SUPPLEMENTAL SAMPLING OF EMERGENT FRY HABITAT IN THE NECHAKO RIVER

NECHAKO FISHERIES CONSERVATION PROGRAM

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EXECUTIVE SUMMARY

This study was undertaken to determine the relative abundance and density of emergent chinook salmon (*Oncorhynchus tshawytscha*) fry in four habitat types in the upper Nechako River: (i) regular margins, (ii) irregular margins, (iii) flooded vegetation, and (iv) back channels. Other objectives of the study were an assessment of the spatial distribution of chinook fry in the upper Nechako River, and documentation of the river's fish communities.

A standardized pole seine survey was conducted over 25 m sections of shoreline in a representative number of habitat types within each reach. Sampling was conducted from May 15 to June 12, 2002, with downstream reaches sampled on the later dates to accommodate later fry emergence times.

Overall, chinook salmon were the most abundant fish species collected during the sampling program. Chinook fry were most abundant in Reaches 3 and 4, and least abundant in Reaches 2 and 7. Juvenile chinook were also the most abundant fish in nearly all the sampled reaches and habitat types. They made up the greatest proportion of the fish fauna along regular shoreline habitats of Reach 2 and the irregular shoreline habitats of Reaches 2-5. In contrast, they made up only a relatively small proportion of the fish communities in the back-channels and flooded vegetation habitats of Reaches 6 and 7.

Back-channel habitats had the highest catch per unit effort (CPUE) of the habitats sampled, closely followed by flooded vegetation and irregular shorelines. Chinook juveniles were collected less often along regular shorelines.

INTRODUCTION

Upon their emergence from the spawning gravel in tributaries to the upper Fraser River, fry of stream-type chinook salmon (*Oncorhynchus tshawytscha*) become distributed downstream throughout natal streams and into the Fraser River mainstem (Bradford 1997); fry may move as far as 100 km within a few days of their emergence (Bradford and Taylor, unpublished data, in Bradford 1997). Many factors, such as the timing and magnitude of freshet flows, affect downstream fry movements. Although freshet flows may sweep fry downstream in mainstem habitats, they also create off-channel velocity refugia (in which fry can escape high mainstem flows) by flooding low-lying vegetated floodplain areas. These low-velocity areas provide high-quality rearing habitats with abundant cover and invertebrate prey which contribute to the enhanced growth and survival of juvenile chinnook (Sommer *et al.* 2001). Fry unable to find low-velocity habitats remain in the mainstem flow, where they face an increased risk to predation by piscivorous fish (Brown *et al*. 1994).

In the upper Nechako River, where flow regulation has reduced the spring freshet flows, the quality and quantity of available low-velocity habitats near the chinook spawning beds may have a considerable bearing on fry survival and growth (Bradford 1994). Because of their poor swimming ability, newly emergent chinook are usually most abundant in these habitats (Healey 1991) which include areas in the lee of gravel bars with regular shorelines, sheltered coves along irregular shorelines, side- and back-channels, and areas of flooded vegetation along the channel margin.

Background

Chinook stocks have been monitored since 1987 in the Nechako River by the Nechako Fisheries Conservation Program (NFCP). Monitoring data have been collected on adult spawner returns, fry emergence success, and fry rearing success. To date, relationships such as the rate of fry emergence per spawner, the catch per unit effort (CPUE), and the number of juvenile outmigrants per spawner (Triton 2001a, 2001b) suggest that suffi-

cient post-emergence habitat has been available for rearing juvenile chinook within the range of spawner numbers observed during the period of record. However, the return of a record number of spawners to the upper Nechako River in 2001 provided the opportunity to assess post-emergence habitat use under unusually high levels recruitment. The impetus for the study was a concern that, when large numbers of fry are produced in the upper Nechako River, there is a reduction in their rate of survival because insufficient low-velocity habitat is available (Bradford 1994).

Objective

The objective of the 2002 emergent fry sampling program was to sample the range of post-emergent habitat types (regular shorelines, irregular shorelines, flooded vegetation, and side/back-channels) present in Reaches 2-7 of the upper Nechako River (Figure 1), to quantify the abundance and density of emergent fry in each habitat type, to assess the overall spatial distribution of emergent fry along the upper Nechako River, and to document the fish communities present in each type of habitat.

Information regarding the post-emergent habitat preferences of juvenile chinook could potentially be used to manage the Nechako River flows to maximize early life history survival (e.g., by creating a flow pulse during peak emergence to increase downstream distribution, decrease predation potential through increased water turbidity, and provide additional floodplain habitat).

Nechako Chinook Ecology

An understanding of the particular ecology of Nechako River chinook is essential to interpreting the results from this study. First, chinook spawning in the Nechako River occurs during the fall, and is concentrated in Reach 2 and to a lesser extent in Reaches 4-6 (Fig. 1). Chinook are not known to spawn in Reach 7. Jaremovic and Rowland (1988) found that female chinook in the Nechako River have an average fecundity of 5,769 eggs (n= 8, SD = 869), a value that can be combined with spawner escapement data to estimate the average chinook egg deposition per reach.

Eggs incubate over the winter and fry emerge in spring (April - May). The 10-year average for Accumulated Thermal Units (ATUs) at the time of 50% emergence is 914, with a range of 840 to 1,004 (Triton 2002). Emergent fry typically occupy low velocity habitats, but move within three weeks to higher velocity habitats.

Some 0+ chinook leave the system, either heading to the ocean as smolts (presumably the larger individuals) or moving downstream to rear (NFCP 1998). Chinook that overwinter in the Nechako River head to the ocean to following spring and summer as 1+ smolts.

METHODS

Site Selection

The initial phase of this project involved a general habitat assessment along the entire length of the upper Nechako River through an examination of 1:7,500 scale photo-mosaics (NFCP 1988). Four different types of post-emergent fry habitats were identified on the photo-mosaics: (i) bare, regular gravel bars; (ii) bare, irregular shorelines with scallops and velocity shears; (iii) flooded vegetation; and (iv) side- and back-channels. Because the airphoto mosaics only extended downstream as far as Vanderhoof, an overview habitat assessment could not be completed for Reach 7. Instead, sampling sites in Reach 7 were selected during a field reconnaissance. The section of the Nechako River between the Stuart River and Prince George was excluded from the study area because it supports Stuart River chinook in addition to fish originating in the upper Nechako River. In addition, historic data on fish habitat use was available for Reaches 1-7 (Envirocon 1984, Russel *et al.* 1983), but not downstream of the Stuart River confluence.

Field Sampling

The field portion of this project consisted of sampling sites in Reaches 2-7 between May 15 and June 12, 2002 (Figure 1). Reach 1 was not sampled as there is typically a low number of spawners in the reach and the reach has different habitat characteristics than the rest of the river (e.g., the reach is a canyon with abundant bedrock outcroppings). Reach 2 was sampled twice because this area is known to have the greatest fry recruitment, and because this reach is suspected to have the lowest availability of complex fry habitat.

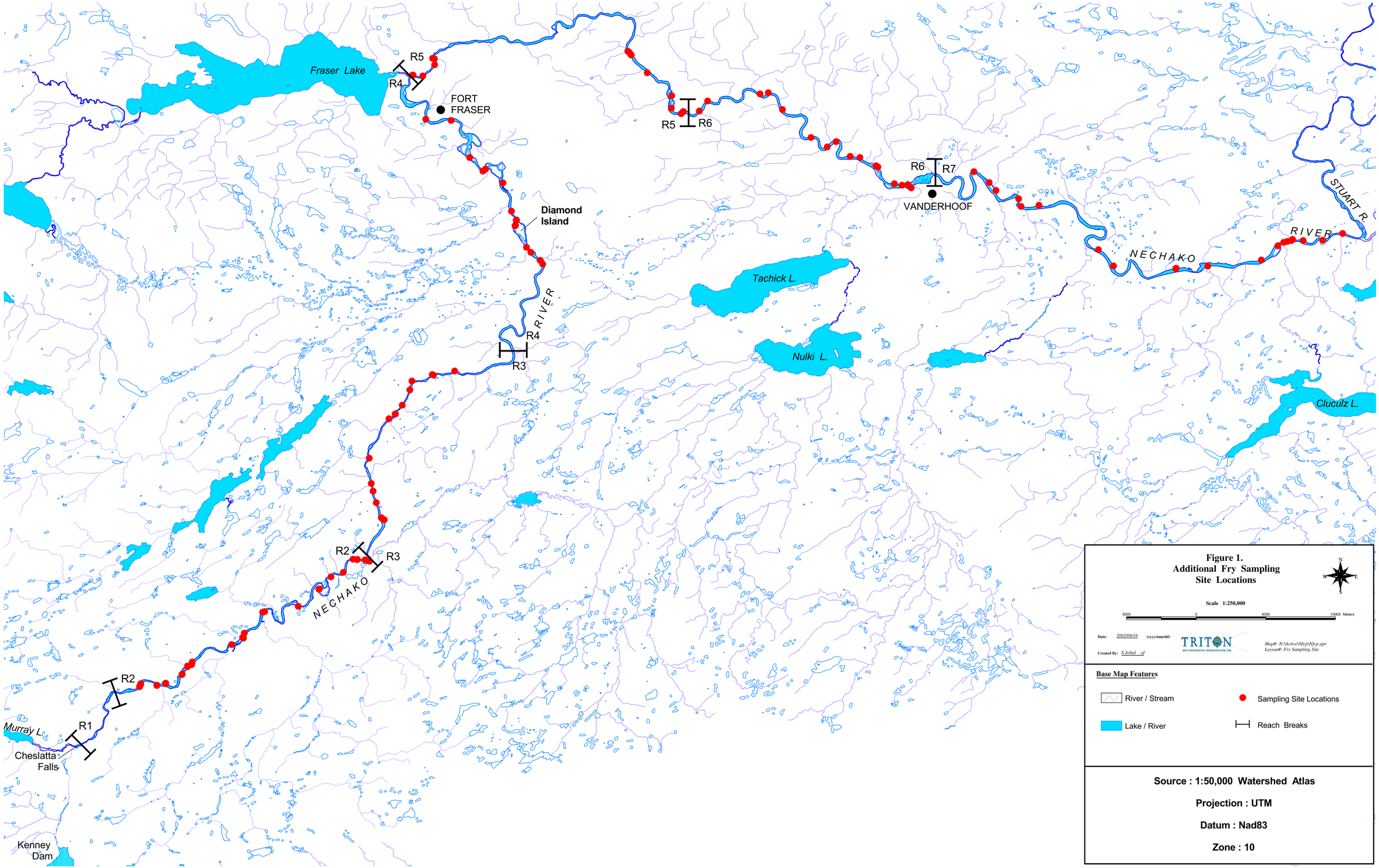


Figure 1.
Additional Fry Sampling
Site Locations

N
W E
S

Scale 1:250,000

5000 0 5000 10000 Meters

Date: 2002/09/16 (yyyy/mm/dd)

Created By: S.Johal of

TRITON ENVIRONMENTAL CONSULTANTS LTD.

Map#: N:\Active\Nfcp\Nfcp.apr
Layout#: Fry Sampling Site

Base Map Features

- River / Stream
- Lake / River
- Sampling Site Locations
- Reach Breaks

Source : 1:50,000 Watershed Atlas

Projection : UTM

Datum : Nad83

Zone : 10

Sampling started during the week of the first peak in fry emergence, as determined by fry collections in Inclined Plane Traps (IPTs) located in Reach 2 at km 19.0. Because the timing of peak emergence is later as one proceeds downstream, sampling was temporally staggered to sample each reach approximately one week after the reach's estimated peak emergence date.

Initial site selections were modified in the field when differences were observed between actual habitat conditions and the habitat classification derived from photo-mosaic interpretation. In many cases, the habitat strata identified on the mosaics did not accurately represent the habitat encountered in the field, and this was particularly true for reaches downstream from Fort Fraser. For example, irregular shoreline sites were often found along portions of the river margin that had originally been classified as having a regular shoreline. In general, the scale and quality of the photo-mosaics were insufficient to allow accurate identification of habitats at the micro-habitat level (e.g., 25 m section) that formed the basis for field sampling. Ultimately, the photo mosaics were useful for suggesting where certain habitat types might be encountered, but it was necessary to select individual sites from the boat while drifting downstream.

Sites were selected to ensure that at least four separate replicates of each habitat type were sampled in each reach (e.g., not all regular shoreline sites within a reach were sampled on the same gravel bar). Site selection in the field also took into account the fact that pole seining was the sampling method used; this sometimes meant that sites with abundant woody debris and/or large boulder substrates, which would have decreased the effectiveness of pole seining, were avoided. Because complex cover is rare along the margins in the Nechako River (Lister 1993), this sampling bias was not judged to have a significant effect on the results.

Equal numbers (n=29) of sites were sampled in back-channel (BC), irregular (IR), and regular (R) habitats; 28 flooded vegetation (FV) habitats were also sampled (Table 1). Note that the sampling design does not permit characterization of each reach by habitat type, because representative proportions of the various habitats present in each reach were not sampled.

A 3 m wide pole seine was used to capture fish following the standard methods described by Brown *et al.* (1994). Site boundaries were measured with a fiberglass tape measure, and a minimum of two seine passes were completed at each site, unless no chinook were caught in the first pass. The rest period between passes was approximately five minutes, to limit the introduction of new fish into the site. The originally proposed rest period of 15 minutes between passes (as was described in the Terms of Reference for this study) was found to be excessive because increasing catch numbers in successive passes indicated that fish were actively moving into the sampling sites from upstream.

Fish caught during the preceding pass were identified and counted during the five-minute rest period. A maximum of ten chinook and ten sockeye salmon per site were measured and weighed with an electronic scale. Other fish that were incidentally collected were counted by species and age class (juveniles *vs*. adults). Fish were held in recovery buckets until all seine passes had been completed. Successive passes were carried out at each site until the captured number of chinook decreased.

Other data recorded during each sampling session included the general weather conditions, the surface water velocity and depth (at 0, 1, 2, and 3 m from shore), water temperature and clarity, a description of the dominant and subdominant substrates in the sampled area, and site vegetation characteristics. Surface water velocity was visually estimated with a floating chip. Subdominant substrates were noted when one particu-

Table 1
Number of Sites Sampled, by Reach and Habitat Type

Reach	Date Sampled	No. of Days Required to Complete Sampling	Habitat				Total
			BC	FV	IR	R	
2	May 15 - 18	4	9	5	9	8	31
3	May 22 - 23	2	4	4	4	4	16
4	May 29 - 30	2	4	4	4	4	16
5	June 3 - 4	2	4	4	4	4	16
6	June 6 - 7	2	4	4	4	4	16
7	June 11 - 12	2	4	7	4	5	20
Total			29	28	29	29	115

lar substrate was not clearly dominant. Percent cover (submerged vegetation, cobble, undercut banks, woody debris) was visually estimated. The field UTM coordinates at the downstream end of the site were recorded using a Garmin 12XLS GPS unit. A representative photo of each site was taken looking downstream from the top of the site. The date, time and location of the site downstream from the Kenney Dam (km 0) were noted. Locations of sites in Reaches 2–6 were also highlighted on a field copy of the photo mosaic.

Data Analysis

A Tukey-Kramer honestly significant difference (HSD) test was used to detect significant differences between habitat types in chinook abundance and fork length at the 0.05 level (α).

RESULTS

Sampling was initiated during the week after the first peak in fry emergence on May 13[1]. Weather during the sampling period was generally mild and wet, which resulted in reduced water clarity in all sampled reaches; water clarity was approximately 1.0 m during the entire sampling period.

Site Sampling and CPUE Analysis

Juvenile chinook were collected in similar numbers in all of the sampled habitats, except along the regular shoreline, where densities were significantly lower than in the other sampled habitat types (HSD test, $p<0.05$). Average CPUEs at regular shoreline sites were approximately half of those recorded in other habitat types (Table 2).

In all, 28% of the total juvenile chinook collected were taken in Reach 3 (Table 3), which also had the highest CPUE of all sampled reaches. The average CPUE in Reach 3 was significantly higher than average CPUEs in all other reaches except Reach 4 (HSD test, $p<0.05$), and the average CPUE in Reach 4 was significantly higher than that in Reach 2 (HSD test, $p<0.05$). Average CPUEs in other sampled reaches did not differ significantly from one another (HSD test, $p\geq0.05$)(Table 3).

Slightly more juvenile chinook were caught during second seine passes than during first passes, even though 26 fewer second passes were completed (Table 4).

When only the second pass was taken into account (larger sample sizes sometimes reflect truer population processes (Schefler 1979)), back-channels and flooded vegetation habitats had the highest average CPUEs, followed by irregular shoreline habitats and regular shoreline habitats (Table 5). This is similar to the between-habitat average CPUE rankings when all three passes are taken into account, except that no sig-

Table 2
Average CPUE by Habitat, for all Passes
Values with different letters are significantly different (HSD test, P<0.05)

Habitat	Number of Sites	Number of Passes	Average CPUE	Standard Error
Back-channels	29	66	17.8^{A}	2.6
Flooded vegetation	28	95	16.7^{A}	2.2
Irregular shoreline	29	93	16.5^{A}	2.3
Regular shoreline	29	82	7.9^{B}	2.4

Table 3
CPUE by Reach and Total Number of 0+ Chinook Caught
Values with different letters are significantly different (HSD test, P<0.05)

Reach	Number of Passes	Average CPUE	Standard Error	Total Number of 0+ Chinook Caught	Percent of Total Chinook Caught
2	88	10.1^{C}	2.3	888	17.9
3	48	28.9^{A}	3.1	1,387	28.0
4	50	$20.9^{A,B}$	3.0	1,044	21.1
5	60	$11.9^{B,C}$	2.7	714	14.4
6	56	$10.5^{B,C}$	2.8	587	11.9
7	34	$9.8^{B,C}$	3.6	333	6.7

[1] It should be noted that peak emergence at the IPT's is usually mid - late April, but was delayed in 2002.

Table 4
Total Number of Chinook Caught During First, Second and Third Passes

Pass	Number of 0+ Chinook Caught	Number of Passes
1	1,665	115
2	1,742	89
3	1,116	82

Table 5
CPUE Averages for Second Passes

Habitat	Number of Sites	Mean CPUE	Standard Error
Back-channels	19	27.8	6.5
Flooded vegetation	22	26.1	6.1
Irregular shoreline	25	16.0	5.7
Regular shoreline	23	10.3	5.9

nificant differences were observed among habitat types (HSD test, $p \geq 0.05$). CPUEs were quite variable among samples taken in each habitat type, as indicated by the high standard error values associated with each average CPUE value (Table 5).

The key points regarding site sampling and CPUE analysis are:

- CPUEs were lowest at sites with regular shoreline.
- CPUEs were similar at back-channel, flooded vegetation and irregular shoreline sites.
- CPUEs were highest in Reach 3 and lowest in reaches 2 and 7.

Habitat Characteristics

The average water depth was similar among the four sampled habitats, but flooded vegetation habitats were generally shallower than irregular shoreline habitats. The average surface water velocity was higher in the regular shoreline habitat than in either back-channels or flooded vegetation habitats (Table 6).

The amount of available cover was significantly higher in back channel and flooded vegetation habitats than along regular or irregular shorelines (HSD test, $p \geq 0.05$; Table 7). Although cover was not significantly different between regular and irregular shorelines (HSD test, $p < 0.05$), "hydraulic cover" associated with velocity shears along scalloped areas was present along irregular shoreline habitats, and these shear zones were used as velocity refugia by fry.

