

BLIND CREEK CHINOOK SALMON ENUMERATION WEIR, 2008

CRE-37-08

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Restoration and Enhancement Fund

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ABSTRACT

In 2008, a weir was installed and operated in Blind Creek to enumerate and sample Chinook salmon returns. Chinook escapements to Blind Creek have been recorded from weir operations in 1995, 1997-1999 and 2003-2007. This was the sixth consecutive year that weir operations have been funded by the Yukon River Panel Restoration & Enhancement Fund. Camp set-up began on July 16; however, installation of the weir was delayed until July 25 because of unusually high water conditions. The weir was placed in the same general area as previous years, approximately 1 km upstream of the confluence with the Pelly River. The first fish passed through the counting chamber on July 28. In total, 276 Chinook salmon were counted between July 25 and August 19. Fifty percent of the run had passed through by August 12 and 90% by August 17. A total of 191 Chinook salmon (69% of the run) was sampled randomly throughout the weir operation. Of these, 88 (46%) were females and 103 (54%) were males. Jacks comprised 10% of the males sampled. The mean fork length of females and males sampled was 837 mm and 773 mm, respectively. Age data was determined from 146 Chinook sampled. Of these, age 5 and age 6 fish were the predominant age classes at 47.9% and 37.0%, respectively. Age 4 and age 7 fish represented 10.3% and 4.8%, respectively. Tissue samples for DNA analysis were collected from 25 of the fish sampled. This brings the total number of DNA samples that have been collected at the weir since 2003 to 304, which is currently a sufficient sample size for genetic identification of the Blind Creek Chinook stock. A total of six spaghetti tags was observed and retrieved. The proximity of the weir operation to the Town of Faro has provided an opportunity for salmon viewing and increasing awareness of the salmon resource. At least 40 people visited the weir during the course of operations this year.

INTRODUCTION

Blind Creek is one of the major Chinook salmon spawning tributaries of the Pelly River in the Upper Yukon River drainage. Chinook escapements to Blind Creek have been recorded from weir operations in 1995, 1997-1999 and 2003-2007¹. Based on escapements in these years², Blind Creek supports an average run size of 722 Chinook with annual returns ranging from 304 (2007) to 1,155 (2003). Since there is very little quantitative information available for the Pelly River drainage, annual weir counts in Blind Creek provide a valuable index for the estimation of total Chinook escapements in the drainage.

In addition to escapement enumeration, information on the biological characteristics of the run has been obtained from Chinook live sampled at the weir since 2003, including age, sex, length (ASL) data and genetic material. ASL data provides fisheries managers with information for constructing brood year tables that are used for making future run projections. Through analysis of DNA material, scientists are able to identify the genetic markers which could be used to identify Pelly River Chinook salmon in the Yukon River mixed stock fisheries and enable managers to estimate timing of entry and run-timing patterns.

The proximity of the weir operation to the Town of Faro has also provided an opportunity for salmon viewing and increasing awareness of the salmon resource. The weir site is located approximately 10 km from the Town of Faro and is accessible to the public along a maintained mining road (Blind Creek Road). Since 2003, a considerable number of tourists as well as local people have stopped to view the weir operation and a great deal of interest has been shown in salmon and the enumeration project.

This report provides a summary of the Blind Creek weir operations in 2008. This was the sixth consecutive year that weir operations have been funded by the Yukon River Panel Restoration & Enhancement Fund.

STUDY AREA

Blind Creek flows in a southwesterly direction from its headwaters in the Anvil Range into the Pelly River, approximately 10 km southeast of the Town of Faro (Figure 1). The creek and its tributaries drain an area of approximately 618 km². Major lake systems in the drainage basin include the Blind Lake and Swim Lake chains. A mining access road from the Town of Faro crosses the creek at two locations, approximately 2 km (lower bridge) and 3 km (upper bridge) upstream of its confluence with the Pelly River. The weir site is located approximately 1 km upstream of the creek mouth and 30 m downstream of the lower bridge crossing.

¹ Counts from weir operations in 1996 and 2000 were not reported and the weir was not operated in 2001 and 2002.

² Later installation dates in 1997, 1998 and 1999 may have resulted in early run fish being missed (Appendix 3).

