

BLIND CREEK CHINOOK SALMON ENUMERATION WEIR, 2012

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Restoration and Enhancement Fund

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## ABSTRACT

A weir was operated in Blind Creek in 2012 to enumerate the Chinook salmon (*Onchorynchus tshawytscha*) escapement and obtain biological information from the stock. This was the tenth year a weir has been operated in Blind Creek with funding by the Yukon River Panel, Restoration & Enhancement Fund. Camp set up was initiated on July 19; however, high water levels at the start of the project delayed weir construction until July 23 after the water level had subsided. The weir was located at the same site used for the past nine years, approximately 1 km upstream of the confluence with the Pelly River. Operation of the weir began on July 25 and continued through to August 20. The first fish passed through the counting chamber on July 28. A total of 157 Chinook salmon was counted in 2012 which was the lowest escapement observed over the ten year duration of the project. The midpoint of the run occurred on August 8 and 90% of the run had passed through the weir by August 15. Migrating Chinook were sampled randomly throughout the period of weir operation to obtain information on the age-sex-length structure of the run. A total of 134 Chinook salmon (85% of the run) was live sampled. Of these, 65 (49%) were female and 69 (51%) were male. The mean fork length of females and males sampled was 863 mm and 749 mm, respectively. The DFO scale lab determined ages from 105 Chinook sampled. Age-6 (46.7%) was the dominant age class, followed by age-5 fish (38.1%). Age-4 and age-7 fish represented 10.5% and 4.8% of the sample, respectively.

## INTRODUCTION

Blind Creek is a tributary of the Pelly River in the upper Yukon River drainage supporting a Chinook salmon spawning population. Blind Creek flows for about 45 km from headwater lakes located in the Anvil Range and empties into the Pelly River near the town of Faro. Aerial survey results have shown that Chinook salmon spawning occurs throughout the lower 40 km of the creek with highest concentrations found between 12 and 35 km upstream (Harder 1996; Wilson 2001, 2002).

Chinook salmon returns in Blind Creek have been monitored periodically between 1989 and 2000 through aerial surveys or enumeration weir operations and annually since 2003 through weir operations. This was the tenth consecutive year a weir has been operated in Blind Creek with funding by the Yukon River Panel, Restoration & Enhancement Fund. The previous 9 year average run size is 564 with annual returns ranging from 270 (2010) to 1,155 (2003).

In 2005, improvements were made to the weir structure to enable live sampling of Chinook for age, sex and length (ASL) data. Chinook sampling is conducted over the entire run and randomly each day to obtain biological characteristics that are unbiased and representative of the entire run. This information provides important biological baseline data on the health of the stock as well as information used by fishery managers to construct sibling based pre-season run forecasts. ASL data collected over a number of years can also be used to support investigations into basin-wide trends in the composition of Chinook stocks. In addition, Chinook size and age data from 2011 and subsequent years will assist fisheries managers in determining the effectiveness of the gillnet mesh size restrictions in Alaska implemented in 2011 to allow more of the larger and older fish to reach spawning grounds.

The Blind Creek weir operation currently provides the only escapement index for the Pelly River drainage. Quantifying Chinook escapements into upper Yukon River index streams allows for independent (from Pilot station and Eagle sonar project estimates) assessment of total above border Chinook escapements. The goal of the project is to provide additional stock assessment information that will enhance the ability of salmon management agencies to manage Yukon River Chinook salmon.

The proximity of the weir operation to the town of Faro and road access has allowed for public viewing of the weir operation and an opportunity to increase awareness of Yukon River salmon and management programs. The weir site is located approximately 10 km southeast of the town of Faro and can be accessed from a maintained mining road (Blind Creek Road). Approximately 80 different people visit the weir annually including tourists to the Faro area as well as local people. As a consequence, a great deal of interest has been shown in the returning Chinook salmon and the enumeration project.

A proposal to continue weir operations in Blind Creek was submitted by J. Wilson and Associates to the Yukon River Panel Restoration and Enhancement (R&E) fund in January 2012. The proposal was accepted and financial support was received from the R&E fund. This report is a summary of the 2012 project.

## 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 km<sup>2</sup>. 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.