Key points about habitat characteristics are:

- Irregular shoreline sites had the greatest average depth, while flooded vegetation sites were the shallowest.
- Average water velocities were lower in back channel and flooded vegetation sites compared to irregular and regular shoreline sites.
- Back channel and flooded vegetation sites had greater amounts of cover compared to irregular and regular shoreline sites.

Morphometrics

Based upon fork lengths and wet weights, chinook juveniles caught in flooded vegetation were, on average, 1.2% shorter (Table 8) and weighted 11% less than those collected in other habitats . However neither of these differences was statistically significant (HSD test, $p \geq 0.05$).

Juvenile chinook differed significantly in length among reaches (HSD test, $p \geq 0.05$). Fish from Reach 7 were longer than fish from Reaches 5 and 6, which in turn were longer than fish from Reaches 2, 3 and 4

Table 6
Average Water Depth and Velocity
(measured at margin, +1 m, +2 m, +3 m) by Habitat Type
Values with different letters are significantly different
(HSD test, P<0.05)

Habitat	N	Average Depth (m)	Standard Error	Average Velocity	Standard Error
Back-channels	116	$0.28^{A,B}$	0.02	0.04^{B}	0.02
Flooded vegetation	112	0.26^{B}	0.02	0.06^{B}	0.02
Irregular shoreline	116	0.34^{A}	0.02	0.13^{A}	0.02
Regular shoreline	116	$0.27^{A,B}$	0.02	0.18^{A}	0.02

Table 7
Average of Estimated Cover
Values with different letters are significantly different (HSD test, P<0.05)

Habitat	Number of Sites	Mean Percent of Instream Cover	Standard Error
Back-channels	29	39.6A	3.8
Flooded vegetation	28	63.9A	3.9
Irregular shoreline	29	11.2B*	3.8
Regular shoreline	29	7.4B	3.8

*does not take into account "hydraulic cover" - shears

Table 8
Average Fork Length by Habitat

Habitat	N	Fork Length (mm)	SE
Back-channels	130	38.2	0.29
Flooded vegetation	214	37.8	0.21
Irregular shoreline	240	38.2	0.22
Regular shoreline	188	38.0	0.26

(Table 9). The largest average size difference (6 mm) was observed between fry from Reaches 7 and 4.

Reach 7 was sampled approximately one month later than Reaches 2, 3, and 4. Therefore the observed trend in increasing fry length as one proceeds downstream probably reflects downstream migration by earlier-emerging fry rather than any reach-specific difference in size of emergent fry.

With the exception of two outliers, the length-weight curve of all juvenile chinook collected can be described by the same linear relationship, regardless of the habitat sampled (Figure 2, r^2=0.78). The relationship Ln wet weight + 1 *vs*. Ln fork length did not differ significantly among habitats ($p \geq 0.05$)(Figure 3).

Key points regarding chinook morphometrics are:

- There was no significant difference in average fork length among the four habitat types.

Table 9
Fork Lengths by Reach
Values with different letters are significantly different (HSD test, P<0.05)

Reach	N	Fork Length (mm)	Standard Error
2	176	36.8^{C}	0.22
3	150	37.0^{C}	0.23
4	146	36.6^{C}	0.24
5	129	39.2^{B}	0.25
6	117	39.7^{B}	0.27
7	54	42.6^{A}	0.39

- Chinook captured in Reach 7 were longer than those from Reaches 5 and 6, which in turn were longer than those from Reaches 2, 3, and 4 (likely the result of downstream migration of earlier-emerging fry rather than reach-specific size differences of emergent fry).

Community Structure

In addition to juvenile chinook and sockeye salmon, eight other fish species were caught during the fry sampling program (Table 10). Chinook salmon were the most abundant species encountered and sockeye salmon were the third most abundant (Table 11).

Juvenile chinook were the most common fish species in most of the sampled habitat types. Sockeye were more prevalent in Reach 5 because the input of juvenile sockeye from the Nautley River system. Juvenile redside shiners, suckers, dace and northern pikeminnows were also common throughout the sampled reaches. Adult fish were less common than juveniles as pole seine sampling tends to be biased towards juveniles, which are weaker swimmers. In addition, the habitats sampled were selected specifically because they are preferred by juvenile fish, rather than adults.

Chinook were not among the three most numerous species in flooded vegetation, irregular and back-channel habitats in Reach 7, or in back channel habitats in Reach 6 (Table 12). Field crews noted that there was an increase in the abundance and size of northern pikeminnow in reaches 6 and 7, where it was not uncommon to capture numerous 120 – 180 mm individuals at a site.

Figure 2
Chinook 0+ Wet Weight vs. Fork Length

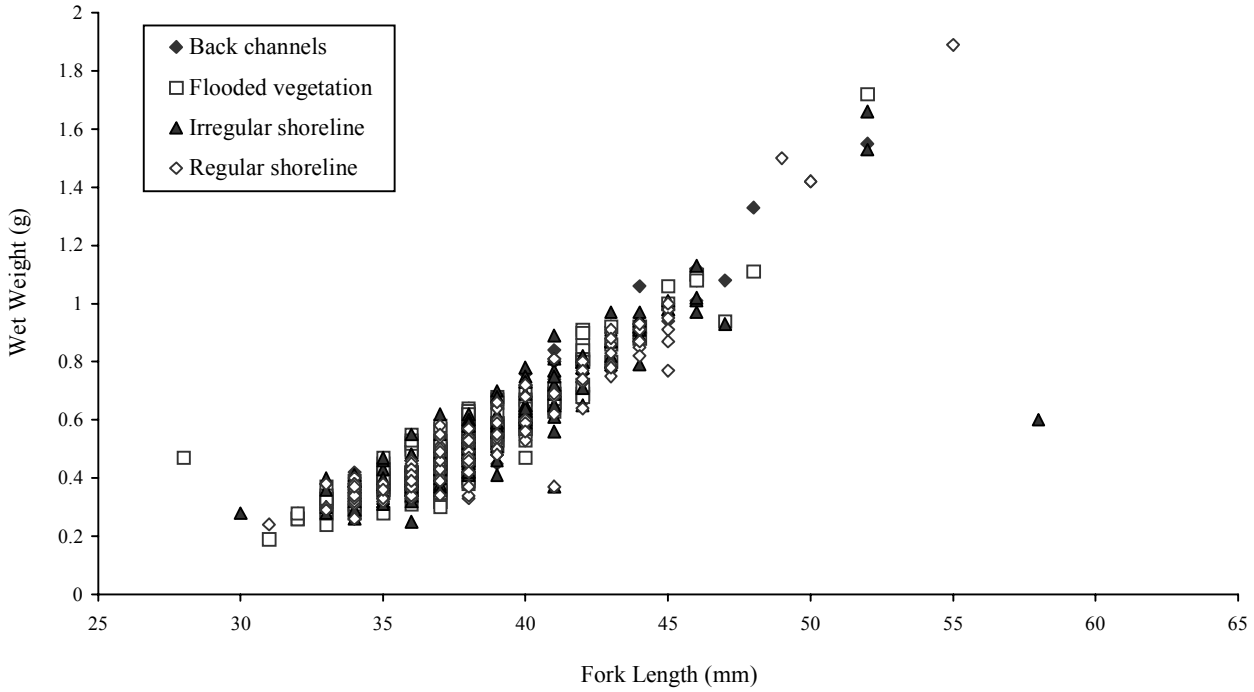


Figure 3
Predicted Weight vs. Fork Length by Habitat

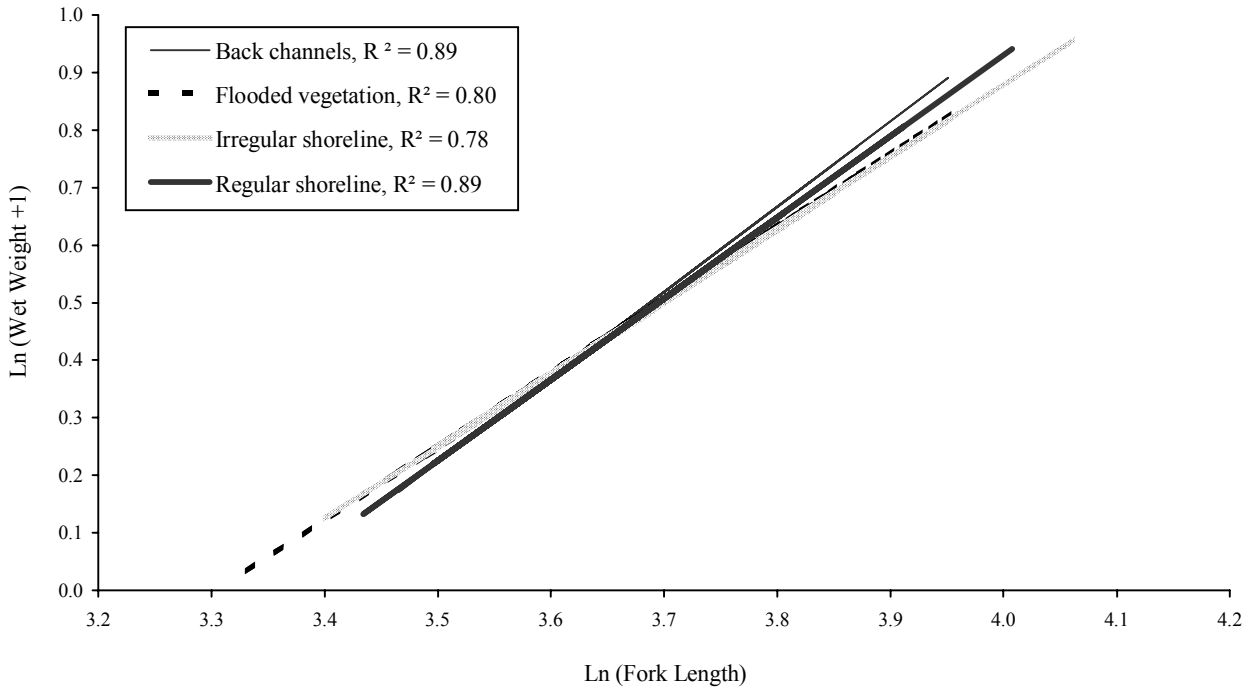


Table 10
Fish Species Caught During the
Fry Sampling Program

Common Names	Latin Name
Chinook Salmon	*Oncorhynchus tshawytscha*
Sockeye Salmon	*Oncorhychus nerka*
Mountain Whitefish	*Prosopium williamsoni*
Leopard Dace	*Rhinichthys falcatus*
Longnose Dace	*Rhinichthys cataractae*
Peamouth Chub	*Mylocheilus caurinus*
Redside Shiner	*Richardsonius balteatus*
Sculpins (general)	*Cottus* spp.
Suckers (general)	*Catostomus* spp.

Table 11
Most Numerous Fish Species, by Age Class,
Caught During Sampling

Common Name and Age Class	Number Caught	% of Total Number of Fish Caught (n=13,588)
Chinook Salmon (0+)	4,953	36.4
Redside Shiner (Juveniles)	3,068	22.6
Sockeye Salmon (0+)	1,317	9.7
Northern Pikeminnow (Juveniles)	1,184	8.7
Suckers (Juveniles)	1,101	8.1
Others	1,965	14.5

Key points about community structure are:

- Chinook were the most abundant species captured.
- Chinook comprised a small proportion of the fish community in the flooded vegetation, irregular and back channel habitats in Reach 7 and the back-channel habitats of Reach 6.

DISCUSSION

Chinook Habitat Use

The movement of newly emergent chinook fry occurs largely at night (Triton 2001a; Healey 1991), as fish seek refuge to avoid being carried downstream during the day. The fry densities observed in the various habitat types during daytime, when all the sampling occurred during this study, should therefore reflect the selection of refuge habitats by newly emergent fry. Juvenile chinook were abundant in three of the habitats sampled during this study (flooded vegetation, back-channel, and irregular shoreline habitats), but were caught in lower densities at sites with regular shorelines. This suggests that chinook fry use habitats with velocity refuge and cover, and avoid the more exposed habitat found along regular shorelines.

Back channel and flooded vegetation habitats offer greater amounts of instream cover and lower average water velocities than regular and irregular shorelines (Tables 6 and 7). The abundance of chinook in these habitat types is understandable since the habitats provide fry with food and cover from predation while demanding lower energy expenditures than in shoreline habitats with higher water velocities. The fact that irregular shoreline habitats had CPUE values comparable to those of more sheltered habitats suggests that, despite the reduced amount of instream cover and higher velocities present along irregular shorelines, the amount of shelter offered by irregular shoreline habitats was sufficient to meet the needs of emergent fry.

The fact that more chinook were captured during second seine passes than during first passes (Table 4) may reflect the effect of the disturbance caused by the passage of the seine net through the site, or may have resulted from recruitment of new fish into the sampled area during the rest times between passes, although rest times were shortened at the onset of the project to minimize this effect. Regardless of whether all passes or only second passes are used for analyses, the observed CPUEs are higher in back channel, flooded vegetation, and irregular shoreline sites than in regular shoreline sites.

Chinook Distribution

Releases from the Nechako reservoir were consistent with previous years, but peak flows resulting from snow melt were observed a couple of weeks later than normal because of the late spring. Approximately 4,500 spawners utilized Reach 2 (Table 13). With an estimated egg deposition of over 13,000,000, CPUE values of emergent fry for Reach 2 were expected to be the highest.

Table 12
Community Structure[2], by Reach and Habitat Type

Habitat Type	Reach 2 Species & age class	2 % of fish community	3 Species & age class	3 % of fish community	4 Species & age class	4 % of fish community	5 Species & age class	5 % of fish community	6 Species & age class	6 % of fish community	7 Species & age class	7 % of fish community
BC	RSC J	46.5	CH 0+	59.0	RSC J	31.1	CH 0+	40.9	RSC J	52.2	RSC J	26.4
	CH 0+	26.0	RSC J	20.7	CH 0+	25.9	LNC J	24.5	LSS J	28.0	LPD J	26.0
	LSS J	20.4	LSS J	8.2	LSS J	21.8	LPD J	15.9	LPD J	9.9	LSS J	17.6
									CH 0+	0.9	CH 0+	9.7
FV	CH 0+	55.9	CH 0+	53.3	CH 0+	65.2	CH 0+	55.2	NPM J	33.1	RSC J	55.0
	RSC J	27.8	RSC J	29.5	RSC J	9.0	SO 0+	19.8	RSC J	22.6	NPM J	12.1
	LSS J	14.0	LPD J	5.3	LSS J	8.0	LNC J	13.0	CH 0+	14.2	LSS J	11.7
											CH 0+	6.5
IR	CH 0+	77.3	CH 0+	69.0	CH 0+	85.2	CH 0+	70.4	CH 0+	38.7	SO 0+	42.9
	RSC J	12.7	LNC J	7.7	LNC J	4.3	SO 0+	11.4	SO 0+	39.8	RSC J	27.8
	LSS J	8.7	NPM J	7.1	RSC J	2.8	LNC J	9.2	LNC J	13.8	LPD J	18.6
											CH 0+	14.5
R	CH 0+	71.2	CH 0+	52.1	CH 0+	56.6	SO 0+	70.8	SO 0+	39.4	CH 0+	35.6
	LSS J	20.5	LNC J	20.6	RSC J	15.5	CH 0+	17.8	CH 0+	27.9	SO 0+	23.9
	LNC J	5.5	COTT J	12.8	LNC J	14.7	LNC J	4.7	LPD J	19.7	RSC J	20.3

[2] For clarity only the top three species,by age class, are shown. Where chinook were not one of the top three species caught, they have ben included as a 4th record.

Table 13
Nechako River 2001 Peak (September 14)
Spawning Data for Chinook

(unpublished data provided by
B. Nutton, DFO Prince George)

River Section (corresponding reach)	Percent Distribution[1]	Number of Spawners[2]	Estimated Egg Deposition[3]
1 (1)	3.9	400	1,153,800
2 (1)	0.8	54	155,763
Reach total:	4.7%	454	1,309,563
3a (2)	13.8	1284	3,703,698
3b (2)	8.9	800	2,307,600
4 (2)	5.8	600	1,730,700
5 (2)	10.5	1028	2,965,266
6 (2)	9.4	800	2,307,600
Reach total:	48.4%	4512	13,014,864
7 (3)	2.8	242	698,049
8 (3)	2	164	473,058
9 (3)	2.3	224	646,128
Reach total:	7.1%	630	1,817,235
10 (4)	4.7	470	1,355,715
11 (4)	7.3	644	1,857,618
12 (4)	8.5	840	2,422,980
13 (4)	3.7	360	1,038,420
Reach total:	24.2%	2314	6,674,733
14 (5)	6	662	1,909,539
15 (5)	4.5	490	1,413,405
Reach total:	10.5%	1152	3,322,944
16 (6)	5.2	552	1,592,244

[1] Based on maximum live count on September 14.

[2] Based on 2 times the peak of spawning, on redds only.

[3] Based on females comprising 50% of spawners with an average fecundity of 5,769 eggs per female (Jaremovic and Rowland 1988).

Reaches 3 and 4 had CPUEs almost two times greater than the other sampled reaches. Since egg deposition during fall 2001 was greatest in Reach 2, CPUE values in these reaches were expected to be the highest among the sampled reaches. However, there are several possible explanations for the lower-than-expected CPUE's in Reach 2:

1. *Chinook fry emerging in Reach 2 are not finding adequate rearing habitats, and migrate downstream in an effort to find more suitable rearing locations.*

   As complex cover (e.g., debris jams) is rare along the Nechako River (Lister 1993), reaches with limited vegetation or back channel habitats would have limited preferred emergent fry habitat. Field crews noted that regular and irregular shoreline habitats made up much of the shoreline in Reach 2, suggesting that rearing habitat capacity may be limited in the event of unusually high levels of recruitment.

2. *Sampling in Reach 2 was conducted prior to the peak emergence.*

   This is not likely, as sampling in Reach 2 (May 15-18) coincided with the peak of fry emergence, as noted from IPT catches (Figure 4).

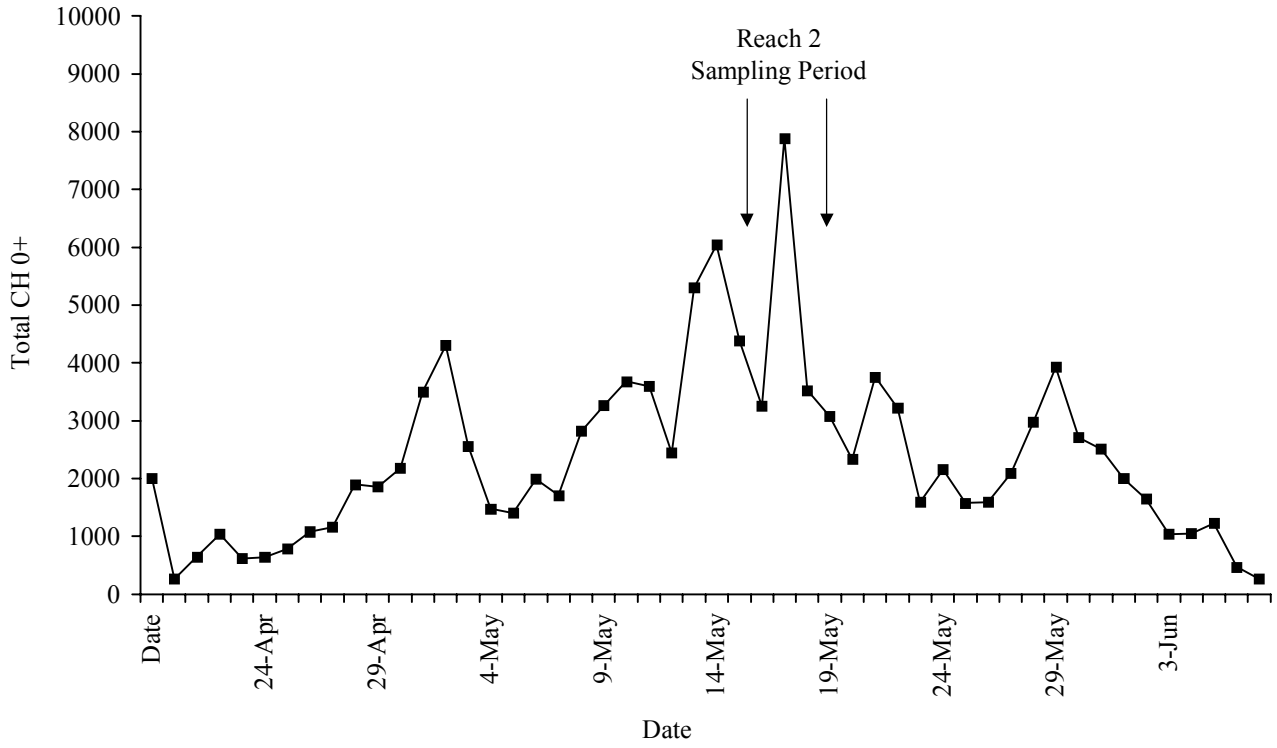
3. *Chinook eggs deposited in Reach 2 had reduced survival relative to eggs deposited in other reaches.*

   Although emergent success of other reaches is not known, the 2002 index of fry emergence for Reach 2 was 2,606,654, with an emergence success of 83% (Triton 2002). This is a high emergence success compared to the 1991 – 2001 average of 63%, and there is no reason to believe that eggs deposited in other reaches had higher emergence success.

