TWIN VALLEY DAM ENVIRONMENTAL MONITORING PROGRAM: LITTLE BOW RIVER AND MOSQUITO CREEK FISH INVENTORY PROJECT, 2014

Final

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ABSTRACT

In 2014, fish sampling was conducted by means of boat and backpack electrofishing as part of an ongoing program to monitor for changes in composition, relative abundance, and distribution of fish species in the Little Bow River and Mosquito Creek, post completion of the Twin Valley Dam. Sampling was carried out at the seven previously established boat electrofishing reference sample sections on the Little Bow River with each site containing two to four backpack electrofishing sections to obtain small fish. Six monitoring sections on Mosquito Creek were established in 2009 and sampled again in 2014. Sampling was completed on a seasonal basis during the spring, summer and the fall. Measurements of basic water quality were recorded during each season at each site and habitat within each reference section was inventoried during the summer season. During summer and fall sampling, a sub-sample of Northern Pike and White Sucker were retained for mercury analysis.

A total of fifteen species were captured from the Little Bow River during sampling in 2014, down from the eighteen species captured in 2009. Eleven species, including three sport fish species and eight non-sport species were captured from upstream of Twin Valley Reservoir, and eleven species; four sport and seven non-sport species, were captured from downstream of the reservoir. White Sucker dominated the catch by boat electrofishing and Longnose Dace were the dominant fish species in the small fish sections. Both of these species dominated the catch upstream and downstream of Twin Valley Reservoir. The community downstream of the reservoir is influenced by fish resident to Travers Reservoir including Lake Whitefish, Walleye, Burbot and Shorthead Redhorse and the community upstream of Twin Valley Reservoir is influenced by migrants, primarily Mountain Whitefish, from the Highwood River.

In general, the relative abundance and distribution of major species in the populations downstream and upstream of Twin Valley Reservoir was similar in 2014 as compared to previous sample data. Northern Pike were elusive during the spring and summer electrofishing efforts but were well-dispersed across all study sections during the fall monitoring and were slightly more abundant than in previous years. Yellow Perch were not captured above or below Twin Valley Dam in 2014 and ripe Lake Whitefish were found below the Carmangay weir in the fall. Juvenile Mountain Whitefish were somewhat common upstream of the Twin Valley Reservoir and Brown Trout were captured in Section 6 during both the summer and fall sampling.

Habitat composition and basic water quality parameters have also exhibited little change over monitoring years; run type habitat remains predominant with fine substrates comprising the majority of the streambed and aquatic vegetation providing the bulk of fish cover. Basic water quality measurements obtained in each season indicated moderate temperatures and good oxygen content; water was moderately basic in the spring and became slightly basic by fall, and displayed moderate to high conductivity while turbidity values ranged from low to moderate.

In Mosquito Creek nine of the fifteen historically captured species were found including White Sucker and Longnose Dace, which dominated the fish population in Mosquito Creek. Sport fish species were rare in 2014 with a single Rainbow Trout captured in Section 5 during the fall sampling. Habitat within the creek was comprised primarily of shallow to moderate depth run habitat with deep water habitat suitable for overwintering relatively scarce. Basic water quality measurements indicated a moderate temperature variation with reasonable oxygen content. Water was moderately basic and displayed moderate to high conductivity and low to moderate turbidity.

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1.0 INTRODUCTION

The Twin Valley Reservoir (TVR) is located on the Little Bow River southeast of Nanton and west of Champion, Alberta (Figure 2.1). Completed in 2003, the reservoir was constructed to increase water supply for agricultural and municipal use and reduce dependence on summer diversion from the Highwood River. The reservoir is an on-stream impoundment filled by the Little Bow River, Mosquito Creek, and diversion from the Highwood River during the spring freshet. Fisheries mitigation projects on the Little Bow River included construction of a fish exclusion screen at the Little Bow Canal head works, replacement of impassable or partially passable river fords, and construction of a bypass channel at the Carmangay Weir. These mitigation efforts are expected to result in reduced entrainment of Highwood River fish and dispersal of fish past historical barriers. Potential effects to the fisheries resources of the Little Bow River and Mosquito Creek as a result of the Twin Valley Dam (TVD) project may include habitat alterations, changes in water quality, and changes in flow and temperature regimes. Monitoring of the Little Bow River and Mosquito Creek is necessary to determine if these factors are affecting fish populations.

In 2004, Alberta Environment initiated a fish population-monitoring program on the Little Bow River upstream of Travers Reservoir. The objective of the 2004 work was to establish reference sample sections and define methodology to facilitate long-term monitoring of fish species composition, relative abundance, and distribution in the Little Bow River post completion of the TVD. The monitoring program conducted in 2005, 2006 and 2009 included boat and backpack electrofishing of the established reference sample sections on the Little Bow River. In 2009 six backpack electrofishing reference sections were established additionally on Mosquito Creek. The sampling of these reference sections on both the Little Bow River and Mosquito Creek was repeated during the 2014 monitoring program.

This document presents the results of the 2014 monitoring conducted by Pisces Environmental Consulting Services Ltd (Pisces). These investigations are part of the ongoing program to describe the fish community of the Little Bow River and Mosquito Creek within the study areas during the spring, summer, and fall in terms of range of occurrence and relative abundance of fish species, with the overall objective of determining the effect of water management on the Little Bow River and Mosquito Creek fish populations.

2.0 STUDY AREA

The 2014 monitoring program included sampling of previous established sections on the Little Bow River and Mosquito Creek (Figure 2.1).

2.1 LITTLE BOW RIVER

The Little Bow River originates in the town of High River, Alberta and is augmented by diversions from the Highwood River. The drainage area extends in a south-easterly direction with the Little Bow River eventually flowing into the Oldman River northeast of Lethbridge. Two reservoirs are located on the Little Bow River; the Twin Valley Reservoir (TVR) is located approximately 18 km west of the town of Champion and the Travers Reservoir is located approximately 23 km east of Champion (Figure 2.1).

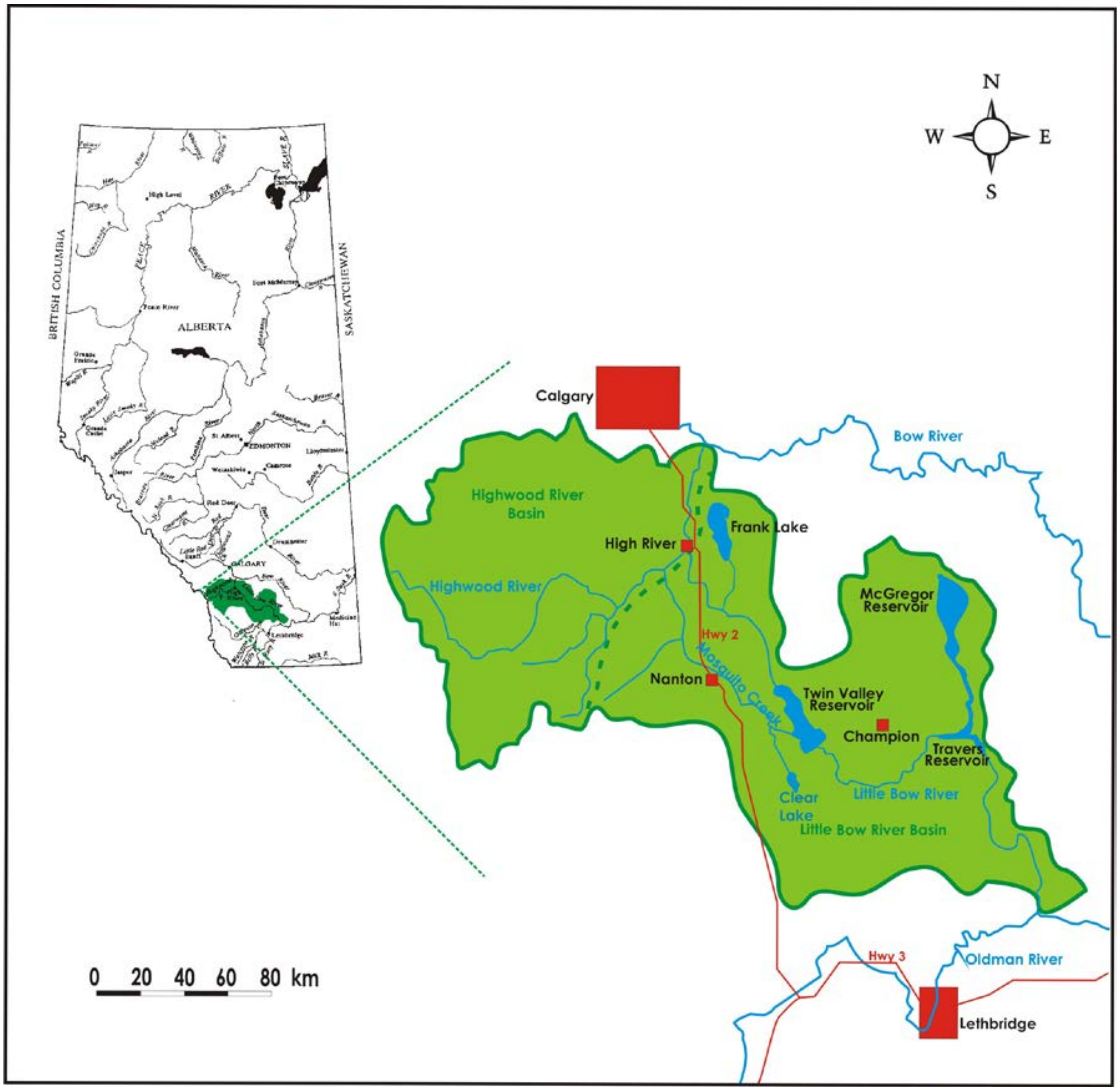

Figure 2.1. Location of the Little Bow River Basin and Highwood River Basin in Alberta.

2.1.1 Reference Sections for Boat Electrofishing

The seven reference sample sections in 2014 were the same as in 2005, 2006 and 2009 and section boundaries were consistent with the previous monitoring programs (Figure 2.2). The location (UTM), length (m), and average width (m) were recorded for each section (Table 2.1).

Table 2.1. Little Bow River boat electrofishing sample section characteristics.

Section	Location (UTM NAD 83) Upstream Section Boundary	Location (UTM NAD 83) Downstream Section Boundary	Section Length (m)	Average Wetted Width (m)		
				Spring	Summer	Fall
LBR 1	359181 E 5561777 N	358835 E 5563192 N	2769	14.2	14.1	13.6
LBR 2	348589 E 5554985 N	350415 E 5556792 N	3805	16.2	19.7	17.1
LBR 3	328641 E 5567029 N	329295 E 5566144 N	1910	18.1	23.9	18.6
LBR 4	319117 E 5580780 N	320246 E 5579157 N	2593	15.3	20.7	16.4
LBR 5	313938 E 5593698 N	314274 E 5593142 N	909	12.7	16.1	13.2
LBR 6	304432 E 5596713 N	305938 E 5596385 N	1975	9.8	13.3	10.4
LBR 7	301736 E 5600289 N	301940 E 5599233 N	1688	15.3	17.4	15.7

2.1.2 Sample Sections for Backpack Electrofishing

Two to four backpack electrofishing sample sections were selected within each of the seven reference sections. The location and length of each sample section was dependent on the incidence and size of discrete habitat units (i.e. riffle, shallow run) that could be sampled by backpack electrofishing. The location (UTM), length (m), and average width (m) of each section were recorded (Table 2.2).

Table 2.2. Little Bow River backpack electrofishing sample section characteristics.

Section		Location (UTM NAD 83) Downstream Section Boundary	Section Length (m)	Section Width (m)		
				Spring	Summer	Fall
LBR 1	A	359200 E 5561873 N	28	13.5	14.1	12.9
	B	358836 E 5563322 N	28	15.7	16.7	14.9
	C	358811 E 5563296 N	23	16.3	17.4	15.8
LBR 2	A	328916 E 5566427 N	26	25.3	27.1	25.6
	B	329036 E 5566432 N	29	24.0	26.5	24.8
	C	329033 E 5566415 N	46	22.0	24.3	21.7
LBR 3	A	328869 E 5566411 N	30	26.3	27.5	25.8
	B	328942 E 5566439 N	26	18.0	19.3	18.2
	C	329046 E 5566390 N	55	20.3	22.0	19.9
LBR 4	A	319045 E 5580961 N	29	10.7	12.1	10.4
	B	319094 E 5580961 N	35	9.7	11.6	9.9
LBR 5	A	314250 E 5593314 N	45	6.7	7.6	7.0
	B	314288 E 5593387 N	30	14.3	16.3	15.1
LBR 6	A	304402 E 5596936 N	15	6.7	8.2	7.0
	B	304555 E 5593378 N	40	7.8	10.1	8.6
	C	304565 E 5596782 N	32	6.6	7.9	7.1
	D	305758 E 5596437 N	32	5.2	7.3	5.9
LBR 7	A	301685 E 5600496 N	23	11.3	13.5	11.9
	B	301689 E 5600537 N	66	9.0	12.2	9.6

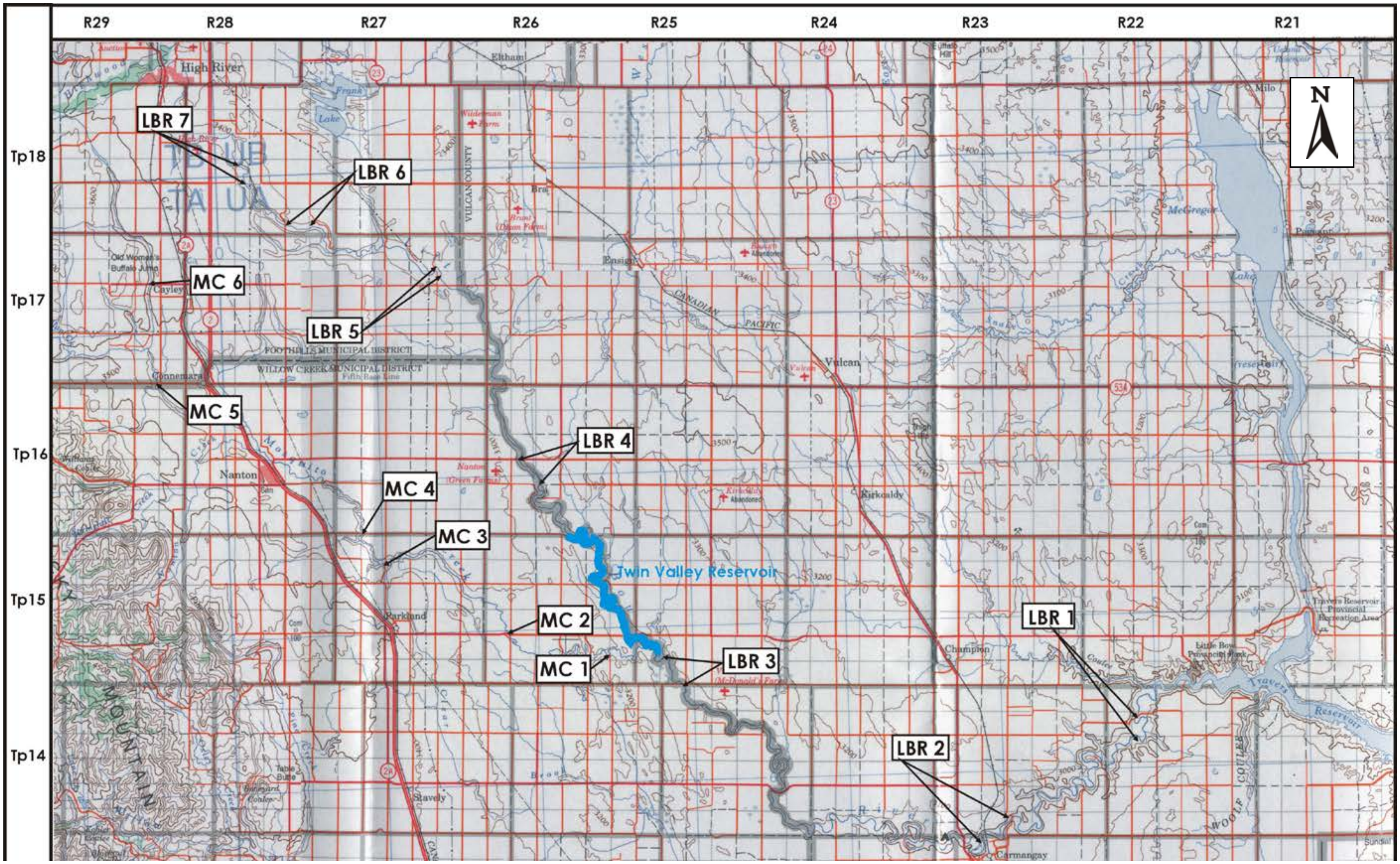

Figure 2.2. Location of Sample Sections on the Little Bow River and Mosquito Creek.

2.2 MOSQUITO CREEK

Mosquito Creek originates approximately 12 km southwest of the town of High River, Alberta and is augmented by flows from the Highwood River via the Woman's Coulee diversion structure (Figure 2.1). A portion of Mosquito Creek is diverted into Clear Lake, with the remainder flowing into the TVR (Figure 2.1).

2.2.1 Reference Sections for Electrofishing

Six reference sample sections established in 2009 along Mosquito Creek between Woman's Coulee Reservoir and the TVR were again electrofished in 2014 (Figure 2.2). Site four in 2009 was fished downstream of the Township Road 160 bridge but due to complications getting ahold of the landowner in 2014 the section was moved upstream of the bridge. The location (UTM), length (m), and average width (m) were recorded for each section (Table 2.3).

Table 2.3 Mosquito Creek Electrofishing Section Characteristics in 2014.

Section	Location (UTM NAD 83)		Section Length (m)	Average Wetted Width (m)		
	Upstream Section Boundary	Downstream Section Boundary		Spring	Summer	Fall
MC 1	323120 E 5568072 N	323324 E 5567919 N	300	8.5	8.9	7.44
MC 2	317944 E 5569892 N	317933 E 5569747 N	300	11.2	11.7	9.4
MC 3	309904 E 5574634 N	310085 E 5574595 N	300	13.8	13.1	12.6
MC 4	308572 E 5576746 N	308506 E 5576562 N	300	14.8	15.2	14.1
MC 5	295515 E 5586587 N	295580 E 5586561 N	310	7.1	8.3	6.8
MC 6	295324 E 5593198 N	295207 E 5593008 N	310	3.9	5.7	3.1

3.0 METHODS

3.1 LITTLE BOW RIVER

3.1.1 Fish Sampling

Fish sampling was conducted on a seasonal basis in 2014. Spring sampling was completed in early June; summer sampling was conducted in early August and fall sampling was completed in late October.

All capture data was recorded and submitted to the Alberta Environment and Sustainable Resource Development (ESRD), Fisheries and Wildlife Management Information System (FWMIS).

3.1.1.1 Boat Electrofishing

Sample section boundaries were the same as in 2005, 2006 and 2009. A minimum of five stream widths were recorded for each section during spring, summer, and fall sampling events.

A portable electrofisher (Smith-Root GPP 2.5) mounted on an inflatable boat was used in a single pass electrofishing survey of each section. Electrofishing was conducted using a three-person crew. The crew leader was positioned in the rear of the boat and operated the electrofisher and rowed the boat. From the front of the boat, one crewmember manipulated a pole-mounted ring anode while the other crewmember dip-netted fish. As fish were captured, they were placed in a live-well located directly behind the crewmembers at the front of the boat.

For each species, all sport fish and up to 30 fish of each non-sport species were measured (fork length) and weighed (to the nearest gram) with the remaining catch identified and enumerated.

3.1.1.2 Backpack Electrofishing

Sample section boundaries within the boat electrofishing were the same as in 2009 with the exception of site 2d and 4c which were removed from the monitoring program because they no longer had the habitat characteristics that met the criteria for small fish sampling. The UTM coordinates of the downstream boundary of each sample section were recorded and stakes were placed at the upstream and downstream boundaries to define the section. The length, average width, and a general description of the habitat within each study section were recorded during spring, summer and fall sampling events.

A Smith Root Type LR-24 backpack electrofisher was used in a single pass survey of each sample section. Backpack electrofishing was conducted using two person crews; one crew member carried the electrofisher and manipulated the pole-mounted ring anode, while the other crewmember dip-netted fish and placed captured specimens in a live-well.

For each section, 30 fish of each species captured were measured (fork length) and weighed (to the nearest gram) with the remaining catch identified and enumerated.

3.1.1.3 Mercury Sampling

Sub-samples of Northern Pike and White Suckers were retained from above and below TVR for mercury analysis. The objective was to retain 20 specimens of each of the target species from both upstream and downstream of the reservoir. Specimens were weighed, measured, tagged for identification, frozen, and delivered to Alberta Environment (AENV) Lethbridge office to transport to the Alberta Research Council in Vegreville, Alberta for analysis.

3.1.2 Habitat

During summer sampling habitat within each boat electrofishing sample section was characterized using Pisces' standard inventory methods (Appendix A), which are based on the O'Neil method (O'Neil and Hildebrand 1986) suited for small to medium size rivers where distinct channel units are discernible. The procedure divides the stream channel into a continuous series of habitat types, based on differentiation in specific features such as depth, velocity, surface, flow pattern and substrate, and provides results that are comparable with methods employed during baseline pre-dam work (Pisces 2000) and during post construction monitoring (Sikina and Bryski 2005, Stemo 2006 and 2007, Herron and Stemo 2010, Herron and Boorman 2010).

3.1.3 Water Quality

Basic water quality parameters for the Little Bow River were measured at one location within each of the reference sections during each season (Table 3.1).

Table 3.1. Select water chemistry parameters measured in the Little Bow River and Mosquito Creek.

Parameter	Sampling Equipment
Dissolved O_2 (mg/l)	Oxy-Guard DO/Temp meter/Yellow Springs Instrument Co. model 85
pH	Hanna Combo pH/EC tester
Turbidity (NTU)	LaMotte 2020 Turbidimeter
Conductivity (µMHOS/cm)	Yellow Springs Instrument Co. model 85/Hanna Combo pH/EC tester
Water temperature (^oC)	Oxy-Guard DO/Temp meter/Yellow Springs Instrument Co. model 85

3.2 Mosquito Creek

3.2.1 Fish Sampling

Six reference sample sections established from the 2009 monitoring program were backpack electrofished along Mosquito Creek between Woman's Coulee Reservoir and the TVR with the exception of MC-4 which was electrofished downstream of the Township Road 160 bridge in 2009 was relocated directly upstream of the bridge in 2014. Stakes were placed at the upstream boundaries in order to define the section, and the UTM coordinates of the upstream and downstream boundary of each sample section was recorded (Table 2.3). The length and average width within each study section was recorded during spring, summer and fall sampling events, and a description of the habitat was recorded during the summer.

Sampling of Mosquito Creek was conducted on a seasonal basis in 2014. Spring sampling was completed in early June; summer sampling was conducted in early August, and fall sampling was finished in late October.

3.2.1.1 Backpack Electrofishing

Sampling was conducted using a Smith Root Type LR-24 backpack electrofisher in a single-pass electrofishing survey. For each 300 section fished, 30 fish of each species captured were measured (fork length) and weighed (to the nearest gram) with the remaining catch identified and enumerated.

All capture data was recorded and submitted to the Alberta Environment and Sustainable Resource Development (ESRD), Fisheries and Wildlife Management Information System (FWMIS).

3.2.1.2 Mercury Sampling

An objective of the Mosquito Creek monitoring program was to obtain sub-samples of Northern Pike and White Suckers for mercury analysis. The intention was to obtain 20 specimens of each of the target species from Mosquito Creek.

3.2.2 Habitat

During summer sampling the habitat within each electrofishing sample section was characterized using Pisces' standard inventory methods (Appendix A), which are based on the O'Neil method (O'Neil and Hildebrand 1986) suited to small to medium size rivers where distinct channel units are discernible. The procedure divides the stream channel into a continuous series of habitat types, based on differentiation in specific features such as depth, velocity, surface, flow pattern and substrate, and provides results that are comparable with methods used during the 2009 monitoring program (Herron and Boorman 2010).

3.2.3 Water Quality

Basic water quality parameters for the Mosquito Creek were measured at one location within each of the reference sections during each season (Table 3.1).

4.0 RESULTS

4.1 LITTLE BOW RIVER

4.1.1 Fish Sampling

A total of fifteen species were captured from the Little Bow River during sampling in 2014 (Table 4.1). Eleven species, including three sport and eight non-sport species, were captured from upstream of the TVR and ten species, four sport and six non-sport species, were captured from downstream of the reservoir (Table 4.1). Detailed capture data from all sampling effort in the Little Bow River in 2014 is presented in Appendices B & C.

Table 4.1. Fish species captured from the Little Bow River in 2014.

Common Name	Scientific Name	Species Code	Upstream of TVR Historical Inventories	Upstream of TVR 2014 Monitoring	Downstream of TVR Historical Inventories	Downstream of TVR 2014 Monitoring
Brook Stickleback	*Culaea inconstans*	BRST	•[h]			
Brown Trout	*Salmo trutta*	BNTR	•[dfgh]	•		
Bull Trout	*Salvelinus confluentus*	BLTR	•[a]			
Burbot	*Lota lota*	BURB	•[ae]		•[bcfgh]	•
Fathead Minnow	*Pimephales promelas*	FTMN	•[agh]	•	•[g]	•
Finescale Dace	*Phoxinus neogauus*	FNDC	•[f]		•[f]	
Lake Chub	*Couesius plumbeus*	LKCH	•[adefgh]	•	•[cefgh]	•
Lake Whitefish	*Coregonus clupeaformis*	LKWH			•[abcfgh]	•
Longnose Dace	*Rhinichthys cataractae*	LNDC	•[adefgh]	•	•[acefgh]	•
Longnose Sucker	*Catostomus catostomus*	LNSC	•[adefgh]	•	•[abcfegh]	•
Mountain Sucker	*Catostomus platyrhynchus*	MNSC	•[ah]	•		
Mountain Whitefish	*Prosopium williamsoni*	MNWH	•[adfgh]	•		
Northern Pike	*Esox lucius*	NRPK	•[adefgh]	•	•[abcefgh]	•
Pearl Dace	*Margariscus margarita*	PRDC	•[a]			
Rainbow Trout	*Oncorhynchus mykiss*	RNTR	•[aefh]		•[bgh]	
Shorthead Redhorse	*Moxostoma macrolepidotum*	SHRD			•[bfgh]	•
Spoonhead Sculpin	*Cottus ricei*	SPSC	•[aefgh]	•		
Spottail Shiner	*Notropis hudsonius*	SPSH			•[aefgh]	
Trout-Perch	*Percopsis omiscomaycus*	TRPR	•[a]	•	•[a]	
Walleye	*Sander vitreus*	WALL			•[abefgh]	•
White Sucker	*Catostomus commersoni*	WHSC	•[adefgh]	•	•[abcefgh]	•
Yellow Perch	*Perca flavescens*	YLPR			•[acefgh]	

a Fernet and Bjornson (1994)
b Council (2000)
c Boorman (2004)
d Pisces (2004)
e Sikina and Bryski (2005)
f Stemo (2006)
g Stemo (2007)
h Herron and Stemo(2010)

4.1.2 Boat Electrofishing

All sections were sampled once each season; in the spring, summer and fall. Sample sections were the same as the location and lengths of sections established in 2005 (Table 4.2).

Table 4.2. Boat electrofishing sampling effort in the Little Bow River, 2014.

Section	Length of Sample Section (m)	Electrofishing Duration (s)		
		Spring	Summer	Fall
LBR 1	2520	2798	2528	2586
LBR 2	3507	3901	3041	4007
LBR 3	2009	2200	2325	2674
LBR 4	2303	3432	3433	3677
LBR 5	924	737	737	1294
LBR 6	1569	1877	2059	2002
LBR 7	1735	707*	1639	1995

* Equipment malfunction caused by precipitation event

A total of 2251 fish, represented by six sport fish species and eight non-sport fish species, were captured during boat electrofishing in 2014 (Table 4.3). Seven hundred ninety-six fish were captured from sections downstream of the TVR and 1455 specimens were captured from sections upstream of the TVR (Table 4.3). Sport fish accounted for approximately 16% of all fish captured during 2014 boat electrofishing.

Northern Pike were captured from all study sections in 2014 and were the only sport fish species captured from both upstream and downstream of the TVR. The only other large-bodied species that were present within all study sections was White Sucker. Mountain Whitefish, Brown Trout, Mountain Sucker, Spoonhead Sculpin, Fathead Minnow and Trout Perch were captured upstream of the reservoir, but were not captured downstream of the TVR. Fish captured downstream of the reservoir but not upstream included Burbot, Lake Whitefish, Shorthead Redhorse, and Walleye (Table 4.3).

Downstream from TVR (Sections 1-3)

Four sport fish species representing 13% of the total downstream catch were captured downstream of the TVR. Walleye were the most abundant, accounting for 5% of the total catch while Northern Pike were second in sport fish abundance, accounting for 4% of the total catch (Table 4.3). Burbot were infrequently encountered and were found only in the bottom two sections (Table 4.3). Lake Whitefish were encountered in all sections below TVR though they were not captured in all seasons (Table 4.3).

A total of five non-sport fish species were captured downstream of the TVR. Non-sport fish were dominated by sucker species including White Sucker, Shorthead Redhorse, and Longnose Sucker in decreasing order of abundance (Table 4.3). White Sucker was the most prolific of any species accounting for 79% of the total downstream catch (Table 4.3). Cyprinid species contributed less than 4% to the overall downstream catch (Table 4.3).

Table 4.3. Sampling results from monitoring sections downstream and upstream of TVR during 2014 boat electrofishing.

Downstream of Twin Valley Reservoir

Species	Individuals Captured (% of total catch)									
	Section 1			Section 2			Section 3			Total
	Sp	Su	Fa	Sp	Su	Fa	Sp	Su	Fa	
BURB	-	4(4)	-	1(<1)	4(4)	4(2)	-	-	-	13(2)
LKCH	-	-	1(1)	1(<1)	4(4)	1(<1)	-	-	-	7(<1)
LKWH	-	-	1(1)	10(9)	1(1)	6(3)	-	-	5(5)	23(3)
LNDC	2(2)	9(10)	-	-	6(5)	2(1)	-	-	1(1)	20(2)
LNSC	3(4)	1(1)	-	5(5)	-	4(2)	2(6)	-	-	15(2)
NRPK	2(2)	2(2)	-	2(2)	-	5(3)	7(20)	1(11)	15(15)	34(4)
SHRD	7(8)	9(10)	-	4(4)	-	1(<1)	-	-	-	21(3)
WALL	11(13)	10(11)	1(1)	1(<1)	6(5)	7(4)	-	-	-	36(4)
WHSC	58(71)	54(62)	65(96)	83(78)	91(81)	162(84)	26(74)	8(89)	80(79)	627(79)
Non-Sport	70(84)	73(82)	66(97)	93(87)	101(90)	170(89)	28(80)	8(89)	81(80)	690(87)
Sport	13(16)	16(18)	2(3)	14(13)	11(10)	22(11)	7(20)	1(11)	20(20)	106(13)
TOTAL	83(100)	89(100)	68(100)	107(100)	112(100)	192(100)	35(100)	9(100)	101(100)	796(100)
# Species	6	7	4	8	6	9	3	2	4	9

Upstream of Twin Valley Reservoir

	Section 4			Section 5			Section 6			Section 7			Total
	Sp	Su	Fa	Sp	Su	Fa	Sp	Su	Fa	Sp	Su	Fa	
BNTR	-	-	-	-	-	-	-	2(1)	3(1)	-	-	-	5(<1)
LKCH	3(3)	1(1)	-	1(2)	-	1(1)	2(2)	5(3)	-	2(3)	3(3)	-	18(1)
LNDC	2(2)	19(17)	1(<1)	22(35)	-	-	11(9)	70(39)	-	8(14)	11(6)	2(1)	146(10)
LNSC	-	-	-	-	3(4)	-	7(6)	9(5)	13(6)	6(11)	3(2)	2(1)	43(3)
MNSC	-	-	-	-	-	-	3(2)	-	-	-	1(1)	-	4(<1)
MNWH	-	-	1(<1)	1(2)	-	-	9(7)	8(4)	21(10)	6(11)	13(25)	26(15)	85(6)
NRPK	4(4)	27(23)	60(41)	-	5(7)	13(16)	1(<1)	11(6)	28(13)	-	3(3)	9(5)	161(11)
SPSC	-	-	-	-	-	-	-	-	1(<1)	-	-	-	1(<1)
FTMN	-	-	-	1(2)	-	-	-	-	-	-	-	-	1(<1)
TRPR	-	-	-	-	-	-	1(<1)	2(1)	-	-	4(11)	2(1)	9(<1)
WHSC	96(91)	68(59)	86(58)	38(60)	64(89)	68(83)	87(72)	72(40)	153(70)	34(61)	85(67)	131(76)	982(67)
Non-Sport	101(96)	88(77)	87(59)	62(98)	67(93)	69(84)	111(92)	158(88)	167(76)	50(89)	107(81)	137(80)	1204(83)
Sport	4(4)	27(23)	61(41)	1(2)	5(7)	13(16)	10(8)	21(12)	52(24)	6(11)	16(19)	35(20)	251(17)
TOTAL	105(100)	115(100)	148(100)	63(100)	72(100)	82(100)	121(100)	179(100)	219(100)	56(100)	123(100)	172(100)	1455(100)
# Species	3	4	4	5	3	3	8	8	6	5	8	6	11

Walleye were only captured in sections 1 and 2 below TVR but were caught in all three seasons with the majority (44%) of Walleye captured during the summer portion of monitoring (Table 4.3). Northern Pike were captured in all downstream sections and were particularly abundant in the fall, when approximately 59% of all Northern Pike were captured (Table 4.3). Lake Whitefish were captured in all downstream sections of the Little Bow River and 52% of all Lake Whitefish captured were obtained during the fall portion of monitoring (Table 4.3).

White Sucker was present in all study sections and was captured during all seasons (Table 4.3). Shorthead Redhorse were found in Section 1and 2 during the spring monitoring, and Longnose Suckers were found in all three sections with the majority of captures (67%) occurring during spring monitoring (Table 4.3).

White Sucker catch rates were higher than for any other species, and the capture frequency of non-sport fish was higher than for sport fish (Table 4.4). All nine species were captured during all three seasons of sampling. Overall, 46% of all captures occurred in the fall, 28% in the spring, with the remaining 26% in the summer. Catch-per-unit-effort (CPUE) during the spring was lowest, while fall catch rates were the highest (Table 4.4).

Table 4.4. Catch per unit effort for the large-bodied fish species captured downstream from the TVR during boat electrofishing in 2014.

Species	CPUE (Fish/min)											
	Section 1			Section 2			Section 3			All Sections		
	Sp	Su	Fa	Sp	Su	Fa	Sp	Su	Fa	Sp	Su	Fa
BURB	-	0.09	-	0.02	0.08	0.06	-	-	-	0.01	0.06	0.03
LKCH	-	-	0.02	0.02	0.08	0.01	-	-	-	0.01	0.03	0.01
LKWH	-	-	0.02	0.15	0.02	0.09	-	-	0.11	0.07	0.01	0.08
LNDC	0.04	0.21	-	-	0.12	0.03	-	-	0.02	0.01	0.11	0.02
LNSC	0.06	0.02	-	0.08	-	0.06	0.05	-	-	0.07	0.01	0.03
NRPK	0.04	0.05	-	0.03	-	0.07	019	0.03	0.34	0.07	0.02	0.13
SHRD	0.15	0.21	-	0.06	-	0.01	-	-	-	0.07	0.07	0.01
WALL	0.24	0.24	0.02	0.02	0.12	0.10	-	-	-	0.08	0.12	0.05
WHSC	1.24	1.28	1.51	1.27	1.80	2.43	0.71	0.21	1.79	1.13	1.16	1.99
Non-Sport	1.50	1.73	1.53	1.43	1.99	2.55	0.76	0.21	1.93	1.29	1.38	2.08
Sport	0.28	0.38	0.05	0.22	0.22	0.33	0.19	0.03	0.34	0.23	0.21	0.25
All species	1.78	2.11	1.58	1.65	2.21	2.88	0.95	0.24	2.27	1.52	1.60	2.34

All 34 Northern Pike captured from downstream of the TVR were measured with a range of size classes present (Figure 4.1). Capture data compared with Fernet and Bjornson (1994) and Council and Clayton (1999) data suggest that both juvenile and adult year classes were present in the Little Bow River downstream from TVR in 2014 (Figure 4.1).