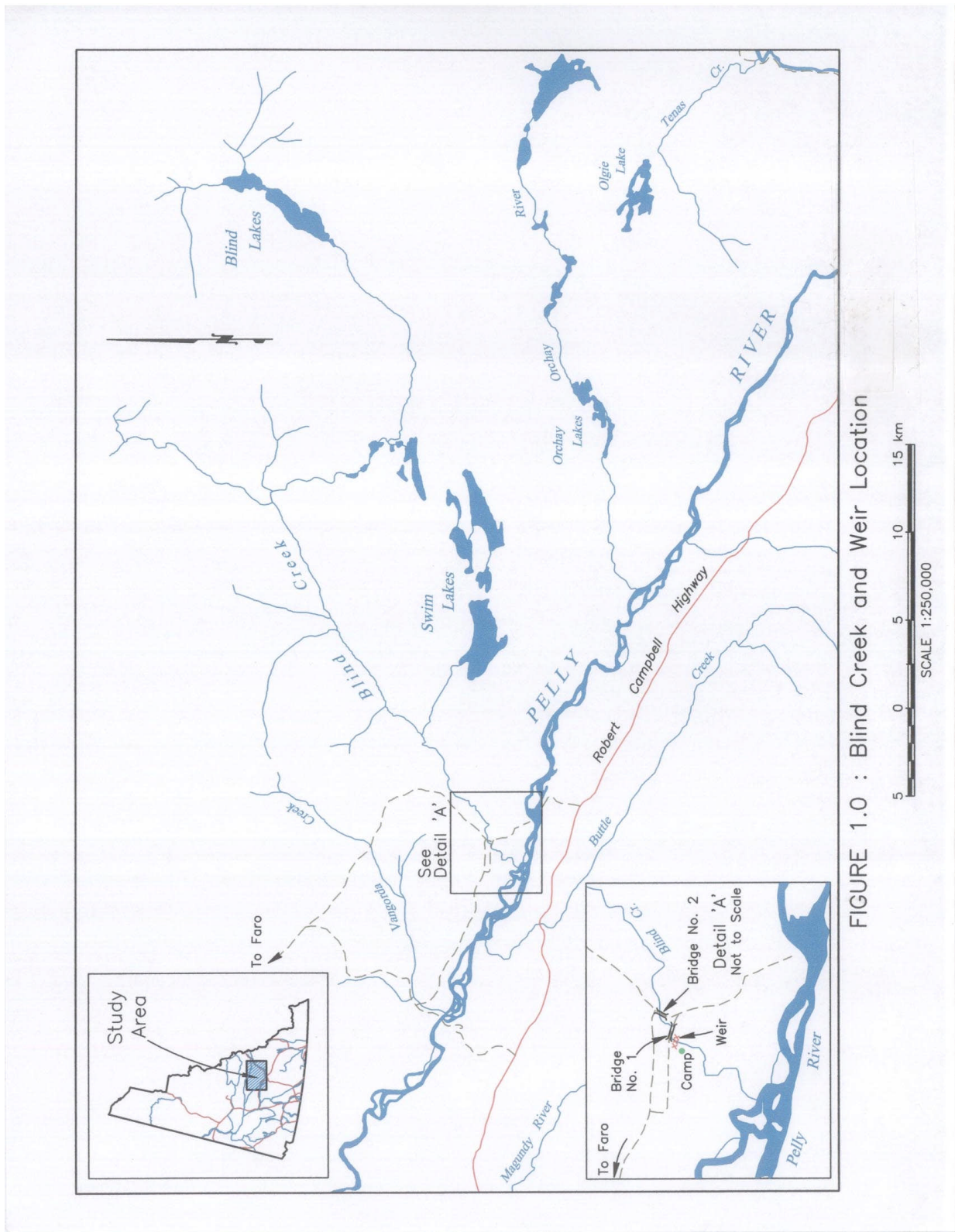


FIGURE 1.0 : Blind Creek and Weir Location

Figure 1. Blind Creek and Weir Location

OBJECTIVES

The specific objectives of the weir project were as follows:

- 1) Install and operate a weir in Blind Creek to enumerate the Chinook salmon escapement.
- 3) Conduct a sampling program to obtain age-sex-length data and genetic material from live Chinook salmon at the weir and recover spaghetti tags.
- 4) Promote salmon viewing and increase awareness of the weir project and the salmon resource.
- 5) Provide training and employment for community residents.

METHODS

Camp Set-up

Camp set-up was initiated on July 16. Materials for the camp were transported from storage in Whitehorse and Faro by truck.

As in previous years, the camp was situated on the west side of Blind Creek approximately 80 meters from the weir site. The camp consisted of three wall tents: one to house a kitchen/eating area and two for sleeping quarters.

Weir Construction

The weir was scheduled to go in on July 16; however, due to unusually high water at this time installation was delayed until July 25 after the water level had subsided (Figure 2). The weir was placed in the same general location as in previous operations, approximately 1 km upstream of the creek mouth and 30 m downstream of the first bridge crossing. Weir materials stored on site from previous operations were used in construction. Construction of the weir began with the placement of the counting chamber mid-stream and at the upstream apex of the fence. This chamber consisted of conduit panels connected together to form an enclosure measuring 2m (L) X 0.7 m (W) X 1.0 m (H). Two conduit panels, each 2 meters long, were used to connect the chamber to the fence and create a staging area for fish moving into the chamber. The fence was constructed of conduit panels and tripods placed downstream of the counting chamber in a 'V' configuration to direct fish moving close to the bank towards the staging area (Figure 3).

After the panels were in place, sand bags were placed along the bottom upstream side of the weir to prevent scouring of the creek substrate and undermining of the structure. A white 'flashboard' was secured to the bottom of the counting chamber to improve visibility of salmon passing through. A platform was placed alongside the counting chamber for enumerating and sampling fish and accessed from the bank via a wooden walkway. Black poly was secured over the staging area to prevent fish moving in from seeing weir attendants on the platform.



Figure 2. Flood conditions as seen on July 16 at the weir site



Figure 3. View of weir and sampling station looking upstream

Weir Operation

Personnel were on site 24 hours a day for the duration of the Chinook run. The weir was monitored daily from first light until dark. Daily and cumulative counts of fish passage were maintained throughout the run and relayed twice a week by phone to Patrick Milligan, DFO, Whitehorse.

Enumeration was achieved by allowing fish access to the counting chamber. This was done by removing two or three pieces of conduit from both the downstream and upstream end of the counting chamber. After a few fish were counted through the chamber, a vertical gate secured to the upstream opening was released for quick closure and the next fish moving in held for sampling. After closing the downstream opening by releasing a similar vertical gate, all Chinook held in the chamber were immediately sampled to avoid causing stress on the fish. Only a small number of fish were held at any one time. Sampling events were attempted each day and, when possible, at various times throughout the day to obtain a representative sample of the daily run.

