly smaller than past measurements (Table 13).

Although tributaries such as Owen and Lamprey creeks probably provide a distinct advantage to juvenile steelhead growth during the spring and early summer due to warmer water temperatures early in the year compared to the mainstem river, there may be some disadvantages in the late summer due to low flows and crowding. As well, during many years these creeks are iced over by early November while conditions in the mainstem river remain more suitable for fish growth due to the warming influence of Morice Lake. This may account for little apparent difference in parr sizes between the mainstem river and, for example, Owen Creek.

Although Zymoetz River fry were larger than Morice River fry, there appeared to be little difference in the age 1+ parr sizes. We observed a noticeable increase in algal accumulations on the Morice River bed material over past years. This may reflect increased nutrient input into the system from very large pink salmon escapements or from fertilizer additions to Morice Lake in the mid-1980's.

5.0 RECOMMENDATIONS

1.) It is recommended that a program of conducting juvenile steelhead population estimates at selected sites be continued on an annual basis to provide an index of the strength of past spawning escapements and an index of the potential of the system to produce steelhead parr. The surveys will provide real data for management modelling programs for Skeena steelhead stocks.

2.) The surveys suggest that juvenile steelhead abundance is well below the potential in the Sustut River. The lack of fry and parr in the 45 sites sampled in this system suggest that there have been recruitment problems for at least 3 years. Highest management priority should be directed towards ensuring that sufficient steelhead reach the Sustut and its tributaries to adequately seed the system.

3.) Surveys should be conducted in a systematic manner each year. Several sites should be established in key streams (eg, Kitwanga and Morice rivers) and sampled on a repetitive basis during a single year (eg, 2-week intervals) in an effort to establish growth rates and changes in density at these sites from the period shortly after emergence to late September. This would assist in interpretation of data collected at index sites.

4.) It is suggested that more effort be directed towards sampling steelhead parr rearing areas and less towards steelhead fry rearing. The sampling results indicate that parr distributions are more erratic in the mainstem river, and a larger area needs to be sampled to achieve a reasonable estimate of utilization. The best potential areas for parr index sites are large sidechannels.

5.) Sample efforts should increase the amount of habitat sampled in Reach 3 of the Morice and reduce that sampled in the other two reaches.

6.) The Kitwanga River should be re-sampled at the index sites. This system had the highest fry densities of the larger systems sampled in 1991, but had very low levels of parr. Sampling in 1992 (after a high fry year) should provide a good indication of the capability of the system for parr rearing. Sampling in the Skeena River downstream of the Kitwanga River confluence might help to explain the lack of parr in the Kitwanga River itself.

7.) It is recommended that the Kitsequecla River be removed as a candidate stream for juvenile steelhead index sites. The system was turbid for much of the late summer/fall period, and has limited ground access sites.

8.) It is suggested that some measures of productivity (nutrients, alkalinity, etc) and more detailed water temperature data be collated where available, and collected where necessary in the various systems. This information can be used in conjunction with the juvenile sampling data to help account for apparent differences in fish numbers and sizes between and within systems. Data in the upper Sustut, in particular, is needed, so that the very low densities and the apparent differences in fry sizes in the upper system may be better understood.

6.0 LITERATURE CITED

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Appendix 1. Site Descriptions and Detailed Results of Fish Sampling in the Kitwanga River.

Appendix 1 Table 1. Kitwanga River Catch Composition and Biomass Estimates for Sample Sites.

CATCH COMPOSITION

SYSTEM	REACH	SITE	FRY	AGE 1+	AGE 2+	CHINOOK	COHO	DOLLY WHITEFISH VARDEN	SCULPIN	TOTAL	AREA	LENGTH (m)	
Kitwanga	1	K1	103	1	0	4	0	11	8	1	128	80	20.5
	2	K2	133	1	0	44	1	9		5	193	57	16.8
	2	K3	137	2		25	10	133	2		308	86	20.2
	3	K4	146			49	1	22			217	94	17.0
	3	K5	153	0	0	31	1	17	1		203	99	20.3
	4	K6	206	1	0	6	2	86			301	145	23.0
	5	K7	43		28			20		48	139	134	15.0
		TOTAL	920	33	0	159	35	278	11	54	1489	695	132.8
		%	61.8	2.2	0.0	10.7	2.3	18.6	0.8	3.6			
Moonlit Ck	1	Km1	6	0	0	8		50			65	115	11.3

BIOMASS ESTIMATES

SITE	LOCATION	RAINBOW FRY	CHINOOK PARR	COHO	DOLLY WHITEFISH VARDEN	SCULPIN	AREA	TOTAL		
K1	Reach 1	0.79	0.05	0.11	0.00	0.12	0.09	0.19	80	1.350
K2	Reach 2	1.49	0.10	2.11	0.03	0.17	0.00	1.10	57	5.000
K3	Reach 2	0.63	0.08	0.49	0.09	1.36	0.02	0.00	86	2.670
K4	Reach 3	0.66	0.00	1.24	0.01	0.46	0.00	0.00	94	2.370
K5	Reach 3	0.88	0.00	1.00	0.01	0.26	0.02	0.00	99	2.170
K6	Reach 4	0.87	0.03	0.13	0.02	0.58	0.00	0.00	145	1.630
K7	Reach 5	0.56	0.79	0.00	0.34	0.00	0.00	2.08	134	3.770
										0.000
	TOTAL	5.88	1.05	5.08	0.5	2.95	0.13	3.37	695	18.96
	PERCENT	31.01	5.54	26.79	2.64	15.56	0.69	17.77		100
	MEAN	0.84	0.15	0.73	0.07	0.42	0.02	0.48		2.71
Km1	Reach 1	0.01	0.00	0.11	0.00	0.70	0.00	0.00	115	0.82

KITWANGA RIVER STEELHEAD INDEX SITE 1991

SITE: K1 REACH: 1 MAP#: ACCESS: VEH DATE: AUG 19 PHOTO: (1)#6

SITE LOCATION: Kitwanga River, approximately 40 m downstream from the Woodcock Road bridge.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 1 TEMP (C) 13.5 Q (cfs): >200
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Observed several hundred pink spawners, mostly downstream of Woodcock Road bridge.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN	BIOMASS
		RANGE	MEAN	1	2	U1+U2					WT	(g/m*m)
Rbt	0+	29-47	37.5	90	11	101	102.5	1.6	1.276	10.00	0.617	0.79
Rbt	1+	70	70.0	1	0	1	1.0	0.0	0.012	0.10	4.004	0.05
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.00
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.00
Chinook	0+	50-57	53.8	4	0	4	4.0	0.0	0.050	0.39	2.155	0.11
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.00
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.00
M. Whitefish	0+	44-56	50.8	7	1	8	8.2	0.5	0.102	0.80	0.889	0.09
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.00
Dolly Varden	0+	33-46	39.0	10	1	11	11.1	0.4	0.138	1.08	0.844	0.12
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.00
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.00
Sculpin	all	108	108.0	1	0	1	1.0	0.0	0.012	0.10	15.070	0.19
TOTAL									1.590	12.47		1.34

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	2.6	LOD		POOL	25
3	4.3	COBBLE/BOULDER	100	RIFFLE	25
6	5.5	IN VEG		RUN	50
9	4.3	OVER VEG		OTHER	
12	2.9	CUTBANK			
15					
18		TOTAL	75	D50/90	7/10
21					
24					

3.9
 AREA (M*M) 80.4 MARGIN (M) 20.5

HABITAT COMMENTS:

STEELHEAD FRY RATING: Moderate habitat

RATIONALE: Fast cobble riffle on outside edge, with slack areas along the margin.

STEELHEAD PARR RATING: Poor habitat

RATIONALE: Shallow water depth with limited parr cover due to small substrate.

KITWANGA RIVER STEELHEAD INDEX SITE 1991

SITE: K2 REACH: 2 MAP#: ACCESS: VEH DATE: Aug 19 PHOTO: (1)#7

SITE LOCATION: Kitwanga River left access road from the National Historic Site.
 Sampled left side where road first contacts the river.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 2 TEMP (C) 13.5 Q (cfs): >200
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Observed high numbers of fry along margin in this section.
 Caught 12 lamprey ammocoetes.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	29-53	37.9	105	22	127	132.8	3.8	2.325	15.81	0.640	1.49
Rbt	1+	78	78.0	1	0	1	1.0	0.0	0.018	0.12	5.647	0.10
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.00
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.00
Chinook	0+	42-72	58.0	24	11	35	44.3	9.2	0.776	5.27	2.724	2.11
Coho	0+	51	51.0	1	0	1	1.0	0.0	0.018	0.12	1.664	0.03
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.00
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.00
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.00
Dolly Varden	0+	33-55	44.3	3	2	5	9.0	13.4	0.158	1.07	1.063	0.17
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.00
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.00
Sculpin	all	92-124	105.5	3	1	4	4.5	1.5	0.079	0.54	13.990	1.10
TOTAL									3.373	22.93		5.00

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	2.0	LOD		POOL	
3	3.3	COBBLE/BOULDER	100	RIFFLE	80
6	3.4	IN VEG		RUN	20
9	4.8	OVER VEG		OTHER	
12	3.5	CUTBANK			
15					
18		TOTAL	100	D50/90	8/40
21					
24					
	3.4				
AREA (M*M)	57.1	MARGIN (M)	16.8		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Excellent habitat

RATIONALE: Shallow riffle with large cobble substrate. Good cover in the interstitial spaces. This habitat is typical throughout the reach.

STEELHEAD PARR RATING: Good Habitat

RATIONALE: Good 1+ parr habitat along outer edge of the site in deeper water. Fishermen report catching large parr in fast water throughout this section. According to locals adult Sthd pass through Tea Creek culvert.

KITWANGA RIVER STEELHEAD INDEX SITE 1991

SITE: K3 REACH: 2 MAP#: ACCESS: VEH DATE: Aug 16 PHOTO: (1)#5

SITE LOCATION: Kitwanga River, approximately 70 m upstream from the bridge crossing on the Mill Creek road.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 1 TEMP (C) 15 Q (cfs): >100
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Observed hundreds of pinks and several chinook spawning above and below bridge crossing. Groundwater seepage along edge of sample site, temp 7 C. Poor decline with DV fry - two passes added leading to a minimum estimate.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	26-37	33.0	64	34	98	136.5	23.9	1.594	13.52	0.397	0.63
Rbt	1+	62-69	65.5	2	0	2	2.0	0.0	0.023	0.20	3.243	0.08
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.00
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.00
Chinook	0+	42-65	50.1	14	6	20	24.5	5.9	0.286	2.43	1.726	0.49
Coho	0+	37-43	40.2	7	2	9	9.8	1.7	0.114	0.97	0.806	0.09
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.00
M. Whitefish	0+	47-48	47.5	0	2	2	2.0	0.0	0.023	0.20	0.705	0.02
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.00
Dolly Varden	0+	29-47	37.5	75	54	129	129.0	104.3	1.506	12.77	0.732	1.10
Dolly Varden	1+	61-88	76.7	2	1	3	4.0	3.5	0.047	0.40	5.642	0.26
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.00
Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.00
TOTAL									3.594	30.48		2.68

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	2.7	LOD		POOL 30	
3	4.6	COBBLE/BOULDER	100	RIFFLE 30	
6	6.3	IN VEG		RUN 40	
9	3.0	OVER VEG		OTHER	
12	4.6	CUTBANK			
15					
18		TOTAL	75	D50/90 7/40	
21					
24					
	4.2				
AREA (M*M)	85.6	MARGIN (M)	20.2		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Moderate habitat

RATIONALE: Slow flat area with limited cover due to small cobble substrate.

STEELHEAD PARR RATING: Poor to moderate habitat

RATIONALE: Limited due to small substrate and low velocity. Some moderate parr habitat in deeper areas along the outer edge.

KITWANGA RIVER STEELHEAD INDEX SITE 1991

SITE: K4 REACH: 3 MAP#: ACCESS: VEH DATE: Aug 16 PHOTO: (1)#4

SITE LOCATION: Kitwanga River, approximately 4 km downstream from Kitwancool.
 Accessed from a small road through the brush, south of pull-out along Highway.
 Sampled a margin of mainstem across the river (right side).

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 2 TEMP (C) 16 Q (cfs): >100
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Approximately 20% of river margin is suitable for fry and parr.
 No spawning in this section. This site may be hard to access in higher flows.
 Caught 2 lamprey ammocoetes.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	29-41	33.6	98	32	130	145.5	8.2	1.549	17.12	0.423	0.66
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.00
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.00
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.00
Chinook	0+	43-72	55.5	37	9	46	48.9	2.9	0.521	5.75	2.375	1.24
Coho	0+	45	45.0	1	0	1	1.0	0.0	0.011	0.12	1.137	0.01
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.00
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.00
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.00
Dolly Varden	0+	27-46	33.9	9	4	13	16.2	5.2	0.172	1.91	0.584	0.10
Dolly Varden	1+	72-96	81.0	4	1	5	5.3	1.0	0.057	0.63	6.421	0.36
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.00
Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.00
TOTAL									2.310	25.52		2.37

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	4.0	LOD		POOL 40	
3	6.2	COBBLE/BOULDER	100	RIFFLE 60	
6	6.0	IN VEG		RUN	
9	5.9	OVER VEG		OTHER	
12		CUTBANK			
15					
18		TOTAL	100	D50/90 15/30	
21					
24					

5.5
 AREA (M*M) 93.9 MARGIN (M) 17.0

HABITAT COMMENTS:

STEELHEAD FRY RATING: Excellent habitat
 RATIONALE: Shallow cobble flats inside half of site.

STEELHEAD PARR RATING: Good habitat
 RATIONALE: Good parr habitat on outer half of site, where chinook were caught.

KITWANGA RIVER STEELHEAD INDEX SITE 1991

SITE: K5 REACH: 3 MAP#: ACCESS: VEH DATE: Aug 16 PHOTO: (1)#3

SITE LOCATION: Kitwanga River below lower bridge crossing at Kitwancool Village.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 2 TEMP (C) 14 Q (cfs): 100
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Observed 6 chinook spawners adjacent to sample site and 6 upstream of bridge. Caught a total of 5 lamprey ammocoetes.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN BIOMASS	
		RANGE	MEAN	1	2	U1+U2					WT	(g/m*m)
Rbt	0+	27-48	36.7	112	30	142	153.0	6.0	1.543	15.07	0.573	0.88
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.00
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.00
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.00
Chinook	0+	51-80	61.1	30	1	31	31.0	0.2	0.313	3.06	3.203	1.00
Coho	0+	47	47.0	1	0	1	1.0	0.0	0.010	0.10	1.298	0.01
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.00
M. Whitefish	0+	62	62.0	0	1	1	1.0	0.0	0.010	0.10	1.768	0.02
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.00
Dolly Varden	0+	31-54	39.6	13	2	15	15.4	0.8	0.155	1.51	0.827	0.13
Dolly Varden	1+	70-91	80.5	2	0	2	2.0	0.0	0.020	0.20	6.328	0.13
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.00
Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.00
TOTAL									2.052	20.04		2.17

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	4.5	LOD		POOL 50	
3	5.4	COBBLE/BOULDER	100	RIFFLE 50	
6	6.0	IN VEG		RUN	
9	5.7	OVER VEG		OTHER	
12	4.9	CUTBANK			
15	2.8				
18		TOTAL	90	D50/90 10/20	
21					
24					
	4.9				
AREA (M*M)	99.1	MARGIN (M)	20.3		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good to Excellent habitat
 RATIONALE: Good cobble riffle with moderate velocity.

STEELHEAD PARR RATING: Good habitat
 RATIONALE: Good rearing for parr in deeper sections but appears to be under-utilized.

KITWANGA RIVER STEELHEAD INDEX SITE 1991

SITE: K6 REACH: 4 MAP#: ACCESS: VEH DATE: Aug 15 PHOTO: (1)#1

SITE LOCATION: Kitwanga River downstream from the Kitwancool Forest Service bridge crossing.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) 1 TEMP (C) 17.5 Q (cfs): N/A
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Large numbers of fry visible along shallow margins.
Observed 2 pinks near sample site, appears to be good spawning in this section.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	28-54	37.4	117	50	167	206.3	16.8	1.419	8.97	0.611	0.87
Rbt	1+	71	71.0	0	1	1	1.0	0.0	0.007	0.04	4.189	0.03
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.00
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.00
Chinook	0+	54-68	60.0	5	1	6	6.3	0.8	0.043	0.27	3.028	0.13
Coho	0+	44-55	49.5	1	1	2	2.0	0.0	0.014	0.09	1.520	0.02
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.00
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.00
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.00
Dolly Varden	0+	33-48	41.0	46	21	67	84.6	12.7	0.582	3.68	0.894	0.52
Dolly Varden	1+	93	93.0	1	0	1	1.0	0.0	0.007	0.04	8.917	0.06
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.00
Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.00
TOTAL									2.072	13.10		1.63

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	7.3	LOD		POOL 50	
3	8.6	COBBLE/BOULDER	100	RIFFLE 50	
6	5.5	IN VEG		RUN	
9	4.9	OVER VEG		OTHER	
12	5.3	CUTBANK			
15					
18		TOTAL	50	D50/90 7/13	
21					
24					
	6.3				
AREA (M*M)	145.4	MARGIN (M)	23.0		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Moderate habitat

RATIONALE: Shallow pool and fast riffle habitat. Moderate habitat, but well-utilized.

STEELHEAD PARR RATING: Poor habitat

RATIONALE: Limited for parr due to shallow depth and small substrate.

KITWANGA RIVER STEELHEAD INDEX SITE 1991

SITE: K7 REACH: 5 MAP#: ACCESS: VEH DATE: Aug 15 PHOTO: (1)#0

SITE LOCATION: Kitwanga River approximately 1.5 km upstream from the Moonlit Creek confluence. Accessed by spur road off old Highway.

SIDE/MAINSTEM: M P=1/F=2 2 SLOPE (%) 2 TEMP (C) 21.5 Q (cfs): <50
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Excellent spawning gravels upstream. Observed 6 sockeye spawners near lake outlet.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	38-58	50.7	13	9	22	43.3	34.3	0.324	2.89	1.741	0.56
Rbt	1+	60-80	68.6	14	7	21	28.0	9.2	0.210	1.87	3.756	0.79
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.00
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.00
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.00
Coho	0+	48-60	55.1	15	3	18	18.8	1.3	0.140	1.25	2.107	0.30
Coho	1+	75	75.0	1	0	1	1.0	0.0	0.007	0.07	5.389	0.04
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.00
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.00
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.00
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.00
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.00
Sculpin	all	32-114	79.8	26	12	38	48.3	9.8	0.362	3.22	5.755	2.08
TOTAL									1.044	9.29		3.77

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	7.3	LOD		POOL	20
3	8.5	COBBLE/BOULDER	70	RIFFLE	50
6	10.9	IN VEG		RUN	30
9		OVER VEG	30	OTHER	
12		CUTBANK			
15					
18		TOTAL	50	D50/90	5/20
21					
24					

8.9
AREA (M*M) 133.5 MARGIN (M) 15.0

HABITAT COMMENTS:

STEELHEAD FRY RATING: Moderate habitat
RATIONALE: Shallow cobble habitat.

STEELHEAD PARR RATING: Moderate habitat
RATIONALE: Shallow cobble habitat.
Warm temperatures (hot weather) seriously limits rearing in this segment of stream.

KITWANGA RIVER STEELHEAD INDEX SITE 1991

SITE: Km1 REACH: 1 MAP#: ACCESS: VEH DATE: Aug 15 PHOTO: (1)#2

SITE LOCATION: Moonlit Creek at rest stop along Highway. Sampled the mainstem just upstream from the old bridge site.

SIDE/MAINSTEM: M P=1/F=2 2 SLOPE (%) 1 TEMP (C) 14 Q (cfs): 40
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Rbt fry were newly-emerged. As a result, sampling at a later date may yield more fry. Kitwanga River temperature decreased considerably downstream of the Moonlit Creek confluence.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	24-29	26.3	5	1	6	6.3	0.8	0.054	0.55	0.182	0.01
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.00
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.00
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.00
Chinook	0+	42-52	48.1	5	2	7	8.3	2.9	0.072	0.74	1.521	0.11
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.00
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.00
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.00
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.00
Dolly Varden	0+	31-47	37.7	33	6	39	40.3	1.7	0.350	3.57	0.741	0.26
Dolly Varden	1+	62-107	74.2	7	2	9	9.8	1.7	0.085	0.87	5.215	0.44
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.00
Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.00
TOTAL									0.561	5.73		0.82

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	9.9	LOD		POOL 40	70.000
3	10.2	COBBLE/BOULDER	100	RIFFLE 20	15
6	10.5	IN VEG		RUN 40	
9		OVER VEG		OTHER	
12		CUTBANK			
15					
18		TOTAL	40	D50/90 5/15	
21					
24					

10.2
AREA (M*M) 115.3 MARGIN (M) 11.3

HABITAT COMMENTS:

STEELHEAD FRY RATING: Moderate to Poor habitat

RATIONALE: Heavy flow in mid-channel with small compact cobbles. Some moderate habitat in flat areas along the margin.

STEELHEAD PARR RATING: Not rated.

RATIONALE: Assumed to be Poor habitat due to limited cover from small substrate.

Appendix 2. Site Descriptions and Detailed Results of Fish Sampling in the Morice River and Tributaries.

Appendix 2 Table 1. Morice River Catch Composition for Sample Sites.

FILE = SUMMARY

CATCH COMPOSITION

SITE	LOCATION	RAINBOW			CHINOOK		COHO	DOLLY WHITE-		LN	SCULPIN	SUCKER	AREA	LENGTH
		FRY	1+	2+				VARDEN	FISH					
M1	Reach 3	45	1	0	17	0	0	0	2	1	0	79	23.6	
M2	"	45	4	2	37	6			8			125	19	
M3	Reach 2	45	24	17	43	21						274	28	
M4	"	44	0	0	12	1			117	1		158	30	
M5	"	62	4	3	58	20		2	16			185	28.3	
M6	"	39	25	23	44	36	4	1	5	2		150	24.2	
M7	"	24	0	0	2					6		131	23.7	
M8	"	32	8	5	49	21	2			6		155	19	
M9	"	45	2	0	0	1				2		227	17.1	
M10	"	61	2	0	4	25		1	1	10		215	20.1	
M11	Reach 1	1	0	0	1	1				5		47	14.9	
M12	"	62	1	2	15	44				3		128	25.4	
M13	"	12	1	6	43	27				4		67	16.2	
M14	"	21	7	1	8	4						94	23.8	
M15	"	92	16	12	43	102		1		5		287	24.9	
M16	"	53	2	0	1	1			2	5		116	24.8	
M17	"	39	2	0	2					3		118	25.1	
M18	"	21	0	4					1	1		125	25.3	
M19	"	20	0		8					4		75	16.8	
M20	"	60	0		8	5				5		320	28.6	
M21	"	8	0		1		0			1		77	12.3	
M22	"	36	0		2	3	0			5		111	16.1	
Mb1	Buck Creek	175	18	16				1	282		13	390	43	
Mh1	Houston Tommy		1	8		9	1					160	19.6	
Mh2	Houston To	2	1	0		50	15					150	15.9	
Mo1	Owen 1	124	5	0	1	4	2		1			107	18	
Mo2	Owen 4	153	17	10			4	5	2			136	20.2	
Mo3	Owen 5	125	8	1			9		29			94	15.4	
Ml1	Lamprey 1	158	5	5	56	57		11	7			171	30.9	
Ml2	Lamprey 2	28	9	0				2	1			196	29.3	
Ml3	Lamprey 2	282	12	0					38			143	23.5	
Mt1	Thautil 1	41	7	0		1	3					107	19.3	
Mt2	Thautil 1	12	9	4			8					101	19.5	
Mt3	Thautil 1	18	5	0		5	11					99	17.6	
Mt4	Thautil 1	18	9	6		19						143	19.9	
Mg1	Gosnell 1	83	13	0			1	29				301	18.2	
Mg2	Gosnell 2	54	5	0		5	3			1		99	17.1	
Mg3	Gosnell 3	6	0			25	4	3				145	29.6	
Ms1	Shea 1	89	16	0		22	23	1	1			160	16.8	
Ms2	Shea 2	53	13	3		4	5		4			132	16	
TOTAL		2287	252	128	455	517	95	57	517	70	13	6097	4390	
PERCENT		52.1	5.7	2.9	10.4	11.8	2.2	1.3	11.8	1.6	0.3		100	

Appendix 2 Table 1 (cont'd). Morice River Catch Composition by Reach and Tributaries.

FILE = SUMMARY (bottom)

LOCATION	RAINBOW		CHINOOK		COHO	DOLLY WHITE		LN	SCULPIN	SUCKER	AREA	TOTAL
	FRY	1+	2+	VARDEN		FISH	DACE					
REACH 3	90	5	2	54	6	0	0	10	1	0	205	169
%	53.5	3.0	1.2	32.1	3.6	0.0	0.0	6.1	0.6	0.0		100
REACH 2	352	65	48	212	124	6	4	139	27	0	1496	977
%	36.0	6.7	4.9	21.7	12.7	0.6	0.4	14.2	2.8	0.0		100
REACH 1	425	29	25	132	187	0	1	3	40	0	1565	842
%	50.5	3.4	3.0	15.7	22.2	0.0	0.1	0.4	4.8	0.0		100
REACHES 1-3	867	99	75	398	317	6	5	152	69	0	3265	1987
%	43.6	5.0	3.8	20.0	15.9	0.3	0.3	7.7	3.5	0.0		100
HOUSTON TOMMY	2	2	8	0	59	16	0	0	0	0	309.6	87
%	2.3	2.3	9.2	0.0	67.7	18.6	0.0	0.0	0.0	0.0		100
OWEN	402	30	11	1	4	15	5	32	0	0	336	500
%	80.4	6.0	2.2	0.2	0.8	3.0	1.1	6.3	0.0	0.0		100
LAMPREY	467	26	5	56	57	0	13	46	0	0	510	669
%	69.8	3.9	0.7	8.3	8.4	0.0	1.9	6.9	0.0	0.0		100
THAUTIL	88	30	10	0	25	22	0	0	0	0	451	176
%	50.3	17.1	5.7	0.0	14.4	12.5	0.0	0.0	0.0	0.0		100
GOSNELL	143	18	0	0	30	8	32	0	1	0	544	232
%	61.7	7.8	0.0	0.0	12.9	3.4	13.8	0.0	0.4	0.0		100
SHEA	143	29	3	0	26	28	1	5	0	0	292	234
%	60.9	12.4	1.3	0.0	11.1	11.8	0.4	2.1	0.0	0.0		100
BUCK	175	18	16	0	0	0	1	282	0	13	390	505
%	34.7	3.6	3.2	0.0	0.0	0.0	0.2	55.8	0.0	2.6		100
ALL TRIBS COMBIN	1420	153	53	57	201	89	52	365	1	13	2831	2403
%	59.1	6.4	2.2	2.4	8.4	3.7	2.2	15.2	0.0	0.5		100

Appendix 2 Table 2. Summary of Morice River Biomass Estimates in Mainstem and Tributaries.