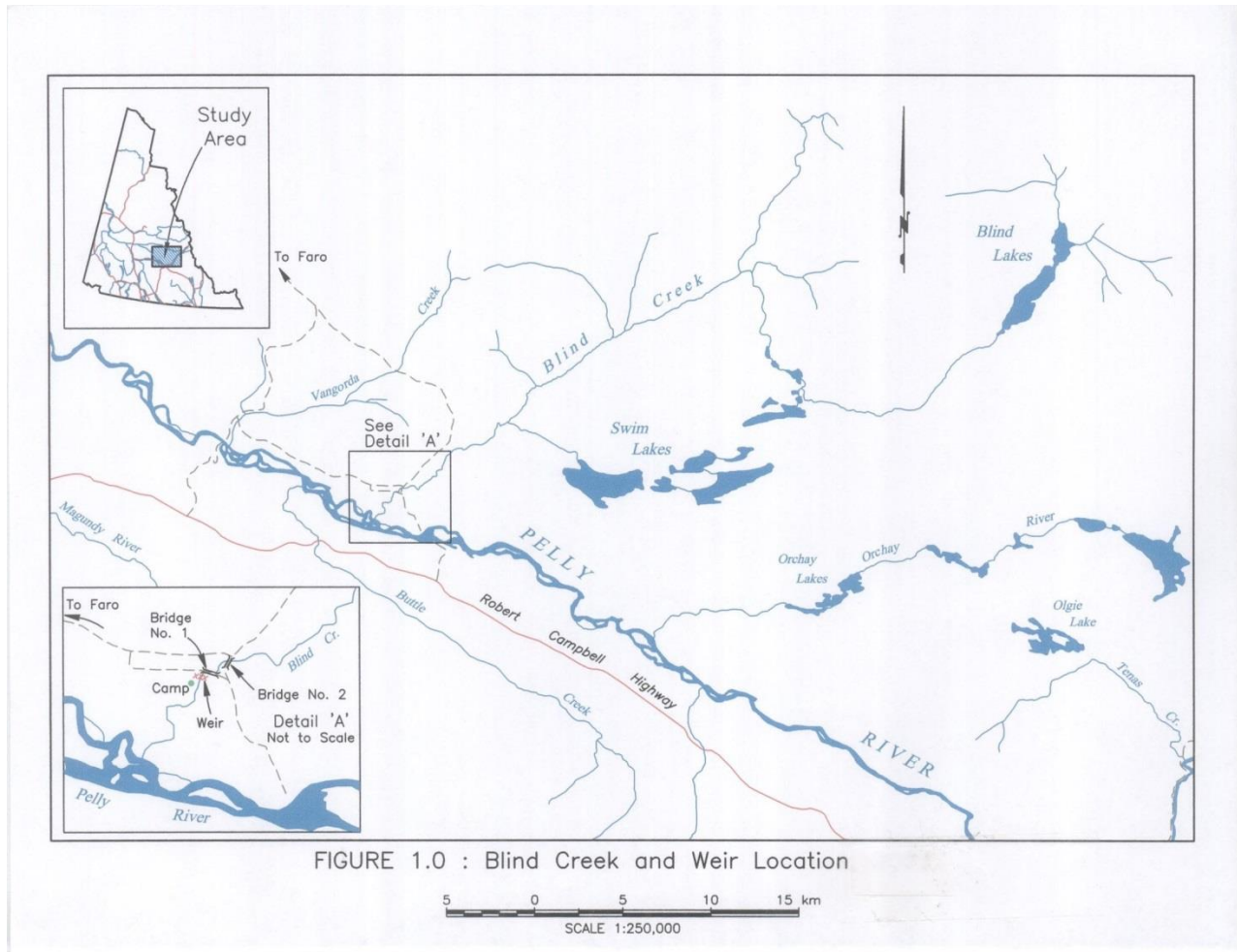


Figure 1. Blind Creek and Weir Location

## OBJECTIVES

The specific objectives of this project are as follows:

- 1) Operate a weir in Blind Creek to obtain an accurate count of the 2012 Chinook escapement;

- 2) Obtain age-sex-length (ASL) data from a representative sample of migrating Chinook with a minimum goal of 25% of the run;
- 3) Provide a Chinook salmon viewing opportunity and increase public awareness of the salmon resource and management programs.
- 4) Provide training and employment for local community residents and promote a stewardship ethic.

## **METHODS**

### ***Camp Set-up***

Materials for the camp were transported to the site from storage in Whitehorse and Faro by truck on July 19. As in previous years, the camp was set up on the west side of Blind Creek approximately 80 metres from the weir site and comprised of three wall tents: one to house a kitchen/eating area and two for sleeping quarters.

### ***Weir Construction***

Due to the high water levels encountered during scheduled set up in mid-July, construction of the weir was delayed until July 23 after water levels had subsided. The weir was placed at the same site used since 2003, 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 triangular shaped conduit panels, each 2 metres 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 2).

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 (Figure 3). Black poly was secured over the staging area to prevent fish moving in from seeing weir attendants on the platform. The weir was completed and 'fish tight' on July 25.

### ***Weir Operation***

Personnel were on site 24 hours a day for the duration of the Chinook run. Commencing July 25, the weir was monitored daily from first light until dark and kept closed at night. Daily and cumulative counts were recorded and relayed three times per week by phone to DFO Whitehorse Stock Assessment.



Figure 2. Blind Creek at high water on August 13.



Figure 3. View of counting chamber and sampling station looking from the east bank.

