



LOWER SNAKE RIVER  
COMPENSATION PLAN  
*Hatchery Program*

## **McCALL FISH HATCHERY**

**2008 Summer Chinook Salmon Brood Year Report**



by

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## APPENDICES

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## ABSTRACT

The South Fork Salmon River (SFSR) trapping season began on June 25, 2008, with the lowering of the weir panels. The first adult salmon was trapped on June 26. Trapping operations concluded on September 18, 2008.

Of the 6,571 fish trapped: 2,733 were females, of which 900 were held for spawning, 174 natural origin females were released above the weir, while the remaining hatchery females were used for fishery recycle or subsistence giveaway. There were 1,759 adult males trapped of which 301 natural origin males were released above the weir, 825 were held for spawning, with the remaining hatchery males also used for fishery recycle or subsistence. There were 2,079 jacks trapped (according to length frequency criteria), 114 were released upstream of the weir, 18 were used for spawning, with the remainder being recycled through the fishery or distributed for subsistence giveaways. The average prespawn mortality for adult males and females was 32.3%. There were an additional 11 adult males, 22 females, and 30 jacks that died in the trap that are not included as prespawn mortality. There were 1,660 adult fish and jacks given to the tribes or charitable organizations (Table 2).

Chinook salmon *Oncorhynchus tshawytscha* spawning at the trap commenced on August 12 and concluded on September 18, 2008. From the females ponded, 429 SFSR stock were spawned with an average fecundity rate of 4,833 eggs per female, resulting in 2,073,280 green eggs taken. There were 30 Johnson Creek females held and spawned, resulting in 136,891 green eggs. There were 322,620 eyed reserve eggs produced for the Sho-Ban tribal egg box program. The overall average eye up from eggs taken from the SFSR stock and Johnson Creek stock was 88.4% and 77.3% respectively.

During the period of March 23 through March 25, 2010, there were 1,037,600 brood year 2008 smolts (49,550 pounds) transported and released at Knox Bridge. Nez Perce tribal fishery personnel transported 50,420 Johnson Creek stock smolts (1,733 pounds) to Johnson Creek for release on March 15-17 and 49,198 smolts (1,691 pounds) on April 5-6, 2010.

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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 U.S. Fish and Wildlife Service administer funding for LSRCP to the Idaho Department of Fish and Game (IDFG).

The MCFH is located within the city limits of McCall, Idaho along the North Fork of the Payette River, approximately .25 miles downstream from Payette Lake.

A satellite facility for trapping and spawning adult chinook salmon *Oncorhynchus tshawytscha* is located on the South Fork Salmon River (SFSR) 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 IDFG.

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 MCFH.

## FISH REARING FACILITIES

The hatchery is designed to raise a maximum capacity of 1,000,000 smolts, averaging 17 fish per pound. 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 primary incubation eight-tray stacks of Flex-A-Lite (FAL, Consolidated) vertical flow (Heath type) incubators. Secondary incubation capability consists of plumbing that will support up to 12 eight-tray vertical flow (Heath type) stacks that may be placed into four of the early rearing vats when not in use.
2. Fourteen concrete vats 4-ft x 40-ft x 2-ft (water depth); 320 ft<sup>3</sup> of rearing area per vat.
3. Two concrete rearing ponds 196-ft x 40.5-ft x 4-ft (water depth); 23,814 ft<sup>3</sup> of rearing space per pond.
5. One concrete collection basin 101-ft x 15-ft x 4-ft (water depth).

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 permanent bridge and weir structure, 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. Unmarked adults are passed above the weir to spawn naturally; 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, thus providing the capability of obtaining optimum rearing water temperatures during summer and fall months.

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 10). The pH stays about 6.8. There is no indication of problems with heavy metals. Temperatures are maintained below 56°F and may reach a low of 37°F in the winter (Appendix 9).

## **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 six temporary employees to assist during the busy summer field season.

## TRAPPING AND SPAWNING

The 2008 trapping season started on June 25, with the lowering of the weir panels. The first fish was trapped on June 26. Trapping continued through September 18, 2008. Normal trap installation is usually around June 20 with the fish arriving shortly thereafter. The peaks of the run for 2007 were July 14 and August 25.