4. *Fry emerging in Reach 2 are drifting downstream, the result of passive dispersal.*

   Healy (1991) suggests that almost all chinook fry drift downstream on the first night after their emergence and that stream residence behaviour takes several days to develop. During their drifting period, fry can be displaced quite far downstream. Because few eggs were deposited in Reach 1 (Table 1), relatively few fry drifted downstream from Reach 1 into Reach 2. In contrast, large numbers of fry may have

Figure 4
Timing of Fry Sampling in Reach 2, Relative to the Number of 0+



drifted from Reach 2 into Reach 3, and this is reflected by the low CPUE in Reach 2 relative to Reach 3. Although some increased variation is to be expected as one moves downstream (e.g., fish caught in Reach 4 could have drifted downstream from Reaches 1, 2 or 3), this trend was not observed throughout the entire upper Nechako River (e.g., Reach 4 had a relatively high CPUE even though few chinook spawn in Reach 3).

Additionally, fry emergence studies on the Nechako River (Triton 2002) show that a high proportion of emergent fry are captured in margin traps (78% in 2002), indicating that emergent fry actively move along the river margins and are not entirely at the mercy of the mainstem velocities.

The differences in juvenile chinook CPUE observed among the sampled reaches may be correlated with the availability of preferred low-velocity habitats among reaches. However, it was not possible to confirm this during the present study because the resolution of the photo-mosaics was too low to permit differentiation between the different habitat types present in each reach (see section on Field Sampling).

A study designed to assess the amount of each habitat type per reach would identify reaches with the most (and least) preferred emergent fry habitat (flooded vegetation, back-channel habitat). Such an assessment could help estimate the fry habitat capacity of the various reaches, but would require detailed aerial photography/satellite imagery and ground truthing.

Qualitative assessments of habitat availability during the field surveys showed that :

- The habitat in Reach 2 was mainly composed of regular and irregular shorelines, with less back channel and flooded vegetation habitats compared to lower reaches;
- All habitat types were equally represented in Reach 4;
- Reaches 5-7 had higher flows than Reaches 1-4 due to the Nautley River convergence;

- Reaches 5-7 had the greatest proportion of flooded vegetation habitat (due to the Nautley River).

Morphometrics

Fry in the downstream reaches (5-7) were significantly larger than those in upstream Reaches (2-4). This was due either to the later sampling in lower reaches relative to the upper reaches, or to the downstream displacement of fry that had emerged earlier from locations in the upper river. Since fry emergence occurs sequentially from upstream to downstream because of the temperature gradient in the river, the latter explanation is the most plausible. Fish in the lower reaches are a mixture of newly emergent fry and fish moving downstream from upstream reaches.

Fish Communities

Chinook were the most abundant fish collected during this study, comprising 36.5% of all fish taken. Chinook were least abundant in flooded vegetation, irregular and back channel habitats in Reach 7. The relatively small proportion of chinook in Reach 7 is attributable to low chinook numbers rather than unusually high numbers of other fish there (Table 3). Because no chinook spawning has been documented in Reach 7, the absence of chinook in this reach is likely due to the lack of recruitment and to the fact that relatively few fry from upstream had dispersed into this reach at the time it was sampled.

However northern pikeminnows, a predatory species, were nearly twice as numerous as chinook in the habitats in Reach 7 where chinook were least common. Many of the northern pikeminnow captured in the reach were of a predatory size. Northern pikeminnow with a length of 100 mm have been observed to prey upon young sockeye salmon (Scott and Crossman 1973), and the numerous 120 – 180 mm individuals captured in reaches 6 and 7 would be able to capture juvenile chinook. The low chinook numbers in Reach 7 may therefore result from predation or competition with pikeminnows (Brown et al 1992), although the competitive interactions between chinook salmon fry and juvenile non-game fish have not been examined.

Comparison of the Results of this Study with the Findings of Brown *et al.* (1994).

Although the sampling methods used in the present study were similar to those used by Brown *et al.* (1994; 3 m pole seines, 25 m site lengths), it is difficult to compare the results of the two studies. Brown *et al.* (1994) did not classify habitat type, but instead randomly selected four 25 m sites along each of eight 250 m sections of river margin. Further, Brown *et al.* sampled during both day and night during two sampling periods (May-June and August-September). Although spring sampling dates were relatively similar in both studies (Brown *et al.*: May 19 – June 25, 1991; NFCP: May 15 – June 12, 2002) emergence in 1991 peaked around the 20th of April, more than three weeks earlier than in 2002.

Another important difference between the two studies was the flows in the Nechako River during the sampling period. In 1991, flows measured by the Water Survey of Canada downstream of Cheslatta Falls were receding and in the range of 53 to 68 m^3/s. In 2002 the flows at the same location rose from the beginning of the sampling period to a peak of almost 90 m^3/s at the beginning of June and then receded to about 65 m^3/s at the end of June (Figure 5). Runoff in 2002 was both later and higher that in most years resulting from the cold spring. The freshet came at the beginning of June with the first major warming trend. During sampling in 2002 there was as much as 50% more water in the river than in 1991.

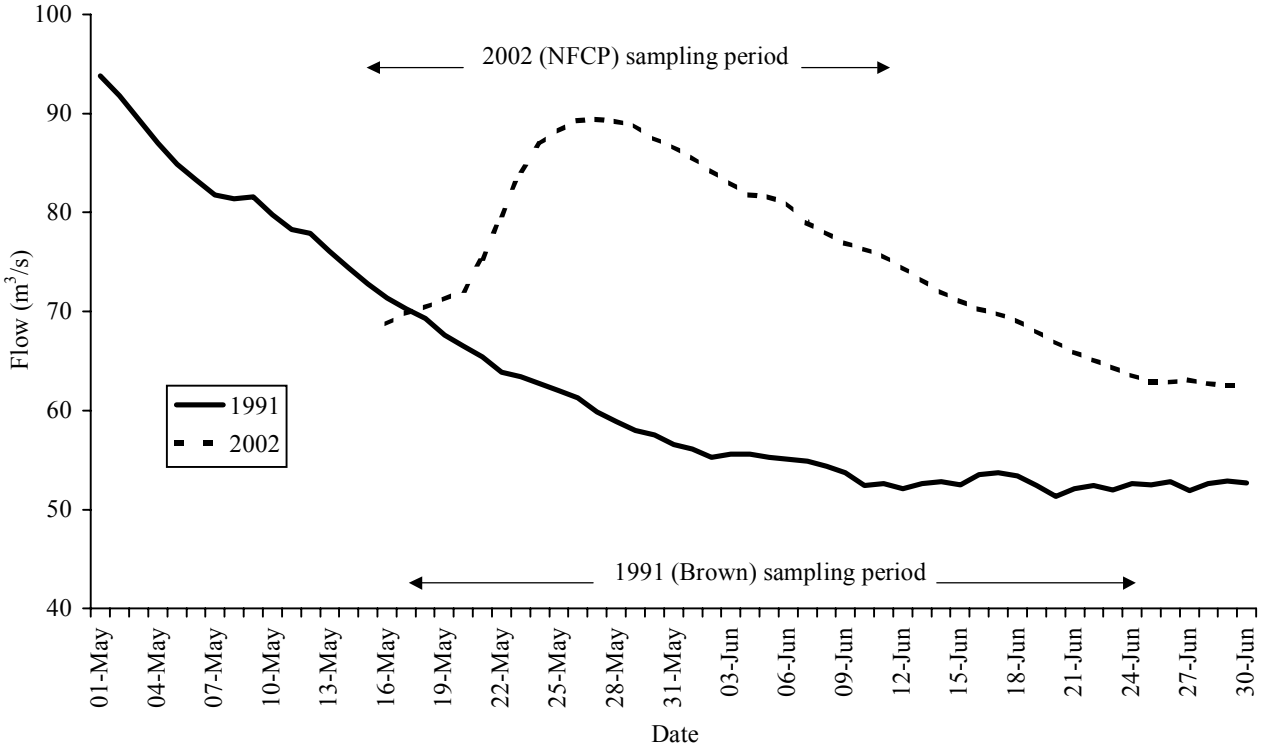
Relevant findings from the Brown *et al.* (1994) study are:

1. In spring juvenile chinook represented 30% of the fish numbers present in the margins of the Nechako and Stuart rivers.

2. In spring chinook salmon were more abundant along the river margins of the Lower Nechako River than in either the Stuart or Upper Nechako River.

3. Chinook salmon in the Lower Nechako River used flooded vegetation habitat more than exposed sites; more chinook in the Upper Nechako River used exposed sites compared to flooded sites.

Figure 5
Comparison of Flows Below Cheslatta Falls During the 1991 (Brown) and 2002 (NFCP) Sampling Periods



4. Chinook occupied shallow sites in the spring (and shifted to deeper sites in the fall).

Keeping the differences between the two studies in mind, the following general comparisons are nonetheless possible:

1. Both studies found greater numbers of chinook fry in vegetated habitats compared to exposed (e.g., regular margin) habitats, although Brown *et al.* reported that this was only true in the lower river (Reaches 5 to 7) during spring.
2. Brown *et al.* found that juvenile chinook were most abundant in Reach 5, while the current study found chinook to be most abundant in Reach 3.

CONCLUSIONS

The objectives of this study were to:

- determine the relative abundance and density of emergent chinook salmon fry by habitat type in Reaches 2 to 7 of the Nechako River,
- assess the spatial distribution of chinook fry in these reaches; and,
- document the fish communities.

Back channel habitats had the highest CPUE of the habitats sampled, closely followed by flooded vegetation and irregular shorelines. Chinook juveniles were less aubundant along regular shorelines. Chinook fry were most abundant in Reaches 3 and 4, and least abundant in Reaches 2 and 7. Juvenile chinook were the most common fish species in most of the sampled habitat types, comprising 36.5% of all fish taken. Other common species, in decreasing order of abundance, were reside shiner (22.6 %), sockeye salmon (9.7%), northern pikeminnow (8.7%) and suckers (8.1%).

REFERENCES

Department of Fisheries and Ocean. 2001. Spawner enumeration results for the Nechako River. Unpublished data.

Bradford, M. 1994. Trends in the abundance of Chinook Salmon (Oncorhynchus tshawytscha) of the Nechako River, British Columbia. Can J. Fish. Aquat. Sci. 965: 9p.

Bradford, M. 1997. Individual variation in dispersal behaviour of newly emerged chinook salmon (Onchorhynchus tshawytscha) from Upper Fraser River, British Columbia. Can J. Fish. Aquat. Sci. 1585: 8p.

Brown, T.G., E. White, D. Kelly, L. Rzen and J. Rutten. 1994. Availability of juvenile chinook salmon to predators along the margins of the Nechako and Stuart rivers, BC. Can. Manuscr. Rep. Fish Aquat Sci. 2245: 34p.

Brown, T.G., B. Bravender, P. Dubeau and R. Lauzier. 1992. Initial survey: stomach contents of potential fish predators of juvenile chinook salmon (Onchorhynchus tshawytscha) in the Nechako River, B.C. Can. Manuscr. Rep. Fish Aquat Sci. 2141: 33p.

Envirocon Ltd. 1984. Kemano completion hydroelectric development. Environmental studies. 22 Volumes.

Healey, M.C. 1991. Life history of chinook salmon (Oncorhynchus tshawytscha), p. 310-393. In C. Groot and L. Margolis [ed.] Pacific salmon life histories. University of British Columbia Press, Vancouver, B.C.

Jaremovic, L., and D. Rowland. 1988. Review of chinook salmon escapements in the Nechako River, British Columbia. Can. MS Report Fish. Aquat. Sci. 1963: 135 p.

Lister, D.B. and Associates. 1993. Preliminary inventory of habitat cover and cover opportunities, Nechako River, 1989. Nechako Fisheries Conservation Program. Report No. RM89-6.

Nechako Fisheries Conservation Program. 1988. Airphoto Mosaics. Kenney Dam to Vanderhoof. 0 km – 158.1 km. Scale 1:7,500. 23 sheets.

Nechako Fisheries Conservation Program. 1998. Size, distribution and abundance of juvenile chinook salmon of the Nechako River, 1998. Technical Report No. M98-3.

Triton Environmental Consultants Ltd. 2001a. 2001 Fry Emergence. Nechako Fisheries Conservation Program Technical Report No. M00-5. In review.

Triton Environmental Consultants Ltd. 2001b. Juvenile Outmigration 2001. Nechako Fisheries Conservation Program Technical Report No. M01-3. In review.

Triton Environmental Consultants Ltd. 2002. 2002 Fry Emergence. Nechako Fisheries Conservation Program Technical Report No. M01-5. In review.

Russell, L.R., K.R. Conlin, O.K. Johansen and U. Orr. 1983. Chinook salmon studies in the Nechako River: 1980, 1981, 1982. Can. MS Rep. Fish. Aquat. Sci., 1728:185p.

Schefler, W.C. 1979. Statistics for the biological sciences. Second Edition. Addison-Wesley Publishing Company, Inc.

Scott, W.B. and E.J. Crossman. 1973. Freshwater fishes of Canada. Canadian Department of Fisheries and Oceans, Scientific information and publications branch, Ottawa, ON.

Sommer, T.R. and M.L. Nobriga, W.C. Harrell, W. Batham, and W.J. Kimmerer. 2001. Floodplain rearing of juvenile chinook salmon: evidence of enhanced growth and survival. Can J. Fish. Aquat. Sci. 325: 9p.

APPENDIX 1
Site Location Data

APPENDIX 1
Site Location Data

Reach	Site	Margin	UTM	Km	Habitat Type	Date	Crew
2	1	L	10U.0376608.5950133	17.1	R	15-May-02	BR/DT
2	2	L	10U.0376587.5950092	17.05	FV	15-May-02	BR/DT
2	3	L	10U.0376660.5950263	16.8	R	15-May-02	BR/DT
2	4	L	10U.0376661.5950308	16.75	BC	15-May-02	BR/DT
2	5	R	10U.0377826.5950200	18.5	IR	15-May-02	BR/DT
2	6	R	10U.0377823.5950173	18.5	BC	15-May-02	BR/DT
2	7	L	10U.0378474.5950320	19.1	IR	15-May-02	BR/DT
2	8	L	10U.0378477.5950351	19.2	BC	15-May-02	BR/DT
2	9	R	10U.0379627.5950970	20.8	IR	15-May-02	BR/DT
2	10	R	10U.0379655.5951015	20.9	FV	15-May-02	BR/DT
2	11	L	10U.0380032.5951546	21.6	R	15-May-02	BR/DT
2	12	L	10U.0380027.5951575	21.6	BC	16-May-02	BR/DT
2	13	R	10U.0380325.5951681	21.8	IR	16-May-02	BR/DT
2	14	L	10U.0380367.5951879	22.5	R	16-May-02	BR/DT
2	15	R	10U.0383217.5953124	25.9	BC	16-May-02	BR/DT
2	16	L	10U.0383990.5953639	27.1	R	16-May-02	BR/DT
2	17	R	10U.0384048.5953586	27.1	IR	16-May-02	BR/DT
2	18	L	10U.0384127.5953944	27.5	BC	16-May-02	BR/DT
2	19	L	10U.0385435.5955462	29.5	IR	16-May-02	BR/DT
2	20	R	10U.0385582.5955485	29.7	R	16-May-02	BR/DT
2	21	R	10U.0387987.5955877	34.3	R	17-May-02	BR/DT
2	22	R	10U.0389517.5957124	37.5	BC	17-May-02	BR/DT
2	23	R	10U.0389477.5957098	37.5	BC	17-May-02	BR/DT
2	24	R	10U.0390339.5957982	38.9	BC	17-May-02	BR/DT
2	25	L	10U.0391236.5958318	40	R	17-May-02	BR/DT
2	26	R	10U.0391926.5959266	41.6	IR	17-May-02	BR/DT
2	27	R	10U.0392202.5959244	41.1	FV	17-May-02	BR/DT
2	28	R	10U.0392243.5959236	42.2	FV	17-May-02	BR/DT
2	29	L	10U.0392786.5959221	42.5	FV	18-May-02	BR/DT
2	30	L	10U.0392850.5959180	42.5	IR	18-May-02	BR/DT
2	31	R	10U.0393114.5959119	42.7	IR	18-May-02	BR/DT
3	1	R	10U.0394090.5962118	46.2	FV	22-May-02	DT/GS
3	2	R	10U.0394174.5962096	46.2	BC	22-May-02	DT/GS
3	3	R	10U.0393971.5962249	46.4	R	22-May-02	DT/GS
3	4	L	10U.0393596.5963327	47.9	FV	22-May-02	DT/GS
3	5	L	10U.0393369.5964153	48.5	BC	22-May-02	DT/GS
3	6	L	10U.0393243.5964697	49	IR	22-May-02	DT/GS
3	7	L	10U.0393101.5966513	50.9	FV	22-May-02	DT/GS
3	8	L	10U.0394516.5969358	54.6	IR	23-May-02	DT/GS
3	9	R	10U.0394951.5969689	55.25	R	23-May-02	DT/GS
3	10	R	10U.0394977.5969698	55.25	BC	23-May-02	DT/GS
3	11	R	10U.0395469.5970341	56.1	FV	23-May-02	DT/GS
3	12	L	10U.0396023.5971444	56.95	R	23-May-02	DT/GS
3	13	L	10U.0396154.5972067	57.95	BC	23-May-02	DT/GS
3	14	L	10U.0397614.5972526	59.5	IR	23-May-02	DT/GS
3	15	R	10U.0397704.5972494	60	R	23-May-02	DT/GS
3	16	L	10U.0399229.5972782	61.2	IR	23-May-02	DT/GS
4	1	L	10U.0405560.5980475	77	IR	29-May-02	DT/RL