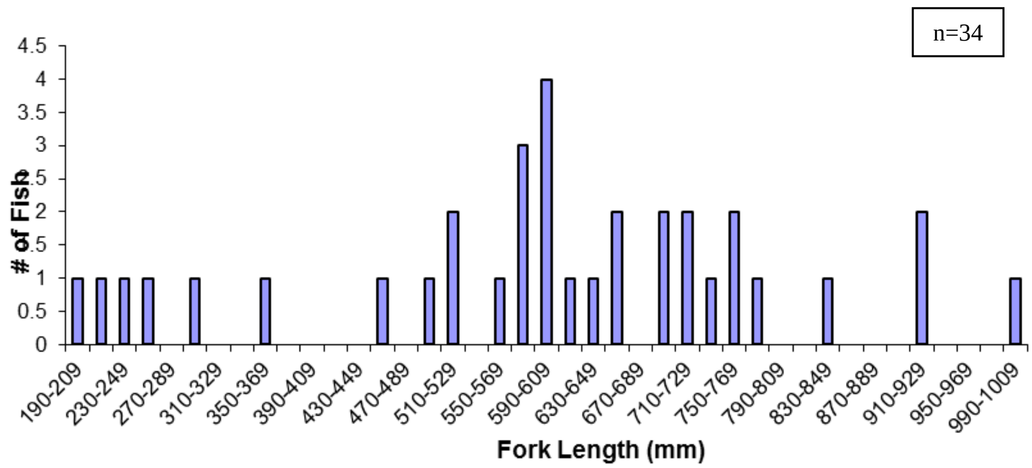

Figure 4.1. Northern Pike length-frequency distribution for Little Bow River sites 1-3.

Size classes of Lake Whitefish that were captured downstream of the TVR varied (Figure 4.2). Most specimens were relatively large. Based on the range of sizes, it is probable that two or more age classes are represented in the catch.

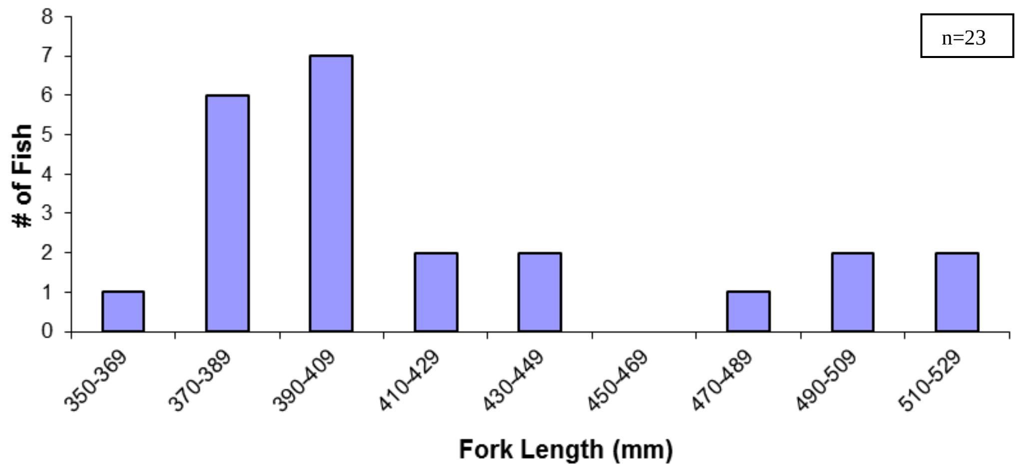

Figure 4.2. Lake Whitefish length-frequency distribution for Little Bow River sites 1-3.

Two or three size classes of Walleye were captured downstream of the TVR (Figure 4.3). Capture data from Council (2000) suggests that the captured specimens ranged from immature to adult.

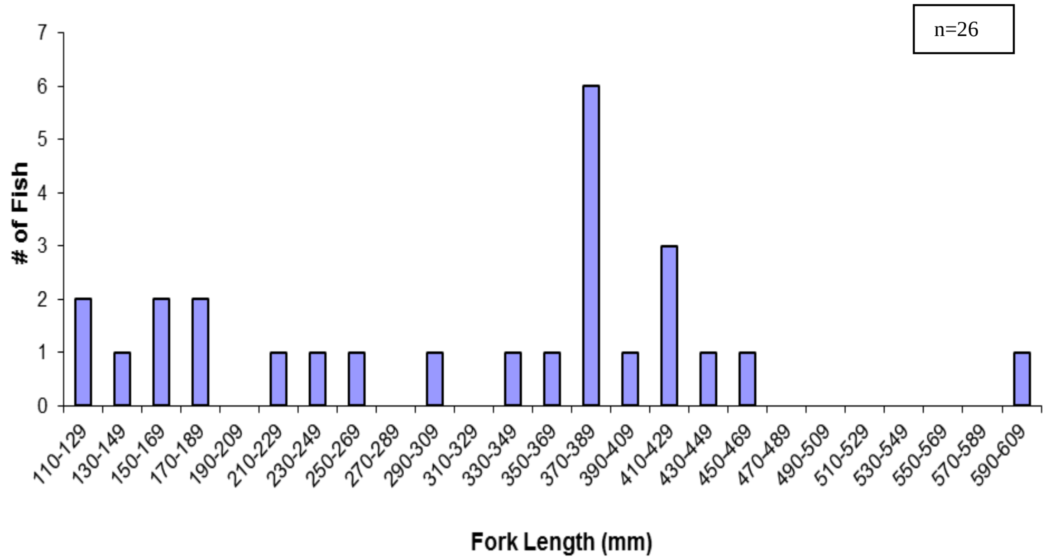

Figure 4.3. Walleye length-frequency distribution for Little Bow River sites 1-3.

All thirteen Burbot captured below TVR were measured. Most of the catch was comprised with adults but juveniles were also present (Figure 4.4).

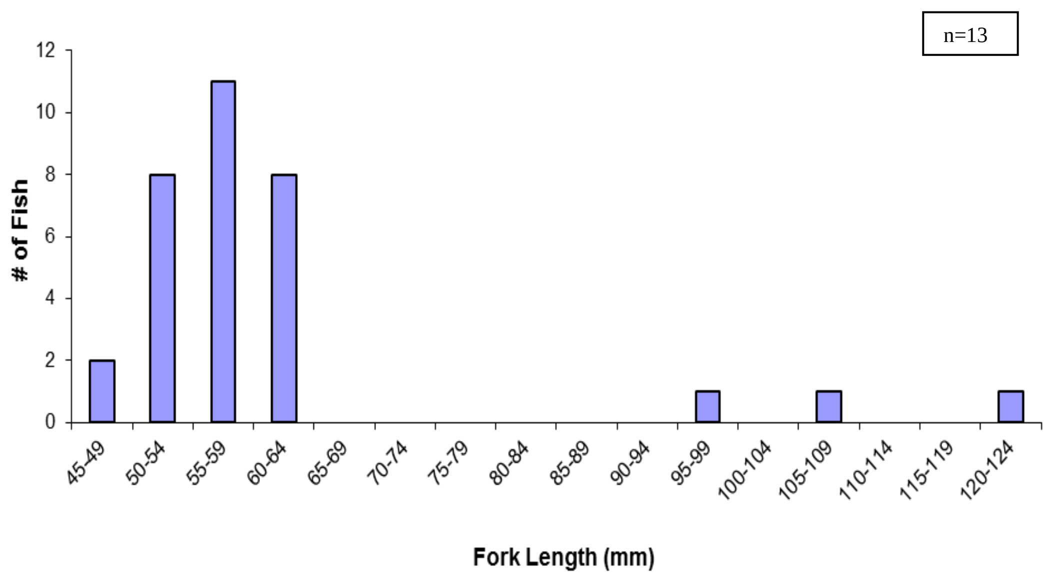

Figure 4.4. Burbot length-frequency distribution for Little Bow River sites 1-3.

Two hundred-sixty of the 627 White Suckers captured downstream of the TVR were measured. Most of the catch was comprised of adults, with likely three or more age classes present (Figure 4.5).

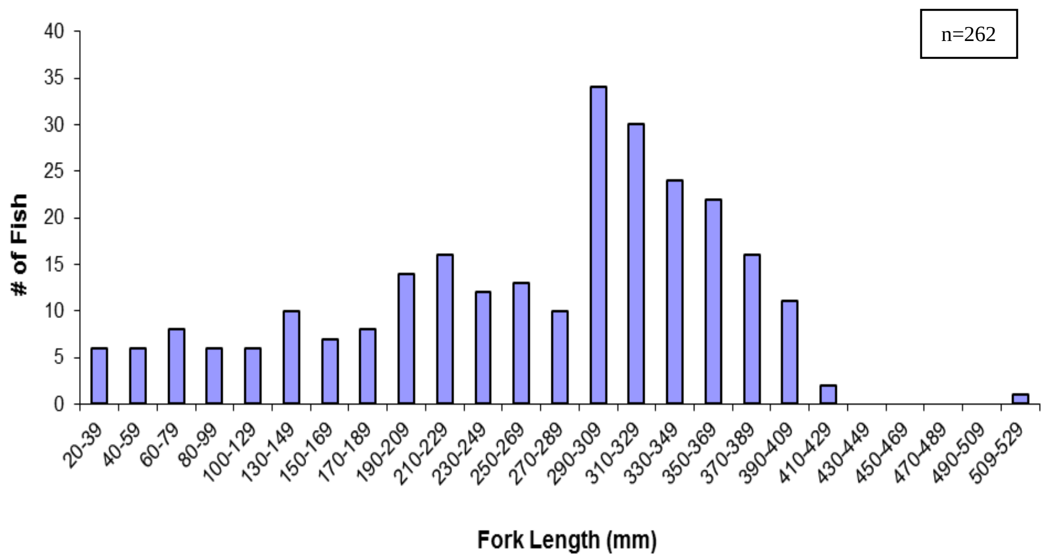

Figure 4.5. White Sucker length frequency distribution for Little Bow River sites 1-3.

Upstream from TVR (Sections 4-7)

Northern Pike (11% of the total upstream catch), Mountain Whitefish (6%) and Brown Trout (<1%) were the only sport fish species captured upstream of the TVR in 2014 (Table 4.3). Non-sport fish species included White Sucker (67%), which were numerically dominant, Longnose Sucker (3%), Mountain Sucker (<1%) and various cyprinids that contributed approximately 12% to the total upstream catch.

Northern Pike, Mountain Whitefish, Longnose Dace, Lake Chub and White Sucker were present in all study sections (Table 4.3). Fifty-seven percent of all Northern Pike were captured from Section 4, during the spring monitoring (Table 4.3). Northern Pike young of the year (YoY) and juveniles dominated the sport fish catch above TVR in 2014. Overall, 43% of all captures occurred in the fall, 33% in the summer, with the remaining 24% in the spring. Nine species were captured during spring and summer sampling while eight species were captured in the fall.

Catch rates for non-sport fish were higher than for sport species in all sections and in all seasons (Table 4.5). The CPUE for White Sucker was higher than for all other species (Table 4.5). Overall, catch rates increased from spring to fall monitoring for both sport and non-sport fish species (Table 4.5).

Table 4.5. Catch-per-unit-effort for the large-bodied species captured upstream from the TVR during boat electrofishing in 2014.

Species	CPUE (Fish/min)														
	Section 4			Section 5			Section 6			Section 7			All Sections		
	Sp	Su	Fa	Sp	Su	Fa	Sp	Su	Fa	Sp	Su	Fa	Sp	Su	Fa
BNTR	-	-	-	-	-	-	-	0.06	0.18	-	-	-	-	0.02	0.02
LKCH	0.05	0.02	-	0.08	-	0.05	0.06	0.15	-	0.17	0.11	-	0.07	0.07	0.01
LNDC	0.03	0.33	0.02	1.79	-	-	0.35	2.04	-	0.68	0.40	0.60	0.38	0.75	0.02
LNSC	-	-	-	-	0.21	-	0.22	0.26	0.78	0.51	0.11	0.60	0.12	0.11	0.11
MNSC	-	-	-	-	-	-	0.10	-	-		0.04	--	0.03	0.01	-
MNWH	-	-	0.02	0.08	-	-	0.29	0.23	1.26	0.51	0.48	0.78	0.14	0.16	0.36
NRPK	0.07	0.47	0.98	-	0.35	0.60	0.03	0.32	1.68	-	0.11	0.27	0.04	0.35	0.83
SPSC	-	-	-	-	-	-	-	-	0.06	-	-	-	-	-	0.01
FTMN	-	-	-	0.08	-	-	-	-	-	-	-	-	0.01	-	-
TRPR	-	-	-	-	-	-	0.03	0.06	-	-	0.15	0.60	0.01	0.05	0.02
WHSC	1.68	1.19	1.40	3.09	4.48	3.15	2.78	2.10	9.16	2.89	3.11	3.94	2.27	2.17	3.30
Non-Sport	1.77	1.54	1.42	5.05	4.69	3.20	3.55	4.60	10.00	4.24	3.92	4.12	2.88	3.15	3.46
Sport	0.07	0.47	1.00	0.08	0.35	0.60	0.32	0.61	3.11	0.51	0.59	1.05	0.19	0.52	1.21
All Species	1.84	2.01	2.42	5.13	5.04	3.80	3.87	5.21	13.11	4.75	4.50	5.17	3.07	3.67	4.67

All 161 Northern Pike captured from upstream of the TVR were measured and weighed. Capture data compared with Fernet and Bjornson (1994) and Council and Clayton (1999) data suggest that both juvenile and adult year classes were present. YoY and juveniles dominated the overall Northern Pike catch above TVR in 2014 (Figure 4.6).

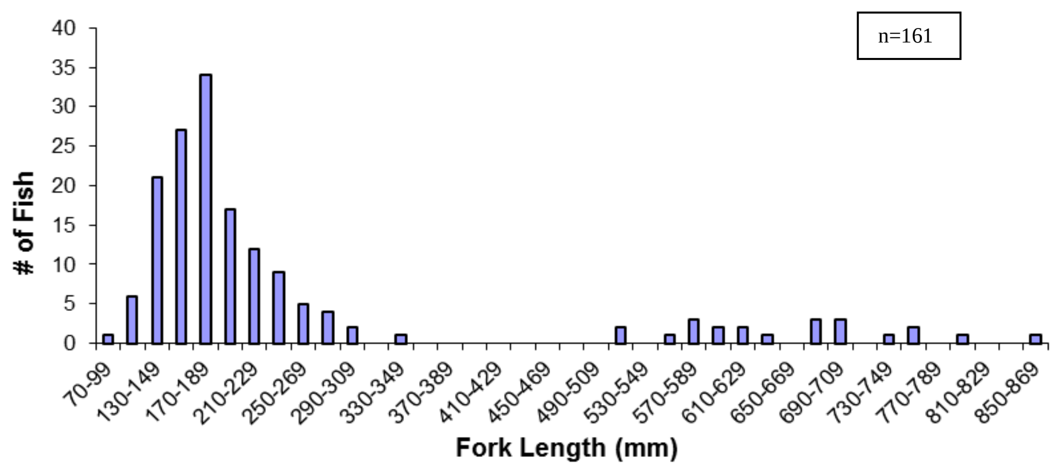

Figure 4.6. Northern Pike length-frequency distribution for Little Bow River sites 4-7.

A total of 85 Mountain Whitefish were captured upstream of the TVR in 2014. The catch was dominated by juvenile year classes, based on comparison of age and length data reported by Thompson (1974) (Figure 4.7).

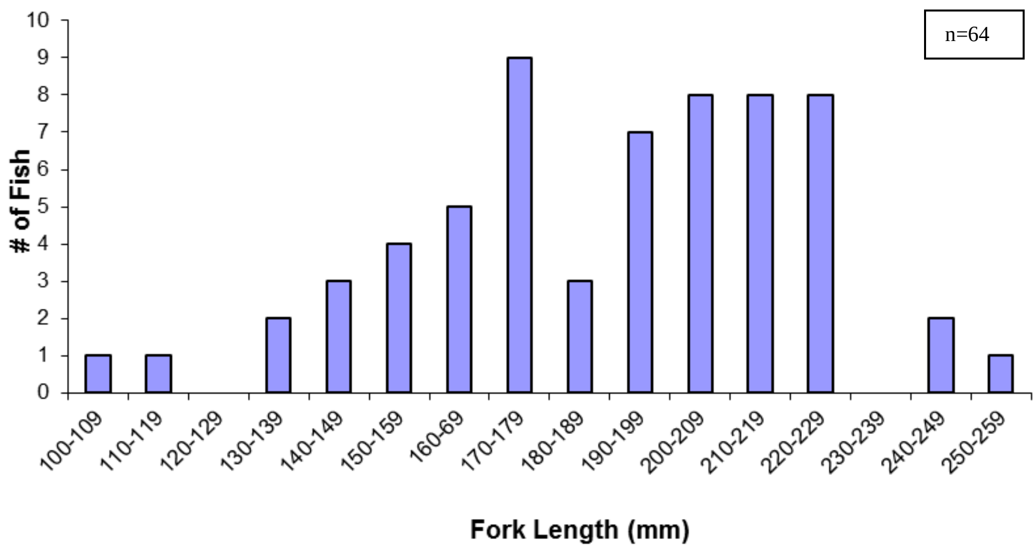

Figure 4.7. Mountain Whitefish length frequency distribution for Little Bow River sites 4-7.

Of the 982 White Suckers captured, 381 were measured. Most of the catch was comprised of adults with likely more than three age classes present (Figure 4.8).

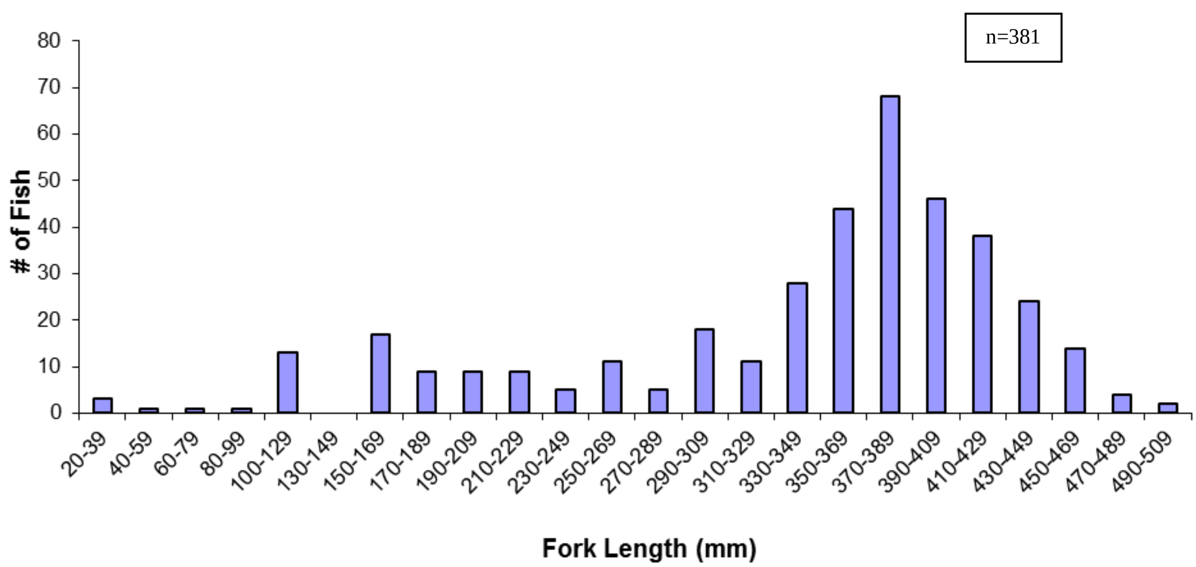

Figure 4.8. White Sucker length frequency distribution for Little Bow River sites 4-7.

4.1.3 Backpack Electrofishing

All backpack sample sections were sampled once each season in the spring, summer and fall. Habitat within the sample sections generally consisted of shallow run (R3), moderate run (R2) or riffle (RF) habitat; sections ranged from 15 to 66 metres in length.

Backpack electrofishing captured a total of 3956 fish (Table 4.6). Eight different species of non-sport fish and four species of sport fish were captured at backpack fishing sections (Table 4.6). Cyprinids were numerically dominant accounting for 97% of the total catch, and other non-sport species including Longnose Sucker, Mountain Sucker, Spoonhead Sculpin, Shorthead Redhorse and White Sucker comprised over 2% of the total catch (Table 4.6). Four species of sport fish including Walleye, Burbot, Mountain Whitefish, Northern Pike, represented <1% of the total catch (Table 4.6).

All cyprinids captured in 2014 were common in sample sections both up and downstream of the TVR with the exception of Trout Perch which were only captured upstream of the TVR. Spoonhead Sculpin were only present upstream of the TVR and Shorthead Redhorse were only present downstream of TVR. Other non-sport species, including Longnose Dace, were captured from all sample sections. White Sucker were captured in all sample sections with the exception of section 5, located upstream of TVR.

Burbot and Walleye were found downstream of the TVR but were absent in upstream sections, and Northern Pike and Mountain Whitefish were captured from upstream sections but were not found in the lower sections downstream of the TVR.

Downstream from TVR (Sections 1-3)

Non-sport species were numerically dominant comprising 99% of the total catch (Table 4.6). Of those species, Longnose Dace was the most abundant (88%) followed by White Sucker (10%). All other species each accounted for less than 1% of the total catch (Table 4.6).

Longnose Dace, White Sucker and Lake Chub were the only species found in all three sections of the study area. Burbot, Walleye and Shorthead Redhorse were only captured from Section 1 during the fall sampling. Longnose Sucker was found in both Sections 2 and 3 (Table 4.6). Fathead Minnow were only captured during spring sampling in Section 3 (Table 4.6). Just over 47% of all fish were captured during the fall with 28% and 25% captured in the spring and summer respectively (Table 4.6).

Table 4.6. Sampling results from monitoring sections downstream and upstream of TVR during 2014 backpack electrofishing.

Downstream of Twin Valley Reservoir

Species	Individuals Captured (% of total catch)									
	Section 1			Section 2			Section 3			Total
	Sp	Su	Fa	Sp	Su	Fa	Sp	Su	Fa	
LNDC	124(100)	77(99)	83(74)	143(100)	212(100)	291(95)	87(96)	22(88)	75(41)	1114 (88)
WHSC	-	1(1)	19(17)	-	-	7(2)	1(1)	-	105(58)	133(10)
FTMN	-	-	-	-	-	-	3(3)	-	-	3(<1)
LKCH	-	-	1(1)	-	-	6(2)	-	2(8)	2(1)	11(1)
LNSC	-	-	-	-	-	1(<1)	-	1(4)	-	2 (<1)
SHRD	-	-	6(6)	-	-	-	-	-	-	6(<1)
BURB	-	-	1(1)	-	-	-	-	-	-	1(<1)
WALL	-	-	1(1)	-	-	-	-	-	-	1(<1)
Non-Sport	124(100)	78(100)	109(98)	143(100)	212(100)	305(100)	91(100)	25(100)	182(100)	1269(>99)
Sport	-	-	2(2)	-	-	-	-	-	-	2(<1)
Total	124(100)	78(100)	111(100)	143(100)	212(100)	305(100)	91(100)	25(100)	182100)	1271(100)
# Species	1	2	6	1	1	4	3	3	3	8

Upstream of Twin Valley Reservoir

	Section 4			Section 5			Section 6			Section 7			Total
	Sp	Su	Fa	Sp	Su	Fa	Sp	Su	Fa	Sp	Su	Fa	
LNDC	345(99)	441(99)	313(100)	456(100)	1(33)	11(44)	355(85)	101(99)	210(98)	112(98)	117(98)	189(98)	2651 (96)
TRPR	2(<1)	-	-	-	-	-	2(<1)	-	2(<1)	-	-	1(<1)	7(<1)
LKCH	1(<1)	1(<1)	-	-	-	-	5(1)	1(1)	1(<1)	2(2)	-	3(<1)	14(<1)
FTMN	-	-	-	-	-	-	51(12)	-	-	-	-	1(<1)	52(2)
WHSC	-	-	-	-	1 (33)	6(24)	4(1)	-	2(<1)	-	1(1)	16(1)	30(1)
LNSC	-	-	-	-	-	1(4)	1(<1)	-	-	-	-		2(<1)
NRPK	-	3 (<1)	-	-	1(33)	6(24)	-	-	-	-	1(1)	1(<1)	12(<1)
SPSC	-	-	-	-	-	1(4)	-	-	-	-	-		1 (<1)
MNWH	-	-	-	-	-	-	-	-	-	-	-	1(<1)	1(<1)
Non-Sport	348(100)	442(>99)	313(100)	456(100)	2(67)	19(97)	418(100)	102(100)	215(100)	114(100)	118(99)	210(99)	2757(>99)
Sport	-	3(<1)	-	-	1(33)	6(3)	-	-	-	-	1(1)	2(1)	13(<1)
Total	348(100)	445(100)	313(100)	456(100)	3(100)	25(100)	418(100)	102(100)	215(100)	114(100)	119(100)	212(100)	2770(100)
# Species	3	3	1	1	3	5	6	2	4	2	3	7	9

Catch rates for non-sport species were substantially higher than for sport species during all sampling events, and were heavily influenced by the CPUE for Longnose Dace, which was high in comparison to other species (Table 4.7). At the downstream sections White Sucker were captured at a substantially lower rate than Longnose Dace, but were captured more frequently than other species. Burbot, Walleye, Shorthead Redhorse, Lake Chub, Fathead Minnow and Longnose Sucker were all captured relatively infrequently (Table 4.7). CPUE was similar during the spring and summer sampling period, and was generally the highest during the fall (Table 4.7).

Table 4.7. Catch per unit effort for species captured in the Little Bow River downstream of the TVR during backpack electrofishing in 2014.

Species	CPUE (Fish/min)											
	Section 1			Section 2			Section 3			All Sections		
	Sp	Su	Fa	Sp	Su	Fa	Sp	Su	Fa	Sp	Su	Fa
LNDC	5.12-	5.00	2.93	3.93	5.68	10.21	2.17	0.76	1.49	3.52	3.81	4.20
WHSC	-	0.06	0.67	-	-	0.25	0.02	-	2.09	0.01	0.01	1.22
FTMN	-	-	-	-	-	-	0.07	-	-	0.03	-	-
LKCH	-	-	0.04	-	-	0.21	-	0.07	0.04	-	0.02	0.08
LNSC	-	-	-	-	-	0.04	-	0.03	-	-	0.01	0.01
SHRD	-	-	0.21	-	-	-	-	-	-	-	-	0.06
BURB	-	-	0.04	-	-	-	-	-	-	-	-	0.01
WALL	-	-	0.04	-	-	-	-	-	-	-	-	0.01
Non-Sport	5.12	5.06	3.85	3.93	5.68	10.71	2.26	0.86	3.62	3.56	3.85	5.57
Sport	-	-	0.08	-	-	-	-	-	-	-	-	0.02
All species	5.12	5.06	3.93	3.93	5.68	10.71	2.26	0.86	3.62	3.56	3.85	5.59

Upstream from TVR (Sections 4-7)

Non-sport fish comprised almost the entire sample population accounting for over 99% of the total catch (Table 4.6). Longnose Dace was the dominant species upstream of TVR accounting for 96% of the total catch, all other species, with the exception of Fathead Minnow (2%) and White Sucker (1%), all other each species each accounted for less than 1% of the total catch (Table 4.6).

Longnose Dace was the only species captured from all sample sections and captured in all seasons, while Northern Pike, Longnose Sucker, White Sucker, Fathead Minnow, Trout Perch and Lake Chub were found in two or three sections. Spoonhead Sculpin were only captured in Section 5 and Mountain Whitefish in Section 7 during fall sampling (Table 4.6).

Longnose Dace CPUE was noticeably higher in comparison to the other species captured upstream of the TVR with the exception of summer sampling in Section 5 where the CPUE was 0.04 (Table 4.8). Catch rates were the highest during the spring in Sections 5 and 6 while CPUE was highest during fall sampling in Sections 4 and 7 (Table 4.8). Due to relative abundance of Longnose Dace in comparison to other species, the overall CPUE is essentially a reflection of Longnose Dace catch rates (Table 4.8). When Longnose Dace are excluded, the overall CPUE was similar between seasons and sample sections.

Table 4.8. Catch per unit effort for species captured in the Little Bow River upstream of the TVR during backpack electrofishing in 2014.

Species	CPUE (Fish/min)														
	Section 4			Section 5			Section 6			Section 7			All Sections		
	Sp	Su	Fa	Sp	Su	Fa	Sp	Su	Fa	Sp	Su	Fa	Sp	Su	Fa
LNDC	15.00	17.78	33.30	31.67	0.04	0.63	15.37	3.61	10.61	6.29	5.11	8.83	16.19	6.51	10.63
TRPR	0.09	-	-	-	-	-	0.09	-	0.10	-	-	0.05	0.05	-	0.04
LKCH	0.04	0.04	-	-	-	-	0.22	0.04	0.05	0.11	-	0.14	0.10	0.02	0.06
FTMN	-	-	-	-	-	-	2.21	-	-	-	-	0.05	0.65	-	0.01
WHSC	-	-	-	-	0.04	0.34	0.17	-	0.10	-	0.04	0.75	0.05	0.02	0.35
LNSC	-	-	-	-	-	0.06	0.04	-	-	-	-	-	0.01	-	0.01
NRPK	-	0.12	-	-	0.04	0.34	-	-	-	-	0.04	0.05	-	0.05	0.10
SPSC	-	-	-	-	-	0.06	-	-	-	-	-	-	-	-	0.01
MNWH	-	-	-	-	-	-	-	-	-	-	-	0.05	-	-	0.01
Non-Sport	15.13	17.82	33.30	31.67	0.08	1.09	18.10	3.65	10.86	6.40	5.15	9.82	17.05	6.55	11.11
Sport	-	0.12	-	-	0.04	0.34	-	-	-	-	0.04	0.10	-	0.05	0.11
All species	15.13	17.94	33.30	31.67	0.12	1.43	18.10	3.65	10.86	6.40	5.19	9.92	17.05	6.60	11.22

4.1.4 Mercury Sampling

Pisces captured and retained a total of 75 fish from the Little Bow River during summer and fall sampling for mercury analysis including 33 Northern Pike and 42 White Sucker (Table 4.9). Specimens were transported to the Alberta Research Council in Vegreville for analysis and reporting of the results.

Table 4.9. Summary of capture data for fish retained from the Little Bow River for mercury analysis in 2014.

Species	# of fish			Fork Length (mm)			Weight (g)		
	Total	U/S	D/S	Mean	Min	Max	Mean	Min	Max
NRPK	33	16	17	674.6	499	915	2091.5	905	6577
WHSC	42	20	22	364.0	210	470	781.6	123	1597

4.1.5 Habitat

Run type habitat was predominant in all study sections, accounting for greater than 80% of the total habitat area in each study section (Table 4.10). Class 2 (moderate depth) runs accounted for the highest percentage of the total habitat area in all sections, except for Sections 3 and 5 where Class 1 (deep) run habitat was dominant (Table 4.10). Riffle habitat represented over 10% of the total habitat area in Sections 1, 2 and 6 but was present in substantially lower quantities in Sections 3, 4, 5 and 7 (Table 4.10). Flat type habitat was absent in Sections 1, 2 and 5, and relatively rare in other sections, with the exception of Section 3 which was made up of over 16% flat habitat and Section 4 where flat habitat made up over 13% of the total habitat (Table 4.10). Limited pool habitat was present in sections both upstream and downstream of the TVR.

Fine substrates were dominant in all study sections except Section 1, where boulder was slightly more common than cobble (Table 4.10). The secondary substrate varied between sites; cobbles were the second most common substrate in Sections 1, 2, 5 and 7 while boulders were in Sections 3 and 4 and gravels were the second most dominant substrate in Section 6 (Table 4.10).

Sections 3 and 4 were the most abundant sections for fish cover accounting for 74% and 60 % respectively (Table 4.10). The least amount of cover for fish was found in Section 6 (3%) and Section 1 (7%) (Table 4.10). Aquatic vegetation was the predominant source of cover in all study sections with boulder gardens, woody debris, overhanging banks and overhanging vegetation also present in lower quantities (Table 4.10). Detailed habitat information is presented in Appendix D.

Table 4.10. Summary of habitat data for study sections on the Little Bow River, 2006, 2009 and 2014.

	Section1			Section2			Section3			Section 4			Section 5			Section 6			Section 7		
	2006	2009	2014	2006	2009	2014	2006	2009	2014	2006	2009	2014	2006	2009	2014	2006	2009	2014	2006	2009	2014
Habitat Type	% Area			% Area			% Area			% Area			% Area			% Area			% Area		
RF	19.2	11.2	10.3	17.8	14.1	15.5	1.6	-	2.5	-	0.6	1.5	36.0	-	1.3	7.2	8.2	12.2	0.7	2.1	8.5
R1	23.4	12.8	31.2	31.7	38.5	19.7	52.0	71.4	57.8	36.7	33.2	25.5	40.1	21.4	68.7	32.8	32.2	19.1	7.1	40.6	3.5
R2	37.8	54.9	33.6	43.3	37.9	50.7	26.6	14.1	17.3	50.0	54.5	36.5	6.0	32.4	16.7	35.0	40.5	50.5	44.1	44.2	64.6
R3	19.1	21.0	24.8	3.6	7.8	13.0	5.3	4.4	5.3	7.5	9.4	20.3	-	3.0	13.3	22.1	13.0	10.9	41.6	13.2	23.2
F1	-	-	-	-	-	-	6.1	8.0	16.4	-	-	-	-	-	-	-	-	-	-	-	-
F2	-	-	-	-	-	-	5.0	0.1	-	5.8	-	10.9	17.8	0.4	-	-	-	2.4	-	-	-
F3	-	-	-	-	-	-	-	0.5	-	-	2.2	2.8	-	42.7	-	0.6	0.8	1.8	6.7	-	0.2
P1	0.5	-	-	1.3	1.4	0.02	1.3	1.6	0.7	-	-	1.9	-	-	-	0.1	2.2	1.4	-	-	-
P2	-	-	-	0.2	0.4	0.2	1.8	-	-	-	-	0.6	-	-	-	2.1	2.6	1.2	-	-	-
P3	-	-	-	-	-	-	0.3	-	-	-	-	-	-	-	-	-	-	0.5	-	-	-
RA	-	-	-	2.1	-	-	-	-	-	-	-	-	-	-	-	0.3	0.5	-	-	-	-
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Substrate Type	% Composition			% Composition			% Composition			% Composition			% Composition			% Composition			% Composition		
FN	53.5	66.0	24.4	64.0	31.7	67.1	70.0	63.4	54.0	72.5	65.3	58.8	55.5	85.0	59.7	49.3	41.4	46.9	67.0	64.0	57.3
GR	14.6	11.8	19.4	3.7	11.7	5.9	3.8	11.7	14.3	3.6	0.4	17.0	7.5	2.2	21.8	10.8	19.4	41.4	8.9	20.9	13.0
CB	19.4	13.2	27.1	17.0	33.2	13.5	14.7	18.2	10.9	2.9	7.5	10.6	36.8	5.1	16.5	37.4	27.2	7.0	19.1	11.5	23.1
BL	12.4	9.0	29.1	15.3	23.4	13.5	116	6.7	20.8	21.0	26.8	13.6	0.2	7.7	2.0	2.6	12.0	4.7	5.0	3.6	6.6
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Cover Type	% Composition			% Composition			% Composition			% Composition			% Composition			% Composition			% Composition		
WD	-	-	-	0.02	-	-	-	-	-	-	-	-	-	-	-	0.08	0.1	0.02	-	-	0.05
OB	0.2	0.8	0.5	0.2	0.2	0.9	0.05	-	0.5	-	-	0.3	0.75	-	0.07	0.2	0.4	0.7	-	0.3	0.8
OV	-	0.01	0.8	0.02	2.6	1.2	0.6	-	0.5	-	4.2	0.5	14.8	-	1.2	0.6	2.6	1.0	0.03	6.2	1.8
AV	0.3	29.6	3.2	9.7	71.4	10.2	36.7	3.4	72.9	78.3	47.4	59.1	80.4	70.4	26.1	56.8	19.4	1.0	48.4	34.5	28.9
BG	5.4	3.5	2.8	15.3	2.0	-	0.01	0.3	1.0	2.8	1.1	1.0	-	1.3	-	0.3	0.02	0.1	1.3	-	-
Total	5.9	33.9	7.2	25.3	76.3	12.2	37.3	3.7	74.9	81.1	52.7	60.9	95.9	71.7	27.4	58.0	22.5	3.0	49.7	41.0	31.6
Mean Width	14.1	14.4	14.1	18.1	16.8	19.7	19.4	20.0	23.9	23.9	25.3	20.7	18.1	19.1	16.1	8.0	10.5	13.3	15.2	15.8	17.4
Length	2523	2441	2769	3512	3510	3805	2016	2273	1910	2308	2280	2593	916	876	909	1574	1839	1975	1736	1725	1688
Total Area	35450	35020	39087	63428	59103	74774	39069	45435	45640	55114	57705	53690	16532	16725	14608	12648	19379	26210	26310	27199	29370

4.1.6 Water Quality

Basic water quality parameters were measured seasonally within each study section (Table 4.11). Water was well oxygenated and displayed overall moderate conductivity with the exception of spring monitoring in Section 4 and 5 where conductivity was elevated (Table 4.11). Measured water temperatures were moderate and turbidity values were low at all study sections during all seasons of monitoring (Table 4.11).