FILE = SUMBIO

SITE	LOCATION	FILE = SUMBIO										TOTAL
		RAINBOW FRY	CHINOOK PARR	CHINOOK	COHO	DOLLY VARDEN	WHITEFISH	LN	DACE	SCULPIN	SUCKER	
M1	Reach 3	0.830	0.059	0.966	0.000	0.000	0.000	0.034	0.185	0.000	79	2.074
M2	"	0.525	0.419	1.178	0.230	0.000	0.000	0.077	0.000	0.000	125	2.429
M3	Reach 2	0.240	1.518	0.949	0.353	0.000	0.000	0.000	0.000	0.000	274	3.060
M4	"	0.272	0.000	0.255	0.020	0.000	0.000	0.816	0.031	0.000	158	1.394
M5	"	0.289	0.373	0.900	0.188	0.000	0.010	0.089	0.000	0.000	185	1.849
M6	"	0.339	4.018	1.027	0.967	2.130	0.014	0.032	0.052	0.000	150	8.579
M7	"	0.186	0.000	0.042	0.000	0.000	0.000	0.000	0.112	0.000	131	0.340
M8	"	0.179	0.749	1.147	0.216	0.000	0.000	0.000	0.218	0.000	155	2.509
M9	"	0.116	0.046	0.000	0.006	0.000	0.000	0.000	0.008	0.000	227	0.176
M10	"	0.166	0.049	0.058	0.243	0.000	0.008	0.010	0.040	0.000	215	0.574
M11	Reach 1	0.020	0.000	0.069	0.028	0.000	0.000	0.000	0.797	0.000	47	0.914
M12	"	0.413	0.222	0.407	0.457	0.000	0.000	0.000	0.024	0.000	128	1.523
M13	"	0.185	1.382	2.734	0.880	0.000	0.000	0.000	0.474	0.000	67	5.655
M14	"	0.281	0.646	0.383	0.085	0.000	0.000	0.000	0.000	0.000	94	1.395
M15	"	0.325	1.056	0.559	0.449	0.000	0.064	0.000	0.146	0.000	287	2.599
M16	"	0.468	0.150	0.033	0.009	0.000	0.000	0.034	0.182	0.000	116	0.876
M17	"	0.382	0.142	0.059	0.000	0.000	0.000	0.000	0.115	0.000	118	0.698
M18	"	0.211	0.555	0.000	0.000	0.000	0.000	0.098	0.100	0.000	125	0.964
M19	"	0.506	0.000	0.414	0.000	0.000	0.000	0.000	0.134	0.000	75	1.054
M20	"	0.202	0.000	0.106	0.023	0.000	0.000	0.000	0.062	0.000	320	0.393
M21	"	0.151	0.000	0.057	0.000	0.000	0.000	0.000	0.030	0.000	77	0.238
M22	"	0.435	0.000	0.063	0.038	0.000	0.000	0.000	0.350	0.000	111	0.886
Mb1	Buck Creek	0.700	1.110	0.000	0.000	0.000	0.003	2.040	0.000	0.680	390	4.533
Mh1	Houston Tommy	0.000	1.293	0.000	0.118	0.063	0.000	0.000	0.000	0.000	160	1.474
Mh2	Houston Tommy	0.015	0.045	0.000	1.141	0.547	0.000	0.000	0.000	0.000	150	1.748
Mo1	Owen 1	1.131	0.273	0.026	0.107	0.022	0.000	0.025	0.000	0.000	107	1.584
Mo2	Owen 4	1.405	2.150	0.000	0.000	0.165	0.133	0.031	0.000	0.000	136	3.884
Mo3	Owen 5	2.413	0.763	0.000	0.000	0.365	0.000	1.462	0.000	0.000	94	5.003
ML1	Lamprey 1	1.202	0.738	1.002	0.940	0.000	0.077	0.043	0.000	0.000	171	4.002
ML2	Lamprey 2	0.141	0.290	0.000	0.000	0.000	0.031	0.002	0.000	0.000	196	0.464
ML3	Lamprey 2	2.403	0.475	0.000	0.000	0.000	0.000	0.345	0.000	0.000	143	3.223
Mt1	Thautil 1	0.334	0.456	0.000	0.009	0.077	0.000	0.000	0.000	0.000	107	0.876
Mt2	Thautil 1	0.156	1.344	0.000	0.000	0.336	0.000	0.000	0.000	0.000	101	1.836
Mt3	Thautil 1	0.217	0.288	0.000	0.123	0.503	0.000	0.000	0.000	0.000	99	1.131
Mt4	Thautil 1	0.196	1.274	0.000	0.095	0.524	0.000	0.000	0.000	0.000	143	2.089
Mg1	Gosnell 1	0.273	0.345	0.000	0.000	0.022	0.264	0.000	0.000	0.000	301	0.904
Mg2	Gosnell 2	0.250	0.259	0.000	0.047	0.033	0.000	0.000	0.366	0.000	99	0.955
Mg3	Gosnell 3	0.020	0.000	0.000	0.301	0.040	0.093	0.000	0.000	0.000	145	0.454
Ms1	Shea 1	0.399	0.538	0.000	0.235	1.001	0.011	0.102	0.000	0.000	160	2.286
Ms2	Shea 2	0.277	1.126	0.000	0.102	0.254	0.000	0.474	0.000	0.000	132	2.233
TOTAL		18.25	24.15	12.43	7.41	6.08	0.71	5.71	3.43	0.68	6097	78.86
PERCENT		23.1	30.6	15.8	9.4	7.7	0.9	7.2	4.3	0.9		100
MEAN		0.456	0.604	0.311	0.185	0.152	0.018	0.143	0.086	0.017		1.971

Appendix 2 Table 2 (cont'd). Summary of Morice River Biomass Estimates in Mainstem and Tributaries.

LOCATION	RAINBOW FRY	CHINOOK PARR	CHINOOK	COHO	DOLLY VARDEN	WHITEFISH	LN DACE	SCULPIN	SUCKER	AREA	TOTAL
REACH 3	0.678	0.239	1.072	0.115			0.056	0.093		205	2.252
REACH 2	0.223	0.844	0.547	0.249	0.266	0.004	0.118	0.058		1496	2.310
REACH 1	0.298	0.346	0.407	0.164		0.005	0.011	0.201		1565	1.433
REACHES 1-3	0.306	0.517	0.518	0.191	0.097	0.004	0.054	0.139		3265	1.826
HOUSTON TOMMY	0.008	0.669		0.630	0.305					309.	1.611
OWEN	1.650	1.062	0.009	0.036	0.184	0.044	0.506			336	3.490
LAMPREY	1.249	0.501	0.334	0.313		0.036	0.130			510	2.563
THAUTIL	0.226	0.841		0.057	0.360					451	1.483
GOSNELL	0.181	0.201		0.116	0.032	0.119		0.122		544	0.771
SHEA	0.338	0.832		0.169	0.628	0.006	0.288			292	2.260
BUCK	0.700	1.110	0.000	0.000	0.000	0.003	2.040	0.000	0.680	390	4.533
ALL TRIBS COMBINED	0.641	0.709	0.057	0.179	0.220	0.034	0.251	0.020	0.038	2831	2.149

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: M1 REACH: 3 MAP#: 93L/7 ACCESS: VEH DATE: Oct 1 PHOTO: (5)#7

SITE LOCATION: Morice River at the Aspen Forest Service Rec. Area.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) <1 TEMP (C) 11 Q (cfs): 1000+
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Algae is abundant on substrate.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN BIOMASS	
		RANGE	MEAN	1	2	U1+U2					WT	(g/m*m)
Rbt	0+	32-65	50.0	36	7	43	44.7	2.0	0.565	3.79	1.469	0.830
Rbt	1+	74	74.0	1	0	1	1.0	0.0	0.013	0.08	4.688	0.059
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	61-81	70.4	16	1	17	17.1	0.3	0.216	1.45	4.475	0.966
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all	37-49	43.0	0	2	2	2.0	0.0	0.025	0.17	1.349	0.034
Prickly Sculpin	all	107	107.0	1	0	1	1.0	0.0	0.013	0.08	14.640	0.185
TOTAL									0.832	5.57		2.075

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	4.3	LOD		POOL	
3	4.1	COBBLE/BOULDER	100	RIFFLE	80
6	3.5	IN VEG		RUN	20
9	3.3	OVER VEG		OTHER	20
12	3.0	CUTBANK			
15	1.9				
18		TOTAL	80	050/90	12/30
21					
24					
	3.4				
AREA (M*M)	79.1	MARGIN (M)	23.6		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good habitat

RATIONALE: Good along margin in large cobbles with low velocity.

STEELHEAD PARR RATING: Moderate habitat

RATIONALE: Some deeper sections could be improved with slightly less velocity and some larger cobble/boulder substrate. No cutbanks or LOD in this site.

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: M2 REACH: 3 MAP#: 93L/7 ACCESS: VEH DATE: Oct 3 PHOTO: (5)#14

SITE LOCATION: Morice River at the Aspen Forest Service Rec. Area.
 Located approximately 0.5 km upstream from Site M1.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) <1 TEMP (C) 11 Q (cfs): 1000+
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Algae is abundant on substrate.
 Coho were grouped as age 0+.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN BIOMASS	
		RANGE	MEAN	1	2	U1+U2					WT	(g/m*m)
Rbt	0+	42-62	49.8	33	9	42	45.4	3.3	0.362	4.78	1.451	0.525
Rbt	1+	67-84	78.8	4	0	4	4.0	0.0	0.032	0.42	5.012	0.160
Rbt	2+	115-117	116.0	2	0	2	2.0	0.0	0.016	0.21	16.210	0.259
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	56-89	67.3	36	1	37	37.0	0.2	0.295	3.90	3.988	1.178
Coho	0+	56-104	72.3	6	0	6	6.0	0.0	0.048	0.63	4.815	0.230
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all	33-52	40.7	5	2	7	8.3	2.9	0.066	0.88	1.166	0.077
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.819	10.81		2.429

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	5.3	LOD		POOL	
3	6.2	COBBLE/BOULDER	100	RIFFLE	100
6	7.4	IN VEG		RUN	
9	8.7	OVER VEG		OTHER	
12	5.4	CUTBANK			
15					
18		TOTAL	100	D50/90	12/28
21					
24					

6.6
 AREA (M*M) 125.4 MARGIN (M) 19.0

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good habitat in some sections
 RATIONALE: Good along margin in shallow cobbles.

STEELHEAD PARR RATING: Good habitat
 RATIONALE: Some deeper sections with cobble and boulder substrate.
 Appears to be under-utilized by parr.

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: M3 REACH: 2 MAP#: 93L/2 ACCESS: VEH DATE: Oct 1 PHOTO: (5)#6

SITE LOCATION: Morice River sidechannel at 33 Km on the mainline.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) 1.5 TEMP (C) 12 Q (cfs): 20-30
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Pink spawners were abundant in most lower velocity riffle sections.
 Coho were grouped as age 0+.

POPULATION ESTIMATES:

SPECIES	AGE	FL RANGE	FL MEAN	PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
				1	2	U1+U2						
Rbt	0+	35-59	49.9	15	10	25	45.0	30.0	0.164	1.61	1,460	0.240
Rbt	1+	66-97	84.7	7	5	12	24.5	30.3	0.089	0.88	6,241	0.558
Rbt	2+	100-133	115.0	10	4	14	16.7	4.2	0.061	0.60	15,780	0.960
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	54-92	79.3	30	9	39	42.9	3.8	0.156	1.53	6,066	0.949
Coho	0+	57-91	71.9	15	4	19	20.5	2.2	0.075	0.73	4,735	0.353
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.545	5.34		3.059

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	11.6	LOD	60	POOL 20	100
3	10.1	COBBLE/BOULDER		RIFFLE 40	25
6	10.9	IN VEG		RUN 40	
9	10.7	OVER VEG	20	OTHER	
12	9.6	CUTBANK	10		
15	8.5	DP POOL	10		
18	8.8			D50/90 4/15	
21	8.1	TOTAL	30		
24					
	9.8				
AREA (M*M)	274.1	MARGIN (M)	28.0		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Poor habitat except along margins.

RATIONALE: Generally too deep with high velocity and limited cobble/boulder cover.
 Caught some fry along margins and around LOD sections.

STEELHEAD PARR RATING: Good to Excellent habitat

RATIONALE: Productive sections within LOD and cutbank areas adjacent to fast-flowing water.
 Small substrate limits cover in pool and riffle sections.

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: M4 REACH: 2 MAP#: 93L/3 ACCESS: VEH DATE: Sept 30 PHOTO: (5)#5

SITE LOCATION: Morice River, 50 M above Lamprey Creek confluence.
Right side of mainstem along margin.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) <1 TEMP (C) N/A Q (cfs): >1000
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Site is characteristic of the gravel bar edge habitat within this reach.
Heavy algae growth along margin.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	30-53	43.6	35	7	42	43.8	2.0	0.277	2.92	0.985	0.272
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	70-57	62.9	6	3	9	12.0	6.0	0.076	0.80	3.356	0.255
Coho	0+	63	63.0	1	0	1	1.0	0.0	0.006	0.07	3.166	0.020
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all	28-49	39.8	65	29	94	117.4	14.1	0.742	7.82	1.099	0.816
Prickly Sculpin	all	76	76.0	0	1	1	1.0	0.0	0.006	0.07	4.927	0.031
TOTAL									1.107	11.67		1.394

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	3.7	LOD		POOL	
3	5.8	COBBLE/BOULDER	99	RIFFLE	
6	6.0	IN VEG		RUN	100
9	6.9	OVER VEG	1	OTHER	25
12	5.4	CUTBANK			
15	4.5				
18	4.6	TOTAL (Fry cover)	100	D50/90	3/20
21					
24					

5.3
AREA (M*M) 158.1 MARGIN (M) 30.0

HABITAT COMMENTS:

STEELHEAD FRY RATING: Moderate to Good habitat

RATIONALE: Shallow riffle throughout most of site, substrate is small but adequate for fry.

STEELHEAD PARR RATING: Poor habitat

RATIONALE: Limited by shallow depth and inadequate cover for parr.

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: M5 REACH: 2 MAP#: 93L/3 ACCESS: VEH DATE: Sept 30 PHOTO: (5)#3

SITE LOCATION: Morice River sidechannel at the 50.5 Km boat launch (Morice West road).

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) 2 TEMP (C) 12 Q (cfs): 2-3
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Heavy algae growth throughout this section.
 Approximately 15 dead fry and parr recovered around sample site. Some individuals were just dying or newly-dead.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN	BIOMASS
		RANGE	MEAN	1	2	U1+U2					WT	(g/m*m)
Rbt	0+	30-62	41.6	37	15	52	62.2	8.3	0.336	2.20	0.859	0.289
Rbt	1+	82-95	88.0	4	0	4	4.0	0.0	0.022	0.14	7.007	0.151
Rbt	2+	105-115	109.7	3	0	3	3.0	0.0	0.016	0.11	13.680	0.222
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	37-78	59.3	38	13	51	57.8	5.6	0.312	2.04	2.887	0.900
Coho	0+	38-66	51.8	10	5	15	20.0	7.7	0.108	0.71	1.744	0.188
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+	48-43	45.5	1	1	2	2.0	0.0	0.011	0.07	0.965	0.010
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all	32-48	38.8	12	3	15	16.0	1.7	0.086	0.57	1.028	0.089
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.891	5.83		1.850

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	8.9	LOD	50	POOL 80	40
3	4.8	COBBLE/BOULDER	50	RIFFLE 20	6
6	8.0	IN VEG		RUN	
9	7.5	OVER VEG		OTHER	
12	7.3	CUTBANK			
15	5.9				
18	5.0	TOTAL	30	D50/90 5/12	
21	6.2				
24	5.3				
	6.5				
AREA (M*M)	185.2	MARGIN (M)	28.3		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Moderate to Good habitat
 RATIONALE: Low velocity sidechannel with some cobble and debris cover.

STEELHEAD PARR RATING: Moderate to Good habitat in some sections
 RATIONALE: Good in deeper sections with pool and LOD habitat. The lower section of this site is mainly shallow riffle and limited for parr habitat.

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: M6 REACH: 2 MAP#: 93L/3 ACCESS: VEH DATE: Sept 9 PHOTO: (5)#4

SITE LOCATION: Morice River, 50.5 Km boat launch on the Morice West. Adjacent to Site M5 along mainstem logjam habitat.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) <1 TEMP (C) 12 Q (cfs): >1000
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Sampled debris-jam habitat along the mainstem morice. Coho were grouped as age 0+.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	34-61	48.0	25	9	34	39.1	5.1	0.260	3.23	1.304	0.339
Rbt	1+	69-96	84.2	10	6	16	25.0	15.0	0.167	2.07	6.129	1.021
Rbt	2+	99-129	110.7	11	4	15	17.3	3.5	0.115	1.43	14.060	1.620
Rbt	3+	145-166	154.6	4	1	5	5.3	1.0	0.036	0.44	38.750	1.377
Chinook	0+	50-80	63.9	23	11	34	44.1	10.2	0.294	3.64	3.494	1.027
Coho	0+	42-102	68.2	30	5	35	36.0	1.4	0.240	2.98	4.031	0.967
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+	60	60.0	1	0	1	1.0	0.0	0.007	0.08	2.162	0.014
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+	172-206	189.0	2	1	3	4.0	3.5	0.027	0.33	79.910	2.130
Longnose Dace	all	29-43	39.5	3	1	4	4.5	1.5	0.030	0.37	1.077	0.032
Prickly Sculpin	all	70-71	70.5	1	1	2	2.0	0.0	0.013	0.17	3.880	0.052
TOTAL									1.188	14.73		8.580

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	1.9	LOD	75	POOL 80	
3	2.5	COBBLE/BOULDER	25	RIFFLE	
6	5.5	IN VEG		RUN 20	40
9	7.1	OVER VEG		OTHER	
12	8.2	CUTBANK			
15	11.4				
18	10.9	TOTAL	80	D50/90 4/13	
21	4.3				
24	4.0				
	6.2				
AREA (M*M)	150.0	MARGIN (M)	24.2		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good habitat

RATIONALE: Low velocity site with good cover from LOD and some small cobble.

STEELHEAD PARR RATING: Excellent habitat

RATIONALE: Deep sections under LOD, along the mainstem. This habitat type is typical for much of this reach.

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: M7 REACH: 2 MAP#: ACCESS: BOAT DATE: Sept 26 PHOTO: (4)#21

SITE LOCATION: Morice River, approximately 2.5 km downstream of the Gosnell Creek confluence. Adjacent to sample Site S8.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 1 TEMP (C) 13 Q (cfs): >1000
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Heavy algae growth on substrate.

POPULATION ESTIMATES:

SPECIES	AGE	FL RANGE	FL MEAN	PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
				1	2	U1+U2						
Rbt	0+	33-54	44.0	17	5	22	24.1	2.8	0.183	2.03	1.012	0.186
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	57-59	58.0	2	0	2	2.0	0.0	0.015	0.17	2.728	0.042
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all	55-65	60.2	5	1	6	6.3	0.8	0.048	0.53	2.347	0.112
TOTAL									0.246	2.73		0.339

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	3.7	LOD		POOL	
3	4.8	COBBLE/BOULDER	100	RIFFLE	70
6	5.9	IN VEG		RUN	30
9	7.1	OVER VEG		OTHER	
12	6.7	CUTBANK			
15	6.8				
18	3.8	TOTAL	70	D50/90	8/35
21					
24					
	5.5				
AREA (M*M)	131.4	MARGIN (M)	23.7		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Moderate to Good habitat

RATIONALE: Good for fry inside high velocity current along a 2 meter edge. Cobble substrate within the site is adequate cover for fry.

STEELHEAD PARR RATING: Moderate habitat

RATIONALE: Limited cover for parr and high velocity along outer edge of site. Site disturbance during re-bar installation (slippery substrate) may have reduced the number of parr within the site.

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: M8 REACH: 2 MAP#: ACCESS: BOAT DATE: Sept 26 PHOTO: (4)#19,20

SITE LOCATION: Morice River, approximately 2.5 km downstream from the Gosnell Creek confluence. Adjacent to Site M7.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) <1 TEMP (C) 13 Q (cfs): 10-15
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Caught 1 lamprey ammocoete.
 Due to the poor catch reduction on coho and chinook, Pass 1 and 2 were combined to make a minimum estimate.

POPULATION ESTIMATES:

SPECIES	AGE	FL RANGE	FL MEAN	PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
				1	2	U1+U2						
Rbt	0+	29-56	41.7	16	8	24	32.0	9.8	0.207	1.68	0.865	0.179
Rbt	1+	82-96	88.7	5	2	7	8.3	2.9	0.054	0.44	7.178	0.387
Rbt	2+	98-121	106.3	3	1	4	4.5	1.5	0.029	0.24	12.430	0.362
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	49-76	64.8	30	19	49	49.0	33.0	0.317	2.58	3.621	1.147
Coho	0+	45-61	50.2	11	10	21	21.0	504.1	0.136	1.11	1.588	0.216
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+	192-198	195.0	2	0	2	2.0	0.0	0.013	0.11	83.450	1.079
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all	52-98	79.2	6	0	6	6.0	0.0	0.039	0.32	5.618	0.218
TOTAL									0.794	6.46		3.586

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	9.2	LOD	15	POOL 50	70
3	9.0	COBBLE/BOULDER	80	RIFFLE	
6	7.9	IN VEG		RUN 50	15
9	8.0	OVER VEG	5	OTHER	
12	8.8	CUTBANK			
15	8.3				
18	5.8	TOTAL	80	D50/90 8/15	
21					
24					
	8.1				
AREA (M*M)	154.7	MARGIN (M)	19.0		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Moderate habitat

RATIONALE: Deep with high velocity water along much of this site. Fry habitat is confined to margin sections with cobble substrate.

STEELHEAD PARR RATING: Good habitat

RATIONALE: Deep with good cobble cover for approximately 75% of site. Excellent cover in small debris complex, where most parr were caught.

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: M9 REACH: 2 MAP#: ACCESS: BOAT DATE: Sept 26 PHOTO: (4)#17,18

SITE LOCATION: Morice River, approximately 0.8 km downstream of Gosnell Creek confluence.
Shallow riffle at top end of gravel island.

SIDE/MAINSTEM: S P=1/F=2 1 SLOPE (%) 3 TEMP (C) 11 Q (cfs): >100
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Many of the Rbt fry caught in shallow sections are newly-emerged and have not moved onto feeding areas with higher velocity.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	30-46	36.5	43	2	45	45.1	0.3	0.198	5.27	0.587	0.116
Rbt	1+	80	80.0	2	0	2	2.0	0.0	0.009	0.23	5.247	0.046
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+	48	48.0	1	0	1	1.0	0.0	0.004	0.12	1.383	0.006
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all	26-62	44.0	2	0	2	2.0	0.0	0.009	0.23	0.866	0.008
TOTAL									0.220	5.86		0.176

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	3.2	LOD		POOL	
3	9.5	COBBLE/BOULDER	100	RIFFLE	100
6	12.6	IN VEG		RUN	
9	15.5	OVER VEG		OTHER	
12	15.0	CUTBANK			
15	24.0				
18		TOTAL	90	D50/90	7/15
21					
24					
	13.3				
AREA (M*M)	227.4	MARGIN (M)	17.1		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Upper half Good habitat, lower half Moderate to Good habitat.
RATIONALE: Gravel and cobble riffle with moderate flow. Lower section is limited by higher velocity and shallow depth.

STEELHEAD PARR RATING: Poor

RATIONALE: Limited for parr due to shallow depth and small substrate for cover.

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: M10 REACH: 1 MAP#: ACCESS: Boat Sept 26 PHOTO: (4)#16

SITE LOCATION: Morice River sidechannel approximately 0.8 km downstream of Gosnell Creek confluence. Adjacent to Site M9.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) 1 TEMP (C) 11 Q (cfs): <5
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL RANGE	FL MEAN	PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
				1	2	U1+U2						
Rbt	0+	29-47	36.5	42	13	55	60.8	4.8	0.282	3.03	0.587	0.166
Rbt	1+	77-83	80.0	2	0	2	2.0	0.0	0.009	0.10	5.247	0.049
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	56-68	61.3	4	0	4	4.0	0.0	0.019	0.20	3.142	0.058
Coho	0+	39-91	55.4	7	5	12	24.5	30.3	0.114	1.22	2.140	0.243
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+	55	55.0	0	1	1	1.0	0.0	0.005	0.05	1.655	0.008
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all	51	51.0	1	0	1	1.0	0.0	0.005	0.05	2.119	0.010
Prickly Sculpin	all	21-88	44.0	10	0	10	10.0	0.0	0.046	0.50	0.866	0.040
TOTAL									0.480	5.14		0.574

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	11.6	LOO	5	POOL	
3	12.4	COBBLE/BOULDER	95	RIFFLE	50
6	14.9	IN VEG		RUN	50
9	9.2	OVER VEG		OTHER	
12	7.9	CUTBANK			
15	8.3				
18		TOTAL	80	D50/90	
21					
24					
	10.7				
AREA (M*M)	215.4	MARGIN (M)	20.1		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good habitat

RATIONALE: Shallow cobble and gravel run with a small riffle, could be improved with slightly larger substrate and more riffle.

STEELHEAD PARR RATING: Poor habitat

RATIONALE: Limited by depth, velocity and cover.

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: M11 REACH: 1 MAP#: ACCESS: BOAT DATE: Sept 25 PHOTO: (4)#14

SITE LOCATION: Morice River, approximately 500 m upstream of Gosnell Creek confluence.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) <1 TEMP (C) 13.5 Q (cfs): >1000
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Used 2 barrier nets, sampled the edge of a fast mainstem run.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	43	43.0	1	0	1	1.0	0.0	0.021	0.13	0.947	0.020
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	62	62.0	1	0	1	1.0	0.0	0.021	0.13	3.235	0.069
Coho	0+	47	47.0	0	1	1	1.0	0.0	0.021	0.13	1.297	0.028
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all	63-110	85.0	4	1	5	5.3	1.0	0.113	0.72	7.036	0.797
TOTAL									0.177	1.12		0.913

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	2.5	LOD		POOL	
3	3.8	COBBLE/BOULDER	100	RIFFLE	
6	3.7	IN VEG		RUN	100
9	3.1	OVER VEG		OTHER	
12	2.7	CUTBANK			
15					
18		TOTAL	75	D50/90	15/60
21					
24					
	3.2				
AREA (M*M)	47.1	MARGIN (M)	14.9		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Poor to Moderate habitat

RATIONALE: Good cobble substrate, but drops off quickly. Fry habitat is limited to a 1 meter strip along margin.

STEELHEAD PARR RATING: Moderate habitat

RATIONALE: Large substrate with good interstitial spaces for cover. However, (slippery) algae growth made it hard to put nets in without some site disturbance.

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: M12 REACH: 1 MAP#: ACCESS: BOAT DATE: Sept 25 PHOTO: (4)#12

SITE LOCATION: Morice River sidechannel, approximately 0.5 km upstream from the upper bridge crossing. Sample Area A from Envirocon studies.

SIDE/MAINSTEM: S P=1/F=2 SLOPE (%) <1 TEMP (C) 15 Q (cfs): Almost no flow in Site.
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Sampled a blind bay area.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	35-51	41.6	52	8	60	61.5	1.7	0.481	2.42	0.859	0.413
Rbt	1+	87	87.0	1	0	1	1.0	0.0	0.008	0.04	6.768	0.053
Rbt	2+	100-103	101.5	1	1	2	2.0	0.0	0.016	0.08	10.810	0.169
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	46-79	63.1	13	2	15	15.4	0.8	0.120	0.60	3.383	0.407
Coho	0+	37-65	47.5	28	10	38	43.6	5.3	0.341	1.71	1.339	0.457
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all	23-91	46.3	3	0	3	3.0	0.0	0.023	0.12	1.018	0.024
TOTAL									0.989	4.98		1.523

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	8.5	LOD	10	POOL	
3	6.1	COBBLE/BOULDER	90	RIFFLE	
6	4.5	IN VEG		RUN	
9	4.5	OVER VEG		FLAT	100
12	5.5	CUTBANK			15
15	4.0				
18	2.1	TOTAL (Fry cover)	100	D50/90	4/11
21					
24					

5.0
 AREA (M*M) 127.7 MARGIN (M) 25.4

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good habitat

RATIONALE: Different habitat than is typically sampled. Blind bay area with good fry habitat due to warm temperatures and small cobble and some LOD cover.

STEELHEAD PARR RATING: Poor habitat

RATIONALE: Limited habitat due to shallow depth and small substrate. Some parr cover around LOD section.

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: M13 REACH: 1 MAP#: ACCESS: BOAT DATE: Sept 25 PHOTO: (4)#13

SITE LOCATION: Morice River sidechannel, approximately 500 m upstream from Site M12.

SIDE/MAINSTEM: S P=1/F=2 1 SLOPE (%) 1 TEMP (C) 13 Q (cfs): 100
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Heavy algae growth on substrate.
Hard to retrieve fish from spaces in cobbles. Caught 2 lamprey ammocoetes.
Coho were grouped as age 0+.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	37-51	44.3	6	3	9	12.0	6.0	0.179	1.48	1.032	0.185
Rbt	1+	92	92.0	0	1	1	1.0	0.0	0.015	0.12	8.019	0.120
Rbt	2+	100-127	110.8	6	0	6	6.0	0.0	0.089	0.74	14.110	1.262
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	49-82	69.3	32	8	40	42.7	2.8	0.636	5.27	4.298	2.734
Coho	0+	43-91	56.0	20	5	25	26.7	2.2	0.398	3.29	2.212	0.880
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all	81-99	88.3	4	0	4	4.0	0.0	0.060	0.49	7.942	0.474
TOTAL									1.377	11.40		5.654

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	3.2	LOD		POOL 70	70
3	6.0	COBBLE/BOULDER	100	RIFFLE 30	50
6	4.9	IN VEG		RUN	
9	4.0	OVER VEG		OTHER	
12	2.6	CUTBANK			
15					
18		TOTAL	95	D50/90 20/35	
21					
24					

4.1
AREA (M*M) 67.1 MARGIN (M) 16.2

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good habitat

RATIONALE: Good along edge in lower velocity sections. Large cobble substrate with good interstitial spaces for cover.

STEELHEAD PARR RATING: Good to Excellent habitat

RATIONALE: Good depth, cobble cover and velocity away from margin.

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: M14 REACH: 1 MAP#: ACCESS: BOAT DATE: Sept 25 PHOTO: (4)#11

SITE LOCATION: Morice River at the large gravel bank, approximately 3.5 km upstream from the upper Morice bridge crossing.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 1.5 TEMP (C) 12.5 Q (cfs): >1000
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL	FL	PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN	BIOMASS
		RANGE	MEAN	1	2	U1+U2					WT	(g/m*m)
Rbt	0+	33-58	47.2	16	4	20	21.3	2.0	0.226	1.79	1.242	0.281
Rbt	1+	67-95	86.9	6	1	7	7.2	0.6	0.076	0.61	6.746	0.515
Rbt	2+	106	106.0	1	0	1	1.0	0.0	0.011	0.08	12.330	0.131
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	67-74	70.6	8	0	8	8.0	0.0	0.085	0.67	4.508	0.383
Coho	0+	44-61	54.3	2	1	3	4.0	3.5	0.042	0.34	2.013	0.085
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.441	3.49		1.395

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	3.0	LOD		POOL	
3	4.1	COBBLE/BOULDER	100	RIFFLE	100
6	4.0	IN VEG		RUN	
9	4.7	OVER VEG		OTHER	
12	4.0	CUTBANK			
15					
18		TOTAL	90	D50/90	10/35
21					
24					
	4.0				
AREA (M*M)	94.2	MARGIN (M)	23.8		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good to Poor habitat

RATIONALE: Good habitat within 1 m of shore in large cobbles with low velocity. Poor fry habitat in deeper sections with higher velocity.

STEELHEAD PARR RATING: Good habitat

RATIONALE: Good 3-4 m band of moderate velocity and large cobble/boulder substrate.