APPENDIX 1 (continued)
Site Location Data

Reach	Site	Margin	UTM	Km	Habitat Type	Date	Crew
4	2	L	10U.0405362.5480754	77.5	FV	29-May-02	DT/RL
4	3	L	10U.0404712.5981322	78.6	BC	29-May-02	DT/RL
4	4	L	10U.0404395.5981683	78.8	R	29-May-02	DT/RL
4	5	R	10U.0403604.5983265	81	R	29-May-02	DT/RL
4	6	R	10U.0403579.5983231	81	IR	29-May-02	DT/RL
4	7	R	10U.0403656.5983618	81.5	R	29-May-02	DT/RL
4	8	R	10U.0403682.5983655	81.5	FV	29-May-02	DT/RL
4	9	L	10U.0403310.5984287	82.3	FV	30-May-02	DT/RL
4	10	R	10U.0402703.5986314	84.8	BC	30-May-02	DT/RL
4	11	L	10U.0401459.5987311	86.9	R	30-May-02	DT/RL
4	12	L	10U.0401428.5987283	87	IR	30-May-02	DT/RL
4	13	L	10U.0401265.5987162	87.1	FV	30-May-02	DT/RL
4	14	L	10U.0400302.5988141	88.8	BC	30-May-02	DT/RL
4	15	L	10U.0398974.5990807	93.2	BC	30-May-02	DT/RL
4	16	L	10U.0397150.5990892	95.2	IR	30-May-02	DT/RL
5	1	L	10U.0396211.5994052	100.8	R	03-Jun-02	DT/RL
5	2	L	10U.0396244.5994060	100.85	FV	03-Jun-02	DT/RL
5	3	MID	10U.0397787.5994803	103	FV	03-Jun-02	DT/RL
5	4	R	10U.0397771.5995243	103.5	IR	03-Jun-02	DT/RL
5	5	L	10U.0397649.5995277	103.7	IR	03-Jun-02	DT/RL
5	6	L	10U.0396947.5994005	101.8	FV	03-Jun-02	DT/RL
5	7	L	10U.0411684.5995782	123.9	BC	04-Jun-02	DT/RL
5	8	L	10U.0411778.5995686	124.1	R	04-Jun-02	DT/RL
5	9	L	10U.0411864.5995555	124.15	R	04-Jun-02	DT/RL
5	10	L	10U.0411921.5995507	124.2	IR	04-Jun-02	DT/RL
5	11	R	10U.0413069.5994229	126.1	BC	04-Jun-02	DT/RL
5	12	L	10U.0414840.5992574	129	BC	04-Jun-02	DT/RL
5	13	MID	10U.0414811.5991686	129.9	BC	04-Jun-02	DT/RL
5	14	R	10U.0415505.5991282	131	IR	04-Jun-02	DT/RL
5	15	L	10U.0415671.5991439	129.8	FV	04-Jun-02	DT/RL
5	16	L	10U.0415648.5991432	129.8	R	04-Jun-02	DT/RL
6	1	L	10U.0416820.5991481	132.5	R	06-Jun-02	GS/RL
6	2	L	10U.0417408.5992207	133.5	FV	06-Jun-02	GS/RL
6	3	L	10U.0421171.5992698	136.5	FV	06-Jun-02	GS/RL
6	4	L	10U.0421777.5992791	137.5	IR	06-Jun-02	GS/RL
6	5	L	10U.0422796.5991589	138.8	R	06-Jun-02	GS/RL
6	6	L	10U.0424838.5989574	147	FV	06-Jun-02	GS/RL
6	7	L	10U.0426013.5988894	145.2	R	06-Jun-02	GS/RL
6	8	R	10U.0426645.5989281	145.6	IR	07-Jun-02	GS/RL
6	9	L	10U.0427649.5988214	149.9	IR	07-Jun-02	GS/RL
6	10	L	10U.0428347.5988124	150.2	FV	07-Jun-02	GS/RL
6	11	L	10U.0429529.5987538	152.4	IR	07-Jun-02	GS/RL
6	12	L	10U.0430838.5986247	154.4	BC	07-Jun-02	GS/RL
6	13	L	10U.0431383.5986145	154.8	BC	07-Jun-02	GS/RL
6	14	L	10U.0431799.5986185	155.4	BC	07-Jun-02	GS/RL
6	15	R	10U.0432048.5985965	155.6	BC	07-Jun-02	GS/RL
6	16	L	10U.0429641.5987458	152.5	R	07-Jun-02	GS/RL

APPENDIX 1 (continued)
Site Location Data

Reach	Site	Margin	UTM	Km	Habitat Type	Date	Crew
7	1	L	10U.0436555.5987110	164.6	FV	11-Jun-02	DT/GS
7	2	L	10U.0437655.5986339	166.1	R	11-Jun-02	DT/GS
7	3	L	10U.0438144.5985762	166.9	BC	11-Jun-02	DT/GS
7	4	R	10U.0439771.5985177	168.9	R	11-Jun-02	DT/GS
7	5	L	10U.0439927.5984618	169.6	FV	11-Jun-02	DT/GS
7	6	L	10U.0441228.5984702	171	BC	11-Jun-02	DT/GS
7	7	L	10U.0445510.5981501	179.8	FV	11-Jun-02	DT/GS
7	8	L	10U.0446582.5980352	181.5	IR	11-Jun-02	DT/GS
7	9	L	10U.0451052.5980163	187.8	IR	11-Jun-02	DT/GS
7	10	L	10U.0451088.5980172	187.9	R	11-Jun-02	DT/GS
7	11	R	10U.0453362.5980332	190.6	BC	12-Jun-02	DT/GS
7	12	R	10U.0458822.5982042	196.8	R	12-Jun-02	DT/GS
7	13	R	10U.0463056.5982681	201.3	IR	12-Jun-02	DT/GS
7	14	R	10U.0461608.5982177	199.8	BC	12-Jun-02	DT/GS
7	15	R	10U.0458387.5981792	196.2	FV	12-Jun-02	DT/GS
7	16	L	10U.0457212.5980763	194.6	IR	12-Jun-02	DT/GS
7	17	L	10U.0459077.5982112	197.1	FV	12-Jun-02	DT/GS
7	18	R	10U.0459372.5982157	197.5	FV	12-Jun-02	DT/GS
7	19	L	10U.0459457.5982247	197.55	R	12-Jun-02	DT/GS
7	20	R	10U.0460202.5982164	198.5	FV	12-Jun-02	DT/GS

APPENDIX 2
Site Characteristics

APPENDIX 2
Site Characteristics

Reach	Site	Temp (°C)	Dom. Substrate	Sub-dom. Substrate	Instream Cover (%)	Water Depth and Velocity (estimated at reg. intervals from shore) 0 m Depth (m)	0 m V (m/s)	1 m Depth (m)	1 m V (m/s)	2 m Depth (m)	2 m V (m/s)	3 m Depth (m)	3 m V (m/s)	Comments
2	1	8.5	G	G	0	0	0	0.05	<0.1	0.1	0.1	0.15	0.2	Site extends along a bare margin with no complexity. Cover is limted to small substrates.
2	2	8.5	F	G	60	0	0	0.05	0	0.1	<0.1	0.15	<0.1	Site extends along a section of river margin dominated by flooded vegetation (reed; grass) and small woody debris.
2	3	9	G	F	0	0	0	0.1	0.1	0.15	0.2	0.2	0.3	Site extends along bare shoreline with gravel and sand. Cover limited to substrate with no instream vegetation present.
2	4	10	F	G	33	0	0	0.1	0.1	0.2	0.15	0.3	0.2	Site located in a shallow back channel with flooded vegetation (sedge) and abundant inverts (predatious diving beetles).
2	5	9.5	F	G	0	0	0	0.1	<0.1	0.2	0.1	0.3	0.15	Site extends along an irregular shoreline with scallops.
2	6	9	F	G	50	0	0	0.1	<0.1	0.2	<0.1	0.3	0.1	Site is located in a side channel with approx. 50% of the site dominated by flooded grasses.
2	7	9	G	C	0	0	0	0.1	0.1	0.2	0.2	0.3	0.3	Site located along an irregular shoreline with no instream vegetation or woody debris to provide cover.
2	8	15	C	G	0	0	0	0.2	0	0.3	0	0.4	0	Site is located within a back channel with no instream vegetation or woody debris cover.
2	9		G	G	0	0	0	0.1	0.05	0.15	0.1	0.2	0.2	Site extends along an irregular shoreline along a grassy margin.
2	10	9	G	G	30	0	0	0.1	<0.1	0.15	<0.1	0.1	<0.1	Site extends along a shallow, flooded bar dominated by grass (dormant).
2	11	9	G	G	0	0.05	0	0.15	<0.1	0.2	0.1	0.2	0.1	Site extends along a section of bare river margin with shoreline vegetation consists of grass and willow.
2	12	9	G	G	0	0.05	0	0.1	0	0.2	0	0.3	0	Site located with a bare gravel back channel with no instream cover.
2	13	7	C	G	0	0	0	0.15	0.15	0.2	0.25	0.3	0.35	Site extends along a complex scalloped shoreline.
2	14		G	G	0	0.02	0	0.05	<0.10	0.1	<0.1	0.2	0.1	Site extends along bare shoreline with low habitat values. Instream cover limited to larger substrates.
2	15	19	F		80	0.05	0	0.1	0	0.2	0	0.1	0	Site located within a silt dominated sidechannel with abundant algal growth.
2	16	8	G	G	0	0.05	0	0.1	0	0.2	<0.1	0.3	0.1	Site extends along a bare margin with grassy shoreline. Cover is limited to the larger substrates.
2	17	9	C	G	0	0.1	0	0.2	0.1	0.3	0.15	0.4	0.2	Site extends along an irregular shoreline with no instrem vegetation or woody debris to provide cover.
2	18	12	F	G	50	0.4	0	0.4	0	0.4	0	0.3	0	Site located within a back channel that is an outlet to a beaver pond, resulting in tannin coloured water.
2	19	12	G	G	0	0	0	0.1	<0.1	0.2	0.1	0.3	0.2	Site extends along an irregular shoreline downstream of shears resulting in a back-eddy. Grass dominated shoreline.
2	20	9	F	G	0	0.2	<0.1	0.3	0.1	0.3	0.2	0.4	0.25	Site extends along a regular shoreline with steep grassy banks and no instream cover.

APPENDIX 2
Site Characteristics

Reach	Site	Temp (°C)	Dom. Substrate	Sub-dom. Substrate	Instream Cover (%)	Water Depth and Velocity (estimated at reg. intervals from shore) 0 m Depth (m)	0 m V (m/s)	1 m Depth (m)	1 m V (m/s)	2 m Depth (m)	2 m V (m/s)	3 m Depth (m)	3 m V (m/s)	Comments
2	21		F	G	0	0	0	0.1	<0.1	0.2	0.1	0.3	0.2	Site extends along a regular shoreline with sand and pea-gravel substrates. No instream cover present.
2	22	8	F		20	0	0	0.15	0	0.2	0	0.3	0	Site is located within a side channel with flooded vegetation (grass) and silty substrates. The shoreline is dominated by grass and shrubs.
2	23	8	F		40	0	0	0.1	0	0.2	0	0.3	0	Site loacted within a side channel with cover provided by grass and aquatic weeds. The substrate is exclusively fines (silt).
2	24	15	F		50	0.05	0	0.2	0	0.4	0	0.7	0	Site located within a backchannel approx 5 m wide with 50% of the site dominated by flooded, dead grass.
2	25	8	F		0	0.3	0	0.3	0.1	0.4	0.15	0.6	0.2	Site extends along a regular grass bank with evidence of erosion. No instream cover present.
2	26	8	F		10	0.1	0	0.2	<0.1	0.4	<.1	0.5	0.1	Site extends along an irregular shoreline with instream cover provided by flooded grass (10% of site).
2	27	8	F		75	0	0	0.1	<0.1	0.2	<0.1	0.3	0.1	Site is dominated by flooded vegetation that extends approx 3 - 5 m from shoreline.
2	28	8	F		80	0	0	0.1	0	0.2	<0.1	0.3	0.1	Site is dominated by flooded vegetation which provides cover to approx 80% of the site.
2	29	5	F		50	0	0	0.2	0	0.3	0.1	0.5	0.2	Site is dominated by thick, flooded vegetation that provides cover to approx 50% of the site.
2	30	5	F	G	5	0	0	0.15	0	0.3	0.1	0.45	0.2	Site extends along an irregular shoreline with the region upstream of the site dominated by shallow bays.
2	31	6	F	G	1	0.05	0	0.2	0.1	0.4	0.2	0.7	0.25	Site extends along an irregular shoreline with scallops as a result of erosion due to cattle impacts.
3	1	6	F		90	0.05	0	0.2	0	0.25	0	0.3	0.05	Site extends along a flooded shoreline dominated by dead vegetation with some new growth.
3	2	6	F		20	0.05	0	0.15	0	0.25	0.05	0.4	0.1	Site loacted along a section of a flooded shelf of a sidechannel with approximately 20% of the site dominated by flooded vegetation.
3	3	6	G	C	0	0.05	0	0.3	0.15	0.75	0.15	1.1	0.3	Site extends along a gravel and cobble dominated bar with no instream vegetation or woody debris. Cover provided by substrate exclusively.
3	4	8	F		80	0.05	0	0.1	0	0.2	0	0.25	0	Site extends along a vegetated shoreline dominated by flooded dead grass that extends approx 6 m into the river.
3	5	9	F		85	0.05	0	0.15	0	0.3	0	0.4	0	Site is dominated by poor quality habitat due to limited flow and likely low O2 concentrations.
3	6	5	F		20	0.2	0	0.4	0.1	0.6	0.15	1	0.25	Site extends along an irregular shoreline with scallops throughout and is located downstream of a stream resulting in cooler temp. Small bay at downstream end of site contains 100% of the cover.

APPENDIX 2
Site Characteristics

Reach	Site	Temp (°C)	Dom. Substrate	Sub-dom. Substrate	Instream Cover (%)	Water Depth and Velocity (estimated at reg. intervals from shore) 0 m Depth (m)	0 m V (m/s)	1 m Depth (m)	1 m V (m/s)	2 m Depth (m)	2 m V (m/s)	3 m Depth (m)	3 m V (m/s)	Comments
3	7	6	F		75	0.1	0	0.3	0	0.8	0.1	1.3	0.2	Site is dominated by flooded vegetation (dead rushes) throughout.
3	8	5	F	C	10	0.05	0	0.2	0.05	0.4	0.15	0.75	0.3	Site extends along an irregular shoreline due to scallops and the occassional boulder outcrop.
3	9	5	G	C	5	0	0	0.2	0.1	0.6	0.2	1.2	1.3	Site extends along a gravel and cobble dominated bar with limited instream cover (10% of site has flooded vegetation). Low habitat complexity.
3	10	5	F		50	0	0	0.15	0	0.3	0	0.5	0	Site located within a backwatered channel with no flow, abundant flooded vegetation (mostly dead) and exclusively fine substrates.
3	11	7	F		20	0.05	0	0.1	0	0.15	0	0.3	0.05	Site is dominated by sedge and grass, which provides cover to approx 20% of the site. The substrate is exclusively fines.
3	12	7	G	F	5	0.05	0	0.2	0.05	0.3	0.1	0.6	0.15	Site extends along a regular shoreline with limited cover provided by willow and grass.
3	13	7	F	G	10	0.05	0	0.35	0	0.5	0	0.7	0	Site is in a backwatered channel with no flow observed. Instream cover is provided to 10% of the site by willow.
3	14	6	G	F	5	0.05	0	0.3	0.1	0.6	0.2	0.8	0.3	Site is located along a section of flooded shoreline with small scallops.
3	15	9	G	C	5	0	0	0.1	0	0.2	0	0.3	5	Site is located along a regular gravel bar with cover primarily associated with the larger substrate and the occassional willow.
3	16	7	C	F	5	0.05	0	0.5	0	0.7	0.2	1	0.3	Site extends along a section of irregular shoreline with frequent scallops. Fine substrate primarily a result of bank erosion.
4	1	13	F	C	5	0.05	0	0.15	0	0.35	0.1	0.4	0.2	Site extends along a section of irregular shoreline with small scallops throughout.
4	2	14	F		80	0.1	0	0.1	0	0.15	0	0.15	0	Site extends along a flooded bank dominated by horsetail and sedge.
4	3	15	F	C	50	0.1	0	0.15	0	0.25	0	0.35	0	Site is located within a backwatered channel with no flow.
4	4	11	G	C	0	0.2	0.1	0.25	0.15	0.3	0.2	0.35	0.3	Site extends along a regular shoreline with no flooded vegetation or woody debris to provide cover. Low habitat complexity.
4	5	11	G	F	0	0.05	0.05	0.25	0.35	0.4	0.45	0.55	0.5	Site extends along a section of regular shoreline with a 2 m high bank. Flows are fast and deep and cover is provided by the large substrate predominantly.
4	6	11	G	F	10	0.1	0	0.3	0.1	0.5	0.2	0.65	0.3	Site extends along a section of irregular shoreline with deep scallops that provide shelter from the main flows.
4	7	11	G	F	0	0.1	0.05	0.4	0.1	0.5	0.2	0.55	0.2	Site extends along a regular shoreline with no flooded vegetation or woody debris to provide cover. Low habitat complexity.
4	8	14	F		90	0.1	0	0.25	0	0.3	0	0.35	0.05	Site extends along a flooded shoreline with abundant vegetation to provide cover. Substrates are primarily organic fines.
4	9	9	F		50	0.15	0	0.25	0	0.3	0	0.4	0.05	Site extends along a flooded shoreline dominated by sedges and willow. vegetation is mostly dead with sparse new growth.

APPENDIX 2
Site Characteristics

Reach	Site	Temp (°C)	Dom. Substrate	Sub-dom. Substrate	Instream Cover (%)	Water Depth and Velocity (estimated at reg. intervals from shore) 0 m Depth (m)	0 m V (m/s)	1 m Depth (m)	1 m V (m/s)	2 m Depth (m)	2 m V (m/s)	3 m Depth (m)	3 m V (m/s)	Comments
4	10	9	F	G	30	0.15	0	0.25	0	0.3	0	0.55	0	Site is a backwatered side channel with abundant vegetation throughout. No flow observed.
4	11	10	G	F	5	0	0	0.25	0	0.4	0.05	0.6	0.15	Site extends along a regular shoreline with limited cover provided by instream vegetation (approx 5% of site). Low habitat complexity.
4	12	10	G	F	10	0	0	0.55	0.1	0.8	0.2	1.1	0.4	Site extends along an irregular shoreline with eroded banks forming scallops and pockets.
4	13	14	F		95	0.05	0	0.15	0	0.3	0	0.6	0	Site extends along a shallow, flooded shoreline dominated by dense mats of sedges and grasses.
4	14	11	F	G	30	0.05	0	0.2	0	0.4	0	0.9	0.15	Site is located in a backwatered side channel with approx 30% dominated by dead vegetation. No flow was observed.
4	15	15	F		30	0.1	0	0.15	0	0.25	0	0.45	0	Site is located in a backwatered side channel with approx 30% dominated by dead vegetation. No flow was observed.
4	16	10			15	0	0	0.4	0.1	0.9	0.2	1.1	0.3	Site extends along an irregular shoreline with small scallops and steep banks.
5	1	11.5	F		20	0	0	0.2	0	0.4	0.05	0.6	0.1	Site extends along a regular shoreline with fine substrates and cover provided to approx 20% by sedge.
5	2	15	F		30	0	0	0.15	0	0.2	0	0.35	0.05	Site extends along a flooded vegetated shoreline dominated by sedges and willow and characterized by low velocity discharge and exclusively fine substrates.
5	3	11	F		30	0.4	0.3	0.45	0.3	0.45	0.3	0.4	0.3	Site is a flooded mid-channel bar dominated by willows and grasses (provides cover to approx 30% of the site).
5	4	11	F	B	10	0	0	0.2	0	0.35	0.05	0.55	0.15	Site is located within a shallow bay creating a back-eddy.
5	5	11	F	B	10	0.1	0	0.4	0	0.8	0.1	1	0.2	Site extends along an irregular shoreline with small scallops throughout. Flooded vegetation provides cover to only 10% of the site.
5	6	14	F	G	40	0.15	0	0.2	0.05	0.25	0.1	0.3	0.1	Site is located along a flooded sidebar dominated by willow, grass and dandelion.
5	7	13	F	B	5	0	0	0.2	0	0.4	0.1	0.6	0.2	Site extends along a sidechannel in a bedrock channel. Cover is limited to the larger substrates (flooded vegetation provides cover to approx 5% of the site).
5	8	12	F	C	10	0	0	0.15	0	0.2	0.1	0.4	0.15	Site extends along a regular shoreline with trace cover provided by flooded vegetation (10% of the site).
5	9	12	F	B	10	0	0	0.2	0	0.4	0.1	0.6	0.2	Site extends along a regular shoreline with trace cover provided by flooded vegetation (10% of the site).
5	10	12	F	B	30	0	0	0.15	0.1	0.3	0.2	0.5	0.4	Site extends along an irregular portion of shoreline dominated by small scallops. Cover is provided to approx 30% of the site by flooded vegetation.