Chinook held for sampling were dip netted from the counting chamber and placed in a v-shaped trough filled with water (Figure 4). Sex and fork length (FL) was recorded as well as 50 paired FL and mid-eye fork (MEF) lengths. Scale samples (5 per fish) were taken for age determination only when it was possible to do so quickly and without stressing the fish. DNA tissue samples were obtained by removing the right and left axillary appendages using guillotine clippers. The two DNA samples collected from each fish were placed in separate vials containing an alcohol preservative and submitted to DFO, Whitehorse for analysis. Chinook with spaghetti tags were held in the counting chamber and dip netted for tag recovery.

The weir was checked regularly for scouring and areas of possible escape. Debris collecting on the weir was removed as required.



Figure 4. Chinook sampling in progress.

Physical Measurements

Weir personnel recorded general weather and water conditions each morning. Air and water temperatures were taken using a hand-held thermometer. Water depth measurements were taken from a staff gauge located about 25 m downstream of the lower bridge along the right bank.

Yukon Department of Environment (Water Resources Branch) maintains a station for monitoring stream flows and water temperatures, located about 10 m upstream of the weir site. Daily water temperatures and discharge data were obtained for this report.

RESULTS

Chinook Counts

A total of 276 Chinook salmon was counted through the weir between July 25 and August 19 (see daily counts Appendix 1). The first Chinook passed through the counting chamber on July 28. Fifty percent of the run had passed through by August 12 and 90% by August 17.

Biological Sampling/Tag Recovery

A total of 191 Chinook salmon (69% of the run) was live sampled for age-sex-length data (see sampling data, Appendix 2). Of these, 88 (46%) were female and 103 (54%) were male. The mean fork length of females and males sampled was 837 mm and 773 mm, respectively. Fork length frequencies of female and male Chinook sampled are presented in Figures 5 and 6, respectively. Age was determined from scales taken from 146 of the Chinook sampled (Table 1). Age 5 and age 6 fish were the dominant age classes at 47.9% and 37.0%, respectively.

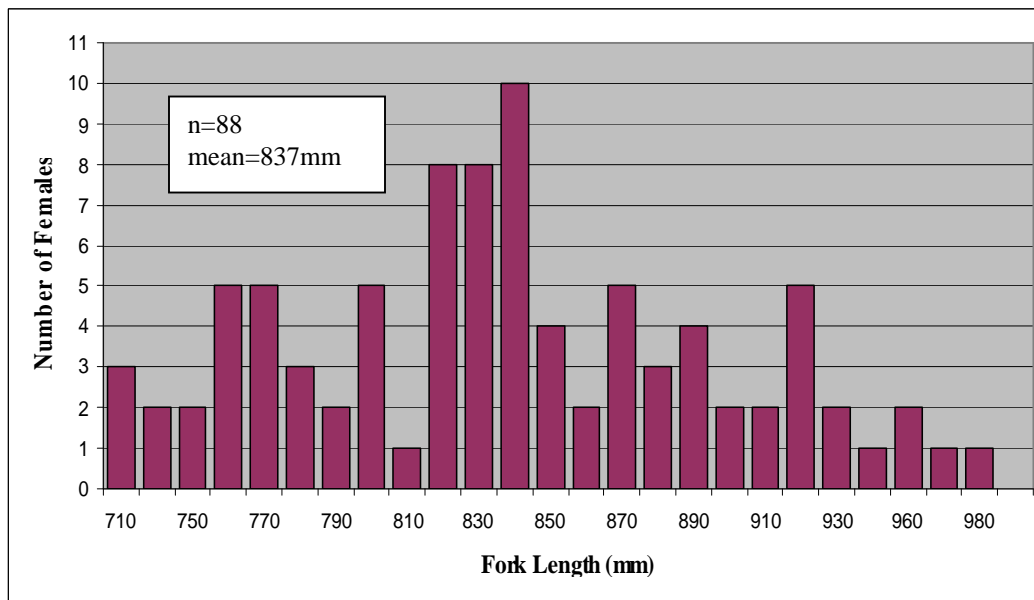


Figure 5. Length frequency of female Chinook sampled in 2008

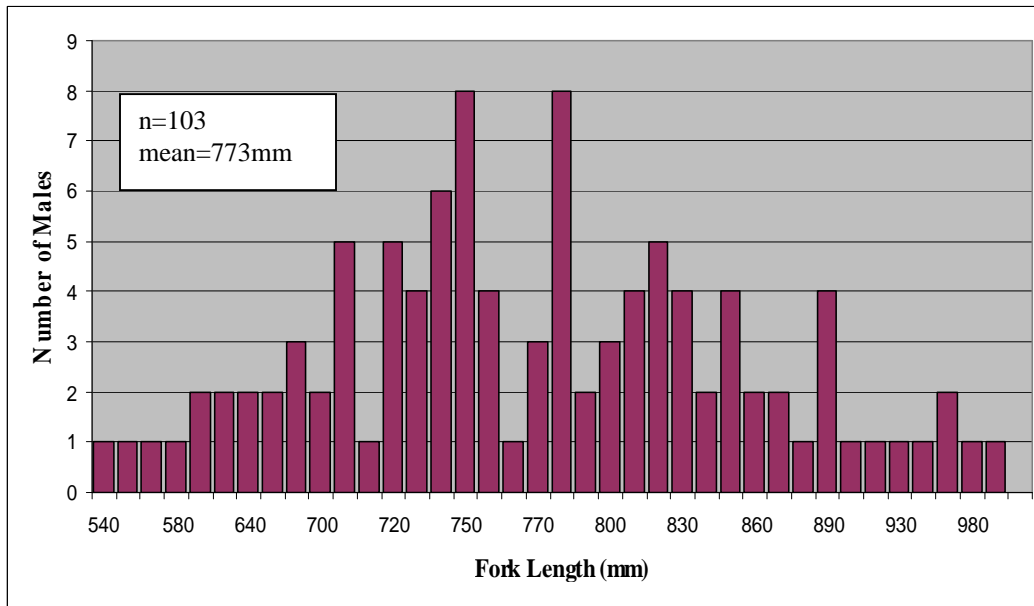


Figure 6. Length frequency of male Chinook sampled in 2008.