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: M15 REACH: 1 MAP#: ACCESS: BOAT DATE: Sept 24 PHOTO: (4)#8

SITE LOCATION: Morice River sidechannel, approximately 4.0 km upstream from the upper Morice bridge crossing.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) 1 TEMP (C) 12.5 Q (cfs): 25
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Caught several lamprey ammocoetes.

POPULATION ESTIMATES:

SPECIES	AGE	FL RANGE	FL MEAN	PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
				1	2	U1+U2						
Rbt	0+	30-54	44.1	69	17	86	91.6	4.0	0.319	3.68	1.019	0.325
Rbt	1+	75-97	87.5	15	1	16	16.1	0.3	0.056	0.65	6.887	0.385
Rbt	2+	99-140	115.7	12	0	12	12.0	0.0	0.042	0.48	16.070	0.671
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	56-79	65.7	37	5	42	42.8	1.2	0.149	1.72	3.751	0.559
Coho	0+	38-59	46.6	58	25	83	101.9	12.1	0.355	4.09	1.264	0.449
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+	120	120.0	0	1	1	1.0	0.0	0.003	0.04	18.250	0.064
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all	52-114	92.8	3	1	4	4.5	1.5	0.016	0.18	9.303	0.146
TOTAL									0.940	10.84		2.599

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	11.5	LOD	5	POOL 30	40
3	11.5	COBBLE/BOULDER	85	RIFFLE 70	20
6	11.0	IN VEG		RUN	
9	11.8	OVER VEG	10	OTHER	
12	12.5	CUTBANK			
15	10.9				
18		TOTAL	75	D50/90 12/50	
21					
24					

11.5
AREA (M*M) 287.2 MARGIN (M) 24.9

HABITAT COMMENTS:

STEELHEAD FRY RATING: 50% Excellent habitat
RATIONALE: Excellent habitat in loose algae covered cobbles along the edges. Also small bays with cobble and deris cover.

STEELHEAD PARR RATING: 50% Good habitat
RATIONALE: Large bed material with some deep sections, moderate velocities throughout site.

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: M16 REACH: 1 MAP#: ACCESS: BOAT DATE: Sept 25 PHOTO: (4)#9,#10

SITE LOCATION: Morice River adjacent to Site M15.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) <1 TEMP (C) 12.5 Q (cfs): >1000
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN	BIOMASS
		RANGE	MEAN	1	2	U1+U2					WT	(g/m*m)
Rbt	0+	31-57	44.1	50	3	53	53.2	0.5	0.460	4.29	1.019	0.468
Rbt	1+	94-95	94.5	2	0	2	2.0	0.0	0.017	0.16	8.700	0.150
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	66	66.0	1	0	1	1.0	0.0	0.009	0.08	3.795	0.033
Coho	0+	43	43.0	1	0	1	1.0	0.0	0.009	0.08	0.989	0.009
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all	45-54	49.5	2	0	2	2.0	0.0	0.017	0.16	1.958	0.034
Prickly Sculpin	all	55-97	74.8	3	1	4	4.5	1.5	0.039	0.36	4.684	0.182
TOTAL									0.550	5.14		0.876

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	2.9	LOD		POOL	
3	4.6	COBBLE/BOULDER	100	RIFFLE	100
6	5.6	IN VEG		RUN	
9	6.1	OVER VEG		OTHER	
12	6.2	CUTBANK			
15	2.6				
18		TOTAL	80	D50/90	10/25
21					
24					
	4.7				
AREA (M*M)	115.7	MARGIN (M)	24.8		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good habitat

RATIONALE: Shallow riffle with some flat, slightly fast on the outside margin.

STEELHEAD PARR RATING: Poor habitat

RATIONALE: Limited by shallow depth and small bed material.

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: M17 REACH: 1 MAP#: ACCESS: BOAT DATE: Sept 24 PHOTO: (4)#6

SITE LOCATION: Morice River sidechannel, approximately 1.5 km downstream of Nado Creek confluence.

SIDE/MAINSTEM: S P=1/F=2 1 SLOPE (%) 1 TEMP (C) 12.5 Q (cfs): >1000
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Long sample site, used 4 barrier seines.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	31-59	46.0	36	3	39	39.3	0.6	0.332	3.13	1.152	0.382
Rbt	1+	92-95	93.5	1	1	2	2.0	0.0	0.017	0.16	8.422	0.142
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	63-65	64.0	1	1	2	2.0	0.0	0.017	0.16	3.507	0.059
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all	57-105	74.0	3	0	3	3.0	0.0	0.025	0.24	4.527	0.115
TOTAL									0.391	3.69		0.698

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	2.9	LOD		POOL	
3	4.3	COBBLE/BOULDER	100	RIFFLE	100
6	5.7	IN VEG		RUN	
9	5.2	OVER VEG		OTHER	
12	5.4	CUTBANK			
15	4.8				
18		TOTAL	70	D50/90	14/28
21					
24					
	4.7				
AREA (M*M)	118.4	MARGIN (M)	25.1		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good habitat

RATIONALE: Good fry habitat along margin in shallow cobble riffle.

STEELHEAD PARR RATING: Poor to Moderate

RATIONALE: Limited by small cobbles, absence of boulders, and moderate depth.

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: M18 REACH: 1 MAP#: ACCESS: BOAT DATE: Sept 24 PHOTO: (4)#7

SITE LOCATION: Morice River sidechannel, approximately 40 m upstream from Site M17.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) 2 TEMP (C) 12.5 Q (cfs): 10
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Observed one chinook redd within the sample site.

POPULATION ESTIMATES:

SPECIES	AGE	FL RANGE	FL MEAN	PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
				1	2	U1+U2						
Rbt	0+	36-56	47.4	20	1	21	21.1	0.3	0.168	0.83	1.257	0.211
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+	98-136	118.7	2	1	3	4.0	3.5	0.032	0.16	17.380	0.555
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all	99	99.0	0	1	1	1.0	0.0	0.008	0.04	12.260	0.098
Prickly Sculpin	all	102	102.0	1	0	1	1.0	0.0	0.008	0.04	12.570	0.100
TOTAL									0.216	1.07		0.965

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	4.9	LOD	10	POOL	
3	4.8	COBBLE/BOULDER	70	RIFFLE	30
6	4.9	IN VEG		RUN	70
9	4.8	OVER VEG	10	OTHER	
12	5.0	CUTBANK	10		
15	5.3				
18		TOTAL	60	D50/90	6/24
21					
24					

5.0
 AREA (M*M) 125.2 MARGIN (M) 25.3

HABITAT COMMENTS:

STEELHEAD FRY RATING: Poor to Moderate habitat

RATIONALE: Poor habitat due to water velocity. Some moderate areas along margins in cobbles and cutbanks.

STEELHEAD PARR RATING: Poor to Moderate habitat

RATIONALE: Could improve this site for parr with large instream boulders, thereby reducing velocity and adding cover. Water depth is adequate for parr but cover is limited.

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: M19 REACH: 1 MAP#: ACCESS: Boat DATE: Sept 24 PHOTO: (4)#5

SITE LOCATION: Morice River approximately 1.5 km downstream of Nado Creek confluence.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 1 TEMP (C) 12.5 Q (cfs): >1000
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	46-62	54.3	11	5	16	20.2	6.1	0.271	2.40	1.868	0.506
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	59-74	66.4	4	2	6	8.0	4.9	0.107	0.95	3.854	0.414
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all	48-85	61.3	2	1	3	4.0	3.5	0.054	0.48	2.487	0.134
TOTAL									0.432	3.83		1.053

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	3.9	LOD		POOL	
3	5.4	COBBLE/BOULDER	100	RIFFLE	
6	5.5	IN VEG		RUN	100
9	5.7	OVER VEG		OTHER	30
12	4.6	CUTBANK			
15	1.5				
18		TOTAL	90	D50/90	25/40
21					
24					
	4.4				
AREA (M*M)	74.5	MARGIN (M)	16.8		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good habitat

RATIONALE: Good along margin, deep on outside edge with large rock.

STEELHEAD PARR RATING: Moderate to Good habitat

RATIONALE: Limited due to low velocity on outside edge. Large bed material was hard to enclose without some site disturbance.

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: M20 REACH: 1 MAP#: ACCESS: BOAT DATE: Sept 23 PHOTO: (4)#0,#1

SITE LOCATION: Morice River sidechannel, approximately 400 m downstream of Nado Creek confluence.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) 1 TEMP (C) 12.5 q (cfs): 20-30
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL RANGE	FL MEAN	PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
				1	2	U1+U2						
Rbt	0+	37-57	45.1	54	5	59	59.5	0.9	0.186	2.08	1.087	0.202
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	58-83	68.3	7	1	8	8.2	0.5	0.025	0.29	4.142	0.106
Coho	0+	40-53	48.0	4	1	5	5.3	1.0	0.017	0.19	1.383	0.023
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all	56-86	71.2	5	0	5	5.0	0.0	0.016	0.17	4.004	0.062
TOTAL									0.244	2.73		0.393

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	14.8	LOD		POOL	
3	13.3	COBBLE/BOULDER	100	RIFFLE	30
6	8.7	IN VEG		RUN	70
9	9.9	OVER VEG		OTHER	
12	9.9	CUTBANK			
15	10.3				
18	11.5	TOTAL	75	D50/90	12/25
21					
24					
	11.2				
AREA (M*M)	320.3	MARGIN (M)	28.6		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good to Poor habitat

RATIONALE: Good habitat in large cobbles along margins. Limited slightly due to fines in the cobble. Poor habitat mid-stream where water velocity is high.

STEELHEAD PARR RATING: Moderate to Poor habitat

RATIONALE: This channel probably offers better parr habitat during higher water levels. Large cobbles along the margin appear to be limited by water depth. Mid-channel sections could be improved with some larger bed material.

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: M21 REACH: 1 MAP#: ACCESS: BOAT DATE: Sept 23 PHOTO: (4)#3

SITE LOCATION: Morice River approximately 400 m downstream of the Nado Creek confluence. Sampled the mainstem Morice River adjacent to Site M20.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 1 TEMP (C) 12.5 Q (cfs): >1000
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	46-53	49.4	7	1	8	8.2	0.5	0.106	1.33	1.418	0.151
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	70	70.0	1	0	1	1.0	0.0	0.013	0.16	4.411	0.057
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all	60	60.0	1	0	1	1.0	0.0	0.013	0.16	2.323	0.030
TOTAL									0.132	1.65		0.238

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	9.2	LOD		POOL	
3	8.6	COBBLE/BOULDER	100	RIFFLE	100
6	7.3	IN VEG		RUN	
9	5.7	OVER VEG		OTHER	
12	4.6	CUTBANK			
15	2.1				
18		TOTAL	80	D50/90	15/25
21					
24					
	6.3				
AREA (M*M)	76.9	MARGIN (M)	12.3		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good habitat

RATIONALE: Good fry habitat along margin with high velocity in deeper sections.

STEELHEAD PARR RATING: Good habitat

RATIONALE: Good habitat in deeper sections with cobble and boulder substrate. Site disturbance while installing barrier nets may have impacted the parr catch.

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: M22 REACH: 1 MAP#: ACCESS: Boat DATE: Sept 23 PHOTO: (4)#4

SITE LOCATION: Morice River approximately 0.5 km upstream of Nado Creek confluence.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) <1 TEMP (C) 12.5 q (cfs): >1000
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Sampled a gravel and cobble riffle at the top of a sidechannel.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	37-62	48.4	24	8	32	36.0	4.2	0.326	4.47	1.336	0.435
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	60-68	64.0	0	2	2	2.0	0.0	0.018	0.25	3.507	0.063
Coho	0+	46-50	48.3	3	0	3	3.0	0.0	0.027	0.37	1.409	0.038
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all	78-101	87.6	5	0	5	5.0	0.0	0.045	0.62	7.743	0.350
TOTAL									0.416	5.71		0.887

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	7.9	LOD		POOL	
3	8.9	COBBLE/BOULDER	100	RIFFLE	100
6	8.3	IN VEG		RUN	
9	7.4	OVER VEG		OTHER	
12	5.6	CUTBANK			
15	3.1				
18		TOTAL (Fry cover)	100	D50/90	6/20
21					
24					

6.9
 AREA (M*M) 110.6 MARGIN (M) 16.1

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good habitat

RATIONALE: Small clean cobble riffle with low velocity and shallow depth. Not an excellent site due to absence of cover diversity form large cobbles.

STEELHEAD PARR RATING: Poor habitat

RATIONALE: Limited cover for parr without large cobbles and boulders.

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: Mh1 REACH: 1 MAP#: 93L/7 ACCESS: HEL DATE: Oct 2 PHOTO: (5)#9

SITE LOCATION: Houston Tommy Creek, at top end of canyon in Reach 1.

SIDE/MAINSTEM: M P=1/F=2 2 SLOPE (%) 2 TEMP (C) 5 Q (cfs): 15
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Observed 4 pink carcasses and several redds above sample site.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN	BIOMASS
		RANGE	MEAN	1	2	U1+U2					WT	(g/m*m)
Rbt	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	1+	98	98.0	1	0	1	1.0	0.0	0.006	0.05	11.630	0.073
Rbt	2+	107-132	117.5	6	0	6	6.0	0.0	0.037	0.31	20.130	0.755
Rbt	3+	143-145	144.0	2	0	2	2.0	0.0	0.012	0.10	37.210	0.465
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+	45-61	55.0	3	2	5	9.0	13.4	0.056	0.46	2.095	0.118
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+	98	98.0	1	0	1	1.0	0.0	0.006	0.05	10.100	0.063
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.119	0.97		1.473

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	7.4	LOD	1	POOL	70
3	7.6	COBBLE/BOULDER	99	RIFFLE 50	40
6	8.0	IN VEG		RUN 50	
9	8.3	OVER VEG		OTHER	
12	8.4	CUTBANK			
15	9.3				
18		TOTAL	90	D50/90 20/60	
21					
24					
	8.2				
AREA (M*M)	160.1	MARGIN (M)	19.6		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Poor to moderate habitat

RATIONALE: Fast and deep boulder areas with some cobble sections along margin.

STEELHEAD PARR RATING: Good to excellent habitat

RATIONALE: Deep and fast water with cobble and boulders (good cover).

This reach looks good for Rbt parr rearing.

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: Mh2 REACH: 2 MAP#: 93L/6 ACCESS: HEL DATE: Oct 2 PHOTO: (5)#8

SITE LOCATION: Houston Tommy Creek, approximately 4 Km below falls.

SIDE/MAINSTEM: M P=1/F=2 2 SLOPE (%) <1 TEMP (C) 4.5 Q (cfs): 10-20
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL RANGE	FL MEAN	PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
				1	2	U1+U2						
Rbt	0+	42-49	45.5	0	2	2	2.0	0.0	0.013	0.13	1.091	0.015
Rbt	1+	82	82.0	1	0	1	1.0	0.0	0.007	0.06	6.794	0.045
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+	50-71	58.2	15	10	25	45.0	30.0	0.301	2.83	2.489	0.749
Coho	1+	89-104	96.8	5	0	5	5.0	0.0	0.033	0.31	11.730	0.392
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	43-51	48.0	4	2	6	8.0	4.9	0.054	0.50	1.272	0.068
Dolly Varden	1+	78-131	97.4	6	1	7	7.2	0.6	0.048	0.45	9.949	0.479
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.456	4.29		1.749

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	9.3	LOD	30	POOL 50	100
3	9.0	COBBLE/BOULDER	70	RIFFLE	
6	9.4	IN VEG		RUN 50	10
9	9.3	OVER VEG		OTHER	
12	10.0	CUTBANK			
15					
18		TOTAL	80	D50/90 9/14	
21					
24					

9.4
 AREA (M*M) 149.5 MARGIN (M) 15.9

HABITAT COMMENTS:

STEELHEAD FRY RATING: Moderate habitat
 RATIONALE: Some fry habitat in shallow gravels along margin.

STEELHEAD PARR RATING: Good habitat
 RATIONALE: Deeper sections with large gravel/cobble and LOD provide good parr habitat.
 (Appears to be under-utilized)

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: M11 REACH: 1 MAP#: 93L/3 ACCESS: VEH DATE: Oct 3 PHOTO: (5)#13

SITE LOCATION: Lamprey Creek, under lower bridge crossing in ponded section.

SIDE/MAINSTEM: M P=1/F=2 2 SLOPE (%) 1 TEMP (C) 5.5 Q (cfs): <5
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Sampled within a ponded section of stream due to low-flows.

POPULATION ESTIMATES:

SPECIES	AGE	FL RANGE	FL MEAN	PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
				1	2	U1+U2						
Rbt	0+	34-63	48.5	102	36	138	157.6	9.9	0.922	5.10	1.304	1.202
Rbt	1+	85-99	94.4	4	1	5	5.3	1.0	0.031	0.17	9.116	0.284
Rbt	2+	104-128	115.0	5	0	5	5.0	0.0	0.029	0.16	15.530	0.454
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	53-69	60.8	46	8	54	55.7	1.9	0.326	1.80	3.077	1.002
Coho	0+	41-81	60.8	31	14	45	56.5	10.1	0.331	1.83	2.843	0.940
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+	46-58	52.2	8	2	10	10.7	1.4	0.062	0.35	1.229	0.077
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all	32-56	40.4	3	4	7	7.0	N/A	0.041	0.23	1.055	0.043
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									1.742	9.64		4.003

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	7.8	LOD		POOL 50	20
3	7.6	COBBLE/BOULDER	100	RIFFLE 50	8
6	6.7	IN VEG		RUN	
9	6.4	OVER VEG		OTHER	
12	4.9	CUTBANK			
15	5.5				
18	2.5	TOTAL	90	D50/90 10/35	
21	4.0				
24	4.4				
	5.5				
AREA (M*M)	171.0	MARGIN (M)	30.9		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good to excellent habitat

RATIONALE: Large cobbles combined within the shallow riffle section provided good fry habitat. Less productive fry rearing in the slow ponded section.

STEELHEAD PARR RATING: Moderate to good habitat

RATIONALE: Large cobble areas could be improved with more discharge, parr are confined to deep sections with large substrate.

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: M12 REACH: 2 MAP#: 93L/3 ACCESS: VEH DATE: Sept 29 PHOTO: (5)#2

SITE LOCATION: Lamprey Creek, approximately 100 m downstream of the upper bridge crossing.

SIDE/MAINSTEM: M P=1/F=2 2 SLOPE (%) <1 TEMP (C) 6-7 Q (cfs): <5
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: (Low flow condition) Noticed concentrations of fry in flowing riffle sections. Observed one Pacific Lamprey carcass and several ammocoetes. Sampled a deep ponded section with shallow riffle on the lower end.

POPULATION ESTIMATES:

SPECIES	AGE	FL RANGE	FL MEAN	PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
				1	2	U1+U2						
Rbt	0+	36-60	43.6	14	7	21	28.0	9.2	0.143	0.96	0.985	0.141
Rbt	1+	73-98	81.9	8	1	9	9.1	0.5	0.047	0.31	6.213	0.290
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+	65-70	67.5	0	2	2	2.0	0.0	0.010	0.07	2.984	0.031
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all	30	30.0	1	0	1	1.0	0.0	0.005	0.03	0.471	0.002
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.205	1.37		0.464

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	8.7	LOD	30	POOL 70	60
3	8.9	COBBLE/BOULDER	10	RIFFLE 30	5
6	7.6	IN VEG	5	RUN	
9	7.1	OVER VEG	5	OTHER	
12	8.7	CUTBANK	50		
15	7.1				
18	2.8	TOTAL	30	D50/90 3/8	
21	2.5				
24					

6.7
 AREA (M*M) 195.6 MARGIN (M) 29.3

HABITAT COMMENTS:

STEELHEAD FRY RATING: Poor habitat

RATIONALE: Due to low flows fry were concentrated in shallow flowing riffle section.

STEELHEAD PARR RATING: Poor to moderate habitat

RATIONALE: Due to low flow condition, parr were concentrated in ponded areas with LOD and cutbanks. This segment of stream was typical for upper Lamprey Creek.

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: H13 REACH: 2 MAP#: 93L/3 ACCESS: VEH DATE: Aug 28 PHOTO: (2)#12

SITE LOCATION: Lamprey Creek, approximately 1 km upstream past the bridge on the Bill Nye road.
 Sampled a section of stream beside a gravel pit.

SIDE/MAINSTEM: M P=1/F=2 2 SLOPE (%) 1 TEMP (C) 11.5 Q (cfs): 1-2
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Low flow condition. Observed lamprey redds and ammocoetes.

POPULATION ESTIMATES:

SPECIES	AGE	FL RANGE	FL MEAN	PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
				1	2	U1+U2						
Rbt	0+	36-60	47.4	200	58	258	281.7	9.2	1.972	11.99	1.219	2.403
Rbt	1+	73-90	80.2	9	2	11	11.6	1.2	0.081	0.49	5.871	0.475
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all	39-52	43.5	29	7	36	38.2	2.5	0.268	1.63	1.289	0.345
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									2.320	14.11		3.224

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	3.7	LOD		POOL 95	
3	5.4	COBBLE/BOULDER	50	RIFFLE 5	
6	7.1	IN VEG	10	RUN	
9	7.0	OVER VEG		OTHER	
12	7.2	CUTBANK	40		
15					
18		TOTAL	25	D50/90 3/25	
21					
24					

6.1
 AREA (M*M) 142.9 MARGIN (M) 23.5

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good habitat

RATIONALE: Slow and shallow with large gravel / cobble. Channel maintains most of width even at low flow. (Heavy seeding)

STEELHEAD PARR RATING: Poor habitat

RATIONALE: Shallow and slow with limited cover for parr. Suspect that most parr would leave this site.

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: No1 REACH: 1 MAP#: 93L/2 ACCESS: VEH DATE: Aug 27 PHOTO: (2)#9

SITE LOCATION: Owen Creek, approximately 50 m upstream from concrete culvert.

SIDE/MAINSTEM: M P=1/F=2 2 SLOPE (%) 0.5 TEMP (C) 13 Q (cfs):
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Riffle margin is well-utilized. A 1-meter beaver dam is located 70 meters upstream, probably a barrier to adult coho.

POPULATION ESTIMATES:

SPECIES	AGE	FL RANGE	FL MEAN	PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
				1	2	U1+U2						
Rbt	0+	33-64	42.9	81	28	109	123.8	8.4	1.161	6.88	0.975	1.131
Rbt	1+	73-97	82.0	3	1	4	4.5	1.5	0.042	0.25	6.465	0.273
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	58	58.0	1	0	1	1.0	0.0	0.009	0.06	2.728	0.026
Coho	0+	61-69	64.0	4	0	4	4.0	0.0	0.038	0.22	2.843	0.107
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	43-51	47.0	1	1	2	2.0	0.0	0.019	0.11	1.199	0.022
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all	57	57.0	0	1	1	1.0	0.0	0.009	0.06	2.680	0.025
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									1.278	7.57		1.584

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	4.5	LOD		POOL 40	100
3	4.7	COBBLE/BOULDER	75	RIFFLE 30	8
6	6.4	IN VEG		RUN 30	
9	8.1	OVER VEG		OTHER	
12		CUTBANK	25		
15					
18		TOTAL	25	D50/90 2/6	
21					
24					

5.9
 AREA (M*M) 106.7 MARGIN (M) 18.0

HABITAT COMMENTS:

STEELHEAD FRY RATING: Poor to good habitat
 RATIONALE: Poor fry habitat in pool sections with good habitat in riffle areas.

STEELHEAD PARR RATING: Poor habitat
 RATIONALE: Limited by lack of cover, some parr habitat in deep pool sections with LOD.

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: Mo2 REACH: 4 MAP#: 93L/2 ACCESS: VEH DATE: Aug 27 PHOTO: (2)#10

SITE LOCATION: Owen Creek, downstream of old bridge site on the winter access road below Puport Creek.

SIDE/MAINSTEM: M P=1/F=2 2 SLOPE (%) <0.5 TEMP (C) 12.5 Q (cfs): 6-10
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Lamprey ammocoetes abundant throughout site.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	38-57	46.5	81	38	119	152.6	18.2	1.124	7.55	1.250	1.405
Rbt	1+	73-95	86.1	10	4	14	16.7	4.2	0.123	0.83	7.320	0.899
Rbt	2+	101-131	110.0	6	2	8	9.0	2.1	0.066	0.45	13.790	0.914
Rbt	3+	152	152.0	0	1	1	1.0	0.0	0.007	0.05	45.700	0.337
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+	57-77	70.0	4	1	5	5.3	1.0	0.039	0.26	3.383	0.133
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	52	52.0	1	0	1	1.0	0.0	0.007	0.05	1.593	0.012
Dolly Varden	1+	80-86	83.7	1	2	3	3.0	3.5	0.022	0.15	6.941	0.153
Longnose Dace	all	52	52.0	1	1	2	2.0	0.0	0.015	0.10	2.090	0.031
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									1.404	9.43		3.884

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	5.2	LOD	40	POOL 90	70
3	5.3	COBBLE/BOULDER		RIFFLE 10	8
6	4.8	IN VEG		RUN	
9	6.7	OVER VEG	20	OTHER	
12	11.6	CUTBANK	40		
15					
18		TOTAL	40	D50/90 <1/5	
21					
24					
	6.7				
AREA (M*M)	135.7	MARGIN (M)	20.2		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good to poor habitat

RATIONALE: Good fry habitat in short riffles and bays, limited by small substrate.

STEELHEAD PARR RATING: Good habitat for Owen Creek

RATIONALE: Deep sections along cutbanks are typical for this segment of Owen Creek.

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: Mo3 REACH: 5 MAP#: 93L/2 ACCESS: VEH DATE: Aug 28 PHOTO: (2)#11

SITE LOCATION: Owen Creek, approximately 70 m downstream of 36 Km sign, where creek is alongside road.

SIDE/MAINSTEM: M P=1/F=2 2 SLOPE (%) 0.5 TEMP (C) 12 Q (cfs): 6-10
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: 4-5 lamprey redds present in site, lamprey ammocoetes are abundant.
 This site was previously dammed by beavers.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN	BIOMASS
		RANGE	MEAN	1	2	U1+U2					WT	(g/m*m)
Rbt	0+	42-65	52.4	105	17	122	125.3	2.5	1.339	8.14	1.802	2.413
Rbt	1+	70-96	84.6	8	0	8	8.0	0.0	0.086	0.52	7.000	0.599
Rbt	2+	114	114.0	1	0	1	1.0	0.0	0.011	0.06	15.370	0.164
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	52-62	57.6	7	0	7	7.0	0.0	0.075	0.45	2.122	0.159
Dolly Varden	1+	92-100	96.0	2	0	2	2.0	0.0	0.021	0.13	9.614	0.206
Longnose Dace	all	47-102	70.7	22	5	27	28.5	2.0	0.304	1.85	4.803	1.462
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									1.836	11.15		5.002

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	3.5	LOD	20	POOL 50	70
3	5.7	COBBLE/BOULDER	60	RIFFLE 40	7
6	7.6	IN VEG		RUN 10	
9	7.5	OVER VEG	10	OTHER	
12		CUTBANK	10		
15					
18		TOTAL	75	050/90 6/20	
21					
24					

6.1
 AREA (M*M) 93.6 MARGIN (M) 15.4

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good habitat
 RATIONALE: Shallow riffle and edge of pool provide good fry habitat.

STEELHEAD PARR RATING: Good habitat
 RATIONALE: Good parr habitat along inside bank due to even flow and cover.

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: Mg1 REACH: 1 MAP#: 93L/3 ACCESS: VEH DATE: Sept 29 PHOTO: (5)#1

SITE LOCATION: Gosnell Creek, approximately 30 m above bridge crossing.
 Sampled a section of the center channel.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) 1 TEMP (C) 9 Q (cfs): 10-20 in
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: RMW catches were combined for a minimum estimate due to the increased sample size in pass 2.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	36-52	43.8	73	9	82	83.3	1.5	0.277	4.58	0.984	0.273
Rbt	1+	71-99	86.3	12	1	13	13.1	0.4	0.044	0.72	7.927	0.345
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+	61-73	65.8	5	24	29	29.0	0.0	0.096	1.59	2.733	0.264
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+	82	82.0	1	0	1	1.0	0.0	0.003	0.05	6.610	0.022
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.420	6.94		0.904

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	14.1	LOD		POOL	
3	18.4	COBBLE/BOULDER	100	RIFFLE	75
6	18.0	IN VEG		RUN	25
9	17.4	OVER VEG		OTHER	
12	19.0	CUTBANK			
15	14.5				
18	14.2	TOTAL	80	D50/90	7/18
21					
24					
	16.5				
AREA (M*M)	300.6	MARGIN (M)	18.2		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good to excellent habitat

RATIONALE: Excellent habitat in shallow cobbles with low velocity. Good habitat in glide area with slightly higher velocity.

STEELHEAD PARR RATING: Moderate to good habitat

RATIONALE: Good habitat in the glide section above riffle. Habitat could be improved with some large cobble and boulder in deeper sections.

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: Mg2 REACH: 2 MAP#: 93L/3 ACCESS: HEL DATE: Sept 23 PHOTO: (2)#6

SITE LOCATION: Gosnell Creek, below the square corner (mapsheet) and upstream of the unnamed tributary. Downstream of Shea Creek.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) <1 TEMP (C) 12.5 Q (cfs): 150
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Rbt fry were newly-emerged. Observed several pink spawners just upstream.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	27-40	33.0	44	8	52	53.8	2.0	0.546	6.29	0.459	0.250
Rbt	1+	62-78	73.0	4	1	5	5.3	1.0	0.054	0.62	4.782	0.259
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+	36-44	41.2	5	0	5	5.0	0.0	0.051	0.58	0.922	0.047
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	41-48	45.3	1	2	3	3.0	0.0	0.030	0.35	1.081	0.033
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all	142	142.0	1	0	1	1.0	0.0	0.010	0.12	36.010	0.366
TOTAL									0.692	7.97		0.955

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	2.6	LOD		POOL 70	15
3	6.2	COBBLE/BOULDER	100	RIFFLE 30	
6	7.0	IN VEG		RUN	
9	8.5	OVER VEG		OTHER	
12	4.5	CUTBANK			
15					
18		TOTAL	75	D50/90 10/20	
21					
24					

5.8
AREA (M*M) 98.5 MARGIN (M) 17.1

HABITAT COMMENTS:

STEELHEAD FRY RATING: 75% Good habitat

RATIONALE: Small clean cobbles with shallow sections. Some faster sections along the outer margin of net.