APPENDIX 2
Site Characteristics

Reach	Site	Temp (°C)	Dom. Substrate	Sub-dom. Substrate	Instream Cover (%)	Water Depth and Velocity (estimated at reg. intervals from shore) 0 m Depth (m)	0 m V (m/s)	1 m Depth (m)	1 m V (m/s)	2 m Depth (m)	2 m V (m/s)	3 m Depth (m)	3 m V (m/s)	Comments
5	11	12	F		80	0.2	0	0.3	0	0.4	0.1	0.4	0.1	Site is located in a sidechannel with dominated by flooded vegetation but lacking in habitat complexity.
5	12	12	G	F	10	0.4	0	0.5	0.2	0.6	0.3	0.7	0.4	Site extends along a side channel with low habitat complexity and limited cover (flooded vegetation provides cover to approx 10% of the site).
5	13	12	G	F	15	0.1	0	0.15	0.1	0.2	0.15	0.2	0.2	Site is located along a gravel sidechannel with low habitat complexity. Flooded vegetation (willows) provide cover to approx. 15% of the site.
5	15	12	F		70	0	0	0.2	0.1	0.3	0.2	0.5	0.8	Site extends along a flooded shoreline which is dominated by grass and willows.
5	16	15	F		30	0	0	0.15	0	0.25	0.1	0.4	0.15	Site extends along a regular shoreline that is lacking in cover (flooded vegetation provides cover to approx 30% of the site) and habitat complexity.
6	1	13	F	G	60	0	0	0.2	0.05	0.4	0.1	0.6	0.2	Site extends along a regular shoreline with flooded vegetation for cover (approx 60% of site), low habitat complexity and low discharge velocity.
6	2	13	F		90	0	0	0.1	0	0.2	0.05	0.4	0.1	Site is dominated by thick flooded vegetation (sedge and grass) and has low discharge velocity and habitat complexity.
6	3	14	F		75	0	0	0.3	0	0.6	0.05	0.8	0.1	Site is dominated by thick, flooded vegetation consisting of sedge, grass and willow. The substrates are exclusively fines and the site has low habitat complexity.
6	4	13	F		40	0	0	0.3	0.05	0.5	0.1	0.9	0.2	Site extends along an irregular shoreline with the occasional shallow scallop. Approx 40% of the site is dominated by flooded vegetation and the substrates are exclusively fines.
6	5	11	C	F	0	0	0.1	0.2	0.3	0.3	0.5	0.5	0.5	Site extends along a regular shoreline dominated by cobble substrates. Cover is primarily provided by the cobbles with no flooded vegetation or woody debris within the site.
6	6	11	F		35	0	0	0.1	0	0.2	0.5	0.4	0.1	Site is dominated by flooded vegetation (sedge and willow) with exclusively sand substrates.
6	7	11	F	C	5	0	0	0.1	0.5	0.2	0.1	0.4	0.2	Site extends along a regular shoreline with low habitat complexity and trace cover provided by flooded vegetation (5%) and cobble substrate (3%).
6	8	10	G	F	40	0	0	0.1	0.1	0.3	0.4	0.5	0.5	Site is located along an irregular shoreline with cover provided by flooded vegetation (grass and willow).
6	9	10	F	G	5	0	0	0.2	0.2	0.4	0.3	0.8	0.4	Site extends along an irregular shoreline with small scallops as a result of the bank slumping. Trace cover is provided by grass, which cover approximately 5% of the site.

APPENDIX 2
Site Characteristics

Reach	Site	Temp (°C)	Dom. Substrate	Sub-dom. Substrate	Instream Cover (%)	Water Depth and Velocity (estimated at reg. intervals from shore) 0 m Depth (m)	0 m V (m/s)	1 m Depth (m)	1 m V (m/s)	2 m Depth (m)	2 m V (m/s)	3 m Depth (m)	3 m V (m/s)	Comments
6	10	10	F		95	0	0	0.2	0	0.5	0.05	0.7	0.1	Site is dominated by flooded vegetation (95% of site) with exclusively fine substrates and low discharge velocity.
6	11	10	G	F	15	0	0.1	0.2	0.3	0.4	0.4	0.6	0.6	Site extends along an irregular shoreline with shallow scallops. Trace cover is provided by patches of flooded vegetation (approx 15% of the site).
6	12	10	F	G	10	0.3	0.1	0.4	0.2	0.6	0.3	0.8	0.4	Site constists of a vegetated side channel with trace cover and moderate discharge volume.
6	13	10	F		20	0.2	0	0.3	0.1	0.4	0.2	0.6	0.3	Site extends along a side channel with flooded willow and sedge vegetation. Trace cover with low habitat complexity and sand and silt dominated substrates.
6	14	11	F		90	0	0	0.1	0	0.2	0	0.4	0.05	Site extends along side channel with abundant flooded vegetation, very low discharge and low habitat complexity.
6	15	11	F		80	0	0	0.2	0	0.4	0	0.8	0.05	Site is backwatered and sedge and willow vegetation is flooded. Low velocity discharge and low habitat complexity within site.
6	16	10	C	F	5	0.3	0.1	0.4	0.2	0.6	0.3	0.7	0.3	Site extends along a regular cobble shoreline adjacent to flooded vegetation.
7	1	15	F		40	0.1	0	0.2	0	0.25	0.1	0.3	0.15	Site extends along an irregular shoreline dominated by flooded rushes and grasses.
7	2	15	F		5	0	0	0.15	0	0.3	0.1	0.55	0.2	Site extends along side channel but habitat is more representative of a regular shoreline as the side channel is very large.
7	3	11	F		60	0.15	0	0.25	0	0.3	0.1	0.4	0.1	Site contains poor salmonid habitat, vegetation was choked with algae and much. No flows and poor cover.
7	4	15	F		30	0	0	0.2	0.1	0.4	0.2	0.8	0.3	Site is located along a regular section of shoreline.
7	5	15	F		70	0.2	0	0.2	0	0.4	0.1	0.6	0.2	Site extends along flood shoreline, dominated by grass and rushes.
7	6	15	F		40	0	0	0.2	0	0.4	0	0.65	0	Site is located in an ancient side channel flooded by high flows and is dominated by rushes.
7	7	16	F		60	0.15	0	0.3	0	0.6	0	0.75	0.1	Site extends along flooded shoreline which is vegetated with rushes and willows. Lack of velocity through vegetation provides marginal salmonid habitat.
7	8	14	F		5	0	0	0.3	0	0.6	0.1	0.8	0.15	Site extends along irregular margin formed by slumping banks along a farmers field.
7	9	15	F		5	0	0	0.2	0	0.35	0.15	0.6	0.3	Site extends along irregular margin formed by cattle impacts and slumping banks.
7	10	15	F		0	0	0	0.15	0	0.3	0.1	0.45	0.2	Site extends along an open shoreline impacted by cattle grazing, with no useable cover.
7	11	15	F		20	0	0	0.3	0	0.8	0.1	1.1	0.2	Site is located within a deep side channel with trace cover and limited flow.

APPENDIX 2
Site Characteristics

Reach	Site	Temp (°C)	Dom. Substrate	Sub-dom. Substrate	Instream Cover (%)	Water Depth and Velocity (estimated at reg. intervals from shore) 0 m Depth (m)	0 m V (m/s)	1 m Depth (m)	1 m V (m/s)	2 m Depth (m)	2 m V (m/s)	3 m Depth (m)	3 m V (m/s)	Comments
7	12	16	G	F	0	0	0	0.2	0.1	0.6	0.2	0.8	0.4	Site extends along a bare gravel bar formed by Clukus Creek, however it lacks in cover or structural complexity.
7	13	16	F		30	0	0	0.1	0	0.2	0.1	0.4	0.1	Site extends along irregular shoreling with limited cover. Little structure provided by small shallow bays.
7	14	20	F		90	0.1	0	0.2	0	0.4	0	0.5	0	Site consits of a backwatered section with dense dead vegetation and no flow. Low value salmonid habitat.
7	15	17	F		80	0.1	0	0.3	0	0.4	0	0.6	0.1	Site consits of flooded grasses and rushes with little flow through vegetation.
7	16	17	F		40	0	0	0.3	0.1	0.7	0.2	1.1	0.2	Site extends along irregular vegetated point bar-like feature with small scallops. However, poor habitat lacking structure.
7	17	20	F		80	0.1	0	0.25	0	0.5	0.1	0.65	0.1	Site is located downstream of Clukuz Creek and is dominated by flooded vegetation which provides cover. Little flow through vegetation.
7	18	18	G	F	40	0.1	0	0.2	0.1	0.3	0.2	0.4	0.2	Site extends through flooded small willows and grasses which provide some cover. Flows are good throughout but no salmonids were captured.
7	19	17	F	C	20	0	0	0.15	20	0.4	0.4	0.7	0.5	Good flows occur within site, but low cover provided by grasses and lack of woody debris limit habitat value.
7	20	17	F		80	0.1	0	0.2	0.1	0.3	0.1	0.4	0.1	Site extends through flooded grasses and willow which provide some cover. Trace flows and no habitat structure.

APPENDIX 3
Photo's and Photo Log

Plate 1. Typical flooded vegetation site. Photograph taken at site 2-27 (Reach 2).

Plate 2. Typical irregular shoreline site. Photograph taken at site 2-13 (Reach 2).

Plate 3. Typical regular shoreline site. Photograph taken at site 2-20 (Reach 2).

Plate 4. Typical side channel site. Photograph taken at site 2-23 (Reach 2).

APPENDIX 3
Photo Log

CD #	Image # (.jpg)	Reach	Site	Type	Water Depth and Velocity (estimated at reg. intervals from shore) 0 m Depth (m)	0 m V (m/s)	1 m Depth (m)	1 m V (m/s)	2 m Depth (m)	2 m V (m/s)	3 m Depth (m)	3 m V (m/s)	Comments
1	025_25	2	1	R	0	0	0.05	<0.1	0.1	0.1	0.15	0.2	Site extends along a bare margin with no complexity. Cover is limted to small substrates.
1	024_24	2	2	FV	0	0	0.05	0	0.1	<0.1	0.15	<0.1	Site extends along a section of river margin dominated by flooded vegetation (reed; grass) and small woody debris.
1	026_26	2	3	R	0	0	0.1	0.1	0.15	0.2	0.2	0.3	Site extends along bare shoreline with gravel and sand. Cover limited to substrate with no instream vegetation present.
1	027_27	2	4	BC	0	0	0.1	0.1	0.2	0.15	0.3	0.2	Site located in a shallow back channel with flooded vegetation (sedge) and abundant inverts (predatious diving beetles).
1	028_28	2	5	IR	0	0	0.1	<0.1	0.2	0.1	0.3	0.15	Site extends along an irregular shoreline with scallops.
1	029_29	2	6	BC	0	0	0.1	<0.1	0.2	<0.1	0.3	0.1	Site is located in a side channel with approx. 50% of the site dominated by flooded grasses.
1	031_31	2	7	IR	0	0	0.1	0.1	0.2	0.2	0.3	0.3	Site located along an irregular shoreline with no instrem vegetation or woody debris to provide cover.
1	030_30	2	8	BC	0	0	0.2	0	0.3	0	0.4	0	Site is located within a back channel with no instream vegetation or woody debris cover.
1	032_32	2	9	IR	0	0	0.1	0.05	0.15	0.1	0.2	0.2	Site extends along an irregular shoreline along a grassy margin.
1	033_33	2	10	FV	0	0	0.1	<0.1	0.15	<0.1	0.1	<0.1	Site extends along a shallow, flooded bar dominated by grass (dormant).
1	034_34	2	11	R	0.05	0	0.15	<0.1	0.2	0.1	0.2	0.1	Site extends along a section of bare river margin with shoreline vegetation consists of grass and willow.
1	035_35 001_1	2	12	BC	0.05	0	0.1	0	0.2	0	0.3	0	Site located with a bare gravel back channel with no instream cover.
1	002_2	2	13	IR	0	0	0.15	0.15	0.2	0.25	0.3	0.35	Site extends along a complex scalloped shoreline.
1	003_3	2	14	R	0.02	0	0.05	<0.10	0.1	<0.1	0.2	0.1	Site extends along bare shoreline with low habitat values. Instream cover limited to larger substrates.
1	004_4	2	15	BC	0.05	0	0.1	0	0.2	0	0.1	0	Site located within a silt dominated sidechannel with abundant algal growth.
1	009_9	2	16	R	0.05	0	0.1	0	0.2	<0.1	0.3	0.1	Site extends along a bare margin with grassy shoreline. Cover is limited to the larger substrates.
1	008_8	2	17	IR	0.1	0	0.2	0.1	0.3	0.15	0.4	0.2	Site extends along an irregular shoreline with no instrem vegetation or woody debris to provide cover.
1	005_5	2	18	BC	0.4	0	0.4	0	0.4	0	0.3	0	Site located within a back channel that is an outlet to a beaver pond, resulting in tannin coloured water.
1	006_6	2	19	IR	0	0	0.1	<0.1	0.2	0.1	0.3	0.2	Site extends along an irregular shoreline downstream of shears resulting in a back-eddy. Grass dominated shoreline.
1	007_7	2	20	R	0.2	<0.1	0.3	0.1	0.3	0.2	0.4	0.25	Site extends along a regular shoreline with steep grassy banks and no instream cover.

APPENDIX 3
Photo Log

CD #	Image # (.jpg)	Reach	Site	Type	Water Depth and Velocity (estimated at reg. intervals from shore) 0 m Depth (m)	0 m V (m/s)	1 m Depth (m)	1 m V (m/s)	2 m Depth (m)	2 m V (m/s)	3 m Depth (m)	3 m V (m/s)	Comments
1	011_11	2	21	R	0	0	0.1	<0.1	0.2	0.1	0.3	0.2	Site extends along a regular shoreline with sand and pea-gravel substrates. No instream cover present.
1	012_12	2	22	BC	0	0	0.15	0	0.2	0	0.3	0	Site is located within a side channel with flooded vegetation (grass) and silty substrates. The shoreline is dominated by grass and shrubs.
1	013_13	2	23	BC	0	0	0.1	0	0.2	0	0.3	0	Site loacted within a side channel with cover provided by grass and aquatic weeds. The substrate is exclusively fines (silt).
1	014_14	2	24	BC	0.05	0	0.2	0	0.4	0	0.7	0	Site located within a backchannel approx 5 m wide with 50% of the site dominated by flooded, dead grass.
1	015_15	2	25	R	0.3	0	0.3	0.1	0.4	0.15	0.6	0.2	Site extends along a regular grass bank with evidence of erosion. No instream cover present.
1	016_16	2	26	IR	0.1	0	0.2	<0.1	0.4	<.1	0.5	0.1	Site extends along an irregular shoreline with instream cover provided by flooded grass (10% of site).
1	017_17	2	27	FV	0	0	0.1	<0.1	0.2	<0.1	0.3	0.1	Site is dominated by flooded vegetation that extends approx 3 - 5 m from shoreline.
1	018_18	2	28	FV	0	0	0.1	0	0.2	<0.1	0.3	0.1	Site is dominated by flooded vegetation which provides cover to approx 80% of the site.
1	019_19	2	29	FV	0	0	0.2	0	0.3	0.1	0.5	0.2	Site is dominated by thick, flooded vegetation that provides cover to approx 50% of the site.
1	020_20	2	30	IR	0	0	0.15	0	0.3	0.1	0.45	0.2	Site extends along an irregular shoreline with the region upstream of the site dominated by shallow bays.
1	021_21	2	31	IR	0.05	0	0.2	0.1	0.4	0.2	0.7	0.25	Site extends along an irregular shoreline with scallops as a result of erosion due to cattle impacts.
1	022_22 118_18	3	1	FV	0.05	0	0.2	0	0.25	0	0.3	0.05	Site extends along a flooded shoreline dominated by dead vegetation with some new growth.
1	119_19	3	2	BC	0.05	0	0.15	0	0.25	0.05	0.4	0.1	Site loacted along a section of a flooded shelf of a sidechannel with approximately 20% of the site dominated by flooded vegetation.
1	120_20	3	3	R	0.05	0	0.3	0.15	0.75	0.15	1.1	0.3	Site extends along a gravel and cobble dominated bar with no instream vegetation or woody debris. Cover provided by substrate exclusively.
1	121_21	3	4	FV	0.05	0	0.1	0	0.2	0	0.25	0	Site extends along a vegetated shoreline dominated by flooded dead grass that extends approx 6 m into the river.
1	122_22	3	5	BC	0.05	0	0.15	0	0.3	0	0.4	0	Site is dominated by poor quality habitat due to limited flow and likely low O2 concentrations.
1	123_23	3	6	IR	0.2	0	0.4	0.1	0.6	0.15	1	0.25	Site extends along an irregular shoreline with scallops throughout and is located downstream of a stream resulting in cooler temp. Small bay at downstream end of site contains 100% of the cover.
1	124_24	3	7	FV	0.1	0	0.3	0	0.8	0.1	1.3	0.2	Site is dominated by flooded vegetation (dead rushes) throughout.