Table 1. Size and age structure of Blind Creek Chinook salmon live sampled in 2008.

SEX	AGE	DATA	TOTAL	% of TOTAL
Female	4(2)	Average of FL (mm)	745	
		Count of Age	2	1 %
	5(2)	Average of FL (mm)	791	
		Count of Age	22	15 %
	6(2)	Average of FL (mm)	846	
		Count of Age	34	23 %
	6(3)	Average of FL (mm)	830	
		Count of Age	1	1 %
	7(2)	Average of FL (mm)	903	
		Count of Age	3	2 %
	7(3)	Average of FL (mm)	895	
		Count of Age	4	3 %
F Average of FL (mm)			835	
F Count of Age			66	45 %
Male	4(2)	Average of FL (mm)	685	
		Count of Age	13	9 %
	5(2)	Average of FL (mm)	769	
		Count of Age	48	33 %
	6(2)	Average of FL (mm)	872	
		Count of Age	18	12 %
	6(3)	Average of FL (mm)	710	
	Count of Age	1	1 %	
M Average of FL (mm)			759	
M Count of Age			80	55 %

Note: 146 samples were aged, 45 samples had resorbed/regenerated scales.

A total of six spaghetti tags was observed and retrieved. There were no markings on the Chinook sampled that indicated tag loss. The tag numbers and dates recovered are given in Table 2.

Table 2. Tags Recovered from Blind Creek Chinook salmon in 2008.

TAG #	Date Recovered
A 00865	Aug 9
A 01041	Aug 12
A 00415	Aug 14
A 00345	Aug 14
A 01176	Aug 16
A 01073	Aug 16

Physical Measurements

The mean water temperature recorded by a temperature logger in the months of July and August was 8.2°C and 8.9°C, respectively. Water temperatures during this period ranged from a low of 7.1°C on July 16 to a high of 10.4°C on August 10.

Streamflow conditions in Blind Creek were above normal in July and August (Appendix 4). Peak flows occurred on July 16 and August 26 (Figure 7) after heavy rainfall events. The mean, maximum and minimum discharge in July and August for the period 1992 to 2008 is presented in Appendix 4.

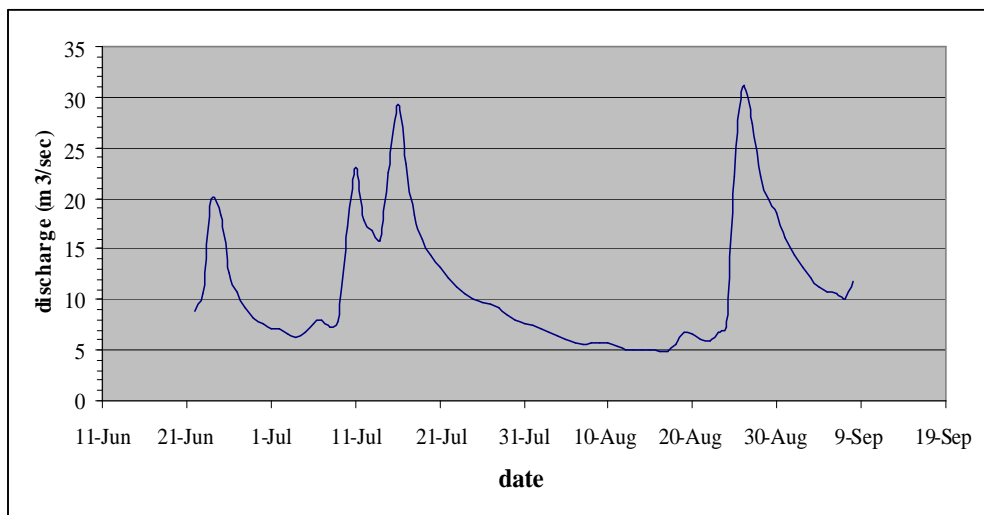


Figure 7. Stream discharge in Blind Creek, 2008 (Water Resources, Yukon Department of Environment).

DISCUSSION

This was the second consecutive year of low Chinook salmon escapements to Blind Creek. The 2008 escapement of 276 Chinook salmon was the lowest recorded since weir operations began in 1995³ and 62% below the previous average escapement of 722, based on recorded weir counts in 1995, 1997-1999, 2003-2007. Lower than average escapements were also observed in other index areas in the upper Yukon River in 2008 (Mercer & Wilson 2009, JTC 2009). As in 2007, the number of Chinook salmon returning to the Yukon River in 2008 was much lower than the preseason outlook (JTC 2009). Fisheries managers indicate the low returns observed in 2007 and 2008 could be attributed to a number of factors including: environmental conditions, poor marine survival and increases in the Chinook salmon bycatch in the Bering Sea trawl fishery targeting Pollock (JTC 2009).