Table 4.11. Water quality parameters at study sections on the Little Bow River, 2014.

Study Section	Date	Temperature (ºC)	Dissolved Oxygen (mg/L)	pH	Conductivity (uMHOS/cm)	Turbidity (NTU)
LBR 1	6-June-14	17.4	9.5	9.9	637	8.1
	7-Aug-14	24.9	8.9	7.9	698	7.7
	24-Oct-14	6.6	10.2	8.1	678	4.2
LBR 2	5-June-14	13.1	7.8	9.9	494	8.4
	7-Aug-14	22.9	10.5	8.7	728	5.3
	23-Oct-14	9.3	11.5	8.1	700	3.3
LBR 3	5-June-14	14.1	9.9	9.6	487	6.3
	6-Aug-14	20.5	9.0	7.4	635	2.6
	22-Oct-14	10.2	9.0	8.1	658	2.6
LBR 4	3-June-14	19.4	8.5	8.5	1223	7.2
	5-Aug-14	24.5	10.5	7.8	569	4.8
	22-Oct-14	5.9	8.2	7.7	435	3.9
LBR 5	3-June-14	18.8	7.7	8.9	1156	12.1
	5-Aug-14	20.7	14.0	8.3	625	8.4
	21-Oct-14	8.5	9.4	7.5	446	1.2
LBR 6	2-June-14	19.0	9.3	7.9	515	12.6
	4-Aug-14	21.3	9.4	6.7	376	9.9
	20-Oct-14	9.0	10.6	7.4	502	3.1
LBR 7	2-June-14	17.8	9.3	8.0	266	12.7
	4-Aug-14	20.6	12.0	7.9	410	7.3
	21-Oct-14	8.0	9.2	7.1	476	1.3

4.2 Mosquito Creek

4.2.1 Fish Sampling

A total of nine species were captured from Mosquito Creek during seasonal backpack electrofishing efforts in 2014 (Table 4.12). One sport fish species which was a Rainbow Trout and eight non-sport species including Brook Stickleback, Lake Chub, Fathead Minnow, Longnose Dace, Longnose Sucker, Mountain Sucker, Trout Perch and White Sucker were captured (Table 4.12). Detailed capture data from all sampling efforts in Mosquito Creek in 2014 is presented in Appendix E.

Table 4.12. Fish species captured from Mosquito Creek.

Common Name	Scientific Name	Species Code	Historical Inventories	2014 Monitoring
Brook Stickleback	*Culaea inconstans*	BRST	f	•
Burbot	*Lota lota*	BURB	d	
Bull Trout	*Salvelinus confluentus*	BLTR	d	
Fathead Minnow	*Pimephales promelas*	FTMN	df	•
Lake Chub	*Couesius plumbeus*	LKCH	abdef	•
Longnose Dace	*Rhinichthys cataractae*	LNDC	abcdef	•
Longnose Sucker	*Catostomus catostomus*	LNSC	cef	•
Mountain Sucker	*Catostomus platyrhynchus*	MNSC	cd	•
Mountain Whitefish	*Prosopium williamsoni*	MNWH	acde	
Northern Pike	*Esox lucius*	NRPK	aef	
Pearl Dace	*Margariscus margarita*	PRDC	ae	
Rainbow Trout	*Oncorhynchus mykiss*	RNTR	cdef	•
Spoonhead Sculpin	*Cottus ricei*	SPSC	d	
Trout-Perch	*Percopsis omiscomaycus*	TRPR	df	•
White Sucker	*Catostomus commersoni*	WHSC	abcef	•

a Fernet and Bjornson (1994)
b Allan (2003)
c Meagher (2006)
d Peterson,Maximnuk,Shields and Meagher (2009)
e Alberta Government (FWMIS) (2010)
f Herron and Stemo (2010)

4.2.2 Backpack Electrofishing

Fish sampling of Mosquito Creek in 2014 was conducted on a seasonal basis and consisted of backpack electrofishing only (Table 4.13). Sample sections were typically about 300 metres in length and habitat generally consisted of riffle and/or run habitat (Table 4.13).

Table 4.13. Electrofishing sampling effort Mosquito Creek, 2014.

Section	Electrofishing Method	Section Length (m)	Habitat Description	Sampling Duration (s)		
				Spring	Summer	Fall
MC 1	Backpack	300	R2/R3/RF	2362	2989	1445
MC 2	Backpack	300	R2/R3/RF	1398	1685	1574
MC 3	Backpack	300	R2/R3/RF/P1	2481	1273	1511
MC 4	Backpack	300	R1/R2/R3/RF	1863	1753	1797
MC 5	Backpack	310	R1/R2/R3/RF	2948	2442	2337
MC 6	Backpack	310	R1/R2/R3/RF	2806	2325	1867

Sampling efforts in 2014 resulted in the capture of 997 fish (Table 4.14). Eight different species of non-sport fish including Longnose Dace, Fathead Minnow, Lake Chub, Brook Stickleback, Trout Perch, Mountain Sucker, Longnose Sucker and White Sucker were captured in Mosquito Creek. Cyprinids were numerically dominant accounting for 68% of the total catch, and other non-sport fish species including Mountain Sucker, Longnose Sucker and White Sucker comprised 31% of the total catch (Table 4.14, Figure 4.9). A single Rainbow Trout was captured in Section 5 during the fall monitoring accounting for the only sport fish species in Mosquito Creek during the 2014 monitoring program (Table 4.14, Figure 4.9). White Sucker, Longnose Dace and Lake Chub were the only species found in all sample sections while other species were not as well distributed (Table 4.14).

Table 4.14. Sampling results from monitoring sections on Mosquito Creek during 2014 electrofishing efforts

Species	Individuals Captured (% of total catch)																				
	Section 1			Section 2			Section 3			Section 4			Section 5			Section 6			All Sections		
	Sp	Su	Fa	Sp	Su	Fa	Sp	Su	Fa	Sp	Su	Fa	Sp	Su	Fa	Sp	Su	Fa	Sp	Su	Fa
LNDC	40(93)	17(27)	11(29)	14(88)	22(92)	-	125(95)	49(96)	2(8)	16(89)	10(83)	4(31)	33(69)	103(88)	109(52)	4 (7)	10(20)	1(37)	232(74)	211(66)	127(35)
FTMN	-	-	-	1(6)	2(8)	-	1(1)	-	-	-	-	-	1(2)	2(2)	5(2)	6(11)	5 (10)	28(37)	9(3)	9(3)	33(9)
LKCH	-	1(2)	-	1(6)	-	-	1(1)	2(4)	-	-	-	2(15)	2(4)	4(3)	-	18(32)	14(27)	9(37)	22(7)	21 (7)	11(2)
BRST	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1(2)	3(37)	-	1(<1)	3(1)
TRPR	-	-	-	-	-	-	1(1)	-	-	-	-	-	-	-	2(1)	1(2)	-	-	2 (1)	-	2(<1)
MNSC	-	-	-	-	-	-	-	-	-	-	-	-	6(13)	3(3)	-	-	-	-	6(2)	3(1)	-
LNSC	-	-	-	-	-	-	-	-	-	-	-	-	2(4)	-	2(1)	2(4)	2(4)	2(37)	4(1)	2(1)	4(1)
WHSC	3(7)	45(71)	27(71)	-	-	2(100)	3(2)	-	24(92)	2 (11)	2(17)	7(54)	4(8)	5(4)	90(43)	26(44)	19(37)	35(37)	38(12)	71(22)	185(51)
RNTR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1(1)	-	-	-	-	-	1(<1)
Non-Sport	43(100)	63(100)	38(100)	16(100)	24(100)	2(100)	131(100)	51(100)	26(100)	18(100)	12(100)	13(100)	48(100)	117(100)	208(99)	57(100)	51 (100)	78 (100)	313(100)	318(100)	365(>99)
Sport	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1(1)	-	-	-	-	-	1(<1)
All species	43(100)	63(100)	38(100)	16(100)	24(100)	2(100)	131(100)	51(100)	26(100)	18(100)	12(100)	13(100)	48(100)	117(100)	209(100)	57(100)	51(100)	78 (100)	313(100)	318(100)	366(100)
# Species	2	3	2	3	2	1	5	2	2	2	2	3	6	5	6	6	6	6	7	7	8

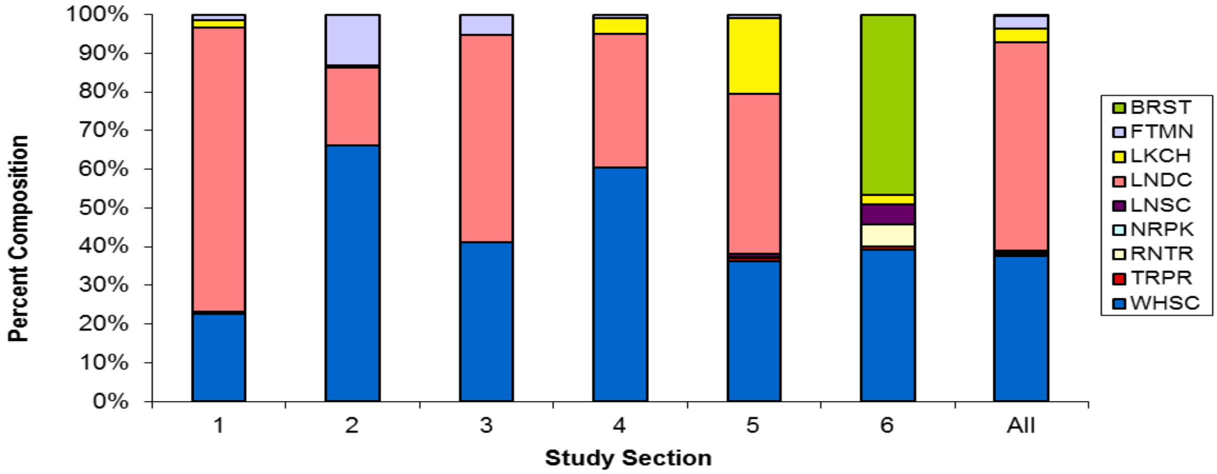

Figure 4.9. Percent distribution of species captured during 2014 monitoring on Mosquito Creek.

Catch rates for sampling were similar across seasons the overall was strongly affected by the relative abundance of Longnose Dace and White Sucker and when these species were excluded, the overall CPUE was substantially lower for all three seasons of sampling (Table 4.15).

Table 4.15. Catch per unit effort for fish species captured from Mosquito Creek during backpack electrofishing in 2014.

Species	CPUE (Fish/min)											
	Section 1			Section 2			Section 3			Section 4		
	Sp	Su	Fa	Sp	Su	Fa	Sp	Su	Fa	Sp	Su	Fa
BRST	-	-	-	-	-	-	-	-	-	-	-	-
FTMN	-	-	-	0.04	0.1	-	0.02	-	-	-	-	-
LKCH	-	0.02	-	0.04	-	-	0.02	0.1	-	-	-	0.1
LNDC	1.0	0.3	0.5	0.6	0.8	-	3.0	2.3	0.1	0.5	0.3	0.1
LNSC	-	-	-	-	-	-	-	-	-	-	-	-
MNSC	-	-	-	-	-	-	-	-	-	-	-	-
WHSC	0.1	0.9	1.1	-	-	0.1	0.1	-	1.0	0.1	0.1	0.2
TRPR	-	-	-	-	-	-	0.02	-	-	-	-	-
RNTR	-	-	-	-	-	-	-	-	-	-	-	-
Non-sport	1.1	1.3	1.6	0.7	0.9	0.1	3.2	2.4	1.1	0.6	0.4	0.4
Sport	-	-	-	-	-	-	-	-	-	-	-	-
All species	1.1	1.3	1.6	0.7	0.9	0.1	3.2	2.4	1.1	0.6	0.4	0.4

Species	CPUE (Fish/min)								
	Section 5			Section 6			All Sections		
	Sp	Su	Fa	Sp	Su	Fa	Sp	Su	Fa
BRST	-	-	-	-	0.03	0.1	-	0.01	0.02
FTMN	0.02	0.1	0.1	0.1	0.1	0.9	0.04	0.04	0.2
LKCH	0.04	0.1	-	0.4	0.4	0.3	0.1	0.1	0.1
LNDC	0.7	2.5	2.8	0.1	0.3	0.03	1.0	1.0	0.7
LNSC	0.01	-	0.1	0.04	0.1	0.1	0.02	0.01	0.02
MNSC	0.1	0.1	-	-	-	-	0.03	0.01	-
WHSC	0.1	0.1	2.3	0.6	0.5	1.1	0.2	0.3	1.1
TRPR	-	-	0.1	0.02	-	-	0.01	-	0.01
RNTR	-	-	0.03	-	-	-	-	-	0.01
Non-sport	1.0	2.9	5.4	1.3	1.4	2.5	1.4	1.5	2.2
Sport		-	0.03	-	-	-	-	-	-
All species	1.0	2.9	5.43	1.3	1.4	2.5	1.4	1.5	2.2

Two hundred and twenty White Sucker captured from Mosquito Creek were measured. A range of size classes were present but the majority of fish were juveniles (Figure 4.10). The lone Rainbow Trout captured measured 348 mm and weighed 580 g likely representing the adult age class (Appendix E).

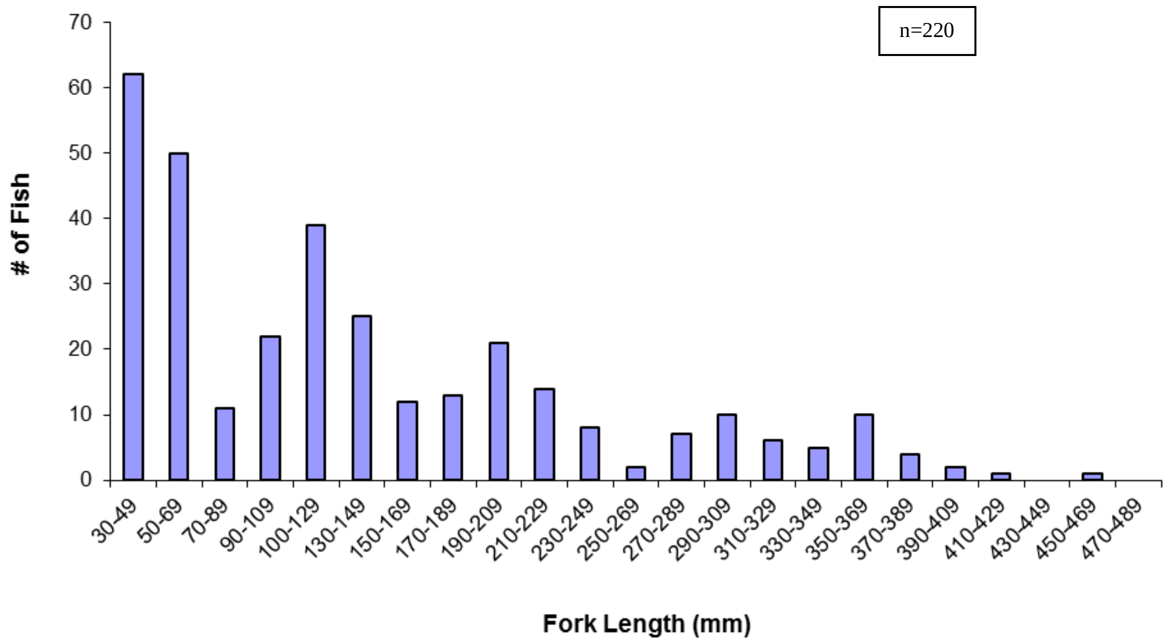

Figure 4.10. White Sucker length frequency distribution for Mosquito Creek

4.2.3 Mercury Sampling

Collection of mercury fish was one of the objectives of the 2014 monitoring program on Mosquito Creek. There were no Northern Pike captured during any of the sampling seasons, the only sport fish captured in Mosquito Creek in 2014 was a single Rainbow Trout. A sub-sample of White Sucker was to be obtained for mercury analysis in 2014 but due to an oversight this objective was not met. To meet requirements sampling in the spring 2015 could be completed.

4.2.4 Habitat

Habitat within the sample sections generally consisted of shallow (R3), moderate depth (R2) and deep (R1) run habitat (Table 4.16). Class 2 run habitat accounted for the highest percentage of the total habitat area in Sections 2 through 6 (Table 4.16). Riffle habitat represented less than 10% of the total habitat area in Sections 1 through 5, and was absent in section 6 (Table 4.16). Limited pool habitat was present in Sections 2, 3 and 6 with no rapids present in all six sections (Table 4.16). Class 3 Flat (F3) habitat was dominant in Section 1 and was present in smaller amounts in Section 6 (Table 4.16).

Fine substrates were predominant in Sections 2, 3, 4 and 6 and cobbles or gravels were the secondary substrate in all sections (Table 4.16). Gravels dominated substrate in Section 5 and cobbles were the dominant substrate in Section 1 (Table 4.16). Boulders were present in all six sections but were more prevalent in Section 1 where more than 10% of the substrate, was composed of boulders (Table 4.16).

Cover for fish was available in all sections and was generally more abundant in Sections 1 and 3 (Table 4.16). Aquatic vegetation was not present in Section 5 but was the predominant source of cover in Sections 1, 3, 4 and 6 (Table 4.16). Cover for fish in Sections 2 and 5 was dominated by overhanging vegetation (Table 4.16). Overhanging bank provided limited cover in all of the study sections while woody debris was almost non-existent. Boulder garden was the second most abundant cover available in Section 1 and was also present in Sections 5 and 6 in smaller quantities (Table 4.16). Detailed habitat information is presented in Appendix F

Table 4.16. Summary of habitat data for study sections on Mosquito Creek, 2014.

Habitat Type	Section1		Section2		Section3		Section 4		Section 5		Section 6	
	2009	2014	2009	2014	2009	2014	2009	2014	2009	2014	2009	2014
	% Area		% Area		% Area		% Area		% Area		% Area	
RF	2.6	6.8	1.1	2.3	-	4.2	9.6	7.0	6.1	9.7	-	-
R1	1.1	-	-	-	5.1	1.5	10.8	16.7	41.9	25.1	87.5	-
R2	18.4	10.3	2.5	83.8	20.3	69.5	48.4	53.6	45.6	48.6	3.4	79.9
R3	77.9	16.2	96.4	13.5	72.7	23.8	31.2	22.7	6.4	16.6	2.5	10.0
F1	-	-	-	-	-	-	-	-	-	-	-	-
F2	-	13.9	-	-	-	-	-	-	-	-	-	-
F3	-	52.8	-	-	-	-	-	-	-	-	3.0	-
P1	-	-	-	-	1.9	1.0	-	-	-	-	1.5	10.1
P2	-	-	-	0.4	-	-	-	-	-	-	-	-
P3	-	-	-	-	-	-	-	-	-	-	0.6	-
RA	-	-	-	-	-	-	-	-	-	-	1.5	-
Total	100	100	100	100	100	100	100	100	100	100	100	100
Substrate Type	% Composition		% Composition		% Composition		% Composition		% Composition		% Composition	
FN	37.9	21.5	88.1	84.7	66.7	61.7	56.4	44.8	69.0	36.5	98.0	62.6
GR	21.8	32.2	4.6	5.7	17.6	15.8	13.8	37.1	21.0	46.6	0.3	27.8
CB	25.9	35.5	3.4	5.8	8.9	16.8	21.5	14.6	7.0	9.9	0.4	7.0
BL	14.4	10.8	3.9	3.8	6.8	5.7	8.3	3.5	3.0	7.0	1.3	2.6
Total	100	100	100	100	100	100	100	100	100	100	100	100
Cover Type	% Composition		% Composition		% Composition		% Composition		% Composition		% Composition	
WD	0.00	-	-	0.02	-	-	-	0.01	0.04	0.2	-	-
OB	2.7	0.1	4.9	1.2	2.6	1.5	0.3	0.2	3.3	0.4	0.1	2.3
OV	2.0	1.1	1.7	3.2	1.7	1.6	0.5	0.04	1.2	0.4	8.0	5.0
AV	34.1	12.5	9.7	1.0	17.4	16.0	6.9	0.2	2.0	-	7.1	5.6
BG	-	10.8	-	-	-	-	-	-	-	0.1	0.03	0.3
Total	38.8	24.5	16.3	5.4	21.7	19.1	7.8	0.45	6.6	1.1	15.2	13.2
Mean Width	8.9	8.5	10.8	9.7	11.1	12.8	12.7	10.2	7.3	8.4	6.0	4.2
Length	300	394	300	316	295	304	361	271	552	370	323	376
Total Area	2680.5	3337.5	3234	3074.5	3271	3891	4574	2754.5	4043	3100	1952	1581.5

4.2.5 Water Quality

Basic water quality parameters were measured seasonally within each study section (Table 4.17). Water was generally well oxygenated and displayed moderate to high conductivity. The pH values ranged from moderate to slightly basic as the seasons progressed. Temperatures were moderate and turbidity values ranged from low to moderate at each sample site.

Table 4.17. Water quality parameters at study sections on Mosquito Creek, 2014.

Study Section	Date	Temperature (°C)	Dissolved Oxygen (mg/L)	pH	Conductivity (uMHOS/cm)	Turbidity (NTU)
1	4-June-14	21.0	8.8	9.7	644	22.2
	6-Aug-14	23.8	9.3	8.1	631	9.8
	22-Oct-14	9.2	11.3	7.9	784	2.7
2	4-June-14	18.2	8.8	9.2	648	18.2
	6-Aug-14	20.5	7.9	8.5	663	10.8
	22-Oct-14	8.1	9.8	7.9	785	1.6
3	4-June-14	15.0	8.4	9.5	655	16.4
	6-Aug-14	21.6	9.9	8.6	676	8.9
	22-Oct-14	7.2	10.2	7.8	769	2.0
4	5-June-14	14.0	8.2	9.9	645	15.0
	8-Aug-14	19.4	7.7	8.5	630	14.2
	22-Oct-14	6.8	9.7	7.8	746	2.2
5	4-June-14	17.1	*	8.5	645	13.5
	8-Aug-14	19.5	7.4	8.0	539	13.5
	21-Oct-14	9.6	10.8	7.8	793	13.5
6	4-June-14	13.0	*	8.3	532	12.1
	8-Aug-14	20.3	7.4	7.9	349	14.4
	21-Oct-14	9.1	11.0	7.5	1700	15.2

*- Equipment malfunction

5.0 DISCUSSION

The objective of the 2014 monitoring program was to replicate previous monitoring programs by assessing fish species composition, relative abundance, and distribution within the Little Bow River, upstream and downstream of TVR, and within Mosquito Creek. Sub-samples of both Sucker species and Northern Pike were obtained for mercury analysis. Both boat and backpack electrofishing techniques were employed in an effort to minimize sampling biases associated with each sampling method. Boat electrofishing selects for larger fish (Meador 2005, Sikina and Bryski 2005) and is effective for sampling deeper run and pool habitat. Backpack shocking is better suited to target smaller fish in shallow habitat and has limited effectiveness in water that is deeper than one metre.

5.1 LITTLE BOW RIVER

In 1990, prior to the existence of the TVR, boat electrofishing was conducted at two sites downstream of the reservoir location; one site was located in close proximity to what is now referred to as Section 1, and the second site included most of the current Section 2 (Fernet and Bjornson 1994). Boat electrofishing was also conducted at five locations upstream of the proposed TVR prior to construction. One sample site was located immediately upstream of the proposed TVR, a second site was located within the Little Bow Diversion Canal while a third site was located approximately eight kilometers downstream from the current Section 5 monitoring site; two other sample sections were similar to the current Sections 4 and 7. Sampling downstream of the proposed dam was conducted in the spring and summer while sampling upstream was completed during three seasons; in fall 1990, then spring and summer of 1991 (Fernet and Bjornson 1994). In 2004, boat electrofishing was conducted at Sections 1, 2, and 3 once during the summer however low flows limited boat shocking upstream of the TVR (Sikina and Bryski 2005). Boat electrofishing in 2005 and 2006 included sampling of Sections 1 through 7 during the spring, the summer, and the fall with the exception of section 5 which was not established until the summer of 2005 (Stemo 2006, 2007). In 2009 the previously established seven reference sections were sampled during the spring, summer, and fall (Herron and Stemo 2010). In 2014, the same seven reference sections that were sampled in 2009 were again sampled during spring, summer and fall.

In 2006, twenty backpack electrofishing sampling sections were established within the seven boat electrofishing reference sections (Stemo 2007). The backpack electrofishing sections were sampled in spring, summer and fall and focused on discrete riffle and shallow run habitats where smaller forage fish reside. Previous to this, backpack sampling that concentrated on these habitats was less intensive; in August 2005, University of Lethbridge researchers conducted backpack sampling at seven locations during the summer (Stemo 2006) and in 2004, backpack sampling was limited to summer sampling of Sections 6 and 7 (Sikina and Bryski 2005). In 2009, twenty-one backpack electrofishing sections were sampled three times (seasonally) (Herron and Stemo 2010). In 2014 nineteen backpack electrofishing sections were sampled three times (seasonally); two backpack sections (LBR Section 2D and LBR Section 4C) were dropped from the monitoring program because these sites no longer met the criteria for backpack electrofishing.

5.1.1 Species Composition, Relative Abundance, and Distribution

Twin Valley Dam segregates the different species assemblage of the Little Bow River upstream and downstream of the reservoir. Upstream migrants from Travers Reservoir influence the fish community composition of the lower Little Bow River (Herron and Stemo 2010). The fish community composition of the upper Little Bow River has historically been influenced by entrainment of fish from the Highwood River via the Little Bow Canal; however, this effect has been reduced since the installation of the fish exclusion screen at the entrance of the canal. Historical inventories in the Little Bow River found a total of sixteen species inhabiting the river upstream of the TVR and fourteen species downstream of the river (Herron and Stemo 2010). Yellow Perch were documented downstream of the TVR in 2005, 2006 and 2009 but no specimens were captured or observed in 2014. Northern Pike YoY and juveniles dominated the catch for Northern Pike both above and below TVR in 2014. In 2014, twelve species were captured upstream of the TVR and ten species were captured downstream of the reservoir.

Downstream from TVR (Sections 1-3)

Finescale Dace, Trout-Perch, Fathead Minnow, Spottail Shiner, Yellow Perch and Rainbow Trout have been previously captured from the Little Bow River downstream of the TVR, but were not captured in 2014. Historically these species are rare with the exception of Yellow Perch and Spottail Shiners which have been captured downstream of the reservoir every monitoring year since 2005. In the past, White Sucker have comprised the majority of the large-bodied fish population downstream of the TVR while other species including Lake Whitefish, Longnose Sucker, Northern Pike and Walleye have consistently represented small percentages of the total population (Fernet and Bjornson 1994, Sikina and Bryski 2005, Stemo 2006, 2007, Herron and Stemo 2010).

Data suggests little change in overall species composition with the exception of Yellow Perch which were not captured in 2014 (Figure 5.1). White Sucker remains the dominant species and account for over 50% of the fish population. Lake Whitefish, Northern Pike, Walleye and Longnose Sucker continue to represent a relatively low percentage of the total population. Lake Whitefish, Northern Pike Longnose Sucker were less abundant in 2014 compared to 2009 (Figure 5.1). Walleye counts were the highest recorded amounts since monitoring began in 1991(Figure 5.1).The percentage of Yellow Perch has been highly variable between monitoring years and was non-existent in 2014 (Figure 5.1).

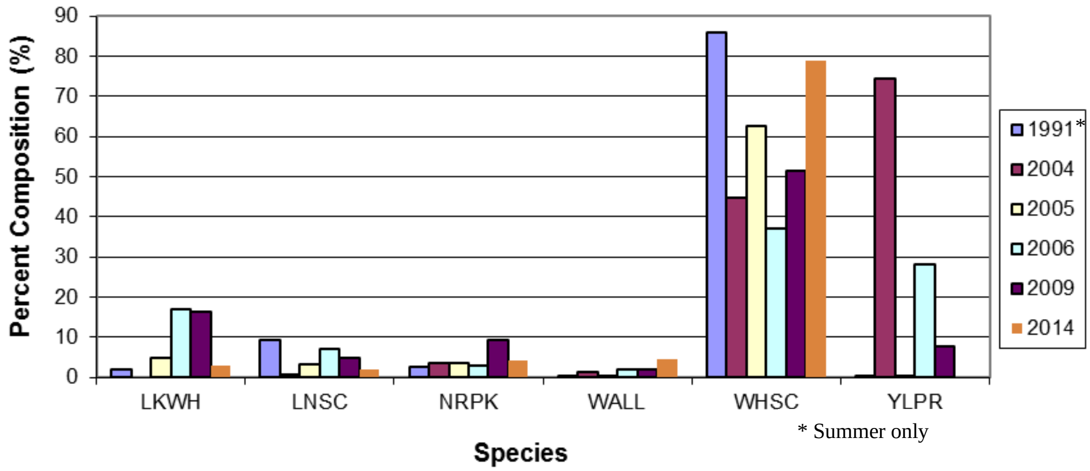

Figure 5.1. Percent composition of the main large-bodied fish species captured during boat electrofishing downstream of the TVR over time.

Longnose Dace continue to comprise the majority of the small fish community downstream of the TVR, and were abundant in all study sections in 2014. Other small fish and cyprinids were much less abundant and less widespread within the study sections.

CPUE for large-bodied fish species occupying the river downstream of the TVR have been relatively constant over time. In 2014, catch rates for Northern Pike were comparable to 2006 but were less than the previous monitoring in 2009 (Figure 5.2). Adult Northern Pike dominated the catch in 2014 with the majority of Northern Pike captures came during the fall sampling. The CPUE for Yellow Perch has fluctuated quite dramatically since completion of the TVD. In 2014 no Yellow Perch were captured or observed during any season or method of sampling, 2009 catch rates were lower than in 2004 and 2006 and were greater than in 2005 (Figure 5.2).

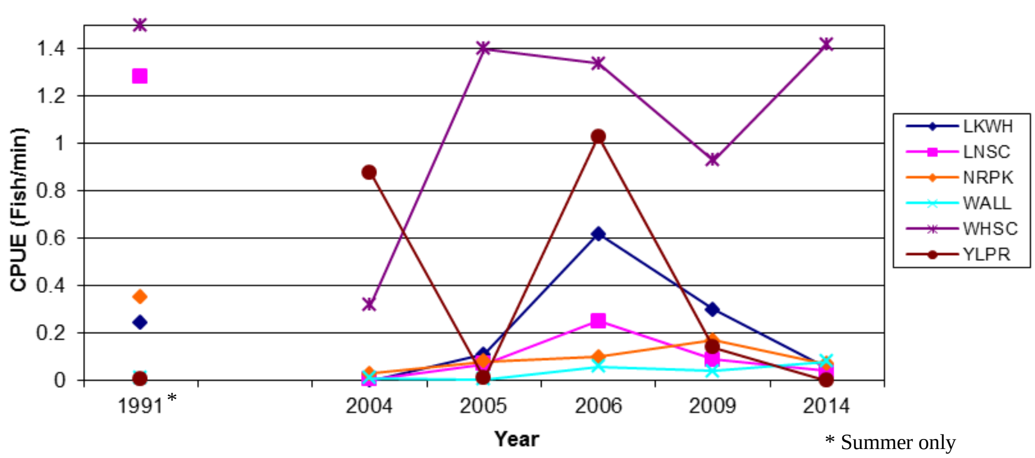

Figure 5.2. Catch-Per-Unit-Effort over time for the main large-bodied fish species captured from the Little Bow River downstream of the TVR.

Longnose Suckers were captured frequently during pre-dam sampling and continue to be captured but at a substantially lower rate post-construction. The catch rates for Lake Whitefish and Longnose Sucker decreased substantially in 2014 in comparison to previous monitoring and were the lowest since 2004 (Figure 5.2). In 2005, 2006 and 2009 Lake Whitefish were relatively abundant during spring and fall sampling season, but were rare during the summer season (Stemo 2006 & 2007, Herron and Stemo 2010). In 2014 Lake Whitefish CPUE declined from 2009, dropping below 0.1 fish per minute, and has been trending downward since 2006 (Figure 5.2).

White Sucker has dominated the catch in all years except for 2004 (Figure 5.2). Only summer sampling took place in 2004 and may be the reason that the CPUE for White Sucker was relatively low. In 1991, the CPUE for White Sucker during the summer was extremely low in comparison to other seasons and in 2005 and 2009 catch rates for White Sucker were the highest in the fall season (Fernet and Bjornson 1994, Stemo 2006, Herron and Stemo 2010). Catch rates for the2014 monitoring program were the highest recorded since the 1991 monitoring program (Figure 5.2).

A weir near the town of Carmangay at the upstream boundary of Section 2 prohibited upstream fish passage beyond this point until 2004. Fish that were resident in the Little Bow River downstream of the Carmangay Weir, and migrants from Travers Reservoir were unable to migrate upstream of the weir. Installation of a bypass channel at the weir in 2004 allowed fish from downstream to access the Little Bow River from the weir upstream to the TVR. Prior to construction of the bypass channel, the fish community in the section of the Little Bow River between the TVR and the Carmangay Weir consisted largely of White Sucker, Northern Pike, Longnose Dace, and Lake Chub (Boorman 2004). Since the construction of the bypass channel Lake Whitefish have been captured repeatedly in Section 3 (upstream of the weir) during previous monitoring and were captured again in 2014 (Sikina and Bryski 2005, Stemo 2006, 2007, Herron and Stemo 2010).

Northern Pike were captured from all downstream sample sections in 2014. Catch rates were lower in 2014 than in 2009 and the total number of Pike captured from the downstream sections represented approximately four percent of the total catch from boat sampling compared to nine percent in 2009. Based on dates of capture and length information from Fernet and Bjornson (1994) and Council and Clayton (1999), pike less than 230 mm in length are probably young-of-the-year (YOY). This year class represents approximately 6% of the total Northern Pike catch downstream of the reservoir, which was 14% less than 2009. While it is expected that annual Northern Pike production will vary between years, the 2014 results may suggest that Northern Pike spawning success below TVR may have suffered due to recent flood events in the area.

Fernet and Bjornson (1994) documented Lake Whitefish made use of the lower sections of the Little Bow River and suggested that the majority of Lake Whitefish were adults utilizing the river on feeding excursions and possibly for spawning. Lake Whitefish were relatively abundant through 2005 to 2009; in 2009 Lake Whitefish represented 16% of the total catch below TVR. In 2014 Lake Whitefish represented only 3% of the total catch. In 2009 the most abundant numbers of Lake Whitefish (92) were in Section 1 during the fall sampling while in 2014 only a single Lake Whitefish was captured in this section in all three seasons of sampling. The majority Whitefish in 2014 were captured during fall sampling in sections 2 and 3 which may be an indication that Lake Whitefish use of the lower Little Bow River is still primarily seasonal. The relative abundance, during the fall, downstream of TVR could be related to Lake Whitefish that are attempting to spawn in the lower portion of the Little Bow River. However it is unsure if spawning has been successful since there has been no YOY Whitefish captured during monitoring. If Mountain Whitefish spawning is successful fry may be drifting or migrating down to Travers reservoir after hatching.

As in previous monitoring years Burbot were only captured from sections downstream of the TVR in 2014. Overall capture numbers were low in 2014 as has historically been the case (Fernet and Bjornson 1994, Sikina and Bryski 2005, Stemo 2006, 2007, Herron and Stemo 2010). Alan (2007) conducted tracking of Burbot implanted with radio transmitters and found that most Burbot movements are limited. This lack of movement suggests that Burbot in the Little Bow River between the TVR and Travers reservoir may be largely resident fish. Although during Trout Unlimited fish rescues of the Lethbridge Northern Irrigation District (LNID) canal there has been Burbot captured suggesting Burbot migrate a substantial distance upstream from Keho Reservoir (M. Bryski personal communication, March 9, 2015).