STEELHEAD PARR RATING: Poor habitat

RATIONALE: Limited by shallow depth and small substrate (Poor cover). No pool sections within the sample site.

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: Mg3 REACH: 3 MAP#: ACCESS: HEL DATE: Aug 23 PHOTO: (2)#7

SITE LOCATION: Gosnell Creek, approximately 0.8 km above the Shea Creek confluence.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) <1 TEMP (C) 11.5 Q (cfs): 150
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Lamprey ammocoetes were abundant within sample site.
 Coho fry were caught in the LOD along the site margin. This site is typical of upper Gosnell Creek habitat.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	28-37	31.2	3	3	6	6.0	0.0	0.041	0.41	0.494	0.020
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+	33-66	48.4	23	1	24	24.0	0.2	0.166	1.62	1.420	0.236
Coho	1+	90	90.0	1	0	1	1.0	0.0	0.007	0.07	9.391	0.065
M. Whitefish	0+	34-42	39.0	3	0	3	3.0	0.0	0.021	0.20	4.495	0.093
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	36-68	50.3	2	1	3	4.0	3.5	0.028	0.27	1.451	0.040
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.263	2.57		0.455

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	3.3	LOD	100	POOL	25
3	4.6	COBBLE/BOULDER		RIFFLE 10	
6	6.8	IN VEG		RUN	
9	6.4	OVER VEG		OTHER 90	
12	6.8	CUTBANK			
15	4.4				
18	1.9	TOTAL	15	D50/90 1/4	
21					
24					
	4.9				
AREA (M*M)	144.6	MARGIN (M)	29.6		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Poor habitat

RATIONALE: Small substrate, with limited debris cover along margin.

STEELHEAD PARR RATING: Poor habitat

RATIONALE: Limited by shallow depth, lack of cover, and low velocity.

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: Ms1 REACH: 1 MAP#: ACCESS: HEL DATE: Aug 22 PHOTO: (2)#5

SITE LOCATION: Lower end of Shea Creek, approximately 1 Km upstream from the Gosnell confluence.

SIDE/MAINSTEM: M P=1/F=2 2 SLOPE (%) 0.5 TEMP (C) 12 q (cfs): 20

P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Large amounts of algae on substrate.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN BIOMASS	
		RANGE	MEAN	1	2	U1+U2					WT	(g/m*m)
Rbt	0+	29-50	38.9	59	20	79	89.3	6.9	0.558	5.31	0.715	0.399
Rbt	1+	66-93	75.9	8	4	12	16.0	6.9	0.100	0.95	5.379	0.538
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+	39-55	47.2	19	1	20	20.1	0.3	0.125	1.19	1.315	0.165
Coho	1+	72-80	76.0	2	0	2	2.0	0.0	0.013	0.12	5.611	0.070
M. Whitefish	0+	58	58.0	1	0	1	1.0	0.0	0.006	0.06	1.768	0.011
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	47-50	48.5	2	0	2	2.0	0.0	0.013	0.12	1.310	0.016
Dolly Varden	1+	67-126	87.1	17	3	20	20.6	1.2	0.129	1.23	7.630	0.985
Longnose Dace	all	111	111.0	0	1	1	1.0	0.0	0.006	0.06	16.300	0.102
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.950	9.04		2.286

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	10.6	LOD	N/A	POOL 10	30
3	9.5	COBBLE/BOULDER		RIFFLE 60	15
6	10.3	IN VEG		RUN 30	
9	8.7	OVER VEG		OTHER	
12	8.5	CUTBANK			
15					
18		TOTAL	90	D50/90 10/40	
21					
24					
	9.5				
AREA (M*M)	159.9	MARGIN (M)	16.8		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good habitat

RATIONALE: Shallow cobble areas throughout much of site.

STEELHEAD PARR RATING: Good habitat

RATIONALE: Could be improved with more velocity and water depth.

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: Ms2 REACH: 2 MAP#: ACCESS: HEL DATE: Aug 22 PHOTO: (2)#4

SITE LOCATION: Shea Creek, downstream of falls below lake outlet.

SIDE/MAINSTEM: M P=1/F=2 2 SLOPE (%) 1.5 TEMP (C) 12.5 q (cfs): 15
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Good algae growth on substrate.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	30-47	38.3	31	13	44	53.4	8.3	0.404	3.34	0.685	0.277
Rbt	1+	74-92	82.8	12	1	13	13.1	0.4	0.099	0.82	6.995	0.694
Rbt	2+	102-136	115.3	1	2	3	3.0	3.5	0.023	0.19	19.010	0.432
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+	50-52	51.0	1	2	3	3.0	3.5	0.023	0.19	1.664	0.038
Coho	1+	87	87.0	1	0	1	1.0	0.0	0.008	0.06	8.468	0.064
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	42-46	44.0	2	0	2	2.0	0.0	0.015	0.13	0.996	0.015
Dolly Varden	1+	73-114	99.7	3	0	3	3.0	0.0	0.023	0.19	10.510	0.239
Longnose Dace	all	102-117	109.3	2	2	4	4.0	0.0	0.030	0.25	15.640	0.474
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.625	5.15		2.233

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	7.5	LOD		POOL 50	50
3	7.2	COBBLE/BOULDER	80	RIFFLE 50	10
6	7.4	IN VEG	5	RUN	
9	10.9	OVER VEG	5	OTHER	
12		CUTBANK	10		
15					
18		TOTAL	80	D50/90 6/40	
21					
24					

8.3
 AREA (M*M) 132.0 MARGIN (M) 16.0

HABITAT COMMENTS:

STEELHEAD FRY RATING: Excellent habitat

RATIONALE: Shallow cobble riffle area.

STEELHEAD PARR RATING: Good habitat

RATIONALE: Deep pool areas provide good cover.

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: Mt1 REACH: 1 MAP#: 93L/3 ACCESS: HEL DATE: Aug 23 PHOTO: (2)#8

SITE LOCATION: Thautil River, approximately 4 km upstream from the Gosnell Ck confluence.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 1 TEMP (C) N/A Q (cfs): 60
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: This lower reach appears to be good stealhead habitat.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	31-62	42.0	35	5	40	40.8	1.2	0.381	4.23	0.879	0.334
Rbt	1+	77-92	82.0	6	1	7	7.2	0.6	0.067	0.75	6.793	0.456
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+	42	42.0	1	0	1	1.0	0.0	0.009	0.10	0.922	0.009
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	42-51	46.5	1	1	2	2.0	0.0	0.019	0.21	1.163	0.022
Dolly Varden	1+	78	78.0	1	0	1	1.0	0.0	0.009	0.10	5.870	0.055
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.485	5.39		0.875

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	4.2	LOD		POOL 30	80
3	8.7	COBBLE/BOULDER	100	RIFFLE 40	15
6	7.2	IN VEG		RUN 30	
9	5.1	OVER VEG		OTHER	
12	2.6	CUTBANK			
15					
18		TOTAL	75	D50/90 15/40	
21					
24					

5.6
 AREA (M*M) 107.3 MARGIN (M) 19.3

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good habitat
 RATIONALE: Shallow with large clean cobble and even flow.

STEELHEAD PARR RATING: Moderate habitat
 RATIONALE: Limited for parr due to shallow depth and substrate size.

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: Mt2 REACH: 1 MAP#: 93L/6 ACCESS: HEL DATE: Oct 2 PHOTO: (5)#12

SITE LOCATION: Thautil River, downstream from Gabriel Creek.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 1.5 TEMP (C) 7 Q (cfs): 40
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: The Rbt parr at 140 mm may be age 3+.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN BIOMASS	
		RANGE	MEAN	1	2	U1+U2					WT	(g/m*m)
Rbt	0+	45-52	49.4	9	2	11	11.6	1.2	0.115	1.19	1.362	0.156
Rbt	1+	67-84	75.4	9	0	9	9.0	0.0	0.089	0.92	5.273	0.471
Rbt	2+	106-140	121.0	4	0	4	4.0	0.0	0.040	0.41	21.990	0.873
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	44-59	51.5	4	0	4	4.0	0.0	0.040	0.41	1.550	0.062
Dolly Varden	1+	78-88	83.5	4	0	4	4.0	0.0	0.040	0.41	6.901	0.274
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.323	3.34		1.836

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	2.2	LOD		POOL	
3	5.0	COBBLE/BOULDER	100	RIFFLE	100
6	6.4	IN VEG		RUN	
9	7.9	OVER VEG		OTHER	
12	5.6	CUTBANK			
15	3.9				
18		TOTAL	90	050/90	10/30
21					
24					

5.2
 AREA (M*M) 100.8 MARGIN (M) 19.5

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good to poor habitat

RATIONALE: Good fry habitat in slower sections along the margin, poor in higher velocity areas.

STEELHEAD PARR RATING: Good habitat

RATIONALE: Good parr habitat in large cobbles, could be improved with larger boulders and deeper sections.

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: Mt3 REACH: 1 MAP#: 93L/6 ACCESS: HEL DATE: Oct 2 PHOTO: (5)#10

SITE LOCATION: Thautil River, approximately 0.5 km upstream from the Gabriel Creek confluence.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) 1 TEMP (C) 7 Q (cfs): 10
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL RANGE	FL MEAN	PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
				1	2	U1+U2						
Rbt	0+	40-52	47.1	12	4	16	18.0	3.0	0.182	1.02	1.197	0.217
Rbt	1+	73-82	77.4	5	0	5	5.0	0.0	0.050	0.28	5.707	0.288
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+	48-68	56.6	4	1	5	5.3	1.0	0.054	0.30	2.286	0.123
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	42-55	48.8	5	0	5	5.0	0.0	0.050	0.28	1.332	0.067
Dolly Varden	1+	76-112	85.0	6	0	6	6.0	0.0	0.061	0.34	7.200	0.436
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.397	2.23		1.131

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	6.0	LOD	10	POOL	25
3	5.5	COBBLE/BOULDER	75	RIFFLE	15
6	6.1	IN VEG		RUN	
9	6.1	OVER VEG	15	OTHER	
12	5.3	CUTBANK			
15	4.8				
18		TOTAL	80	D50/90 10/28	
21					
24					

AREA (M*M) 5.6
 99.1 MARGIN (M) 17.6

HABITAT COMMENTS:

STEELHEAD FRY RATING: Moderate habitat

RATIONALE: Limited by water depth/velocity in riffle areas. Moderate fry habitat in slower sections along margin.

STEELHEAD PARR RATING: Moderate to good habitat

RATIONALE: Good in deep cobble sections and around LOD. Moderate in riffle areas, due to small cobbles.

MORICE RIVER STEELHEAD INDEX SITE 1991

SITE: Mt4 REACH: 1 MAP#: 93L/6 ACCESS: HEL DATE: Oct 2 PHOTO: (5)#11

SITE LOCATION: Thautil River, approximately 1 km upstream from the Gabriel Creek confluence.
Adjacent to Site Mt3.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 1.5 TEMP (C) 7 Q (cfs): 40
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS		U1+U2	NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2							
Rbt	0+	44-57	52.2	14	3	17	17.8	1.4	0.124	1.79	1.580	0.196
Rbt	1+	71-93	84.2	8	1	9	9.1	0.5	0.064	0.92	7.359	0.470
Rbt	2+	111-131	115.7	6	0	6	6.0	0.0	0.042	0.60	19.210	0.804
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+	42-61	51.4	8	0	8	8.0	0.0	0.056	0.80	1.704	0.095
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	47-53	51.0	4	2	6	8.0	4.9	0.056	0.80	1.508	0.084
Dolly Varden	1+	61-93	77.2	11	0	11	11.0	0.0	0.077	1.11	5.728	0.440
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.418	6.03		2.090

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	4.6	LOD	5	POOL 5	35
3	9.6	COBBLE/BOULDER	95	RIFFLE 95	8
6	10.3	IN VEG		RUN	
9	7.1	OVER VEG		OTHER	
12	4.4	CUTBANK			
15					
18		TOTAL	95	D50/90 10/30	
21					
24					

7.2
AREA (M*M) 143.3 MARGIN (M) 19.9

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good to excellent habitat

RATIONALE: Shallow cobbles with moderate flow provide good fry habitat.

STEELHEAD PARR RATING: Moderate habitat

RATIONALE: Limited by water depth.

Appendix 3. Site Descriptions and Detailed Results of Fish Sampling in the Sustut River and Tributaries.

Appendix 3 Table 1. Sustut River Catch Composition for Sample Sites.

FILE = SUMMARY

SITE	LOCATION	RAINBOW			CHINOOK	FILE = SUMMARY				LENGTH		
		FRY	AGE 1+	AGE 2+		COHO	DOLLY WHITEFISH VARDEN	LN BURBOT DACE	AREA			
S1	Sustut below Bear R.	12	0	0	12	0	2			110	18.5	
S2	"	1	0	0	3	0	0			190	25.2	
S3	"	8	0	0	4		4			130	19.5	
S4	"	30	2	0	1		8			114	17.3	
S5	"	2	0	0	3					125	38	
S6	"	11	0	0	1		6			101	17.3	
S7	"	11	0	1	9	15	3			136	40.5	
S8	"	16	0	0	7					91	19	
S9	"	28	2	0	35					112	13.8	
S10	"	9	0	0	11			1		209	18.5	
S11	Sustut above Bear R.		0	4	28	1	4	4		775	49.5	
S12	"	1	0	0	16		1			163	26.6	
S13	"	4	0	0	6		2			95	13	
S14	"	5	0	0	15					96	14	
S15	"	5	0	0						65	18	
S16	"	5	1	0	8					110	17.8	
S17	"	24	2	0	3					90	20.5	
S18	"	11	0	0	1					90	15	
S19	"	36	11	4	5	1	2			256	37	
S20	"	6	1	0	7					104	15.2	
S21	"	3	5	0	2					184	32	
S22	"	26	0	0	3					82	16.4	
S23	"	27	0	0	12		1	1		83	12.5	
S24	"	31	0	0	4		4	2		279	41	
S25	"	19	0	0	1		1			100	17	
S26	"	41	1	1	1		3			123	17.2	
S27	"	5	0	0	5	1				138	42	
S28	"	11	0	1						30	8.9	
S29	"	7	2	0						34	15.6	
S30	"		0	0					1	71	13.5	
Sb1	Bear R.	29	0	0	2		1	1	1	99	14.2	
Sb2	"	37	0	0				5	2	120	17.8	
St1	Two Lakes		0	0		1	14			165	17.3	
St2	"		0	0		5	10			139	36.7	
Sm1	Moosevale	1	2	1			1			153	30	
Sj1	Johanson Creek		0	0	3	4	22			323	42	
Sj2	"	2	2	1	4		4			130	17.7	
Sj3	"	0	0	0	5		5			93	15	
Sj4	"		3	2		1	1			82	13.2	
Sj5	"	3	0	0		1	2			107	17.5	
Sj6	"	3	1	0			3			334	55	
Sj7	"	1	0	1			2	1		83	15.8	
Sj8	"	11	0	0			1			129	24	
SUa1	Unnamed A	0	8	5						199	30.5	
SUb1	Unnamed B	0	0	1	11		46			198	28.5	
TOTAL		482	43	22	228	30	153	15	3	1	6636	1046
PERCENT		49.3	4.4	2.3	23.3	3.1	15.7	1.5	0.3	0.1		100
												TOTAL FISH = 977

Appendix 3 Table 1 (cont'd). Sustut River Catch Composition for Sample Sites.

FILE = SUMMARY (block to bottom)

SITE	LOCATION	RAINBOW		CHINOOK	COHO	DOLLY WHITEFISH VARDEN	LN BURBOT AREA			LENGTH		
		FRY	AGE 1+				AGE 2+	DACE				
SUSTUT BELOW BEAR		128	4	1	86	15	23	1	0	0	1318	258
%		49.6	1.6	0.4	33.3	5.8	8.9	0.4	0.0	0.0		100
SUSTUT ABOVE BEAR		267	23	10	117	3	18	7	0	1	2964	446
%		59.9	5.2	2.2	26.2	0.7	4.0	1.6	0.0	0.2		100
BEAR RIVER		66	0	0	2	0	1	6	3	0	219	78
%		84.6	0.0	0.0	2.6	0.0	1.3	7.7	3.8	0.0		100
JOHANSON		20	6	4	12	6	40	1	0	0	1281	89
%		22.5	6.7	4.5	13.5	6.7	44.9	1.1	0.0	0.0		100
ALL TRIBS		87	16	11	25	12	112	7	3	0	2355	273
%		31.9	5.9	4.0	9.2	4.4	41.0	2.6	1.1	0.0		100
SUSTUT TOTAL		395	27	11	203	18	41	8	0	1	4282	704
		56.1	3.8	1.6	28.8	2.6	5.8	1.1	0.0	0.1		100

Appendix 3 Table 2. Summary of Sustut River Biomass Estimates in Mainstem and Tributaries.

FILE = SUMBIO (SUSTUT)

SITE	LOCATION	RAINBOW	CHINOOK	COHO	DOLLY WHITEFISH		LN DACE	BURBOT	AREA	TOTAL	
		FRY	PARR		VARDEN						
S1	Sustut below Bear R.	0.083	0.000	0.246	0.000	0.017	0.000	0.000	0.000	110	0.346
S2	"	0.003	0.000	0.033	0.000	0.000	0.000	0.000	0.000	190	0.036
S3	"	0.051	0.000	0.073	0.000	0.024	0.000	0.000	0.000	130	0.148
S4	"	0.186	0.073	0.018	0.000	0.123	0.000	0.000	0.000	114	0.400
S5	"	0.010	0.000	0.047	0.000	0.000	0.000	0.000	0.000	125	0.057
S6	"	0.070	0.000	0.030	0.000	0.044	0.000	0.000	0.000	101	0.144
S7	"	0.070	0.101	0.133	0.340	0.168	0.000	0.000	0.000	136	0.812
S8	"	0.138	0.000	0.205	0.000	0.000	0.000	0.000	0.000	91	0.343
S9	"	0.230	0.145	0.863	0.000	0.000	0.000	0.000	0.000	112	1.238
S10	"	0.052	0.000	0.170	0.000	0.000	0.014	0.000	0.000	209	0.236
S11	Sustut above Bear R.	0.000	0.128	0.116	0.007	0.164	0.012	0.000	0.000	775	0.427
S12	"	0.002	0.000	0.253	0.000	0.002	0.000	0.000	0.000	163	0.257
S13	"	0.049	0.000	0.192	0.000	0.034	0.000	0.000	0.000	95	0.275
S14	"	0.064	0.000	0.457	0.000	0.000	0.000	0.000	0.000	96	0.521
S15	"	0.065	0.000	0.000	0.000	0.000	0.000	0.000	0.000	65	0.065
S16	"	0.061	0.058	0.184	0.000	0.000	0.000	0.000	0.000	110	0.303
S17	"	0.254	0.143	0.071	0.000	0.000	0.000	0.000	0.000	90	0.468
S18	"	0.137	0.000	0.028	0.000	0.000	0.000	0.000	0.000	90	0.165
S19	"	0.182	0.532	0.063	0.005	0.045	0.000	0.000	0.000	256	0.827
S20	"	0.086	0.057	0.157	0.000	0.000	0.000	0.000	0.000	104	0.300
S21	"	0.018	0.170	0.021	0.000	0.000	0.000	0.000	0.000	184	0.209
S22	"	0.225	0.000	0.073	0.000	0.000	0.000	0.000	0.000	82	0.298
S23	"	0.398	0.000	0.377	0.000	0.038	0.040	0.000	0.000	83	0.853
S24	"	0.100	0.000	0.039	0.000	0.529	0.018	0.000	0.000	279	0.686
S25	"	0.170	0.000	0.030	0.000	0.119	0.000	0.000	0.000	100	0.319
S26	"	0.319	0.135	0.025	0.000	0.057	0.000	0.000	0.000	123	0.536
S27	"	0.027	0.000	0.105	0.041	0.000	0.000	0.000	0.000	138	0.173
S28	"	0.266	0.855	0.000	0.000	0.000	0.000	0.000	0.000	30	1.121
S29	"	0.156	0.389	0.000	0.000	0.000	0.000	0.000	0.000	34	0.545
S30	"	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.279	71	0.279
Sb1	Bear R.	0.216	0.000	0.058	0.000	0.005	0.675	0.036	0.000	99	0.990
Sb2	"	0.234	0.000	0.000	0.000	0.000	0.984	0.060	0.000	120	1.278
St1	Two Lakes	0.000	0.000	0.000	0.025	0.450	0.000	0.000	0.000	165	0.475
St2	"	0.000	0.000	0.000	0.101	0.162	0.000	0.000	0.000	139	0.263
Sm1	Moosevale	0.005	0.163	0.000	0.000	0.013	0.000	0.000	0.000	153	0.181
Sj1	Johanson Creek	0.000	0.000	0.024	0.061	0.377	0.000	0.000	0.000	323	0.462
Sj2	"	0.016	0.191	0.106	0.000	0.246	0.000	0.000	0.000	130	0.559
Sj3	"	0.000	0.000	0.189	0.000	0.704	0.000	0.000	0.000	93	0.893
Sj4	"	0.508	0.000	0.000	0.024	0.183	0.000	0.000	0.000	82	0.715
Sj5	"	0.028	0.000	0.000	0.018	0.114	0.000	0.000	0.000	107	0.160
Sj6	"	0.008	0.020	0.000	0.000	0.023	0.000	0.000	0.000	334	0.051
Sj7	"	0.021	0.144	0.000	0.000	0.063	0.045	0.000	0.000	83	0.273
Sj8	"	0.072	0.000	0.000	0.000	0.125	0.000	0.000	0.000	129	0.197
SUa1	Unnamed A	0.000	0.580	0.000	0.000	0.000	0.000	0.000	0.000	199	0.580
Sub1	Unnamed B	0.000	0.130	0.264	0.000	1.453	0.000	0.000	0.000	198	1.847
TOTAL		4.58	4.01	4.65	0.62	5.28	1.79	0.10	0.28	6636	21.31
PERCENT		21.5	18.8	21.8	2.9	24.8	8.4	0.5	1.3		100
MEAN		0.10	0.09	0.10	0.01	0.12	0.04	0.00	0.01		0.47

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: S1 REACH: 1 MAP#: 94 D/6 ACCESS: HEL DATE: Sept 16 PHOTO: (2)#19

SITE LOCATION: Approximately 3 km upstream from the Skeena confluence.

SIDE/MAINSTEM: S P=1/F=2 1 SLOPE (%) 1 TEMP (C) 9 Q (cfs): N/A
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Cannot see mainchannel as site is located on the edge of a large vegetated bar. Instream cover is mostly cobble with a few boulders.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	32-60	42.0	12	0	12	12.0	0.0	0.110	1.30	0.759	0.083
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	50-62	57.1	12	0	12	12.0	0.0	0.110	1.30	2.247	0.246
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	46-52	49.0	1	1	2	2.0	0.0	0.018	0.22	0.941	0.017
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.238	2.81		0.347

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	5.5	LOD		POOL	
3	7.4	COBBLE/BOULDER	100	RIFFLE	50
6	6.5	IN VEG		RUN	40
9	5.4	OVER VEG		FLAT	10
12	5.8	CUTBANK			
15	4.9				
18		TOTAL	60	D50/90	/30
21					
24					
	5.9				
AREA (M*M)	109.5	MARGIN (M)	18.5		

HABITAT COMMENTS:

STEELHEAD FRY RATING: 60% Good to excellent habitat
 RATIONALE: Shallow medium velocity riffle, over cobble substrate.

STEELHEAD PARR RATING: 40% Moderate habitat
 RATIONALE: Deep run and riffle over cobble/boulder substrate with higher velocity.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: S2 REACH: 1 MAP#: 94 D/6 ACCESS: HEL DATE: Sept 13 PHOTO: N/A

SITE LOCATION: Approximately 4.2 km upstream from the Skeena confluence.
Side channel site along a gravel bar.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) 0.5 TEMP (C) 9.5 Q (cfs): N/A
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Heavy silt deposits along margins and pool areas.
Appears to be under-utilized by fry and parr.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	38	38.0	1	0	1	1.0	0.0	0.005	0.04	0.555	0.003
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	46-62	55.7	3	0	3	3.0	0.0	0.016	0.12	2.115	0.033
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.021	0.16		0.036

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	5.5	LOD		POOL	
3	7.3	COBBLE/BOULDER	100	RIFFLE 70	20
6	7.2	IN VEG		RUN 20	
9	8.0	OVER VEG		OTHER 10	
12	7.8	CUTBANK			
15	8.7				
18	8.2	TOTAL	25	D50/90 10/20	
21					
24					
	<u>7.5</u>				
AREA (M*M)	189.7	MARGIN (M)	25.2		

HABITAT COMMENTS:

STEELHEAD FRY RATING: 50% Good habitat

RATIONALE: Shallow riffle section with good cobble/gravel substrate. Some good cover within the cobbles.

STEELHEAD PARR RATING: 50% Moderate habitat

RATIONALE: High velocity run section with large cobble cover.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: S3 REACH: 1 MAP#: 94 D/6 ACCESS: HEL DATE: Sept 09 PHOTO: (2)#2

SITE LOCATION: Approximately 4.2 km upstream of Skeena confluence, adjacent to Site S2.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 0.5 TEMP (C) 10 Q (cfs): N/A
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Appears to be under-utilized by parr.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	34-52	43.3	8	0	8	8.0	0.0	0.061	0.82	0.835	0.051
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	52-64	58.5	4	0	4	4.0	0.0	0.031	0.41	2.384	0.073
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	43-48	46.3	2	1	3	4.0	3.5	0.031	0.41	0.772	0.024
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.123	1.64		0.148

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	3.0	LOD		POOL	
3	8.0	COBBLE/BOULDER	100	RIFFLE	65
6	7.8	IN VEG		RUN	20
9	7.9	OVER VEG		FLAT	15
12	7.0	CUTBANK			
15	6.4				
18		TOTAL	35	D50/90	15/35
21					
24					
	6.7				
AREA (M*M)	130.3	MARGIN (M)	19.5		

HABITAT COMMENTS:

STEELHEAD FRY RATING: 30% Good habitat

RATIONALE: Riffle section with cobble/gravel substrate and a flat section near the upstream margin.

STEELHEAD PARR RATING: 70% Good habitat

RATIONALE: Deep high velocity run with good cobble and boulder cover.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: S4 REACH: 1 MAP#: 94 D/6 ACCESS: HEL DATE: Sept 14 PHOTO: (2)#6

SITE LOCATION: Approximately 4 km downstream of the Suskeena Lodge.

SIDE/MAINSTEM: S P=1/F=2 1 SLOPE (%) 1.5 TEMP (C) 8 Q (cfs): N/A
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: It appears that there are possible redds at the top end of this side channel. This site is typical of this reach. Heavy algae growth on substrate.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	32-48	40.9	24	5	29	30.3	1.8	0.266	3.50	0.699	0.186
Rbt	1+	73-75	74.0	2	0	2	2.0	0.0	0.018	0.23	4.141	0.073
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	55	55.0	1	0	1	1.0	0.0	0.009	0.12	2.050	0.018
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	43-50	46.3	5	1	6	6.3	0.8	0.055	0.72	0.772	0.042
Dolly Varden	1+	68-86	77.0	2	0	2	2.0	0.0	0.018	0.23	4.591	0.081
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.365	4.81		0.400

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	5.4	LOD		POOL	
3	6.0	COBBLE/BOULDER	100	RIFFLE	50
6	7.1	IN VEG		RUN	40
9	7.0	OVER VEG		FLAT	10
12	6.8	CUTBANK			
15	7.2				
18		TOTAL	40	D50/90	15/30
21					
24					
	6.6				
AREA (M*M)	113.9	MARGIN (M)	17.3		

HABITAT COMMENTS:

STEELHEAD FRY RATING: 70% Good to excellent habitat
 RATIONALE: Low velocity riffle over cobble and gravel with some flat areas.

STEELHEAD PARR RATING: 70% Good to excellent habitat
 RATIONALE: High velocity deep run section with cobble and boulder substrate. Cobbles and boulders provide good cover.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: S5 REACH: 1 MAP#: 94 D/6 ACCESS: HEL DATE: Sept 14 PHOTO: (2)#9

SITE LOCATION: Approximately 4 km downstream of Suskeena Lodge.
Sidechannel beside Site S4.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) 1.5 TEMP (C) 9 Q (cfs): N/A
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Sampled this small side channel because this type of habitat is common in this reach.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS		NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)	
		RANGE	MEAN	1	2							
Rbt	0+	39-41	40.0	2	0	2	2.0	0.0	0.016	0.05	0.652	0.010
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	48-58	53.7	3	0	3	3.0	0.0	0.024	0.08	1.933	0.047
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.040	0.13		0.057

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	1.7	LOD		POOL 10	20
3	2.5	COBBLE/BOULDER	20	RIFFLE 30	10
6	2.7	IN VEG		RUN	
9	2.5	OVER VEG	70	FLAT 60	
12	3.2	CUTBANK			
15	2.9				
18	4.3	TOTAL	30	D50/90 8/20	
21	4.3				
24	5.4				

3.3
AREA (M*M) 124.6 MARGIN (M) 38.0

HABITAT COMMENTS:

STEELHEAD FRY RATING: 100% Moderate habitat
RATIONALE: Some shallow riffles over gravels and cobbles.