Despite the delay in weir installation caused by extreme high water levels at the beginning of the project, it is likely that few, if any, Chinook moved upstream before the weir was placed. The first Chinook was not observed until three days after the weir was in place and over the next few days, the number of fish arriving at the weir was very low. This run timing was similar in 2006 and four days later than 2007 (July 24) (Wilson 2007 and 2008). The peak run timing in 2008 was approximately 6 days later than observed in 2007, suggesting the run may have been delayed because of the high water.

There was no pooling or holding of fish behind the weir for extended periods of time as observed during weir operations within the 2003-2006 period (Wilson 2004, 2005, 2006, 2007). In 2008, fish generally arrived at the weir in small groups and moved into the counting chamber within a relatively short period of time. This was also observed in 2007 when returns were poor (Wilson 2008). In high return years, fish would accumulate behind the weir and be easily disturbed when there was any excessive activity at the weir, such as during dip netting. Consequently, sampling was only performed after a pulse of fish was first allowed to pass through the counting chamber without being handled. Since there were fewer fish holding behind the weir at any one time in 2008 it was possible to sample more Chinook without causing a significant delay in the run.

The weir operation continued to be visited by a number of tourists as well as local people this year. Many of the visitors were directed to the weir by staff at the Town of Faro Interpretive Centre. As a result of the interest shown in salmon and the enumeration project, a salmon brochure containing information about the salmon resource and weir operation was produced in 2005 and has been provided to the Town of Faro Interpretive Centre each year since. At least 40 people visited the weir over the course of operations this year.

³ Weir counts in 1996 and 2000 were not reported and the weir was not operated in 2001 and 2002. Later installation dates in 1997, 1998 and 1999 may have resulted in early run fish being missed (Appendix 3).

ACKNOWLEDGMENTS

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Appendix 1. Blind Creek weir Chinook salmon counts, 2008.

DATE	Daily Count	Cumulative	# Sampled	Comments
25-Jul	0	0	0	Weir fish tight 6:00 p.m.
26-Jul	0	0	0	
27-Jul	0	0	0	
28-Jul	1	1	1	
29-Jul	1	2	1	
30-Jul	2	4	2	
31-Jul	1	5	1	
1-Aug	4	9	4	
2-Aug	1	10	1	
3-Aug	6	16	6	
4-Aug	3	19	3	
5-Aug	5	24	5	
6-Aug	11	35	11	
7-Aug	17	52	15	
8-Aug	26	78	14	
9-Aug	18	96	11	
10-Aug	11	107	11	
11-Aug	15	122	12	
12-Aug	19	141	14	
13-Aug	27	168	22	
14-Aug	20	188	8	
15-Aug	26	214	20	
16-Aug	23	237	12	
17-Aug	23	260	11	
18-Aug	12	272	6	
19-Aug	4	276	0	Weir removed
TOTAL:	276		191	

Appendix 2. Blind Creek Chinook Salmon Live Sampling Results, 2008.

DATE	FISH #	SEX	FL (mm)	MEF (mm)	Gilbert-Rich Age	Code*
28-Jul	1	F	800	775	6.2	
29-Jul	2	F	710	672	5.2	
30-Jul	3	M	970	809	5.2	
30-Jul	4	M	850	770	5.2	
31-Jul	5	F	760	701	-	NS
1-Aug	6	M	690	625	5.2	
1-Aug	7	F	780	720	5.2	
1-Aug	8	F	770	700	5.2	
1-Aug	9	M	810	750	6.2	
2-Aug	10	M	700	610	5.2	
3-Aug	11	M	720	665	5.2	
3-Aug	12	M	769	700	3M	RG
3-Aug	13	F	820	770	6.2	
3-Aug	14	M	750	670	6.2	
3-Aug	15	M	720	665	5.2	
3-Aug	16	F	820	780	4M	RG
4-Aug	17	F	710	640	5.2	
4-Aug	18	F	850	800	6.2	
4-Aug	19	F	710	635	5.2	
5-Aug	20	M	830	750	3M	RG
5-Aug	21	F	760	625	5.2	
5-Aug	22	M	970	860	6.2	
5-Aug	23	F	770	730	6.2	
5-Aug	24	F	750	695	5.2	
6-Aug	25	M	750	680	5.2	
6-Aug	26	M	590	520	2M	RG
6-Aug	27	M	710	640	5.2	
6-Aug	28	F	820	740	-	MF
6-Aug	29	M	630	565	4.2	
6-Aug	30	M	540	490	4.2	
6-Aug	31	M	720	650	5.2	
6-Aug	32	F	770	710	5.2	
6-Aug	33	M	580	530	4.2	
6-Aug	34	F	760	720	6.2	
6-Aug	35	M	760	700	5.2	
7-Aug	36	M	890	820	6.2	
7-Aug	37	M	715	655	5.2	
7-Aug	38	F	820	775	6.2	
7-Aug	39	M	890	795	6.2	
7-Aug	40	M	890	818	4M	RG
7-Aug	41	F	720	665	5.2	
7-Aug	42	M	900	820	6.2	
7-Aug	43	M	780	715	5.2	
7-Aug	44	M	770	710	5.2	
7-Aug	45	M	780	715	4M	RG

Appendix 2 cont'd. Blind Creek Chinook Salmon Live Sampling Results, 2008.