Walleye numbers in the Little Bow River have historically been low (Fernet and Bjornson 1994, Council 2000, Sikina and Bryski 2005, Stemo 2006, 2007, Herron and Stemo 2010). Juvenile Walleye were captured from all three downstream sample sections in 2006, confirming that Walleye can navigate the bypass channel at the Carmangay weir. Walleye however were not captured above the weir in 2009 or 2014 suggesting that Walleye may not migrate that far upstream in the Little Bow River on an annual basis. During 2014 monitoring, all Walleye were captured in Section 1 and 2 throughout all three seasons of sampling. The infrequent yet repeated presence of juvenile Walleye in the river suggests that there is some feeding and rearing ongoing in the lower Little Bow River.

Past sampling indicates that White Sucker have consistently been the most abundant and wide-ranging large-bodied fish species in the Little Bow River upstream and downstream of the TVR (Fernet and Bjornson 1994, Sikina and Bryski 2005, Stemo 2006, 2007, Herron and Stemo 2010). As in previous years, the 2014 White Sucker population was dominant. Capture of a number of size classes suggest that successful spawning continues to occur within the Little Bow River both upstream and downstream of TVR.

Previous years monitoring indicate Longnose Sucker are less abundant than White Sucker, as was the case during the 2014 monitoring program. All Longnose Suckers captured in 2014 were from Sections 1 and 2, compared to 2009 where the majority of captures came from above the Carmangay weir in Section 3 (Herron and Stemo 2010). During previous years monitoring individuals were more evenly dispersed between study sections (Stemo 2006, 2007). The collection of specimens in spawning condition during spring sampling in 2014 suggests that spawning within the Little Bow River is likely.

Fernet and Bjornson (1994), Sikina and Bryski (2005) have indicated no Shorthead Redhorse have been captured upstream of Section 1 and Shorthead Redhorse were not captured in 1990 or in 2004 in the Little Bow River. In 2009, three Shorthead Redhorse were captured in Section 1 only and were assumed to be residents of Travers Reservoir (Herron and Stemo 2010). In 2014 a total of 27 Shorthead Redhorse were captured within Sections 1 and 2 which is the first time Shorthead Redhorse have been recorded upstream of Section 1 since monitoring began. During the fall backpack electrofishing in Section 1 six YoY Shorthead Redhorse were captured indicating that some spawning may be taking place in the lower reaches of the Little Bow River.

Upstream from TVR (Sections 4-7)

Bull Trout, Burbot, Finescale Dace, Pearl Dace, Brook Stickleback and Rainbow Trout were all previously captured at locations upstream of the TVR, but were not captured in these sections 2014. Previous capture data suggests that these species are relatively rare within the Little Bow River. The presence of Bull Trout, Burbot, Rainbow Trout and Mountain Sucker in the upper Little Bow River is the direct result of the connection between the Highwood River and the Little Bow via the diversion canal in High River (Herron and Stemo 2010). In 2009 Brook Stickleback were captured for the first time in the Little Bow River during the spring and summer backpack electrofishing efforts. During the 2014 sampling efforts Brook Stickleback was not present which may be an indication of a small population. As previously discussed, Finescale Dace have only been found once and identification is unsubstantiated. Pearl Dace were also only captured on a single occasion and were only found in a single section upstream of Highway 2, which is upstream from current monitoring sections (Fernet and Bjornson 1994).

A combination of temperature fluctuation and recent flood events in the area may have had an effect on the survival and reproduction of these species within the Little Bow River. As a result, their frequency of occurrence within the Little Bow drainage has been low (Fernet & Bjornson 1994, Sikina and Bryski 2005, Stemo 2006, 2007, Herron and Stemo 2010). When the exclusion screen is functioning at the headwaters of the Little Bow Canal it limits the number of fish that can enter the Little Bow River from the Highwood River and therefore limit regeneration of small populations that are upset by flooding or habitat changes.

The coarse large-bodied fish population upstream of the TVR continues to be dominated by White Sucker which accounted for 67% of the total catch (Figure 5.3). The dominant sport fish in 2014 is Northern Pike accounting for 11% of the total catch upstream of TVR (Figure 5.3). The percent composition of other species including Mountain Whitefish and Longnose Sucker has remained relatively stable during monitoring (Figure 5.3). Similar to previous years, the small fish community was heavily dominated by Longnose Dace which represented 96% of the total backpack electrofishing catch in 2014. Other small fish and cyprinids are less abundant within the study section.

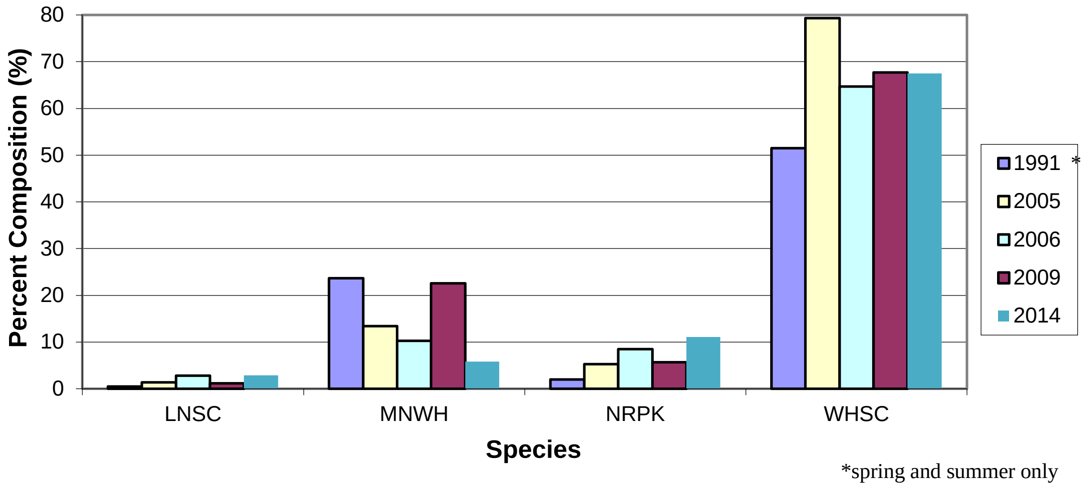

Figure 5.3. Percent distribution of the main large-bodied fish species captured during boat electrofishing upstream of the TVR over time.

In general, CPUE for large-bodied fish in 2014 exhibited a slight increase to previous sampling results with the exception of White Sucker which showed a substantial increase for the second straight monitoring program (Figure 5.4). Longnose Sucker and Northern Pike catch rates increased slightly compared to previous monitoring in 2005, 2006 and 2009 (Figure 5.4). Mountain Whitefish CPUE was virtually unchanged compared to the 2009 sampling (Figure 5.4). Catch rates for small fish captured by backpack electrofishing were similar to 2009 where the CPUE was high for Longnose Dace and relatively low for all other species.

In 2014, Northern Pike represented approximately 11% of the total catch from upstream of the TVR (from boat electrofishing) up from 6% in 2009. Catch rates for Northern Pike were slightly higher than in previous years. Capture data from 2014 and historical length at age data indicates that approximately 85% of the total Northern Pike catch consists of YoY and juvenile pike up from 20% in 2009. The increased captures of YoY and juvenile Northern Pike may be an indication of successful recruitment years throughout this section of the river, which may be attributed to additional spawning habitat within this portion of the Little Bow River.

Past sampling indicates that White Sucker have consistently been the most abundant and wide-ranging large-bodied fish species in the Little Bow River upstream of the TVR (Fernet and Bjornson 1994, Stemo 2006, 2007, Herron and Stemo 2010). White Sucker was again the most abundant species present in 2014 and were captured in all study sections and in all three seasons of sampling. Capture of mature ripe individuals and the presence of a number of size classes suggest that spawning occurs throughout this section of the river.

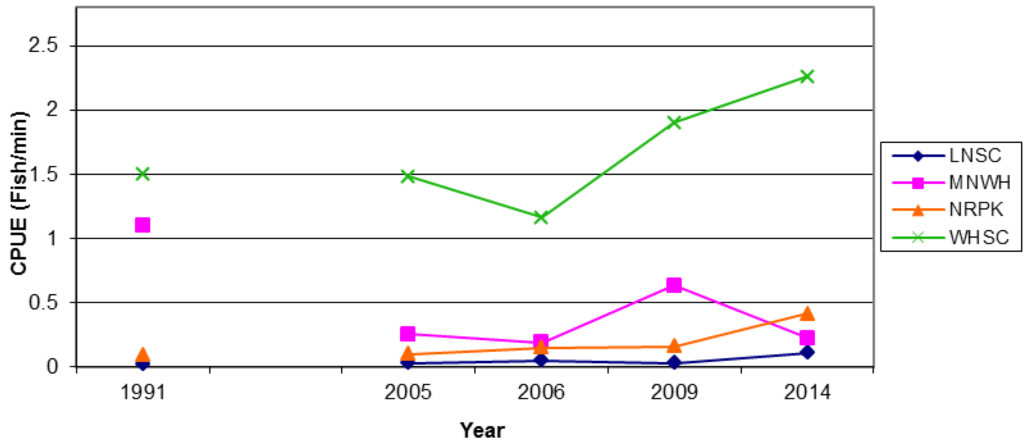

Figure 5.4. Catch-Per-Unit-Effort for the main large-bodied fish species captured from the Little Bow River upstream of the TVR.

Mountain Whitefish accounted for 6% of the total catch (boat electrofishing) in 2014 which is down from the 20% recorded in 2009. The effects from recent flood events may be a contributing factor in the lower percentage of Mountain Whitefish within this section of the Little Bow River. It still remains unclear if Mountain Whitefish are using the Little Bow River for the purpose of spawning or if recruitment is coming from the Highwood River and the system is used for rearing purpose only.

Longnose Dace were the most abundant of the forage fish accounting for 10% of the overall boat electrofishing catch and 96% of the overall backpack electrofishing catch. Longnose Dace were captured during all seasons and in all sections above TVR.

5.1.2 Habitat and River Flows

Downstream from TVR (Sections 1-3)

Little Bow River flows in 2014 downstream of the TVR (at Carmangay) were above average compared to historical flows (Appendix G), particularly during the spring, when compared to discharge levels during previous monitoring years (Stemo 2006, 2007, Herron and Stemo 2010).

The habitat of the Little Bow River downstream of the dam site prior to construction of the TVD was comprised primarily of Class 2 and Class 3 run type habitat (Pisces 2000). Post Construction of TVD, habitat downstream of the reservoir consisted primarily of moderate and deep flat water habitat (Sikina and Bryski 2005). In 2005, 2006 and 2009 habitat inventory of the downstream study sections found that run type habitat was predominant in all study sections with Class 2 runs generally most common (Stemo 2006 & 2007, Herron and Stemo 2010). In 2014 the habitat within the study sections was largely comparable to habitat data from previous years monitoring consisting primarily of moderate and deep run habitat. The quantity of deep water run habitat has increased within Section 1 in 2014 while moderate depth run habitat has increased in Section 2. Section 3 continues to consist primarily of deep run habitat although the total area of deep water habitat has decreased by nearly 14%. Fines continue to be the predominant substrate in Sections 2 and 3. Boulders and cobble now dominate the substrate composition in Section 1 which may be due to flushing effects from recent flooding in the area. Cover for fish during the baseline habitat inventory and in 2005, 2006, 2009 (Pisces 2000, Stemo 2006, 2007, Herron and Stemo 2010) and 2014 was dominated by aquatic vegetation.

The relative consistency in overall habitat composition has been apparent since 2005 (Stemo 2006, 2007, Herron and Stemo 2010), the difference in proportion of habitat type, substrate composition and cover in each section varies from year to year which may be indicative of flood events and spring freshets in the Little Bow River system. Variability in habitat classification due to observer bias has also been documented, the complexity of the habitat, the level of uniformity in observer training, and stream channel characteristics can also lead to variation in observer classification of habitat features (Roper and Scarnecchia 1995).

Upstream from TVR (Sections 4-7)

Discharge in the Little Bow River at the Hwy 533 gauging station was lower during the spring and summer in 2014 as compared to 2009 but flows were similar during the fall, when flows are reduced through the Little Bow River system (Appendix G, Herron and Stemo 2010).

The Little Bow River upstream of the proposed dam site prior to construction was comprised primarily of Class 2 run habitat; Class 3 run habitat was also relatively common with all other habitat types relatively uncommon (Pisces 2000). Class 3 runs and Class 2 flats dominated the study sections upstream of the reservoir in 2004(Sikina and Bryski 2005). Class 2 and Class 3 run type habitat was generally predominant in the upstream sections during the habitat assessments conducted in 2005 and 2006 (Stemo 2006, 2007). Habitat in 2009 was similar to previous years in that Class 2 and Class 3 run type habitat was the most common (Herron and Stemo 2010). In 2014, moderate and deep run habitat was the predominant habitat in the study sites above TVR. As was the case during previous inventories (Pisces 2000, Stemo 2006, 2007, Herron and Stemo 2010), fine substrates were predominant and aquatic vegetation comprised the majority of cover for fish in 2014.

5.2 MOSQUITO CREEK

Mosquito Creek is a major tributary to the Little Bow River and is fed from flows from the Highwood River which is diverted into Woman's Coulee Reservoir approximately seven kilometres upstream of the town of High River (Fernet and Bjornson 1994), Women's Coulee Reservoir then connects to the upper portion of Mosquito Creek. A portion of Mosquito Creek is then diverted into Clear Lake, which is located approximately nine kilometres south of TVR, via a ten kilometre diversion canal with the remaining water flowing into the TVR. Clear Lake is a shallow basin approximately 300 hectares in size which historically supported Northern Pike and Yellow Perch before it dried up in 1985 (Fernet and Bjornson 1994). A Northern Pike population was re-established via transfers from the lower Little Bow River in 2001 and 2002 (Boorman 2004). It is assumed those fish residents to Clear Lake are unable to move into Mosquito Creek due to the flow control structure that is considered impassable.

The species assemblage within Mosquito Creek is similar to the Little Bow River upstream of the TVR and can be influenced by entrainment of fish from the Highwood River via the Woman's Coulee diversion. In 2014, nine of the 15 previously documented species from Mosquito Creek were captured. White Sucker and Longnose Dace dominated the catch in Mosquito Creek during the 2014 monitoring accounting for more than 85% of all fish captured. A single Rainbow Trout was captured at Section 5 during fall sampling which was the only sport fish species captured throughout the entire monitoring program in 2014, which suggests that salmonid entrainment was either very low or was restricted to the uppermost reach of Mosquito Creek (upstream of Section 6).

Fernet and Bjornson (1994) identified a general lack of instream and streamside cover, extreme summer temperatures and high nutrient input prior to construction of the TVR which may contribute to limiting factors affecting fish production in Mosquito Creek. Insufficient winter dissolved oxygen levels, particularly for salmonids, and a lack of deep water habitat suitable for overwintering indicated that the stream provided primarily seasonal habitat (Fernet and Bjornson 1994).

With the exceptions of Sections 5 and 6, deep water habitat was relatively scarce in 2014. Habitat within the remaining study sections was comprised primarily of Class 3 run with the exception of Section 1 which was dominated by Class 3 flat habitat which suggests that overwintering habitat remains scarce within the system. Overhanging banks and vegetation was still relatively rare within the study sections but instream cover primarily in the form of aquatic vegetation was the most abundant.

Discharge data for Mosquito Creek indicates that 2014 flows were above historical average flows throughout the entire monitoring program (Appendix G).

6.0 SUMMARY

The results of the 2014 monitoring program indicate the Little Bow River fish community upstream and downstream of the TVR has had little change since monitoring was initiated in 2004. Monitoring results since the construction of the TVR does suggest that there have been notable changes in the distribution and relative abundance of several fish species compared to the pre-dam period (1990 and 1991 data).

Habitat can be characterized as moderate to deep run habitat with fine and cobble substrates and abundant aquatic vegetation. White Sucker and Longnose Dace continue to dominate the fish community upstream and downstream of the reservoir in 2014. Both species are abundant and occupy the river on a year-round basis. The high numbers of juvenile and YoY Northern Pike indicate successful spawning is taking place in the Little Bow River system. The absence of Yellow Perch in 2014 cannot be explained as it was beyond the scope of our study. Since construction of the Carmangay Weir fish bypass Lake Whitefish have utilized the river downstream of the TVR consistently and have expanded their range of occurrence to include all sections downstream of TVR. Walleye in 2014 were the second most frequently captured species below TVR behind White Sucker. Since the construction of TVD Walleye have been captured more often and have been found further upstream in the lower Little Bow River than prior to the building of the dam. Juvenile Mountain Whitefish continue to occupy the upper study sections while other salmonids that are resident to the Highwood River are rare suggesting that the fish exclusion device at the entrance of the Little Bow Canal is at least partially effective.

Monitoring in Mosquito Creek in 2014 resembled the 2009 data indicating that the creek is primarily occupied by non-sport species including White Sucker and Longnose Dace that together comprise the majority of the population. Sport fish are rare; a single Rainbow Trout was captured in upper Mosquito Creek close to the diversion from the Highwood River.

The creek is comprised almost exclusively of run habitat with shallow habitat dominating at downstream sections and deeper habitat more common at upstream sections. Overall habitat diversity is relatively low and overwintering potential is minimal.

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APPENDIX A:

Standard Habitat Inventory Methods

PISCES' STANDARD HABITAT INVENTORY METHODS
(adapted from O'Neil and Hildebrand 1986)

HABITAT MAPPING AND CLASSIFICATION

This habitat mapping and classification system is used to evaluate and inventory the habitat characteristics of a watercourse within a designated study area. Assessment data is measured and recorded using a standard habitat inventory form (HI/95-1) and, where feasible, delineated on air photo enlargements in the field.

The components of fish habitat that are assessed include:

1.	**Physical Dimensions**	habitat units are measured (length and width) to determine total area of each habitat type.
2.	**Habitat Types**	parts of the environment on which fish depend, directly or indirectly in order to carry out life processes, generally distinguished from one another based on water depth, flow, surface appearance, substrate type, and water velocity. **Table 1**
3.	**Cover**	physical attributes which provide protection from predators and resting places for fish recorded as area (m^2) of occurrence (when feasible) in each habitat unit, or as present or absent within each habitat unit. **Table 1**
4.	**Substrate**	composition of the streambed within the channel, recorded as area (m^2) of occurrence (when feasible) in each habitat unit, or as frequency of occurrence within each habitat unit. **Table 2**
5.	**Unstable Bank**	estimation of length (m) of unstable or slumping bank
6.	**Riparian Vegetation**	identification of dominant and subdominant riparian vegetation. **Table 3**

Table 1: Parameters used for habitat mapping and inventories. (adapted from O'Neil and Hildebrand 1986 and Hawkins et al. 1993)

DESCRIPTION					
habitat type	water depth	Surface	flow	substrate	velocity
Riffle (RF)	<0.5 m	irregular broken	turbulent	coarse	high
Class 1 Run (R1) R1^o	>1.0 m >2.0 m	irregular rarely broken	moderate turbulence	coarse	moderate to high
Class 2 Run (R2)	0.5 to 1.0 m	irregular rarely broken	moderate turbulence	coarse	moderate to high
Class 3 Run (R3)	<0.5 m	irregular rarely broken	moderate turbulence	coarse	moderate
Class 1 Pool (P1) P1^o	>1.0 m >2.0 m	smooth	low turbulence	variable	low, variable
Class 2 Pool (P2)	0.5 to 1.0 m	smooth	low turbulence	variable	low, variable
Class 3 Pool (P3)	<0.5 m	smooth	low turbulence	variable	low, variable
Class 1 Flat (F1) F1^o	>1.0 m >2.0 m	smooth	laminar	fines	low
Class 2 Flat (F2)	0.5 to 1.0 m	smooth	laminar	fines	low
Class 3 Flat (F3)	<0.5 m	smooth	laminar	fines	low
Cascade (CA)	<0.5 m	irregular, broken	very turbulent	very coarse	highly variable
Rapids (RA)	>0.5 m	irregular, broken	very turbulent	very coarse	highly variable
Chutes (CH)	<0.5 m	irregular	shooting	bedrock	high
COVER COMPONENTS					
Woody Debris (WD)	large, in stream woody debris				
Overhanging Bank (OB)	undercut, overhanging bank				
Overhanging Vegetation (OV)	overhanging terrestrial vegetation				
Aquatic Vegetation (AV)	dense, well distributed aquatic vegetation providing cover				
Boulder Garden (BG)	dense, well distributed boulders providing cover				
OTHER FEATURES					
Ledges (LG)	bedrock outcrops forming hydraulic controls				
Log Ledge (LL)	large woody debris forming a hydraulic jump, typically with a scour pool beneath				
Beaver Dams (BD)	beaver dams				
Log Jam (LJ)	accumulation of woody debris across channel with water flowing through				

Table 2. Substrate types and description

Type	bedrock	boulder	cobble	gravel	fines
Abbreviation	BR	BL	CB	GR	FN
Size (mm)	n/a	> 300	75 - 300	2 - 75	< 2

Table 3 Bank vegetation types

Type	Trees	Shrubs	Grass	Exposed
Abbreviation	Tr	Sh	Gr	Exp

APPENDIX B:
Little Bow River Fish Capture Data
Boat Electrofishing

Appendix B-1
Section 1

Spring

Species	F.L. (mm)	Weight (g)	Comments
WHSC	279	340	
WHSC	432	1325	
WHSC	282	315	
WHSC	284	304	
WHSC	244	225	
WHSC	413	1070	
WHSC	422	1150	
WHSC	446	1230	
WHSC	405	978	
WHSC	405	1095	
WHSC	375	806	
WHSC	187	93	
WHSC	432	1006	
WHSC	433	1215	
WHSC	430	1226	
WHSC	165	54	
WHSC	164	54	
WHSC	425	1320	
WHSC	250	284	
WHSC	285	364	
WHSC	155	93	
WHSC	255	240	
WHSC	420	1059	
WHSC	300	380	
WHSC	255	220	
WHSC	425	1062	
WHSC	117	24	
WHSC	180	80	
WHSC	280	346	
WHSC	155	52	
WALL	445	1030	
SHRD	351	755	
SHRD	292	383	
WALL	461	1218	
WALL	372	480	
SHRD	420	1234	
SHRD	245	228	
WALL	375	552	
LNSC	255	259	
LNSC	258	275	
SHRD	180	120	
WALL	374	590	
WALL	255	188	
LNSC	275	246	
NRPK	460	882	
WALL	395	707	
LNDC	62	4	
LNDC	74	4	
SHRD	405	1073	
WALL	355	480	
WALL	240	161	tail chewed
WALL	330	217	
WALL	415	830	
SHRD	302	390	
NRPK	710	2584	

Additional Captures

Species	Number
WHSC	28

Appendix B-1
Section 1

Summer

Species	F.L. (mm)	Weight (g)	Comments
WALL	466	1073	
WALL	422	745	
WALL	252	159	
WALL	241	126	
SHRD	114	19	
SHRD	135	40	
SHRD	211	133	
SHRD	114	23	
SHRD	116	24	
SHRD	130	32	
SHRD	212	148	
BURB	325	207	
SHRD	129	31	
LNDC	75	2	
LNDC	64	3	
LNDC	62	2	
LNDC	63	2	
WHSC	286	320	
WHSC	205	119	
WHSC	355	614	
WALL	260	198	
WHSC	368	697	
WHSC	327	489	
LNDC	73	3	
LNDC	63	2	
WHSC	390	765	
WHSC	336	484	
WHSC	285	284	
WHSC	320	420	
WHSC	132	28	
WHSC	153	45	
NRPK	195	48	
WHSC	145	40	
WHSC	214	125	
WHSC	297	350	
WHSC	285	295	
LNSC	232	155	
BURB	200	49	
WHSC	261	224	
WHSC	393	767	
WHSC	324	452	
WHSC	223	139	
LNDC	71	3	
WHSC	375	647	
WHSC	194	90	
WHSC	330	477	
WHSC	205	115	
WHSC	400	898	
WHSC	216	135	
LNDC	73	4	
WHSC	300	347	
WHSC	206	103	
WHSC	380	718	
WHSC	433	986	
WHSC	187	84	
LNDC	60	2	
WALL	395	696	

Appendix B-1
Section 1

Summer

Species	F.L. (mm)	Weight (g)	Comments
NRPK	215	66	
WALL	335	373	
WALL	229	118	
WALL	365	519	
BURB	360	267	
SHRD	210	116	
WALL	209	78	
BURB	248	89	
WHSC	116	19	
WHSC	210	122	
WHSC	178	63	Mercury
WHSC	406	955	Mercury
WHSC	446	1245	Mercury
WHSC	420	960	Mercury
WHSC	435	981	Mercury
WHSC	438	1129	Mercury
WHSC	406	923	Mercury
WHSC	306	425	Mercury
WHSC	298	337	Mercury
WHSC	210	123	Mercury
WHSC	225	142	Mercury

Additional Captures

Species	Number
WHSC	11

Appendix B-1

Section 1

Fall

Species	F.L. (mm)	Weight (g)	Comments
WHSC	308	465	
WHSC	386	752	
WHSC	374	790	
WHSC	445	1255	
WHSC	397	836	
WHSC	451	1287	
WHSC	353	633	
WHSC	482	1546	
WHSC	406	940	
WHSC	412	1037	
WHSC	227	177	
WHSC	376	980	
WHSC	315	445	
WHSC	243	237	
WHSC	223	456	
WHSC	384	833	
WHSC	331	513	
WHSC	315	436	
WHSC	346	458	
WHSC	342	524	
WHSC	348	595	
WHSC	267	253	
WHSC	256	197	
WHSC	145	40	
WHSC	143	37	
SHRD	132	32	
WHSC	146	41	
WHSC	416	1141	
WHSC	224	149	
WHSC	426	1050	
LKWH	400	926	
WALL	129	20	
LKCH	51	1	

Additional Captures

Species	Number
WHSC	36

Appendix B-2
Section 2

Spring

Species	F.L. (mm)	Weight (g)	Comments
LKWH	380	734	mort
LKWH	410	919	
LKWH	375	753	
LKWH	375	777	
LKWH	390	904	
LKWH	370	972	
LKWH	380	669	
WHSC	340	598	
BURB	500	656	
LKCH	90	11	
WHSC	380	792	
WHSC	440	843	
SHRD	450	1594	
SHRD	390	1050	male in spawn
WHSC	300	378	
LNSC	305	332	
WHSC	480	1287	
WHSC	290	350	
WHSC	270	321	
WHSC	395	1077	
SHRD	450	1864	
SHRD	395	1061	
WHSC	150	52	
WHSC	270	295	
WHSC	370	666	
WHSC	365	590	
WHSC	435	1085	
WHSC	345	624	
LKWH	375	780	
WHSC	245	204	
LKWH	390	948	
WHSC	290	407	
WHSC	170	61	
WHSC	435	1037	
WHSC	300	403	
WHSC	280	293	
WHSC	300	360	
WHSC	370	635	
WHSC	420	1033	
WHSC	380	857	
WHSC	400	880	
WHSC	450	1380	
WHSC	375	800	
WHSC	460	1240	
WHSC	390	904	
WHSC	300	447	
WHSC	235	197	
WHSC	375	778	
LNSC	265	280	
NRPK	510	750	
NRPK	600	1770	
WALL	380	518	
LNSC	205	130	
LNSC	180	78	
LNSC	170	67	
LKWH	400	950	mort

Additional Captures

Species	Number
WHSC	51

Appendix B-2

Section 2

Summer

Species	F.L. (mm)	Weight (g)	Comments
WALL	378	675	
WHSC	425	1215	
WHSC	375	875	
WHSC	430	1190	
WHSC	314	880	
WHSC	346	700	
WHSC	435	1200	
WHSC	328	535	
WHSC	380	915	
BURB	560	1140	
BURB	472	795	
WHSC	363	800	
WHSC	388	885	
WHSC	127	35	
WHSC	282	445	
WHSC	428	1230	Mercury
WHSC	417	1160	Mercury
WHSC	250	280	
WHSC	316	525	
WHSC	326	611	
WHSC	385	472	
WHSC	433	1120	
WHSC	328	557	Mercury
WHSC	427	1182	
WHSC	391	932	
WHSC	415	995	
WHSC	392	1060	
WHSC	387	835	
WHSC	128	26	
LKCH	88	8	Mort
LNDC	75	4	Mort
LNDC	57	2	Mort
LNDC	75	4	Mort
LNDC	60	2	Mort
LNDC	67	3	Mort
LNDC	68	3	Mort
WALL	600	1936	
BURB	700	1700	
WALL	420	834	
BURB	590	967	
WALL	225	132	
WHSC	205	139	
WHSC	325	515	Mercury
WHSC	290	444	Mercury
WHSC	365	673	Mercury
WHSC	370	800	Mercury
WHSC	305	450	Mercury
LKCH	92	9	
LKWH	365	580	
WALL	411	746	
WALL	388	674	
LKCH	92	9	
LKCH	87	4	

Additional Captures

Species	Number
WHSC	59

Appendix B-2

Section 2

Fall

Species	F.L. (mm)	Weight (g)	Comments
LKWH	425	1070	
LKWH	405	1045	
LKWH	434	1127	
LKWH	407	990	
LKWH	432	1337	
LNSC	352	598	
NRPK	305	165	
LNSC	355	636	
NRPK	265	105	
NRPK	242	88	
LNSC	349	542	
BURB	729	3010	
BURB	750	3500	
LKWH	403	950	
BURB	525	964	
WALL	299	269	
LNSC	440	1129	
BURB	594	1159	
WALL	150	28	
SHRD	158	35	
WALL	171	41	
WALL	159	31	
WALL	172	62	
WALL	144	20	
WALL	127	18	
NRPK	577	1325	Mercury
NRPK	499	905	Mercury
LKCH	64	4	
LNDC	61	3	
LNDC	45	<1	
WHSC	310	44	
WHSC	307	427	
WHSC	382	773	
WHSC	404	981	
WHSC	395	978	
WHSC	457	1192	
WHSC	399	910	
WHSC	392	909	
WHSC	405	1026	
WHSC	476	1559	
WHSC	405	998	
WHSC	423	1167	
WHSC	400	869	
WHSC	240	203	
WHSC	345	620	
WHSC	158	56	
WHSC	388	849	
WHSC	360	663	
WHSC	344	558	
WHSC	383	793	
WHSC	381	852	
WHSC	372	796	
WHSC	365	767	
WHSC	402	913	
WHSC	340	584	
WHSC	334	509	
WHSC	415	1062	
WHSC	386	834	
WHSC	295	373	Missing lower caudal
WHSC	470	1480	

Additional Captures

Species	Number
WHSC	132

Appendix B-3

Section 3

Spring

Species	F.L. (mm)	Weight (g)	Comments
WHSC	387	832	
WHSC	365	624	
WHSC	459	1430	
WHSC	382	717	
LNSC	594	2550	
LNSC	560	2274	
WHSC	425	1060	
NRPK	635	1673	
NRPK	516	980	
WHSC	373	760	
WHSC	423	998	
WHSC	407	821	
WHSC	389	891	
WHSC	385	795	
WHSC	395	900	
WHSC	399	851	
WHSC	469	1473	
WHSC	362	683	
WHSC	472	1483	
NRPK	581	1204	
WHSC	405	896	
WHSC	600	1644	
WHSC	494	1546	
WHSC	421	1048	
WHSC	480	1578	
WHSC	373	707	
WHSC	377	762	
WHSC	388	735	
WHSC	407	912	
WHSC	405	891	
WHSC	380	712	
NRPK	562	1390	bite marks
NRPK	727	3165	
NRPK	999	7443.5	mort
NRPK	915	5833.2	

Appendix B-3

Section 3

Summer

Species	F.L. (mm)	Weight (g)	Comments
WHSC	431	1074	Mercury
WHSC	234	174	
WHSC	168	61	
WHSC	216	137	
WHSC	117	20	
WHSC	427	931	Mercury
WHSC	467	1526	Mercury
WHSC	409	900	Mercury
NRPK	915	>5000	Mercury

Appendix B-3

Section 3

Fall

Species	F.L. (mm)	Weight (g)	Comments
LKWH	471		Scale malfunction
LKWH	504		Scale malfunction
LKWH	511		Scale malfunction
WHSC	499		Scale malfunction
WHSC	123		Scale malfunction
LKWH	511	1865	Mort
WHSC	277		Scale malfunction
WHSC	462		Scale malfunction
WHSC	432		Scale malfunction
WHSC	466		Scale malfunction
WHSC	132		Scale malfunction
WHSC	459		Scale malfunction
WHSC	256		Scale malfunction
WHSC	189		Scale malfunction
LKWH	507		Scale malfunction
WHSC	419		Scale malfunction
WHSC	472		Scale malfunction
WHSC	471		Scale malfunction
WHSC	428		Scale malfunction
WHSC	483		Scale malfunction
WHSC	455		Scale malfunction
WHSC	480		Scale malfunction
WHSC	391		Scale malfunction
WHSC	437		Scale malfunction
WHSC	285		Scale malfunction
WHSC	456		Scale malfunction
WHSC	452		Scale malfunction
WHSC	441		Scale malfunction
WHSC	430		Scale malfunction
WHSC	457		Scale malfunction
WHSC	427		Scale malfunction
WHSC	469		Scale malfunction
WHSC	459		Scale malfunction
WHSC	443		Scale malfunction
WHSC	473		Scale malfunction
NRPK	351		Scale malfunction
LNDC	79		Scale malfunction
NRPK	836	3368	Mercury
NRPK	768	1973	Mercury
NRPK	743	2737	Mercury
NRPK	657	2060	Mercury
NRPK	705	2304	Mercury
NRPK	752	2161	Mercury
NRPK	595	1366	Mercury
NRPK	598	1366	Mercury
NRPK	773	3259	Mercury
NRPK	653	1781	Mercury
NRPK	582	1519	Mercury
NRPK	701	1590	Mercury
NRPK	598	1389	Mercury
NRPK	625	1505	Mercury

Additional Captures

Species	Number
WHSC	50

Appendix B-4

Section 4

Spring

Species	F.L. (mm)	Weight (g)	Comments
WHSC	419	1064	
WHSC	455	1236	
WHSC	416	1055	
WHSC	434	1154	
WHSC	389	873	
WHSC	369	668	
WHSC	370	712	
WHSC	375	818	
WHSC	300	442	
WHSC	230	186	
WHSC	355	578	
WHSC	353	576	
WHSC	376	714	
WHSC	296	384	
WHSC	314	453	
WHSC	153	49	
WHSC	330	540	
WHSC	270	288	
WHSC	332	505	
WHSC	224	127	
WHSC	335	508	
WHSC	370	540	
WHSC	461	1370	
WHSC	355	609	
WHSC	374	696	
WHSC	359	567	
WHSC	388	892	
WHSC	209	124	
WHSC	256	244	
WHSC	220	162	
LNDC	74	7	
NRPK	695	1975	red bumps, rash
LKCH	55	4	
LKCH	69	6	
NRPK	521	948	ripe female
NRPK	565	1120	
NRPK	577	1394	
LKCH	63	3	
LNDC	73	4	

Additional Captures

Species	Number
WHSC	66

Appendix B-4
Section 4

Summer

Species	F.L. (mm)	Weight (g)	Comments
WHSC	415	1096	
WHSC	378	731	
WHSC	419	1142	
WHSC	374	850	
WHSC	288	329	
WHSC	392	861	
WHSC	428	1137	
WHSC	377	811	
WHSC	264	252	
WHSC	369	717	
WHSC	225	157	
WHSC	57	1	
WHSC	397	785	
WHSC	38	<1	
WHSC	428	1090	
WHSC	159	52	
WHSC	462	1351	
WHSC	407	1016	
WHSC	363	717	
WHSC	452	1225	
WHSC	380	756	
WHSC	372	795	
WHSC	26	<1	
WHSC	26	<1	
WHSC	413	1041	
WHSC	157	49	
WHSC	415	1011	
NRPK	175	37	
NRPK	120	13	
NRPK	140	22	
LNDC	61	2	
NRPK	120	12	
LNDC	53	2	
LNDC	45	1	
LNDC	82	6	
LNDC	54	1	
LNDC	57	1	
LNDC	52	1	
LNDC	84	8	
LNDC	53	2	
LNDC	53	2	
LNDC	48	1	
NRPK	194	49	
NRPK	165	34	
NRPK	138	17	
NRPK	143	19	
NRPK	146	18	
NRPK	149	22	
NRPK	146	18	
LNDC	50	1	
NRPK	127	12	
NRPK	139	16	
LNDC	49	1	
LKCH	105	13	
NRPK	133	22	
NRPK	153	25	
NRPK	140	24	