STEELHEAD PARR RATING: Poor
RATIONALE: Limited by size and depth.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: S6 REACH: 1 MAP#: 94 D/6 ACCESS: HEL DATE: Sept 16 PHOTO: (2)#20

SITE LOCATION: Approximately 3 km downstream from Suskeena Lodge.

SIDE/MAINSTEM: S P=1/F=2 1 SLOPE (%) 1 TEMP (C) 8.5 Q (cfs): N/A
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	34-45	39.8	11	0	11	11.0	0.0	0.109	1.27	0.642	0.070
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	64	64.0	1	0	1	1.0	0.0	0.010	0.12	2.971	0.030
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	41-52	45.2	5	1	6	6.3	0.8	0.062	0.72	0.709	0.044
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.181	2.11		0.144

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	5.9	LOD		POOL	
3	5.8	COBBLE/BOULDER	100	RIFFLE	60
6	6.3	IN VEG		RUN	30
9	6.0	OVER VEG		FLAT	10
12	5.1	CUTBANK			
15					
18		TOTAL	40	D50/90	10/35
21					
24					

5.8
 AREA (M*M) 100.7 MARGIN (M) 17.3

HABITAT COMMENTS:

STEELHEAD FRY RATING: 70% Good to excellent habitat

RATIONALE: Some lower velocity riffle over cobble and gravel with some flat areas.

STEELHEAD PARR RATING: 30% Moderate habitat

RATIONALE: Fast deep run and riffle with cobble and some boulder cover.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: S7 REACH: 1 MAP#: 94 D/6 ACCESS: HEL DATE: Sept 16 PHOTO: (2)#21

SITE LOCATION: Approximately 3 km downstream of Suskeena Lodge, adjacent to Site S6 on other side of gravel bar.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) 1 TEMP (C) 8.5 Q (cfs): N/A
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	38-48	43.7	10	1	11	11.1	0.4	0.081	0.27	0.859	0.070
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+	110	110.0	1	0	1	1.0	0.0	0.007	0.02	13.800	0.101
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	52-60	54.6	3	2	5	9.0	13.4	0.066	0.22	2.014	0.133
Coho	0+	42-65	54.7	12	1	13	13.1	0.4	0.096	0.32	2.260	0.217
Coho	1+	75-98	86.5	2	0	2	2.0	0.0	0.015	0.05	8.383	0.123
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+	68-125	89.0	3	0	3	3.0	0.0	0.022	0.07	7.628	0.168
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.288	0.97		0.812

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	1.6	LOD	20	POOL 40	100
3	2.0	COBBLE/BOULDER		RIFFLE 30	7
6	2.5	IN VEG	20	RUN	
9	3.5	OVER VEG	20	FLAT 30	
12	4.4	CUTBANK	20		
15	6.1	DP POOL	20		
18	3.6			D50/90 2/5	
21	3.6	TOTAL	50		
24	3.0				

3.4
AREA (M*M) 136.4 MARGIN (M) 40.5

HABITAT COMMENTS:

STEELHEAD FRY RATING: 60% Moderate habitat

RATIONALE: Low velocity side channel with pools, LOD, undercut banks and over veg. for cover.

STEELHEAD PARR RATING: 40% Moderate habitat

RATIONALE: Pools, LOD, undercut banks and overveg provide cover, but limited by low velocity.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: S8 REACH: 1 MAP#: 94 D/6 ACCESS: HEL DATE: Sept 13 PHOTO: (2)#3

SITE LOCATION: Approximately 0.8 km downstream of Suskeena Lodge.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) N/A TEMP (C) 9 Q (cfs): N/A
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Slightly turbid due to heavy rains.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	37-46	42.3	15	1	16	16.1	0.3	0.177	1.69	0.777	0.138
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	56-68	61.1	7	0	7	7.0	0.0	0.077	0.74	2.653	0.205
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.254	2.43		0.343

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	4.3	LOD		POOL	
3	5.1	COBBLE/BOULDER	100	RIFFLE	50
6	4.7	IN VEG		RUN	40
9	5.8	OVER VEG		FLAT	10
12	5.2	CUTBANK			
15	4.1				
18	4.2	TOTAL	50	D50/90	30/60
21					
24					
	4.8				
AREA (M*M)	90.7	MARGIN (M)	19.0		

HABITAT COMMENTS:

STEELHEAD FRY RATING: 30% Good habitat

RATIONALE: Low velocity riffle over good cobble cover, some flat along center margin.

STEELHEAD PARR RATING: 70% excellent habitat

RATIONALE: High velocity run/riffle over large cobbles and boulders throughout length of site.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: S9 REACH: 1 MAP#: 94 D/6 ACCESS: HEL DATE: Sept 14 PHOTO: (2)#12

SITE LOCATION: Approximately 13 km downstream of Bear River confluence.
Adjacent to Site S10.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 1.5 TEMP (C) 9 Q (cfs): N/A
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: This site is typical for about half this reach.

POPULATION ESTIMATES:

SPECIES	AGE	FL RANGE	FL MEAN	PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
				1	2	U1+U2						
Rbt	0+	34-52	44.6	26	2	28	28.2	0.5	0.251	4.08	0.917	0.230
Rbt	1+	88-97	92.5	2	0	2	2.0	0.0	0.018	0.29	8.153	0.145
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	52-78	62.1	33	2	35	35.1	0.4	0.313	5.09	2.760	0.863
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.581	9.46		1.238

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	7.5	LOD		POOL	
3	9.3	COBBLE/BOULDER	90	RIFFLE	80
6	8.3	IN VEG	10	RUN	10
9	7.5	OVER VEG		FLAT	10
12	8.1	CUTBANK			
15					
18		TOTAL	70	D50/90	25/60
21					
24					
	8.1				
AREA (M*M)	112.3	MARGIN (M)	13.8		

HABITAT COMMENTS:

STEELHEAD FRY RATING: 80% Good to excellent habitat

RATIONALE: Low velocity riffle and flat area at inner margin with good interstitial spaces in large cobble and boulders.

STEELHEAD PARR RATING: 20% Moderate habitat

RATIONALE: Deep run/riffle over large cobble and boulder substrate with good spaces.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: S10 REACH: 1 MAP#: 94 D/6 ACCESS: HEL DATE: Sept 14 PHOTO: (2)#13

SITE LOCATION: Approximately 13 km downstream of the Bear River confluence.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) N/A TEMP (C) 8.5 Q (cfs): N/A
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL RANGE	FL MEAN	PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
				1	2	U1+U2						
Rbt	0+	37-58	48.7	9	0	9	9.0	0.0	0.043	0.49	1.207	0.052
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	56-84	66.2	11	0	11	11.0	0.0	0.053	0.59	3.227	0.170
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+	68	68.0	1	0	1	1.0	0.0	0.005	0.05	3.024	0.014
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.100	1.14		0.236

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	11.4	LOD		POOL 10	
3	10.2	COBBLE/BOULDER	60	RIFFLE 40	25
6	11.1	IN VEG	10	RUN 50	35
9	11.9	OVER VEG	10	OTHER	
12	11.7	CUTBANK	20		
15	11.6				
18		TOTAL	50	D50/90 12/40	
21					
24					
	11.3				
AREA (M*M)	209.4	MARGIN (M)	18.5		

HABITAT COMMENTS:

STEELHEAD FRY RATING: 20% Moderate habitat

RATIONALE: Slower velocity riffle over gravel and cobble substrate.

STEELHEAD PARR RATING: 80% Excellent habitat

RATIONALE: Deep riffle and run over large cobble and boulder with over veg. and cutbank cover.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: S11 REACH: 2 MAP#: 94 D/7 ACCESS: REL DATE: Sept 11 PHOTO: (1)#11

SITE LOCATION: Approximately 2 km downstream from Saiya Creek.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) 1 TEMP (C) 8.5 Q (cfs): N/A
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL RANGE	FL MEAN	PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
				1	2	U1+U2						
Rbt	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+	105-150	133.3	2	1	3	4.0	3.5	0.005	0.08	24.710	0.128
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	50-80	66.0	14	7	21	28.0	9.2	0.036	0.57	3.204	0.116
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+	75	75.0	1	0	1	1.0	0.0	0.001	0.02	5.576	0.007
M. Whitefish	0+	59-70	63.0	2	1	3	4.0	3.5	0.005	0.08	2.402	0.012
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+	110-175	133.8	4	0	4	4.0	0.0	0.005	0.08	31.850	0.164
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.053	0.83		0.427

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	16.2	LOD	20	POOL	
3	14.3	COBBLE/BOULDER	60	RIFFLE 30	20
6	16.0	IN VEG	20	RUN 70	
9	14.5	OVER VEG		OTHER	
12	14.2	CUTBANK			
15	15.6				
18	18.8	TOTAL	50	D50/90 35/60	
21					
24					
	15.7				
AREA (M*M)	775.0	MARGIN (M)	49.5		

HABITAT COMMENTS:

STEELHEAD FRY RATING: 30% Moderate habitat

RATIONALE: Some quiet sections along margins with low velocity. Cover is made up of gravels, LOD, and over veg. with cobbles silted in.

STEELHEAD PARR RATING: 70% Excellent habitat

RATIONALE: Some large boulders with moderate velocity.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: S12 REACH: 3 MAP#: 94 D/7 ACCESS: HEL DATE: Sept 11 PHOTO: (1)#12

SITE LOCATION: Sidechannel 3-4 km downstream of Red Creek.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) 1 TEMP (C) 9.5 Q (cfs): N/A
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: RBT fry was just buttoned-up.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN	BIOMASS
		RANGE	MEAN	1	2	U1+U2					WT	(g/m*m)
Rbt	0+	34	34.0	1	0	1	1.0	0.0	0.006	0.04	0.392	0.002
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	52-72	60.2	15	1	16	16.1	0.3	0.099	0.60	2.557	0.253
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	34	34.0	1	0	1	1.0	0.0	0.006	0.04	0.261	0.002
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.111	0.68		0.257

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	5.7	LOD		POOL	
3	6.4	COBBLE/BOULDER	100	RIFFLE	20
6	7.4	IN VEG		RUN	10
9	5.6	OVER VEG		FLAT	70
12	7.3	CUTBANK			
15	4.3				
18		TOTAL	60	D50/90	15/35
21					
24					
	6.1				
AREA (M*M)	162.7	MARGIN (M)	26.6		

HABITAT COMMENTS:

STEELHEAD FRY RATING: 100% Good fry habitat

RATIONALE: Gravel and cobble substrate, low velocity. Substrate is slightly silted in.

STEELHEAD PARR RATING: Poor

RATIONALE: Limited by low velocity and shallow depth.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: S13 REACH: 3 MAP#: 94 D/7 ACCESS: HEL DATE: Sept 11 PHOTO: (1)#13

SITE LOCATION: 3-4 km downstream of Red Creek, adjacent to Site S12.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 1 TEMP (C) 9.5 Q (cfs): N/A
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Rbt fry 37 & 34 mm were just buttoned-up.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN	BIOMASS
		RANGE	MEAN	1	2	U1+U2					WT	(g/m*m)
Rbt	0+	34-40	37.0	2	1	3	4.0	3.5	0.042	0.62	1.150	0.049
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	57-75	64.5	6	0	6	6.0	0.0	0.063	0.92	3.028	0.192
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	38	38.0	1	0	1	1.0	0.0	0.011	0.15	0.386	0.004
Dolly Varden	1+	67	67.0	1	0	1	1.0	0.0	0.011	0.15	2.819	0.030
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.127	1.85		0.274

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	5.6	LOD		POOL	
3	6.4	COBBLE/BOULDER	100	RIFFLE	20
6	8.5	IN VEG		RUN	70
9	7.4	OVER VEG		FLAT	10
12	8.5	CUTBANK			
15					
18		TOTAL	40	D50/90	15/35
21					
24					

7.3
 AREA (M*M) 94.6 MARGIN (M) 13.0

HABITAT COMMENTS:

STEELHEAD FRY RATING: 20% Good habitat
 RATIONALE: Riffle over cobble, but heavily silted cobbles limits quality.

STEELHEAD PARR RATING: 80% Good habitat
 RATIONALE: Fast flow over cobbles and boulders.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: S14 REACH: 4 MAP#: 94 D/7 ACCESS: HEL DATE: Sept 11 PHOTO: (1)#14

SITE LOCATION: Approximately 8 km upstream of Red Creek, on left bank of gravel bar.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 1 TEMP (C) 8.5 Q (cfs): N/A
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Stream channels are split equally by bars in this section.

POPULATION ESTIMATES:

SPECIES	AGE	FL RANGE	FL MEAN	PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
				1	2	U1+U2						
Rbt	0+	42-53	48.0	4	1	5	5.3	1.0	0.055	0.76	1.150	0.064
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	52-80	63.5	14	1	15	15.1	0.3	0.157	2.15	2.914	0.457
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.212	2.92		0.521

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	10.0	LOD		POOL	
3	8.0	COBBLE/BOULDER	100	RIFFLE	80
6	7.5	IN VEG		RUN	
9	6.2	OVER VEG		FLAT	20
12	5.4	CUTBANK			
15	4.1				
18		TOTAL	40	D50/90	15/30
21					
24					
	6.9				
AREA (M*M)	96.1	MARGIN (M)	14.0		

HABITAT COMMENTS:

STEELHEAD FRY RATING: 70% Moderate habitat

RATIONALE: Riffle over medium-sized cobble. The substrate at this site is much cleaner (less silt) than downstream areas.

STEELHEAD PARR RATING: 30% Moderate habitat.

RATIONALE: Moderate velocity over large cobble/boulder, may be limited by shallow depth.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: S15 REACH: 4 MAP#: 94 D/10 ACCESS: HEL DATE: Sept 12 PHOTO: (1)#15

SITE LOCATION: Approximately 0.5 km upstream of Two Lakes.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 1 TEMP (C) 8.5 Q (cfs): N/A
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Sampled approximately one-half of main channel.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	35-47	42.6	4	1	5	5.3	1.0	0.082	0.59	0.794	0.065
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.082	0.59		0.065

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	3.4	LOD		POOL	
3	3.8	COBBLE/BOULDER	100	RIFFLE	30
6	3.6	IN VEG		RUN	60
9	3.4	OVER VEG		FLAT	10
12	3.8	CUTBANK			
15	3.7				
18		TOTAL	30	D50/90	15/30
21					
24					

AREA (M*M) 3.6 65.1 MARGIN (M) 18.0

HABITAT COMMENTS:

STEELHEAD FRY RATING: 20% Moderate habitat
 RATIONALE: Highly compacted cobbles and boulder substrate with some low velocity flat areas.

STEELHEAD PARR RATING: 80% Moderate habitat
 RATIONALE: High velocity through large cobble and boulders.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: S16 REACH: 4 MAP#: 94 D/10 ACCESS: HEL DATE: Sept 12 PHOTO: (1)#16

SITE LOCATION: Side channel dividing two bars, approximately 0.5 km upstream of Two Lakes Creek.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) 1.5 TEMP (C) 8.5 Q (cfs): N/A
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	49-53	50.4	5	0	5	5.0	0.0	0.045	0.28	1.344	0.061
Rbt	1+	85	85.0	1	0	1	1.0	0.0	0.009	0.06	6.380	0.058
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	53-74	59.4	7	1	8	8.2	0.5	0.074	0.46	2.475	0.184
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.129	0.80		0.303

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	3.8	LOD		POOL	
3	4.1	COBBLE/BOULDER	100	RIFFLE	80
6	5.6	IN VEG		RUN	
9	6.6	OVER VEG		FLAT	20
12	7.0	CUTBANK			
15	7.6				
18	8.6	TOTAL	60	D50/90	15/30
21					
24					
	6.2				
AREA (M*M)	110.1	MARGIN (M)	17.8		

HABITAT COMMENTS:

STEELHEAD FRY RATING: 100% Excellent habitat

RATIONALE: Shallow riffle over large cobbles with a flat area at top end.

STEELHEAD PARR RATING: Poor

RATIONALE: Limited by shallow depth and low velocity.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: S17 REACH: 4 MAP#: 94 D/10 ACCESS: HEL DATE: Sept 12 PHOTO: (1)#17

SITE LOCATION: Approximately 3 km upstream of Willow Creek confluence.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 1.5 TEMP (C) 8 Q (cfs): N/A
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Rbt fry 34 mm was just buttoned-up.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	34-54	45.4	20	3	23	23.5	1.0	0.262	2.30	0.969	0.254
Rbt	1+	78-93	85.5	2	0	2	2.0	0.0	0.022	0.20	6.420	0.143
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	52-58	56.0	3	0	3	3.0	0.0	0.033	0.29	2.142	0.071
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.317	2.78		0.468

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	3.9	LOO		POOL	
3	4.9	COBBLE/BOULDER	100	RIFFLE	10
6	4.8	IN VEG		RUN	60
9	4.6	OVER VEG		FLAT	30
12	4.5	CUTBANK			
15	4.0				
18	4.0	TOTAL	50	D50/90	15/45
21					
24					

4.4
 AREA (M*M) 89.9 MARGIN (M) 20.5

HABITAT COMMENTS:

STEELHEAD FRY RATING: 50% Moderate habitat

RATIONALE: Flat low velocity margin over cobble and boulder. All Rbt fry were caught in this area.

STEELHEAD PARR RATING: 50% Moderate habitat

RATIONALE: Fairly high velocity through boulder and cobble substrate.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: S18 REACH: 4 MAP#: 94 D/10 ACCESS: HEL DATE: Sept 12 PHOTO: (1)#19

SITE LOCATION: Sidechannel at top of gravel bar, approximately 3 km upstream of Willow Creek confluence.

SIDE/MAINSTEM: S P=1/F=2 1 SLOPE (%) 1.5 TEMP (C) 8 Q (cfs): N/A
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	44-54	47.3	10	1	11	11.1	0.4	0.124	1.48	1.102	0.137
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	60	60.0	1	0	1	1.0	0.0	0.011	0.13	2.537	0.028
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.135	1.61		0.165

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	7.3	LOD		POOL	
3	8.0	COBBLE/BOULDER	100	RIFFLE 60	10
6	6.6	IN VEG		RUN 10	
9	3.9	OVER VEG		FLAT 30	
12	4.1	CUTBANK			
15					
18		TOTAL	30	D50/90 20/35	
21					
24					

6.0
 AREA (M*M) 89.7 MARGIN (M) 15.0

HABITAT COMMENTS:

STEELHEAD FRY RATING: 70% Good habitat

RATIONALE: Flat sections with low velocity over gravel and cobbles.

STEELHEAD PARR RATING: 30% Moderate habitat

RATIONALE: High velocity riffle over cobbles and boulders.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: S19 REACH: 4 MAP#: 94 D/10 ACCESS: HEL DATE: Sept 18 PHOTO: (2)#35

SITE LOCATION: Approximately 7 km upstream of Willow Creek confluence.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) 2.5 TEMP (C) 9 Q (cfs): N/A
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL RANGE	FL MEAN	PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
				1	2	U1+U2						
Rbt	0+	39-57	49.8	6	5	11	36.0	99.5	0.141	0.97	1.295	0.182
Rbt	1+	78-98	87.7	11	0	11	11.0	0.0	0.043	0.30	6.930	0.298
Rbt	2+	102-126	113.0	4	0	4	4.0	0.0	0.016	0.11	14.970	0.234
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	57-72	64.6	4	1	5	5.3	1.0	0.021	0.14	3.039	0.063
Coho	0+	45	45.0	1	0	1	1.0	0.0	0.004	0.03	1.294	0.005
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	53	53.0	1	0	1	1.0	0.0	0.004	0.03	1.240	0.005
Dolly Varden	1+	97	97.0	1	0	1	1.0	0.0	0.004	0.03	10.310	0.040
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.232	1.60		0.828

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	4.8	LOD	10	POOL	
3	7.0	COBBLE/BOULDER	90	RIFFLE	50
6	6.8	IN VEG		RUN	40
9	6.9	OVER VEG		FLAT	10
12	7.7	CUTBANK			
15	6.5				
18	8.7	TOTAL	40	D50/90	18/80
21					
24					

6.9
 AREA (M*M) 255.8 MARGIN (M) 37.0

HABITAT COMMENTS:

STEELHEAD FRY RATING: 30% Good to excellent habitat

RATIONALE: Shallow riffles over cobble and boulders with medium velocity. Some flat areas along margin.

STEELHEAD PARR RATING: 70% Excellent habitat

RATIONALE: Riffle and run with medium to high velocity over cobble and boulder.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: S20 REACH: 4 MAP#:94 D/10 ACCESS: HEL DATE: Sept 17 PHOTO: (2)#30

SITE LOCATION: Approximately 10 km downstream of Moosevale Creek.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 1.5 TEMP (C) 9.5 Q (cfs): N/A
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: This segment of stream downstream of Moosevale Creek should probably be a separate reach. This site is typical for the area.

POPULATION ESTIMATES:

SPECIES	AGE	FL RANGE	FL MEAN	PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
				1	2	U1+U2						
Rbt	0+	45-55	51.3	5	1	6	6.3	0.8	0.060	0.82	1.420	0.086
Rbt	1+	83	83.0	1	0	1	1.0	0.0	0.010	0.13	5.870	0.057
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	42-64	57.3	6	1	7	7.2	0.6	0.069	0.95	2.266	0.157
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.139	1.90		0.300

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	6.8	LOD		POOL	
3	7.7	COBBLE/BOULDER	100	RIFFLE	40
6	8.4	IN VEG		RUN	50
9	6.2	OVER VEG		FLAT	10
12	5.0	CUTBANK			
15					
18		TOTAL	30	D50/90	10/80
21					
24					

6.8
 AREA (M*M) 103.7 MARGIN (M) 15.2

HABITAT COMMENTS:

STEELHEAD FRY RATING: 40% Good to excellent habitat
 RATIONALE: Shallow low and medium velocity riffle with broken flow.
 Substrate is composed of clean cobble and boulder with good interstitial spaces.

STEELHEAD PARR RATING: 60% Good to excellent habitat
 RATIONALE: Deep runs with medium velocity combined with broken flow over cobble and boulder cover.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: S21 REACH: 4 MAP#:94 D/10 ACCESS: HEL DATE: Sept 17 PHOTO: (2)#31

SITE LOCATION: Approximately 10 km downstream of Moosevale Creek, adjacent to Site S20.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) 1.8 TEMP (C) 9.5 Q (cfs): N/A
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: See Site S20.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN BIOMASS	
		RANGE	MEAN	1	2	U1+U2					WT	(g/m*m)
Rbt	0+	39-55	47.3	3	0	3	3.0	0.0	0.016	0.09	1.102	0.018
Rbt	1+	79-90	84.8	5	0	5	5.0	0.0	0.027	0.16	6.260	0.170
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	53-55	54.0	1	1	2	2.0	0.0	0.011	0.06	1.963	0.021
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.054	0.31		0.210

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	6.1	LOD		POOL	
3	4.6	COBBLE/BOULDER	100	RIFFLE 60	10
6	4.6	IN VEG		RUN 30	25
9	7.0	OVER VEG		FLAT 10	
12	6.3	CUTBANK			
15	5.8				
18	5.8	TOTAL	60	D50/90 15/80	
21					
24					
	5.7				
AREA (M*M)	183.8	MARGIN (M)	32.0		

HABITAT COMMENTS:

STEELHEAD FRY RATING: 50% Good to excellent habitat

RATIONALE: Shallow medium velocity riffle with broken flow over clean cobble and boulder substrate with good interstitial spaces for cover.

STEELHEAD PARR RATING: 50% Good to excellent habitat.

RATIONALE: Shallow riffle and run over clean cobble & boulder providing good cover.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: S22 REACH: 5 MAP#: 94 D/10 ACCESS: HEL DATE: Sept 17 PHOTO: (1)#20

SITE LOCATION: Approximately 4.5 km downstream of Moosevale Creek.
 Sampled a section of mainchannel at the top of a gravel bar island.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 1.5 TEMP (C) 8.5 Q (cfs): N/A
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	36-48	41.0	21	4	25	25.9	1.5	0.318	3.16	0.705	0.225
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	51-57	54.3	3	0	3	3.0	0.0	0.037	0.37	1.987	0.073
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.355	3.53		0.298

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	5.4	LOD		POOL	
3	5.2	COBBLE/BOULDER	100	RIFFLE	60
6	5.2	IN VEG		RUN	30
9	4.6	OVER VEG		FLAT	10
12	4.3	CUTBANK			
15	5.1				
18		TOTAL	30	D50/90	10/25
21					
24					
	5.0				
AREA (M*M)	81.5	MARGIN (M)	16.4		

HABITAT COMMENTS:

STEELHEAD FRY RATING: 80% Moderate habitat

RATIONALE: Flat areas combined with low velocity riffles over gravels and cobbles. Some siltation on substrate limits quality somewhat.

STEELHEAD PARR RATING: 20% Moderate habitat

RATIONALE: Higher flows over large cobbles and boulders in some sections; however, limited by shallow depth.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: S23 REACH: 5 MAP#: 94 D/10 ACCESS: VEH DATE: Sept 10 PHOTO: (1)#8

SITE LOCATION: Approximately 1.5 km upstream from Moosevale Creek confluence; where unnamed trib and Sustut River meet the road.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 1 TEMP (C) N/A Q (cfs): N/A
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Undercut banks with debris and overhanging veg. appear typical for this reach.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN	BIOMASS
		RANGE	MEAN	1	2	U1+U2					WT	(g/m*m)
Rbt	0+	42-54	49.0	20	5	25	26.7	2.2	0.323	4.27	1.231	0.398
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	52-71	59.5	5	3	8	12.5	10.6	0.152	2.00	2.486	0.377
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+	70	70.0	0	1	1	1.0	0.0	0.012	0.16	3.301	0.040
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+	69	69.0	0	1	1	1.0	0.0	0.012	0.16	3.125	0.038
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.499	6.59		0.852

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	9.7	LOD	10	POOL 20	
3	8.4	COBBLE/BOULDER	10	RIFFLE 30	15
6	7.2	IN VEG		RUN 50	
9	6.3	OVER VEG	10	OTHER	
12	5.6	CUTBANK	70		
15	5.0				
18	4.0	TOTAL	30	D50/90 15/35	
21					
24					
	6.6				
AREA (M*M)	82.5	MARGIN (M)	12.5		

HABITAT COMMENTS:

STEELHEAD FRY RATING: 70% Good habitat

RATIONALE: 40% of this site is riffle fry habitat and 30% undercut bank fry habitat. Most fry were captured in the undercut bank/debris cover.

STEELHEAD PARR RATING: Good

RATIONALE: Good parr habitat in the section with fast flow and boulder substrate. However, no parr were caught.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: S24 REACH: 6 MAP#: 94 D/10 ACCESS: HEL DATE: Sept 17 PHOTO: (2)#29

SITE LOCATION: Approximately 4 km upstream of Moosevale Creek.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) 1 TEMP (C) 10.5 Q (cfs): N/A
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Dvc 156 mm - ripe male, 145 mm - ripe female

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	37-51	44.4	20	7	27	30.8	4.3	0.110	0.75	0.904	0.100
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	52-68	58.8	3	1	4	4.5	1.5	0.016	0.11	2.414	0.039
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+	64	64.0	0	2	2	2.0	0.0	0.007	0.05	2.519	0.018
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+	84-156	135.0	3	1	4	4.5	1.5	0.016	0.11	32.860	0.529
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.150	1.02		0.686

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	5.9	LOD		POOL 10	100
3	5.2	COBBLE/BOULDER	40	RIFFLE 30	10
6	4.8	IN VEG		RUN 50	90
9	5.0	OVER VEG	10	FLAT 10	
12	5.0	CUTBANK	40		
15	6.2	DP POOL	10		
18	10.8			D50/90 7/20	
21	11.6	TOTAL	40		
24					

6.8
 AREA (M*M) 279.3 MARGIN (M) 41.0

HABITAT COMMENTS:

STEELHEAD FRY RATING: 30% Good to excellent habitat

RATIONALE: Slow velocity riffle over clean gravels. Undercut banks somewhat limited by high velocity.

STEELHEAD PARR RATING: 70% Moderate habitat

RATIONALE: High velocity deep run over clean gravel/cobble for cover. Also undercut banks, over veg. and deep pool cover.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: S25 REACH: 6 MAP#: 94 D/10 ACCESS: HEL DATE: Sept 13 PHOTO: (1)#25

SITE LOCATION: Approximately 3.5 km upstream of Moosevale Creek.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 1 TEMP (C) 7 Q (cfs): N/A
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	40-49	44.1	18	1	19	19.1	0.3	0.192	2.24	0.885	0.170
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	64	64.0	1	0	1	1.0	0.0	0.010	0.12	2.971	0.030
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+	101	101.0	1	0	1	1.0	0.0	0.010	0.12	11.880	0.119
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.212	2.48		0.319

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	4.4	LOD		POOL	
3	5.6	COBBLE/BOULDER	100	RIFFLE 50	10
6	6.5	IN VEG		RUN	
9	6.7	OVER VEG		FLAT 50	
12	5.6	CUTBANK			
15	6.3				
18		TOTAL	30	D50/90 7/15	
21					
24					

5.9
 AREA (M*M) 99.5 MARGIN (M) 17.0

HABITAT COMMENTS:

STEELHEAD FRY RATING: 100% Excellent habitat

RATIONALE: Shallow reasonably low velocity riffle and slow flat area with good cobble/gravel cover. Some silt on substrate, but generally lots of good spaces in cobbles.

