

# **McCALL FISH HATCHERY**

**2003 Summer Chinook Salmon Brood Year Report**

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## ABSTRACT

The South Fork Salmon River trapping season began on June 25, 2003 with the weir installation and opening of the trap. Trapping operations concluded on September 12, 2003.

Chinook salmon *Oncorhynchus tshawytscha* spawning at the trap commenced on August 12 and concluded on September 9, 2003. A total of 8,098 returning Chinook salmon were trapped, measured, and recorded during this period. The overall average eye-up from eggs taken from the South Fork stock was 83.1%.

Of the 8,098 fish trapped 3,003 were females, 843 of which were ponded; 1,013 were released above the weir, while the remaining hatchery females were used for fishery recycle or subsistence giveaway. Twenty-one females died in the trap. The pre-spawn mortality for females was 45.9%. There were 3,301 adult males trapped, 1,205 of which were released above the weir, 1,105 were ponded for spawning, with the remaining hatchery males also used for fishery recycle or subsistence. The pre-spawn mortality for the males was 17.6%. There were 1,794 jacks trapped (according to length frequency criteria); 163 were released and 34 were used for spawning. Due to the high numbers of reserve adults and jacks, 2,124 were given to the tribes or charitable organizations.

Of the females ponded, 481 South Fork stock were spawned with an average fecundity rate of 5,401 eggs per female, resulting in 2,598,233 green eggs taken. There were 41 Johnson Creek females held and spawned, resulting in 126,900 eyed eggs. There were 317,500 eyed reserve eggs produced for the Sho-Ban tribal egg box program.

During the period of March 18 through March 21, 2005, 1,047,530 Brood Year 2003 smolts weighing 50,120 lbs were transported and released at Knox Bridge. Nez Perce tribal fishery personnel transported 105,230 Johnson Creek stock smolts to Johnson Creek for release.

There were 220,000 ad-clipped South Fork stock parr released at the trap site below the intake structure on September 23 and 24, 2004. These fish were determined to be in excess of our mitigation smolt release goal.

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## INTRODUCTION

McCall Fish Hatchery (MCFH) was built in 1979 as a result of the Water Resources Development Act enacted by Congress in 1976. A portion of this Act is the Lower Snake River Fish and Wildlife Compensation Plan (LSRCP). The LSRCP compensates Idaho for fish and wildlife losses caused by the Lower Snake River Projects (Ice Harbor, Lower Monumental, Little Goose, and Lower Granite dams). The MCFH was the first hatchery built as a partial fulfillment of the LSRCP. The US Fish and Wildlife Service (USFWS) administers funding for LSRCP to the Idaho Department of Fish and Game (Department).

The MCFH is located within the city limits of McCall, Idaho along the North Fork of the Payette River, approximately 0.16 km (1/4 mile) downstream from Payette Lake.

A satellite facility for trapping and spawning adult Chinook salmon *Oncorhynchus tshawytscha* is located on the South Fork Salmon River near Warm Lake, approximately 26 miles east of Cascade, Idaho.

The main production for MCFH is summer Chinook reared to smolt size. There is also a resident trout program funded solely by the Department.

The first salmon reared at the MCFH were transferred in from the Mackay Fish Hatchery and the Dworshak/Kooskia National Fish Hatchery complex. These eggs were the products of adult summer Chinook trapped at Little Goose and Lower Granite dams. The first eggs from the South Fork of the Salmon River were received in August 1980.

## OBJECTIVES

The mitigation goal is to return 8,000 adult summer Chinook salmon above Lower Granite Dam. The objectives of the MCFH are:

1. Restore summer Chinook salmon to the South Fork Salmon River; historically a major summer Chinook stream in Idaho.
2. Trap and spawn adult salmon returning to the South Fork Salmon River.
3. Raise 1,000,000 summer Chinook smolts for release into the South Fork Salmon River.
4. Work with management and research to identify optimum operating procedures for the MCFH.

## **FISH REARING FACILITIES**

The hatchery facility consists of six buildings on approximately 15 acres. The largest building consists of a shop, parking garage, incubation and early rearing area, generator room, and feed/freezer room. The office and a three-bedroom dormitory are contained in one building. There is a visitor center with restrooms, a flow chart for a self-guided tour, and historical information signs. There are three residences for permanent personnel also located on the site.

The fish production facilities include:

1. Twenty-six eight-tray stacks of FAL (Flex-A-Lite, Consolidated) vertical flow (Heath type) incubators.
2. Fourteen concrete vats 4-ft x 40-ft x 2-ft (water depth); 320 cubic feet of rearing area per vat.
3. Two concrete rearing ponds 196-ft x 40.5-ft x 4-ft (water depth); 23,814 cubic feet of rearing space per pond.
4. One concrete collection basin 101-ft x 15-ft x 4-ft (water depth). The hatchery is designed to raise a maximum capacity of 1,000,000 smolts, averaging 17 fish per pound.

An adult trapping and spawning facility is located on the South Fork of the Salmon River near Warm Lake. This facility is equipped with a removable weir, fish ladder, trap, two adult holding ponds (10-ft x 90-ft), and a covered spawning area. Water is supplied from the South Fork Salmon River through a 33-inch underground pipeline. Holding capacity for the facility is approximately 1,000 adult salmon. Some adults are passed above the weir to spawn naturally, with an additional group transported to Stolle Meadows for Idaho Supplementation research. Eggs collected at the facility are transported "green" to MCFH for incubation and rearing.

## **WATER SUPPLY**

Hatchery water is obtained by gravity flow from Payette Lake through a 36-inch underground pipeline. Water may be taken from the surface or up to a depth of 50 ft, providing the capability of obtaining optimum rearing water temperatures.

Through an agreement with the Payette Lake Reservoir Company, 20 cubic feet per second (cfs) of water flow is available for hatchery use. Design criteria and production goals were established using this constraint, ensuring the hatchery has enough water to meet its production goals.