There were 6,571 fish trapped: 2,733 (61%) were adult females and 1,759 (39%) were adult males. A total of 2,079 male fish (32% of total trapped) were jacks (three-year-old fish) according to length frequency criteria. There were 174 females, 301 adult males, and 114 jacks released upstream of the weir (Tables 1 and 3).

Fork lengths were taken on all of the fish trapped, and all of the adult fish were injected with Erythromycin (Erythro 100) at a rate of 20 mg/kg. All salmon were scanned for Passive Integrated Transponder (PIT) tags, checked for external tags, radio transmitters, fin mark type (indicating origin), and injuries. In addition, all unclipped fish were scanned for coded wire tags and fin ray samples for DNA analysis were collected. DNA samples were also collected from all hatchery brood stock at time of trapping.

The run was comprised of 5,977 marked (90%) and 594 (10%) unmarked fish. Of the 5,962 adipose (AD) clipped reserve fish trapped 298 (5%) were noted as having a partial adipose fin. In addition there were 645 (242 females and 403 males) previously trapped and released adipose clipped fish that were re-trapped. Of the tags recovered or detected, 319 were PIT tags, 567 coded wire tags (CWT), and nine radio tags. The CWTs recovered were from the fishery and the trap. There were 15 CWTs detected in unclipped fish.

Table 1. Trapping Summary.

Gender	AD	NO w/CWT	NO	Total
Females	2,552	4	117	<b>2,733</b>
Males	1,453	5	301	<b>1,759</b>
Jacks	1,957	6	116	<b>2,079</b>
Total	<b>5,962</b>	<b>15</b>	<b>594</b>	<b>6,571</b>

Mark Type Key:

AD = adipose clip, hatchery fish.

NO w/CWT = no clip with coded micro-wire tag, unknown origin.

NO = no clip "unmarked", wild or natural fish.

Of the total number of fish released, 589 (301 males, 174 females, 114 jacks) were released above the weir at the time of trapping. The percent release for unmarked adult males and females was 63% and 37%, respectively. A total of 2,570 hatchery fish recycled through sport and tribal fisheries downstream of the SFSR weir. In addition, a supplementation release of AD clipped hatchery fish was performed on August 29 into the East Fork South Fork Salmon River drainage. There were 123 combined adult males and jacks plus 93 females released at two sites above Stibnite mine. The Roaring Creek site has been referred to as the Goat Creek site in previous years; however, hatchery staff determined Roaring Creek is closer to the actual release site than Goat Creek. (Tables 2 and 3).

There were 1,660 reserve adult and jack salmon killed for consumptive purposes and given to tribal and non-profit organizations.

Table 2. Trap Disposition Summary by Age and Sex.

AGE		DISPOSITION								Total	
		One Ocean									
Male Only	MARK	D	KO	PO	P2	RA	RB	KNU	RO	Total	
		AD	28	8	457	1,301	0	3	150	10	1,957
		NO w/CWT	0	6	0	0	0	0	0	0	6
		NO	2	0	0	0	114	0	0	0	116
<b>Total</b>		30	14	457	1,301	114	3	150	10	<b>2,079</b>	
		Two Ocean								Total	
Male / Female	AD	8 / 17	0	758 / 819	598 / 1,571	0	0 / 5	2 / 0	18 / 41		1,384 / 2,453
	NO w/CWT	1 / 1	3 / 3	1 / 0	0	0	0	0	0		5 / 4
	NO	0 / 2	0	0	0	282 / 163	0	0	0		282 / 165
<b>Total</b>		9 / 20	3 / 3	759 / 819	598 / 1,571	282 / 163	0 / 5	2 / 0	18 / 41	<b>1,671 / 2,622</b>	
		Three Ocean								Total	
Male / Female	AD	2 / 1	0	66 / 81	1 / 16	0	0 / 1	0	0		69 / 99
	NO w/CWT	0	0	0	0	0	0	0	0		0
	NO	0 / 1	0	0	0	19 / 11	0	0	0		19 / 12
<b>Total</b>		2 / 2	0	66 / 81	1 / 16	19 / 11	0 / 1	0	0	<b>88 / 111</b>	

Note: Re-traps not included in table.