STEELHEAD PARR RATING: Poor habitat

RATIONALE:

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: S26 REACH: 6 MAP#: 94 D/10 ACCESS: HEL DATE: Sept 16 PHOTO: (2)#16

SITE LOCATION: Approximately 40 m downstream of Johanson Creek confluence, at junction pool.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 1.5 TEMP (C) 7 Q (cfs): N/A
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	34-54	45.1	34	6	40	41.3	1.6	0.336	4.80	0.949	0.319
Rbt	1+	85	85.0	1	0	1	1.0	0.0	0.008	0.12	6.310	0.051
Rbt	2+	100	100.0	1	0	1	1.0	0.0	0.008	0.12	10.330	0.084
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	65	65.0	1	0	1	1.0	0.0	0.008	0.12	3.086	0.025
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	47	47.0	1	0	1	1.0	0.0	0.008	0.12	0.813	0.007
Dolly Varden	1+	65-72	68.5	2	0	2	2.0	0.0	0.016	0.23	3.047	0.050
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.384	5.50		0.535

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	5.0	LOD		POOL	
3	6.3	COBBLE/BOULDER	100	RIFFLE	70
6	7.6	IN VEG		RUN	20
9	9.2	OVER VEG		FLAT	10
12	8.3	CUTBANK			
15	6.5				
18		TOTAL	40	D50/90	10/40
21					
24					

7.2
 AREA (M*M) 123.0 MARGIN (M) 17.2

HABITAT COMMENTS:

STEELHEAD FRY RATING: 70% Good to excellent habitat

RATIONALE: Medium velocity, fairly shallow riffle over cobble/gravel; some flat sections along inner margin of site.

STEELHEAD PARR RATING: 30% Moderate habitat

RATIONALE: Sections of deeper run and riffle over boulder and large cobble along outer margin of site.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: S27 REACH: 6 MAP#: 94 D/10 ACCESS: HEL DATE: Sept 16 PHOTO: (2)#17

SITE LOCATION: Approximately 40 m downstream of Johanson Creek confluence, at the Junction Pool.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) N/A TEMP (C) 7 Q (cfs): N/A
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL RANGE	FL MEAN	PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
				1	2	U1+U2						
Rbt	0+	34-47	41.8	5	0	5	5.0	0.0	0.036	0.12	0.748	0.027
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	58-68	63.4	5	0	5	5.0	0.0	0.036	0.12	2.903	0.105
Coho	0+	75	75.0	1	0	1	1.0	0.0	0.007	0.02	5.576	0.041
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.080	0.26		0.173

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	3.6	LOO	10	POOL 20	70
3	3.9	COBBLE/BOULDER	10	RIFFLE 70	5
6	4.4	IN VEG		RUN	
9	3.8	OVER VEG	50	FLAT 10	
12	4.2	CUTBANK	20		
15	3.4	DP POOL	10		
18	2.7			D50/90 5/15	
21	2.1	TOTAL	40		
24	1.4				

3.3
 AREA (M*M) 137.7 MARGIN (M) 42.0

HABITAT COMMENTS:

STEELHEAD FRY RATING: 100% Moderate habitat
 RATIONALE: Slow riffle over small cobble and gravel.

STEELHEAD PARR RATING: 10% Moderate habitat
 RATIONALE: Deep pool along undercut bank.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: S28 REACH: 7 MAP#: 94 D/9 ACCESS: HEL DATE: Sept 12 PHOTO: (1)#21

SITE LOCATION: Approximately 1.5 km upstream from Johanson Creek confluence.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 2.5 TEMP (C) 9.5 Q (cfs): N/A
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Heavy brown algae growth on substrate.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	35-45	41.4	11	0	11	11.0	0.0	0.366	2.47	0.726	0.266
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+	135	135.0	1	0	1	1.0	0.0	0.033	0.22	25.680	0.855
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.400	2.70		1.121

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	3.4	LOD		POOL	
3	4.4	COBBLE/BOULDER	100	RIFFLE	60
6	3.5	IN VEG		RUN	35
9	2.2	OVER VEG		FLAT	5
12		CUTBANK			
15					
18		TOTAL	50	D50/90	25/50
21					
24					
	3.4				
AREA (M*M)	30.0	MARGIN (M)	8.9		

HABITAT COMMENTS:

STEELHEAD FRY RATING: 20% Moderate habitat

RATIONALE: limited by high velocity. However, some sections have lower velocities over gravels/cobbles.

STEELHEAD PARR RATING: 80% Good habitat

RATIONALE: Also limited by high velocities in some sections. ie, most of channel is >2 meters/sec.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: S29 REACH: 7 MAP#: 94 D/9 ACCESS: HEL DATE: Sept 12 PHOTO: (1)#22

SITE LOCATION: Approximately 1.5 km upstream of Johanson Creek. Adjacent to Site S28 on a small side channel.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) 1.5 TEMP (C) 9.5 Q (cfs): N/A
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Brown algae is abundant on substrate, similar to Site S28.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	38-45	41.4	6	1	7	7.2	0.6	0.215	0.46	0.726	0.156
Rbt	1+	76-96	86.0	2	0	2	2.0	0.0	0.060	0.13	6.530	0.389
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.274	0.59		0.545

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	3.3	LOD		POOL 10	25
3	2.7	COBBLE/BOULDER	90	RIFFLE 70	5
6	2.2	IN VEG		RUN 20	
9	1.5	OVER VEG	10	OTHER	
12	1.6	CUTBANK			
15	1.6				
18		TOTAL	30	D50/90 20/40	
21					
24					
	2.2				
AREA (M*M)	33.5	MARGIN (M)	15.6		

HABITAT COMMENTS:

STEELHEAD FRY RATING: 80% Moderate habitat
RATIONALE: Shallow riffle sections over cobbles.

STEELHEAD PARR RATING: 20% Moderate habitat
RATIONALE: Run section over boulders.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: S30 REACH: 7 MAP#: 94 D/9 ACCESS: HEL DATE: Sept 17 PHOTO: (2)#26

SITE LOCATION: Approximately 1.5 km downstream from Sustut Lake.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 1 TEMP (C) 11.5 Q (cfs): N/A
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: This site is typical for the upper part of this reach.
 Observed what appeared to be several large adult Steelhead holding across from this site.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+			0	0	0	0.0	0.0	0.000	0.00	0.000	
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00	0.000	
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00	0.000	
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00	0.000	
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00	0.000	
Coho	0+			0	0	0	0.0	0.0	0.000	0.00	0.000	
Coho	1+			0	0	0	0.0	0.0	0.000	0.00	0.000	
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00	0.000	
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00	0.000	
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00	0.000	
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00	0.000	
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00	0.000	
Burbot	all	132	132	1	0	1	1.0	0.0	0.014	0.15	19.780	0.279
TOTAL									0.014	0.15		0.279

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	4.2	LOD		POOL 10	75
3	4.2	COBBLE/BOULDER	40	RIFFLE 20	25
6	5.1	IN VEG	10	RUN 70	80
9	6.7	OVER VEG	20	OTHER	
12	6.1	CUTBANK	20		
15		DP POOL	10		
18				D50/90 25/100	
21		TOTAL	30		
24					

5.3
 AREA (M*M) 71.0 MARGIN (M) 13.5

HABITAT COMMENTS:

STEELHEAD FRY RATING: 20% Poor habitat

RATIONALE: Heavy silt deposits and algae growth on cobble/boulder substrate, few spaces for cover. Some undercut bank, instream veg. and over veg. cover.

STEELHEAD PARR RATING: 80% Moderate habitat

RATIONALE: Deep run with some boulder cover, limited by heavy green algae and silt.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: Sb1 REACH: 1 MAP#: 94 D/7 ACCESS: HEL DATE: Sept 14 PHOTO: (2)#10

SITE LOCATION: Bear River, approximately 0.8 km upstream from the Sustut River.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 1.5 TEMP (C) 12.5 Q (cfs): N/A
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Observed large numbers of spawning chinook in the upper section of the Bear River. Heavy growth of green/brown algae on bed material.

Rbt fry 32, 31, & 35 were just buttoned-up.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN	BIOMASS
		RANGE	MEAN	1	2	U1+U2					WT	(g/m*m)
Rbt	0+	31-53	41.6	27	2	29	29.2	0.5	0.293	4.11	0.737	0.216
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	62-64	63.0	2	0	2	2.0	0.0	0.020	0.28	2.858	0.058
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+	190	190.0	0	1	1	1.0	0.0	0.010	0.14	67.090	0.675
Dolly Varden	0+	40	40.0	0	1	1	1.0	0.0	0.010	0.14	0.462	0.005
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all	55	55.0	1	0	1	1.0	0.0	0.010	0.14	3.553	0.036
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.344	4.81		0.989

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	7.6	LOD		POOL	
3	7.3	COBBLE/BOULDER	100	RIFFLE 60	25
6	7.2	IN VEG		RUN 30	40-60
9	6.9	OVER VEG		FLAT 10	
12	6.0	CUTBANK			
15					
18		TOTAL	60	D50/90 25/60	
21					
24					

7.0
 AREA (M*M) 99.4 MARGIN (M) 14.2

HABITAT COMMENTS:

STEELHEAD FRY RATING: 40% Good to excellent habitat

RATIONALE: Shallow riffle over cobble at center and inner margin of site.

STEELHEAD PARR RATING: 60% Good to excellent habitat

RATIONALE: High velocity over large boulders with good interstitial spaces.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: Sb2 REACH: 1 MAP#: 94 D/2 ACCESS: VEH DATE: Sept 16 PHOTO: (2)#18

SITE LOCATION: Bear River, approximately 6 km downstream from north end of airstrip.
 Sampled the mainchannel off a gravel bar.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 1.5 TEMP (C) 12.5 Q (cfs): N/A
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Heavy growth of green/brown algae.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	32-54	42.0	31	5	36	37.0	1.4	0.308	4.15	0.760	0.234
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+	62-74	68.0	3	1	4	4.5	1.5	0.038	0.51	3.024	0.114
M. Whitefish	1+	220	220.0	0	1	1	1.0	0.0	0.008	0.11	104.300	0.870
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all	54-57	55.5	2	0	2	2.0	0.0	0.017	0.22	3.617	0.060
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.371	5.00		1.279

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	5.8	LOD		POOL	
3	5.6	COBBLE/BOULDER	100	RIFFLE 70	15
6	6.6	IN VEG		RUN 20	30
9	7.4	OVER VEG		OTHER 10	
12	7.8	CUTBANK			
15	7.2				
18		TOTAL	30	D50/90 12/40	
21					
24					

6.7
 AREA (M*M) 119.9 MARGIN (M) 17.8

HABITAT COMMENTS:

STEELHEAD FRY RATING: 70% Good to excellent
 RATIONALE: Medium velocity riffle over cobble substrate with some flat areas at inner margin of site.

STEELHEAD PARR RATING: 30% Moderate habitat
 RATIONALE: Higher velocity riffle over cobble with some boulders at outer margin of the site.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: St1 REACH: 1 MAP#: 94 D/10 ACCESS: HEL DATE: Sept 17 PHOTO: (2)#23

SITE LOCATION: Two Lakes Creek, approximately 1 km upstream from Sustut River confluence.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 1 - 2 TEMP (C) 7 Q (cfs): N/A
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Appears to be excellent rearing habitat throughout reach, but no Rbt present ?

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN	BIOMASS
		RANGE	MEAN	1	2	U1+U2					WT	(g/m*m)
Rbt	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+	68	68.0	1	0	1	1.0	0.0	0.006	0.12	4.213	0.025
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	42-49	45.8	5	1	6	6.3	0.8	0.038	0.72	0.743	0.028
Dolly Varden	1+	70-135	95.3	6	1	7	7.2	0.6	0.044	0.83	9.698	0.422
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.087	1.67		0.476

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	8.2	LOD		POOL	
3	9.4	COBBLE/BOULDER	100	RIFFLE	40
6	9.7	IN VEG		RUN	30
9	10.5	OVER VEG		FLAT	30
12	10.0	CUTBANK			
15					
18		TOTAL	40	D50/90	12/60
21					
24					
	9.6				
AREA (M*M)	165.4	MARGIN (M)	17.3		

HABITAT COMMENTS:

STEELHEAD FRY RATING: 50% Good to excellent habitat
 RATIONALE: Medium velocity riffle over cobble and boulder cover; some flat also along inner margin with good cobble cover.

STEELHEAD PARR RATING: 50% Good to excellent habitat
 RATIONALE: Deep high velocity run over cobble/boulder.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: St2 REACH: 1 MAP#: 94 D/10 ACCESS: HEL DATE: Sept 17 PHOTO: (2)#24

SITE LOCATION: Two Lakes Creek, approximately 1 km upstream of the Sustut River confluence.
 Sampled a small side channel adjacent to Site St1.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) 1.5 TEMP (C) 7 q (cfs): N/A
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+	44-65	59.0	5	0	5	5.0	0.0	0.036	0.14	2.808	0.101
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	42-60	49.6	6	2	8	9.0	2.1	0.065	0.25	0.982	0.064
Dolly Varden	1+	105	105.0	1	0	1	1.0	0.0	0.007	0.03	13.620	0.098
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.108	0.41		0.263

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	3.0	LOD	10	POOL 10	75
3	3.3	COBBLE/BOULDER	20	RIFFLE 30	10
6	3.7	IN VEG		RUN 40	30
9	4.4	OVER VEG	30	FLAT 20	
12	3.5	CUTBANK	30		
15	4.0	DP POOL	10		
18	4.8			D50/90 7/50	
21	3.5	TOTAL	40		
24					

3.8
 AREA (M*M) 138.5 MARGIN (M) 36.7

HABITAT COMMENTS:

STEELHEAD FRY RATING: 50% Good to excellent habitat
 RATIONALE: Low velocity riffle with clean cobbles, undercut banks, LOD, and over veg. cover.

STEELHEAD PARR RATING: 50% Moderate habitat
 RATIONALE: Undercut bank with a few large boulders providing cover. Also some deeper sections.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: SJ1 REACH: 1 MAP#: 94 D/9 ACCESS: HEL DATE: Sept 18 PHOTO: (2)#32

SITE LOCATION: Johanson Creek, approximately 2.5 km upstream of the Sustut River confluence.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) 1.5 TEMP (C) 7.5 Q (cfs): N/A
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: This site is typical for this reach.
 The coho at 92 mm may be age 1+.

POPULATION ESTIMATES:

SPECIES	AGE	FL RANGE	FL MEAN	PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
				1	2	U1+U2						
Rbt	0+			0	0	0	0.0	0.0	0.000	0.00	0.000	
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00	0.000	
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00	0.000	
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00	0.000	
Chinook	0+	59-61	60.0	1	2	3	3.0	0.0	0.009	0.07	2.537	0.024
Coho	0+	61-92	72.0	4	0	4	4.0	0.0	0.012	0.09	4.961	0.061
Coho	1+			0	0	0	0.0	0.0	0.000	0.00	0.000	
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00	0.000	
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00	0.000	
Dolly Varden	0+	47-60	51.4	3	2	5	9.0	13.4	0.028	0.21	1.113	0.031
Dolly Varden	1+	70-108	93.1	5	3	8	12.5	10.6	0.039	0.30	8.933	0.346
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00	0.000	
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00	0.000	
TOTAL									0.088	0.68		0.462

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	10.3	LOD	20	POOL 10	70
3	8.5	COBBLE/BOULDER	30	RIFFLE 40	20
6	4.9	IN VEG		RUN 40	30
9	10.1	OVER VEG	20	FLAT 10	
12	8.8	CUTBANK	20		
15	7.5	DP POOL	10		
18	5.1			D50/90 10/20	
21	6.0	TOTAL	40		
24					

7.7

AREA (M*M) 322.8 MARGIN (M) 42.2

HABITAT COMMENTS:

STEELHEAD FRY RATING: 60% Good to excellent habitat

RATIONALE: Low velocity riffle over clean cobble, some LOD, over veg. and cutbank cover with a few pools. Flat areas, but velocities generally quite high in this site.

STEELHEAD PARR RATING: 40% Moderate habitat

RATIONALE: High velocity deep run and riffle sections over clean cobble with some boulders.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: SJ2 REACH: 1 MAP#: 94 D/9 ACCESS: HEL DATE: Sept 18 PHOTO: (2)#34

SITE LOCATION: Johanson Creek, approximately 5.5 km upstream of the Sustut River confluence.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) 1.5 TEMP (C) 8.5 Q (cfs): N/A
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	46-47	46.5	2	0	2	2.0	0.0	0.015	0.11	1.045	0.016
Rbt	1+	85-86	85.5	1	1	2	2.0	0.0	0.015	0.11	6.420	0.099
Rbt	2+	105	105.0	1	0	1	1.0	0.0	0.008	0.06	11.980	0.092
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	65-74	68.0	4	0	4	4.0	0.0	0.031	0.23	3.446	0.106
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	51	51.0	0	1	1	1.0	0.0	0.008	0.06	1.083	0.008
Dolly Varden	1+	79-128	97.0	3	0	3	3.0	0.0	0.023	0.17	10.320	0.238
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.100	0.73		0.559

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	10.0	LOD	10	POOL	
3	8.7	COBBLE/BOULDER	90	RIFFLE 50	15
6	6.6	IN VEG		RUN 30	30
9	6.7	OVER VEG		FLAT 20	
12	6.4	CUTBANK			
15	5.7				
18		TOTAL	40	D50/90 15/35	
21					
24					

7.4
 AREA (M*M) 130.1 MARGIN (M) 17.7

HABITAT COMMENTS:

STEELHEAD FRY RATING: 70% Good to excellent habitat
 RATIONALE: Riffle with cobble bed material.

STEELHEAD PARR RATING: 30% Good to excellent habitat
 RATIONALE: Run with boulder and cobble bed material.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: SJ3 REACH: 1 MAP#: 94 D/9 ACCESS: HEL DATE: Sept 12 PHOTO: (1)#23

SITE LOCATION: Johanson Creek, approximately 6 km upstream of Sustut River confluence.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) 1.5 TEMP (C) 8 Q (cfs): N/A
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN	BIOMASS
		RANGE	MEAN	1	2	U1+U2					WT	(g/m*m)
Rbt	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	58-72	66.8	4	1	5	5.3	1.0	0.057	0.36	3.300	0.189
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	55	55.0	1	0	1	1.0	0.0	0.011	0.07	1.411	0.015
Dolly Varden	1+	95-120	110.0	4	0	4	4.0	0.0	0.043	0.27	16.030	0.689
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.111	0.69		0.894

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	4.4	LOD		POOL	
3	4.0	COBBLE/BOULDER	80	RIFFLE	40
6	8.0	IN VEG		RUN	50
9	7.6	OVER VEG	10	FLAT	10
12	7.0	CUTBANK	10		
15					
18		TOTAL	30	D50/90	15/30
21					
24					

6.2
 AREA (M*M) 93.0 MARGIN (M) 15.0

HABITAT COMMENTS:

STEELHEAD FRY RATING: 30% Good habitat

RATIONALE: Most of site is limited by high velocity. However, from the center towards the margin there is a shallow riffle and flat area where chinook were caught.

STEELHEAD PARR RATING: 70% Good habitat

RATIONALE: Riffle and run sections with depths up to 30-40 cm, cobble and boulder substrate with some cutbank and over veg.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: SJ4 REACH: 2 MAP#: 94 D/9 ACCESS: VEH DATE: Sept 19 PHOTO: (3)#4

SITE LOCATION: Johanson Creek, approximately 3-4 km downstream of bridge at Site SJ7.
This site is just downstream of Site SJ5.

SIDE/MAINSTEM: M P=1/F=2 2 SLOPE (%) 1.5 TEMP (C) 6.5 Q (cfs): N/A
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: This site is typical of this reach.

POPULATION ESTIMATES:

SPECIES	AGE	FL RANGE	FL MEAN	PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
				1	2	U1+U2						
Rbt	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	1+	75-83	79.3	3	0	3	3.0	0.0	0.036	0.23	5.110	0.186
Rbt	2+	100-117	108.5	2	0	2	2.0	0.0	0.024	0.15	13.230	0.322
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+	52	52.0	1	0	1	1.0	0.0	0.012	0.08	1.957	0.024
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+	108	108.0	1	0	1	1.0	0.0	0.012	0.08	15.030	0.183
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.085	0.53		0.714

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	5.7	LOD		POOL	
3	5.9	COBBLE/BOULDER	50	RIFFLE	30
6	6.0	IN VEG		RUN	70
9	6.7	OVER VEG	20	OTHER	
12	6.0	CUTBANK	30		
15	7.1				
18		TOTAL	40	050/90	30/100
21					
24					

6.2
AREA (M*M) 82.3 MARGIN (M) 13.2

HABITAT COMMENTS:

STEELHEAD FRY RATING: 20% Poor habitat

RATIONALE: Some medium velocity riffle and good undercut bank with over veg. cover. Relatively few spaces in highly compacted cobble/boulder substrate.

STEELHEAD PARR RATING: 80% Good to excellent habitat

RATIONALE: Fast run/riffle over cobble and boulder substrate.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: Sj5 REACH: 2 MAP#: 94 D/9 ACCESS: VEH DATE: Sept 19 PHOTO: (3)#8

SITE LOCATION: Johanson Creek, approximately 3 km downstream of the bridge at Site Sj7.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 1.5 TEMP (C) 6.5 Q (cfs): N/A
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	43-49	46.0	3	0	3	3.0	0.0	0.028	0.34	1.011	0.028
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+	52	52.0	1	0	1	1.0	0.0	0.009	0.11	1.957	0.018
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+	77-90	83.5	2	0	2	2.0	0.0	0.019	0.23	6.100	0.114
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.056	0.69		0.161

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	3.5	LOD	10	POOL	
3	5.6	COBBLE/BOULDER	80	RIFFLE 80	15
6	7.2	IN VEG		RUN 20	20
9	7.5	OVER VEG	10	OTHER	
12	7.1	CUTBANK			
15	5.7				
18		TOTAL	30	D50/90 5/20	
21					
24					
	6.1				
AREA (M*M)	106.8	MARGIN (M)	17.5		

HABITAT COMMENTS:

STEELHEAD FRY RATING: 100% Good to excellent habitat

RATIONALE: Medium velocity riffle and some run over clean cobble/gravel.

STEELHEAD PARR RATING: Poor habitat

RATIONALE: Not suitable parr habitat.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: Sj6 REACH: 2 MAP#: 94 D/9 ACCESS: HEL DATE: Sept 18 PHOTO: (3)#2

SITE LOCATION: Johanson Creek, approximately 5.5 km downstream of Solo Creek confluence.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) 1.5 TEMP (C) 10 Q (cfs): N/A
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: In general this site is not great habitat; however, it is typical for this reach.

POPULATION ESTIMATES:

SPECIES	AGE	FL RANGE	FL MEAN	PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
				1	2	U1+U2						
Rbt	0+	40-50	43.7	3	0	3	3.0	0.0	0.009	0.05	0.860	0.008
Rbt	1+	87	87.0	1	0	1	1.0	0.0	0.003	0.02	6.770	0.020
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	48-55	51.5	2	0	2	2.0	0.0	0.006	0.04	1.112	0.007
Dolly Varden	1+	80	80.0	0	1	1	1.0	0.0	0.003	0.02	5.249	0.016
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.021	0.13		0.050

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	6.9	LOD	10	POOL	
3	8.1	COBBLE/BOULDER	20	RIFFLE	60
6	6.5	IN VEG		RUN	30
9	7.4	OVER VEG	20	FLAT	10
12	7.3	CUTBANK	60		
15	7.1				
18	3.0	TOTAL	20	D50/90	5/12
21	4.1				
24	4.3				

6.1
 AREA (M*M) 334.3 MARGIN (M) 55.0

HABITAT COMMENTS:

STEELHEAD FRY RATING: 70% Moderate habitat
 RATIONALE: Slow shallow riffle sections over gravel and cobble sustrate. Some LOD, over veg. and cutbank cover.

STEELHEAD PARR RATING: 30% Poor to moderate habitat
 RATIONALE: Deep high velocity run, limited boulder/cobble cover.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: SJ7 REACH: 2 MAP#: 94 D/9 ACCESS: VEH DATE: Sept 15 PHOTO: (2)#14

SITE LOCATION: Johanson Creek, approximately 10 km downstream of Johanson Lake.
Turn-off is near Km 405 at bridge crossing up to mine.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 2 TEMP (C) 7.5 Q (cfs): N/A
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: This upstream stretch of Johanson Creek is mostly high velocity broken flow over boulders with a few gravel bars. The lower section is a bit slower with more gravel bars.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN	BIOMASS
		RANGE	MEAN	1	2	U1+U2					WT	(g/m*m)
Rbt	0+	55	55.0	1	0	1	1.0	0.0	0.012	0.13	1.766	0.021
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+	105	105.0	1	0	1	1.0	0.0	0.012	0.13	11.970	0.144
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+	73	73.0	1	0	1	1.0	0.0	0.012	0.13	3.745	0.045
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	51	51.0	1	0	1	1.0	0.0	0.012	0.13	1.083	0.013
Dolly Varden	1+	75	75.0	1	0	1	1.0	0.0	0.012	0.13	4.186	0.050
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.060	0.63		0.274

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	5.4	LOD		POOL	
3	5.1	COBBLE/BOULDER	70	RIFFLE	10
6	5.5	IN VEG		RUN	80
9	6.1	OVER VEG	20	FLAT	10
12	5.2	CUTBANK	10		
15	5.3				
18	4.2	TOTAL	60	D50/90	40/80
21					
24					
	5.3				
AREA (M*M)	83.1	MARGIN (M)	15.8		

HABITAT COMMENTS:

STEELHEAD FRY RATING: 10% Poor habitat

RATIONALE: A few slower spots with cobble, over veg. and cutbank cover. Limited by high velocity.

STEELHEAD PARR RATING: 90% Good to excellent habitat

RATIONALE: Deep high velocity run/riffle over large cobbles and boulders. Good cover from over veg. cutbank and cobble/boulder substrate.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: SJ8 REACH: 3 MAP#: 94 D/9 ACCESS: HEL DATE: Sept 18 PHOTO: (3)#3

SITE LOCATION: Johanson Creek, approximately 5.5 km downstream of Johanson Lake outlet.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) N/A TEMP (C) 10 Q (cfs): N/A
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL RANGE	FL MEAN	PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
				1	2	U1+U2						
Rbt	0+	39-47	43.3	10	1	11	11.1	0.4	0.086	0.46	0.835	0.072
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+	110	110.0	1	0	1	1.0	0.0	0.008	0.04	16.030	0.125
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.094	0.50		0.197

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	6.5	LOD		POOL	
3	4.3	COBBLE/BOULDER	80	RIFFLE	60
6	4.4	IN VEG		RUN	30
9	4.6	OVER VEG	10	FLAT	10
12	5.0	CUTBANK	10		
15	5.8				
18	6.9	TOTAL	30	D50/90	10/90
21					
24					
	5.4				
AREA (M*M)	128.6	MARGIN (M)	24.0		

HABITAT COMMENTS:

STEELHEAD FRY RATING: 70% Good to excellent habitat

RATIONALE: Slow and medium velocity riffle over gravel, cobble and boulder substrate.

STEELHEAD PARR RATING: 30% Moderate habitat

RATIONALE: Medium velocity riffle/run over cobble and boulder. Not enough cover for high quality parr habitat.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: Sm1 REACH: 1 MAP#: 94 D/10 ACCESS: VEH DATE: Sept 10 PHOTO: (1)#7

SITE LOCATION: Moosevale Creek, approximately 75 m downstream of road crossing and 350 m upstream of the Sustut River.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 0.5 TEMP (C) 8 Q (cfs): N/A
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN	BIOMASS
		RANGE	MEAN	1	2	U1+U2					WT	(g/m*m)
Rbt	0+	42	42.0	1	0	1	1.0	0.0	0.007	0.07	0.760	0.005
Rbt	1+	62-78	70.0	2	0	2	2.0	0.0	0.013	0.13	3.490	0.046
Rbt	2+	120	120.0	1	0	1	1.0	0.0	0.007	0.07	17.960	0.117
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	60	60.0	1	0	1	1.0	0.0	0.007	0.07	1.915	0.013
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.033	0.33		0.180

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	4.9	LOD		POOL	
3	6.4	COBBLE/BOULDER	70	RIFFLE	70
6	5.5	IN VEG		RUN	30
9	5.2	OVER VEG	20	OTHER	
12	4.7	CUTBANK	10		
15	4.8				
18	4.2	TOTAL	30	D50/90	20/40
21					
24					
	5.1				
AREA (M*M)	153.0	MARGIN (M)	30.0		

HABITAT COMMENTS:

STEELHEAD FRY RATING: 40% Moderate habitat

RATIONALE: Lower quarter of site is a riffle over cobble/gravel, limited by high velocity.

STEELHEAD PARR RATING: 60% Good habitat

RATIONALE: Fairly high velocity through large boulders and cobbles.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: SUA1 REACH: MAP#: 94 D/9 ACCESS: VEH DATE: Sept 15 PHOTO: (2)#15

SITE LOCATION: Unnamed Tributary A located, approximately 60 m upstream of Johanson Creek confluence. Sampled on upstream side of bridge between Km 410 & 415.