Water quality analysis reveals a somewhat "distilled" system for rearing fish (Appendix 12). The pH stays about 6.8. There is no indication of problems with heavy metals and temperature is maintained at 52°F to 56°F, with a low of 37°F.

## STAFFING

The hatchery is staffed with three permanent employees: a Hatchery Manager II, an Assistant Hatchery Manager, and a Fish Culturist. In addition, there are five temporary employees to assist during the busy field season.

## TRAPPING AND SPAWNING

The 2003 trapping season started on June 25, with the ponds set up, water turned on in the fish ladder, and the weir installed. The first fish was trapped on June 27. Trapping continued through September 12, 2003. Normal trap installation is usually around June 20 with the fish arriving shortly thereafter. The peaks of the run for 2003 were July 3, July 14, and August 28.

There were 8,098 fish trapped; 3,003 (37.1%) were females and 5,095 (62.9%) were males. A total of 1,794 male fish (22.1%) were jacks (three-year-old fish) according to length frequency criteria. There were 1,013 females, 1,205 adult males and 163 jacks released upstream of the weir.

Trap data obtained from the fish included fork length, sex and mark type. All fish were also checked for internal and external tags.

The run was comprised of 6,603 marked (81.5%) and 1,495 (18.5%) unmarked fish. Of the 5,698 adipose-fin-clipped reserve fish trapped, 305 (5.4%) were noted as having a partial adipose fin. In addition, there were 181 (29 females and 152 males) previously trapped and released adipose clipped fish that were re-trapped. Re-trapped fish numbers were down from last year (281). Of the tags recovered or detected, 299 were Passive-Integrated-Transponder (PIT) tags, 1,205 Coded-Wire-Tag (CWT), 21 jaw tags, and 12 radio tags. The CWTs recovered were from the fishery and the trap.

A total of 80 CWTs were detected in unclipped fish. These were either supplementation fish released by the Nez Perce tribe as parr in 1998 (100% CWT w/o fin clip) or supplementation fish reared through parr in the Stolle acclimation pond (100% CWT w/o fin clip). These fish were recorded as unmarked fish in the database. Detection and recovery of the tags was important to identify potential year class survival and differentiate between the two parr release groups.

A total of 299 PIT tags were detected during trapping operations this year. A new passive method of detecting tags was implemented to reduce handling time and increase detection rates. A few problems with poor detection of test tags did arise, but were solved with adjustments being made to the tuning box connected to the antenna. The reader box was linked directly to a laptop computer this season, improving tag recording procedures.

The jaw tags recovered were part of a tangle net study on the Columbia River being performed by the Washington Department of Fish and Wildlife (WDFW). The radio tags detected were part of a migration study on adult salmon in the lower Snake and Salmon rivers conducted by the University of Idaho. The age-class determination by length frequency was

used at the trap site during initial trapping. The CWT recovery data using R-mix show an overlap of age-classes originally determined using length frequency (Appendix 1).

Fork lengths were taken on all of the fish trapped, and all of the adult fish were injected with Erythromycin (Erythro 200) at a rate of 10 mg/kg.

Of the total number of fish released 2,381 (1,205 males, 1,013 females, 163 jacks) were released above the weir at the time of trapping. The percent release for unmarked males and females was 61.3% and 63.3%, respectively. A 1:1 ratio was required by the National Marine Fisheries Service (NMFS) in the Department's trapping permit. There were 1,318 reserve fish transported to a site near Dollar Creek and a site upstream of Goat Creek to be recycled through the fishery. ShoBan tribal representatives received 317,500 eyed reserve eggs from McCall Hatchery for placement into instream egg incubation boxes located in the South Fork Salmon River drainage. There were 2,124 reserve adult and jack salmon killed for consumptive purposes and given to tribal and non-profit organizations

A total of 2,356 SFSR stock adults were held for hatchery production. Pre-spawn mortality was 45.9% for the females and 17.6% for the males. It is likely that low water conditions, in conjunction with warmer water temperature, contributed to the increased mortality rate. Nez Perce fisheries personnel held 79 summer Chinook salmon trapped from Johnson Creek on site at the South Fork trap, 41 females and 38 males (3 jacks). These fish were initially held with the South Fork stock. At primary sort, Johnson Creek males were moved into a circular holding tank. This was done to eliminate the need for excess sorting of South Fork males during spawning. Johnson Creek females were held along with SFSR females throughout spawning. All Johnson Creek fish were uniquely marked to distinguish them from South Fork stock. Multiple marks were used to ensure positive identification. A total of 126,900 green eggs were collected from 25 females. There were no females culled due to high BKD ELISA values. Eye-up was 80.4% and fecundity was 5,076 eggs per female. Spawning operations began on August 12 and concluded on September 9 2003. Tuesdays and Fridays were reserved for spawning. A total of 9 spawn days were needed to spawn 481 South Fork females, resulting in 2,598,233 green eggs.

Spawning procedures remained relatively consistent with recent years. Reserve fish were spawned with reserve fish. When possible, hatchery staff tried to spawn unmarked fish with ventral clips (supplementation). However, due to the difficulty in finding suitable males, ventral fish were at times spawned with other ventral fish and unmarked with unmarked. All spawned out carcasses were returned to the river. Approximately 34 jacks were used in the spawning process. The eggs from one female were halved into two colanders and fertilized with two males, producing a male to female ratio of 2 to 1. The colanders were then placed in activation buckets for approximately two minutes. The eggs were then recombined and placed in a 100 ppm iodine solution and allowed to harden for one hour. After hardening, the eggs were placed in numbered egg tubes and packed in coolers for transportation back to the hatchery.