Chinook moving up behind the weir were allowed access to the counting chamber by raising a vertical gate secured to the downstream opening. After a few Chinook moved into the chamber the gate was closed and the fish immediately sampled. Only a small number of fish (<10) were held at any one time. In the instance where Chinook were observed accumulating behind the weir, a few were allowed to pass through the chamber without being sampled to avoid delaying the run. This was achieved by removing two or three pieces of loose conduit from the front panel. After a few fish were counted through the chamber, the conduit pieces were replaced and the next fish moving in held for sampling.

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 removed from the counting chamber by dip net 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. Five scales were taken from each fish and placed on standard scale cards for age determination. Scale cards and an electronic copy of ASL data were submitted to DFO, Whitehorse at the completion of field operations. Scales were analyzed for age by the DFO scale analysis lab at the Pacific Biological Station, Nanaimo, B.C.

During the high water event in early August, water conditions were too turbid to see Chinook moving into the counting chamber. At this time, it was possible to detect fish moving into the pen by the vibration of the conduit when fish hit the upstream end panel. When this occurred the gate was closed and all fish were removed by dip net and sampled.

The weir was checked at least twice a day for scouring and areas of possible escape and several times throughout the day during high water. Debris collecting on the weir was removed as required.



Figure 4. Chinook salmon sampling.

### ***Physical Measurements***

The air and water temperature was taken each morning using a hand-held thermometer. Water depth readings were taken at the same time from the Yukon Department of Environment staff gauge located about 25 m downstream of the lower bridge along the right bank.

Stream discharge and continuous water temperature data from May 9 to October 3 was obtained from The Yukon Department of Environment (Water Resources Branch) who have maintained a recording station in Blind Creek since 1992.

### ***Public Awareness***

Copies of the salmon brochure produced in 2005 by the proponent were provided to the Town of Faro Interpretive Centre at the start of the project. This brochure contains information about the salmon resource and weir operation for visitors to the Faro area. On-site interpretation was

provided by the proponent and field technicians. A daily record of the number of visitors viewing the weir operation was maintained.

## RESULTS

### *Chinook Counts*

A total of 157 Chinook salmon was counted through the weir between July 25 and August 20. Daily and cumulative counts are presented in Appendix 1. The first Chinook passed through the counting chamber on July 28. Fifty percent of the run had passed through the weir by August 8 and 90% by August 15.

### *Biological Sampling*

A total of 134 Chinook salmon (85% of the run) was live sampled for age-sex-length data (see sampling data, Appendix 2). Of these, 65 (49%) were female and 69 (51%) were male. The mean fork length of females and males sampled was 863 mm and 749 mm, respectively. The length frequency of female and male Chinook sampled is presented in Figure 6. Complete age data was determined from 105 of the Chinook sampled<sup>1</sup>. Age 6 (1.4, 2.3)<sup>2</sup> fish were the predominant age class at 46.7% followed by age 5 (1.3) at 38.1%. Age 4 (1.2) fish represented 10.5% and age 7 (2.4), 4.8%. Average length at age data for male and female Chinook sampled is presented in Table 1.

Table 1. Average length at age of Chinook sampled from Blind Creek, 2012.

DATA	AGE*	SEX	
		F	M
Average of FL	1.2		643
	1.3	821	745
	1.4	882	815
	2.3	910	743
	2.4	910	860
	no age	856	766
Count of SEX	1.2		11
	1.3	15	25
	1.4	28	15
	2.3	1	4
	2.4	4	1
	no age	17	13
Total Average of FL		863	749
Total Count of SEX		65	69

\*European age format

<sup>1</sup> Partial ages were determined for 26 fish sampled; no age could be determined for 4 of the sampled fish

<sup>2</sup> European age format, e.g. 1.4 denotes a 6 year old fish with 1+ years freshwater residence and 4 years marine.

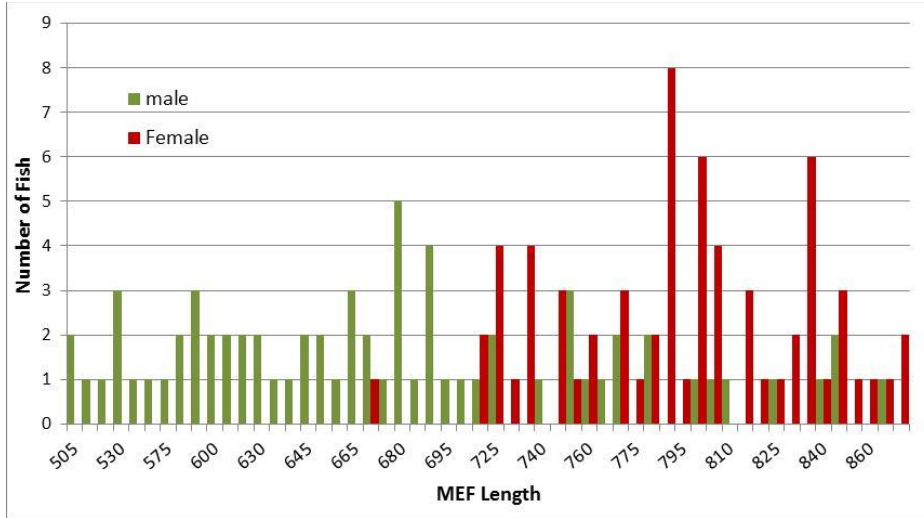


Figure 6. Length frequency of female and male Chinook sampled in 2012.