Appendix B-4
Section 4

Summer

Species	F.L. (mm)	Weight (g)	Comments
NRPK	152	23	
NRPK	141	21	
NRPK	133	20	
NRPK	142	19	
NRPK	163	32	
NRPK	141	23	
NRPK	133	20	
NRPK	144	24	
NRPK	133	20	
NRPK	143	23	
LNDC	79	6	
LNDC	54	2	
LNDC	52	1	
LNDC	47	<1	
LNDC	45	<1	
LNDC	51	1	
WHSC	359	752	Mercury
WHSC	371	806	Mercury
WHSC	383	880	Mercury
WHSC	419	877	Mercury
WHSC	251	256	Mercury
WHSC	251	258	Mercury
WHSC	211	131	Mercury
WHSC	308	424	Mercury
WHSC	415	1125	Mercury
NRPK	691	2003	Mercury

Additional Captures

Species	Number
WHSC	32

Appendix B-4
Section 4

Fall

Species	F.L. (mm)	Weight (g)	Comments
WHSC	375	796	
WHSC	428	1148	
MNWH	225	152	
WHSC	433	1214	
WHSC	386	953	
WHSC	371	797	
WHSC	412	1121	
WHSC	404	1103	
WHSC	376	825	
WHSC	388	997	
WHSC	353	616	
WHSC	408	1126	
WHSC	397	991	
WHSC	423	1170	
WHSC	383	886	
WHSC	373	812	
WHSC	405	1072	
WHSC	198	92	
WHSC	370	825	
NRPK	220	93	
NRPK	150	22	
NRPK	185	45	
WHSC	334	620	
WHSC	452	1432	
NRPK	176	27	
NRPK	163	34	
WHSC	380	938	
NRPK	128	18	
NRPK	186	39	
NRPK	189	37	
NRPK	158	34	
NRPK	173	37	
NRPK	175	38	
NRPK	193	53	
NRPK	155	35	
NRPK	170	36	
NRPK	166	33	
NRPK	177	42	
NRPK	158	31	
NRPK	177	36	
NRPK	135	24	
WHSC	345	608	
NRPK	171	35	
WHSC	150	49	
NRPK	173	45	
NRPK	178	35	
NRPK	185	44	
NRPK	195	47	
NRPK	153	36	
NRPK	186	39	
NRPK	182	43	
NRPK	158	25	
WHSC	165	64	
WHSC	163	59	
NRPK	179	40	
WHSC	310	482	
WHSC	254	247	

Appendix B-4
Section 4

Fall

Species	F.L. (mm)	Weight (g)	Comments
WHSC	170	65	
NRPK	151	23	
NRPK	190	52	
NRPK	197	56	
NRPK	176	28	
WHSC	165	68	
NRPK	160	32	
NRPK	163	32	
NRPK	180		Scale malfunction
NRPK	185		Scale malfunction
NRPK	159		Scale malfunction
NRPK	164		Scale malfunction
NRPK	190		Scale malfunction
NRPK	211		Scale malfunction
NRPK	176		Scale malfunction
NRPK	187		Scale malfunction
NRPK	164		Scale malfunction
NRPK	186		Scale malfunction
NRPK	192		Scale malfunction
NRPK	165		Scale malfunction
WHSC	153	60	
NRPK	177		Scale malfunction
NRPK	166		Scale malfunction
NRPK	170		Scale malfunction
NRPK	159		Scale malfunction
NRPK	164		Scale malfunction
NRPK	190		Scale malfunction
NRPK	172		Scale malfunction
NRPK	197		Scale malfunction
NRPK	162		Scale malfunction
NRPK	175		Scale malfunction
LNDC	52	1	Scale malfunction
NRPK	678	1595	Mercury
NRPK	616	1378	Mercury
NRPK	597	1472	Mercury

Additional Captures

Species	Number
WHSC	56

Appendix B-5
Section 5

Spring

Species	F.L. (mm)	Weight (g)	Comments
WHSC	400	850	
WHSC	405	1100	
WHSC	410	1048	
WHSC	370	695	
WHSC	390	722	
WHSC	365	474	
WHSC	410	841	
WHSC	470	1523	
WHSC	430	1250	
WHSC	440	1170	
WHSC	320	542	
WHSC	430	1080	
WHSC	490	1819	
WHSC	380	920	
WHSC	385	610	
WHSC	370	725	
WHSC	300	457	
WHSC	360	730	
WHSC	320	595	
WHSC	390	955	
WHSC	380	1073	
LNDC	40	<1	
LNDC	40	<1	
LNDC	40	<1	
WHSC	405	954	
WHSC	220	169	
WHSC	410	1070	
LNDC	40	<1	
WHSC	380	963	
LNDC	37	<1	
WHSC	390	840	
LNDC	36	48	
WHSC	210	144	
LNDC	42	<1	
LNDC	43	<1	
WHSC	430	1092	
LNDC	40	<1	
WHSC	420	540	
LNDC	36	<1	
LNDC	35	<1	
WHSC	430	1110	
LNDC	35	<1	
WHSC	370	830	
LKCH	60	2	
LNDC	38	<1	
LNDC	63	4	
LNDC	37	<1	
LNDC	36	<1	
LNDC	34	<1	
LNDC	42	<1	
LNDC	41	<1	
FTMN	37	<1	
LNDC	42	<1	
LNDC	58	3	
LNDC	39	<1	
MNWH	135	14	

Additional Captures

Species	Number
WHSC	7

Appendix B-5
Section 5

Summer

Species	F.L. (mm)	Weight (g)	Comments
WHSC	394	1070	
WHSC	432	1247	
WHSC	411	1000	
NRPK	95	11	
WHSC	444	1262	
WHSC	360	980	
WHSC	414		scale malfunction
WHSC	325		scale malfunction
WHSC	400		scale malfunction
WHSC	432		scale malfunction
WHSC	364		scale malfunction
WHSC	415		scale malfunction
WHSC	425		scale malfunction
WHSC	364		scale malfunction
WHSC	370		scale malfunction
WHSC	400		scale malfunction
WHSC	375		scale malfunction
WHSC	400		scale malfunction
WHSC	415		scale malfunction
WHSC	440		scale malfunction
WHSC	435		scale malfunction
WHSC	347		scale malfunction
WHSC	362		scale malfunction
WHSC	430		scale malfunction
WHSC	417		scale malfunction
WHSC	402		scale malfunction
WHSC	387		scale malfunction
WHSC	380		scale malfunction
WHSC	372		scale malfunction
WHSC	375		scale malfunction
WHSC	382		scale malfunction
NRPK	522	1202	Mercury
NRPK	130	14	
WHSC	337	485	Mercury
WHSC	392	805	Mercury
WHSC	295	400	Mercury
WHSC	295	337	Mercury
WHSC	346	650	Mercury
NRPK	134	15	
LNSC	152	217	
LNSC	270	250	
LNSC	132	34	
NRPK	148	19	

Additional Captures

Species	Number
WHSC	29

Appendix B-5

Section 5

Fall

Species	F.L. (mm)	Weight (g)	Comments
NRPK	730	2960	Mercury
NRPK	854	6577	Mercury
WHSC	470	1863	
WHSC	368	708	
WHSC	399	967	
WHSC	426	1389	
WHSC	398	867	
WHSC	465	1623	
WHSC	383	792	
WHSC	429	1128	
WHSC	393	922	
WHSC	444	1298	
WHSC	406	931	
WHSC	455	1568	
WHSC	415	1086	
WHSC	385	936	
WHSC	429	1146	
WHSC	422	1063	
WHSC	327	524	
WHSC	446	1393	
WHSC	380	786	
WHSC	405	1042	
NRPK	162	28	
WHSC	410	1107	
NRPK	185	34	
WHSC	355	676	
WHSC	378	918	
WHSC	420	1170	
WHSC	383	830	
WHSC	474	1589	
WHSC	460	1448	
WHSC	388	779	
WHSC	398	916	
WHSC	430	1163	
NRPK	167	29	
NRPK	671	2037	Mercury
NRPK	599	1374	Mercury
NRPK	755	3285	Mercury
NRPK	674	1776	Mercury
NRPK	215	56	
NRPK	690	2043	Mercury
LKCH	86	4	
NRPK	216	55	
NRPK	206	56	

Additional Captures

Species	Number
WHSC	38

Appendix B-6
Section 6

Spring

Species	F.L. (mm)	Weight (g)	Comments
WHSC	366	630	
WHSC	164	65	
WHSC	121	19	
WHSC	191	91	
WHSC	209	134	
WHSC	393	850	
WHSC	352	620	
WHSC	359	713	
WHSC	366	717	
WHSC	363	620	
WHSC	361	665	
WHSC	109	18	
WHSC	402	920	
WHSC	254	150	weight estimated
WHSC	362	569	
WHSC	422	1019	
WHSC	356	668	
MNWH	225	164	
WHSC	308	398	
WHSC	340	589	
WHSC	343	514	
WHSC	346	646	
LNSC	318	398	
WHSC	202	112	
WHSC	349	595	
WHSC	349	653	
LNSC	278	283	
WHSC	324	490	
WHSC	114	19	
WHSC	332	547	
WHSC	103	15	
WHSC	351	591	
WHSC	338	548	
LNSC	291	320	
LNSC	185	94	
MNSC	103	18	
LKCH	53	2	
MNSC	86	7	
LNDC	51	2	
LNDC	59	3	
LNDC	53	2	
LNDC	53	2	
LNDC	49	1	
LNDC	51	1	
LNDC	48	1	
LNDC	56	2	
NRPK	615	1820	
LNSC	322	395	
MNWH	250	199	mort
LNSC	391	311	
LNDC	59	2	
LNSC	201	98	mort
MNWH	223	139	mort
MNWH	222	147	mort
MNWH	215	133	mort
MNWH	159	49	mort
MNWH	182	72	mort

Appendix B-6
Section 6

Spring

Species	F.L. (mm)	Weight (g)	Comments
MNWH	145	32	mort
MNWH	138	29	mort
MNSC	107	13	mort
TRPR	81	8	mort
LNDC	43	<1	
LNDC	47	1	mort
LKCH	56	2	

Additional Captures

Species	Number
WHSC	57

Appendix B-6
Section 6

Summer

Species	F.L. (mm)	Weight (g)	Comments
BNTR	568	1560	
MNWH	183	75	
MNWH	158	49	
MNWH	220	132	
MNWH	152	42	
NRPK	159	25	
NRPK	165	28	
NRPK	214	72	
LKCH	91	10	
LKCH	93	8	
NRPK	180	48	
MNWH	166	55	
LNDC	51	1	
NRPK	175	39	Mercury
MNWH	170	64	
MNWH	175	58	
MNWH	183	79	
BNTR	358	670	
WHSC	240	176	
WHSC	390	684	
WHSC	388	765	
WHSC	378	572	
WHSC	205	102	
LNSC	300	320	
LKCH	93	9	
LNDC	41	1	
LNDC	55	1	
LNDC	46	1	
LNDC	47	1	
LNDC	56	2	
WHSC	345	550	
WHSC	499	1345	
WHSC	254	255	
WHSC	340	475	
LNSC	301	310	
WHSC	360	587	
WHSC	336	503	
WHSC	383	591	
WHSC	389	845	
WHSC	363	682	
WHSC	398	966	
WHSC	301	415	
WHSC	451	1325	
WHSC	256	646	
WHSC	294	338	
LNSC	295	343	
WHSC	370	675	
WHSC	90	8	
WHSC	154	47	
WHSC	156	52	
WHSC	192	90	
WHSC	158	50	
WHSC	174	70	
WHSC	179	76	
LNSC	262	212	
LNSC	253	216	
WHSC	360	398	

Appendix B-6
Section 6

Summer

Species	F.L. (mm)	Weight (g)	Comments
LNSC	231	144	
WHSC	430	983	
WHSC	423	1186	Mercury
LNDC	60	2	
LNDC	46	1	
LKCH	80	8	
LNSC	290	295	
LNSC	282	245	
LNDC	52	1	
LNDC	47	1	
LNDC	46	1	
LNDC	47	1	
LNDC	46	1	
LNDC	43	1	
LNDC	60	2	
LNDC	52	2	
LNDC	50	1	
LNDC	43	<1	
LNDC	43	1	
LKCH	82	6	
LNDC	46	1	
LNDC	45	1	
LNDC	45	1	
LNDC	47	1	
LNDC	73	4	
LNDC	43	<1	
LNDC	73	4	
TRPR	79	5	
LNDC	48	1	
LNDC	57	2	
LNDC	42	<1	
LNDC	50	1	
LNDC	47	1	
LNSC	343	502	
NRPK	217	73	
NRPK	175	31	
NRPK	180	39	
NRPK	180	36	
NRPK	182	39	
NRPK	580	1303	Mercury
TRPR	33	<1	

Additional Captures

Species	Number
WHSC	42
LNDC	39

Appendix B-6
Section 6

Fall

Species	F.L. (mm)	Weight (g)	Comments
MNWH	205	110	
MNWH	201	99	
MNWH	204	94	
MNWH	197	99	
MNWH	216	125	
WHSC	364	682	Tooth marks
WHSC	224	165	
WHSC	365	654	
MNWH	177	69	
WHSC	385	733	
WHSC	353	618	
WHSC	405	758	
WHSC	342	533	
LNSC	344	499	
WHSC	201	104	
WHSC	370	641	
WHSC	357	582	
WHSC	311	398	
WHSC	445	1261	
WHSC	373	745	
WHSC	465	1312	
LNSC	312	389	
WHSC	307	391	
WHSC	355	631	
WHSC	346	586	
LNSC	210	118	
WHSC	394	902	
WHSC	195	105	
WHSC	322	431	
LNSC	222	127	
LNSC	220	121	
WHSC	309	420	
WHSC	375	701	
WHSC	284	291	
WHSC	353	612	
WHSC	185	80	
WHSC	335	442	
WHSC	388	793	
WHSC	425	1202	
WHSC	272	271	
LNSC	332	461	
WHSC	294	351	
NRPK	246	93	
NRPK	194	43	
NRPK	254	101	
NRPK	194	51	
NRPK	280	126	
NRPK	218	61	
NRPK	205	53	
NRPK	254	104	
NRPK	232	87	
NRPK	283	121	
NRPK	210	76	
NRPK	261	97	
NRPK	216	64	
NRPK	247	91	
MNWH	203	103	

Appendix B-6
Section 6

Fall

Species	F.L. (mm)	Weight (g)	Comments
MNWH	212	116	
MNWH	198	93	
MNWH	205	122	
MNWH	207	113	
MNWH	200	102	
MNWH	195	90	
MNWH	207	108	
MNWH	212	111	
MNWH	203	96	
LNSC	326	466	
LNSC	218	140	
MNWH	196	99	
NRPK	115	63	
LNSC	337	508	
LNSC	242	191	
NRPK	239	73	
LNSC	326	453	
NRPK	225	97	
NRPK	277	138	
LNSC	282	304	
NRPK	211	61	
LNSC	209	103	
BNTR	500	1620	
BNTR	492	1350	
MNWH	208		No weight
MNWH	202		No weight
MNWH	206		No weight
BNTR	363	640	
NRPK	298	155	
NRPK	110	52	
NRPK	245	89	
NRPK	330	230	
NRPK	200	56	
NRPK	254	88	
NRPK	235	69	
SPSC	113	19	
NRPK	194	43	
NRPK	759	2612	

Additional Captures

Species	Number
WHSC	123

Appendix B-7
Section 7

Spring

Species	F.L. (mm)	Weight (g)	Comments
LNDC	36	<1	
LNDC	70	2	
LNDC	56	1	
WHSC	157	48	
LNSC	193	99	
WHSC	385	827	
WHSC	401	880	
WHSC	375	880	
WHSC	450	1164	
WHSC	338	760	
WHSC	161	57	
WHSC	395	826	
WHSC	370	774	
WHSC	440	1152	
WHSC	410	1083	
WHSC	395	840	
WHSC	392	855	
WHSC	287	348	
MNWH	145	41	mort
WHSC	123	44	
WHSC	338	770	
WHSC	337	672	
LKCH	62	1	
LKCH	38	<1	
WHSC	155	55	mort
MNWH	220	134	
MNWH	224	165	
WHSC	188	87	
WHSC	355	677	
WHSC	340	707	
MNWH	240	137	
WHSC	214	132	
WHSC	325	500	
WHSC	342	604	
LNSC	173	70	
MNWH	160	55	mort
WHSC	368	655	
MNWH	145	38	mort
LNDC	42	<1	
LNSC	239	182	
LNSC	185	93	
WHSC	166	62	
WHSC	117	137	
WHSC	105	15	
WHSC	176	67	
WHSC	106	11	
WHSC	104	10	
LNSC	121	23	
WHSC	117	23	
LNSC	121	22	
WHSC	117	23	
LNDC	76	5	
LNDC	60	2	
LNDC	48	1	
LNDC	57	2	
WHSC	104	17	

Appendix B-7
Section 7

Summer

Species	F.L. (mm)	Weight (g)	Comments
MNWH	174		Scale Malfunction
MNWH	177		Scale Malfunction
MNWH	175		Scale Malfunction
MNWH	174		Scale Malfunction
WHSC	395		Scale Malfunction
WHSC	399		Scale Malfunction
WHSC	410		Scale Malfunction
WHSC	458		Scale Malfunction
WHSC	230		Scale Malfunction
WHSC	253		Scale Malfunction
LNSC	171		Scale Malfunction
WHSC	295		Scale Malfunction
WHSC	327		Scale Malfunction
WHSC	400		Scale Malfunction
LKCH	98		Scale Malfunction
WHSC	268		Scale Malfunction
WHSC	393		Scale Malfunction
MNWH	175		Scale Malfunction
WHSC	437		Scale Malfunction
NRPK	290		Scale Malfunction
WHSC	381		Scale Malfunction
NRPK	195		Scale Malfunction
WHSC	388		Scale Malfunction
WHSC	233		Scale Malfunction
WHSC	391		Scale Malfunction
WHSC	370		Scale Malfunction
WHSC	405		Scale Malfunction
WHSC	420		Scale Malfunction
WHSC	360		Scale Malfunction
WHSC	73		Scale Malfunction
WHSC	405		Scale Malfunction
WHSC	125		Scale Malfunction
WHSC	442		Scale Malfunction
WHSC	400		Scale Malfunction
WHSC	382		Scale Malfunction
MNWH	175		Scale Malfunction
WHSC	237		Scale Malfunction
MNWH	160		Scale Malfunction
MNWH	175		Scale Malfunction
WHSC	355		Scale Malfunction
MNWH	180		Scale Malfunction
MNWH	181		Scale Malfunction
MNWH	162		Scale Malfunction
MNWH	165		Scale Malfunction
WHSC	159		Scale Malfunction
TRPR	80		Scale Malfunction
TRPR	75		Scale Malfunction
WHSC	295		Scale Malfunction
LNDC	40		Scale Malfunction
TRPR	54		Scale Malfunction
LNDC	73		Scale Malfunction
LNDC	38		Scale Malfunction
LKCH	75		Scale Malfunction
LKCH	55		Scale Malfunction
MNSC	182		Scale Malfunction
MNWH	155		Scale Malfunction
LNSC	168		Scale Malfunction

Appendix B-7
Section 7

Summer

Species	F.L. (mm)	Weight (g)	Comments
LNDC	50		Scale Malfunction
LNDC	52		Scale Malfunction
WHSC	451	1553	Mercury
WHSC	470	1490	Mercury
WHSC	447	1597	Mercury
WHSC	341	670	Mercury
WHSC	372	666	Mercury
LNDC	52		Scale Malfunction
LNDC	75		Scale Malfunction
LNSC	80		Scale Malfunction
TRPR	74		Scale Malfunction
NRPK	218		Scale Malfunction
LNDC	45		Scale Malfunction
LNDC	62		Scale Malfunction
LNDC	62		Scale Malfunction
LNDC	46		Scale Malfunction

Additional Captures

Species	Number
WHSC	50

Appendix B-7
Section 7

Fall

Species	F.L. (mm)	Weight (g)	Comments
WHSC	375	685	
WHSC	385	720	
WHSC	357	675	
WHSC	372	634	
WHSC	364	793	
WHSC	265	269	
WHSC	436	1154	
WHSC	387	737	
WHSC	405	1058	
WHSC	421	1108	
WHSC	356	607	
WHSC	309	410	
WHSC	375	818	
WHSC	301	358	
WHSC	453	1550	
WHSC	415	1143	
MNWH	215	112	
MNWH	204	104	
MNWH	198	91	
MNWH	212	138	
MNWH	214	110	
MNWH	227	134	
MNWH	197	83	
MNWH	205	102	
MNWH	206	118	
MNWH	215	119	
MNWH	217	114	
MNWH	192	81	
WHSC	385	758	
WHSC	187	88	
WHSC	395	903	
WHSC	378	757	
WHSC	307	398	
WHSC	294	344	
WHSC	398	907	
WHSC	363	761	
WHSC	440	1352	
WHSC	348	540	
WHSC	351	632	
MNWH	213	112	
NRPK	638	2018	Mercury
NRPK	205	47	
NRPK	245	84	
MNWH	115	14	
NRPK	272	113	
WHSC	178	76	
WHSC	220	466	
MNWH	240	172	
WHSC	180	69	
MNWH	107	8	
TRPR	86	3	
LNDC	50	<1	
MNWH	210	113	
MNWH	207	107	
MNWH	202	120	
MNWH	209	118	
MNWH	208	110	

Appendix B-7
Section 7

Fall

Species	F.L. (mm)	Weight (g)	Comments
MNWH	198	104	
MNWH	200	107	
MNWH	192	95	
MNWH	196	97	
NRPK	800	3865	Mercury
MNWH	190	102	Mort
NRPK	589	1433	Mercury
TRPR	77	10	
NRPK	230	76	Deformed upper jaw
NRPK	233	77	
LNSC	368	258	
NRPK	258	111	
LNSC	180	77	
LNDC	33	<1	

Additional Captures

Species	Number
WHSC	101

APPENDIX C:

Little Bow River Fish Capture Data

Backpack Electrofishing

Appendix C-1
Section 1A

Spring

Species	F.L. (mm)	Weight (g)	Comments
LNDC	69	4	
LNDC	41	1	
LNDC	65	3	
LNDC	67	4	
LNDC	61	4	
LNDC	59	4	
LNDC	57	3	
LNDC	71	5	
LNDC	66	3	
LNDC	60	3	
LNDC	55	3	
LNDC	59	4	
LNDC	69	3	
LNDC	47	1	
LNDC	47	1	
LNDC	67	4	
LNDC	46	1	
LNDC	58	3	
LNDC	63	3	
LNDC	39	<1	
LNDC	51	1	
LNDC	57	2	
LNDC	42	1	

Appendix C-1
Section 1B

Spring

Species	F.L. (mm)	Weight (g)	Comments
LNDC	64	3	
LNDC	63	3	
LNDC	62	3	
LNDC	56	2	
LNDC	34	<1	
LNDC	55	2	
LNDC	62	2	
LNDC	76	5	
LNDC	72	5	
LNDC	65	4	
LNDC	65	3	
LNDC	60	3	
LNDC	57	2	
LNDC	65	3	
LNDC	63	3	
LNDC	64	3	
LNDC	63	3	
LNDC	67	3	
LNDC	60	2	
LNDC	83	7	
LNDC	63	3	
LNDC	42	<1	
LNDC	62	2	
LNDC	58	2	
LNDC	57	2	
LNDC	57	2	
LNDC	54	2	

Appendix C-1
Section 1B

Spring

Species	F.L. (mm)	Weight (g)	Comments
LNDC	62	3	
LNDC	67	3	
LNDC	55	2	

Additional Captures

Species	Number
LNDC	36

Appendix C-1
Section 1C

Spring

Species	F.L. (mm)	Weight (g)	Comments
LNDC	61	2	
LNDC	77	6	
LNDC	57	3	
LNDC	49	1	
LNDC	59	3	
LNDC	60	2	
LNDC	59	2	
LNDC	68	4	
LNDC	64	2	
LNDC	50	1	
LNDC	57	3	
LNDC	62	3	
LNDC	55	2	
LNDC	51	1	
LNDC	57	2	
LNDC	55	2	
LNDC	56	1	
LNDC	59	2	
LNDC	57	3	
LNDC	50	2	
LNDC	68	4	
LNDC	52	1	
LNDC	77	6	
LNDC	72	5	
LNDC	54	2	
LNDC	51	1	
LNDC	66	4	
LNDC	33	<1	
LNDC	57	2	
LNDC	63	3	

Additional Captures

Species	Number
LNDC	15

Appendix C-1
Section 1A

Summer

Species	F.L. (mm)	Weight (g)	Comments
LNDC	64	3	
LNDC	68	4	
LNDC	32	<1	
LNDC	31	<1	
LNDC	55	2	
LNDC	56	2	
LNDC	46	1	
LNDC	71	4	
LNDC	62	2	
LNDC	57	3	
LNDC	50	1	
LNDC	49	1	
LNDC	56	2	
LNDC	53	1	
LNDC	51	1	
LNDC	63	2	
LNDC	29	<1	
LNDC	33	<1	
LNDC	29	<1	
LNDC	30	<1	

Appendix C-1
Section 1B

Summer

Species	F.L. (mm)	Weight (g)	Comments
LNDC	63	3	
LNDC	31	<1	
LNDC	30	<1	
LNDC	58	1	
LNDC	28	<1	
WHSC	37	<1	
LNDC	53	1	
LNDC	60	2	
LNDC	53	1	
LNDC	27	<1	
LNDC	24	<1	
LNDC	61	3	
LNDC	58	1	
LNDC	64	3	
LNDC	59	1	
LNDC	60	2	
LNDC	67	3	
LNDC	54	2	
LNDC	26	<1	
LNDC	33	<1	
LNDC	66	3	
LNDC	58	1	
LNDC	63	2	
LNDC	57	1	
LNDC	51	1	
LNDC	28	<1	
LNDC	47	1	
LNDC	66	3	
LNDC	57	2	

Appendix C-1
Section 1B

Summer

LNDC	58	2	
LNDC	58	2	

Additional Captures

Species	Number
LNDC	12

Appendix C-1
Section 1C

Summer

Species	F.L. (mm)	Weight (g)	Comments
LNDC	62	2	
LNDC	65	3	
LNDC	65	3	
LNDC	84	7	
LNDC	69	3	
LNDC	65	3	
LNDC	28	<1	
LNDC	56	2	
LNDC	30	<1	
LNDC	51	1	
LNDC	61	2	
LNDC	58	2	
LNDC	49	<1	
LNDC	24	<1	
LNDC	28	<1	
LNDC	57	3	

Appendix C-1

Section 1A

Fall

Species	F.L. (mm)	Weight (g)	Comments
WHSC	171	66	
WHSC	263	258	
WHSC	242	197	
WHSC	216	155	
WHSC	259	212	
WHSC	142	34	
SHRH	133	29	
WHSC	166	55	
WHSC	159	52	
WHSC	166	59	
SHRH	141	37	
WHSC	143	35	
BURB	217	45	
SHRH	136	36	
LNDC	36	<1	
LNDC	62	3	
LNDC	66	3	
LNDC	68	4	
LNDC	68	3	
LNDC	53	1	
LNDC	58	2	
LNDC	38	<1	
LNDC	64	3	
LNDC	78	5	
LNDC	58	2	
SHRH	45	<1	
LNDC	53	2	
LNDC	55	2	
LNDC	33	<1	
LNDC	38	<1	
LNDC	34	<1	
LNDC	39	<1	

Additional Captures

Species	Number
LNDC	12

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Section 1B

Fall

Species	F.L. (mm)	Weight (g)	Comments
WHSC	133	27	
WHSC	163	52	
WHSC	156	46	
WHSC	160	48	
WHSC	131	29	
WHSC	143	39	
LKCH	87	7	
LKCH	103	14	
LNDC	28	<1	
SHRD	53	1	
LNDC	41	<1	
LNDC	33	<1	
LNDC	63	3	
LNDC	65	3	
LNDC	46	<1	
LNDC	31	<1	
LNDC	65	3	
LNDC	66	3	
LNDC	32	<1	
LNDC	72	4	
LNDC	33	<1	
LNDC	58	2	
LNDC	71	4	
LNDC	58	2	
LNDC	39	<1	
LNDC	58	2	
LNDC	34	<1	
LNDC	65	3	
LNDC	37	<1	
LNDC	58	2	
LNDC	67	3	
LNDC	69	4	
LNDC	33	<1	
LNDC	34	<1	
LNDC	38	<1	
LNDC	52	1	
LNDC	34	<1	
LNDC	34	<1	
LNDC	33	<1	

Additional Captures

Species	Number
LNDC	1

Appendix C-1
Section 1C

Fall

Species	F.L. (mm)	Weight (g)	Comments
WHSC	161	52	
WHSC	163	58	
WHSC	156	43	
WALL	131	20	
LNDC	73	4	
LNDC	56	2	
LNDC	33	<1	
LNDC	65	3	
LNDC	72	4	
LNDC	67	3	
LNDC	71	4	
LNDC	56	2	
LNDC	60	2	
LNDC	31	<1	
LNDC	36	<1	
LNDC	43	<1	
LNDC	38	<1	
LNDC	57	1	
LNDC	64	3	
LNDC	42	<1	
LNDC	68	3	
LNDC	64	2	
LNDC	58	2	
LNDC	57	2	
LNDC	60	2	
LNDC	63	3	
LNDC	46	<1	
LNDC	39	<1	
LNDC	48	<1	
LNDC	51	1	
LNDC	38	<1	
LNDC	44	<1	
LNDC	61	3	
LNDC	56	1	
SHRD	53	1	

Additional Captures

Species	Number
LNDC	5

Appendix C-2
Section 2A

Spring

Species	F.L. (mm)	Weight (g)	Comments
LNDC	103	14	
LNDC	52	1	
LNDC	77	5	
LNDC	45	1	
LNDC	78	7	
LNDC	37	<1	
LNDC	33	<1	
LNDC	60	3	
LNDC	58	3	
LNDC	75	6	
LNDC	63	3	
LNDC	90	8	
LNDC	78	7	
LNDC	72	6	
LNDC	76	8	
LNDC	63	3	
LNDC	32	<1	
LNDC	83	6	
LNDC	62	3	
LNDC	80	8	
LNDC	67	4	
LNDC	62	3	
LNDC	74	5	
LNDC	59	3	
LNDC	44	<1	
LNDC	37	<1	
LNDC	39	<1	
LNDC	58	2	
LNDC	65	3	
LNDC	59	2	

Additional Captures

Species	Number
LNDC	19

Appendix C-2
Section 2B

Spring

Species	F.L. (mm)	Weight (g)	Comments
LNDC	52	1	
LNDC	67	4	
LNDC	65	3	
LNDC	78	6	
LNDC	60	3	
LNDC	61	3	
LNDC	80	7	
LNDC	48	1	
LNDC	33	<1	
LNDC	57	2	
LNDC	58	2	
LNDC	53	1	
LNDC	62	4	
LNDC	36	<1	
LNDC	63	3	
LNDC	44	<1	
LNDC	56	2	

Appendix C-2
Section 2B

Spring

Species	F.L. (mm)	Weight (g)	Comments
LNDC	44	<1	
LNDC	73	5	
LNDC	64	4	
LNDC	77	6	
LNDC	47	1	
LNDC	81	8	
LNDC	57	2	
LNDC	55	1	
LNDC	36	<1	
LNDC	65	3	
LNDC	44	<1	
LNDC	52	2	

Additional Captures

Species	Number
LNDC	36

Appendix C-2
Section 2C

Spring

Species	F.L. (mm)	Weight (g)	Comments
LNDC	82	7	
LNDC	90	10	
LNDC	44	<1	
LNDC	61	3	
LNDC	62	3	
LNDC	61	3	
LNDC	68	4	
LNDC	47	<1	
LNDC	93	11	
LNDC	63	3	
LNDC	43	<1	
LNDC	60	2	
LNDC	47	<1	
LNDC	43	<1	
LNDC	45	<1	
LNDC	43	<1	
LNDC	62	2	
LNDC	67	4	
LNDC	54	2	
LNDC	67	4	
LNDC	62	3	
LNDC	56	2	
LNDC	36	<1	
LNDC	44	<1	
LNDC	39	<1	
LNDC	42	<1	
LNDC	45	<1	
LNDC	31	<1	

Appendix C-2
Section 2A

Summer

Species	F.L. (mm)	Weight (g)	Comments
LNDC	63	3	
LNDC	72	4	
LNDC	71	3	
LNDC	70	3	
LNDC	55	2	
LNDC	46	<1	
LNDC	80	5	
LNDC	64	3	
LNDC	90	6	
LNDC	60	2	
LNDC	68	4	
LNDC	90	8	
LNDC	42	<1	
LNDC	58	2	
LNDC	78	4	
LNDC	57	2	
LNDC	60	3	
LNDC	65	3	
LNDC	45	<1	
LNDC	42	<1	
LNDC	65	3	
LNDC	68	3	
LNDC	75	5	
LNDC	68	4	
LNDC	75	4	
LNDC	55	2	
LNDC	62	3	
LNDC	68	4	
LNDC	58	2	
LNDC	55	2	

Additional Captures

Species	Number
LNDC	82

Appendix C-2
Section 2B

Summer

Species	F.L. (mm)	Weight (g)	Comments
LNDC	34	<1	
LNDC	65	3	
LNDC	51	2	
LNDC	66	3	
LNDC	36	<1	
LNDC	47	1	
LNDC	33	<1	
LNDC	63	3	
LNDC	69	4	
LNDC	42	<1	
LNDC	65	3	
LNDC	66	3	
LNDC	67	3	
LNDC	30	<1	
LNDC	50	1	
LNDC	59	2	
LNDC	67	3	

Appendix C-2
Section 2B

Summer

LNDC	59	2	
LNDC	48	1	
LNDC	73	4	
LNDC	68	3	
LNDC	53	2	
LNDC	46	<1	
LNDC	57	2	
LNDC	71	4	
LNDC	68	3	
LNDC	82	5	
LNDC	49	1	
LNDC	35	<1	
LNDC	57	2	

Additional Captures

Species	Number
LNDC	30

Appendix C-2
Section 2C

Summer

Species	F.L. (mm)	Weight (g)	Comments
LNDC	70	3	
LNDC	58	2	
LNDC	56	1	
LNDC	53	1	
LNDC	61	2	
LNDC	56	2	
LNDC	58	1	
LNDC	50	<1	
LNDC	54	1	
LNDC	60	2	
LNDC	60	2	
LNDC	50	1	
LNDC	68	3	
LNDC	60	2	
LNDC	52	<1	
LNDC	68	4	
LNDC	65	3	
LNDC	55	2	
LNDC	34	<1	
LNDC	60	2	
LNDC	64	2	
LNDC	30	<1	
LNDC	44	<1	
LNDC	76	4	
LNDC	50	1	
LNDC	53	1	
LNDC	53	1	
LNDC	63	2	
LNDC	34	<1	
LNDC	36	<1	

Additional Captures

Species	Number
LNDC	10

Appendix C-2

Section 2A

Fall

Species	F.L. (mm)	Weight (g)	Comments
WHSC	167	63	
WHSC	140	38	
LNDC	75	5	
LNDC	52	2	
LNDC	64	3	
LNDC	67	3	
LNDC	68	3	
LNDC	46	1	
LNDC	64	3	
LNDC	77	6	
LNDC	46	1	
LNDC	72	4	
LNDC	43	1	
LNDC	48	1	
LNDC	75	4	
LNDC	34	<1	
LNDC	52	1	
LNDC	50	1	
LNDC	43	1	
LNDC	38	<1	
LNDC	45	1	
LNDC	47	1	
LNDC	49	1	
LNDC	39	<1	
LNDC	67	3	
LNDC	48	1	
LKCH	90	8	
WHSC	77	8	
LNDC	68	3	
LNDC	53	2	
LNDC	62	2	
LNDC	35	<1	
LNDC	38	<1	
LNDC	40	<1	
LNDC	55	2	
WHSC	63	4	

Additional Captures

Species	Number
LNDC	89

Appendix C-2

Section 2B

Fall

Species	F.L. (mm)	Weight (g)	Comments
WHSC	138	37	
WHSC	78	7	
LNDC	43	1	
LNDC	70	4	
LNDC	85	7	
LNDC	72	5	
LNDC	53	2	
LNDC	48	1	
LNDC	55	2	
LNDC	37	<1	
LNDC	40	<1	
LNDC	78	6	
LNDC	55	2	
LNDC	64	3	
LNDC	37	<1	
LNDC	92	8	
LNDC	58	2	
LNDC	61	2	
LNDC	38	<1	
LNDC	41	<1	
LNDC	67	3	
LNDC	74	4	
LNDC	85	6	
LNDC	78	5	
LNDC	65	3	
LNDC	78	5	
LNDC	35	<1	
WHSC	65	5	
LNDC	38	<1	
LNDC	43	1	
LNDC	43	1	
LNDC	48	1	
LNDC	60	2	