Disposition Key:

- KO = Killed other, e.g. research, disease, spawned out, or unknown origin.
- PO = Poned; hatchery fish held for spawning purposes.
- RA = Fish released upstream of the weir (wild/natural).
- RB = Released Below; hatchery fish released below the weir (SFSR).
- RO = Released Other; hatchery fish recycled downstream.
- D = Dead, trap mortality.
- P2 = Pond 2; Hatchery fish held for recycling and subsistence.
- KNU = Killed Not Used.

Table 3. Fish Released Upstream.

Gender	Total
Female	174
Male	301
Jacks	114
<b>Total</b>	<b>589</b>

Initially, there were 2,181 SFSR stock adults held for hatchery production. There were 133 females and 156 male recaptures that were added for broodstock. Prespawn mortality for the females was 34.4%, with 30.2% for the males. This year the female pond was divided into two sections: one to hold females for spawning, the other for hatchery fish for recycle or subsistence distribution. This greatly reduced the amount of handling. There was a rainstorm

event on July 22 that brought down silt and debris from the 2007 fire that created poor water quality and clarity for two weeks. Formalin treatments were suspended at this time. This event elevated the normal prespawn mortality rate from 18 to 20% to 32% due to irritated gills and increased stress.

Spawning operations began on August 12 and concluded on September 2. Tuesdays and Fridays were reserved for spawning. Seven spawn days were needed to spawn 429 SFSR females of which eggs from 281 of these females were retained for hatchery production. Hatchery staff transferred 322,620 eyed eggs, from 78 adipose fin clipped females, to Shoshone-Bannock Tribe (SBT) fishery personnel on October 14-15, 2008. These eggs were allocated for use in the SBT in-stream incubator boxes located in Dollar Creek, a tributary to the South Fork Salmon River. Eggs and milt were collected from hatchery AD clipped fish only.

Spawning procedures remained relatively consistent with recent years. Females were bled prior to spawning to prevent blood from inhibiting fertilization. The eggs from each female were halved into two colanders and fertilized with one male per colander resulting in a male to female ratio of 2 to 1. The colanders were then placed into activation buckets for approximately two minutes. The eggs were then recombined and placed in an iodine (100 ppm) solution and allowed to harden for one hour. After hardening, the eggs were placed in numbered egg bags and packed in coolers for transportation back to the hatchery. Approximately 18 jacks were used in the spawning process. All spawned out carcasses were returned to the South Fork Salmon River immediately below the trap water intake.

The eggs from hatchery, or reserve, females were loaded at two females per tray into hatchery incubation egg trays. Eggs from the Johnson Creek stock were loaded at one female per tray. 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 Bacterial Kidney Disease (BKD) levels through Enzyme-Linked Immunosorbent Assay (ELISA) testing. ELISA optical density values of 0.25 or greater were considered high positive for bacterial kidney disease. There were 15 females found to be high BKD positive during incubation and their eggs, paired with those from 15 other females, were culled prior to hatching resulting in the loss of 124,380 eggs. Eggs from 21 low BKD positive females (ELISA 0.100–0.249) were culled to achieve full hatchery rearing capacity. These females were paired with 19 additional females and resulted in culling 155,420 eyed eggs. In all, eggs from 70 females were culled during incubation. Overall average fecundity was 4,833 eggs per female and average eye up was 88.4 %.

Incubator flows were set at a 5 gallons per minute (gpm) flow rate, and incubators were loaded at 2 females per tray due to space concerns. The eggs were treated with 1,667 parts per million (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 (TU) and were then shocked, picked, and enumerated. Hatching began at approximately 925 TU.

### **Johnson Creek Trapping And Spawning**

Nez Perce fisheries personnel transferred 77 unmarked summer chinook salmon trapped at the Johnson Creek weir to the SFSR facility for broodstock. A total of 38 females, 38 adult males, and 1 jack were transferred. These fish were initially held with the SFSR stock. At primary sort Johnson Creek males were moved into a circular holding tank. This was done to

eliminate the need for excessive sorting of SFSR males during spawning. Johnson Creek females were held along with SFSR females throughout the spawning process. All Johnson Creek fish were uniquely marked to distinguish them from SFSR stock. Multiple marks were used to ensure positive identification.