APPENDIX 3
Photo Log

CD #	Image # (.jpg)	Reach	Site	Type	Water Depth and Velocity (estimated at reg. intervals from shore) 0 m Depth (m)	0 m V (m/s)	1 m Depth (m)	1 m V (m/s)	2 m Depth (m)	2 m V (m/s)	3 m Depth (m)	3 m V (m/s)	Comments
1	125_25	3	8	IR	0.05	0	0.2	0.05	0.4	0.15	0.75	0.3	Site extends along an irregular shoreline due to scallops and the occassional boulder outcrop.
1	126_26 127_27	3	9	R	0	0	0.2	0.1	0.6	0.2	1.2	1.3	Site extends along a gravel and cobble dominated bar with limited instream cover (10% of site has flooded vegetation). Low habitat complexity. Photo of adult cottus captured on site.
1	128_28	3	10	BC	0	0	0.15	0	0.3	0	0.5	0	Site located within a backwatered channel with no flow, abundant flooded vegetation (mostly dead) and exclusively fine substrates.
1	129_29	3	11	FV	0.05	0	0.1	0	0.15	0	0.3	0.05	Site is dominated by sedge and grass, which provides cover to approx 20% of the site. The substrate is exclusively fines.
1	130_30	3	12	R	0.05	0	0.2	0.05	0.3	0.1	0.6	0.15	Site extends along a regular shoreline with limited cover provided by willow and grass.
1	131_31	3	13	BC	0.05	0	0.35	0	0.5	0	0.7	0	Site is in a backwatered channel with no flow observed. Instream cover is provided to 10% of the site by willow.
1	132_32	3	14	IR	0.05	0	0.3	0.1	0.6	0.2	0.8	0.3	Site is located along a section of flooded shoreline with small scallops.
1	133_33 134_34	3	15	R	0	0	0.1	0	0.2	0	0.3	5	Site is located along a regular gravel bar with cover primarily associated with the larger substrate and the occassional willow. Picture of sockeye and chinook salmon capotured at site.
1	135_35	3	16	IR	0.05	0	0.5	0	0.7	0.2	1	0.3	Site extends along a section of irregular shoreline with frequent scallops. Fine substrate primarily a result of bank erosion.
1	101_1	4	1	IR	0.05	0	0.15	0	0.35	0.1	0.4	0.2	Site extends along a section of irregular shoreline with small scallops throughout.
1	102_2	4	2	FV	0.1	0	0.1	0	0.15	0	0.15	0	Site extends along a flooded bank dominated by horsetail and sedge.
1	103_3	4	3	BC	0.1	0	0.15	0	0.25	0	0.35	0	Site is located within a backwatered channel with no flow.
1	104_4	4	4	R	0.2	0.1	0.25	0.15	0.3	0.2	0.35	0.3	Site extends along a regular shoreline with no flooded vegetation or woody debris to provide cover. Low habitat complexity.
1	105_5	4	5	R	0.05	0.05	0.25	0.35	0.4	0.45	0.55	0.5	Site extends along a section of regular shoreline with a 2 m high bank. Flows are fast and deep and cover is provided by the large substrate predominantly.
1	106_6	4	6	IR	0.1	0	0.3	0.1	0.5	0.2	0.65	0.3	Site extends along a section of irregular shoreline with deep scallops that provide shelter from the main flows.
1	107_7	4	7	R	0.1	0.05	0.4	0.1	0.5	0.2	0.55	0.2	Site extends along a regular shoreline with no flooded vegetation or woody debris to provide cover. Low habitat complexity.
1	108_8	4	8	FV	0.1	0	0.25	0	0.3	0	0.35	0.05	Site extends along a flooded shoreline with abundant vegetation to provide cover. Substrates are primarily organic fines.
1	109_9	4	9	FV	0.15	0	0.25	0	0.3	0	0.4	0.05	Site extends along a flooded shoreline dominated by sedges and willow. vegetation is mostly dead with sparse new growth.

APPENDIX 3
Photo Log

CD #	Image # (.jpg)	Reach	Site	Type	Water Depth and Velocity (estimated at reg. intervals from shore)								Comments
					0 m		1 m		2 m		3 m		
					Depth (m)	V (m/s)	Depth (m)	V (m/s)	Depth (m)	V (m/s)	Depth (m)	V (m/s)	
1	110_10	4	10	BC	0.15	0	0.25	0	0.3	0	0.55	0	Site is a backwatered side channel with abundant vegetation throughout. No flow observed.
1	111_11	4	11	R	0	0	0.25	0	0.4	0.05	0.6	0.15	Site extends along a regular shoreline with limited cover provided by instream vegetation (approx 5% of site). Low habitat complexity.
1	112_12	4	12	IR	0	0	0.55	0.1	0.8	0.2	1.1	0.4	Site extends along an irregular shoreline with eroded banks forming scallops and pockets.
1	113_13	4	13	FV	0.05	0	0.15	0	0.3	0	0.6	0	Site extends along a shallow, flooded shoreline dominated by dense mats of sedges and grasses.
1	114_14	4	14	BC	0.05	0	0.2	0	0.4	0	0.9	0.15	Site is located in a backwatered side channel with approx 30% dominated by dead vegetation. No flow was observed.
1	115_15	4	15	BC	0.1	0	0.15	0	0.25	0	0.45	0	Site is located in a backwatered side channel with approx 30% dominated by dead vegetation. No flow was observed.
1	116_16	4	16	IR	0	0	0.4	0.1	0.9	0.2	1.1	0.3	Site extends along an irregular shoreline with small scallops and steep banks.
2	001_1	5	1	R	0	0	0.2	0	0.4	0.05	0.6	0.1	Site extends along a regular shoreline with fine substrates and cover provided to approx 20% by sedge.
2	002_2	5	2	FV	0	0	0.15	0	0.2	0	0.35	0.05	Site extends along a flooded vegetated shoreline dominated by sedges and willow and characterized by low velocity discharge and exclusively fine substrates.
2	003_3	5	3	FV	0.4	0.3	0.45	0.3	0.45	0.3	0.4	0.3	Site is a flooded mid-channel bar dominated by willows and grasses (provides cover to approx 30% of the site).
2	004_4	5	4	IR	0	0	0.2	0	0.35	0.05	0.55	0.15	Site is located within a shallow bay creating a back-eddy.
2	005_5	5	5	IR	0.1	0	0.4	0	0.8	0.1	1	0.2	Site extends along an irregular shoreline with small scallops throughout. Flooded vegetation provides cover to only 10% of the site.
2	006_6	5	6	FV	0.15	0	0.2	0.05	0.25	0.1	0.3	0.1	Site is located along a flooded sidebar dominated by willow, grass and dandelion.
2	007_7	5	7	BC	0	0	0.2	0	0.4	0.1	0.6	0.2	Site extends along a sidechannel in a bedrock channel. Cover is limited to the larger substrates (flooded vegetation provides cover to approx 5% of the site).
2	008_8	5	8	R	0	0	0.15	0	0.2	0.1	0.4	0.15	Site extends along a regular shoreline with trace cover provided by flooded vegetation (10% of the site).
2	009_9	5	9	R	0	0	0.2	0	0.4	0.1	0.6	0.2	Site extends along a regular shoreline with trace cover provided by flooded vegetation (10% of the site).
2	010_10	5	10	IR	0	0	0.15	0.1	0.3	0.2	0.5	0.4	Site extends along an irregular portion of shoreline dominated by small scallops. Cover is provided to approx 30% of the site by flooded vegetation.

APPENDIX 3
Photo Log

CD #	Image # (.jpg)	Reach	Site	Type	Water Depth and Velocity (estimated at reg. intervals from shore) 0 m Depth (m)	0 m V (m/s)	1 m Depth (m)	1 m V (m/s)	2 m Depth (m)	2 m V (m/s)	3 m Depth (m)	3 m V (m/s)	Comments
2	011_11	5	11	BC	0.2	0	0.3	0	0.4	0.1	0.4	0.1	Site is located in a sidechannel with dominated by flooded vegetation but lacking in habitat complexity.
2	012_12	5	12	BC	0.4	0	0.5	0.2	0.6	0.3	0.7	0.4	Site extends along a side channel with low habitat complexity and limited cover (flooded vegetation provides cover to approx 10% of the site).
2	013_13	5	13	BC	0.1	0	0.15	0.1	0.2	0.15	0.2	0.2	Site is located along a gravel sidechannel with low habitat complexity. Flooded vegetation (willows) provide cover to approx. 15% of the site.
2	014_14	5	14	IR	0.1	0	0.4	0	0.6	0.15	0.8	0.2	Site extends along an irregular shoreline dominated by small scallops but lacking in instream cover (flooded vegetation or small woody debris). The substrates are exclusively fines.
2	015_15	5	15	FV	0	0	0.2	0.1	0.3	0.2	0.5	0.8	Site extends along a flooded shoreline which is dominated by grass and willows.
2	016_16	5	16	R	0	0	0.15	0	0.25	0.1	0.4	0.15	Site extends along a regular shoreline that is lacking in cover (flooded vegetation provides cover to approx 30% of the site) and habitat complexity.
2	017_17	6	1	R	0	0	0.2	0.05	0.4	0.1	0.6	0.2	Site extends along a regular shoreline with flooded vegetation for cover (approx 60% of site), low habitat complexity and low discharge velocity.
2	018_18	6	2	FV	0	0	0.1	0	0.2	0.05	0.4	0.1	Site is dominated by thick flooded vegetation (sedge and grass) and has low discharge velocity and habitat complexity.
2	019_19	6	3	FV	0	0	0.3	0	0.6	0.05	0.8	0.1	Site is dominated by thick, flooded vegetation consisting of sedge, grass and willow. The substrates are exclusively fines and the site has low habitat complexity.
2	020_20	6	4	IR	0	0	0.3	0.05	0.5	0.1	0.9	0.2	Site extends along an irregular shoreline with the occasional shallow scallop. Approx 40% of the site is dominated by flooded vegetation and the substrates are exclusively fines.
2	021_21	6	5	R	0	0.1	0.2	0.3	0.3	0.5	0.5	0.5	Site extends along a regular shoreline dominated by cobble substrates. Cover is primarily provided by the cobbles with no flooded vegetation or woody debris within the site.
2	022_22	6	6	FV	0	0	0.1	0	0.2	0.5	0.4	0.1	Site is dominated by flooded vegetation (sedge and willow) with exclusively sand substrates.
2	023_23	6	7	R	0	0	0.1	0.5	0.2	0.1	0.4	0.2	Site extends along a regular shoreline with low habitat complexity and trace cover provided by flooded vegetation (5%) and cobble substrate (3%).
2	101_1	6	8	IR	0	0	0.1	0.1	0.3	0.4	0.5	0.5	Site is located along an irregular shoreline with cover provided by flooded vegetation (grass and willow).

APPENDIX 3
Photo Log

CD #	Image # (.jpg)	Reach	Site	Type	Water Depth and Velocity (estimated at reg. intervals from shore) 0 m Depth (m)	0 m V (m/s)	1 m Depth (m)	1 m V (m/s)	2 m Depth (m)	2 m V (m/s)	3 m Depth (m)	3 m V (m/s)	Comments
2	102_2	6	9	IR	0	0	0.2	0.2	0.4	0.3	0.8	0.4	Site extends along an irregular shoreline with small scallops as a result of the bank slumping. Trace cover is provided by grass, which cover approximately 5% of the site.
2	103_3	6	10	FV	0	0	0.2	0	0.5	0.05	0.7	0.1	Site is dominated by flooded vegetation (95% of site) with exclusively fine substrates and low discharge velocity.
2	104_4	6	11	IR	0	0.1	0.2	0.3	0.4	0.4	0.6	0.6	Site extends along an irregular shoreline with shallow scallops. Trace cover is provided by patches of flooded vegetation (approx 15% of the site).
2	105_5	6	12	BC	0.3	0.1	0.4	0.2	0.6	0.3	0.8	0.4	Site constists of a vegetated side channel with trace cover and moderate discharge volume.
2	106_6	6	13	BC	0.2	0	0.3	0.1	0.4	0.2	0.6	0.3	Site extends along a side channel with flooded willow and sedge vegetation. Trace cover with low habitat complexity and sand and silt dominated substrates.
2	123_25	6	14	BC	0	0	0.1	0	0.2	0	0.4	0.05	Site extends along side channel with abundant flooded vegetationetation, very low discharge and low habitat complexity.
2	124_26	6	15	BC	0	0	0.2	0	0.4	0	0.8	0.05	Site is backwatered and sedge and willow vegetation is flooded. Low velocity discharge and low habitat complexity within site.
2	107_09	6	16	R	0.3	0.1	0.4	0.2	0.6	0.3	0.7	0.3	Site extends along a regular cobble shoreline adjacent to flooded vegetation.
2	108_10	7	1	FV	0.1	0	0.2	0	0.25	0.1	0.3	0.15	Site extends along an irregular shoreline dominated by flooded rushes and grasses.
2	109_11	7	2	R	0	0	0.15	0	0.3	0.1	0.55	0.2	Site extends along side channel but habitat is more representative of a regular shoreline as the side channel is very large.
2	110_12	7	3	BC	0.15	0	0.25	0	0.3	0.1	0.4	0.1	Site contains poor salmonid habitat, vegetation was choked with algae and much. No flows and poor cover.
2	111_13	7	4	R	0	0	0.2	0.1	0.4	0.2	0.8	0.3	Site is located along a regular section of shoreline.
2	112_14	7	5	FV	0.2	0	0.2	0	0.4	0.1	0.6	0.2	Site extends along flood shoreline, dominated by grass and rushes.
2	113_15	7	6	BC	0	0	0.2	0	0.4	0	0.65	0	Site is located in an ancient side channel flooded by high flows and is dominated by rushes.
2	114_16	7	7	FV	0.15	0	0.3	0	0.6	0	0.75	0.1	Site extends along flooded shoreline which is vegetated with rushes and willows. Lack of velocity through vegetation provides marginal salmonid habitat.
2	115_17	7	8	IR	0	0	0.3	0	0.6	0.1	0.8	0.15	Site extends along irregular margin formed by slumping banks along a farmers field.
2	116_18	7	9	IR	0	0	0.2	0	0.35	0.15	0.6	0.3	Site extends along irregular margin formed by cattle impacts and slumping banks.
2	117_19	7	10	R	0	0	0.15	0	0.3	0.1	0.45	0.2	Site extends along an open shoreline impacted by cattle grazing, with no useable cover.

APPENDIX 3
Photo Log

CD #	Image # (.jpg)	Reach	Site	Type	Water Depth and Velocity (estimated at reg. intervals from shore) 0 m Depth (m)	0 m V (m/s)	1 m Depth (m)	1 m V (m/s)	2 m Depth (m)	2 m V (m/s)	3 m Depth (m)	3 m V (m/s)	Comments
2	118_20	7	11	BC	0	0	0.3	0	0.8	0.1	1.1	0.2	Site is located within a deep side channel with trace cover and limited flow.
2	119_21	7	12	R	0	0	0.2	0.1	0.6	0.2	0.8	0.4	Site extends along a bare gravel bar formed by Clukus Creek, however it lacks in cover or structural complexity.
2	120_22	7	13	IR	0	0	0.1	0	0.2	0.1	0.4	0.1	Site extends along irregular shoreling with limited cover. Little structure provided by small shallow bays.
2	121_23	7	14	BC	0.1	0	0.2	0	0.4	0	0.5	0	Site consits of a backwatered section with dense dead vegetation and no flow. Low value salmonid habitat.
2	122_24	7	15	FV	0.1	0	0.3	0	0.4	0	0.6	0.1	Site consits of flooded grasses and rushes with little flow through vegetation.
2	201_1	7	16	IR	0	0	0.3	0.1	0.7	0.2	1.1	0.2	Site extends along irregular vegetated point bar-like feature with small scallops. However, poor habitat lacking structure.
2	202_2	7	17	FV	0.1	0	0.25	0	0.5	0.1	0.65	0.1	Site is located downstream of Clukuz Creek and is dominated by flooded vegetation which provides cover. Little flow through vegetation.
2	203_3	7	18	FV	0.1	0	0.2	0.1	0.3	0.2	0.4	0.2	Site extends through flooded small willows and grasses which provide some cover. Flows are good throughout but no salmonids were captured.
2	204_4	7	19	R	0	0	0.15	20	0.4	0.4	0.7	0.5	Good flows occur within site, but low cover provided by grasses and lack of woody debris limit habitat value.
2	205_5	7	20	FV	0.1	0	0.2	0.1	0.3	0.1	0.4	0.1	Site extends through flooded grasses and willow which provide some cover. Trace flows and no habitat structure.

APPENDIX 4
Non-Game Fish Summary

Appendix 4
Non-Game Fish Summary

Reach	Site	Type	Margin	Pass	RSC "J"	RSC "A"	LSS "J"	LSS "A"	COTT "J"	COTT "A"	NPM "J"	NPM "A"	LNC "J"	LNC "A"	RMW "J"	RMW "A"	LPD "J"	LPD "A"	PCC "J"	Total Number
2	1	R	L																	
				1			2													2
2	2	FV	L																	
				1			1													1
				2																
				3													2			2
2	3	R	L																	
				1	1				1											2
2	4	BC	L																	
				1	4		12						1							17
				2	1		6													7
2	5	IR	R																	
				1																
				2			1													1
				3			1													1
2	6	BC	R																	
				1			4													4
				2			11										1			12
				3			3													3
2	7	IR	L																	
2	8	BC	L																	
				1															1	1
2	9	IR	R																	
2	10	FV	R																	
2	11	R	L																	
2	12	BC	L																	
				1	2		1													3
				2	17		8													25
2	13	IR	R																	
				2			1													1
2	14	R	L																	
				3									1							1
2	15	BC	R																	
				1	90		100												20	210
				2	45		56												10	111
				3	15		20													35
2	16	R	L																	
				1			11													11
				2			2						1							3
2	17	IR	R																	
2	18	BC	L																	
				1			4													4
				2	1		1		1											3
				3	2		4													6
2	19	IR	L																	
				1			2						1							3
				2	1		1													2

Appendix 4
Non-Game Fish Summary

Reach	Site	Type	Margin	Pass	RSC "J"	RSC "A"	LSS "J"	LSS "A"	COTT "J"	COTT "A"	NPM "J"	NPM "A"	LNC "J"	LNC "A"	RMW "J"	RMW "A"	LPD "J"	LPD "A"	PCC "J"	Total Number
2	20	R	R																	
				1									1							1
				2									1							1
2	21	R	R																	
2	22	BC	R																	
				1	15				1											16
				2	19			2											1	22
2	23	BC	R																	
				1	15		5												2	22
				2	359		31						2						24	416
				3	19														4	23
2	24	BC	R																	
				1	1								1							2
2	25	R	L																	
2	26	IR	R																	
				1	7		10													17
				2	6															6
				3	10															10
				4	5															5
2	27	FV	R																	
				1	11		6						1							18
				2	74		12													86
				3	3		2													5
2	28	FV	R																	
				1	3															3
				2	4		4													8
				3	7		5		1											13
				4	2		3													5
				5	1		1													2
2	29	FV	L																	
				1			3													3
				2	8		11										1			20
				3	9		10				1									20
				4	5		6													11
				5	6		3													9
2	30	IR	L																	
				1	8		7													15
2	31	IR	R																	
				1	1															1
				2			3		1											4
3	1	FV	R																	
				1	84		1				3									88
				2	41		2				2									45
				3	33	2	1				3									39
3	2	BC	R																	
				1	10		10				2		3				2			27
				2	4		3													7
				3	2	1							5				1			9

Appendix 4
Non-Game Fish Summary

Reach	Site	Type	Margin	Pass	RSC "J"	RSC "A"	LSS "J"	LSS "A"	COTT "J"	COTT "A"	NPM "J"	NPM "A"	LNC "J"	LNC "A"	RMW "J"	RMW "A"	LPD "J"	LPD "A"	PCC "J"	Total Number
3	3	R	R																	
				1	5	1			17				7					1		33
				2		1			2				2				2		1	8
3	4	FV	L																	
				1	41		5				1		3				13			63
				2	42		12						9				13			76
				3	23		8				5		3				19			58
3	5	BC	L																	
				1	3															3
3	6	IR	L																	
				1	2															2
				2	3												1		1	5
				3		1									1		1			3
				4	1	1														2
3	7	FV	L																	
				1	8	1	5						6							20
				2	3		3		1				6							13
				3	2				2				4				3			11
3	8	IR	L																	
				1	2						1		1		3		2			9
				2									7							7
				3									2							5
3	9	R	R																	
				1					5				6							11
				2					5	1	1		20		1					28
				3					1				9							10
3	10	BC	R																	
				1	58		6		1								1			66
				2	21		12				1		8				6			48
				3	41		6										6			53
3	11	FV	R																	
				1			1						1				1			3
				2							1		1				1			3
				3									3	1						4
				4	1															1
3	12	R	L																	
				1	3				5				8	1			2	1		20
				2	1						1		1							6
				3					1				2				1			4
3	13	BC	L																	
				1	8		15						16				12			51
				2	1		3						15				6			25
				3	1		4		1				3				9			
3	14	IR	L																	
				1					2	1	1		5							9
				2					2				12				2			16
				3	1				1		1		6							9