### *Physical Measurements*

Stream flow conditions in Blind Creek were above normal in 2012. The seasonal peak occurred on June 9<sup>th</sup> with a maximum discharge of 72.8 m<sup>3</sup>/sec., the highest recorded since 1992. Heavy rainfall on the 9<sup>th</sup> and 10<sup>th</sup> of August resulted in very high water and extreme turbid conditions which lasted for several days. The mean, maximum and minimum discharge in July and August for the period 1992 to 2012 is presented in Appendix 4. Daily weather and water conditions recorded by weir attendants in July and August are presented in Appendix 7.

A maximum water temperature of 13.9°C on July 27 was recorded by Water Resources, Yukon Department of Environment. Mean water temperatures for July and August were 10.0° C and 9.6° C, respectively (Water Resources, Yukon Department of Environment).

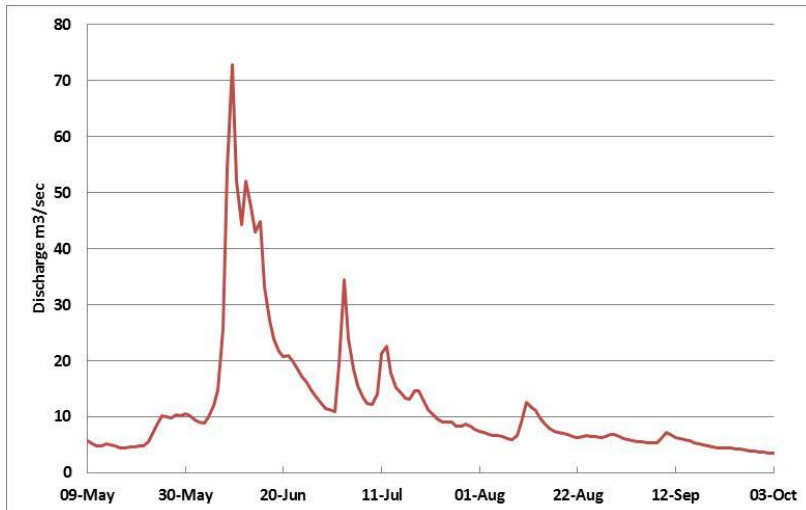


Figure 7. Stream discharge in Blind Creek, 2012. (Water Resources, Yukon Department of Environment)

### ***Public Awareness***

The weir was visited by at least 84 people over the course of operations this year including local people and tourists visiting the Faro area.

### **DISCUSSION**

The escapement total of 157 Chinook in Blind Creek was the lowest observed over the ten year duration of the project. In addition to the Blind Creek project, the other two Chinook escapement monitoring projects in the upper Yukon River, the Big Salmon and Teslin River sonar projects, indicated the 2012 upper Yukon Chinook escapement was significantly below average (Mercer and Wilson 2013, Mercer 2013).

The start of the project was characterized by record high water levels in Blind Creek which delayed placement of the weir until July 25, about 7 days later than scheduled. In previous years Chinook have arrived as early as July 17. The 2012 Chinook run in the Yukon River, however, was 7-10 days later than average and Chinook were not seen at the weir until July 28. This run timing was similar to previous late run years in Blind Creek (Appendix 5). The weir functioned well and remained ‘fish tight’ for the duration of the project.

The condition of Chinook sampled during the high water event in early August was poor with most showing signs of decay. The overall condition of the Blind Creek Chinook in 2012 was generally considered to be fair to poor; likely due to the high flows encountered throughout much of their migration. With the poor condition of fish observed at the peak of the run it may be that some Chinook were unable to complete their migration to spawn in Blind Creek.

### **ACKNOWLEDGEMENTS**

The author would like to thank Caitlin Irvine and John Ollie for their assistance in weir operations. Jeff Irvine and Vincent Ray provided assistance installing the weir. Jonathan Kolot of Environment Yukon provided stream discharge and temperature data for this report. Special acknowledgement is due to the Town of Faro for kindly providing storage space for camp equipment.