Reserve females were double-loaded into hatchery incubation egg trays. Eggs from the Johnson Creek stock were single-loaded. This was done to allow eggs from listed fish to be culled individually if needed. Ovarian fluid was collected from a sample of females by pathology personnel and tested for viruses. Kidney samples were collected from all spawned females to assess BKD levels through ELISA testing. ELISA optical density values of 0.25 or greater were considered high positive for bacterial kidney disease. Females with values of 0.125 or greater were culled out from the population. A total of 57 females returned ELISA values of 0.125 or

greater. Six hatchery females were culled during spawning operations. Trays with double females lost two fish, bringing the total effective number of females culled to 100. Overall average fecundity was 5,401 eggs/female and average eye up was 83.1 %.

Incubator flows were set at a five gallon per minute (gpm) rate, and incubators were loaded at two females per tray due to space concerns. The eggs were treated with 1,667 ppm of formalin for 15 minutes starting three days after fertilization and continuing on a daily basis until the eggs started to hatch.

Eggs eyed-up at approximately 600 thermal units (TUs) and were then shocked, picked and enumerated. Hatching began at approximately 925 TUs.

## **FISH PRODUCTION**

### **Early Rearing**

Fry were sent out to the concrete vats approximately three days prior to initial feeding. Initial feeding begins between 1,750 and 1,775 TUs. Flows for the vats are set at 80 gpm and are loaded at 30,000 to 55,000 fish per vat, depending on the number of fish on hand. The vats start at half length and are extended to full length when the density index (DI) reaches 0.30 to 0.35, usually around mid-February.

Beginning growth rates are slow, only 0.003 to 0.004 inch per day, due to cold water temperatures of only 37°F to 39°F. The fry are started on BioDiet #2 and #3 feed and remain on #3 until they reach 700 fish per pound (fpp). BioDiet feed has been used successfully at MCFH, using modified feed rates. The conversion rates average 1.1:1 to 1.5:1 during the fry-rearing stage.

Fish are moved to the outside rearing ponds mid-June and mid-July. They are adipose clipped, ventral clipped and coded wire tagged (CWT), and enumerated as they are moved to the ponds. There was a 19.9% increase in production numbers, determined at marking, resulting in 220,000 excess parr to be stocked in late September 2004. By the end of September, there were 1,049,708 fish on station. There also 105,851 Johnson Creek stock for Nez Perce tribal releases in to Johnson Creek. (Appendix 13).

## **FISH HEALTH**

### **Diseases Encountered and Treatment**

No epizootics were encountered during the rearing cycle that ended with release in the spring of 2005 for the Brood Year 2003 South Fork and Johnson Creek summer Chinook programs. Two prophylactic treatments of erythromycin-medicated feed were applied to Chinook to control *Renibacterium salmoninarum*, the causative agent of Bacterial Kidney Disease, at target dose of 100 mg/kg for 28 days. Adult Chinook entering the South Fork trap were given an intra-peritoneal injection of erythromycin at a target dose of 20 mg/kg.

Renibacterium was detected during routine brood stock inspections at the South Fork Trap. Eggs from females with ELISA optical densities greater than 0.25 were culled from production in both the South Fork summer Chinook and the Johnson Creek summer Chinook

### **Organosomatic Index**

See attachments.

### **Acute Losses**

No acute losses were experienced at this facility during this reporting period.

### **Other Assessments**

Infectious Hematopoietic Necrosis Virus (IHNV) seems to be increasing in the anadromous stocks in the Pacific Northwest. We have seen increased detection in Idaho stocks. In 2004 and early in 2005, IHN caused mortality in the Brood Year 2003 and Brood Year 2004 Pahsimeroi summer Chinook. Awareness, prevention, and disinfection will be the key to controlling this etiologic agent. No IHNV was detected during routine inspections of brood females at the South Fork Trap.

### **FISH MARKING**

The fish marking crew was here in June and July and marked approximately 1.36 million fish. These fish receive Ad clips, CWT/Ad-clips, and CWT only.

The marking crew returned in February and Passive Integrated Transponder (PIT) tagged 74,804 fish. The breakdown of tagged released fish appears in Appendix 13.

### **FISH DISTRIBUTION**

The Brood Year 2003 smolt hauling operation began on March 18 and concluded the evening of March 21. Approximately twenty-eight loads of fish were hauled in four days. The river conditions were clear and low at the time of release. All together, 1,047,530 Brood Year 2003 smolts at 20.9 fpp totaling 50,120 lbs released. On September 23 and 24, 2004, 220,000 pre-smolts weighing 6,760 lbs were released at the trap intake on the South Fork of the Salmon River (Appendix 8).

Nez Perce Tribal fishery personnel transported 105,230 smolts to Johnson Creek on March 14-16, for release.

## **EXPERIMENTS**

The supplementation research did not carry over to the Brood Year 2003 Chinook. Approximately half of the reserve stock received two prophylactic medicated feed treatments for BKD; the other half received only one. There was no noticeable difference noted of BKD prevalence in either group.

## **CONCLUSIONS**

The Brood Year 2003 summer Chinook released from MCFH were in excellent condition at release time. The culling program utilized on the BKD high-positive eggs had a positive effect on the overall health and condition of the fish. The release pipe and tempering pump were utilized again this year. The fish transport and stocking went smoothly despite slick snowy roads and adverse weather conditions.

## **RECOMMENDATIONS**

Low phosphate feed with a higher vitamin pack was utilized during the peak rearing cycle with no adverse effects noted. It is recommended to continue to utilizing low phosphate feed. All Chinook eggs that tested high-positive for BKD were culled this year and this procedure should be continued as egg numbers will allow. The gabion baskets need to be replaced to make a stable footing for the weir as the existing ones have rotted out over time. The entire asphalt driveway for the hatchery is in need of extensive repair or replacement.

## **APPENDICES**

Appendix 1. Age distribution of 2003 summer Chinook returns to McCall Fish Hatchery, South Fork Salmon River, based on CWT and length frequency data.