Additional Captures

Species	Number
LNDC	38

Appendix C-2

Section 2C

Fall

Species	F.L. (mm)	Weight (g)	Comments
LNSC	177	59	
LKCH	58	2	
LKCH	56	2	
LNDC	30	<1	
LNDC	64	3	
LNDC	48	1	
LNDC	50	1	
LKCH	61	2	
LNDC	62	3	
LNDC	27	<1	
LNDC	49	1	
LNDC	83	6	
LNDC	53	2	
LNDC	61	4	
LNDC	73	6	
LNDC	53	2	
LNDC	54	1	
LNDC	32	<1	
LNDC	53	2	
LNDC	35	<1	
LNDC	26	<1	
LNDC	73	5	
LNDC	63	3	
LNDC	35	<1	
LNDC	36	<1	
LNDC	40	<1	
LNDC	46	1	
LNDC	50	2	
LNDC	28	<1	
LNDC	38	<1	
LNDC	50	2	
LNDC	64	4	
LKCH	55	2	
LKCH	54	2	

Additional Captures

Species	Number
LNDC	75

Appendix C-3
Section 3A

Spring

Species	F.L. (mm)	Weight (g)	Comments
LNDC	99	13	
WHSC	113	16	
LNDC	79	6	
LNDC	72	5	
LNDC	69	4	
LNDC	71	5	
LNDC	83	7	
LNDC	67	3	
LNDC	87	8	
LNDC	78	6	
LNDC	83	7	
LNDC	68	4	
LNDC	70	5	
LNDC	63	3	
LNDC	77	6	
LNDC	94	13	
LNDC	77	6	
LNDC	75	6	
WHSC	64	3	
LNDC	66	3	
LNDC	74	5	
LNDC	73	5	
LNDC	85	9	
LNDC	65	3	
LNDC	68	4	
LNDC	75	5	
LNDC	60	2	
LNDC	70	4	
LNDC	70	5	
LNDC	68	5	
LNDC	75	5	
LNDC	68	4	
FTMN	56	2	

Additional Captures

Species	Number
LNDC	8

Appendix C-3
Section 3C

Spring

Species	F.L. (mm)	Weight (g)	Comments
LNDC	68	4	
LNDC	69	4	
WHSC	136	34	
LNDC	64	3	
LNDC	99	11	
LNDC	68	4	
LNDC	74	5	
LNDC	53	3	
LNDC	58	4	
LNDC	57	4	
LNDC	64	3	
LNDC	73	5	
LNDC	69	4	
LNDC	79	7	
LNDC	78	6	
LNDC	68	4	
LNDC	67	4	
LNDC	71	5	
LNDC	64	3	
LNDC	84	8	
LNDC	64	3	
LNDC	68	5	
LNDC	72	6	
LNDC	63	3	
LNDC	80	5	
LNDC	87	9	
LNDC	54	3	
LNDC	58	4	
LNDC	77	5	
LNDC	75	4	
LNDC	60	3	
LNDC	66	4	

Additional Captures

Species	Number
LNDC	5

Appendix C-3
Section 3B

Spring

Species	F.L. (mm)	Weight (g)	Comments
LNDC	66	3	
LNDC	68	4	
LNDC	59	3	
LNDC	69	4	
LNDC	65	3	
LNDC	61	4	
LNDC	60	3	
LNDC	66	4	
LNDC	62	4	

Appendix C-3
Section 3A

Summer

Species	F.L. (mm)	Weight (g)	Comments
LNSC	340	435	
LNDC	68	3	
LNDC	65	2	
LKCH	113	11	
LNDC	83	7	
LNDC	76	5	
LNDC	72	4	
LNDC	71	4	
LNDC	73	5	
LNDC	46	1	
LNDC	62	3	
LNDC	66	4	
LNDC	71	5	
LNDC	84	9	
LNDC	73	4	
LNDC	66	4	
LNDC	83	6	
LNDC	76	5	
LKCH	125	24	

Appendix C-3
Section 3B

Summer

Species	F.L. (mm)	Weight (g)	Comments
LNDC	62	3	
LNDC	65	4	

Appendix C-3
Section 3C

Summer

Species	F.L. (mm)	Weight (g)	Comments
LNDC	73	4	
LNDC	63	3	
LNDC	69	3	
LNDC	94	12	

Appendix C-3
Section 3A

Fall

Species	F.L. (mm)	Weight (g)	Comments
WHSC	149	53	
WHSC	150	50	
WHSC	200	100	
WHSC	167	51	
WHSC	109	55	
WHSC	174	76	
WHSC	128	59	
WHSC	165	63	
WHSC	142	34	
WHSC	122	28	
WHSC	122	27	

Appendix C-3
Section 3A

Fall

Species	F.L. (mm)	Weight (g)	Comments
WHSC	127	25	
WHSC	128	28	
WHSC	134	29	
WHSC	153	45	
WHSC	141	35	
WHSC	133	28	
WHSC	125	28	
WHSC	148	45	
WHSC	111	19	
WHSC	140	30	
LNDC	69	3	
LNDC	81	6	
LNDC	69	3	
LNDC	69	3	
LNDC	66	3	
LNDC	73	5	
LNDC	71	4	
LNDC	64	3	
LNDC	89	8	
LNDC	62	3	
LNDC	91	10	
WHSC	249	214	
WHSC	220	147	
WHSC	154	41	
WHSC	228	160	
WHSC	189	98	
WHSC	150	48	
WHSC	129	26	
WHSC	129	29	
WHSC	146	44	Missing upper 1/2 caudal
LNDC	75	4	
LNDC	70	3	
LNDC	81	6	
LNDC	75	5	
LNDC	81	7	
LNDC	65	3	
LNDC	76	4	
LNDC	80	5	
LNDC	59	2	
LNDC	71	4	
LNDC	70	4	
LNDC	71	5	
LNDC	62	2	
LNDC	57	2	
LNDC	76	4	
LNDC	54	2	
LKCH	94	7	
LNDC	74	3	
LNDC	80	4	
LNDC	95	10	

Additional Captures

Species	Number
WHSC	18
LNDC	29

Appendix C-3
Section 3B

Fall

Species	F.L. (mm)	Weight (g)	Comments
WHSC	300	386	
WHSC	235	199	
WHSC	218	155	
WHSC	197	120	
WHSC	140	39	
WHSC	141	37	
WHSC	142	46	
WHSC	177	72	
WHSC	163	63	
WHSC	191	90	
WHSC	147	41	
WHSC	181	84	
WHSC	138	35	
WHSC	151	47	
WHSC	163	57	
WHSC	161	54	
WHSC	156	49	
WHSC	128	30	
WHSC	143	39	
WHSC	68	2	
WHSC	127	27	
LNDC	75	3	
WHSC	145	43	
WHSC	114	23	
WHSC	147	44	
WHSC	65	3	
WHSC	144	42	
WHSC	144	41	
WHSC	128	23	
WHSC	120	31	
WHSC	111	16	
LNDC	87	4	
LKCH	97	8	
LNDC	71	4	
LNDC	72	5	
LNDC	74	6	
LNDC	80	6	
LNDC	68	5	
LNDC	77	5	
LNDC	81	8	
LNDC	77	6	
LNDC	63	4	
LNDC	81	8	
LNDC	78	6	
LNDC	68	4	

Additional Captures

Species	Number
WHSC	9

Appendix C-3
Section 3C

Fall

Species	F.L. (mm)	Weight (g)	Comments
WHSC	223	140	
WHSC	210	136	
WHSC	237	182	
WHSC	172	65	
WHSC	137	29	
WHSC	187	96	
WHSC	128	22	
WHSC	138	35	
WHSC	127	27	
WHSC	143	38	
WHSC	146	39	
WHSC	62	3	
WHSC	126	25	
WHSC	134	31	
WHSC	72	5	
WHSC	72	7	
WHSC	115	19	
LNDC	78	3	
WHSC	64	4	
LNDC	78	7	

Appendix C-4
Section 4A

Spring

Species	F.L. (mm)	Weight (g)	Comments
LNDC	61	3	
LNDC	73	4	
LNDC	75	5	
LNDC	36	<1	
LNDC	39	<1	
LNDC	82	7	
LNDC	49	<1	
LNDC	86	7	
LNDC	86	6	
LNDC	74	5	
LNDC	88	8	
LNDC	95	10	
LNDC	75	3	
LNDC	76	6	
LNDC	94	8	
LNDC	83	8	
LNDC	80	8	
LNDC	71	4	
LNDC	75	5	
LNDC	69	3	
LNDC	79	4	
LNDC	65	3	
LNDC	57	3	
LNDC	50	1	
LNDC	86	7	
LNDC	78	4	
LNDC	50	<1	
LNDC	43	<1	
LNDC	42	<1	
LNDC	39	<1	

Additional Captures

Species	Number
LNDC	115

Appendix C-4
Section 4B

Spring

Species	F.L. (mm)	Weight (g)	Comments
TRPR	59	2	
LNDC	130	14	
LNDC	79	4	
LNDC	90	6	
LNDC	38	<1	
LNDC	93	9	
LNDC	96	10	
LNDC	63	7	
LNDC	57	3	
LNDC	51	2	
TRPR	62	2	
LNDC	80	9	
LNDC	88	9	
LNDC	45	1	
LNDC	55	2	
LKCH	78	3	
LNDC	89	10	
LNDC	46	1	
LNDC	52	3	
LNDC	74	3	
LNDC	47	1	
LNDC	47	1	
LNDC	39	<1	
LNDC	46	1	
LNDC	48	1	
LNDC	44	<1	
LNDC	46	2	
LNDC	69	3	
LNDC	59	2	
LNDC	38	<1	
LNDC	61	3	
LNDC	68	4	
LNDC	64	3	
LNDC	45	1	

Additional Captures

Species	Number
LNDC	169

Appendix C-4

Section 4A

Summer

Species	F.L. (mm)	Weight (g)	Comments
LNDC	42	<1	
LNDC	50	1	
LNDC	49	<1	
LNDC	51	<1	
LNDC	47	<1	
LNDC	48	<1	
LNDC	50	1	
LNDC	38	<1	
LNDC	53	1	
LNDC	62	2	
LNDC	60	3	
LNDC	53	1	
LNDC	52	1	
LNDC	89	11	
LNDC	78	5	
LNDC	79	8	
LNDC	90	9	
LNDC	98	12	
LNDC	53	1	
LNDC	40	<1	
LNDC	53	1	
LNDC	45	<1	
LNDC	35	<1	
LNDC	89	9	
LNDC	46	<1	
LNDC	29	<1	
LNDC	53	<1	
LNDC	80	7	
LNDC	76	5	
LNDC	71	4	
NRPK	142	19	
LKCH	80	4	
NRPK	119	14	

Additional Captures

Species	Number
LNDC	240

Appendix C-4

Section 4B

Summer

Species	F.L. (mm)	Weight (g)	Comments
LNDC	52	2	
LNDC	57	2	
LNDC	45	1	
LNDC	41	<1	
LNDC	42	<1	
LNDC	52	2	
LNDC	34	<1	
LNDC	52	2	
LNDC	78	5	
LNDC	52	1	
LNDC	45	1	
LNDC	45	1	
LNDC	36	<1	
LNDC	55	2	
LNDC	51	1	
LNDC	35	<1	
LNDC	46	<1	
LNDC	51	1	
LNDC	37	<1	
LNDC	38	<1	
LNDC	46	1	
LNDC	51	2	
LNDC	70	4	
LNDC	44	<1	
LNDC	59	2	
LNDC	54	1	
LNDC	52	1	
LNDC	36	<1	
LNDC	52	2	
LNDC	61	4	
NRPK	133	16	

Additional Captures

Species	Number
LNDC	141

Appendix C-4
Section 4A

Fall

Species	F.L. (mm)	Weight (g)	Comments
LNDC	46	1	
LNDC	42	<1	
LNDC	48	1	
LNDC	46	1	
LNDC	43	1	
LNDC	51	1	
LNDC	55	1	
LNDC	48	1	
LNDC	45	1	
LNDC	48	1	
LNDC	48	1	
LNDC	51	1	
LNDC	58	1	
LNDC	46	1	
LNDC	43	1	
LNDC	50	1	
LNDC	45	1	
LNDC	44	1	
LNDC	47	1	
LNDC	51	1	
LNDC	36	<1	
LNDC	42	<1	
LNDC	50	1	
LNDC	39	<1	
LNDC	45	1	
LNDC	47	1	
LNDC	52	1	
LNDC	45	1	
LNDC	41	<1	
LNDC	49	1	

Additional Captures

Species	Number
LNDC	140

Appendix C-4
Section 4B

Fall

Species	F.L. (mm)	Weight (g)	Comments
LNDC	71	3	
LNDC	50	1	
LNDC	52	1	
LNDC	53	2	
LNDC	57	2	
LNDC	45	1	
LNDC	44	1	
LNDC	52	1	
LNDC	48	1	
LNDC	50	1	
LNDC	52	1	
LNDC	55	2	
LNDC	46	1	
LNDC	44	1	
LNDC	44	1	
LNDC	64	3	
LNDC	54	2	
LNDC	48	1	
LNDC	53	2	
LNDC	51	1	
LNDC	51	1	
LNDC	73	3	
LNDC	56	2	
LNDC	38	<1	
LNDC	53	2	
LNDC	46	1	
LNDC	54	2	
LNDC	49	1	
LNDC	40	<1	
LNDC	61	2	

Additional Captures

Species	Number
LNDC	113

Appendix C-5

Section 5A

Spring

Species	F.L. (mm)	Weight (g)	Comments
LNDC	35	<1	
LNDC	61	2	
LNDC	60	2	
LNDC	35	<1	
LNDC	30	<1	
LNDC	40	<1	
LNDC	28	<1	
LNDC	38	<1	
LNDC	30	<1	
LNDC	26	<1	
LNDC	34	<1	
LNDC	40	<1	
LNDC	30	<1	
LNDC	20	<1	
LNDC	39	<1	
LNDC	25	<1	
LNDC	40	<1	
LNDC	34	<1	
LNDC	38	<1	
LNDC	40	<1	
LNDC	39	<1	
LNDC	40	<1	
LNDC	24	<1	
LNDC	77	5	
LNDC	80	5	
LNDC	69	3	
LNDC	37	<1	
LNDC	94	5	
LNDC	24	<1	
LNDC	50	1	
LNDC	22	<1	
LNDC	58	1	

Additional Captures

Species	Number
LNDC	152

Appendix C-5

Section 5B

Spring

Species	F.L. (mm)	Weight (g)	Comments
LNDC	25	<1	
LNDC	28	<1	
LNDC	63	3	
LNDC	64	4	
LNDC	32	<1	
LNDC	32	<1	
LNDC	30	<1	
LNDC	31	<1	
LNDC	35	<1	
LNDC	31	<1	
LNDC	35	<1	
LNDC	40	<1	
LNDC	41	<1	
LNDC	36	<1	
LNDC	32	<1	
LNDC	32	<1	
LNDC	56	1	
LNDC	36	<1	
LNDC	33	<1	
LNDC	35	<1	
LNDC	25	<1	
LNDC	31	<1	
LNDC	32	<1	
LNDC	47	1	
LNDC	68	3	
LNDC	35	<1	
LNDC	30	<1	
LNDC	40	<1	
LNDC	34	<1	
LNDC	37	<1	

Additional Captures

Species	Number
LNDC	242

Appendix C-5
Section 5A

Summer

Species	F.L. (mm)	Weight (g)	Comments
No Fish Captured or Observed			

Appendix C-5
Section 5B

Summer

Species	F.L. (mm)	Weight (g)	Comments
WHSC	210	133	
NRPK	145	21	
LNDC	87	8	

Appendix C-5
Section 5A

Fall

Species	F.L. (mm)	Weight (g)	Comments
NRPK	175	36	
NRPK	243	64	
NRPK	145	21	
NRPK	153	27	
WHSC	155	49	
WHSC	166	53	
LNSC	94	13	
LNDC	41	<1	
LNDC	46	1	
WHSC	51	2	
LNDC	46	1	
LNDC	43	<1	
SPSC	68	3	

Appendix C-5
Section 5B

Fall

Species	F.L. (mm)	Weight (g)	Comments
WHSC	284	281	
NRPK	287	51	
NRPK	280	45	
WHSC	165	87	
WHSC	107	16	
LNDC	46	1	
LNDC	29	<1	
LNDC	31	<1	
LNDC	48	1	
LNDC	52	2	
LNDC	37	<1	
LNDC	41	<1	

Appendix C-6
Section 6A

Spring

Species	F.L. (mm)	Weight (g)	Comments
LNDC	68	4	
LNDC	21	<1	
LNDC	56	2	
LNDC	26	<1	
LNDC	49	1	
LNDC	52	1	
LNDC	25	<1	
LNDC	39	<1	
LNDC	37	<1	
LNDC	56	2	
LNDC	32	<1	
LNDC	58	2	
LNDC	40	1	
LNDC	33	<1	
LNDC	22	<1	
LNDC	53	2	
LNDC	54	2	
LNDC	35	<1	
LNDC	24	<1	
LNDC	51	1	
LNDC	47	1	
LNDC	29	<1	
LNDC	30	<1	
FTMN	31	<1	
LNDC	42	<1	
LNDC	44	<1	
LNDC	72	4	
LNDC	35	<1	
FTMN	61	3	
LNDC	61	3	
LNDC	34	<1	
LNDC	53	2	
LNSC	58	2	
FTMN	38	<1	
FTMN	39	<1	
WHSC	51	2	
FTMN	33	<1	
FTMN	45	<1	
FTMN	44	<1	
FTMN	36	<1	
FTMN	33	<1	
FTMN	37	<1	
FTMN	39	<1	
WHSC	46	1	
FTMN	31	1	
FTMN	36	1	
FTMN	42	1	
FTMN	34	1	
FTMN	38	<1	
FTMN	42	<1	
FTMN	43	<1	
FTMN	38	<1	
FTMN	37	<1	
FTMN	45	<1	
FTMN	36	<1	
FTMN	37	<1	
FTMN	36	<1	
WHSC	53	1	
FTMN	38	<1	
FTMN	36	<1	

Appendix C-6
Section 6A

Spring

Species	F.L. (mm)	Weight (g)	Comments
FTMN	39	<1	
FTMN	40	<1	

Additional Captures

Species	Number
LNDC	242

Appendix C-6
Section 6B

Spring

Species	F.L. (mm)	Weight (g)	Comments
LNDC	58	3	
LNDC	73	4	
LNDC	61	3	
LNDC	56	2	
LNDC	89	8	
LNDC	53	1	
LNDC	33	<1	
LNDC	80	5	
LNDC	56	2	
LNDC	57	2	
LNDC	56	1	
LNDC	59	3	
LNDC	55	2	
LNDC	63	3	
LNDC	56	2	
LNDC	37	<1	
LNDC	71	4	
LNDC	66	3	
LNDC	72	4	
LNDC	83	6	
LNDC	61	3	
FTMN	41	<1	
FTMN	33	<1	
LNDC	60	3	
LNDC	76	5	
LNDC	51	2	
LNDC	67	4	
LNDC	59	2	
LNDC	39	<1	
LNDC	77	5	
LNDC	39	<1	
LNDC	25	<1	
FTMN	32	<1	
WHSC	56	2	
FTMN	42	<1	
FTMN	34	<1	
FTMN	36	<1	
TRPR	52	2	

Additional Captures

Species	Number
LNDC	26

Appendix C-6
Section 6C

Spring

Species	F.L. (mm)	Weight (g)	Comments
FTMN	39	<1	
LNDC	53	2	
FTMN	35	<1	
LNDC	56	2	
LNDC	36	<1	
LNDC	15	<1	
LNDC	36	<1	
LNDC	43	1	
FTMN	43	<1	
LNDC	52	1	
LNDC	21	<1	
LNDC	36	<1	
LNDC	57	3	
LNDC	32	<1	
LNDC	34	<1	
LNDC	37	<1	
FTMN	42	<1	
LNDC	34	<1	
FTMN	38	<1	
FTMN	38	<1	
LNDC	56	2	
LNDC	52	2	
LNDC	33	<1	
LNDC	25	<1	
LNDC	37	<1	
LNDC	33	<1	
LNDC	58	2	
LNDC	44	1	
LNDC	48	1	
LNDC	44	<1	
LNDC	52	2	
LNDC	38	<1	
FTMN	32	<1	
LNDC	33	<1	
FTMN	38	<1	
LNDC	35	<1	
LNDC	37	<1	
LNDC	36	<1	
FTMN	38	<1	
FTMN	41	<1	
FTMN	42	<1	

Additional Captures

Species	Number
LNDC	11

Appendix C-6

Section 6D

Spring

Species	F.L. (mm)	Weight (g)	Comments
LNDC	35	<1	
FTMN	38	<1	
FTMN	39	<1	
LNDC	39	<1	
LNDC	51	1	
LNDC	56	2	
LNDC	45	<1	
LNDC	74	4	
LNDC	27	<1	
LNDC	51	1	
LKCH	54	2	
LNDC	48	<1	
LNDC	51	1	
LNDC	35	<1	
LKCH	34	<1	
LNDC	34	<1	
LNDC	52	2	
LNDC	39	<1	
LNDC	55	2	
LNDC	50	1	
LNDC	45	<1	
LNDC	35	<1	
LNDC	55	2	
LNDC	38	<1	
LNDC	56	2	
LNDC	48	1	
LNDC	54	1	
LNDC	36	<1	
LNDC	42	<1	
LNDC	27	<1	
LNDC	38	<1	
LNDC	38	<1	
LNDC	34	<1	
LNDC	39	<1	
LKCH	44	2	
FTMN	36	<1	
TRPR	55	2	
LKCH	37	<1	
FTMN	47	<1	
LKCH	36	<1	
FTMN	36	<1	

Additional Captures

Species	Number
LNDC	96

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Section 6A

Summer

Species	F.L. (mm)	Weight (g)	Comments
LNDC	26	<1	
LNDC	33	<1	
LNDC	33	<1	
LNDC	31	<1	
LNDC	40	<1	
LNDC	33	<1	
LNDC	43	<1	
LNDC	34	<1	
LNDC	26	<1	
LNDC	59	3	
LNDC	27	<1	
LNDC	42	<1	
LNDC	44	<1	
LNDC	41	<1	
LNDC	89	9	
LNDC	37	<1	
LNDC	56	2	
LNDC	64	3	
LNDC	52	2	
LNDC	43	<1	
LNDC	47	<1	
LNDC	37	<1	
LNDC	31	<1	
LNDC	31	<1	
LNDC	53	2	
LNDC	29	<1	
LNDC	32	<1	
LNDC	48	<1	
LNDC	49	1	
LNDC	31	<1	

Additional Captures

Species	Number
LNDC	75

Appendix C-6
Section 6B

Summer

Species	F.L. (mm)	Weight (g)	Comments
LNDC	66	4	
LNDC	67	5	
LNDC	38	<1	
LNDC	82	7	
LNDC	33	<1	
LNDC	47	1	
LNDC	43	<1	
LNDC	36	<1	
LNDC	42	<1	

Appendix C-6
Section 6C

Summer

Species	F.L. (mm)	Weight (g)	Comments
LNDC	42	<1	
LNDC	42	<1	
LNDC	37	<1	
LNDC	41	<1	
LNDC	32	<1	
LNDC	31	<1	
LNDC	29	<1	
LNDC	42	<1	
LNDC	36	<1	
LNDC	37	<1	
LNDC	31	<1	
LNDC	40	<1	
LNDC	31	<1	
LNDC	33	<1	
LNDC	38	<1	
LNDC	32	<1	
LNDC	45	<1	
LNDC	43	<1	
LNDC	29	<1	
LNDC	45	<1	
LNDC	41	<1	
LNDC	30	<1	
LNDC	38	<1	
LNDC	40	<1	
LNDC	38	<1	
LNDC	34	<1	
LNDC	36	<1	
LNDC	44	<1	
LNDC	32	<1	
LNDC	46	1	
LNDC	31	<1	

Appendix C-6
Section 6D

Summer

Species	F.L. (mm)	Weight (g)	Comments
LNDC	39	<1	
LKCH	79	8	
LNDC	53	1	
LNDC	37	<1	
LNDC	34	<1	
LNDC	52	1	
LNDC	44	<1	
LNDC	54	2	
LNDC	56	2	
LNDC	29	<1	
LNDC	28	<1	
LNDC	33	<1	
LNDC	43	<1	
LNDC	38	<1	
LNDC	44	<1	
LNDC	37	<1	
LNDC	36	<1	
LNDC	35	<1	
LNDC	44	<1	
LNDC	22	<1	
LNDC	60	3	
LNDC	40	<1	
LNDC	41	<1	
LNDC	38	<1	
LNDC	33	<1	
LNDC	35	<1	
LNDC	38	<1	
LNDC	38	<1	
LNDC	41	<1	
LNDC	36	<1	
LNDC	37	<1	
LNDC	39	<1	

Additional Captures

Species	Number
LNDC	45

Appendix C-7
Section 7A

Spring

Species	F.L. (mm)	Weight (g)	Comments
LNDC	47	<1	
LNDC	59	2	
LNDC	52	1	
LNDC	52	1	
LNDC	48	1	
LNDC	50	1	
LNDC	55	2	
LNDC	61	2	
LNDC	58	2	
LNDC	55	1	
LNDC	54	1	
LKCH	33	<1	
LNDC	57	2	
LNDC	52	1	
LNDC	52	1	
LNDC	65	3	
LNDC	45	<1	
LNDC	57	2	
LNDC	42	<1	
LNDC	50	1	
LNDC	35	<1	
LNDC	48	1	
LNDC	56	2	
LKCH	44	<1	
LNDC	54	1	
LNDC	52	1	
LNDC	41	<1	
LNDC	58	2	
LNDC	29	<1	
LNDC	44	<1	
LNDC	52	1	

Appendix C-7
Section 7B

Spring

Species	F.L. (mm)	Weight (g)	Comments
LNDC	36	<1	
LNDC	54	1	
LNDC	48	1	
LNDC	55	1	
LNDC	55	1	
LNDC	50	1	
LNDC	57	1	
LNDC	54	1	
LNDC	35	<1	
LNDC	44	1	
LNDC	41	1	
LNDC	32	<1	
LNDC	35	<1	
LNDC	44	1	
LNDC	38	<1	
LNDC	35	<1	
LNDC	52	1	
LNDC	48	1	
LNDC	57	1	
LNDC	60	2	

Appendix C-7
Section 7B

Spring

Species	F.L. (mm)	Weight (g)	Comments
LNDC	38	<1	
LNDC	40	1	
LNDC	44	1	
LNDC	40	1	
LNDC	52	1	
LNDC	37	<1	
LNDC	48	1	
LNDC	54	1	
LNDC	33	<1	
LNDC	50	1	

Additional Captures

Species	Number
LNDC	53

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Section 7A

Summer

Species	F.L. (mm)	Weight (g)	Comments
NRPK	157		Scale Malfunction
LNDC	69		Scale Malfunction
LNDC	59		Scale Malfunction
LNDC	54		Scale Malfunction
LNDC	47		Scale Malfunction
LNDC	58		Scale Malfunction
LNDC	40		Scale Malfunction
LNDC	46		Scale Malfunction
LNDC	45		Scale Malfunction
LNDC	42		Scale Malfunction
LNDC	43		Scale Malfunction
LNDC	60		Scale Malfunction
LNDC	36		Scale Malfunction
LNDC	39		Scale Malfunction
LNDC	40		Scale Malfunction
LNDC	37		Scale Malfunction
LNDC	39		Scale Malfunction
LNDC	59		Scale Malfunction
LNDC	45		Scale Malfunction
LNDC	44		Scale Malfunction
LNDC	40		Scale Malfunction
LNDC	43		Scale Malfunction
LNDC	58		Scale Malfunction
LNDC	42		Scale Malfunction
LNDC	36		Scale Malfunction
LNDC	40		Scale Malfunction
LNDC	38		Scale Malfunction
LNDC	46		Scale Malfunction
LNDC	33		Scale Malfunction
LNDC	45		Scale Malfunction

Additional Captures

Species	Number
LNDC	5

Appendix C-7
Section 7B

Summer

Species	F.L. (mm)	Weight (g)	Comments
LNDC	56		Scale Malfunction
LNDC	59		Scale Malfunction
LNDC	55		Scale Malfunction
LNDC	37		Scale Malfunction
LNDC	32		Scale Malfunction
LNDC	63		Scale Malfunction
LNDC	46		Scale Malfunction
LNDC	45		Scale Malfunction
LNDC	40		Scale Malfunction
LNDC	38		Scale Malfunction
LNDC	42		Scale Malfunction
LNDC	61		Scale Malfunction
LNDC	42		Scale Malfunction
LNDC	33		Scale Malfunction
LNDC	57		Scale Malfunction
LNDC	69		Scale Malfunction
LNDC	31		Scale Malfunction
LNDC	38		Scale Malfunction
LNDC	74		Scale Malfunction
LNDC	50		Scale Malfunction
LNDC	58		Scale Malfunction
LNDC	42		Scale Malfunction
LNDC	55		Scale Malfunction
LNDC	62		Scale Malfunction
LNDC	42		Scale Malfunction
LNDC	36		Scale Malfunction
LNDC	39		Scale Malfunction
LNDC	49		Scale Malfunction
LNDC	39		Scale Malfunction
LNDC	36		Scale Malfunction
WHSC	94		Scale Malfunction

Additional Captures

Species	Number
LNDC	53

Appendix C-7
Section 7A

Fall

Species	F.L. (mm)	Weight (g)	Comments
MNWH	183	81	
WHSC	125	26	
WHSC	162	64	
WHSC	31	<1	
LNDC	43	<1	
LNDC	42	<1	
LNDC	41	<1	
LNDC	37	<1	
LNDC	48	<1	
LNDC	38	<1	
FTMN	52	1	
LNDC	48	<1	
LNDC	41	<1	
LNDC	51	1	
LNDC	39	<1	
LNDC	36	<1	
LNDC	37	<1	
LNDC	38	<1	
LNDC	57	2	
LNDC	52	1	
LNDC	37	<1	
WHSC	138	32	
WHSC	106	16	
LNDC	43	<1	
LNDC	37	<1	
LNDC	38	<1	
WHSC	103	12	
LNDC	36	<1	
LNDC	36	<1	
LNDC	55	1	
LNDC	36	<1	
LNDC	43	<1	
LNDC	44	<1	
LNDC	32	<1	
LNDC	40	<1	
LNDC	35	<1	
LNDC	53	1	
LNDC	36	<1	
LNDC	42	<1	
LNDC	23	<1	
WHSC	44	1	
WHSC	39	<1	
WHSC	38	<1	
WHSC	38	<1	

Additional Captures

Species	Number
LNDC	99

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Section 7B

Fall

Species	F.L. (mm)	Weight (g)	Comments
LNDC	44	<1	
LNDC	46	<1	
LNDC	44	<1	
LNDC	43	<1	
LNDC	37	<1	
NRPK	236	77	
WHSC	133	32	
WHSC	111	14	
LNDC	36	<1	
LNDC	47	<1	
LNDC	37	<1	
LNDC	54	2	
WHSC	107	14	
WHSC	103	14	
LNDC	48	<1	
TRPR	81	6	
WHSC	127	26	
LNDC	49	1	
LKCH	91	9	
LNDC	42	<1	
LNDC	58	2	
LNDC	47	<1	
WHSC	81	6	
LKCH	82	7	
LKCH	83	7	
LNDC	32	<1	
LNDC	57	2	
LNDC	53	1	
LNDC	37	<1	
LNDC	43	<1	
LNDC	33	<1	
LNDC	35	<1	
LNDC	32	<1	
LNDC	47	<1	
LNDC	33	<1	
LNDC	34	<1	
LNDC	32	<1	
LNDC	38	<1	
LNDC	39	<1	
LNDC	42	<1	
LNDC	34	<1	
LNDC	51	1	
LNDC	49	1	

Additional Captures

Species	Number
LNDC	26

APPENDIX D:

Little Bow River

Habitat Inventory Data

Habitat Inventory

Date: 7-Aug-14
Project: Little Bow River/Mosquito Creek - 2014
Stream Name: Little Bow River
Section #: 1

Habitat units numbered from downstream to upstream

Habitat Unit		Physical Dimensions			Cover (m^2)					Substrate Composition					Unstable Bank (m)	Riparian Veg	Comments
#	Type	Length (m)	Width (m)	Area (m^2)	WD	OB	OV	AV	BL	FN	GR	CB	BL	BR			
1	RF	20	15	300		1	2	15	1		10	60	30			Gr	
2	R2	40	9.5	380		4.0	4	19	19	10	10	30	50			Gr	
3	R3	60	11	660		6.0	6	6.6	33	10	10	30	50			Gr	
4	RF	50	17.5	875		5.0	4.5	43.8	87.5		20	30	50		5	Gr	
5	R3	36	10	360		5.0	3.6	3.6		10	10	20	60			Gr	
6	R1	105	13	1365		5.0	10	13.65		70		10	20		80	Gr	
7	R2	25	14	350		0.5	2		1	30	20	20	30		10	Gr	
8	R1	120	18	2160		2.0	12	21.6		70		15	15		10	Gr	
9	R1	50	16	800		5.0	2.5	8		80	10	10			50	Gr	
10	R3	15	1.5	22.5			1.5			10	80	10					Split
11	R1	100	17	1700		3.0	10			50	20	20	10		3	Gr	
12	R2	40	14	560		3.0	4	5.6	2	20	10	20	50			Gr/Sh	
13	R3	70	15	1050			10	52.5	315	10		20	70			Gr	
14	R1	65	13	845		0.5	3	8.45		30	30	20	20			Gr/Exp	
15	RF	50	20	1000		3.0	4	10	100		20	40	40			Gr	
16	R2	110	16	1760		5.0	20		2	40	10	20	30			Gr	
17	R3	53	13	689		2.0	5	6.89	34.45	10	10	20	60			Gr	
18	R2	30	15	450		1.5	3		5	10	20	30	40			Gr	
19	R3	10	16	160		0.5	1.5			20		20	60			Gr	
20	R2	138	13.5	1863		5.0	20	3		20	10	40	30		5	Gr	
21	R3	85	2.5	212.5						20	50	20	10		10	Gr	
22	RF	30	13	390		6.0	4.5				50	30	20			Gr	
23	R2	45	14	630		4.0	8			10	10	30	50			Gr	
24	R1	70	13	910		7.0	12	9.1	91	20	10	30	40			Gr	
25	R2	30	23	690		1.0	1.5	6.9	2	50	15	15	20		15	Gr	
26	RF	15	17	255		1.5	1.5	25.5			50	40	10			Gr/Sh	
27	R2	50	16	800		7.5	5	8	40	20	20	30	30			Gr	
28	R3	30	16	480		3.0	3	4.8	24	10	20	40	30			Gr	
29	R2	25	13	325		2.5	3	3.25	16.3	20	20	30	30			Gr	
30	R3	28	16.5	462		3.5	3	23.1	2		30	40	30		10	Gr	
31	R2	130	16	2080		15	13	104	1	40	30	20	10		30	Gr	
32	R1	15	19	285		1.5	1.5	14.25		70	20	10				Gr	
33	R3	20	2.5	50		2	2	0.5			90	10				Gr	
34	R3	30	13	390		4	3	3.9	39		30	40	30			Gr	
35	R1	55	15	825		5.5	10	8.25	5	30	10	30	30			Gr	
36	R3	42	13	546		2	4	5.46	27.3		30	40	30			Gr	
37	R2	30	13	390		3	6	3.9	5		20	50	30			Gr	
38	R3	55	17	935		2.5	5.5	46.75		20	40	20	20		5	Gr	
39	RF	50	24	1200		0.5	2.5	120	2		70	10	20			Gr	
40	R3	44	13	572		4	4.4	28.6	10	10	20	40	30		3	Gr	
41	R3	41	3	123		2	8	12.3		10	30	30	30			Gr	
42	R3	42	8	336		1	4	67.2			20	50	30		10	Gr	
43	R3	74	15	1110		8	8	222	55.5		30	40	30			Gr	
44	R2	35	14	490		3.5	7	49	24.5		20	50	30			Gr	
45	R3	75	12	900		7.5	14	45	45		20	40	40			Gr	
46	R1	55	13	715		5	10		35.75	10	20	30	40			Gr	
47	R2	30	15	450		3	3			30	10	30	30			Gr	
48	R1	75	14	1050		5	14	10.5		40	10	30	20			Gr	
49	R2	75	14.5	1087.5		7.5	4	108.75		10	40	30	20			Gr	
50	R1	81	14	1134		2	4	11.34		30	20	30	20		20	Gr	
51	R3	20	14	280		2	1	14	28		25	25	50			Gr	
52	R2	60	14	840		6	1	42	42	5	20	25	50			Gr	
53	R1	30	14	420		2	0.5	21		20	10	40	30			Gr	
54	R3	25	15	375							30	40	30			Gr	
55	RF	20	15	300		1	2	15	1		10	60	30			Gr	
56	R2	40	9.5	380		4.0	4	19	19	10	10	30	50			Gr	
57	R3	60	11	660		6.0	6	6.6	33	10	10	30	50			Gr	
58	RF	50	17.5	875		5.0	4.5	43.8	87.5		20	30	50		5	Gr	
59	R3	36	10	360		5.0	3.6	3.6		10	10	20	60			Gr	