A total of 136,891 green eggs were collected from 30 females and returned to MCFH for incubation. No eggs from the Johnson Creek stock were culled for BKD. Eye up was 77.3% producing 105,788 good eggs. Fecundity was 4,563 eggs per female. Prespaw mortality on the females was 21.1% (8/38) and 20.5 % (8/39) for the males. The prespaw mortality was lower than the SFSR stock after the storm event as these fish had not been subjected to the stress or injuries incurred during an intense fishery prior to being placed in the holding ponds at the trap site.

## 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 50,000 to 90,000 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 0.50 to 0.55, usually around April 1.

Beginning growth rates were slow, only 0.002-inch to 0.004-inch per day, due to cold water temperatures of only 37°F to 39°F. The fry were started on Skretting BioVita #0 and did well once they started to feed. The fish appeared to start on feed a little slower than the past.

Fish were moved to the outside rearing ponds mid-June and mid-July. They were adipose clipped, CWT, and enumerated as they were moved to the ponds. There was an 8.74% increase in production numbers, determined at marking, resulting in an additional 90,663 fish on hand. By the end of September, there were 1,108,826 fish on station. There also 91,418 Johnson Creek stock for Nez Perce tribal releases in to Johnson Creek.

## FISH HEALTH

### Diseases Encountered And Treatment

Epizootics were not encountered during the rearing cycle that ended with release in the spring of 2010 for the BY08 SFSR and Johnson Creek summer chinook programs. Erythromycin medicated feed was not applied to Chinook salmon to control *Renibacterium salmoninarum*, the causative agent of Bacterial Kidney Disease. Adult chinook entering the SFSR Trap were given an intra-peritoneal injection of erythromycin at a target dose of 10 mg/kg to limit prespawning mortality due to BKD. Prespawning mortality was measured at 32% at the SFSR Trap in 2008 due to runoff from forest burn areas. Normal prespaw mortality ranges 10% to 15%.

*Renibacterium* was detected during routine brood stock inspections at the SFSR Trap during 2008. Eggs from females with ELISA optical densities greater than 0.25 were culled from production in the SFSR summer chinook (3.5%). There were no Johnson Creek summer

chinook females with an ELISA value above 0.25. Neither Infectious hematopoietic Necrosis Virus (IHNV) nor *Myxobolus cerebralis* (Whirling Disease) were detected in the SFSR or Johnson Creek brood fish.

Preliberation ELISA sampling detected 0/12+ pools (*Renibacterium salmoninarum*) for all Chinook salmon stocks reared at this facility (0/12 for Johnson Creek stock also). Viral replicating agents and *Myxobolus cerebralis* were not detected in either stock.

#### **Organosomatic Index**

See appendix 11a. and 11b.

#### **Disease Related Losses**

Neither acute nor chronic losses were experienced at this facility this year.

#### **Other Assessments**

Prespawning mortality was approximately 32% for 2008. McCall staff was diligent in reducing handling. Hatchery staff was not able to treat the fish with formalin due to thunderstorm runoff in areas that had suffered forest fires. This allowed secondary external mycosis to impact fish health during holding.

### **FISH MARKING**

The fish marking crew was here in June and July and marked approximately 1.22 million fish. These fish receive AD clips, CWT/AD-clips, and CWT only.

The marking crew returned in February and PIT tagged 51,875 fish. The breakdown of tagged released fish appears in Appendix 10.

### **FISH DISTRIBUTION**

The brood year 2008 smolt hauling operation began on March 23, 2010 and concluded on the evening of March 25, 2010. There were approximately 25 loads of fish hauled in three days. The SFSR conditions were clear and low at the time of release. All together there were 1,037,600 brood year 2008 smolts at 20.94 fish per pound totaling 49,550 pounds released (Appendix 5). The Sho-Ban Tribe received 322,620 eyed eggs this season for their Dollar Creek egg box program. There was a fall parr release conducted on September 28 and 29, 2009, of 180,000 fish weighing 5,714 pounds. These fish were released at the intake structure at the SFSR trap facility. This parr release was conducted in order to reduce the pond loading at the hatchery to comfortable levels going in to the final rearing months.