SIDE/MAINSTEM: M P=1/F=2 2 SLOPE (%) 3 TEMP (C) 7.5 Q (cfs): N/A
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Green algae on substrate.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN	BIOMASS
		RANGE	MEAN	1	2	U1+U2					WT	(g/m*m)
Rbt	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	1+	77-88	82.5	4	2	6	8.0	4.9	0.040	0.26	5.760	0.232
Rbt	2+	107-114	110.2	5	0	5	5.0	0.0	0.025	0.16	13.870	0.348
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.065	0.43		0.580

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	7.8	LOD		POOL	
3	6.0	COBBLE/BOULDER	80	RIFFLE 20	30
6	6.6	IN VEG		RUN 80	40
9	7.2	OVER VEG	10	OTHER	
12	7.0	CUTBANK	10		
15	6.4				
18	5.7	TOTAL	70	D50/90 50/120	
21	5.5				
24					
	6.5				
AREA (M*M)	199.0	MARGIN (M)	30.5		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Not available

RATIONALE: Not rated in field. Suspect poor due to deep high velocity water.

STEELHEAD PARR RATING: 100% Excellent habitat

RATIONALE: High velocity with lots of cover in boulders, cutbank and over veg.

SUSTUT RIVER STEELHEAD INDEX SITE 1991

SITE: Sub1 REACH: MAP#: 94 D/9 ACCESS: VEH DATE: Sept 10 PHOTO: (1)#10

SITE LOCATION: Unnamed Tributary B located, approximately 15 m upstream of bridge, and 800 m upstream Johanson Creek confluence.

SIDE/MAINSTEM: M P=1/F=2 2 SLOPE (%) 2.5 TEMP (C) 8.5 Q (cfs): N/A
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: This tributary may be limited by suitable spawning habitat.
 Chinook lengths 95 mm & 100 mm may be age 1+ ?

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN	BIO MASS
		RANGE	MEAN	1	2	U1+U2					WT	(g/m*m)
Rbt	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+	135	135.0	1	0	1	1.0	0.0	0.005	0.04	25.680	0.130
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	60-100	78.6	8	2	10	10.7	1.4	0.054	0.37	4.912	0.264
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	45-55	50.0	0	3	3	3.0	0.0	0.015	0.11	1.011	0.015
Dolly Varden	1+	60-120	85.7	16	10	26	42.7	22.7	0.215	1.50	6.682	1.438
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.289	2.01		1.847

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	9.0	LOD		POOL 10	
3	9.0	COBBLE/BOULDER	80	RIFFLE 30	30
6	7.8	IN VEG		RUN 60	
9	7.2	OVER VEG	10	OTHER	
12	6.0	CUTBANK			
15	5.2	DP POOL	10		
18	4.5			D50/90 35/60	
21		TOTAL	80		
24					
	7.0				
AREA (M*M)	198.3	MARGIN (M)	28.5		

HABITAT COMMENTS:

STEELHEAD FRY RATING: 10% Good habitat
 RATIONALE: Shallow riffle sections over cobble substrate.

STEELHEAD PARR RATING: 90% Excellent habitat
 RATIONALE: Deep riffle/run over cobble and boulder substrate. However, only 1 parr caught. Possibly Rbt move out for winter?

**Appendix 4. Site Descriptions and Detailed Results of Fish
Sampling in the Zymoetz River and Tributaries.**

Appendix 4 Table 1. Zymoetz River Catch Composition for Sample Sites.

FILE = SUMMARY

SITE	LOCATION	RAINBOW			CHINOOK	COHO	DOLLY WHITE- VARDEN FISH DACE			SCULPIN	CUT- THROAT	AREA	LENGTH	
		FRY	1+	2+										
Z1	Reach 6	185	6	3	15	0	1					133	17	
Z2	"	101	4	13	15							273	25	
Z3	"	33	11	19	14		3					195	16.8	
Z4	"	21	2	4	8							96	16.2	
Z5	"	15	2				1					58	21.2	
Z6	"	100	29	5	17	9	2					250	32.3	
Z7	"	71	17	11			2					193	20	
Z8	"	81	12	2			1					168	16.5	
Z9	"	113	20				2	2				100	15.4	
Z10	"	67	7					1				107	18.9	
Z11	"	58	5	1								114	19.7	
Z12	Reach 7	65	1	1								73	14.9	
Z13	"	61	1									58	17.1	
Z14	"	96	3			20		1				106	23.7	
Z15	"	27										60	18.9	
Z16	"	129	9	1		1		3				166	32.5	
Z17	"	23								6		85	20.2	
Z18	"	55							1	13		130	17.1	
Z19	Reach 8	42	2			2			20	44		106	19.2	
C1	Cloze	26		1	4		1					59	19.3	
C2	Cloze	24	1	1	3		1					72	21	
C3	Cloze	33	1	1	1		3					71	19.6	
C4	Cloze	130	1	4	9		7	1				197	29.5	
C5	Cloze	80	3	5	3		2					181	21.7	
C6	Cloze	68	4				3					97	16.8	
C7	Cloze	8	7	5			5	2			1	148	24.3	
Ctrl	Trapline Ck.	195	16	8		13	2					164	28	
Cth1	Thomas Ck.	0	1		6		3					64	20	
Zc1	Coal	80	4	1			3				1	45	14.6	
Zs1	Sandstone Ck.*	21	0	0			3				3	30	13.9	
Zt1	Treasure Ck.	21	1	1			3					139	20.5	
TOTAL		2026	170	86	96	44	48	10	21	63	5	3738	2570	
PERCENT		78.8	6.6	3.4	3.7	1.7	1.9	0.4	0.8	2.4	0.2		100	
TOTAL LENGTH 631.8 m														
Zymoetz		1341.	130.9	59.4	69.8	31.6	12	7	21.2	62.9	0	2469.	382.6	1736.4
		77.3	7.5	3.4	4.0	1.8	0.7	0.4	1.2	3.6	0.0		100.0	
Cloze		368.8	17.2	17	20.1	0	22	3	0	0	1	824.9	152.2	449.1
		82.1	3.8	3.8	4.5	0.0	4.9	0.7	0.0	0.0	0.2		100.0	
Tribes		316	22	10	6	13	14	0	0	0	4	443	97	384.3
		82.2	5.7	2.6	1.6	3.3	3.6	0.0	0.0	0.0	1.0		100.0	

* Mixture of cutthroat and rainbow fry

ZYMOETZ RIVER STEELHEAD INDEX SITE 1991

SITE: Z1 REACH: 6 MAP#: 93L/5 ACCESS: VEH DATE: Sept 17 PHOTO: (3)#5

SITE LOCATION: Zymoetz River at 36.2 Km on the main haul road. Adjacent to sample Site Z2.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) <0.5 TEMP (C) 11.5 Q (cfs): 1000
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS		U1+U2	NUMBER	S.E.	N/M*M	N/LIN-M	MEAN	BIOMASS
		RANGE	MEAN	1	2						WT	(g/m*m)
Rbt	0+	36-61	49.8	151	28	179	185.4	3.7	1.398	21.81	1.496	2.091
Rbt	1+	65-97	87.5	6	0	6	6.0	0.0	0.045	0.71	7.965	0.360
Rbt	2+	98-108	101.7	3	0	3	3.0	0.0	0.023	0.35	12.110	0.274
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	58-80	69.1	11	3	14	15.1	1.9	0.114	1.78	4.862	0.555
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	49	49.0	0	1	1	1.0	0.0	0.008	0.12	1.205	0.009
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									1.587	24.76		3.289

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	7.0	LOD		POOL	
3	12.7	COBBLE/BOULDER	100	RIFFLE	100
6	8.1	IN VEG		RUN	
9	3.4	OVER VEG		OTHER	
12		CUTBANK			
15					
18		TOTAL	90	D50/90	15/80
21					
24					

7.8
AREA (M*M) 132.6 MARGIN (M) 17.0

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good habitat

RATIONALE: Shallow riffle with large cobble substrate and moderate flow. Good interstitial spaces for cover throughout site.

STEELHEAD PARR RATING: Moderate habitat along the outer half of site

RATIONALE: Limited by shallow depth and low velocities near margin.

ZYMOETZ RIVER STEELHEAD INDEX SITE 1991

SITE: Z2 REACH: 6 MAP#: 93L/5 ACCESS: VEH DATE: Sept 17 PHOTO: (3)#4

SITE LOCATION: Zymoetz River sidechannel at 36.2 Km on the main haul road.
Approximately 50 m below "Observation Point".

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) <1 TEMP (C) 11.5 Q (cfs): 3-5
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL RANGE	FL MEAN	PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
				1	2	U1+U2						
Rbt	0+	37-60	48.2	79	17	96	100.7	3.4	0.368	4.03	1.358	0.500
Rbt	1+	82-95	87.6	2	1	3	4.0	3.5	0.015	0.16	7.924	0.116
Rbt	2+	102-131	113.3	5	3	8	12.5	10.6	0.046	0.50	16.360	0.748
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	62-81	70.5	13	2	15	15.4	0.8	0.056	0.61	5.136	0.289
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.485	5.30		1.653

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	8.6	LOD		POOL	
3	9.4	COBBLE/BOULDER	100	RIFFLE	60
6	9.5	IN VEG		RUN	8
9	11.2	OVER VEG		FLAT	40
12	13.5	CUTBANK			
15	13.4				
18		TOTAL	40	D50/90	6/25
21					
24					
	10.9				
AREA (M*M)	273.3	MARGIN (M)	25.0		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good habitat for half of site
RATIONALE: Shallow cobbles with low velocity. Limited in some areas by small substrate and low flow.

STEELHEAD PARR RATING: Poor habitat
RATIONALE: Limited by shallow, low velocity water combined with small substrate.

ZYMOETZ RIVER STEELHEAD INDEX SITE 1991

SITE: Z3 REACH: 6 MAP#: 93L/5 ACCESS: VEH DATE: Sept 17 PHOTO: (3)#2

SITE LOCATION: Zymoetz River sidechannel between Kitnayakwa Ck and the Clore River.
 Located at 37.5 Km along the main haul road.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) <0.5 TEMP (C) 10 Q (cfs): 100
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	31-58	49.0	23	7	30	33.1	3.4	0.169	1.97	1.426	0.241
Rbt	1+	77-95	84.1	8	2	10	10.7	1.4	0.055	0.63	7.132	0.390
Rbt	2+	98-137	115.9	11	3	14	15.1	1.9	0.077	0.90	17.430	1.350
Rbt	3+	145-180	162.7	2	1	3	4.0	3.5	0.020	0.24	44.840	0.918
Chinook	0+	61-82	70.5	12	2	14	14.4	0.9	0.074	0.86	5.136	0.379
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	45	45.0	0	1	1	1.0	0.0	0.005	0.06	0.931	0.005
Dolly Varden	1+	102-171	136.5	2	0	2	2.0	0.0	0.010	0.12	28.450	0.291
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.411	4.78		3.574

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	10.3	LOD		POOL	
3	11.2	COBBLE/BOULDER	100	RIFFLE	100
6	11.5	IN VEG		RUN	
9	13.5	OVER VEG		OTHER	
12		CUTBANK			
15					
18		TOTAL	100	D50/90	30-80
21					
24					
	11.6				
AREA (M*M)	195.3	MARGIN (M)	16.8		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Poor to Moderate habitat

RATIONALE: Poor fry habitat throughout most of site due to high water velocity and depth. Small sections of moderate habitat along the margin with shallow cobbles.

STEELHEAD PARR RATING: Excellent habitat

RATIONALE: Large bed material with good interstitial spaces for cover. Also some boulders present within site. Velocities are high enough to support large parr.

ZYMOETZ RIVER STEELHEAD INDEX SITE 1991

SITE: Z4 REACH: 6 MAP#: 93L/5 ACCESS: VEH DATE: Sept 17 PHOTO: (3)#3

SITE LOCATION: Zymoetz River at 37.5 Km along the main haul road. Located across gravelbar from Site Z3.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) <0.5 TEMP (C) 10 Q (cfs): >500
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL RANGE	FL MEAN	PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
				1	2	U1+U2						
Rbt	0+	39-61	49.6	15	4	19	20.5	2.2	0.214	2.53	1.478	0.316
Rbt	1+	64-88	76	0	2	2	2.0	0.0	0.021	0.25	5.378	0.113
Rbt	2+	102-109	105.7	2	1	3	4.0	3.5	0.042	0.49	13.480	0.564
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	70-83	76.1	8	0	8	8.0	0.0	0.084	0.99	6.325	0.529
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.360	4.25		1.522

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	6.4	LOD		POOL	
3	7.7	COBBLE/BOULDER	100	RIFFLE	100
6	7.4	IN VEG		RUN	
9	5.1	OVER VEG		OTHER	
12	2.9	CUTBANK			
15					
18		TOTAL	90	D50/90	15/60
21					
24					
	5.9				
AREA (M*M)	95.6	MARGIN (M)	16.2		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Moderate to Good habitat for half of site
 RATIONALE: Moderate to good habitat along inner half of site.
 Limited due to deep, high velocity water along outer edge.

STEELHEAD PARR RATING: Good habitat in some sections
 RATIONALE: Good parr habitat within a narrow band between slow water and high velocity outer section.

ZYMOETZ RIVER STEELHEAD INDEX SITE 1991

SITE: Z5 REACH: 6 MAP#: 93L/12 ACCESS: VEH DATE: Sept 20 PHOTO: (3)#19

SITE LOCATION: Zymoetz River mainstem just downstream of the Treasure Creek confluence.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) N/A TEMP (C) 9 Q (cfs): <1000
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Site disturbance from pounding re-bar was thought to have decreased parr catches. However, undisturbed downstream sections were electrofished with the same results. This confirms low catches.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS		U1+U2	NUMBER	S.E.	N/M*M	N/LIN-M	MEAN	BIOMASS
		RANGE	MEAN	1	2						WT	(g/m*m)
Rbt	0+	31-56	45.4	14	1	15	15.1	0.3	0.261	1.42	1.137	0.296
Rbt	1+	78-89	83.5	2	0	2	2.0	0.0	0.035	0.19	6.990	0.242
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	49	49.0	1	0	1	1.0	0.0	0.017	0.09	1.205	0.021
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.313	1.71		0.559

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	1.3	LOD		POOL	
3	1.8	COBBLE/BOULDER	100	RIFFLE	
6	2.9	IN VEG		RUN	100
9	3.8	OVER VEG		OTHER	
12	3.5	CUTBANK			
15	3.3				
18	2.5	TOTAL	50	D50/90	10/25
21					
24					
	2.7				
AREA (M*M)	57.8	MARGIN (M)	21.2		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good habitat along margin

RATIONALE: Good fry habitat in lower velocity sections along the margin and around cobbles out of the main-flow.

STEELHEAD PARR RATING: Moderate habitat

RATIONALE: Limited by fines (sand/silt) between cobble spaces.

ZYMOETZ RIVER STEELHEAD INDEX SITE 1991

SITE: Z6 REACH: 6 MAP#: 93L/12 ACCESS: VEH DATE: Sept 20 PHOTO: (3)#18

SITE LOCATION: Zymoetz River sidechannel approximately 20 m upstream from the Treasure Creek confluence.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) 0.5 TEMP (C) 9 Q (cfs): 3
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: The pool contained a small debris complex, recovered coho from this habitat type. Upper extent of chinook juveniles from 1991 sampling.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	35-57	47.7	70	21	91	100.0	5.8	0.400	3.10	1.316	0.526
Rbt	1+	68-96	81.6	24	4	28	28.8	1.3	0.115	0.89	6.557	0.755
Rbt	2+	100-117	109.0	1	2	3	3.0	3.5	0.012	0.09	14.690	0.176
Rbt	3+	142-150	146.0	2	0	2	2.0	0.0	0.008	0.06	33.170	0.265
Chinook	0+	63-96	74.3	13	3	16	16.9	1.6	0.068	0.52	5.925	0.400
Coho	0+	52-83	62.4	6	2	8	9.0	2.1	0.036	0.28	3.078	0.111
Coho	1+			0	0	0	0.0	0.0	0.000	0.00	0.000	0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00	0.000	0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00	0.000	0.000
Dolly Varden	0+	38	38.0	1	0	1	1.0	0.0	0.004	0.03	0.550	0.002
Dolly Varden	1+	91	91.0	1	0	1	1.0	0.0	0.004	0.03	8.141	0.033
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00	0.000	0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00	0.000	0.000
TOTAL									0.647	5.01		2.269

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	7.6	LOD	10	POOL 60	
3	6.4	COBBLE/BOULDER	90	RIFFLE 40	15
6	7.1	IN VEG		RUN	
9	7.3	OVER VEG		OTHER	
12	6.5	CUTBANK			
15	10.1				
18	9.2	TOTAL	50	D50/90 6/90	
21					
24					
	7.7				
AREA (M*M)	250.1	MARGIN (M)	32.3		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good to Moderate habitat

RATIONALE: Good habitat for approximately half of site in shallow cobble riffle. Pool areas were moderate in deeper sections and good in shallows.

STEELHEAD PARR RATING: Good to Excellent habitat

RATIONALE: Cover is composed of deep pool sections and large rock. Riffle areas are limited somewhat by moderate depths.

ZYMOETZ RIVER STEELHEAD INDEX SITE 1991

SITE: 27 REACH: 6 MAP#: 93L/12 ACCESS: HEL DATE: Aug 21 PHOTO: (1)#21

SITE LOCATION: Zymoetz River sidechannel approximately 3 Km upstream from the Treasure Creek confluence. Located just downstream from an unstable slide area.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) 0.5 TEMP (C) 11.5 Q (cfs): 40
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN	BIOMASS
		RANGE	MEAN	1	2	U1+U2					WT	(g/m*m)
Rbt	0+	32-48	39.4	52	14	66	71.2	4.1	0.368	3.56	0.747	0.275
Rbt	1+	67-90	78.9	16	1	17	17.1	0.3	0.088	0.85	5.971	0.527
Rbt	2+	101-135	116.8	5	1	6	6.3	0.8	0.032	0.31	17.810	0.576
Rbt	3+	142-165	151.8	3	1	4	4.5	1.5	0.023	0.23	36.970	0.861
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	38-40	39.0	2	0	2	2.0	0.0	0.010	0.10	0.596	0.006
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.522	5.05		2.244

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	8.9	LOD		POOL 30	80
3	9.7	COBBLE/BOULDER	100	RIFFLE 70	30
6	10.4	IN VEG		RUN	
9		OVER VEG		OTHER	
12		CUTBANK			
15					
18		TOTAL	90	D50/90 20/60	
21					
24					

9.7
AREA (M*M) 193.3 MARGIN (M) 20.0

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good habitat in some sections

RATIONALE: Good fry habitat in a narrow band along the margin. This site is limited by deep water combined with high velocity.

STEELHEAD PARR RATING: Excellent habitat

RATIONALE: Large substrate with suitable velocities throughout the site.

ZYMOETZ RIVER STEELHEAD INDEX SITE 1991

SITE: 28 REACH: 6 MAP#: 93L/12 ACCESS: HEL DATE: Aug 21 PHOTO: (1)#17,18,19

SITE LOCATION: Zymoetz River approximately 6 km downstream from Red Canyon Creek confluence.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) 0.5 TEMP (C) 10 q (cfs): 10
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN BIOMASS	
		RANGE	MEAN	1	2	U1+U2					WT	(g/m*m)
Rbt	0+	28-44	37.5	57	17	74	81.2	5.2	0.484	4.92	0.646	0.312
Rbt	1+	65-93	78.8	12	0	12	12.0	0.0	0.071	0.73	5.948	0.425
Rbt	2+	100-108	104.0	2	0	2	2.0	0.0	0.012	0.12	12.890	0.154
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+	170	170.0	1	0	1	1.0	0.0	0.006	0.06	56.000	0.334
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.573	5.83		1.225

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	11.0	LOD		POOL	
3	10.2	COBBLE/BOULDER	100	RIFFLE	100
6	10.2	IN VEG		RUN	20
9	9.3	OVER VEG		OTHER	
12		CUTBANK			
15					
18		TOTAL	100	D50/90	20/50
21					
24					
	10.2				
AREA (M*M)	167.9	MARGIN (M)	16.5		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Excellent habitat

RATIONALE: Slow shallow riffle with large cobble and boulder substrate. Appears to be the best available fry rearing in this section of river.

STEELHEAD PARR RATING: Good habitat

RATIONALE: Limited by shallow depth and low velocity. Good parr habitat at present flows. Due to the large substrate, this site could be improved for parr with slightly higher flows.

ZYMOETZ RIVER STEELHEAD INDEX SITE 1991

SITE: Z9 REACH: 6 MAP#: 93L/12 ACCESS: HEL DATE: Aug 21 PHOTO: (1)#20

SITE LOCATION: Zymoetz River mainstem edge across gravel-bar from Site Z8.
 Located approximately 6 km downstream from Red Canyon Creek confluence.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 0.5 TEMP (C) 11 Q (cfs): >1000
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN	BIOMASS
		RANGE	MEAN	1	2	U1+U2					WT	(g/m*m)
Rbt	0+	30-44	35.0	30	22	52	112.5	74.4	1.131	14.61	0.526	0.595
Rbt	1+	70-91	77.6	9	5	14	20.3	10.5	0.204	2.63	5.700	1.160
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+	163	163.0	2	0	2	2.0	0.0	0.020	0.26	46.840	0.942
Dolly Varden	0+	42	42.0	0	1	1	1.0	0.0	0.010	0.13	0.749	0.008
Dolly Varden	1+	103	103.0	1	0	1	1.0	0.0	0.010	0.13	11.930	0.120
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									1.375	17.76		2.824

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	5.5	LOD		POOL 5	
3	6.0	COBBLE/BOULDER	100	RIFFLE 95	30
6	7.3	IN VEG		RUN	
9	8.8	OVER VEG		OTHER	
12	4.7	CUTBANK			
15					
18		TOTAL	100	D50/90 15/50	
21					
24					
	6.5				
AREA (M*M)	99.5	MARGIN (M)	15.4		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good habitat in some sections

RATIONALE: Good in lower velocity sections along margin with cobble substrate.

STEELHEAD PARR RATING: Excellent habitat

RATIONALE: Large cobbles and boulders with suitable flows.

ZYMOETZ RIVER STEELHEAD INDEX SITE 1991

SITE: Z10 REACH: 6 MAP#: 93L/13 ACCESS: HEL DATE: Aug 21 PHOTO: (1)#15

SITE LOCATION: Zymoetz River approximately 2 km downstream from the Red Canyon Creek confluence.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 1 TEMP (C) 10 q (cfs): >500
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Selected this site as the best parr habitat in this area.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN*M	MEAN	BIOMASS
		RANGE	MEAN	1	2	U1+U2					WT	(g/m*m)
Rbt	0+	28-42	37.4	44	15	59	66.8	6.0	0.625	7.06	0.640	0.400
Rbt	1+	66-94	79.4	7	0	7	7.0	0.0	0.066	0.74	6.076	0.398
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+	119	119.0	1	0	1	1.0	0.0	0.009	0.11	17.790	0.167
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.700	7.91		0.965

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	5.5	LOD		POOL 10	
3	5.6	COBBLE/BOULDER	100	RIFFLE 70	30
6	7.3	IN VEG		RUN 20	
9	6.4	OVER VEG		OTHER	
12	4.8	CUTBANK			
15	4.3				
18		TOTAL	100	D50/90 15/40	
21					
24					
	5.7				
AREA (M*M)	106.8	MARGIN (M)	18.9		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good habitat

RATIONALE: Good fry habitat 2-3 m from the margin, in lower velocity cobbles.

STEELHEAD PARR RATING: Excellent habitat

RATIONALE: Moderate flow over large cobble and boulder substrate with clean interstitial spaces.

ZYMOETZ RIVER STEELHEAD INDEX SITE 1991

SITE: Z11 REACH: 6 MAP#: 93L/13 ACCESS: HEL DATE: Aug 21 PHOTO: (1)#16

SITE LOCATION: Zymoetz River sidechannel accross gravel bar from Site Z10.
 Located approximately 2 km downstream from Red Canyon Creek confluence.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) 1 TEMP (C) 10 Q (cfs): 10
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL RANGE	FL MEAN	PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
				1	2	U1+U2						
Rbt	0+	28-44	37.0	35	14	49	58.3	7.8	0.512	2.96	0.620	0.318
Rbt	1+	71-90	78.2	5	0	5	5.0	0.0	0.044	0.25	5.824	0.256
Rbt	2+	102	102.0	1	0	1	1.0	0.0	0.009	0.05	12.210	0.107
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.565	3.27		0.681

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	5.5	LOD		POOL	
3	5.7	COBBLE/BOULDER	100	RIFFLE	80
6	5.7	IN VEG		RUN	20
9	6.1	OVER VEG		OTHER	
12	5.9	CUTBANK			
15					
18		TOTAL	N/A	D50/90	4/30
21					
24					

5.8
 AREA (M*M) 113.9 MARGIN (M) 19.7

HABITAT COMMENTS:

STEELHEAD FRY RATING: Moderate habitat in some sections
 RATIONALE: Limited for fry in deeper sections due to high water velocities.
 Moderate habitat in slower sections along the margin.

STEELHEAD PARR RATING: Good habitat
 RATIONALE: Cobble substrate with good interstitial spaces for cover. Moderate velocities accross the channel. Appears to be under-utilized for parr.

ZYMOETZ RIVER STEELHEAD INDEX SITE 1991

SITE: Z12 REACH: 7 MAP#: 93L/13 ACCESS: HEL DATE: Aug 20 PHOTO: (1)#13

SITE LOCATION: Zymoetz River approximately 2.5 km upstream from the Red Canyon Creek confluence. Sampled a large sidechannel.

SIDE/MAINSTEM: S P=1/F=2 1 SLOPE (%) 2 TEMP (C) 12 Q (cfs): >500
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	25-44	34.6	44	14	58	64.5	5.2	0.888	8.66	0.509	0.452
Rbt	1+	90	90.0	1	0	1	1.0	0.0	0.014	0.13	8.614	0.119
Rbt	2+	100	100.0	1	0	1	1.0	0.0	0.014	0.13	11.550	0.159
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.916	8.93		0.729

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	3.0	LOD		POOL	
3	5.1	COBBLE/BOULDER	100	RIFFLE	30
6	5.8	IN VEG		RUN	
9	5.6	OVER VEG		OTHER	
12		CUTBANK			
15					
18		TOTAL	100	D50/90 10/40	
21					
24					
	4.9				
AREA (M*M)	72.6	MARGIN (M)	14.9		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good habitat in some sections

RATIONALE: Good fry habitat in lower velocity areas along the margin.

STEELHEAD PARR RATING: Excellent habitat

RATIONALE: Large loose cobbles with good flow across the channel. Appears to be under-utilized by parr.

ZYMOETZ RIVER STEELHEAD INDEX SITE 1991

SITE: Z13 REACH: 7 MAP#: 93L/13 ACCESS: HEL DATE: Aug 20 PHOTO: (1)#12

SITE LOCATION: Zymoetz River approximately 5 km downstream from the Coal Creek confluence.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 1 TEMP (C) 11 Q (cfs): >200
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Similar sample sites elsewhere yielded high parr numbers.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN	BIOMASS
		RANGE	MEAN	1	2	U1+U2					WT	(g/m*m)
Rbt	0+	31-46	36.3	44	12	56	60.5	3.9	1.046	7.08	0.586	0.613
Rbt	1+	75	75.0	0	1	1	1.0	0.0	0.017	0.12	5.183	0.090
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									1.063	7.19		0.703

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	3.1	LOD		POOL	
3	3.9	COBBLE/BOULDER	100	RIFFLE	50
6	3.6	IN VEG		RUN	50
9	3.3	OVER VEG		OTHER	
12	3.7	CUTBANK			
15	2.7				
18		TOTAL	N/A	D50/90	5/25
21					
24					
	3.4				
AREA (M*M)	57.9	MARGIN (M)	17.1		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Excellent habitat

RATIONALE: Large shallow cobble with low velocity along the margin.

STEELHEAD PARR RATING: Good to Moderate habitat

RATIONALE: Good in some deeper sections and moderate along the shallow margin.

ZYMOETZ RIVER STEELHEAD INDEX SITE 1991

SITE: Z14 REACH: 7 MAP#: 93L/13 ACCESS: HEL DATE: Aug 20 PHOTO: (1)#11

SITE LOCATION: Zymoetz River sidechannel approximately 5 km downstream from the Coal Creek confluence. Located across the gravel island from Site Z13.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) 1 TEMP (C) 10.5 Q (cfs): 10
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN	BIOMASS
		RANGE	MEAN	1	2	U1+U2					WT	(g/m*m)
Rbt	0+	31-45	37.0	38	23	61	96.3	30.3	0.907	4.06	0.620	0.562
Rbt	1+	72-87	80.3	3	0	3	3.0	0.0	0.028	0.13	6.269	0.177
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+	36-96	64.1	14	4	18	19.6	2.4	0.185	0.83	3.340	0.617
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+	51	51.0	0	1	1	1.0	0.0	0.009	0.04	13.110	0.123
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									1.129	5.06		1.480

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	4.5	LOD	50	POOL 50	40
3	5.1	COBBLE/BOULDER	50	RIFFLE 20	7
6	4.5	IN VEG		RUN 30	
9	4.2	OVER VEG		OTHER	
12	4.1	CUTBANK			
15					
18		TOTAL	60	D50/90 6/20	
21					
24					
	4.5				
AREA (M*M)	106.2	MARGIN (M)	23.7		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good habitat

RATIONALE: Good fry habitat for half of the site. Limited cover due to fine material deposited around cobbles.

STEELHEAD PARR RATING: Poor habitat

RATIONALE: Some parr habitat within pool areas and LOD. Good coho habitat associated with deeper sections and debris.