**References:**

- Harder, P.H., 1996. Chinook Salmon Spawner Aerial Survey, Blind Creek- August 1996. Prepared for Anvil Range Mining Corporation Inc.
- Mercer, B. 2013. 2012 Teslin River Chinook Sonar Project. CRE project 01N-12, Yukon River Panel.
- Mercer, B. and J. Wilson, 2013. 2012 Chinook Salmon Sonar Enumeration on the Big Salmon River. CRE project 41-12, Yukon River Panel.
- Vust, P. 1999. Blind Creek Chinook Salmon Enumeration Weir, 1999. Prepared for the Ross River Dena Council and DFO, Aboriginal Fishery Strategy.
- Wilson, J. 1997. Blind Creek Chinook Salmon Enumeration Weir, 1996. Prepared for the Ross River Dena Council and DFO, Aboriginal Fishery Strategy.
- Wilson, J. 1997. Blind Creek Chinook Salmon Enumeration Weir, 1997. Prepared for the Ross River Dena Council and DFO Aboriginal Fishery Strategy.
- Wilson, J. 1998. Blind Creek Chinook Salmon Enumeration Weir, 1998. Prepared for Ross River Dena Council and DFO Aboriginal Fishery Strategy.
- Wilson, J. 2001. Aerial Enumeration Survey of Chinook Salmon Spawners in Blind Creek, August, 2001. Prepared for Ross River Dena Council and DFO Aboriginal Fishery
- Wilson, J. 2002. Aerial Survey of Chinook Salmon in Selected Tributaries of the Pelly River. Prepared for Ross River Dena Council and DFO Aboriginal Fishery Strategy.
- Wilson, J. 2004-2012. Blind Creek Chinook Salmon Enumeration Weir. Annual reports prepared for the Yukon River Panel, CRE-37.

Appendix 1. Blind Creek weir Chinook salmon counts, 2012.

<b>DATE</b>	<b>Daily Count</b>	<b>Cumulative</b>	<b># Sampled</b>	<b>#Females sampled</b>	<b>#Males sampled</b>	<b>Comments</b>
25-Jul	0	0	0	0	0	weir fish tight 11:00 a.m
26-Jul	0	0	0	0	0	
27-Jul	0	0	0	0	0	
28-Jul	2	2	2	1	1	
29-Jul	2	4	2	1	1	
30-Jul	0	4	9	0	0	
31-Jul	3	7	3	2	1	
1-Aug	3	10	3	2	1	
2-Aug	4	14	4	2	2	
3-Aug	7	21	7	2	5	
4-Aug	6	27	6	1	5	
5-Aug	2	29	1	0	1	
6-Aug	8	37	8	2	6	
7-Aug	9	46	9	3	6	
8-Aug	33	79	23	12	11	
9-Aug	17	96	9	2	7	
10-Aug	13	109	9	4	5	
11-Aug	2	111	2	1	1	
12-Aug	6	117	6	3	3	
13-Aug	10	127	10	9	1	
14-Aug	7	134	7	3	4	
15-Aug	8	142	8	4	4	
16-Aug	9	151	9	8	1	
17-Aug	4	155	4	2	2	
18-Aug	2	157	2	1	1	
19-Aug	0	157	0	0	0	
20-Aug	0	157	0	0	0	weir out by 1:00 p.m.
<b>TOTAL:</b>	157		135	65	69	

Appendix 2. Blind Creek Chinook salmon live sampling results, 2012.

DATE	FISH #	SEX	FL	MEF (mm)	AGE*
24-Jul	1	M	900	805	1.4
24-Jul	2	F	870	800	1.4
26-Jul	3	F	900	820	1.4
27-Jul	4	M	660	595	1.2
28-Jul	5	F	860	800	1.4
28-Jul	6	M	740	670	1.3
29-Jul	7	F	900	830	1.4
29-Jul	8	F	740	670	M3
29-Jul	9	M	700	630	RS
29-Jul	10	F	820	755	M4
30-Jul	11	F	820	750	1.3
30-Jul	12	M	850	760	2.3
31-Jul	13	M	800	725	1.4
1-Aug	14	F	920	845	1.4
1-Aug	15	M	780	695	2.3
1-Aug	16	F	850	775	1.4
1-Aug	17	F	910	840	1.4
1-Aug	18	M	940	840	1.4
1-Aug	19	M	620	550	1.3
1-Aug	20	M	760	675	M3
1-Aug	21	M	710	635	1.3
1-Aug	22	M	810	725	1.3
1-Aug	23	M	940	845	1.4
1-Aug	24	M	680	610	1.3
2-Aug	25	M	720	645	1.3
2-Aug	26	M	790	705	1.3
2-Aug	27	F	840	770	1.4
2-Aug	28	M	580	525	2.3
2-Aug	29	M	990	880	1.4
2-Aug	30	M	770	685	1.2
2-Aug	31	M	840	755	M4
3-Aug	32	M	720	645	1.3
3-Aug	33	M	720	650	M3
3-Aug	34	F	860	795	M4
3-Aug	35	F	860	790	2.4
3-Aug	36	M	590	530	1.2
3-Aug	37	M	770	690	1.3
4-Aug	38	F	890	815	1.4
4-Aug	39	F	910	845	M4
4-Aug	40	F	770	705	1.3
4-Aug	41	M	580	530	1.2
4-Aug	42	M	550	505	1.2
4-Aug	43	M	740	665	M3
4-Aug	44	M	750	670	M3
4-Aug	45	M	760	680	1.3
4-Aug	46	F	800	730	1.3
5-Aug	47	F	810	735	M4
5-Aug	48	F	860	790	1.4
5-Aug	49	F	910	835	2.4
5-Aug	50	F	910	830	2.3