DATE	FISH #	SEX	FL (mm)	MEF (mm)	Age	Code*
7-Aug	46	M	750	670	5.2	
7-Aug	47	M	830	750	5.2	
7-Aug	48	M	780	715	5.2	
7-Aug	49	M	820	740	2M	RG
7-Aug	50	F	720	650	4.2	
8-Aug	51	M	740		5.2	
8-Aug	52	M	980		6.2	
8-Aug	53	F	860		6.2	
8-Aug	54	M	700		5.2	
8-Aug	55	F	820		4M	RG
8-Aug	56	M	880		4M	RG
8-Aug	57	M	760		S2	RS
8-Aug	58	F	770		4.2	
8-Aug	59	M	740		3M	RG
8-Aug	60	M	790		5.2	
8-Aug	61	M	690		4.2	
8-Aug	62	M	710		6.3	
8-Aug	63	M	690		3M	RG
8-Aug	64	M	820		6.2	
9-Aug	65	M	800		3M	RG
9-Aug	66	M	810		3M	RG
9-Aug	67	F	830		4M	RG
9-Aug	68	F	840		7.3	
9-Aug	69	F	850		-	RS
9-Aug	70	F	780		S2	RS
9-Aug	71	M	590		2M	RG
9-Aug	72	F	870		6.2	
9-Aug	73	M	820		6.2	
9-Aug	74	F	920		6.2	
9-Aug	75	M	710		5.2	
10-Aug	76	F	960		5.2	
10-Aug	77	F	850		6.2	
10-Aug	78	M	780		6.2	
10-Aug	79	M	750		5.2	
10-Aug	80	M	670		-	NS
10-Aug	81	M	640		5.2	
10-Aug	82	F	920		6.2	
10-Aug	83	M	870		4.2	
10-Aug	84	M	940		6.2	
10-Aug	85	F	770		3M	RG
10-Aug	86	F	970		4M	RG
11-Aug	87	M	640		4.2	
11-Aug	88	M	710		5.2	
11-Aug	89	F	830		5.2	
11-Aug	90	F	980		7.2	
11-Aug	91	M	770		2M	RG

Appendix 2 cont'd. Blind Creek Chinook Salmon Live Sampling Results, 2008.

DATE	FISH #	SEX	FL (mm)	MEF (mm)	Age	Code*
11-Aug	92	M	630		3M	RG
11-Aug	93	M	730		4.2	
11-Aug	94	F	840		6.2	
11-Aug	95	F	820		6.2	
11-Aug	96	F	880		S2	RS
11-Aug	97	F	830		6.2	
11-Aug	98	M	820		5.2	
12-Aug	99	M	840		3M	RG
12-Aug	100	F	950		7.3	
12-Aug	101	M	760		2M	RG
12-Aug	102	F	840		6.2	
12-Aug	103	M	750		5.2	
12-Aug	104	M	850		5.2	
12-Aug	105	F	910		4M	RG
12-Aug	106	F	930		4M	RG
12-Aug	107	F	870		7.2	
12-Aug	108	M	780		5.2	
12-Aug	109	M	750		3M	RG
12-Aug	110	F	910		3M	RG
12-Aug	111	F	830		6.3	
12-Aug	112	F	870		6.2	
13-Aug	113	F	810		4M	RG
13-Aug	114	F	820		5.2	
13-Aug	115	F	870		6.2	
13-Aug	116	F	920		6.2	
13-Aug	117	F	840		6.2	
13-Aug	118	M	830		5.2	
13-Aug	119	M	730		2M	RG
13-Aug	120	F	800		3M	RG
13-Aug	121	M	730		5.2	
13-Aug	122	F	780		6.2	
13-Aug	123	F	760		6.2	
13-Aug	124	M	860		5.2	
13-Aug	125	F	890		2M	RG
13-Aug	126	F	840		3M	RG
13-Aug	127	M	820		6.2	
13-Aug	128	M	750		4.2	
13-Aug	129	F	840		6.2	
13-Aug	130	M	750		5.2	
13-Aug	131	M	790		4.2	
13-Aug	132	F	840		6.2	
13-Aug	133	F	790		5.2	
13-Aug	134	M	770		4.2	
14-Aug	135	M	920		5.2	
14-Aug	136	F	920		6.2	
14-Aug	137	M	780		5.2	

Appendix 2 cont'd. Blind Creek Chinook Salmon Live Sampling Results, 2008

DATE	FISH #	SEX	FL (mm)	MEF (mm)	Age	Code*
14-Aug	138	M	760		5.2	
14-Aug	139	M	570		4.2	
14-Aug	140	F	930		6.2	
14-Aug	141	F	800		6.2	
14-Aug	142	F	880		6.2	
15-Aug	143	M	780		4.2	
15-Aug	144	M	860		3M	RG
15-Aug	145	M	930		6.2	
15-Aug	146	M	560		4.2	
15-Aug	147	M	830		6.2	
15-Aug	148	M	740		2M	RG
15-Aug	149	F	840		5.2	
15-Aug	150	M	850		6.2	
15-Aug	151	F	960		4M	RG
15-Aug	152	F	820		6.2	
15-Aug	153	M	810		5.2	
15-Aug	154	F	830		6.2	
15-Aug	155	F	840		6.2	
15-Aug	156	M	730		3M	RG
15-Aug	157	F	890		5.2	
15-Aug	158	M	780		5.2	
15-Aug	159	F	830		6.2	
15-Aug	160	F	830		6.2	
15-Aug	161	F	760		5.2	
15-Aug	162	M	720		5.2	
16-Aug	163	M	670		5.2	
16-Aug	164	M	740		5.2	
16-Aug	165	F	860		7.2	
16-Aug	166	F	750		5.2	
16-Aug	167	F	790		5.2	
16-Aug	168	F	800		5.2	
16-Aug	169	M	850		5.2	
16-Aug	170	M	740		5.2	
16-Aug	171	F	890		7.3	
16-Aug	172	F	850		3M	RG
16-Aug	173	M	800		5.2	
16-Aug	174	F	920		-	RG
17-Aug	175	F	800		5.2	
17-Aug	176	F	900		7.3	
17-Aug	177	M	710		5.2	
17-Aug	178	M	890		5.2	
17-Aug	179	M	810		6.2	
17-Aug	180	F	900		6.2	
17-Aug	181	M	1030		6.2	
17-Aug	182	F	890		6.2	
17-Aug	183	F	830		5.2	