Nez Perce Tribal fishery personnel transported and released 50,420 Johnson Creek origin summer chinook smolts into Johnson Creek over the period of March 15–17, 2010, at an approximate release size of 29.10 fish per pound. These fish represented approximately half of the total production from this brood year and was followed by a second release of 49,198 smolts on April 5 and 6 of 2010. These releases are part of a split study design which is trying to

determine why outmigration survival to Lower Granite Dam is approximately half of that experienced by SFSR summer chinook smolts.

### **EXPERIMENTS**

There were no significant experiments conducted by McCall Hatchery personnel for this brood year.

### **CONCLUSIONS**

The brood year 2008 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. There were four PIT antennas temporarily installed on the piping of the fish pump to determine if this would be a method to accurately determine the actual PIT tags released. There proved to be too much interference coupled with large numbers of fish moving through the pipes rapidly, which caused the system to crash.

### **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 of the Chinook eggs that tested high positive for BKD were culled this year and should be continued as egg numbers will allow.

## **APPENDICES**

Appendix 1. 2008 summer Chinook returns to McCall Fish Hatchery, SF SR, based on R-mix\* data and length frequency data age distribution of brood year.

<b>Salmon River, based on CWT and length frequency data.</b>				
<b>Age</b>	<b>Male</b>		<b>Female</b>	
	<b>CWT** Estimate</b>	<b>Length/ frequency Estimate</b>	<b>CWT Estimate</b>	<b>Length/ frequency Estimate</b>
3	1,405	2,079	0	0
4	2,252	1,671	2,475	2622
5	181	88	258	111
<b>Totals</b>	<b>3,838</b>	<b>3,838</b>	<b>2,733</b>	<b>2,733</b>

\*R-Mix is a computer program for estimating age composition of returning fish.

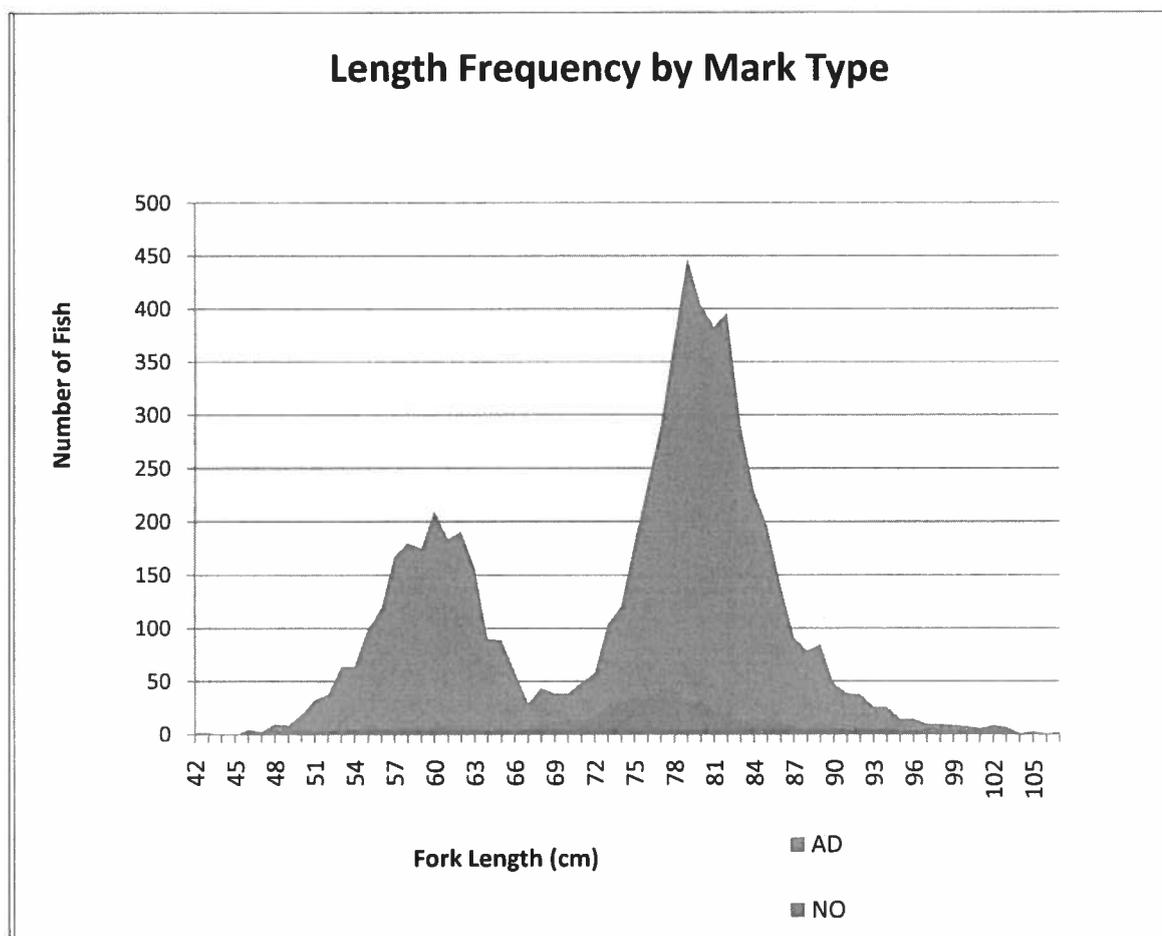
\*\*CWT data based on 418 snouts recovered at the trap and from the fishery.