DATE	FISH #	SEX	FL	MEF (mm)	AGE
5-Aug	51	F	860		1.3
6-Aug	52	F	850		1.3
6-Aug	53	M	630		1.2
6-Aug	54	M	710		1.4
6-Aug	55	F	880		M4
6-Aug	56	F	830		M4
6-Aug	57	M	700		1.4
6-Aug	58	M	840		1.3
6-Aug	59	F	910		2.4
6-Aug	60	M	680		1.4
6-Aug	61	M	730		1.4
6-Aug	62	M	670		1.4
6-Aug	63	M	650		1F
6-Aug	64	M	920		M3
7-Aug	65	M	860		2.4
7-Aug	66	F	860		1.3
7-Aug	67	F	870		1.3
7-Aug	68	M	660		1.3
7-Aug	69	F	910		1.4
7-Aug	70	M	940		1.3
8-Aug	71	M	770		1.4
8-Aug	72	F	850		1.4
8-Aug	73	M	770		1.4
8-Aug	74	M	560		M3
8-Aug	75	M	690		1.2
8-Aug	76	M	660		1.3
8-Aug	77	M	640		1.2
8-Aug	78	F	860		1.3
8-Aug	79	-	NM		1.4
8-Aug	80	M	890		1.4
8-Aug	81	M	760		1.3
8-Aug	82	F	790		M3
8-Aug	83	M	740		1.3
8-Aug	84	M	650		1.2
8-Aug	85	F	800		1.3
8-Aug	86	F	970		M4
9-Aug	87	M	870		1.3
9-Aug	88	M	760		2.3
9-Aug	89	F	890		1.4
9-Aug	90	M	720		1.2
9-Aug	91	M	670		1.3
9-Aug	92	F	820		RG
9-Aug	93	M	825		M3
9-Aug	94	F	880		1.4
9-Aug	95	F	800		1.3
9-Aug	96	M	860		1.3
9-Aug	97	F	770		1.3
9-Aug	98	F	790		1.3
9-Aug	99	F	840		M4
10-Aug	100	F	860		1.4
10-Aug	101	F	870		RG
10-Aug	102	F	870		1.4



DATE	FISH #	SEX	FL	MEF (mm)	AGE
10-Aug	103	F	800		1.3
10-Aug	104	F	880		1.4
10-Aug	105	F	860		M4
10-Aug	106	M	580		1.3
10-Aug	107	M	770		M3
10-Aug	108	M	740		1.3
10-Aug	109	F	970		1.4
10-Aug	110	F	930		1.4
10-Aug	111	M	760		1.3
10-Aug	112	F	910		1.4
10-Aug	113	M	850		1F
10-Aug	114	M	690		1.3
10-Aug	115	F	830		M4
10-Aug	116	F	960		2.4
10-Aug	117	F	890		M4
10-Aug	118	M	900		1.4
10-Aug	119	M	870		NS
10-Aug	120	F	910		M4
10-Aug	121	F	790		1.4
10-Aug	122	M	590		1.2
10-Aug	123	F	900		1.4
10-Aug	124	F	920		M4
10-Aug	125	F	820		1.3
10-Aug	126	F	940		1.4
10-Aug	127	F	910		1.4
10-Aug	128	F	840		1.3
10-Aug	129	F	860		1.4
10-Aug	130	F	790		1.4
10-Aug	131	M	840		1.4
10-Aug	132	M	780		1.3
10-Aug	133	F	870		1.4
10-Aug	134	M	760		1.3
10-Aug	135	F	880		1.4

\*European age format  
 NM = no measurement

**No Ages:**

RS = resorbed scale (growth at scale margin is missing)  
 NS = no scale  
 RG = regenerate scale (center is missing from scale)

**Partial Ages:**

F=freshwater stage  
 M=Marine stage

Appendix 3. Sex composition of Chinook salmon sampled in Blind Creek, 2003-2012.

<b>YEAR</b>	<b>Sample Size</b>	<b># Females</b>	<b>% of Total</b>	<b># Males</b>	<b>% of Total</b>
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%
2009	245	106	43.3%	139	56.7%
2010	185	77	41.6%	108	58.4%
2011	203	111	54.7%	92	45.3%
2012	134	65	49.0%	69	51.0%
<b>Average</b>	<b>144</b>	<b>67</b>	<b>45.6%</b>	<b>78</b>	<b>54.4%</b>

Appendix 4. Percent composition of age class in sampling years 2006 through 2012.

<b>YEAR</b>	<b>SAMPLE SIZE*</b>	<b>% Of TOTAL</b>				
		<b>AGE-3</b>	<b>AGE-4</b>	<b>AGE-5</b>	<b>AGE-6</b>	<b>AGE-7</b>
<b>2006</b>	36	0	71.0	20.0	0	0
<b>2007</b>	61	0	16.0	35.0	46.0	4.0
<b>2008</b>	146	0	10.3	47.9	37.0	4.8
<b>2009</b>	147	4.1	16.3	33.3	44.9	1.4
<b>2010</b>	127	0	8.7	53.5	33.1	4.7
<b>2011</b>	164	0	9.7	26.2	55.8	8.5
<b>2012</b>	105	0	10.5	38.1	46.7	4.8

\* Number of Chinook sampled for which age was determined.