Age	Males		Females	
	CWT* Estimate	Length/frequency Estimate	CWT Estimate	Length/frequency Estimate
3	1,771	1,794	0	0
4	1,567	1,779	1,416	1,885
5	1,757	1,522	1,587	1,118
<b>Totals</b>	<b>5,095</b>	<b>5,095</b>	<b>3,003</b>	<b>3,003</b>

\*CWT data based on 1,205 snouts recovered at the trap and from the fishery using R-mix. Length data is taken at trapping prior to first sort (Historical Breakdown).

Historical Age-class breakdown

66 cm = three-year-olds, jacks  
 67-89 cm = four-year-olds  
 90 cm = five-year-olds

R-Mix Length frequency

64 cm = three-year-olds  
 65-86 cm = four-year-olds  
 >86 cm = five-year-olds

Appendix 2. Lengths of brood year 2003 fish trapped at McCall Hatchery.

<b>Fork Length (cm)</b>	<b>Males</b>	<b>Females</b>
40	1	0
41	3	0
42	1	0
43	5	0
44	10	0
45	10	0
46	29	0
47	30	0
48	48	0
49	70	0
50	119	0
51	116	0
52	161	0
53	187	0
54	185	0
55	141	0
56	175	0
57	124	0
58	126	0
59	79	0
60	60	0
61	28	0
62	34	0
63	17	0
64	17	0
65	7	0
66	11	1
67	11	1
68	10	3
69	13	3
70	24	9
71	30	11
72	40	20
73	55	30
74	70	38
75	86	60
76	86	102
77	111	122
78	159	113
79	139	134
80	123	175
81	116	121
82	133	127
83	125	107
84	101	102
85	82	72

## Appendix 2. Continued.

<b>Fork Length (cm)</b>	<b>Males</b>	<b>Females</b>
86	79	111
87	65	112
88	63	137
89	58	174
90	56	191
91	70	197
92	64	179
93	87	178
94	88	114
95	106	94
96	104	56
97	96	51
98	117	24
99	129	17
100	146	7
101	87	6
102	102	2
103	65	1
104	55	0
105	51	0
106	40	0
107	20	0
108	13	0
109	15	0
110	7	1
111	3	0
115	1	0

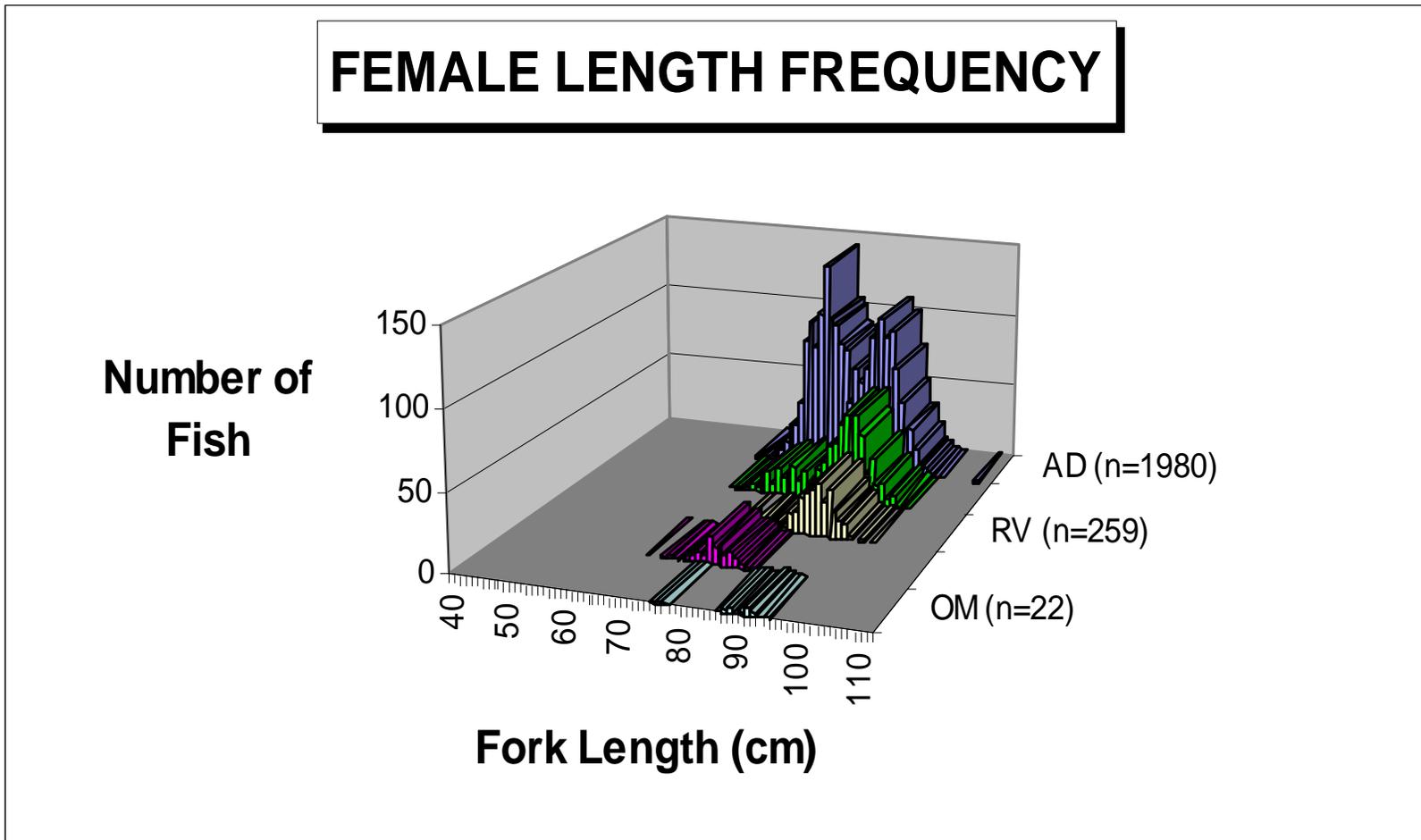
Appendix 3. Length frequency of Brood Year 2003 summer Chinook trapped at the South Fork Salmon River trap according to mark type.