Habitat Inventory

Date: 7-Aug-14
Project: Little Bow River/Mosquito Creek - 2014
Stream Name: Little Bow River
Section #: 2

Habitat units numbered from downstream to upstream

Habitat Unit		Physical Dimensions			Cover (m^2)					Substrate Composition					Unstable Bank (m)	Riparian Veg	Comments
#	Type	Length (m)	Width (m)	Area (m^2)	WD	OB	OV	AV	BL	FN	GR	CB	BL	BR			
1	R1	15	10	150		4.5	9	3		50	10	30	10			Gr	
2	R3	30	12	360		15.0	12	18		10	10	60	20			Gr	
3	R3	20	12	240		10.0	10	4.8		15	10	50	25			Gr	
4	R3	17	9	153		6.8	8.5	1.53		15	15	60	10				Split
5	R2	10	12	120		2.0	3	1.2		25	10	50	15				Split
6	RF	10	29	290		4.0	2	43.5		15	15	25	45			Gr	
7	R2	94	15	1410		37.6	56.4	211.5		40	15	10	35			Gr	
8	RF	12	21	252		4.8	4.8	37.8		15	20	30	35			Gr	
9	R3	11	2	22		2.2	2.2	8.8		20	10	65	5				Split
10	R2	65	15	975		19.5	6.5	146.25		45	10	30	15			Gr	
11	RF	20	24	480		4.0	4	120		15	15	30	40			Gr	
12	R3	14	2.5	35		8.4	4.2	3.5		70	10	10	10				Split
13	R3	58	13	754		11.6	11.6	113.1		35	15	40	10		15.0		Split
14	RF	31	7	217				2.17		5	10	60	25				Split
15	R3	58	10	580		17.4	11.6	29		40	10	35	15			Gr	
16	R3	30	5	150		12.0	6	22.5		45	15	35	5			Gr	
17	RF	28	6	168		8.4	8.4	33.6		15	25	50	10		5		Split
18	R2	60	15	900		12.0	18	90		70	10	10	10			Gr	
19	RF	19	31	589		1.9	3.8	176.7		15	15	30	40				Split
20	R2	77	16	1232		30.8	30.8	123.2		40	25	10	25			Gr	
21	RF	7	21	147		1.4	1.4	14.7		15	15	45	25			Gr	
22	R2	21	21	441		4.2	4.2	22.05		70	15	5	10			Gr	
23	R3	16	23	368		1.6	1.6	36.8		75	5	5	15			Gr	
24	R1	38	20	760		15.2	7.6	38		80	10	5	5			Gr	
25	R1	43	9	387		4.3	8.6	19.35		100						Gr	
26	R3	43	9	387		4.3	8.6	174.15		100							Split
27	R3	31	20	620		3.1	12.4	217		75	5	10	10			Gr	
28	R2	108	21	2268		21.6	64.8	453.6		95			5			Gr	
29	RF	62	21	1302		12.4	12.4	195.3		5	10	35	50			Gr	
30	R1	228	13	2964			22.8			85		5	10				Split
31	R2	228	13	2964		22.8	22.8	296.4		80	5	5	10		65	Gr/Sh	
32	R2	255	25	6375		25.5	25.5	637.5		85			15		80	Gr	
33	R2	273	21	5733		27.3	81.9	573.3		100						Gr/Sh	
34	R3	55	18	990		5.5	5.5	148.5		100							Split
35	R2	55	18	990		5.5	11			100						Gr	
36	R1	71	10	710		7.1	7.1	35.5		100							Split
37	R2	71	12	852		14.2	7.1	42.6		90			10			Gr	
38	RF	25	31	775			2.5	77.5		15	15	30	40		6	Gr/Sh	
39	R2	192	21	4032		38.4	38.4	403.2		95			5			Gr	
40	RF	38	17	646		7.6	7.6	32.3		10	10	45	35			Gr	
41	R3	65	13	845		6.5	19.5	84.5		20	40	30	10			Gr/Sh	
42	RF	80	16	1280		16	16	192		10	15	40	35			Gr/Sh	
43	RF	93	26	2418				120.9		10	10	60	20		50	Gr	
44	R2	90	23	2070		9	9	103.5		50	20	20	10			Gr	
45	P1	10	2	20			1			95			5		2		Split
46	RF	21	13	273		2.1	2.1	40.95		10	15	60	15		5	Gr/Exp	
47	R1	170	16	2720		17	17	136		70	5	5	20		7	Gr	
48	R1	167	21	3507		16.7	33.4			100						Gr	
49	RF	31	17	527			3.1	26.35		25	10	50	15		10	Gr	
50	R1	184	15	2760			18.4	276		95			5		10	Gr	
51	R2	89	18	1602		8.9	26.7	160.2		80	5		15		30	Gr/Exp	
52	RF	42	15	630		4.2		31.5		15	15	60	10		60	Gr	
53	R2	82	17	1394		16.4	8.2	69.7		100						Gr	
54	RF	47	17	799		4.7	4.7	119.85		25	10	45	20			Gr	
55	R3	49	21	1029		4.9	9.8	257.25		40	20	20	20			Gr	
56	R2	187	10	1870		37.4	37.4	280.5		50	10	20	20		15	Gr	
57	R3	187	7	1309		18.7	37.4	523.6		80		10	10				Split
58	R2	149	18	2682		14.9	44.7	402.3		80		10	10			Gr	
59	R3	73	18	1314		21.9	7.3	131.4		50	15	20	15		3	Gr	
60	R1	78	10	780						80	5	5	10		20	Gr/Exp	
61	P2	21	7	147			2.1			100					20		Split
62	RF	56	14	784			5.6			5	5	40	50		30	Exp/Gr	
63	R3	48	12	576			28.8	28.8		5	5	50	40			Gr	
64	RA	50	13	650			10				5	50	45			Gr/Sh	

Habitat Inventory

Date:	6-Aug-14
Project:	Little Bow River/Mosquito Creek - 2014
Stream Name:	Little Bow River
Section #:	3

Habitat units numbered from downstream to upstream

Habitat Unit		Physical Dimensions			Cover (m^2)					Substrate Composition					Unstable Bank (m)	Riparian Veg	Comments
#	Type	Length (m)	Width (m)	Area (m^2)	WD	OB	OV	AV	BL	FN	GR	CB	BL	BR			
1	R1	210	20	4200		42	21	378		100						Gr	
2	R2	15	14	210		3.0	1.5	126		80	5	5	10			Gr	
3	R1	40	22	880				792		99			1			Gr/Exp	
4	R1	50	16	800						58	14	14	14			Exp	
5	R2	20	24	480			2	432		80	5	5	10			Gr/Sh	
6	RF	45	25	1125		5.0	5	562.5			60	20	20			Gr/Sh	
7	R3	40	20	800		10.0	8	400		20	60	10	10			Gr/Sh	
8	R2	160	16	2560		3.2	16	2048		30	40	10	20		10	Gr/Sh	
9	R3	65	25	1625		5.0	6.5	1300		10	20	40	30			Gr/Sh	
10	R2	70	20	1400		4.0	7	1260		20	40	20	20		8.0	Gr/Sh	
11	R1	805	24	19320		161.0	161	17388		70	10	10	10		310	Gr/Sh	
12	F1	150	50	7500				6000		40	10	10	40			Gr	
13	R2	180	18	3240				2592	100	20	20	20	40			Gr/Exp	
14	R1	60	20	1200					300				100			Exp/Gr	
15	P1	20	15	300					75				100				Split

Habitat Inventory

Date:	5-Aug-14
Project:	Little Bow River/Mosquito Creek - 2014
Stream Name:	Little Bow River
Section #:	4

Habitat units numbered from downstream to upstream

Habitat Unit		Physical Dimensions			Cover (m^2)					Substrate Composition					Unstable Bank (m)	Riparian Veg	Comments
#	Type	Length (m)	Width (m)	Area (m^2)	WD	OB	OV	AV	BL	FN	GR	CB	BL	BR			
1	R2	120	25	3000		6	12	2700	60	30	30	20	20			Gr/Sh	
2	R1	150	18	2700			15	2430	27	40	30	15	15			Gr/Sh	
3	R3	140	16	2240		7.0	14	896	112	10	10	40	40			Gr/Sh	
4	R3	120	20	2400		12.0	12	960	120	10	10	30	50			Gr/Sh	
5	R1	60	16	960		6.0	6	768	19.2	40	10	20	30			Gr/Sh	
6	R3	20	20	400		2.0	2	80	20	10	10	30	50			Gr/Sh	
7	R2	20	22	440		2.0	2	352	4.4	20	20	30	30			Gr/Sh	
8	R3	110	14	1540		11.0	11	462	30.8	40	20	20	20			Gr/Sh	
9	R1	30	16	480		0.5	3	288	4.8	40	20	20	20			Gr/Sh	
10	R3	35	20	700		3.5	3.5	210	70	30	10	20	40			Gr/Sh	
11	R1	180	12	2160			18	1728	21.6	50	10	20	20			Gr/Sh	
12	F2	180	10	1800			18	1710		90			10				Split
13	R1	60	15	900			6	720	9	90			10			Gr/Sh	
14	R2	25	24	600			1	180	30	40	10	10	40			Gr/Sh	
15	R1	50	15	750			5	600		90			10			Gr/Sh	
16	R1	253	10	2530				1012		80	20					Gr/Sh	
17	F2	253	10	2530			25.3	2277		100							Split
18	F3	150	10	1500			15	1350		100							Split
19	R2	150	20	3000		15.0	15	2700		90			10			Gr/Sh	
20	R1	140	11	1540				924		90	10					Gr/Sh	
21	F2	140	11	1540		14.0	14	1463		100							
22	R2	130	20	2600		10.0	10	780	5	60	20	10	10			Gr/Sh	
23	R3	120	20	2400		6.0	6	480		20	60	10	10			Gr/Exp	
24	R1	50	13	650				195		70	30						Split
25	R2	50	13	650		2.5	2.5	585		95	5					Gr/Sh	
26	R2	250	30	7500		12.5	12.5	4500		90	10					Gr/Sh	
27	R2	75	15	1125		7.5	7.5	675		40	40	10	10			Gr/Sh	
28	R3	50	15	750		10.0	10	337.5		20	60	10	10			Gr/Sh	
29	RF	30	15	450		3.0	3	90			60	30	10			Gr/Sh	
30	R1	70	10	700		7	7	140		30	40	20	10			Gr/Sh	
31	R2	40	15	600		2	1	60		10	60	15	15			Gr/Sh	
32	P2	30	10	300				15		30	20	20	30			Exp/Gr	
33	R1	30	10	300						30	20	20	30				Split
34	R2	10	8	80			0.5	0.5			20	30	50			Exp/Gr	
35	RF	25	15	375			0.5		1		20	30	50			Exp/Gr	
36	R3	15	30	450				30		30	30	20	20			Gr/Exp	
37	P1	35	30	1050				30		40	20	20	20			Gr/Exp	

Habitat Inventory

Date: 5-Aug-14
Project: Little Bow River/Mosquito Creek - 2014
Stream Name: Little Bow River
Section #: 5

Habitat units numbered from downstream to upstream

Habitat Unit		Physical Dimensions			Cover (m^2)					Substrate Composition					Unstable	Riparian	Comments
#	Type	Length (m)	Width (m)	Area (m^2)	WD	OB	OV	AV	BL	FN	GR	CB	BL	BR	Bank (m)	Veg	
1	R1	18	20	360			5.4	144		80	10	10				Gr	
2	R2	82	9	738			16.4	221.4		80	5	10	5			Gr	
3	R2	38	10	380			11.4	95		35	30	30	5			Gr	
4	R2	60	13	780		6.0	12	234		25	60	10	5			Gr	
5	R3	35	5	175		3.5	7	35		15	80	3	2				Split
6	R2	90	6	540			18	108		20	50	25	5			Gr	
7	R3	90	6	540			18	108		5	60	30	5				Split
8	R3	45	14	630			4.5	315		30	50	18	2			Gr	
9	R1	110	21	2310			11	462		60	20	18	2			Gr	
10	R1	201	25	5025			40.2	1507.5		70	10	19	1			Gr	
11	R1	150	13	1950			15	390		90	5	4	1			Gr	
12	R1	65	6	390			13	78		80	10	10				Gr	
13	R3	35	17	595			7	89.25		30	50	18	2			Gr	
14	RF	15	13	195			3	19.5		5	40	50	5			Gr	

Habitat Inventory

Date:	4-Aug-14
Project:	Little Bow River/Mosquito Creek - 2014
Stream Name:	Little Bow River
Section #:	6

Habitat units numbered from downstream to upstream

Habitat Unit		Physical Dimensions			Cover (m^2)					Substrate Composition					Unstable	Riparian	Comments
		Length	Width	Area											Bank	Veg	
#	Type	(m)	(m)	(m^2)	WD	OB	OV	AV	BL	FN	GR	CB	BL	BR	(m)		
1	R2	165	25	4125	2	16.5	82.5	206.25		70	30					Gr/Sh	
2	F3	55	6	330			5.5	11		100							Split
3	R2	85	12	1020		8.5	8.5	5		50	50					Gr/Sh	
4	R1	20	10	200		2.0	2	2		50	50					Gr/Sh	
5	RF	30	10	300		1.0	1				90	10				Gr/Sh	
6	F3	30	5	150		1.0	1			90	10						Split
7	R3	20	14	280		1.0	1	1			90	10				Gr/Sh	
8	RF	90	14	1260	0.2	4.5	4.5	1	0.5		80	15	5			Gr/Sh	
9	R3	10	10	100		1.0	2				80	15	5			Gr/Sh	
10	R2	270	10	2700		27.0	27	10		70	20	5	5			Gr/Sh	
11	R1	270	5	1350						70	20	5	5				Split
12	R1	70	9	630		7.0	10			90	5	5					Split
13	F2	70	9	630			7	7		100						Gr/Sh	
14	P1	25	15	375	2	2.5	2.5	1		90	5	5				Gr/Sh	
15	P3	20	5	100			2	2		100							Split
16	RF	25	8	200		2.5	2.5				95	5				Gr/Sh	
17	R3	90	10	900		9.0	4.5	1			80	15	5			Gr/Sh	
18	R2	200	16	3200		10.0	10	10		45	45	10				Gr/Sh	
19	RF	20	12	240		1.0	1				90	10				Gr/Sh	
20	R3	35	7	245		1.0	1			10	85	5				Gr/Sh	
21	RF	20	4	80		2.0	1				90	10					Split
22	P2	5	3	15		0.5				40	40	10	10				Split
23	RF	25	5	125		2.0	1				90	10					Split
24	R3	10	6	60		3.0	1.5				90	10				Gr/Sh	
25	R1	15	5	75		3.0	1				90	10				Gr/Sh	
26	R2	10	10	100		1.0	1				90	10				Gr/Sh	
27	R2	28	5	140		3.0	1.5				90	10					Split
28	R3	25	6	150							90	10				Gr/Sh	
29	R3	15	6	90		4.0	1				90	10				Gr/Sh	
30	R2	115	8	920		23	16	1		10	80	10				Gr/Sh	
31	P3	5	5	25				3		80	20						Split
32	RF	55	9	495		1	1				90	10				Gr/Sh	
33	R3	25	10	250		2.5	1			40	60					Gr/Sh	
34	R1	155	10	1550		15.5	31			80	20					Gr/Sh	
35	R3	30	9	270		3	1.5			10	80	10				Gr/Sh	
36	R2	20	6	120		2	1			20	60	20				Gr/Sh	
37	RF	5	9	45							60	20	20			Gr/Sh	
38	R3	20	8	160		2	1				60	20	20			Gr/Sh	
39	P2	20	15	300		0.5	0.5			10	60	10	20			Gr/Sh	
40	RF	25	5	125		2.5	1		12.5		10	20	70			Gr/Sh	
41	R3	25	9	225		1	1		22.5		10	20	70			Gr/Sh	
42	R2	75	12	900		7.5	7.5			40	20	20	20			Gr/Exp	
43	R1	80	11	880		7.5	7.5			20	20	20	40			Gr/Exp	
44	RF	40	8	320		2	2				80	10	10			Gr/Sh	
45	R3	15	9	135		1	1			50	40	10				Gr/Sh	
46	R1	40	8	320		2	1			80	20					Gr/Sh	

Habitat Inventory

Date:	6-Aug-14
Project:	Little Bow River/Mosquito Creek - 2014
Stream Name:	Little Bow River
Section #:	7

Habitat units numbered from downstream to upstream

Habitat Unit		Physical Dimensions			Cover (m^2)					Substrate Composition					Unstable Bank (m)	Riparian Veg	Comments
#	Type	Length (m)	Width (m)	Area (m^2)	WD	OB	OV	AV	BL	FN	GR	CB	BL	BR			
1	RF	25	6	150	2.5	7.5	10	3		5	40	50	5			Gr/Sh	
2	R3	30	7	210	2	6.0	18	42		5	30	60	5			Gr/Sh	
3	R3	25	15	375		7.5	5	131.25		10	40	45	5			Gr	
4	R3	67	6	402		13.4	20.1	160.8		70	20	10					Split
5	R2	67	10	670			6.7	100.5		90	5	5				Gr	
6	R2	59	27	1593	1.5	5.9	17.7	477.9		100						Gr/Sh	
7	R2	140	40	5600		28.0	28	2520		95			5			Gr/Sh	
8	R2	113	25	2825	7	45.2	22.6	706.25		80	10		10			Gr/Sh	
9	F3	27	2.5	67.5			10.8	67.5		100							Split
10	R3	83	24	1992	1	8.3	33.2	796.8		50	10	30	10			Gr/Sh	
11	R3	50	15	750		10.0	10	225		10	25	50	15			Gr/Sh	
12	R2	55	14	770		16.5	11	231		15	30	50	5			Gr/Sh	
13	R3	17	17	289		3.4	6.8	101.15		25	10	60	5			Gr/Sh	
14	R2	28	15	420		5.6	2.8	63		5	15	75	5			Gr/Sh	
15	R2	97	18	1746			9.7	523.8		60	10	20	10			Sh/Gr	
16	R3	87	18	1566		8.7	17.4	391.5		55	25	15	5			Gr/Sh	
17	RF	76	13	988			30.4	148.2		15	15	60	10			Sh/Gr	
18	R3	72	11	792	0.5	3.6	14.4	198		30	15	50	5			Sh/Gr	
19	R2	86	13	1118		8.6	25.8	335.4		60	20	15	5			Sh/Gr	
20	R1	35	10	350		3.5	7	35		60	20	10	10			Sh/Gr	
21	RF	20	13	260			4	26		5	15	60	20			Gr/Sh	
22	R2	163	17	2771		48.9	65.2	692.75		40	20	30	10			Gr/Sh	
23	RF	20	11	220			4	11		20	10	60	10			Gr	
24	R1	82	8	656		8.2	32.8	65.6		90		5	5			Gr	
25	R3	22	4.5	99			8.8	29.7		10	10	70	10			Gr/Sh	
26	R1	10	2.5	25		2.0	2	1.25		20	20	55	5				Split
27	R3	34	10	340			13.6	68		10	20	65	5			Gr/Sh	
28	RF	64	10	640		6.4	12.8	64		10	40	45	5			Sh/Gr	
29	R2	95	13	1235			57	247		20	20	60				Sh/Gr	
30	RF	23	10	230			9.2	11.5		10	20	60	10			Gr/Sh	
31	R2	20	11	220			4	22		25	25	45	5			Gr/Sh	

APPENDIX E:
Mosquito Creek Fish Capture Data
Backpack Electrofishing

Appendix E-1
Section 1

Spring

Species	F.L. (mm)	Weight (g)	Comments
LNDC	63	2	
WHSC	228	146	
LNDC	66	3	
LNDC	68	3	
LNDC	59	2	
LNDC	54	1	
LNDC	59	2	
LNDC	57	1	
LNDC	76	6	
LNDC	52	1	
LNDC	61	2	
LNDC	60	2	
LNDC	49	<1	
LNDC	73	5	
LNDC	42	<1	
LNDC	57	<1	
LNDC	38	<1	
LNDC	48	1	
LNDC	66	4	
LNDC	57	1	
LNDC	41	<1	
LNDC	46	<1	
LNDC	42	<1	
LNDC	39	<1	
LNDC	37	<1	
WHSC	95	7	
LNDC	46	<1	
LNDC	38	<1	
LNDC	54	1	
LNDC	48	<1	
LNDC	53	1	
LNDC	50	1	
WHSC	64	4	

Additional Captures

Species	Number
LNDC	10

Appendix E-1
Section 1

Summer

Species	F.L. (mm)	Weight (g)	Comments
WHSC	303	408	
WHSC	287	264	
WHSC	252	185	
WHSC	183	26	
WHSC	105	17	
WHSC	134	21	
WHSC	150	47	
WHSC	148	43	
WHSC	170	62	
LNDC	50	61	
WHSC	117	23	
WHSC	41	61	
WHSC	98	12	
WHSC	130	32	
WHSC	131	32	
WHSC	102	13	
WHSC	127	24	
WHSC	88	9	
WHSC	109	17	
WHSC	88	9	
WHSC	123	21	
WHSC	125	27	
WHSC	99	15	
WHSC	93	14	
LNDC	43	<1	
LNDC	33	<1	
LKCH	37	<1	
WHSC	87	9	
WHSC	95	11	
LNDC	78	4	
WHSC	88	9	
WHSC	85	8	
WHSC	71	4	
WHSC	92	10	
WHSC	83	7	
LNDC	58	1	
LNDC	56	2	
LNDC	74	4	
LNDC	52	2	
LNDC	54	2	
LNDC	61	3	
LNDC	46	<1	
LNDC	60	2	
LNDC	22	<1	
LNDC	54	2	
LNDC	59	3	
LNDC	57	2	
LNDC	25	<1	

Additional Captures

Species	Number
WHSC	15

Appendix E-1
Section 1

Fall

Species	F.L. (mm)	Weight (g)	Comments
WHSC	303	408	
WHSC	269	240	
WHSC	266	178	
WHSC	274	254	
WHSC	268	171	
WHSC	243	162	
WHSC	236	209	
WHSC	190	88	
WHSC	111	15	
WHSC	110	12	
WHSC	67	3	
LNDC	61	3	
WHSC	61	2	
LNDC	58	2	
WHSC	73	3	
WHSC	80	7	
WHSC	94	10	
WHSC	67	3	
LNDC	31	<1	
WHSC	95	7	
WHSC	57	1	
WHSC	90	8	
WHSC	31	<1	
WHSC	63	3	
LNDC	21	<1	
WHSC	75	5	
LNDC	61	2	
LNDC	21	<1	
WHSC	84	8	
WHSC	90	9	
WHSC	80	9	
WHSC	78	4	
WHSC	63	3	
WHSC	63	3	
LNDC	66	3	
LNDC	33	<1	
LNDC	37	<1	
LNDC	48	1	
LNDC	34	<1	

Appendix E-2
Section 2

Spring

Species	F.L. (mm)	Weight (g)	Comments
LNDC	65	2	
LNDC	64	2	
LNDC	69	3	
LNDC	32	<1	
LNDC	54	1	
LNDC	63	2	
LNDC	73	6	
LKCH	115	17	
LNDC	54	2	
FTMN	67	6	
LNDC	68	5	
LNDC	84	9	
LNDC	67	6	
LNDC	58	2	
LNDC	44	1	
LNDC	34	<1	

Appendix E-2
Section 2

Summer

Species	F.L. (mm)	Weight (g)	Comments
LNDC	57	2	
LNDC	50	1	
LNDC	70	5	
LNDC	56	2	
LNDC	57	2	
LNDC	62	2	
LNDC	58	2	
LNDC	60	3	
LNDC	56	2	
LNDC	84	5	
LNDC	73	4	
LNDC	55	1	
LNDC	53	1	
LNDC	65	2	
LNDC	51	1	
LNDC	66	2	
LNDC	59	2	
LNDC	64	2	
LNDC	58	1	
LNDC	63	2	
LNDC	51	1	
LNDC	65	4	
FTMN	26	<1	
FTMN	25	<1	

Appendix E-2
Section 2

Fall

Species	F.L. (mm)	Weight (g)	Comments
WHSC	283	236	
WHSC	182	87	

Appendix E-3

Section 3

Spring

Species	F.L. (mm)	Weight (g)	Comments
WHSC	410	786	
WHSC	320	400	
LNDC	78	4	
LNDC	53	1	
LNDC	57	1	
LNDC	56	1	
LNDC	60	2	
LNDC	46	1	
LKCH	95	10	
LNDC	70	5	
LNDC	35	<1	
LNDC	41	<1	
LNDC	79	7	
LNDC	80	7	
LNDC	66	5	
LNDC	65	4	
LNDC	43	<1	
LNDC	66	4	
LNDC	51	1	
LNDC	59	2	
LNDC	53	1	
LNDC	44	<1	
LNDC	65	3	
LNDC	58	2	
LNDC	55	1	
LNDC	43	<1	
LNDC	35	<1	
LNDC	32	<1	
LNDC	63	3	
LNDC	58	2	
LNDC	58	2	
LNDC	54	1	
LNDC	42	<1	
LNDC	56	1	
LNDC	39	<1	
TRPR	55	1	
FTMN	62	4	
WHSC	175	53	

Additional Captures

Species	Number
LNDC	98

Appendix E-3

Section 3

Summer

Species	F.L. (mm)	Weight (g)	Comments
LNDC	80	5	
LNDC	60	2	
LNDC	50	1	
LNDC	65	3	
LNDC	55	1	
LNDC	60	2	
LNDC	75	4	
LNDC	83	6	
LNDC	84	4	
LNDC	51	1	
LNDC	65	2	
LNDC	45	<1	
LNDC	65	4	
LNDC	63	3	
LNDC	73	3	
LNDC	49	1	
LNDC	64	3	
LNDC	55	2	
LNDC	58	1	
LNDC	72	4	
LKCH	73	4	
LNDC	48	1	
LNDC	46	1	
LNDC	85	5	
LNDC	45	1	
LNDC	62	2	
LNDC	64	3	
LNDC	57	2	
LNDC	57	2	
LNDC	63	2	
LKCH	30	<1	
LNDC	77	4	

Additional Captures

Species	Number
LNDC	19

Appendix E-3
Section 3

Fall

Species	F.L. (mm)	Weight (g)	Comments
WHSC	193	91	
WHSC	256	198	
WHSC	127	33	
WHSC	127	40	
WHSC	268	254	
WHSC	163	69	
WHSC	212	132	
WHSC	187	84	
WHSC	196	92	
WHSC	242	186	
WHSC	213	128	
WHSC	147	42	
WHSC	185	81	
WHSC	98	16	
WHSC	122	26	
WHSC	120	18	
WHSC	89	8	
WHSC	117	13	
WHSC	96	11	
WHSC	88	9	
WHSC	94	8	
WHSC	66	4	
WHSC	51	2	
WHSC	39	<1	
LNDC	61	2	
LNDC	23	<1	

Appendix E-4
Section 4

Spring

Species	F.L. (mm)	Weight (g)	Comments
WHSC	340	617	
WHSC	181	75	
LNDC	87	9	
LNDC	58	1	
LNDC	82	4	
LNDC	70	3	
LNDC	80	7	
LNDC	81	9	
LNDC	74	6	
LNDC	58	2	
LNDC	51	1	
LNDC	61	3	
LNDC	75	3	
LNDC	65	3	
LNDC	61	2	
LNDC	56	2	
LNDC	39	<1	
LNDC	49	1	

Appendix E-4
Section 4

Summer

Species	F.L. (mm)	Weight (g)	Comments
WHSC	167	45	
WHSC	160	36	
LNDC	65	3	
LNDC	72	4	
LNDC	68	3	
LNDC	69	3	
LNDC	67	3	
LNDC	68	3	
LNDC	62	3	
LNDC	85	7	
LNDC	54	2	
LNDC	48	1	

Appendix E-4
Section 4

Fall

Species	F.L. (mm)	Weight (g)	Comments
WHSC	98	7	
WHSC	168	73	
WHSC	146	39	
WHSC	162	58	
WHSC	111	17	
WHSC	141	40	
WHSC	167	63	
LNDC	77	4	
LNDC	62	2	
LNDC	63	3	
LNDC	31	<1	
LKCH	46	1	
LKCH	44	<1	

Appendix E-5

Section 5

Spring

Species	F.L. (mm)	Weight (g)	Comments
LNSC	373	615	
WHSC	222	142	
WHSC	345	453	
LNDC	77	5	
LNSC	274	245	
MNSC	134	31	
WHSC	183	76	
LNDC	53	2	
LNDC	40	<1	
LNDC	63	2	
LNDC	54	2	
LNDC	33	<1	
LNDC	47	<1	
LNDC	59	3	
MNSC	110	17	
LKCH	79	7	
LNDC	53	2	
LNDC	50	2	
LNDC	47	1	
LNDC	49	1	
LNDC	39	<1	
MNSC	11	18	
LNDC	74	4	
LNDC	58	2	
FTMN	55	2	
MNSC	145	39	
LNDC	64	2	
LNDC	46	1	
LNDC	57	2	
LNDC	51	2	
LNDC	75	4	
LNDC	55	2	
LNDC	67	3	
LNDC	53	2	
MNSC	126	21	
LNDC	50	1	
LNDC	67	3	
MNSC	128	25	
LKCH	50	2	
LNDC	62	2	
WHSC	107	13	
LNDC	57	2	
LNDC	76	5	
LNDC	58	2	
LNDC	49	1	

Additional Captures

Species	Number
LNDC	3

Appendix E-5

Section 5

Summer

Species	F.L. (mm)	Weight (g)	Comments
WHSC	302	333	
WHSC	231	165	
WHSC	118	15	
MNSC	136	34	
LKCH	115	14	
WHSC	98	12	
MNSC	119	24	
WHSC	100	11	
MNSC	138	32	
LNDC	73	4	
LNDC	53	1	
LKCH	65	3	
LNDC	75	5	
LNDC	58	2	
LNDC	57	2	
LNDC	64	2	
LNDC	81	5	
LNDC	81	7	
LNDC	63	3	
LNDC	59	3	
LKCH	40	<1	
LNDC	60	3	
LNDC	59	3	
LKCH	46	2	
LNDC	53	2	
LNDC	74	5	
LNDC	53	3	
LNDC	53	2	
LNDC	51	2	
LNDC	54	2	
LNDC	58	3	
LNDC	48	1	
LNDC	49	1	
LNDC	49	1	
LNDC	53	2	
LNDC	45	1	
LNDC	58	2	
LNDC	64	3	
LNDC	53	2	
LNDC	55	2	
LNDC	52	2	
LNDC	55	2	
FTMN	54	2	
FTMN	49	1	

Additional Captures

Species	Number
LNDC	73

Appendix E-5
Section 5

Fall

Species	F.L. (mm)	Weight (g)	Comments
WHSC	251	215	
WHSC	273	250	
WHSC	264	189	
WHSC	181	77	
WHSC	130	33	
WHSC	108	17	
WHSC	106	14	
WHSC	246	38	
WHSC	193	81	
WHSC	102	12	
WHSC	144	36	
WHSC	99	12	
WHSC	85	8	
WHSC	170	59	
WHSC	103	13	
WHSC	184	74	
WHSC	77	6	
WHSC	98	13	
WHSC	85	8	
WHSC	109	17	
WHSC	117	137	
WHSC	194	99	
WHSC	153	44	
WHSC	99	14	
WHSC	122	25	
WHSC	155	43	
WHSC	176	59	
WHSC	125	24	
WHSC	129	28	
WHSC	123	23	
LNDC	72	3	
LNDC	62	2	
LNDC	87	6	
LNDC	83	7	
LNDC	68	4	
LNDC	57	2	
LNDC	58	2	
LNDC	59	3	
LNDC	75	6	
LNDC	55	2	
LNDC	49	1	
LNDC	52	1	
LNDC	75	4	
LNDC	80	6	
LNDC	83	7	
LNDC	58	2	
LNDC	52	1	
LNDC	77	8	
LNDC	68	4	
LNDC	54	2	
LNDC	34	<1	
LNDC	72	5	
LNDC	69	3	
LNDC	58	2	
LNDC	52	1	
LNDC	80	7	
TRPR	75	5	
TRPR	74	5	
FTMN	54	2	
FTMN	49	1	

Appendix E-5
Section 5

Fall

Species	F.L. (mm)	Weight (g)	Comments
FTMN	49	1	
RNTR	348	580	
LNSC	178	76	
LNSC	156	44	
LNDC	52	1	
LNDC	50	1	
LNDC	67	3	
LNDC	49	<1	
FTMN	44	1	
FTMN	56	3	
FTMN	45	1	

Additional Captures

Species	Number
LNDC	79
WHSC	60

Appendix E-6

Section 6

Spring

Species	F.L. (mm)	Weight (g)	Comments
WHSC	318	465	
WHSC	273	639	
WHSC	342	491	
WHSC	201	111	
WHSC	257	214	
WHSC	271	239	
WHSC	385	677	
WHSC	361	560	
WHSC	317	341	
WHSC	264	255	
WHSC	337	409	
WHSC	224	144	
WHSC	162	50	
WHSC	258	218	
WHSC	301	375	
WHSC	177	75	
WHSC	204	129	
WHSC	196	92	
WHSC	153	46	
LKCH	136	38	
LKCH	116	21	
LKCH	106	17	
LKCH	111	21	
FTMN	61	3	
LKCH	107	18	
WHSC	132	27	
WHSC	48	<1	
LKCH	122	25	
WHSC	54	2	
LKCH	87	9	
LKCH	103	12	
FTMN	72	5	
LKCH	106	15	
LKCH	122	27	
TRPR	64	3	
WHSC	142	38	
LKCH	118	24	
WHSC	144	36	
LKCH	84	10	
LNDC	61	3	
LKCH	104	15	
LKCH	83	9	
LKCH	98	13	
LKCH	113	18	
LNSC	70	4	
LNDC	76	6	
WHSC	62	2	
LKCH	86	8	
LKCH	84	9	
FTMN	44	<1	
LNSC	48	<1	
FTMN	52	2	
FTMN	33	<1	
FTMN	31	<1	
LNDC	62	3	
LNDC	52	1	
WHSC	57	3	

Appendix E-6

Section 6

Summer

Species	F.L. (mm)	Weight (g)	Comments
WHSC	367	654	
WHSC	367	641	
LKCH	73	5	Mort
WHSC	165	54	
WHSC	190	92	
WHSC	183	72	
LNSC	130	25	
LKCH	83	7	
LKCH	86	8	
WHSC	87	9	
WHSC	93	10	
WHSC	88	8	
WHSC	89	8	
WHSC	80	8	
FTMN	59	4	
LKCH	90	10	
WHSC	83	9	
LNDC	88	9	
LNDC	70	6	
LKCH	70	4	
LKCH	30	<1	
LKCH	61	3	
LNDC	60	3	
LNDC	50	1	
FTMN	50	1	
FTMN	53	2	
LNSC	142	30	Mort
WHSC	320	449	
WHSC	330	474	
WHSC	163	53	
LKCH	32	1	
BKST	43	1	
WHSC	94	10	
WHSC	95	11	
LKCH	106	14	
WHSC	36	<1	
LKCH	80	7	
LKCH	96	13	
WHSC	94	12	
LKCH	93	9	
LKCH	110	15	
WHSC	103	14	
FTMN	60	3	
LNDC	70	3	
LNDC	64	2	
LNDC	71	3	
LNDC	60	2	
FTMN	44	2	
LNDC	58	2	
LKCH	78	4	
LNDC	67	3	