Length data is taken at trapping prior to first sort (Historical Breakdown).

Historical Age-class breakdown

<70 cm	=	1 Ocean Male Only
>69 & <94 cm	=	2 Ocean Male
>93 cm	=	3 Ocean Male
<90 cm	=	2 Ocean Female
>89 cm	=	3 Ocean Female

Appendix 2a. Length frequency by mark type graph.



Legend:

NO = No Mark  
AD = AD Clipped

Appendix 2. Length frequency for brood year 2008 summer Chinook brood stock at the SFSR Trap, according to mark type recorded at McCall Fish Hatchery.

<b>Mark Type</b>							
<b>Fork Length</b>	<b>AD</b>	<b>NO Mark</b>	<b>Total</b>	<b>Fork Length</b>	<b>AD</b>	<b>NO Mark</b>	<b>Total</b>
42	2	0	2	83	279	12	291
43	2	0	2	84	213	16	229
44	0	0	0	85	185	11	196
45	0	0	0	86	130	11	141
46	5	0	5	87	84	7	91
47	3	0	3	88	74	5	79
48	9	1	10	89	73	12	85
49	9	0	9	90	42	6	48
50	19	0	19	91	35	4	39
51	30	3	33	92	32	6	38
52	35	3	38	93	21	5	26
53	59	5	64	94	20	6	26
54	59	5	64	95	12	3	15
55	92	8	100	96	12	3	15
56	113	6	119	97	9	1	10
57	161	7	168	98	8	2	10
58	173	7	180	99	8	1	9
59	166	9	175	100	6	2	8
60	203	7	210	101	6	0	6
61	176	8	184	102	8	1	9
62	183	8	191	103	6	1	7
63	152	5	157	104	1	0	1
64	87	3	90	105	2	1	3
65	85	4	89	106	1	0	1
66	57	3	60	107	1	1	2
67	24	6	30	<b>TOTALS</b>	<b>5,962</b>	<b>594</b>	<b>6,556</b>
68	34	10	44				
69	28	11	39				
70	24	15	39				
71	36	13	49				
72	42	16	58				
73	78	26	104				
74	91	30	121				
75	145	35	180				
76	203	33	236				
77	247	45	292				
78	331	42	373				
79	419	30	449				
80	374	31	405				
81	362	21	383				
82	376	21	397				

Appendix 3. McCall Fish Hatchery 2008 summer Chinook run timing/water temperature, SFSR.