Appendix 4
Non-Game Fish Summary

Reach	Site	Type	Margin	Pass	RSC "J"	RSC "A"	LSS "J"	LSS "A"	COTT "J"	COTT "A"	NPM "J"	NPM "A"	LNC "J"	LNC "A"	RMW "J"	RMW "A"	LPD "J"	LPD "A"	PCC "J"	Total Number
3	15	R	R																	
				1									1							1
				2							1		2				3			6
3	16	IR	L																	
				1	9		4		3		23						2			41
				2	11				1	1	3		2				1			19
				3	2	1		3			3									9
4	1	IR	L																	
				1	7				1				4				2	1		15
				2																20
				3	2								3							5
				4	3								2							5
4	2	FV	L																	
				1	12		12				1						13			38
				2	12								3				3			18
				3	5		5						2				3			15
				4	2								1				1		1	5
4	3	BC	L																	
				1	113		91				32		35				20	1		192
				2	102		60		8		45		24				24	1		264
				3	32	1					13		17				8			71
4	4	R	L																	
				1									2							2
				2					4				2							6
				3									1							1
4	5	R	R																	
				1									3							3
				2									1							1
				3					1											1
				4									2							2
4	6	IR	R																	
				1	1						2		2					1		6
				2					1				9			1	2			13
4	7	R	R																	
				1	1								1							2
4	8	FV	R																	
				1			2				6		9				4	5		26
				2						1	1		5				3			10
				3	3				1		3		5				2			14
4	9	FV	L																	
				1	5		3		1		1						5	1		16
				2	5		1		2		1						11	5		
				3	2		3		2								6	4		
4	10	BC	R																	
				1	2		10				2									14
				2			7				1						7			15
				3			5		1		1		1							8

Appendix 4
Non-Game Fish Summary

Reach	Site	Type	Margin	Pass	RSC "J"	RSC "A"	LSS "J"	LSS "A"	COTT "J"	COTT "A"	NPM "J"	NPM "A"	LNC "J"	LNC "A"	RMW "J"	RMW "A"	LPD "J"	LPD "A"	PCC "J"	Total Number
4	11	R	L																	
				1	17								1				3			21
				2	2		2				1		5				5			15
				3									1							1
4	12	IR	L																	
4	13	FV	L																	
				1			10				4		1				2			17
				2			5				2		2				3			12
				3							1									1
4	14	BC	L																	
				1	3		5				2						2			12
				2	2	1	9				2						2			16
				3			1				3									4
4	15	BC	L																	
				1	25		15				25						5			70
				2	10						4		1				5			20
4	16	IR	L																	
				1					1											1
				2													1			1
5	1	R	L																	
				1	1				1		1						1			4
				2													2			2
				3	1															1
5	2	FV	L																	
				1					2											2
				2			1		1											2
				3									1							1
5	3	FV	MID																	
				1									5							5
				2									10							10
				3									3							3
5	4	IR	R																	
				1	2		2						3				2			9
				2									3				1			4
				3									2							2
				4	1		1		1				2							5
5	5	IR	L																	5
				1	1								7				2			10
				2	2															2
				3									2							2
				4					1											1
5	6	FV	L																	
				1					1								4			5
				3													1			1
				4			1													1
				6			1													1
				7			1													1

Appendix 4
Non-Game Fish Summary

Reach	Site	Type	Margin	Pass	RSC "J"	RSC "A"	LSS "J"	LSS "A"	COTT "J"	COTT "A"	NPM "J"	NPM "A"	LNC "J"	LNC "A"	RMW "J"	RMW "A"	LPD "J"	LPD "A"	PCC "J"	Total Number
5	7	BC	L																	
				1	1		2						10				12			25
				2			4				1		30				18	2		55
				3			3						15				8	3		29
				4			1						6				4	1		12
5	8	R	L																	
5	9	R	L																	
				1	1															1
				2	1															1
				4									1							1
5	10	IR	L																	
				1	1				1				1				2			5
				2	1						2		2				2			7
				3	1								2				1	1		5
				4	1								2				2			5
5	11	BC	R																	
				1			2						9				10	1		22
				2			2				1		3				2	2		10
				3									6					2		8
				4													1			1
				5			2						6							8
5	12	BC	L																	
				1									1				1			2
5	13	BC	MID																	
				1			1													1
				2	1								1				1			3
				3			4						2				1			7
5	14	IR	R																	
				1			3						15				6			24
				2									6	1			3			10
				3									7				4			11
5	15	FV	L																	
				1			2						2	1			2			7
				2									3				2			5
				4	2															2
				5									1							1
				6															1	1
5	16	R	L																	
				1	1								2				4			7
				2									8				2			10
				3									1							1
				4			1													1
6	1	R	L																	
				1	5								14				40	1		60
				2					1				5	2			18			26
				3									7				5			12

Appendix 4
Non-Game Fish Summary

Reach	Site	Type	Margin	Pass	RSC "J"	RSC "A"	LSS "J"	LSS "A"	COTT "J"	COTT "A"	NPM "J"	NPM "A"	LNC "J"	LNC "A"	RMW "J"	RMW "A"	LPD "J"	LPD "A"	PCC "J"	Total Number
6	2	FV	L																	
				1	200		15				400		12				60			687
				2	40		5				45						20			110
				3	20		3				18		6				25			72
				4	12		3				14		4				20			53
				5	5		2				3									10
6	3	FV	L																	
				1	8	1	15						6				17	10		57
				2	8				3		15						20			46
				3		1			1		2						7			11
				4													1			
				5							3		2	3			6			14
6	4	IR	L																	
				1			2						5				3			10
				2			2										2	1		5
				3													2			2
6	5	R	L																	
				1									4							4
				2									1							1
				3									1							1
6	6	FV	L																	
				1			2						2							4
				2	3								2				4			9
				3									3				3			6
				4									2				1			3
				5									1				1			2
6	7	R	L																	
				1									10				12			22
				2									4				4			8
				3									1				2			3
				4													5			5
6	8	IR	R																	
				1			1						15				1			17
				2									2				1			3
				3									6				1			7
				4									2							2
				5									2				1			3
6	9	IR	L																	
				1									6							6
				2									4							4
				3									1							1
				4									1							1
6	10	FV	L																	
				1	100		12				150		15				20			297
				2	80		12		3		70						10			175
				3	35		15				30						12			92
				4	5		6				7									18

Appendix 4
Non-Game Fish Summary

Reach	Site	Type	Margin	Pass	RSC "J"	RSC "A"	LSS "J"	LSS "A"	COTT "J"	COTT "A"	NPM "J"	NPM "A"	LNC "J"	LNC "A"	RMW "J"	RMW "A"	LPD "J"	LPD "A"	PCC "J"	Total Number
6	11	IR	L																	
				1	5								2				3			10
				2									3				1			4
				3													1			1
6	12	BC	L																	
				1													5	2		7
				2														2		2
6	13	BC	L																	
				1	20	12											3			35
6	14	BC	L																	
				1	120		80				5						20			225
6	15	BC	R																	
				1	28	3	10				4						4			49
6	16	R	L																	
				2					1											1
7	1	FV	L																	
				1	1		3										7			11
7	2	R	L																	
				1	9		2				1									12
				2	15						1						4			20
7	3	BC	L																	
				1	25		30				9						31	10		105
7	4	R	R																	
				1	6	2	1				8						1			18
				2	28	2	4		1		4									39
				3	6	8	3				4						4			25
				4							1						1			2
7	5	FV	L																	
				1	11		4				8						9			32
				2	22		10				5						8			45
				3	12		8				1						8			29
7	6	BC	L																	
				1	1															1
				2	2		2				1						1			6
				3	8		6				2						5			21
7	7	FV	L																	
				1	28		12										4			44
7	8	IR	L																	
				1	12				1				3				4			20
				2	11		4										2			17
				3	3															3
7	9	IR	L																	
				2							3						3			
				3	15		3				1						19			
				4	5												5			
7	10	R	L																	
				1	8		1				4						13			
				2	1												1			

Appendix 4
Non-Game Fish Summary

Reach	Site	Type	Margin	Pass	RSC "J"	RSC "A"	LSS "J"	LSS "A"	COTT "J"	COTT "A"	NPM "J"	NPM "A"	LNC "J"	LNC "A"	RMW "J"	RMW "A"	LPD "J"	LPD "A"	PCC "J"	Total Number
7	11	BC	R	1	6						4						2			12
7	12	R	R																	
7	13	IR	R	1	6						5		1				15			27
7	14	BC	R	1	18		2				16						20			56
7	15	FV	R	1	7		4				12						6			29
7	16	IR	L	1	36		2		1		18						11			68
7	17	FV	L	1	342		43				59						23			467
7	18	FV	R	1	17		5				8						8			38
7	19	R	L	1	46						19		57							122
7	20	FV	R	1	36		12				12						19			79
			Total		3068	40	1101	5	98	4	1184	0	726	9	5	1	952	59	66	7318

APPENDIX 5
Chinook and Sockeye Length and Weight Data

APPENDIX 5
Chinook and Salmon Length and Weight Data

Reach	Site	Type	Pass	CH 0+ length (mm)	CH 0+ weight (g)	SOCK 0+ length (mm)	SOCK 0+ weight (g)	CH 1+ length (mm)	CH 1+ weight (g)
2	1	R	2	39					
			2	34					
			2	36					
2	2	FV	1	38					
			1	35					
			2	36					
			2	35					
			3	37					
			3	38					
			3	37					
			3	39					
2	3	R	1	36					
			1	36					
			2	35					
			2	38					
			2	37					
			2	35					
			2	39					
			3	36		26			
			3	34					
2	5	IR	1	35					
			1	36					
			2	38					
			2	36					
			2	35					
			2	33					
			2	36					
			3	36		27			
			3	34					
			3	37					
			3	36					
			3	37					
			4	37					
2	6	BC	3	39					
2	7	IR	1	36					
			2	36					
			2	38					
			2	37					
			2	39					
			2	36					
			3	36					
			3	37					
2	9	IR	1	36					
			1	38					
			1	37					
			1	36					
			2	38					
			2	38					
			2	37					
			2	37					
			2	36					

APPENDIX 5
Chinook and Salmon Length and Weight Data

Reach	Site	Type	Pass	CH 0+ length (mm)	CH 0+ weight (g)	SOCK 0+ length (mm)	SOCK 0+ weight (g)	CH 1+ length (mm)	CH 1+ weight (g)
			2	35					
2	10	FV	1	38					
			1	34					
			1	38					
			1	39					
			1	37					
			1	37					
			1	37					
			2	35					
			2	38					
			2	40					
2	13	IR	1	38					
			1	38					
			1	36					
			1	37					
			1	39					
			1	34					
			2	39					
			2	37					
			2	38					
2	14	R	1	39					
			2	38					
			2	36					
			3	36					
			3	34					
			3	37					
			3	37					
			3	36					
2	15	BC	1	36					
			1	35					
			1	37					
			1	36					
			1	37					
			1	39					
			1	35					
			1	36					
			1	38					
			1	37					
2	16	R	1	38					
			1	38					
			2	37					
			2	34					
			2	35					
			3	37					
			3	36					
			3	36					
			4	40					
2	18	BC	1	36					
			1	37					
			2	36					
			3	36					

APPENDIX 5
Chinook and Salmon Length and Weight Data

Reach	Site	Type	Pass	CH 0+ length (mm)	CH 0+ weight (g)	SOCK 0+ length (mm)	SOCK 0+ weight (g)	CH 1+ length (mm)	CH 1+ weight (g)
2	19	IR	1	35					
			1	35					
2	20	R	1	38					
			1	39					
			2	36					
			2	34					
			2	39					
			2	36					
			2	40					
			3	40					
			3	35					
			3	36					
2	22	BC	1	36		30			
			1	39					
			1	34					
			1	36					
			2			30			
2	23	BC	1	41					
			1	35					
			1	37					
			1	36					
			1	36					
			1	39					
			1	39					
			1	37					
			2			29			
			2			28			
			2			29			
			2			26			
			2			27			
			2			27			
			2			28			
			2			28			
			2			30			
			2			29			
2	26	IR	1	37	0.37				
			1	37	0.37				
			1	34	0.26				
			1	37	0.4				
			1	36	0.41				
			1	35	0.32				
			2	36	0.36				
			2	36	0.34				
			2	35	0.32				
			2	38	0.42				
			3			27	0.12		
2	27	FV	1	36	0.31	28	0.129		
			1	37	0.32				
			1	36	0.34				
			1	37	0.32				
			1	37	0.35				

APPENDIX 5
Chinook and Salmon Length and Weight Data

Reach	Site	Type	Pass	CH 0+ length (mm)	CH 0+ weight (g)	SOCK 0+ length (mm)	SOCK 0+ weight (g)	CH 1+ length (mm)	CH 1+ weight (g)
			1	38	0.4				
			1	36	0.36				
			1	38	0.46				
			1	37	0.37				
			1	37	0.36				
			2			27	0.12		
			2			29	0.17		
2	28	FV	1	38	0.38				
			1	40	0.47				
			1	35	0.28				
			1	38	0.4				
			1	38	0.39				
			1	37	0.3				
			2	38	0.42	28	0.12		
			2	34	0.28				
			2	37	0.35				
			2	34	0.29				
2	29	FV	1	35					
			1	38					
			1	39					
			1	38					
			1	37					
			1	36					
			1	41					
			1	39					
			1	37					
			1	38					
			3			28	0.14		
			5			29	0.15		
2	31	IR	1	39	0.41	25	0.14		
			1	35	0.32				
			1	36	0.37				
			1	37	0.41				
			1	38	0.41				
			1	36	0.36				
			1	37	0.38				
			1	36	0.32				
			2	37	0.36				
			2	35	0.31				
3	1	FV	1	37	0.45	26	0.13		
			1	37	0.49				
			1	36	0.39				
			1	37	0.53				
			1	38	0.53				
			1	36	0.41				
			1	37	0.5				
			1	39	0.59				
			1	36	0.38				
			1	35	0.41				
			3			26	0.12		
3	2	BC	1	36	0.41	25	0.11		

APPENDIX 5
Chinook and Salmon Length and Weight Data

Reach	Site	Type	Pass	CH 0+ length (mm)	CH 0+ weight (g)	SOCK 0+ length (mm)	SOCK 0+ weight (g)	CH 1+ length (mm)	CH 1+ weight (g)
			1	37	0.44	27	0.14		
			1	38	0.56				
			1	35	0.37				
			1	34	0.42				
			1	38	0.44				
			1	38	0.5				
			1	40	0.68				
			1	35	0.38				
			1	36	0.42				
			2			25	0.12		
			2			27	0.15		
			2			25	0.11		
3	3	R	1	37	0.42				
			1	35	0.33				
			1	38	0.47				
			1	39	0.52				
			1	36	0.42				
			1	35	0.37				
			1	33	0.3				
			1	38	0.51				
			1	34	0.31				
			1	36	0.38				
3	4	FV	1	36	0.42	29	0.17		
			1	35	0.4	26	0.1		
			1	36	0.42				
			1	35	0.37				
			2	38	0.47	27	0.15		
			2	37	0.51	25	0.12		
			2	36	0.42	28	0.16		
			2	37	0.42	28	0.17		
			2	36	0.39	26	0.13		
			2	37	0.48	28	0.16		
			3			26	0.14		
			3			25	0.12		
3	6	IR	1	37	0.43	27	0.14		
			1	37	0.48				
			1	38	0.44				
			1	40	0.61				
			1	36	0.45				
			1	37	0.41				
			1	38	0.55				
			1	39	0.52				
			1	35	0.38				
			1	37	0.41				
3	7	FV	1	40	0.66				
			1	37	0.43				
			1	37	0.43				
			1	35	0.45				
			1	33	0.33				
			1	35	0.47				
			1	39	0.53				

APPENDIX 5
Chinook and Salmon Length and Weight Data

Reach	Site	Type	Pass	CH 0+ length (mm)	CH 0+ weight (g)	SOCK 0+ length (mm)	SOCK 0+ weight (g)	CH 1+ length (mm)	CH 1+ weight (g)
			1	35	0.4				
			1	33	0.31				
			1	36	0.39				
			2			26	0.15		
			2			27			
			3			28	0.15		
3	8	IR	1	37	0.51			96	8.75
			1	38	0.49				
			1	40	0.63				
			1	36	0.4				
			1	30	0.28				
			1	35	0.33				
			1	37	0.49				
			1	37	0.45				
			1	41	0.37				
			1	37	0.4				
			2					92	9.21
3	9	R	1	42	0.73				
			1	37	0.46				
			1	40	0.53				
			1	38	0.52				
			1	35	0.35				
			1	38	0.45				
			1	39	0.48				
			1	37	0.42				
			1	40	0.6				
			1	35	0.37				
3	10	BC	1	42					
			1	38					
			1	38					
			1	35					
			1	38					
			1	38					
			1	36					
			1	39					
			1	35					
			1	34					
			3			26	0.12		
			3			26	0.14		
3	11	FV	1	36	0.38				
			1	37	0.49				
			1	36	0.55				
			1	34	0.36				
			1	38	0.5				
			1	38	0.5				
			1	35	0.35				
			1	36	0.41				
			1	38	0.5				
			1	37	0.44				
3	12	R	1	37	0.42				
			1	44	0.85				

APPENDIX 5
Chinook and Salmon Length and Weight Data

Reach	Site	Type	Pass	CH 0+ length (mm)	CH 0+ weight (g)	SOCK 0+ length (mm)	SOCK 0+ weight (g)	CH 1+ length (mm)	CH 1+ weight (g)
			1	39	0.53				
			1	38	0.42				
			1	43	0.88				
			1	33	0.29				
			1	36	0.38				
			1	34	0.35				
			1	42	0.64				
			1	34					
3	13	BC	1	39	0.6	26	0.13		
			1	36	0.35				
			1	38	0.43				
			1	35	0.32				
			1	35	0.38				
			1	38	0.42				
			1	36	0.39				
			1	38	0.5				
			1	36	0.46				
			1	38	0.48				
3	14	IR	1	37	0.43				
			1	36	0.4				
			1	36	0.44				
			1	35	0.33				
			1	35	0.43				
			1	35	0.31				
			1	38	0.45				
			1	39	0.56				
			1	38	0.46				
			1	35	0.4				
3	15	R	1	38	0.54	27	0.13		
			1	37	0.5	28	0.14		
			1	38	0.45				
			1	35	0.36				
			1	34	0.26				
			1	38	0.33				
			1	38	0.34				
			1	36	0.38				
			1	37	0.4				
			2	38	0.42	27	0.13		
			2			28	0.16		
			2			25	0.48		
			3			28	0.18		
			3			30	0.16		
			3			26	0.14		
3	16	IR	1	43	0.79	29	0.19		
			1	38	0.49				
			1	40	0.65				
			1	38	0.47				
			1	38	0.48				
			1	39	0.56				
			1	34	0.34				
			1	39	0.52				