Appendix E-6
Section 6

Fall

Species	F.L. (mm)	Weight (g)	Comments
WHSC	108	16	
WHSC	225	148	
WHSC	191	98	
LNSC	185	74	
WHSC	97	13	
WHSC	51	2	
WHSC	162	52	
WHSC	88	9	
FTMN	53	2	
WHSC	98	12	
FTMN	53	2	
FTMN	61	3	
LKCH	102	11	
FTMN	57	3	
FTMN	52	2	
WHSC	47	1	
LKCH	118	20	
WHSC	117	24	
WHSC	104	14	
BKST	49	1	
LNSC	135	32	
WHSC	109	19	
LKCH	61	2	
FTMN	61	3	
FTMN	47	1	
FTMN	58	3	
FTMN	48	1	
WHSC	102	12	
WHSC	112	19	
WHSC	115	13	
LKCH	127	28	
WHSC	84	7	
WHSC	76	5	
LKCH	113	17	
WHSC	98	13	
FTMN	45	1	
FTMN	63	3	
LKCH	101	14	
FTMN	51	2	
FTMN	52	2	
WHSC	103	12	
WHSC	98	13	
WHSC	99	12	
WHSC	95	10	
FTMN	60	3	
WHSC	100	13	
WHSC	95	11	
WHSC	97	13	
WHSC	83	7	
FTMN	46	1	
FTMN	59	3	
BKST	52	1	
WHSC	97	10	
WHSC	97	10	
WHSC	98	11	
LKCH	63	3	
WHSC	81	7	
WHSC	81	6	
FTMN	63	4	

Appendix E-6
Section 6

Fall

Species	F.L. (mm)	Weight (g)	Comments
FTMN	56	3	
WHSC	54	2	
BKST	59	2	
LKCH	98	12	
FTMN	46	1	
FTMN	27	<1	
FTMN	48	1	
LKCH	24	<1	
WHSC	100	13	
FTMN	47	2	
FTMN	68	5	
FTMN	53	3	
FTMN	46	1	
FTMN	47	1	
FTMN	31	1	
FTMN	47	1	
WHSC	49	1	
WHSC	106	16	
LNDC	68	3	

APPENDIX F:

Mosquito Creek

Habitat Inventory Data

Habitat Inventory

Date: 6-Aug-14
Project: Little Bow River/Mosquito Creek - 2014
Stream Name: Mosquito Creek
Section #: 1

Habitat units numbered from downstream to upstream

Habitat Unit		Physical Dimensions			Cover (m^2)					Substrate Composition					Unstable	Riparian	Comments
#	Type	Length (m)	Width (m)	Area (m^2)	WD	OB	OV	AV	BL	FN	GR	CB	BL	BR	Bank (m)	Veg	
1	RF	13	10	130			1.3	39			20	70	10			Gr	
2	R3	20	11	220			2	66		20	10	60	10			Sh/Gr	
3	R2	20	13	260			2	78		20	10	60	10			Gr	
4	R3	20	13	260		0.5		78		20	30	40	10			Gr	
5	F3	40	8	320		2.0	4	16		30	50	10	10			Gr	
6	F2	30	9.5	285		1.0	3			30	50	10	10			Gr	
7	F3	30	9	270			3			30	40	20	10			Gr	
8	RF	8	6	48			0.8	4.8				80	20			Gr	
9	F3	40	8	320			4	32		20	30	40	10			Gr	
10	F2	20	9	180			2	18	3	10	20	40	30			Gr	
11	R3	10	6	60			0.5	3	2	10	20	20	50			Gr	
12	F3	48	9	432			5	43.2		20	50	30				Gr	
13	RF	10	5	50				10				80	20			Gr	
14	R2	15	5.5	82.5			1.5	8.25		10	30	50	10			Gr	
15	F3	70	6	420			7	21		30	30	30	10			Gr	

Habitat Inventory

Date: 6-Aug-14
Project: Little Bow River/Mosquito Creek - 2014
Stream Name: Mosquito Creek
Section #: 2

Habitat units numbered from downstream to upstream

Habitat Unit		Physical Dimensions			Cover (m^2)					Substrate Composition					Unstable	Riparian	Comments
#	Type	Length (m)	Width (m)	Area (m^2)	WD	OB	OV	AV	BL	FN	GR	CB	BL	BR	Bank (m)	Veg	
1	R2	48	12	576	0.5	4.8	2.4	5.76		100					35	Sh/Gr	
2	R3	32	13	416		3.2	3.2	4.16		100					15	Sh/Gr	
3	R2	97	8	776		9.7	38.8	7.76		100					24	Sh/Gr	
4	R2	48	8	384		9.6	9.6	3.84		100					19	Gr/Sh	
5	RF	7	10	70			0.07	0.7		40	10	10	40		7	Gr	
6	P1	5	2.5	12.5		0.1	2.5	0.125		40		20	40		5		Split
7	R2	84	10	840		8.4	42	8.4		50	20	20	10		5	Gr/Sh	

Habitat Inventory

Date: 6-Aug-14
Project: Little Bow River/Mosquito Creek - 2014
Stream Name: Mosquito Creek
Section #: 3

Habitat units numbered from downstream to upstream

Habitat Unit		Physical Dimensions			Cover (m^2)					Substrate Composition					Unstable	Riparian	Comments
#	Type	Length (m)	Width (m)	Area (m^2)	WD	OB	OV	AV	BL	FN	GR	CB	BL	BR	Bank (m)	Veg	
1	R3	60	2.5	150		6	18	30		30	30	30	10		2		Split
2	R3	60	7	420		24.0	12	126		15	25	55	5			Gr	
3	P1	7	5	35			0.35	14		40	40	20			7		Split
4	RF	15	11	165		3.0	3	41.25		20	40	30	10			Gr	
5	R3	21	17	357		2.1	6.3	6.3		10	30	50	10			Gr/Sh	
6	R2	208	13	2704		20.8	20.8	405.6		80	10	5	5		75	Gr/Sh	
7	R1	15	4	60		1.5	1.5			80	10	10			15		Split

Habitat Inventory

Date: 8-Aug-14
Project: Little Bow River/Mosquito Creek - 2014
Stream Name: Mosquito Creek
Section #: 4

Habitat units numbered from downstream to upstream

Habitat Unit		Physical Dimensions			Cover (m^2)					Substrate Composition					Unstable	Riparian	Comments
		Length	Width	Area											Bank	Veg	
#	Type	(m)	(m)	(m^2)	WD	OB	OV	AV	BL	FN	GR	CB	BL	BR	(m)		
1	R2	75	12	900		1.5		3		50	30	20			15	Gr/Sh	
2	R2	23	5	115		0.8				60	30	10			3		Split
3	R3	23	5	115	0.2			0.5		60	30	10			12	Gr/Sh	
4	R3	18	14	252						55	30	10	5		3	Gr/Sh	
5	R1	40	10	400		2.0				55	30	10	5		10	Gr/Sh	
6	RF	7	9	63						25	40	10	25		2	Gr/Sh	
7	R2	18	9	162						25	60	10	5		3	Gr/Sh	
8	R3	45	4	180		1.5		1		15	55	25	5		10	Gr/Exp	
9	RF	5	2	10						10	55	35					Split
10	R3	5	2	10						30	50	20				Gr/Sh	
11	R3	15	4.5	67.5						30	50	20					Split
12	RF	15	8	120						25	40	10	25		7		Split
13	R2	20	7	140			1			40	50	10				Gr/Sh	
14	R1	20	3	60						50	40	10			20		Split
15	R2	20	8	160						40	50	10			20.0	Gr/Sh	

Habitat Inventory

Date: 8-Aug-14
Project: Little Bow River/Mosquito Creek - 2014
Stream Name: Mosquito Creek
Section #: 5

Habitat units numbered from downstream to upstream

Habitat Unit		Physical Dimensions			Cover (m^2)					Substrate Composition					Unstable	Riparian	Comments
		Length	Width	Area											Bank	Veg	
#	Type	(m)	(m)	(m^2)	WD	OB	OV	AV	BL	FN	GR	CB	BL	BR	(m)		
1	R2	35	6.5	227.5		1.75	3.5			40	10	30	20		12	Gr/Sh	
2	R1	5	5.5	27.5		0.5	0.5			40	10	30	20			Gr/Sh	
3	R2	80	8	640	0.5	1.0	2			40	50	10			15	Gr/Sh	
4	R1	30	10	300	1	0.5	1			60	40				25	Gr/Sh	
5	R3	15	7	105	0.5	1.0	0.5			15	80	5				Gr/Sh	
6	R2	20	7	140		0.5	1			20	75	5				Gr/Sh	
7	R3	20	6.5	130		1.0	1			20	40	20	20			Gr/Sh	
8	RF	25	10	250	0.5	1.0					85	10	5		15	Gr/Sh	
9	R2	40	8	320	1	1.5	0.5		3	20	20	20	40		20	Gr/Sh	
10	R3	35	8	280	0.5	0.5	0.5			20	70	10			25.0	Gr/Sh	
11	RF	5	10	50	0.5						80	20			5	Gr/Sh	
12	R2	15	12	180						50	50				30	Gr/Sh	
13	R1	45	10	450		2.0	1			70	30					Gr/Sh	

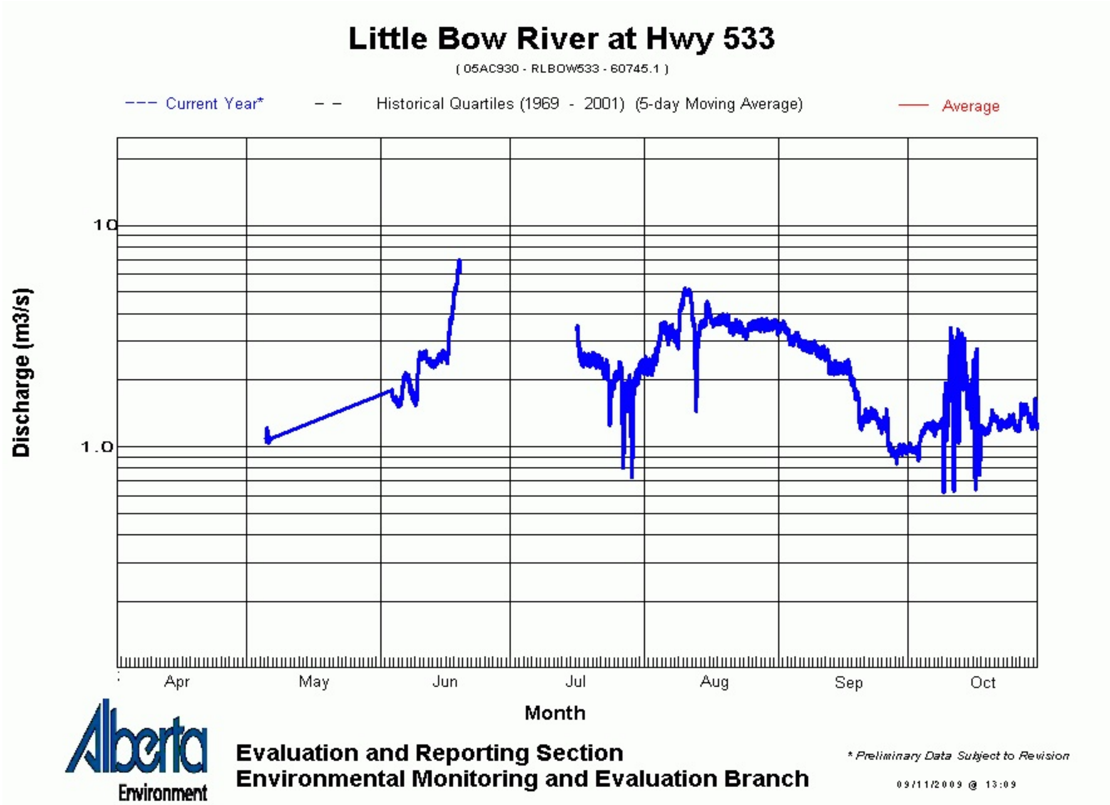
Habitat Inventory

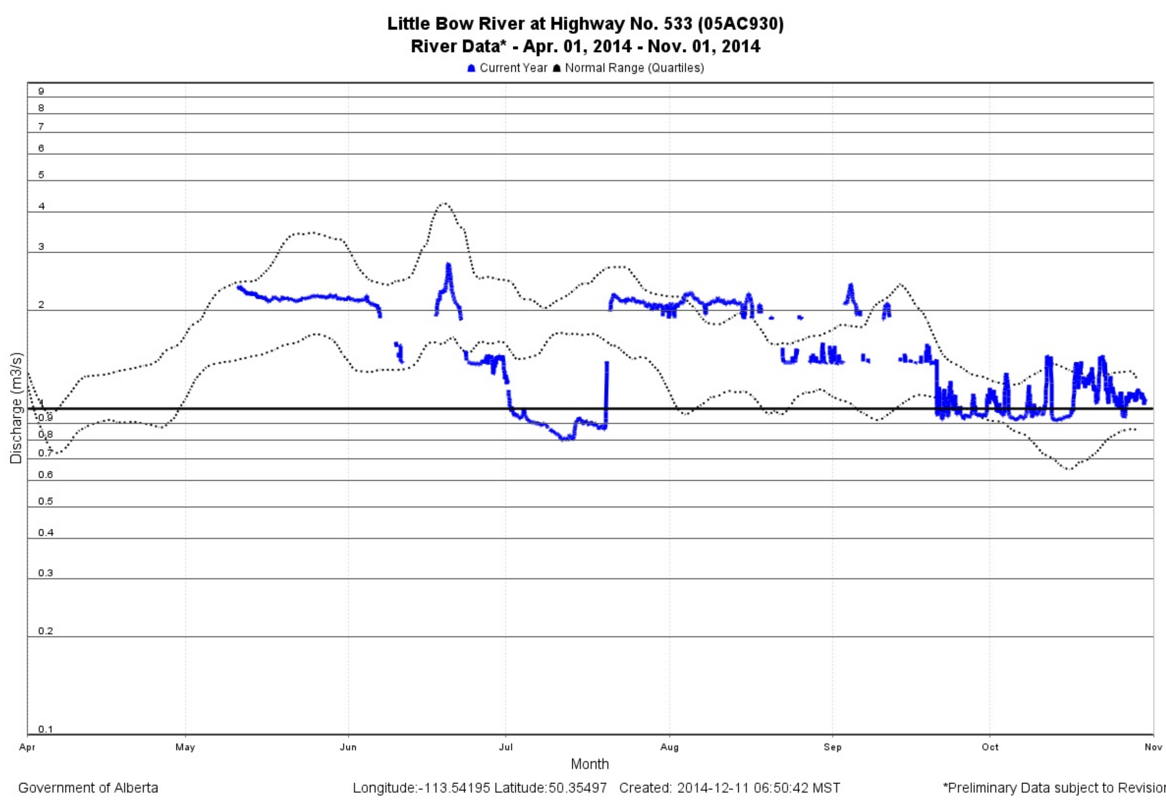
Date: 8-Aug-14
Project: Little Bow River/Mosquito Creek - 2014
Stream Name: Mosquito Creek
Section #: 6

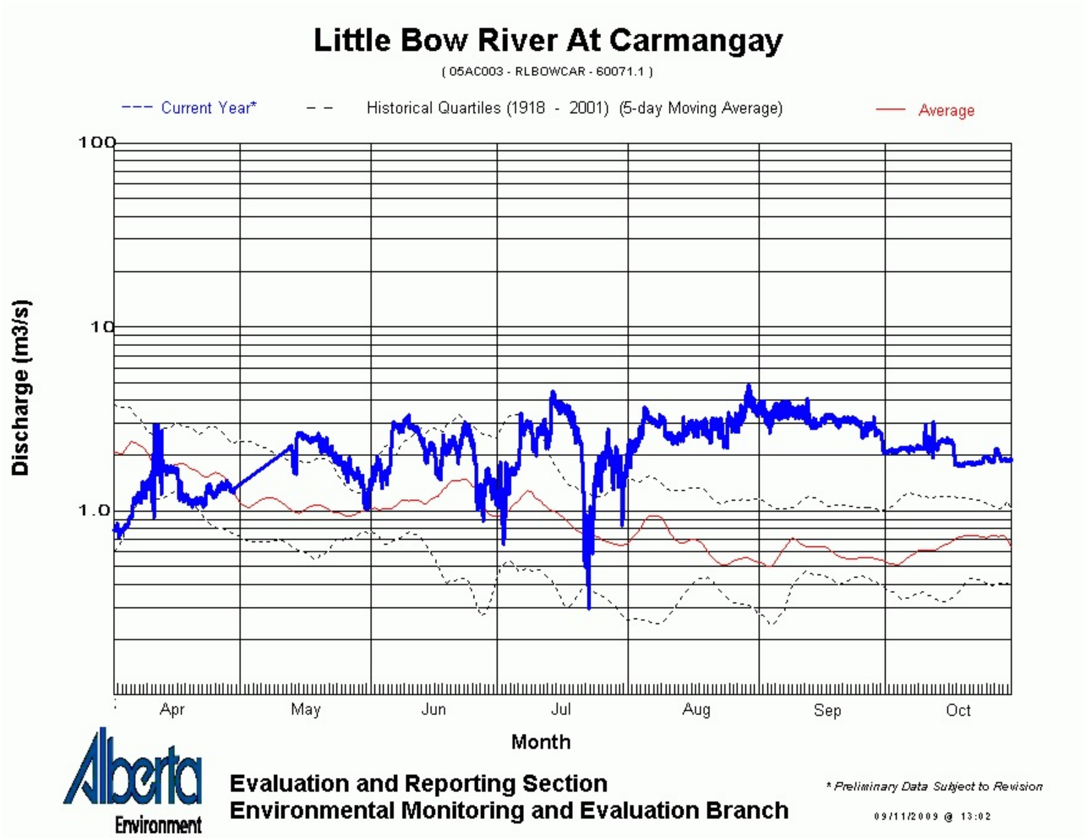
Habitat units numbered from downstream to upstream

Habitat Unit		Physical Dimensions			Cover (m^2)					Substrate Composition					Unstable	Riparian	Comments
		Length	Width	Area											Bank	Veg	
#	Type	(m)	(m)	(m^2)	WD	OB	OV	AV	BL	FN	GR	CB	BL	BR	(m)		
1	R2	80	3.5	280		8	24.0	28		95	3	2				Gr	
2	P1	20	8	160		1.0	3.0			60	40				15	Gr	
3	R2	86	4	344		8.6	17.2	17.2		80	20				18	Gr	
4	R3	15	4.5	67.5		1.5	3	6.75		90	10					Gr/Sh	
5	R2	160	4	640		16.0	32	32		40	40	15	5			Gr	
6	R3	15	6	90		1.0		4.5	4	40	40	10	10		6	Gr/Exp	

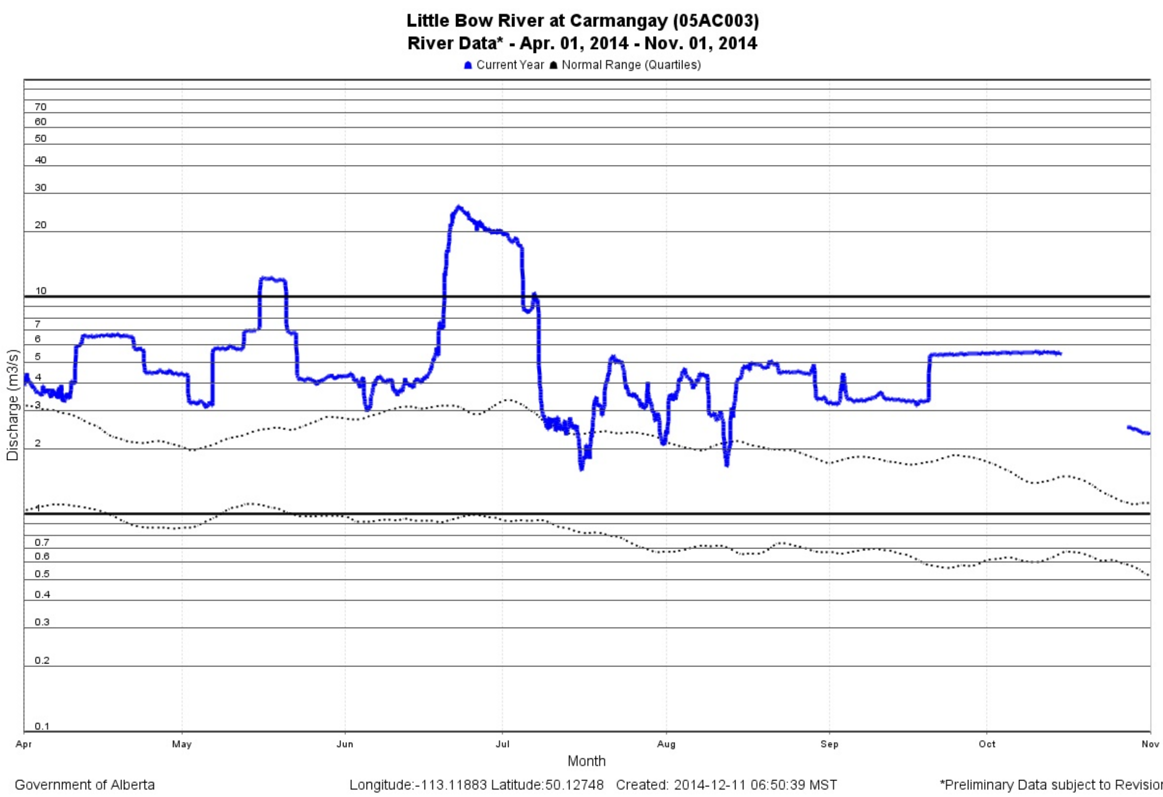
APPENDIX G:
Little Bow River/Mosquito Creek
Flow Data


Little Bow River at Hwy 533
(05AC930 - RLBOW533 - 60745.1)
Current Year*
Historical Quartiles (1969 - 2001) (5-day Moving Average)
Average
Discharge (m3/s)
10
1.0
Apr
May
Jun
Jul
Aug
Sep
Oct
Month
Alberta
Environment
Evaluation and Reporting Section
Environmental Monitoring and Evaluation Branch
* Preliminary Data Subject to Revision
09/11/2009 @ 13:09

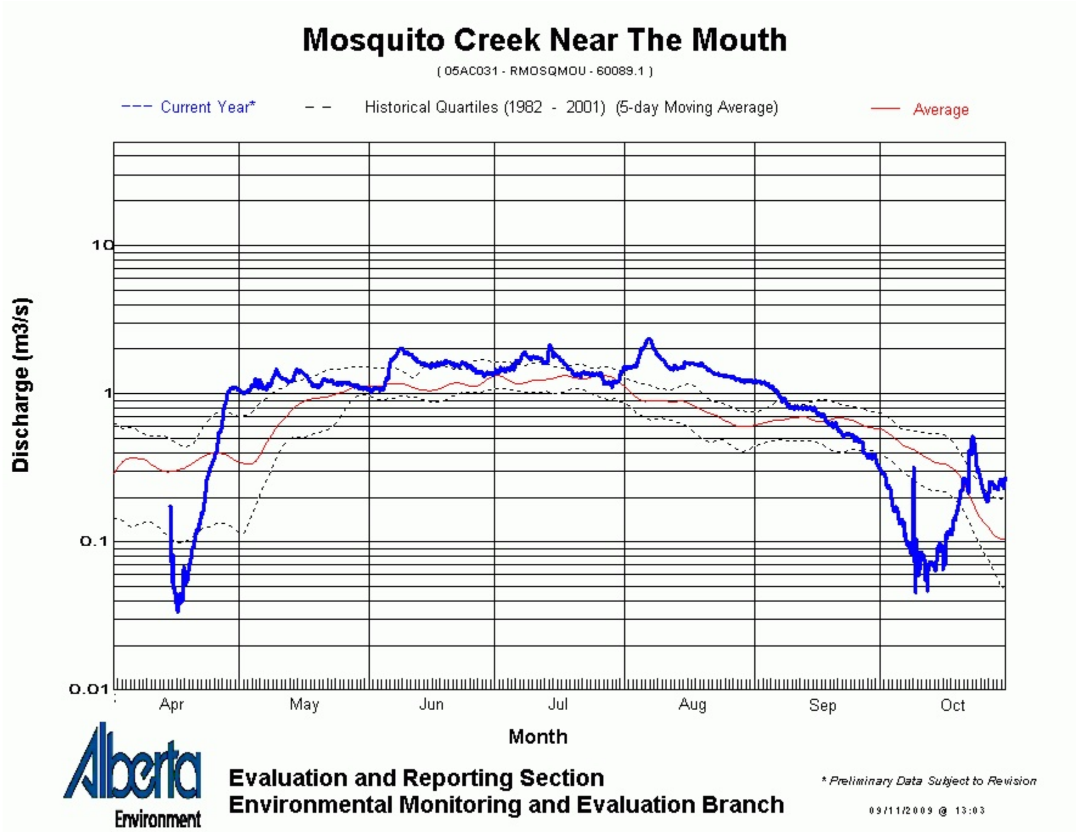

Little Bow River at Highway No. 533 (05AC930)
River Data* - Apr. 01, 2014 - Nov. 01, 2014
Current Year
Normal Range (Quartiles)
Discharge (m3/s)
9
8
7
6
5
4
3
2
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Month
Government of Alberta
Longitude:-113.54195 Latitude:50.35497 Created: 2014-12-11 06:50:42 MST
*Preliminary Data subject to Revision

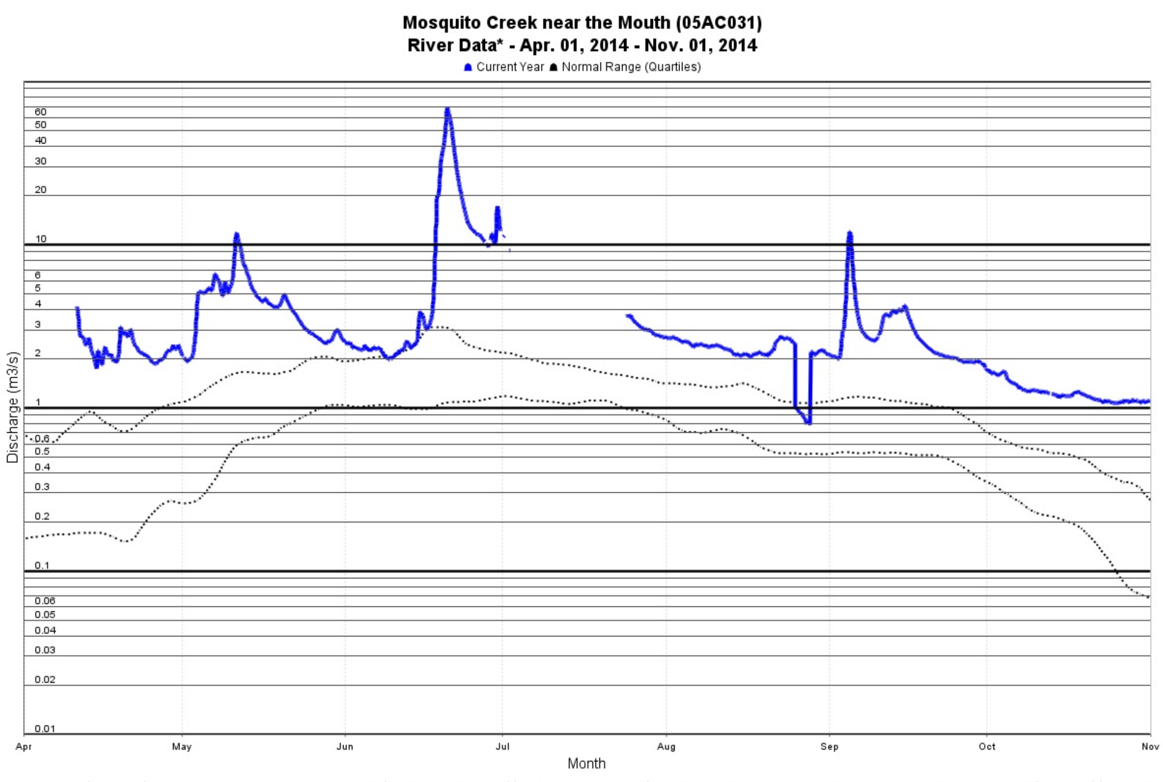


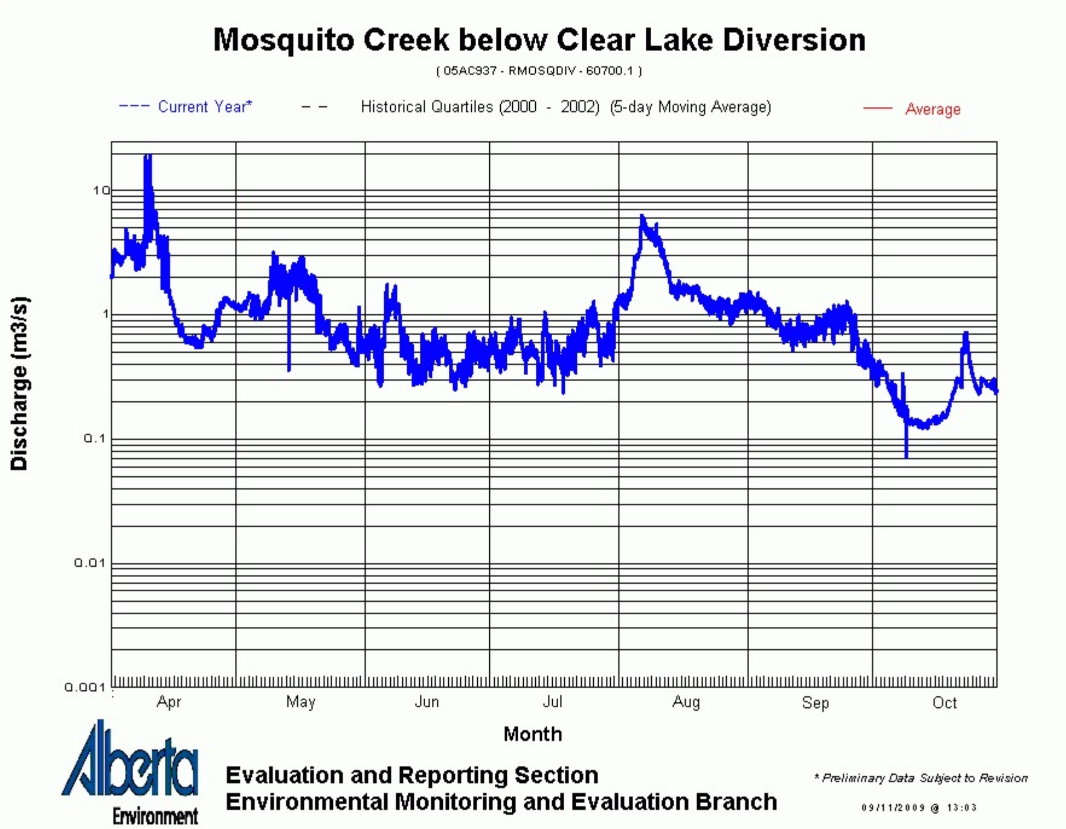
Little Bow River At Carmangay
(05AC003 - RLBOWCAR - 60071.1)
Current Year*
Historical Quartiles (1918 - 2001) (5-day Moving Average)
Average
100
10
1.0
Discharge (m3/s)
Apr
May
Jun
Jul
Aug
Sep
Oct
Month
Alberta
Environment
Evaluation and Reporting Section
Environmental Monitoring and Evaluation Branch
* Preliminary Data Subject to Revision
09/11/2009 @ 13:02



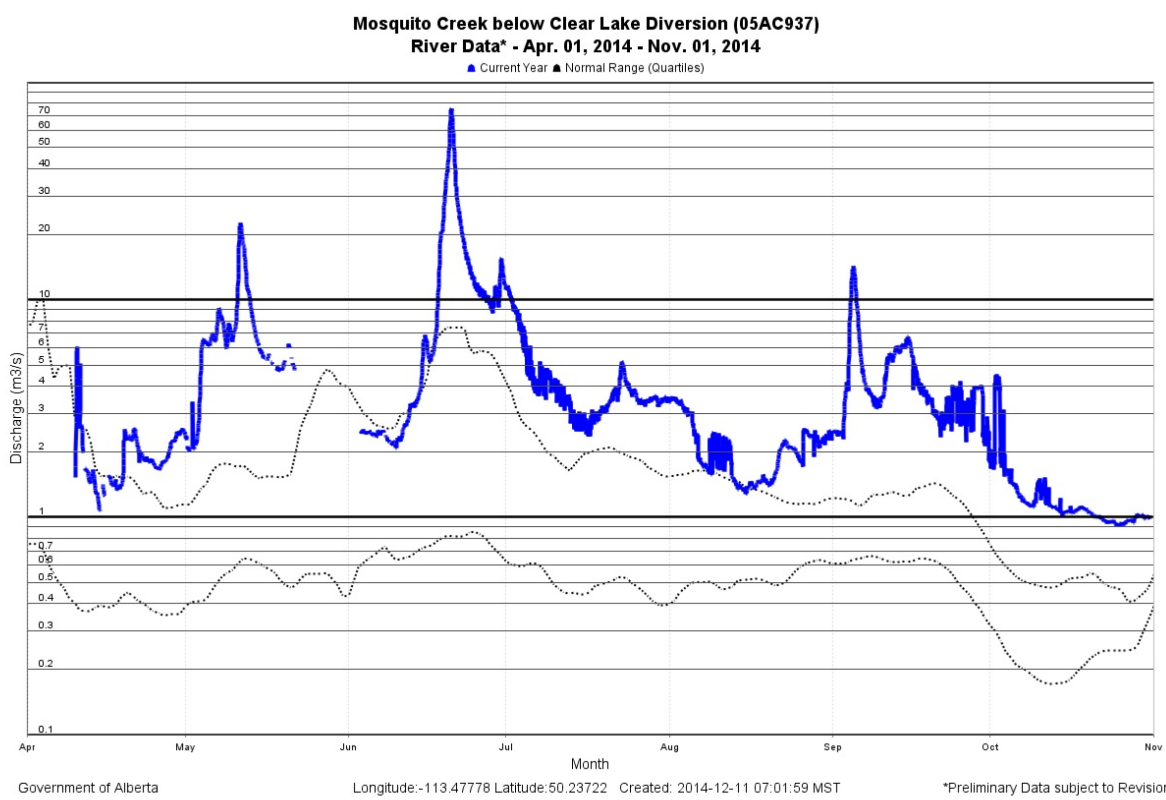
Little Bow River at Carmangay (05AC003)
River Data* - Apr. 01, 2014 - Nov. 01, 2014
Current Year
Normal Range (Quartiles)
Discharge (m3/s)
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Month
Government of Alberta
Longitude:-113.11883 Latitude:50.12748 Created: 2014-12-11 06:50:39 MST
*Preliminary Data subject to Revision


Mosquito Creek Near The Mouth
(05AC031 - RMOSQMOU - 60089.1)
Current Year*
Historical Quartiles (1982 - 2001) (5-day Moving Average)
Average
Discharge (m3/s)
10
1
0.1
0.01
Apr
May
Jun
Jul
Aug
Sep
Oct
Month
Alberta
Environment
Evaluation and Reporting Section
Environmental Monitoring and Evaluation Branch
* Preliminary Data Subject to Revision
09/11/2009 @ 13:03


Mosquito Creek near the Mouth (05AC031)
River Data* - Apr. 01, 2014 - Nov. 01, 2014
Current Year
Normal Range (Quartiles)
Discharge (m3/s)
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Month
Government of Alberta
Longitude:-113.55323 Latitude:50.25222 Created: 2014-12-11 07:02:01 MST
*Preliminary Data subject to Revision



Mosquito Creek below Clear Lake Diversion
(05AC937 - RMOSQDIV - 60700.1)
Current Year*
Historical Quartiles (2000 - 2002) (5-day Moving Average)
Average
Discharge (m3/s)
10
1
0.1
0.01
0.001
Apr
May
Jun
Jul
Aug
Sep
Oct
Month
Alberta
Environment
Evaluation and Reporting Section
Environmental Monitoring and Evaluation Branch
* Preliminary Data Subject to Revision
09/11/2009 @ 13:03



Mosquito Creek below Clear Lake Diversion (05AC937)
River Data* - Apr. 01, 2014 - Nov. 01, 2014
Current Year
Normal Range (Quartiles)
Discharge (m3/s)
70
60
50
40
30
20
10
7
6
5
4
3
2
1
0.7
0.6
0.5
0.4
0.3
0.2
0.1
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Month
Government of Alberta
Longitude:-113.47778 Latitude:50.23722 Created: 2014-12-11 07:01:59 MST
*Preliminary Data subject to Revision