RV	OM	NO	Sum F	Male			RV	OM	NO	Sum M	TOTAL
				AD	LV						
			0	1					1	1	
			0	3					3	3	
			0					1	1	1	
			0	5					5	5	
			0	9				1	10	10	
			0	10					10	10	
			0	25			2	2	29	29	
			0	27			1	1	30	30	
			0	43			2	2	48	48	
			0	63			2		70	70	
			0	110			4		119	119	
			0	105			8	1	116	116	
			0	145			8	1	161	161	
			0	164			10	3	187	187	
			0	162			11	2	185	185	
			0	135			3		141	141	
			0	159			10	3	175	175	
			0	116			3	2	124	124	
			0	120				2	126	126	
			0	74			3		79	79	
			0	55			3		60	60	
			0	28					28	28	
			0	33					34	34	
			0	12					17	17	
			0	14				1	17	17	
			0	5			2		7	7	
			1	7					11	12	
			1	6					11	12	
		2	3	3	1				10	13	
		1	3	8				1	13	16	
		1	9	14	1				24	33	
		2	11	18		2			30	41	
		5	20	20	2		1		40	60	
		4	30	31	3				55	85	
		11	38	48	5		1		70	108	
		14	60	61	4		1		86	146	
1	1	7	102	57	8				86	188	
	1	17	122	80	8				111	233	
	1	12	113	122	7				159	272	
2		15	134	114	6				139	273	
2		20	175	90	10		1		123	298	
		11	121	95	3				116	237	
2		17	127	105	12				133	260	
4		10	107	110	4				125	232	
2		14	102	79	9	1			101	203	
4		20	72	65	7		1		82	154	
13		25	111	62	8		1		79	190	
14	1	36	112	41	6	3			65	177	
24	2	39	137	45	5	1	3		63	200	
27	3	51	174	35	3	7	1		58	232	
30	1	58	191	34		6			56	247	
34	2	54	197	43	1	9	1		70	267	
22	5	59	179	36	2	8			64	243	
31	3	46	178	51		13			87	265	
18	1	21	114	41	1	16	4		88	202	
12	1	31	94	55		14	3		106	200	
11		14	56	49		18	1		104	160	
3		16	51	57		19			96	147	
		5	24	63		17	5		117	141	
2		8	17	67		28	2		129	146	
		1	7	68		30	3		146	153	
1		3	6	39		21			87	93	
		1	2	39		26	2		102	104	
			1	36		7			65	66	
			0	23	1	15			55	55	
			0	21		12	4		51	51	
			0	26		7			40	40	
			0	11		2	1		20	20	
			0	8					13	13	
			0	6		1	1		15	15	
			1	4		1			7	8	
			0	1		2			3	3	
			0	1					1	1	
259	22	651	3003	3718	117	358	58	844	5095	8098	

Appendix 4a. South Fork Salmon River female length frequency graph Brood Year 2003.