Appendix 5. Blind Creek Chinook Counts from aerial surveys and weir operations, 1989, 1990, 1995-2012.

YEAR	METHOD	CHINOOK COUNTS	START DATE	ARRIVAL OF FIRST FISH	END DATE	50% of Run	90% of Run
1989	Aerial survey <sup>a</sup>	400	Aug 7		Aug 7		
1990	Aerial survey <sup>a</sup>	443	Aug 14		Aug 14		
1995	Weir	826	NR		NR		
1996	Aerial survey <sup>a</sup>	422	Aug ?		Aug ?		
1996	Weir	NR	July 28		Aug 17		
1997	Weir	957	July 24	July 25	Aug 22	July 30	Aug 8
1998	Weir	373	July 19	July 27	Aug 19	Aug 4	Aug 15
1999	Weir	892	July 28	Aug 1	Aug 22	Aug 6	Aug 10
2000	Weir	NR	NR		NR		
2001	Aerial survey <sup>b</sup>	226	Aug 21		Aug 21		
2002	Aerial survey <sup>b</sup>	107	Aug 15		Aug 15		
2003	Weir	1,155	July 16	July 17	Aug 18	July 29	Aug 5
2004	Weir	792	July 11	July 19	Aug 15	July 30	Aug 5
2005	Weir	525	July 15	July 20	Aug 15	Aug 4	Aug 10
2006	Weir	677	July 16	July 28	Aug 17	Aug 5	Aug 12
2007	Weir	304	July 17	July 24	Aug 17	Aug 6	Aug 12
2008	Weir	276	July 25	July 28	Aug 19	Aug 12	Aug 17
2009	Weir	716	July 20	July 27	Aug 19	Aug 6	Aug 10
2010	Weir	270	July 19	July 28	Aug 19	Aug 11	Aug 16
2011	Weir	360	July 15	July 24	Aug 18	Aug 10	Aug 13
2012	Weir	157	July 25	July 28	Aug 20	Aug 8	Aug 15

<sup>a</sup> aerial survey conducted by P.A. Harder and Associates Ltd.

<sup>b</sup> aerial survey conducted by RRDC and Jane Wilson & Associates

NR - not reported

Note: weir operations in 1997, 1998 and 1999 involved enumeration of Chinook salmon only. Sampling conducted in later years resulted in delays in the normal migration timing.

Appendix 6. Daily and average Chinook salmon counts in Blind Creek, 1997-1999, 2003-2012

DATE	Daily Count 2012	Daily Count 2011	Daily Count 2010	Daily Count 2009	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					0
16-Jul		0					0	0	0	0				0
17-Jul		0				0	0	0	0	1				0
18-Jul		0				0	0	0	0	1				0
19-Jul		0	0			0	0	0	1	2		0		0
20-Jul		0	0	0		0	0	1	32	0		0		4
21-Jul		0	0	0		0	0	0	5	2		0		1
22-Jul		0	0	0		0	0	1	2	4		0		1
23-Jul		0	0	0		0	0	0	2	2		0		0
24-Jul		3	0	0		1	0	0	140	1		0		16
25-Jul	0	0	0	0	0	0	0	0	24	10	0	0	122	13
26-Jul	0	1	0	0	0	0	0	2	10	17	0	0	85	10
27-Jul	0	1	0	2	0	7	0	10	20	495	0	1	66	50
28-Jul	2	2	1	8	1	3	2	8	60	2	0	0	73	13
29-Jul	2	5	1	27	1	3	9	13	33	68	0	0	64	19
30-Jul	0	4	1	12	2	10	27	105	225	95	0	0	70	46
31-Jul	3	1	17	106	1	9	26	18	36	7	0	0	44	22
01-Aug	3	11	0	84	4	8	67	15	60	45	15	0	49	30
02-Aug	4	7	0	25	1	27	8	15	34	0	65	6	77	22
03-Aug	7	6	0	24	6	6	109	35	7	7	133	34	38	34
04-Aug	6	11	1	0	3	13	25	45	15	201	50	169	60	49
05-Aug	2	7	33	22	5	8	131	46	15	75	116	16	22	41
06-Aug	8	13	23	106	11	63	19	53	27	50	73	4	33	40
07-Aug	10	7	19	67	17	59	47	54	19	12	25	5	20	29
08-Aug	33	35	5	30	26	6	63	31	4	18	129	5	43	33
09-Aug	17	30	9	110	18	20	44	18	8	1	128	1	19	34
10-Aug	13	86	4	28	11	9	14	15	2	0	139	31	21	30
11-Aug	2	45	27	20	15	4	16	14	10	8	1	25	5	16
12-Aug	6	31	23	9	19	16	28	11	1	4	0	15	16	14
13-Aug	9	29	19	7	27	14	19	7	0	18	0	9	5	13
14-Aug	7	6	40	6	20	8	11	3	0	2	0	11	1	9
15-Aug	8	13	14	13	26	6	6	5	0	2	0	18	13	10
16-Aug	9	1	6	3	23	4	5			5	0	7	8	6
17-Aug	4	5	12	4	23		1			0	0	9	3	6
18-Aug	2	0	12	3	12					0	14	3		6
19-Aug	0		3	0	4						4	4		3
20-Aug	0										0			0
21-Aug											0			0
<b>TOTAL</b>	<b>157</b>	<b>360</b>	<b>270</b>	<b>716</b>	<b>276</b>	<b>304</b>	<b>677</b>	<b>525</b>	<b>792</b>	<b>1155</b>	<b>892</b>	<b>373</b>	<b>957</b>	