Trap Date	Number Trapped	Mean Temp F	Mean Temp c
26-Jun	1	50.4	10.2
30-Jun	72	54.7	12.6
2-Jul	206	54.8	12.7
3-Jul	128	55.7	13.2
5-Jul	253	55.0	12.8
7-Jul	150	55.3	13.0
8-Jul	224	55.7	13.2
9-Jul	132	56.0	13.3
11-Jul	317	54.8	12.7
12-Jul	75	53.4	11.9
13-Jul	97	54.6	12.5
14-Jul	401	55.7	13.2
15-Jul	355	57.0	13.9
16-Jul	370	57.4	14.1
17-Jul	337	57.2	14.0
18-Jul	270	56.6	13.7
19-Jul	91	55.2	12.9
20-Jul	100	56.8	13.8
21-Jul	511	55.8	13.2
24-Jul	113	57.2	14.0
28-Jul	231	57.8	14.3
29-Jul	154	56.1	13.4
30-Jul	82	57.2	14.0
31-Jul	74	56.2	13.5
4-Aug	71	57.3	14.0
6-Aug	94	58.8	14.9
8-Aug	198	60.3	15.7
10-Aug	31	57.0	13.9
11-Aug	245	56.0	13.4
13-Aug	77	57.7	14.3
15-Aug	43	59.2	15.1
18-Aug	119	59.9	15.5
20-Aug	170	55.3	13.0
21-Aug	157	56.2	13.4
25-Aug	296	57.9	14.4
28-Aug	183	53.4	11.9
29-Aug	60	55.5	13.1
2-Sep	68	47.1	8.4
5-Sep	10	49.0	9.5
8-Sep	5	50.6	10.3

Appendix 4. Historic hatchery returns at McCall Fish Hatchery.

Brood Year	Release Year	Number of Fish Released	3-year-olds	Year Returned	4-year-olds	Year Returned	5-year-olds	Year Returned
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	1,182,611	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	346	2005
2001	2003	1,053,660	904	2004	2,377	2005	116	2006
2002	2004	1,088,810	491	2005	1,740	2006	207*	2007
2003	2005	1,047,530	295	2006	1,748*	2007	168*	2008
2004	2006	1,096,130	1,510*	2007	3,843*	2008	245*	2009
2005	2007	1,087,170	1,965*	2008	3,650*	2009	0	2010
2006	2008	1,060,540	5,295*	2009	0	2010	0	2011
2007	2009	1,106,700	0	2010	0	2011	0	2012
2008	2010	1,217,600	0	2011	0	2012	0	2013

\* Hatchery fish trapped only.

Appendix 5. Brood year 2008 summer Chinook distribution in the SFSR from McCall Hatchery.

Destination	Weight	Number/pound	Number released
SFSR Trap Intake	5,714	31.50	180,000
Knox Bridge	21,000	20.94	439,740
Knox Bridge	21,000	20.94	439,740
Knox Bridge	7,550	20.94	158,120
	<b>55,264</b>		<b>1,217,600</b>

Appendix 6. Brood year 2008 summer Chinook survival from green eggs to released smolts.

Number of Green Eggs	Number of Eyed Eggs	Percent Survival	Ponded	Released Smolts	Percent Survival
2,159,157	1,325,707	89.32%	1,221,138	1,037,600*	80.04%

\*Totals do not include 279,800 culled eggs from green egg total or the 180 k presmolts released in the fall of 2009.

Appendix 7. Temperature range from August 2008 to April 2010.

Date	Temperature
Aug-08	44.6
Sep-08	44.6
Oct-08	46.8
Nov-08	42.8
Dec-08	38.7
Jan-09	37.4
Feb-09	37.4
Mar-09	37.4
Apr-09	39.0
May-09	42.4
Jun-09	50.2
Jul-09	51.3
Aug-09	48.6
Sep-09	47.8
Oct-09	43.7
Nov-09	39.7
Dec-09	38.3
Jan-10	38.5
Feb-10	38.3
Mar-10	38.5

Appendix 8. Water analysis at McCall Fish Hatchery.

Date	pH	Ammonia	Nitrate	Nitrite	Total Phosphate	KJEL Nitrogen	Hardness	Oxygen ppm
1988	6.8	-	-	-	-	-	<10	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	<0.05	<0.10		
2008					0.005			
2009					0.009			
2010					<0.001			

Appendix 9. Brood year 2008 production cost table.

Number of Fish	Pounds of Feed	Cost of Feed	Pounds of Fish	Conversion	Total Cost	Cost/1,000	Cost/Pound
1,217,600	47,101	\$55,212	55,264	0.85	\$376,191	\$309.11	\$6.81

Appendix 10. Brood year 2008 marked fish released.