mc03by.doc

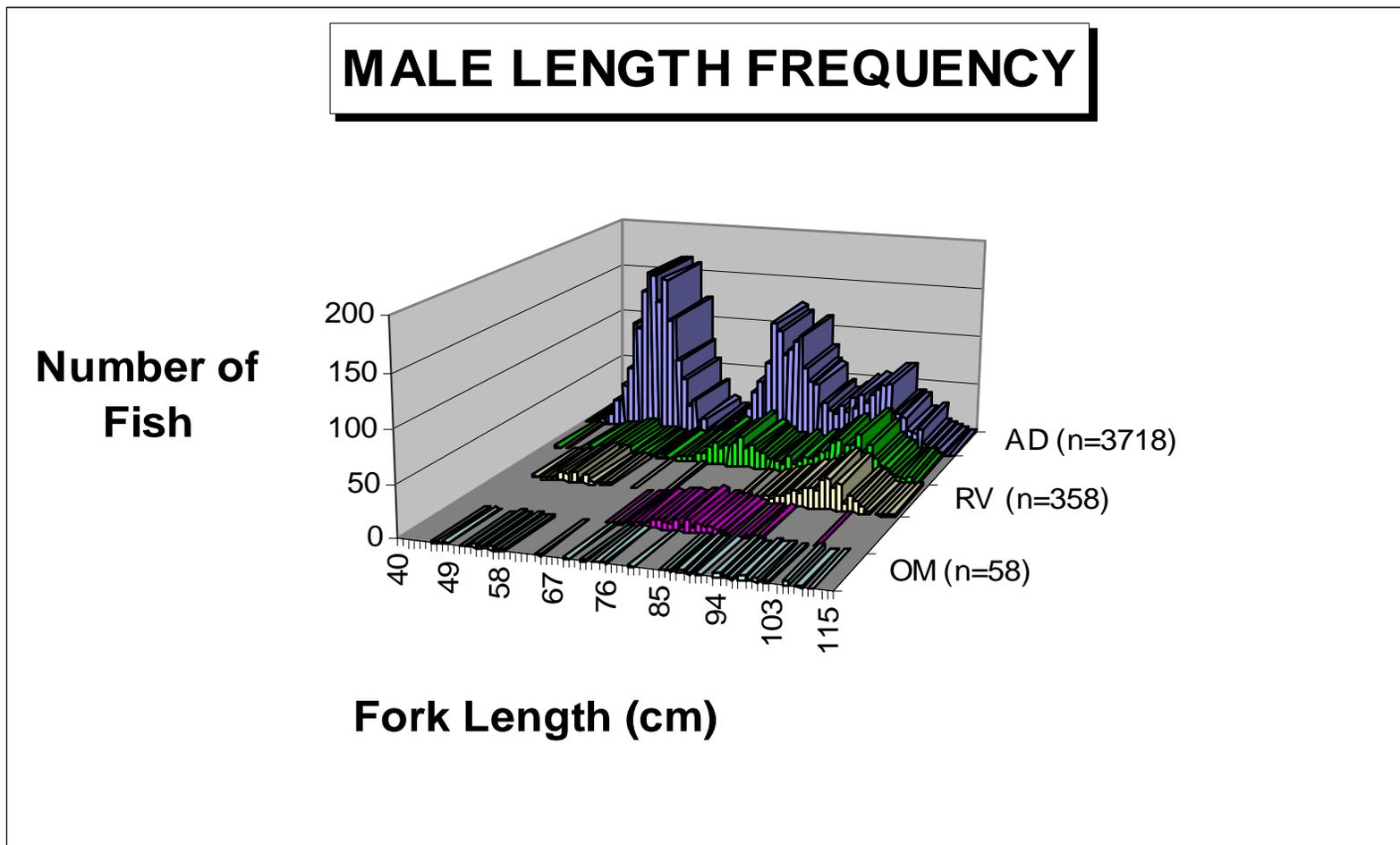
14



Appendix 4b. South Fork Salmon River male length frequency graph Brood Year 2003.

mc03by.doc

15



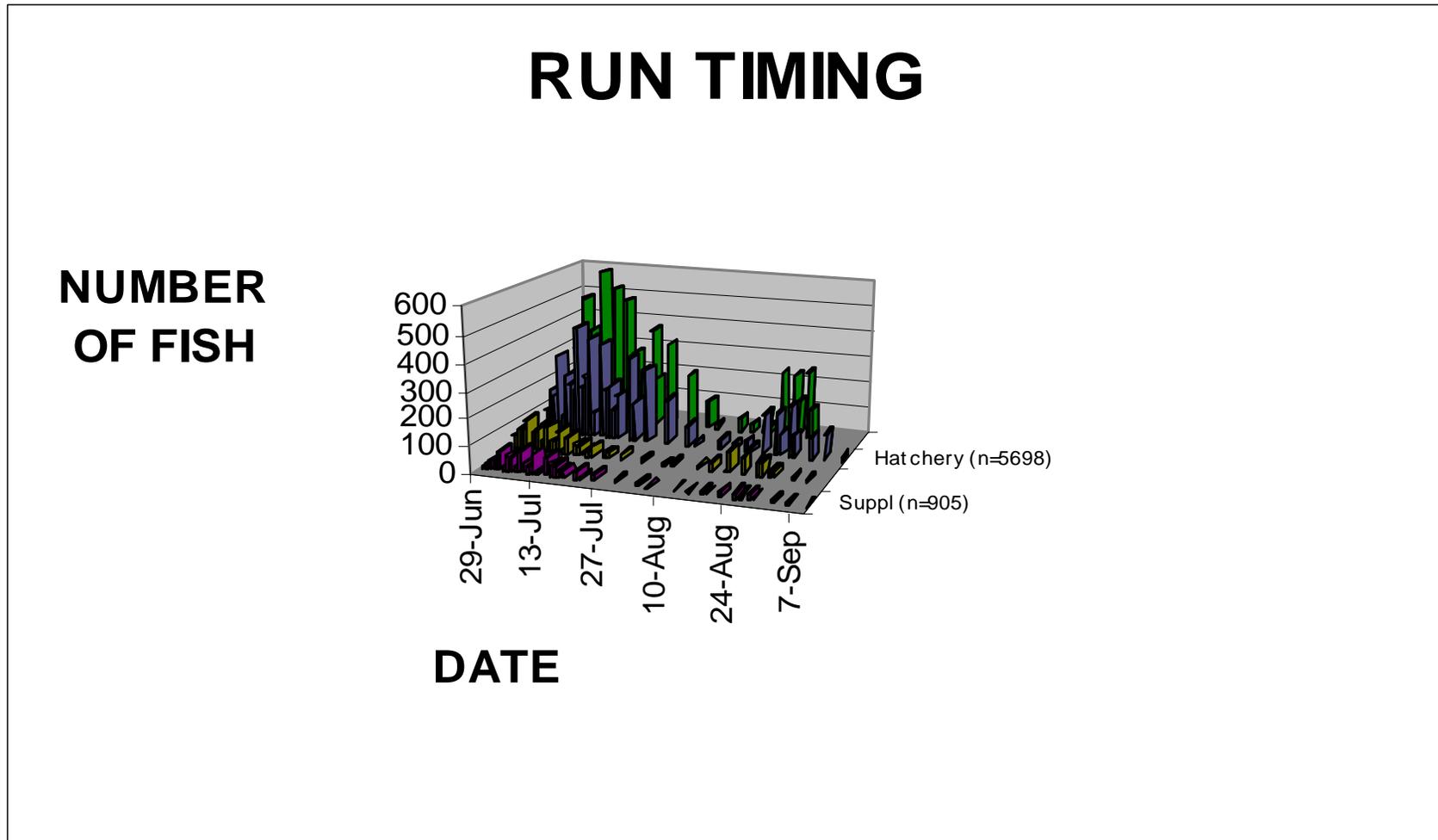
Appendix 5. McCall Fish Hatchery 2003 summer Chinook run timing, South Fork Salmon River

<b>Date</b>	<b>Number Trapped</b>
6/27	1
6/28	0
6/29	64
6/30	144
7/1	276
7/2	261
7/3	482
7/4	99
7/5	354
7/6	334
7/7	238
7/8	593
7/9	267
7/10	307
7/11	529
7/12	117
7/14	486
7/15	263
7/16	279
7/17	150
7/18	209
7/21	373
7/22	179
7/25	327
7/30	203
8/4	105
8/6	17
8/12	51
8/15	32
8/18	77
8/19	23
8/22	246
8/25	243
8/26	141
8/28	261
8/29	113
9/2	116
9/5	120
9/9	18
<b>Totals</b>	<b>8,098</b>

Appendix 6. South Fork Salmon River Chinook run timing graph Brood Year 2003.

mc03by.doc

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Appendix 7. Historic hatchery smolt releases and returns logged at McCall Hatchery.