ZYMOETZ RIVER STEELHEAD INDEX SITE 1991

SITE: Z15 REACH: 7 MAP#: 93L/13 ACCESS: HEL DATE: Aug 20 PHOTO: (1)#8

SITE LOCATION: Zymoetz River approximately 100 m downstream of the Coal Creek confluence.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 0.5 TEMP (C) 9 Q (cfs): >200
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN	BIOMASS
		RANGE	MEAN	1	2	U1+U2					WT	(g/m*m)
Rbt	0+	31-49	37.0	22	4	26	26.9	1.4	0.450	2.85	0.620	0.279
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.450	2.85		0.279

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	2.4	LOD	25	POOL	
3	2.7	COBBLE/BOULDER	75	RIFFLE 50	N/A
6	4.8	IN VEG		RUN 50	
9	3.6	OVER VEG		OTHER	
12	2.3	CUTBANK			
15					
18		TOTAL	15	D50/90 4/15	
21					
24					

3.2
 AREA (M*M) 59.7 MARGIN (M) 18.9

HABITAT COMMENTS:

STEELHEAD FRY RATING: Poor to Moderate habitat

RATIONALE: Cobble and large gravel substrate cemented with fines causing poor cover.

STEELHEAD PARR RATING: Poor habitat

RATIONALE: Limited by shallow depth and poor cover.

ZYMOETZ RIVER STEELHEAD INDEX SITE 1991

SITE: Z16 REACH: 7 MAP#: 93L/13 ACCESS: HEL DATE: Aug 20 PHOTO: (1)#9

SITE LOCATION: Zymoetz River approximately 100 m below the Coal Creek confluence. Located across gravel bar from Site Z15.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) 1 TEMP (C) 9 Q (cfs): 3-4
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	27-49	39.8	93	26	119	129.1	5.9	0.777	3.97	0.770	0.598
Rbt	1+	66-92	76.8	6	2	8	9.0	2.1	0.054	0.28	5.537	0.300
Rbt	2+	102	102.0	1	0	1	1.0	0.0	0.006	0.03	12.210	0.073
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+	55	55.0	1	0	1	1.0	0.0	0.006	0.03	2.095	0.013
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+	51-55	52.3	3	0	3	3.0	0.0	0.018	0.09	14.170	0.256
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.861	4.40		1.239

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	3.4	LOD	20	POOL 20	40
3	5.0	COBBLE/BOULDER	80	RIFFLE 50	10
6	5.1	IN VEG		RUN 30	
9	5.1	OVER VEG		OTHER	
12	5.3	CUTBANK			
15	6.4				
18	5.5	TOTAL	80	D50/90 6/25	
21					
24					
	5.1				
AREA (M*M)	166.2	MARGIN (M)	32.5		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good habitat

RATIONALE: Shallow even flow throughout; however, cover is reduced due to fine materials cementing cobbles.

STEELHEAD PARR RATING: Poor habitat

RATIONALE: Shallow, low velocity water with limited cover for parr.

ZYMOETZ RIVER STEELHEAD INDEX SITE 1991

SITE: Z17 REACH: 7 MAP#: 93L/13 ACCESS: VEH DATE: Aug 29 PHOTO: (2)#15

SITE LOCATION: Zymoetz River approximately 300 m downstream from the Serb Creek confluence. Accessed river from Fossil City road.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 1 TEMP (C) 10 Q (cfs): >300

P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Substrate is heavily silted from Serb Creek influence.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN	BIOMASS
		RANGE	MEAN	1	2	U1+U2					WT	(g/m*m)
Rbt	0+	31-50	39.7	19	3	22	22.6	1.0	0.265	2.23	0.764	0.202
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all	57-79	67.0	5	1	6	6.3	0.8	0.073	0.62	3.709	0.272
TOTAL									0.338	2.85		0.475

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	3.3	LOD		POOL	
3	4.1	COBBLE/BOULDER	100	RIFFLE	60
6	4.8	IN VEG		RUN	40
9	5.4	OVER VEG		OTHER	
12	5.2	CUTBANK			
15	2.5				
18		TOTAL	50	D50/90	6/30
21					
24					
	4.2				
AREA (M*M)	85.2	MARGIN (M)	20.2		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Moderate habitat

RATIONALE: Shallow cobble riffle/run with limited cover due to fines between substrate. Appears to be under-utilized.

STEELHEAD PARR RATING: Poor habitat

RATIONALE: Limited for parr due to shallow depth and inadequate cover.

ZYMOETZ RIVER STEELHEAD INDEX SITE 1991

SITE: Z18 REACH: 7 MAP#: ACCESS: VEH DATE: Aug 29 PHOTO: (2)#13

SITE LOCATION: Zymoetz River approximately 100 m downstream from the Serb Creek confluence. Accessed river from the Fossil City road.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 2.5 TEMP (C) 10 Q (cfs): >300
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	37-60	49.4	42	10	52	55.1	3.0	0.426	6.45	1.462	0.622
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all	69	69.0	1	0	1	1.0	0.0	0.008	0.12	4.716	0.036
Prickly Sculpin	all	27-102	66.9	10	2	12	12.5	1.1	0.097	1.46	3.694	0.356
TOTAL									0.530	8.03		1.015

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	7.3	LOD		POOL	
3	7.5	COBBLE/BOULDER	100	RIFFLE	100
6	8.1	IN VEG		RUN	
9	7.4	OVER VEG		OTHER	
12		CUTBANK			
15					
18		TOTAL	90	D50/90	8/40
21					
24					
	7.6				
AREA (M*M)	129.5	MARGIN (M)	17.1		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good habitat

RATIONALE: Shallow cobble riffle with even flow. Substrate is cemented from Serb Creek silts.

STEELHEAD PARR RATING: Poor habitat

RATIONALE: Limited by shallow depth and poor cover.

ZYMOETZ RIVER STEELHEAD INDEX SITE 1991

SITE: 219 REACH: 8 MAP#: ACCESS: VEH DATE: Aug 29 PHOTO: (2)#14

SITE LOCATION: Zymoetz River mainstem approximately 50 m upstream from the Serb Creek confluence.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 1 TEMP (C) 14 Q (cfs): 100
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Appears to be under-utilized by fry.

POPULATION ESTIMATES:

SPECIES	AGE	FL RANGE	FL MEAN	PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
				1	2	U1+U2						
Rbt	0+	32-63	51.1	35	6	41	42.2	1.6	0.397	4.40	1.614	0.641
Rbt	1+	68-71	69.5	2	0	2	2.0	0.0	0.019	0.21	4.192	0.079
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+	41-53	47.0	2	0	2	2.0	0.0	0.019	0.21	1.298	0.024
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all	51-103	73.3	11	5	16	20.2	6.1	0.190	2.10	5.535	1.049
Prickly Sculpin	all	50-125	79.4	21	11	32	44.1	13.1	0.415	4.59	5.966	2.473
TOTAL									1.039	11.51		4.267

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	4.1	LOD		POOL	30
3	6.8	COBBLE/BOULDER	100	RIFFLE 80	15
6	7.9	IN VEG		RUN 20	
9	6.0	OVER VEG		OTHER	
12	2.9	CUTBANK			
15					
18		TOTAL	75	D50/90 5/40	
21					
24					

5.5
AREA (M*M) 106.4 MARGIN (M) 19.2

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good habitat

RATIONALE: Good fry habitat for most of site. Shallow cobbles with good spaces and even flow. Algae is abundant on substrate.

STEELHEAD PARR RATING: Poor habitat

RATIONALE: Limited due to shallow depth. Some good boulder habitat exists outside of the sample site.

ZYMOETZ RIVER STEELHEAD INDEX SITE 1991

SITE: C1 REACH: MAP#: ACCESS: VEH DATE: Sept 18 PHOTO: (3)#8

SITE LOCATION: Clore River approximately 50 m downstream of the 4 Km sign on the main haul road.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 1 TEMP (C) 11 Q (cfs): >500
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL RANGE	FL MEAN	PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
				1	2	U1+U2						
Rbt	0+	33-48	39.4	16	6	22	25.6	4.5	0.431	2.65	0.660	0.284
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+	112	112.0	0	1	1	1.0	0.0	0.017	0.10	15.910	0.268
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	55-73	64.5	4	0	4	4.0	0.0	0.067	0.41	3.869	0.260
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	50	50.0	1	0	1	1.0	0.0	0.017	0.10	1.238	0.021
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.532	3.27		0.833

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	3.3	LOD		POOL	
3	3.1	COBBLE/BOULDER	100	RIFFLE	50
6	3.0	IN VEG		RUN	50
9	3.1	OVER VEG		OTHER	
12	2.9	CUTBANK			
15					
18		TOTAL	75	050/90	12/60
21					
24					
	3.1				
AREA (M*M)	59.4	MARGIN (M)	19.3		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Moderate to Good habitat

RATIONALE: Good cobble cover with even flow along the margin. Substrate is slightly silted with glacial fines.

STEELHEAD PARR RATING: Moderate habitat

RATIONALE: Adequate depth and velocity on outer edge. Bed material spaces slightly infilled with fines. Too shallow for good parr habitat along the margin.

ZYMOETZ RIVER STEELHEAD INDEX SITE 1991

SITE: C2 REACH: MAP#: ACCESS: VEH DATE: Sept 18 PHOTO: (3)#10

SITE LOCATION: Clore River approximately 20 m upstream of Site C1.
 Located near the 4 km sign on the Clore main haul road.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 1 TEMP (C) 11 Q (cfs): >500
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	33-48	40.7	13	6	19	24.1	6.9	0.336	2.30	0.736	0.248
Rbt	1+	90	90.0	1	0	1	1.0	0.0	0.014	0.10	8.655	0.121
Rbt	2+	100	100.0	1	0	1	1.0	0.0	0.014	0.10	11.600	0.162
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	68-81	74.7	3	0	3	3.0	0.0	0.042	0.29	6.034	0.252
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	48	48.0	1	0	1	1.0	0.0	0.014	0.10	1.131	0.016
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.420	2.87		0.798

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	2.9	LOD		POOL	
3	3.8	COBBLE/BOULDER	100	RIFFLE	50
6	3.8	IN VEG		RUN	50
9	3.5	OVER VEG		OTHER	
12	3.3	CUTBANK			
15	3.2				
18		TOTAL	75	D50/90	N/A
21					
24					
	3.4				
AREA (M*M)	71.8	MARGIN (M)	21.0		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Moderate to Good habitat

RATIONALE: Good cobble along margin with moderate velocity. Slightly wider band of suitable habitat than Site C1. Cover is somewhat reduced due to fines between the cobble spaces.

STEELHEAD PARR RATING: Moderate to Good habitat

RATIONALE: Adequate depth and velocity along outer edge.

ZYMOETZ RIVER STEELHEAD INDEX SITE 1991

SITE: C3 REACH: MAP#: ACCESS: HEL DATE: Sept 19 PHOTO: (3)#12

SITE LOCATION: Clore River approximately 2.5 km upstream from Thomas Creek confluence.
 Sampled edge of sidechannel on diamond-shaped bar.

SIDE/MAINSTEM: S P=1/F=2 1 SLOPE (%) 1 TEMP (C) 9 Q (cfs): 1000
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	30-52	40.2	27	5	32	33.1	1.6	0.464	3.38	0.706	0.328
Rbt	1+	95	95.0	1	0	1	1.0	0.0	0.014	0.10	10.060	0.141
Rbt	2+	98	98.0	1	0	1	1.0	0.0	0.014	0.10	10.090	0.141
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	82		1	0	1	1.0	0.0	0.014	0.10	8.002	0.112
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	48-55	51.3	3	0	3	3.0	0.0	0.042	0.31	1.388	0.058
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.549	3.99		0.781

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	2.9	LOD		POOL	
3	3.7	COBBLE/BOULDER	100	RIFFLE	100
6	4.6	IN VEG		RUN	
9	3.9	OVER VEG		OTHER	
12	3.1	CUTBANK			
15					
18		TOTAL	70	D50/90	8/20
21					
24					
	3.6				
AREA (M*M)	71.3	MARGIN (M)	19.6		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Moderate to Good habitat

RATIONALE: Riffle sections limited for fry due to high water velocities. Good habitat along the margin in shallow cobbles.

STEELHEAD PARR RATING: Poor to Moderate

RATIONALE: Moderate habitat in deeper sections with cobble substrate. This site could be improved with some larger cobbles and boulders.

ZYMOETZ RIVER STEELHEAD INDEX SITE 1991

SITE: C4 REACH: MAP#: ACCESS: HEL DATE: Sept 19 PHOTO: (3)#11

SITE LOCATION: Clore River approximately 2.5 km upstream from the Thomas Creek confluence.
 Sampled a small sidechannel adjacent to Site C3 on the diamond shaped gravel bar.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) 1 TEMP (C) 9 Q (cfs): 3
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL RANGE	FL MEAN	PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
				1	2	U1+U2						
Rbt	0+	32-49	41.5	105	20	125	129.7	3.2	0.659	4.40	0.785	0.517
Rbt	1+	83	83.0	1	0	1	1.0	0.0	0.005	0.03	6.904	0.035
Rbt	2+	112-113	112.5	2	0	2	2.0	0.0	0.010	0.07	16.120	0.164
Rbt	3+	147-152	149.5	2	0	2	2.0	0.0	0.010	0.07	35.590	0.361
Chinook	0+	61-83	70.9	8	1	9	9.1	0.5	0.046	0.31	5.151	0.239
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+	64	64.0	1	0	1	1.0	0.0	0.005	0.03	1.807	0.009
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	42-53	48.2	6	0	6	6.0	0.0	0.030	0.20	1.146	0.035
Dolly Varden	1+	115	115.0	1	0	1	1.0	0.0	0.005	0.03	16.770	0.085
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.771	5.15		1.446

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	5.8	LOD		POOL	
3	5.4	COBBLE/BOULDER	100	RIFFLE	6
6	5.0	IN VEG		RUN	
9	4.7	OVER VEG		OTHER	
12	5.7	CUTBANK			
15	6.5				
18	8.6	TOTAL	70	D50/90	5/15
21	11.7				
24					
	6.7				
AREA (M*M)	196.9	MARGIN (M)	29.5		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good habitat

RATIONALE: Shallow riffle with cobble substrate. This appears to be the optimum fry habitat within this segment of river. Limited by turbidity, cool temperature and fines between spaces.

STEELHEAD PARR RATING: Poor habitat

RATIONALE: Limited by shallow depth and inadequate cover.

ZYMOETZ RIVER STEELHEAD INDEX SITE 1991

SITE: C5 REACH: 6 MAP#: ACCESS: HEL DATE: Sept 19 PHOTO: (3)#13

SITE LOCATION: Clore River sidechannel approximately 2 km upstream from the lower canyon.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) 3 TEMP (C) 8 Q (cfs): 70
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Appears to be good fry seeding in this section.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	32-56	41.8	68	10	78	79.7	1.8	0.442	3.67	0.805	0.355
Rbt	1+	78-94	86.3	3	0	3	3.0	0.0	0.017	0.14	7.696	0.128
Rbt	2+	98-108	103.0	4	0	4	4.0	0.0	0.022	0.18	12.600	0.279
Rbt	3+	143	143.0	1	0	1	1.0	0.0	0.006	0.05	31.440	0.174
Chinook	0+	52-80	64.0	3	0	3	3.0	0.0	0.017	0.14	3.779	0.063
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	46-51	48.5	2	0	2	2.0	0.0	0.011	0.09	1.168	0.013
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.514	4.27		1.013

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	8.8	LOO		POOL 30	70
3	8.6	COBBLE/BOULDER	100	RIFFLE 70	10
6	10.2	IN VEG		RUN	
9	9.8	OVER VEG		OTHER	
12	7.7	CUTBANK			
15	4.8				
18		TOTAL	70	D50/90 8/17	
21					
24					
	8.3				
AREA (M*M)	180.5	MARGIN (M)	21.7		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good to Moderate habitat

RATIONALE: Good habitat in lower velocity sections along the margin. Moderate in sections with higher velocity. Substrate is cemented with glacial fines.

STEELHEAD PARR RATING: Good to Moderate habitat

RATIONALE: Good habitat in deeper sections with higher velocity. Moderate in shallow riffle sections.

ZYMOETZ RIVER STEELHEAD INDEX SITE 1991

SITE: C6 REACH: 6 MAP#: ACCESS: HEL DATE: Sept 19 PHOTO: (3)#14

SITE LOCATION: Clore River approximately 2 km upstream from lower canyon.
 Sampled 30 m upstream from Site C5.

SIDE/MAINSTEM: S P=1/F=2 1 SLOPE (%) 3 TEMP (C) 8 Q (cfs): 70
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS		U1+U2	NUMBER	S.E.	N/M*M	N/LIN-M	MEAN BIOMASS	
		RANGE	MEAN	1	2						WT	(g/m*m)
Rbt	0+	31-51	39.6	59	8	67	68.3	1.5	0.705	8.13	0.671	0.473
Rbt	1+	66-81	76.5	4	0	4	4.0	0.0	0.041	0.48	5.502	0.227
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	44-51	48.3	3	0	3	3.0	0.0	0.031	0.36	1.153	0.036
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.778	8.96		0.736

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	3.4	LOD		POOL	
3	6.6	COBBLE/BOULDER	100	RIFFLE	100
6	8.3	IN VEG		RUN	
9	6.1	OVER VEG		OTHER	
12	4.4	CUTBANK			
15					
18		TOTAL	60	D50/90	6/30
21					
24					
	5.8				
AREA (M*M)	96.8	MARGIN (M)	16.8		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good habitat

RATIONALE: Shallow riffle with moderate flow. Limited slightly by fines between spaces and cool temperature.

STEELHEAD PARR RATING: Poor habitat

RATIONALE: Limited by shallow depth and low velocity.

ZYMOETZ RIVER STEELHEAD INDEX SITE 1991

SITE: C7 REACH: 1 MAP#: ACCESS: HEL DATE: Sept 19 PHOTO: (3)#15

SITE LOCATION: Burnie River approximately 0.5 km upstream from the Clore River confluence.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) 1 TEMP (C) N/A Q (cfs): 20
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: The Rbt at 116 mm had some red under the mandible with a broken margin on the adipose (possible Ct ?).

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	32-52	42.6	5	2	7	8.3	2.9	0.056	0.34	0.858	0.048
Rbt	1+	70-90	78.4	6	1	7	7.2	0.6	0.049	0.30	5.901	0.287
Rbt	2+	116-124	120.0	1	1	2	2.0	0.0	0.013	0.08	19.290	0.260
Rbt	3+	159-173	164.7	3	0	3	3.0	0.0	0.020	0.12	46.620	0.944
Ct	1+	88	88.0	1	0	1	1.0	0.0	0.007	0.04	8.127	0.055
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+	61-68	64.5	2	0	2	2.0	0.0	0.013	0.08	1.810	0.024
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+	76-112	94.8	5	0	5	5.0	0.0	0.034	0.21	12.490	0.421
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.192	1.17		2.039

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	5.3	LOD	10	POOL 50	40
3	5.4	COBBLE/BOULDER	60	RIFFLE 50	20
6	4.6	IN VEG		RUN	
9	6.6	OVER VEG	10	OTHER	
12	4.8	DP POOL	20		
15	5.6				
18	10.4	TOTAL		D50/90 4/10	
21					
24					
	6.1				
AREA (M*M)	148.2	MARGIN (M)	24.3		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good to Moderate habitat

RATIONALE: Good habitat along margin and the shallow riffle at top end of site. Poor to moderate habitat in deeper sections with higher velocities.

STEELHEAD PARR RATING: Good to Moderate habitat

RATIONALE: Good habitat in deeper sections with over-hanging vegetation and LOD.

ZYMOETZ RIVER STEELHEAD INDEX SITE 1991

SITE: Ctr1 REACH: 1 MAP#: ACCESS: VEH DATE: Sept 18 PHOTO: (3)#7

SITE LOCATION: Trapline Creek approximately 100 m upstream from the bridge crossing.
Sampled a large sidechannel.

SIDE/MAINSTEM: S P=1/F=2 2 SLOPE (%) 2.5 TEMP (C) 11 Q (cfs): 10
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN BIOMASS	
		RANGE	MEAN	1	2	U1+U2					WT	(g/m*m)
Rbt	0+	41-57	48.1	124	45	169	194.6	11.6	1.184	6.95	1.271	1.505
Rbt	1+	75-95	88.3	4	3	7	16.0	31.7	0.097	0.57	7.851	0.764
Rbt	2+	98-117	109.1	7	0	7	7.0	0.0	0.043	0.25	13.680	0.582
Rbt	3+	153	153.0	1	0	1	1.0	0.0	0.006	0.04	33.240	0.202
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+	57-70	61.5	5	3	8	12.5	10.6	0.076	0.45	2.937	0.223
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	54-57	55.5	2	0	2	2.0	0.0	0.012	0.07	1.770	0.022
Dolly Varden	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									1.418	8.33		3.298

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	4.8	LOD	5	POOL 30	45
3	4.8	COBBLE/BOULDER	90	RIFFLE 70	25
6	5.2	IN VEG		RUN	
9	5.6	OVER VEG	5	OTHER	
12	6.9	CUTBANK			
15	7.2				
18	6.6	TOTAL	80	D50/90 20/60	
21					
24					
	5.9				
AREA (M*M)	164.4	MARGIN (M)	28.0		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good to Moderate habitat

RATIONALE: Good habitat in shallow riffle sections along the margin. Moderate habitat in deeper sections due to velocity.

STEELHEAD PARR RATING: Good habitat

RATIONALE: Large instream boulders and cobbles with pool and back-eddy sections. This site could be improved with some LOD and cut bank habitat.

ZYMOETZ RIVER STEELHEAD INDEX SITE 1991

SITE: Cth1 REACH: 1 MAP#: ACCESS: VEH DATE: Sept 18 PHOTO: (3)#6

SITE LOCATION: Thomas Creek approximately 70 m downstream from the bridge crossing.

SIDE/MAINSTEM: M P=1/F=2 1 SLOPE (%) 2 TEMP (C) 8 Q (cfs): 200-300
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	1+	97	97.0	1	0	1	1.0	0.0	0.016	0.10	9.900	0.154
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+	60-72	64.7	6	0	6	6.0	0.0	0.093	0.60	3.536	0.329
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	48	48.0	0	1	1	1.0	0.0	0.016	0.10	1.131	0.018
Dolly Varden	1+	108-122	115.0	1	1	2	2.0	0.0	0.031	0.20	16.770	0.521
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.155	1.00		1.022

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	2.7	LOD		POOL	
3	3.4	COBBLE/BOULDER	100	RIFFLE 50	40
6	4.2	IN VEG		RUN 50	
9	3.2	OVER VEG		OTHER	
12	2.6	CUTBANK			
15					
18		TOTAL	30	D50/90 4/60	
21					
24					

3.2
 AREA (M*M) 64.4 MARGIN (M) 20.0

HABITAT COMMENTS:

STEELHEAD FRY RATING: Poor habitat

RATIONALE: Fry are restricted to a small portion along the margin. Limited by high water velocities.

STEELHEAD PARR RATING: Poor habitat

RATIONALE: Bed material is composed of gravels with no deep boulder and cobble sections. This is typical habitat for lower Thomas Creek.

ZYMOETZ RIVER STEELHEAD INDEX SITE 1991

SITE: Zc1 REACH: 1 MAP#: ACCESS: VEH DATE: Aug 22 PHOTO: (2)#0

SITE LOCATION: Coal Creek approximately 20 m downstream from the Forest Service bridge on the Br. 7000 Road.

SIDE/MAINSTEM: M P=1/F=2 2 SLOPE (%) 2.5 TEMP (C) 13 Q (cfs): 2
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Had some difficulty with Rbt/Ct fry identification. Due to the higher occurrence of Rbt parr, these trout fry are likely Rbt. Fry had orange colour on their fins.

POPULATION ESTIMATES:

SPECIES	AGE	FL RANGE	FL MEAN	PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
				1	2	U1+U2						
Trout	0+	33-48	41.5	65	12	77	79.7	2.4	1.773	5.46	1.242	2.202
Rbt	1+	74-89	81.0	4	0	4	4.0	0.0	0.089	0.27	6.422	0.571
Rbt	2+	98	98.0	1	0	1	1.0	0.0	0.022	0.07	10.920	0.243
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Ct	1+	109	109.0	0	1	1	1.0	0.0	0.022	0.07	14.690	0.327
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	51	51.0	1	0	1	1.0	0.0	0.022	0.07	1.364	0.030
Dolly Varden	1+	78-106	92.0	2	0	2	2.0	0.0	0.044	0.14	8.420	0.374
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									1.973	6.08		3.747

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	1.8	LOD		POOL 50	8
3	2.9	COBBLE/BOULDER	80	RIFFLE 50	30
6	2.8	IN VEG		RUN	
9	4.0	OVER VEG	10	OTHER	
12	3.9	CUTBANK	10		
15					
18		TOTAL	75	D50/90 10/40	
21					
24					

3.1
AREA (M*M) 45.0 MARGIN (M) 14.6

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good habitat

RATIONALE: Good cobble with adequate spaces for fry cover. This appears to be typical for much of the creek. (Good potential)

STEELHEAD PARR RATING: Good habitat

RATIONALE: Low flow periods in Coal Creek may limit parr use. As a result parr may move downstream, into deeper sections.

ZYMOETZ RIVER STEELHEAD INDEX SITE 1991

SITE: Zs1 REACH: 1 MAP#: ACCESS: VEH DATE: Aug 22 PHOTO: (2)#2

SITE LOCATION: Sandstone Creek approximately 50 m downstream from the Forest Service culvert on the Br. 7000 Road.

SIDE/MAINSTEM: M P=1/F=2 2 SLOPE (%) N/A TEMP (C) 11 Q (cfs): 2
P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS: Some questions regarding Rbt/Ct fry identification. Suspect these fry are mainly Ct, however Rbt may be present. This system looks flashy, despite being lake-headed.

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Trout	0+	36-47	41.2	17	3	20	20.6	1.2	0.694	1.49	0.853	0.592
Rbt	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	2+			0	0	0	0.0	0.0	0.000	0.00		0.000
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Ct	1+	88-94	91.3	3	0	3	3.0	0.0	0.101	0.22	8.967	0.904
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	1+	84-97	88.7	3	0	3	3.0	0.0	0.101	0.22	7.523	0.759
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.896	1.92		2.255

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	2.4	LOD		POOL 5	30
3	1.9	COBBLE/BOULDER	50	RIFFLE 95	8
6	2.2	IN VEG		RUN	
9	2.0	OVER VEG	50	OTHER	
12	2.2	CUTBANK			
15					
18		TOTAL	50	D50/90 20/70	
21					
24					
	2.1				
AREA (M*M)	29.7	MARGIN (M)	13.9		

HABITAT COMMENTS:

STEELHEAD FRY RATING: Good habitat

RATIONALE: Shallow riffle over large rock with interstitial spaces for cover.

STEELHEAD PARR RATING: Moderate to Good habitat

RATIONALE: Adequate cobble for cover in riffle sections, but poor pool habitat. Due to the questions involving fry identification this system is not recommended as a future index site.

ZYMOETZ RIVER STEELHEAD INDEX SITE 1991

SITE: Zt1 REACH: 1 MAP#: ACCESS: VEH DATE: Sept 20 PHOTO: (3)#16

SITE LOCATION: Treasure Creek approximately 50 m downstream of the bridge crossing.

SIDE/MAINSTEM: M P=1/F=2 2 SLOPE (%) 1 TEMP: 8 Q (cfs): 75
 P=PARTIAL/F=FULL SAMPLE

SAMPLING COMMENTS:

POPULATION ESTIMATES:

SPECIES	AGE	FL		PASS			NUMBER	S.E.	N/M*M	N/LIN-M	MEAN WT	BIOMASS (g/m*m)
		RANGE	MEAN	1	2	U1+U2						
Rbt	0+	37-52	44.9	15	4	19	20.5	2.2	0.147	1.00	1.100	0.161
Rbt	1+	91	91.0	1	0	1	1.0	0.0	0.007	0.05	8.884	0.064
Rbt	2+	98	98.0	1	0	1	1.0	0.0	0.007	0.05	10.920	0.078
Rbt	3+			0	0	0	0.0	0.0	0.000	0.00		0.000
Chinook	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
Coho	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	0+			0	0	0	0.0	0.0	0.000	0.00		0.000
M. Whitefish	1+			0	0	0	0.0	0.0	0.000	0.00		0.000
Dolly Varden	0+	56	56.0	1	0	1	1.0	0.0	0.007	0.05	1.820	0.013
Dolly Varden	1+	88-99	93.5	2	0	2	2.0	0.0	0.014	0.10	8.852	0.127
Longnose Dace	all			0	0	0	0.0	0.0	0.000	0.00		0.000
Prickly Sculpin	all			0	0	0	0.0	0.0	0.000	0.00		0.000
TOTAL									0.183	1.24		0.444

SITE MEASUREMENTS:

LOCATION (m)	WIDTH (m)		SITE COVER (%)	SITE WATER TYPE (%)	MEAN DEPTH (cm)
0	8.2	LOD		POOL	
3	7.1	COBBLE/BOULDER	100	RIFFLE	25
6	7.0	IN VEG		RUN	
9	6.1	OVER VEG		OTHER	
12	5.6	CUTBANK			
15					
18		TOTAL	50	D50/90	8/70
21					
24					

6.8
 AREA (M*M) 139.4 MARGIN (M) 20.5

HABITAT COMMENTS:

STEELHEAD FRY RATING: Moderate habitat

RATIONALE: Moderate fry habitat along margin in areas with large cobbles. Limited for fry due to high velocities and fines between substrate.

STEELHEAD PARR RATING: Good habitat

RATIONALE: Good cover from large substrate with adequate water depth. This site could be improved for parr with cleaner cobbles.