Appendix 2 cont'd. Blind Creek Chinook Salmon Live Sampling Results, 2008

DATE	FISH #	SEX	FL (mm)	MEF (mm)	Age	Code*
17-Aug	184	F	840		3M	RG
17-Aug	185	M	740		5.2	
18-Aug	186	M	870		6.2	
18-Aug	187	M	840		5.2	
18-Aug	188	F	880		4M	RG
18-Aug	189	F	870		5.2	
18-Aug	190	M	720		5.2	
18-Aug	191	M	800		5.2	

*Note: RG = regenerate scale (center is missing from scale)
 RS = resorbed scale (growth from margin is missing)
 MF = mixed fish
 NS = no scale

Appendix 3. Blind Creek Chinook Counts from Aerial Surveys and Weir Operations, 1989, 1990, 1995-2008.

YEAR	METHOD	CHINOOK COUNTS	START DATE	ARRIVAL OF FIRST FISH	END DATE
1989	Aerial survey ^a	400	August 7		August 7
1990	Aerial survey ^a	443	August 14		August 14
1995	Weir	826	NR		NR
1996	Aerial survey ^a	422	August ?		August ?
1996	Weir	NR	July 28		August 17
1997	Weir	957	July 24		August 22
1998	Weir	373	July 19		August 19
1999	Weir	892	July 28		August 22
2000	Weir	NR	NR		NR
2001	Aerial survey ^b	226	August 21		August 21
2002	Aerial survey ^b	107	August 15		August 15
2003	Weir	1,155	July 16	July 17	August 18
2004	Weir	792	July 11	July 19	August 15
2005	Weir	525	July 15	July 20	August 15
2006	Weir	677	July 16	July 28	August 17
2007	Weir	304	July 17	July 24	August 17
2008	Weir	276	July 25	July 28	August 19

^a aerial survey conducted by P.A. Harder and Associates Ltd.

^b aerial survey conducted by RRDC and Jane Wilson & Associates

NR - not reported

Appendix 4. Mean, Maximum and Minimum discharge in cubic metres per second for July and August, Blind Creek, 1992-2008.

	JULY Daily Discharge (m ³ /sec)					AUGUST Daily Discharge (m ³ /sec)				
	Mean	Max.	Max. Day	Min.	Min. Day	Mean	Max.	Max. Day	Min.	Min. Day
1992	9.87	13.06	14/07	6.59	31/07	4.47	6.24	01/08	3.30	27/08
1993	8.93	12.0	11/07	7.41	30/07	7.41	9.18	12/08	6.55	30/08
1994	3.92	5.50	01/07	2.52	27/07	1.48	2.61	01/08	0.94	21/08
1995	4.71	8.09	06/07	2.60	01/07	4.91	5.79	29/08	3.88	15/08
1996	4.80	8.87	12/07	2.67	31/07	3.92	7.62	30/08	2.24	03/08
1997*	4.96	9.66	25/07	2.53	04/07	9.11	10.3	01/08	7.71	03/08
1998	-	-	-	-	-	-	-	-	-	-
1999	4.49	12.5	02/07	2.12	25/07	2.25	3.20	01/08	1.93	27/08
2000	-	-	-	-	-	-	-	-	-	-
2001	8.49	16.2	17/07	5.20	31/07	3.33	5.00	01/08	2.28	18/08
2002	2.85	4.95	06/07	2.25	28/07	2.71	5.81	30/08	1.82	11/08
2003	5.25	14.6	07/07	3.26	29/07	2.49	4.27	01/08	1.37	21/08
2004	3.41	4.56	01/07	3.02	17/07	2.51	3.41	01/08	2.28	26/08
2005	4.28	5.57	19/07	3.23	12/07	2.31	4.48	01/08	1.47	18/08
2006	5.92	10.8	11/07	2.76	31/07	3.46	5.08	15/08	2.50	01/08
2007	5.60	10.8	03/07	3.36	27/07	3.03	4.93	08/08	1.43	31/08
2008	12.55	29.2	16/07	6.26	04/07	9.66	31.1	26/08	4.81	17/08

* no data available for period between July 14-July 24 and after August 3.

Note: 1998 and 2000 data not available

(Water Resources, Yukon Department of Environment).

Appendix 5. Daily and average Chinook salmon counts in Blind Creek, 1997-1999, 2003-2008.