mc03by.doc

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<b>Brood Year</b>	<b>Release Year</b>	<b>Number Of Fish</b>	<b>3-year-olds</b>	<b>Year Returned</b>	<b>4-year-olds</b>	<b>Year Returned</b>	<b>5-yearolds</b>	<b>Year Returned</b>
1978	1980	124,800	124	1981	462	1982	161	1983
1979	1981	248,926	48	1982	272	1983	221	1984
1980	1982	122,247	504	1983	713	1984	151	1985
1981	1983	183,896	595	1984	1,259	1985	203	1986
1982	1984	269,880	828	1985	1,265	1986	202	1987
1983	1985	564,405	1,222	1986	2,117	1987	893	1988
1984	1986	970,348	386	1987	1,392	1988	191	1989
1985	1987	958,300	50	1988	252	1989	30	1990
1986	1988	1,060,400	495	1989	911	1990	154	1991
1987	1989	975,000	28	1990	237	1991	25	1992
1988	1990	1,032,500	821	1991	2,617	1992	1,312	1993
1989	1991	708,600	206	1992	1,363	1993	299	1994
1990	1992	901,500	28	1993	158	1994	17	1995
1991	1993	607,298	70	1994	189	1995	37	1996
1992	1994	1,060,163	101	1995	424	1996	166	1997
1993	1995	1,074,598	738	1996	3,448	1997	555	1998
1994	1996	585,654	45	1997	343	1998	246	1999
1995	1997	238,367	76	1998	972	1999	90	2000
1996	1998	393,872	743	1999	3,306	2000	263	2001
1997	1999	1,182,615	3,416	2000	9,565	2001	971	2002
1998	2000	1,039,930	1,094	2001	6494	2002	3,344	2003
1999	2001	1,165,231	1,138	2002	2,983	2003	386	2004
2000	2002	1,064,250	1,771	2003	4,899	2004	0	2005
2001	2003	1,053,660	904	2004	0	2005	0	2006
2002	2004	1,088,810	0	2005	0	2006	0	2007
2003	2005	1,047,530	0	2006	0	2007	0	2008

Appendix 8. Summer Chinook distribution in the South Fork of the Salmon River from McCall Hatchery.

<b>Destination</b>	<b>Weight</b>	<b>Number/pound</b>	<b>Number released</b>
Knox Bridge	12,800	20.9	267,520
Knox Bridge	12,800	20.9	267,520
Knox Bridge	17,000	20.9	355,300
Knox Bridge	7,520	20.9	157,190
Trap Intake	6,760	32.5	220,000
<b>Total Released</b>	<b>56,880</b>		<b>1,267,530</b>

Appendix 9. Brood year 2003 summer Chinook survival from green eggs to released smolts.

<b>Number of Green Eggs</b>	<b>Number of Eyed Eggs</b>	<b>Percent Survival</b>	<b>Ponded</b>	<b>Percent Survival</b>	<b>Released Smolts</b>	<b>Percent Survival</b>
2,598,233	1,634,181	83.10%	1,275,007	92.30%	1,047,530	71.50%

\*Totals do not include culled eggs from green egg total, eyed eggs to Sho-Bans, and pre-smolts released in September 2004.

Appendix 10. Temperature range from August 2003 to April 2005.

<b>Date</b>	<b>Temperature</b>
Aug-03	50.8
Sep-03	49.2
Oct-03	46.3
Nov-03	43.1
Dec-03	39.3
Jan-04	37.7
Feb-04	37.5
Mar-04	38.0
Apr-04	40.5
May-04	43.6
Jun-04	49.5
Jul-04	52.3
Aug-04	51.6
Sep-04	48.6
Oct-04	47.0
Nov-04	43.0
Dec-04	39.0
Jan-05	37.5
Feb-05	37.0
Mar-05	38.0
Apr-05	40.5

## Appendix 11. Water analysis at McCall Fish Hatchery.

Date	pH	Ammonia	Nitrate	Nitrite	Total Phosphate	Total Nitrogen	KJEL Hardness	CaCO <sub>2</sub> Saturation	Oxygen ppm
1988	6.8	-	-	-	-	-	<10	97/103	7/10
1991		<0.05	<0.1	<0.1	<0.05	<0.10			
1993	6.9	<0.05	<0.1	<0.01	<0.05	<0.10			
1994	6.9	<0.05	<0.1	<0.01	0.01	<0.10			

## Appendix 12. Brood year 2003 production cost table.

Number of Fish	Pounds of Feed	Cost of Feed	Pounds of Fish	Conversion	Total Cost	Cost/1,000	Cost/Pound
1,267,530	64,100.00	\$69,917	56,880	1.15	\$499,209	\$393.84	\$8.78

Includes the pre-smolts released at the trap intake in 2004.

## Appendix 13. Brood year 2003 marked fish released.

Date	Number of Marks Applied	Mark	Purpose	Number Marked Fish Released	Site/group Released
6/14-6/10/04	1,001,658	AD	Identification	922,922	1,267,530
7/06-7/14/04	273,349	AD/CWT	US-Canada	269,854	1,267,530
2/14-2/18/05	74,804	AD/PIT	Migration	74,754	1,267,530
<u>Total</u>	<u>1,349,811</u>			<u>1,267,530</u>	<u>1,267,530</u>

Appendix 14a. Summary of Fish Autopsy South Fork summer Chinook fall pre-smolt release.