Note: shaded areas denote start and end date of weir operations

Appendix 7. Mean, Maximum and Minimum discharge in cubic metres per second for July and August, Blind Creek, 1992-2012.

	JULY Daily Discharge (m <sup>3</sup> /sec)					AUGUST Daily Discharge (m <sup>3</sup> /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
2009 <sup>a</sup>	3.62	6.49	11/07	1.79	31/07	2.24	4.44	27/08	0.81	07/08
2010 <sup>b</sup>	-	-	-	-	-	-	-	-	-	-
2011 <sup>c</sup>	-	-	-	-	-	-	-	-	-	-
2012	14.00	34.4	03/07	7.72	31/07	7.41	12.6	11/08	5.92	08/08

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

<sup>a</sup> Preliminary data – February 10, 2009. Discharge data was not available for the period July 3-July 10.

<sup>b</sup> Data not available at the time of writing this report.

<sup>c</sup> No data available due to equipment malfunction

Note: 1998 and 2000 data not available

(Source: Water Resources, Yukon Department of Environment).

Appendix 8. Blind Creek weather and water conditions, 2012.

DATE	TIME	AIR TEMP (°C)	WATER TEMP (°C)	WATER LEVEL (cm)	WATER CLARITY	WEATHER
July 19	-	-	-	97	dark stained	Sunny and warm
July 20	14:00	26	-	90	dark stained	Sunny, hot
July 21	13:00	28	-	80	dark stained	Sunny, hot
July 22	14:00	28	13	75	dark stained	Sunny, hot
July 23	20:00	20	13	75	dark stained	mix sun & cloud, light breeze
July 24	8:00	12	13	74	dark stained	light rain shower overnight, sunny & hot during day, rain in evening
July 25	8:00	12	12	75	dark stained	mix sun & cloud
July 26	8:05	10	11	74	dark stained	Sunny & hot
July 27	8:25	17	13	71	dark stained	mix sun & cloud, hot
July 28	8:45	14	13	71	dark stained	Rain
July 29	8:35	13	13	71.5	dark stained	mix sun & cloud, warm
July 30	8:20	11	12	72	dark stained	Sunny & warm
July 31	7:55	10	12	69	dark stained	Mix sun and cloud, warm, light rain shower in evening
Aug. 1	8:10	9	12	64	stained	mix sun & Cloud, warm
Aug. 2	8:10	11	12	62	stained	overcast
Aug. 3	8:15	11	12	60	stained	mix sun & cloud, cool & windy
Aug. 4	8:30	11	11.5	58	stained	mix sun and cloud, warm & windy
Aug. 5	8:20	7	11	55	stained	overcast with light rain showers throughout the day
Aug. 6	8:15	9	11.5	55	stained	overcast and cool
Aug. 7	8:10	11	12	53	stained	mix sun & cloud, warm
Aug. 8	8:10	14	11	52	stained	Light rain overnight, overcast in morning, clearing by afternoon, warm
Aug. 9	8:15	12	12	54	slightly turbid	thunderstorm overnight with heavy rain
Aug. 10	8:15	10	10	72	muddy	heavy rain overnight, clearing by afternoon, warm
Aug. 11	8:30	6	9	100	muddy	mix of sun & cloud, warm
Aug. 12	8:30	8	10	103	muddy	thunder with dark clouds, light rain shower
Aug. 13	8:10	9	10	94	muddy	overcast with light rain, clearing by evening
Aug. 14	8:15	5	9	88	turbid	Sunny
Aug. 15	8:20	6	9	81	turbid	Sunny
Aug. 16	8:10	5	10	74	turbid	mix sun & cloud
Aug. 17	8:20	7	10	70	clearing slightly	mix sun & cloud
Aug. 18	8:10	10	11	70	clearing	Rain, clearing by evening
Aug. 19	8:20	6	9	69	clearing	Sunny
Aug. 20	8:20	5	8	68	clearing	Frost in morning, sunny