DATE	Daily Count 2008	Daily Count 2007	Daily Count 2006	Daily Count 2005	Daily Count 2004	Daily Count 2003	Daily Count 1999	Daily Count 1998	Daily Count 1997	Daily Average
11-Jul					0					0
12-Jul					0					0
13-Jul					0					0
14-Jul					0					0
15-Jul				0	0					0
16-Jul			0	0	0	0				0
17-Jul		0	0	0	0	1				0
18-Jul		0	0	0	0	1				0
19-Jul		0	0	0	1	2		0		1
20-Jul		0	0	1	32	0		0		6
21-Jul		0	0	0	5	2		0		1
22-Jul		0	0	1	2	4		0		1
23-Jul		0	0	0	2	2		0		1
24-Jul		1	0	0	140	1		0		24
25-Jul	0	0	0	0	24	10	0	0	122	17
26-Jul	0	0	0	2	10	17	0	0	85	13
27-Jul	0	7	0	10	20	495	0	1	66	67
28-Jul	1	3	2	8	60	2	0	0	73	17
29-Jul	1	3	9	13	33	68	0	0	64	21
30-Jul	2	10	27	105	225	95	0	0	70	59
31-Jul	1	9	26	18	36	7	0	0	44	16
01-Aug	4	8	67	15	60	45	15	0	49	29
02-Aug	1	27	8	15	34	0	65	6	77	26
03-Aug	6	6	109	35	7	7	133	34	38	42
04-Aug	3	13	25	45	15	201	50	169	60	65
05-Aug	5	8	131	46	15	75	116	16	22	48
06-Aug	11	63	19	53	27	50	73	4	33	37
07-Aug	17	59	47	54	19	12	25	5	20	29
08-Aug	26	6	63	31	4	18	129	5	43	36
09-Aug	18	20	44	18	8	1	128	1	19	29
10-Aug	11	9	14	15	2	0	139	31	21	27
11-Aug	15	4	16	14	10	8	1	25	5	11
12-Aug	19	16	28	11	1	4	0	15	16	12
13-Aug	27	14	19	7	0	18	0	9	5	11
14-Aug	20	8	11	3	0	2	0	11	1	6
15-Aug	26	6	6	5	0	2	0	18	13	8
16-Aug	23	4	5			5	0	7	8	7
17-Aug	23		1			0	0	9	3	6
18-Aug	12					0	14	3		7
19-Aug	4						4	4		4
20-Aug							0			0
21-Aug							0			0
TOTAL:	276	304	677	525	792	1155	892	373	957	

Note: shaded areas denote start and end date of weir operations
 Daily weir counts were not reported in 1995

Appendix 6. Sex composition of Chinook salmon sampled in Blind Creek, 2003-2008

YEAR	Sample Size	# Females	% of Total	# Males	% of Total
2003	118	54	45.8%	64	54.2%
2004	19	8	42.1%	11	57.9%
2005	161	78	48.4%	83	51.6%
2006	101	41	40.6%	60	59.4%
2007	83	37	44.6%	46	55.4%
2008	191	88	46.1%	103	53.9%
Average	112	51	44.6%	61	55.4%

Appendix 7. Blind Creek Weather and Water Conditions, 2008

DATE	TIME	AIR TEMP (°C)	WATER TEMP (°C)	WATER LEVEL (cm)	WEATHER
July 16	16:30	21	10	135	Sunny & warm with scattered cloud
July 17	7:45	7	9	124	Sunny & warm with scattered cloud
July 18	7:15	9	10	105	Mostly cloudy with periodic rain showers
July 19	7:00	7	10	95	Rain overnight, periodic showers throughout the day
July 20	12:00	11	10	89	Cool and cloudy
July 21	8:00	7	9	85	Rain showers throughout the day
July 22	8:00	7	9	81	Rain showers during the day, clearing in evening
July 23	8:00	5	9	78	Rain showers throughout the day
July 24	6:15	0	8	76	Clear in a.m. with fog & light frost, evening rain shower
July 25	7:15	10	10	73	Skies clearing, warm
July 26	8:00	12	11	74	Partial cloud, occasional sprinkle of rain, clear evening
July 27	8:00	5	9	74	Rain showers in afternoon, clearing in evening
July 28	8:00	2	8	72	Fog in a.m. skies clear, warm
July 29	7:15	5	10	70	Overcast, light rain shower in evening
July 30	7:30	4	9	68	Clear skies a.m. with frost, windy with light rain in evening
July 31	7:00	5	10	66	Rain overnight & early a.m., partial cloud in afternoon, breezy
Aug. 1	8:30	8	11	65	Rain overnight, clearing in afternoon
Aug. 2	8:00	8	10	64	Sunny & warm
Aug. 3	8:00	12	10	63	Sunny, windy afternoon
Aug. 4	8.15	8	10	61	Mostly sunny & warm
Aug. 5	7:50	5	9	60	Frost in a.m. sunny & warm during day
Aug. 6	8:00	12	11	59	Heavy rain overnight, skies clear in a.m., late evening shower
Aug. 7	7:00	8.5	11	56	Overcast, light fog in a.m. mostly sunny afternoon, windy
Aug. 8	6:30	10	11	58	Rain overnight, overcast with fog in a.m. clearing in afternoon
Aug. 9	6:30	8	11	58	Rain overnight, cloudy during day, thunder shower in evening
Aug. 10	6:30	3	9	59	Cool foggy a.m., warm & sunny during day
Aug. 11	6:30	4	10	57	Sunny & warm
Aug. 12	6:30	3	10	55	Cloudy, rain in afternoon, breezy
Aug. 13	6:30	8	10	55	Light clouds & breezy in a.m. partial cloud in p.m.
Aug. 14	6:30	7	10	55	Cloudy, light rain showers throughout day
Aug. 15	6:30	5	10	54	Light rain showers throughout day, clearing in evening
Aug. 16	6:30	5	9	54	High overcast, rain in evening
Aug. 17	6:30	7	10	53	Rain overnight with fog in a.m. clearing by afternoon
Aug. 18	6:30	7	10	55	Rain overnight, fog in a.m., clearing in afternoon
Aug. 19	6:30	-1	9	63	Cool morning with light frost, skies clear