Date	Number of Marks Applied	Mark	Purpose	Number Marked Fish Released	Site/group Released
6/08-6/12/09	608,531	AD	Identification	961,994**	1,037,600
7/20-7/24/09	311,611	AD	Identification		
7/20-7/24/08	208,389	AD/CWT	US-Canada	203,820*	1,037,600
2/8-2/11/10	51,875	AD/PIT	Migration	51,786	1,037,600
Total	1,180,406			1,217,600	1,037,700

\* Shed rate of 1.92% applied to AD/CWT released.

\*\* 180,000 AD clipped only presmolts were released September 2009.

Appendix 11a. Summary of Organosomatic Index brood year 2008 SFSR summer Chinook.

Summary of Fish Autopsy			
ACCESSION NO:	10-035	LOCATION:	MCCALL
SPECIES:	SU	AUTOPSY DATE:	2/25/2010
STRAIN:	SF	AGE:	juv
UNIT:		SAMPLE SIZE:	60
RIVER FOR AUTOPSY:	Prelib.		
INVESTIGATOR(S):	Munson		
REMARKS:	ponds 1 & 2		

	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	0.00	0.00	0.00
LEUCOCRIT	0.00	0.00	0.00
SERUM PROTEIN	0.00	0.00	0.00

\*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	60	N	60	N	60	0	60	0	0	B	5	0	60	N	60	A	2	0	12
B1	0	F	0	S	0	1	0	1	1	R	55	1	0	S	0	B	58	1	42
B2	0	C	0	L	0	2	0	2	8	G	0	2	0	M	0	C	0	2	6
E1	0	M	0	S&L	0			3	33	NO	0			G	0	D	0	3	0
E2	0	P	0	I	0	Mean=0.00		4	18	E	0	Mean=0.00		U	0	E	0		
H1	0	OT	0	OT	0					OT	0			T	0	F	0		Mean=0.9
H2	0			O	0			Mean=3.13								OT	0		
M1	0																		
OT	0																		

SUMMARY OF NORMALS																			
	60		60		60		60		60		60		60		60		60		60
SEX		M: 0				F: 0				U: 0									

GENERAL REMARKS:		
FINS:	GONADS:	
SKIN:	OTHER:	No ery fpp 19.26

Appendix 11b. Summary of Organosomatic Index brood year 2008 Johnson Creek summer Chinook.

Summary of Fish Autopsy																			
ACCESSION NO:		10-036										LOCATION:		MCCALL					
SPECIES:		SU										AUTOPSY DATE:		2/25/2010					
STRAIN:		JC										AGE:		juv					
UNIT:												SAMPLE SIZE:		60					
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		0.00				0.00				0.00									
LEUCOCRIT		0.00				0.00				0.00									
SERUM PROTEIN		0.00				0.00				0.00									
*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	60	N	60	N	60	0	60	0	0	B	7	0	60	N	60	A	5	0	20
B1	0	F	0	S	0	1	0	1	3	R	53	1	0	S	0	B	51	1	40
B2	0	C	0	L	0	2	0	2	32	G	0	2	0	M	0	C	4	2	0
E1	0	M	0	S&L	0			3	18	NO	0			G	0	D	0	3	0
E2	0	P	0	I	0	Mean=0.00		4	7	E	0	Mean=0.00		U	0	E	0		
																			Mean=0.6
H1	0	OT	0	OT	0					OT	0			T	0	F	0		6
H2	0			O	0			Mean=2.48								OT	0		
M1	0																		
OT	0																		
SUMMARY OF NORMALS																			
60		60		60		60		60		60		60		60		60		60	
SEX		M: 0				F: 0				U: 0									
GENERAL REMARKS:																			
FINS:		GONADS:																	
SKIN:		OTHER: fpp 29.7																	

**Prepared by:**

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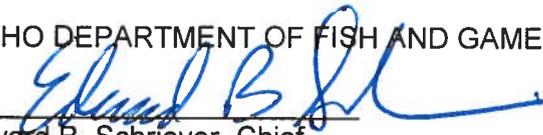
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