**Summary of Fish Autopsy**

ACCESSION NO:	04-420	LOCATION:	MCCALL
SPECIES:	SU	AUTOPSY DATE:	9/15/2004
STRAIN:	SF	AGE:	juv
UNIT:		SAMPLE SIZE:	20
RIVER FOR AUTOPSY:	Prelib.		
INVESTIGATOR(S):	Munson		
REMARKS:			

	MEAN	STANDARD DEVIATION	COEFFICIENT OF VARIATION
LENGTH	0.00	0.00	0.00
WEIGHT	0.00	0.00	0.00
KTL*	0.00	0.00	0.00
CTL*	0.00	0.00	0.00
HEMATOCRIT	41.25	1.91	0.05
LEUCOCRIT	0.00	0.00	0.00
SERUM PROTEIN	9.50	0.93	0.10

\*EXPRESSED AT KTL TIMES 10 TO THE FIFTH POWER

\*\*CONVERTED FROM KTL; EXPRESSED AS CTL TIMES 10 TO FOURTH POWER

	EYES	GILLS	PSEUDO-BRANCHS	THYMUS	FAT	MESEN. SPLEEN	GUT	HIND KIDNEY	LIVER	BILE
N	20	N 20	N 20	0 20	0 0	B 5	0 20	N 20	A 0	0 20
B1	0	F 0	S 0	1 0	1 0	R 15	1 0	S 0	B 20	1 0
B2	0	C 0	L 0	2 0	2 0	G 0	2 0	M 0	C 0	2 0
E1	0	M 0	S&L 0		3 0	NO 0		G 0	D 0	3 0
E2	0	P 0	I 0	Mean=0.00	4 20	E 0	Mean=0.00	U 0	E 0	
H1	0	OT 0	OT 0			OT 0		T 0	F 0	Mean=0.00
H2	0		O 0		Mean=4.00				OT 0	
M1	0									
OT	0									

**SUMMARY OF NORMALS**

	20	20	20	20	20	20	20	20	20
SEX		M: 0		F: 0			U: 0		

**GENERAL REMARKS:**

FINS:

GONADS:

SKIN:

OTHER:

Appendix 14b. Summary of Fish Autopsy South Fork summer Chinook BY03 smolt release.

**Summary of Fish Autopsy**

ACCESSION NO:	04-066	LOCATION:	MCCALL
SPECIES:	SU	AUTOPSY DATE:	3/14/2005
STRAIN:	SF	AGE:	juv
UNIT:		SAMPLE SIZE:	20
RIVER FOR AUTOPSY:	Prelib.		
INVESTIGATOR(S):	Munson		
REMARKS:			

	MEAN	STANDARD DEVIATION	COEFFICIENT OF VARIATION
LENGTH	0.00	0.00	0.00
WEIGHT	0.00	0.00	0.00
KTL*	0.00	0.00	0.00
CTL*	0.00	0.00	0.00
HEMATOCRIT	48.00	2.95	0.06
LEUCOCRIT	0.00	0.00	0.00
SERUM PROTEIN	9.59	0.96	0.09

\*EXPRESSED AT KTL TIMES 10 TO THE FIFTH POWER

\*\*CONVERTED FROM KTL; EXPRESSED AS CTL TIMES 10 TO FOURTH POWER

EYES		GILLS		PSEUDO-BRANCHS		THYMUS		FAT		MESEN. SPLEEN		GUT		HIND KIDNEY		LIVER		BILE	
N	20	N	20	N	20	0	20	0	0	B	0	0	20	N	20	A	0	0	4
B1	0	F	0	S	0	1	0	1	0	R	20	1	0	S	0	B	2	1	13
B2	0	C	0	L	0	2	0	2	2	G	0	2	0	M	0	C	18	2	3
E1	0	M	0	S&L	0			3	8	NO	0			G	0	D	0	3	0
E2	0	P	0	I	0	Mean=0.00		4	10	E	0	Mean=0.00		U	0	E	0		
H1	0	OT	0	OT	0					OT	0			T	0	F	0		Mean=.95
H2	0			O	0			Mean=3.4								OT	0		
M1	0																		
OT	0																		

**SUMMARY OF NORMALS**

	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
SEX		M: 0				F: 0													U: 0

**GENERAL REMARKS:**

FINS:

GONADS:

SKIN:

OTHER:

Appendix 14c. Summary of Fish Autopsy Johnson Creek summer Chinook smolt release.

**Summary of Fish Autopsy**

ACCESSION NO:	05-067	LOCATION:	MCCALL
SPECIES:	SU	AUTOPSY DATE:	3/14/2005
STRAIN:	JC	AGE:	juv
UNIT:		SAMPLE SIZE:	20
RIVER FOR AUTOPSY:	Prelib.		
INVESTIGATOR(S):	Munson		
REMARKS:			

	MEAN	STANDARD DEVIATION	COEFFICIENT OF VARIATION
LENGTH	0.00	0.00	0.00
WEIGHT	0.00	0.00	0.00
KTL*	0.00	0.00	0.00
CTL*	0.00	0.00	0.00
HEMATOCRIT	41.40	3.70	0.08
LEUCOCRIT	0.00	0.00	0.00
SERUM PROTEIN	7.70	0.81	0.11

\*EXPRESSED AT KTL TIMES 10 TO THE FIFTH POWER

\*\*CONVERTED FROM KTL; EXPRESSED AS CTL TIMES 10 TO FOURTH POWER

EYES		GILLS		PSEUDO-BRANCHS		THYMUS		FAT		MESEN. SPLEEN		GUT		HIND KIDNEY		LIVER		BILE	
N	20	N	20	N	20	0	20	0	0	B	0	0	20	N	20	A	0	0	4
B1	0	F	0	S	0	1	0	1	1	R	20	1	0	S	0	B	2	1	13
B2	0	C	0	L	0	2	0	2	6	G	0	2	0	M	0	C	18	2	3
E1	0	M	0	S&L	0			3	9	NO	0			G	0	D	0	3	0
E2	0	P	0	I	0	Mean=0.00		4	4	E	0	Mean=0.00		U	0	E	0		
H1	0	OT	0	OT	0					OT	0			T	0	F	0		Mean=0.95
H2	0			O	0			Mean=2.8								OT	0		
M1	0																		
OT	0																		

**SUMMARY OF NORMALS**

	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
SEX		M: 0				F: 0													U: 0

**GENERAL REMARKS:**

FINS:

GONADS:

SKIN:

OTHER:

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