APPENDIX 5
Chinook and Salmon Length and Weight Data

Reach	Site	Type	Pass	CH 0+ length (mm)	CH 0+ weight (g)	SOCK 0+ length (mm)	SOCK 0+ weight (g)	CH 1+ length (mm)	CH 1+ weight (g)
			1	38	0.49				
			1	38	0.42				
4	1	IR	1	35	0.38	30	0.18	112	17.33
			1	37	0.51				
			1	41	0.77				
			1	38	0.49				
			1	37	0.43				
			1	37	0.43				
			1	38	0.62				
			1	34	0.39				
			1	34	0.37				
			1	36	0.4				
4	2	FV	1	37	0.45	29	0.21		
			1	35	0.36				
			1	35	0.36				
			1	36	0.5				
			1	36	0.4				
			1	34	0.31				
			1	37	0.42				
			1	36	0.36				
			1	39	0.59				
			1	37	0.45				
4	3	BC	1	40	0.57	27	0.13		
			1	38	0.43				
			1	38	0.51				
			1	37	0.36				
			1	38	0.42				
			1	35	0.39				
			1	37	0.5				
			1	36	0.51				
			1	36	0.52				
			1	38	0.46				
			2			29	0.17		
			2			28	0.13		
4	4	R	1	37	0.39	26	0.14		
			1	36	0.33				
			2	35	0.37				
			2	36	0.36				
			2	37	0.51				
			2	33	0.29				
			2	36	0.42				
			2	36	0.41				
			2	37	0.49				
4	5	R	1	34	0.36				
			1	38	0.49				
			1	36	0.42				
			1	36	0.42				
			2	36	0.43				
			2	34	0.32				
			3	36	0.46				
			3	34	0.33				

APPENDIX 5
Chinook and Salmon Length and Weight Data

Reach	Site	Type	Pass	CH 0+ length (mm)	CH 0+ weight (g)	SOCK 0+ length (mm)	SOCK 0+ weight (g)	CH 1+ length (mm)	CH 1+ weight (g)
			4	37					
4	6	IR	1	42	0.78				
			1	39	0.59				
			1	38	0.58				
			1	38	0.54				
			1	36	0.36				
			1	34	0.29				
			1	41	0.7				
			1	36	0.48				
			1	40	0.78				
			1	37					
			2			28	0.13		
4	7	R	1	43	0.79				
			2	37	0.48				
			2	36	0.41				
			2	35	0.32				
			2	39	0.64				
			2	37	0.341				
			2	35	0.38				
			3	36	0.38				
4	8	FV	1	37	0.37	27	0.13		
			1	35	0.38	24	0.14		
			1	37	0.49				
			1	38	0.64				
			1	32	0.26				
			1	33	0.24				
			1	40	0.58				
			1	37	0.45				
			1	39	0.68				
			1	36	0.38				
			2			26	0.09		
4	9	FV	1	46	1.1				
			1	42	0.86				
			1	38	0.6				
			1	37	0.41				
			1	38	0.47				
			1	34	0.39				
			1	39	0.66				
			1	39	0.67				
			1	38	0.51				
			1	35	0.42				
			2			27	0.13		
4	10	BC	1	37	0.43				
			1	37	0.41				
			1	34	0.26				
			1	36	0.41				
			1	35	0.39				
			1	36	0.49				
			1	41	0.74				
			1	40	0.54				
			1	38	0.48				

APPENDIX 5
Chinook and Salmon Length and Weight Data

Reach	Site	Type	Pass	CH 0+ length (mm)	CH 0+ weight (g)	SOCK 0+ length (mm)	SOCK 0+ weight (g)	CH 1+ length (mm)	CH 1+ weight (g)
			1	36	0.38				
4	11	R	1	34	0.4				
			1	33	0.38				
			1	36	0.34				
			1	34	0.34				
			1	41	0.69				
			1	36	0.44				
			1	39	0.66				
			1	36	0.42				
			1	36	0.4				
			1	31	0.24				
4	12	IR	1	33	0.28	24	0.15		
			1	36	0.38				
			1	37	0.43				
			1	38	0.56				
			1	35	0.35				
			2	34	0.39				
			2	33	0.4				
			2	33	0.36				
			2	34	0.38				
			2	36	0.25				
4	13	FV	1	33	0.28				
			1	37	0.46				
			1	36	0.36				
			1	37	0.37				
			1	34	0.33				
			2	36	0.36	26	0.1		
			2	38	0.51				
			2	36	0.42				
			3	33	0.29				
4	14	BC	1	38	0.64				
			1	39	0.45				
			1	36	0.39				
			1	36	0.43				
			1	37	0.36				
			1	36	0.42				
			1	39	0.48				
			1	36	0.42				
			1	35	0.29				
			1	32	0.28				
4	15	BC	1	37	0.41				
4	16	IR	1	37	0.43				
			1	39	0.46				
			1	37	0.43				
			1	38	0.48				
			1	38	0.53				
			1	39	0.59				
			1	38	0.46				
			1	40	0.63				
			1	34	0.32				
			1	35	0.46				

APPENDIX 5
Chinook and Salmon Length and Weight Data

Reach	Site	Type	Pass	CH 0+ length (mm)	CH 0+ weight (g)	SOCK 0+ length (mm)	SOCK 0+ weight (g)	CH 1+ length (mm)	CH 1+ weight (g)
5	1	R	1	37	0.5	30	0.17		
			1	37	0.55	29	0.18		
			1			28	0.15		
			1			28	0.2		
			1			29	0.16		
			1			30	0.18		
			1			26	0.13		
			1			27	0.14		
			1			29	0.21		
			1			30	0.18		
			2	38	0.53				
			2	36	0.45				
			2	38	0.53				
			2	40	0.6				
			3	37	0.44				
			3	34	0.38				
5	2	FV	1	42	0.69	28	0.16		
			1			27	0.13		
			1			29	0.14		
			2	33	0.37				
			2	42	0.68				
			2	42	0.84				
			2	35	0.38				
			3	37	0.48				
			3	31	0.19				
			3	39	0.62				
5	3	FV	1	40	0.6	30	0.16		
			1	46	1.08	30	0.18		
			1	40	0.59	27	0.12		
			1	37	0.52	29	0.16		
			1	41	0.69				
			1	40	0.61				
			1	45	1.06				
			1	39	0.59				
			1	42	0.8				
			1	38	0.62				
			2			27	0.13		
			2			30	0.18		
			2			29	0.14		
			3			27	0.15		
			3			29	0.18		
			3			30	0.17		
5	4	IR	1	41	0.65	30	0.18		
			1	40	0.69	27	0.15		
			1	37	0.43	28	0.14		
			1	38	0.6	29	0.17		
			1	42	0.75	28	0.16		
			1	37	0.62				
			1	36	0.39				
			1	37	0.45				
			1	46	1.01				

APPENDIX 5
Chinook and Salmon Length and Weight Data

Reach	Site	Type	Pass	CH 0+ length (mm)	CH 0+ weight (g)	SOCK 0+ length (mm)	SOCK 0+ weight (g)	CH 1+ length (mm)	CH 1+ weight (g)
			1	39	0.68				
			2			26	0.14		
			2			29	0.2		
			2			28	0.1		
			3			28	0.13		
			3			26	0.13		
5	5	IR	1	38	0.51	28	0.14		
			1	34	0.39	27	0.13		
			1	39	0.62	27	0.15		
			1	37	0.55	27	0.15		
			1	43	0.87	28	0.16		
			1	39	0.56	27	0.12		
			1	35	0.47	28	0.16		
			1	44	0.95	27	0.14		
			1	36	0.39	28	0.16		
			1	40	0.6	27	0.13		
5	6	FV	1	33	0.34	30	0.17		
			1	38	0.63	28	0.18		
			1			30			
			2	32	0.26				
			2	42	0.81				
			2	38	0.53				
			3	42	0.72	30	0.17		
			3	40	0.7	28	0.15		
			3	39	0.56				
			3	36	0.42				
			3	38	0.53				
			4			31	0.2		
			4			30	0.18		
			4			28	0.19		
			5			28	0.2		
			5			28	0.2		
5	7	BC	1	38	0.46	28	0.2		
			1	41	0.66	27	0.14		
			1	36	0.51	30	0.2		
			1	44	0.88	28	0.19		
			1			30	0.24		
			1			29	0.18		
			1			30	0.19		
			1			28	0.18		
			1			28	0.19		
			2	47	1.08	27	0.15		
			2	38	0.48				
			2	41	0.8				
			2	40	0.6				
			2	39	0.68				
			2	42	0.76				
5	8	R	1			27	0.18		
			1			27	0.18		
			1			28	0.15		
			1			28	0.18		

APPENDIX 5
Chinook and Salmon Length and Weight Data

Reach	Site	Type	Pass	CH 0+ length (mm)	CH 0+ weight (g)	SOCK 0+ length (mm)	SOCK 0+ weight (g)	CH 1+ length (mm)	CH 1+ weight (g)
			1			27	0.18		
			1			27	0.13		
			1			27	0.16		
			1			27	0.19		
			1			27	0.17		
			1			29	0.2		
5	9	R	1	43	0.9	28	0.18		
			1	34	0.38				
			2	41	0.68	27	0.17		
			2			28	0.18		
			3	37	0.58				
5	10	IR	1	43	0.87	28	0.18		
			1	33	0.3				
			1	41	0.89				
			1	43	0.97				
			1	38	0.52				
			1	40	0.75				
			1	40	0.61				
			1	37	0.46				
			1	41	0.81				
			1	38	0.52				
			2			29	0.19		
			2			28	0.18		
			2			29	0.16		
			2			28	0.16		
			2			29	0.17		
5	11	BC	1	42	0.66				
			1	41	0.8				
			1	52	1.55				
			1	40	0.72				
			1	35	0.45				
			1	44	1.06				
			1	43	0.92				
			1	38	0.61				
			1	41	0.84				
			1	40	0.76				
5	13	BC	1	43	0.92	28	0.18		
			1	37	0.49	27	0.14		
			1	33	0.35	28	0.19		
			1	41	0.81	27	0.14		
			1	33	0.32	29	0.19		
			1	36	0.4	29	0.19		
			1	41	0.75	30	0.21		
			1	39	0.58	27	0.18		
			1	43	0.85	30	0.19		
			1	46	1.08	28	0.17		
5	14	IR	1	52	1.53				
			1	40	0.73				
			1	41	0.65				
			1	35	0.38				

APPENDIX 5
Chinook and Salmon Length and Weight Data

Reach	Site	Type	Pass	CH 0+ length (mm)	CH 0+ weight (g)	SOCK 0+ length (mm)	SOCK 0+ weight (g)	CH 1+ length (mm)	CH 1+ weight (g)
			1	41	0.56				
			1	43	0.91				
			1	39	0.56				
			1	58	0.6				
			1	40	0.61				
			1	39	0.58				
5	15	FV	1	33	0.32	30	0.21		
			1	43	0.92	28	0.19		
			1	38	0.58	27	0.15		
			1	40	0.67	29	0.22		
			1			29	0.18		
			1			27	0.15		
			2	32	0.28	28	0.19		
			2			28	0.19		
			3	42	0.91				
			3	38	0.57				
			4	33	0.33				
			4	41	0.68				
5	16	R	1	37	0.45	26	0.16		
			1	38	0.57	26	0.1		
			1	36	0.38				
			1	41	0.81				
			1	37	0.48				
			1	36	0.43				
			1	38	0.37				
			1	33	0.38				
			1	34	0.37				
			1	37	0.54				
			2			21	0.15		
			3			29	0.19		
			3			28	0.16		
			3			27	0.16		
			3			30	0.21		
			3			28	0.17		
			3			26	0.14		
			3			28	0.16		
6	1	R	1	41	0.62	33	0.32		
			1	40	0.59	29	0.22		
			1	39	0.6	30	0.21		
			1	43	0.75	30	0.22		
			1	39	0.5	31	0.22		
			1	33	0.29	29	0.19		
			1	44	0.82	29	0.16		
			1	39	0.48	27	0.14		
			1	40	0.56	29	0.17		
			1	37	0.43	29	0.17		
6	2	FV	1	39	0.53	29	0.19		
			1	39	0.51	30	0.2		
			1	38	0.52	27	0.13		
			1	41	0.66				
			1	38	0.46				

APPENDIX 5
Chinook and Salmon Length and Weight Data

Reach	Site	Type	Pass	CH 0+ length (mm)	CH 0+ weight (g)	SOCK 0+ length (mm)	SOCK 0+ weight (g)	CH 1+ length (mm)	CH 1+ weight (g)
			1	40	0.53				
			1	41	0.68				
			1	41	0.65				
			1	40	0.57				
			1	37	0.45				
			2			29	0.19		
			2			27	0.15		
6	3	FV	1	47	0.94	29	0.21		
			1	38	0.49	28	0.17		
			1	39	0.58	31	0.26		
			1	42	0.81	31	0.27		
			1	39	0.58	28	0.17		
			1	39	0.56	30	0.2		
			1	38	0.57	31	0.25		
			1	38	0.59	28	0.2		
			1	39	0.57	27	0.16		
			1	43	0.8				
6	4	IR	1	41	0.61	29	0.17		
			1	44	0.79	28	0.14		
			1	38	0.54	29	0.16		
			1	38	0.49	30	0.17		
			1	38	0.5	27	0.14		
			1	39	0.61	29	0.19		
			1	39	0.5	30	0.19		
			1	36	0.44	27	0.14		
			1	36	0.42	28	0.22		
			1	35	0.34	28	0.14		
6	5	R	1	44	0.91	30	0.19		
			1	38	0.47				
			1	39	0.59				
			1	37	0.55				
			1	41	0.37				
			1	43	0.91				
			1	45	0.91				
			1	40	0.68				
			2	43	0.78				
			2	35	0.33				
6	6	FV	1	40	0.57	27	0.13		
			1	44	0.88	30	0.17		
			1	41	0.66	28	0.17		
			1	40	0.57	27	0.17		
			1	48	1.11	33	0.3		
			1	39	0.55	27	0.16		
			1	41	0.66	27	0.15		
			1	35	0.43	30	0.2		
			1			31	0.26		
			2	41	0.63				
			2	28	0.47				
6	7	R	1	38	0.46	27	0.19		
			1	39	0.54	30	0.21		
			1			29	0.2		

APPENDIX 5
Chinook and Salmon Length and Weight Data

Reach	Site	Type	Pass	CH 0+ length (mm)	CH 0+ weight (g)	SOCK 0+ length (mm)	SOCK 0+ weight (g)	CH 1+ length (mm)	CH 1+ weight (g)
			1			29	0.2		
			1			29	0.19		
			1			26	0.13		
			1			26	0.24		
			1			29	0.21		
			1			29	0.14		
			1			26	0.1		
			2	45	0.98				
			2	37	0.46				
			2	42	0.73				
			3	41	0.69				
			3	36	0.41				
			3	36	0.37				
			3	35	0.36				
			3	36	0.39				
6	8	IR	1	44	0.91	28	0.18		
			1	41	0.69	33	0.28		
			1	42	0.78	29	0.19		
			1	42	0.8	29	0.18		
			1	39	0.7	29	0.19		
			1	45	1.01	32	0.25		
			1	42	0.71	30	0.17		
			1	43	0.8	29	0.21		
			1	43	0.8	28	0.18		
			1	44	0.94	27	0.12		
6	9	IR	1	36	0.48	33	0.29		
			1	40	0.59	27	0.19		
			1	34	0.35	32	0.26		
			1	35	0.38				
			1	39	0.59				
			1	40	0.65				
			1	35	0.37				
			1	39	0.68				
			1	34	0.41				
			1	35	0.38				
6	10	FV	1	35	0.4	31	0.23		
			1	37	0.57	31	0.21		
			1	36	0.49	32	0.23		
			1	43	0.86	29	0.19		
			1	37	0.5	31	0.21		
			1	42	0.8	30	0.21		
			1	36	0.52	31	0.21		
			1	37	0.58	29	0.21		
			1	37	0.53	27	0.19		
			1	38	0.62	28	0.17		
6	11	IR	1	38	0.58	29	0.18		
			1	47	0.93	27	0.19		
			1	42	0.8	28	0.16		
			1	42	0.82	29	0.17		
			1	36	0.55	30	0.24		
			1	44	0.92	29	0.2		

APPENDIX 5
Chinook and Salmon Length and Weight Data

Reach	Site	Type	Pass	CH 0+ length (mm)	CH 0+ weight (g)	SOCK 0+ length (mm)	SOCK 0+ weight (g)	CH 1+ length (mm)	CH 1+ weight (g)
			1	41	0.72	29	0.18		
			1	34	0.39	29	0.18		
			1			27	0.14		
			1			28	0.15		
			2	36	0.44				
			2	37	0.48				
6	12	BC	1	43	0.77				
			1	38	0.58				
6	14	BC	1			29	0.21		
			1			28	0.23		
			1			28	0.23		
			1			30	0.27		
			1			31	0.26		
			1			28	0.19		
			1			29	0.21		
			1			29	0.2		
			1			30	0.23		
			1			22	0.28		
6	15	BC	1			27	0.18		
			1			29	0.22		
6	16	R	1	49	1.5				
			1	50	1.42				
			1	43	0.86				
			1	42	0.8				
			2	50	1.42				
7	1	FV	1			31	0.21		
			1			29	0.2		
			1			28	0.14		
			1			28	0.17		
			1			29	0.18		
			1			31	0.25		
7	2	R	1	45	0.77	29	0.22		
7	4	R	1	38	0.53	31	0.2		
			1	42	0.73	33	0.3		
			1	40	0.72	30	0.21		
			1	45	0.87	31	0.19		
			1	37	0.49	32	0.2		
			1	39	0.55	29	0.19		
			1	45	0.95	33	0.25		
			1	43	0.83	32	0.15		
			1	44	0.87				
			1	43	0.88				
			2			31	0.21		
			2			27	0.14		
7	5	FV	1	36	0.53	32	0.25		
			1	52	1.72	27	0.2		
			1	42	0.9	28	0.18		
			1	40	0.64	30	0.27		
			1	45	1	28	0.18		
			1	38	0.57	30	0.22		
			1	41	0.71	31	0.26		

APPENDIX 5
Chinook and Salmon Length and Weight Data

Reach	Site	Type	Pass	CH 0+ length (mm)	CH 0+ weight (g)	SOCK 0+ length (mm)	SOCK 0+ weight (g)	CH 1+ length (mm)	CH 1+ weight (g)
			1	41	0.69	29	0.24		
			1	35	0.43	29	0.17		
			1	44	0.92	29	0.2		
7	6	BC	1	38	0.51	30	0.23		
			2	41	0.63	29	0.21		
			2	41	0.64	31	0.26		
			2	48	1.33	35	0.3		
			2	45	0.94				
			2	40	0.62				
			2	38	0.53				
			2	46	1.12				
			2	45	0.96				
			2	46	1.01				
7	7	FV	1			27	0.17		
			1			30	0.23		
			1			31	0.21		
7	8	IR	1	45	0.98	31	0.2		
			1	52	1.66	31	0.22		
			1	44	0.97	28	0.13		
			1	46	0.97	29	0.21		
			1	38	0.6	30	0.26		
			1	46	1.13	28	0.19		
			1	39	0.51	30	0.21		
			1	40	0.64	28	0.16		
			1	42	0.65	28	0.16		
			1	42	0.8	29	0.15		
7	9	IR	1	41	0.75				
			1	42	0.78				
			1	46	1.02				
			1	38	0.59				
			2	43	0.87				
			3	44	0.89	31	0.26		
			3	40	0.73				
			4	43	0.82				
7	10	R	1	42	0.77				
			1	45	1				
			1	44	0.93				
			1	42	0.74				
			1	55	1.89				
7	13	IR	1			29	0.23		
			1			31	0.31		
			1			28	0.14		
			1			30	0.22		
			1			30	0.2		
			1			30	0.25		