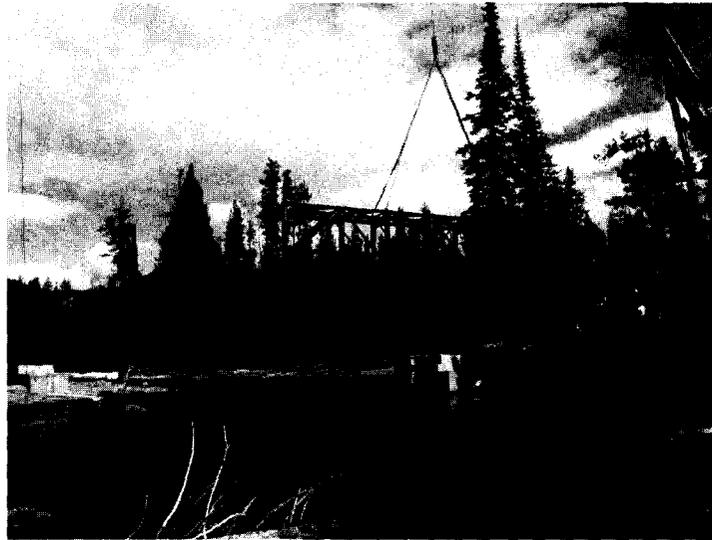


LOWER SNAKE RIVER
COMPENSATION PLAN
Hatchery Program

McCall FISH HATCHERY

2007 Summer Chinook Salmon Brood Year Report



by

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IDFG
09-127
September 2009

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APPENDICES

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ABSTRACT

The South Fork Salmon River trapping season began on June 1st with the weir installation and opening of the trap on June 8th. Trapping operations concluded on September 10, 2007.

Chinook salmon *Oncorhynchus tshawytscha* spawning at the trap commenced on August 17 and concluded on September 10, 2007. A total of 3,745 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 84.8%.

Of the 3,745 fish trapped: 1,031 were females, of which 637 were ponded; 148 were released above the weir, while the remaining hatchery females were used for fishery recycle or subsistence giveaway. There were 1,152 adult males trapped of which 134 were released above the weir, 832 were ponded for spawning, with the remaining hatchery males also used for fishery recycle or subsistence. The pre-spawn mortality for females was 8.1%, for males 9.8%. There were an additional 17 adult males, 19 jacks, and 3 females that died in the trap that are not included as pre-spawn mortality. There were 1,562 jacks trapped (according to length frequency criteria); 55 were released upstream of the weir, 37 were used for spawning, with the majority being recycled through the fishery or distributed for subsistence giveaways. There were 801 fish given to the tribes or charitable organizations. (Table 2).

From the females ponded, 335 South Fork stock were spawned with an average fecundity rate of 4,560 eggs per female, resulting in 1,527,720 green eggs taken. There were 25 Johnson Creek females held and spawned, resulting in 116,617 green eggs. There was no eyed reserve eggs produced for the Sho-Ban tribal egg box program due to the severe fires in the drainage and the potential high silt loads possible during spring runoff.

During the period of March 23, through March 25, 2009, there were 1,106,700 brood year 2007 smolts (52,126 pounds) transported and released at Knox Bridge. Nez Perce tribal fishery personnel transported 91,080 (3,253 pounds) Johnson Creek stock smolts to Johnson Creek for release.

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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 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 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 FAL (Flex-A-Lite, Consolidated) vertical flow (Heath type) incubators. Secondary incubation capability consists of plumbing that will support up to twelve eight-tray vertical flow (Heath type) stacks that may be placed into 4 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.³ of rearing area per vat.
3. Two concrete rearing ponds 196-ft x 40.5-ft x 4-ft (water depth); 23,814 ft.³ 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 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 2007 trapping season started on June 1, with the lowering of the new weir panels. The ponds were set up and water turned on in the fish ladder, on June 8. The first fish was trapped on June 14. Trapping continued through September 10, 2007. Normal trap installation is usually around June 20 with the fish arriving shortly thereafter. The peaks of the run for 2007 were July 12, and August 23.

There were 3,745 fish trapped; 1,031 (48%) were adult females and 1,152 (52%) were adult males. A total of 1,562 male fish (42% of total trapped) were jacks (three-year-old-fish) according to length frequency criteria. There were 148 females, 134 adult males, and 55 jacks released upstream of the weir. Table 1,3.

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

The run was comprised of 3,465 marked (92.6%) and 280 (7.4%) unmarked fish. Of the 3,405 AD clipped reserve fish trapped 232 (6.8%) were noted as having a partial adipose fin. In addition there were 396 (33 females and 363 males) previously trapped and released adipose clipped fish that were re-trapped. Re-trapped fish numbers were comparable to last year (109). Of the tags recovered or detected, 204 were PIT tags, 567 CWT, and 13 radio tags. The CWT recovered were from the fishery and the trap.

Table 1. Trapping Summary.

	AD	OM	NO	Total
Females	883	43	105	1,031
Males	1,016	13	123	1,152
Jacks	1,506	4	52	1,562
Total	3,405	60	280	3,745

Mark Type Key:

AD = adipose clip, hatchery fish.

OM = no clip with coded micro-wire tag, supplementation fish.

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

A total of 56 coded wire tags were detected in unclipped fish. These were either supplementation fish reared through parr in the Stolle acclimation pond from brood year 2001 and 2002 or from a supplementation group, BY 2002, reared through smolt at the McCall Fish Hatchery. The release group for Stolle Pond BY 2002 was 80,340 parr with 100% coded wire tagged w/o fin clip. The hatchery supplementation smolt release for BY 2002 was 174,750 marked as 100% coded wire tag w/o fin clip. These fish were recorded as supplementation fish in the database. The regional research biologist is responsible for recovery and analysis of the coded wire tags obtained from spawning ground surveys and carcass recovery. Detection and recovery of the tags is important for identifying potential year class survival and return rates between release groups. A wand type detector was used to scan fish for the presence of a coded micro-wire tag.

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, 337 (134 males, 148 females, 55 jacks) were released above the weir, at the time of trapping. The percent release for unmarked males and females was 56% and 44% respectively. A 1:1 ratio was required by NMFS in the IDFG trapping permit. A total of 814 hatchery fish recycled through sport and tribal fisheries downstream of the SFSR weir. In addition, there were 195 ad-clipped hatchery males and 190 ad-clipped hatchery females released downstream of the weir for spawning purposed in cooperation with the Shoshone-Bannock Tribe. These fish were released to spawn naturally instead of collecting and eyeing eggs for their egg box program due to the forest fire that burned a large portion of the Dollar Creek drainage. The Roaring Cr. site has been referred to as the Goat Cr. site in previous years however hatchery staff determined Roaring Cr. is actually closer to the actual release site than Goat Cr. Table 2, 3.

There were 801 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								TOT
One Ocean										
Male Only	MARK	D	KO	PO	RO	RA	RB	KN	KS	
	AD	19	61	351	859	0	5	107	104	1,506
	OM	0	1	0	0	3	0	0	0	4
	NO	0	0	0	0	52	0	0	0	52
Total		19	62	351	859	55	5	107	104	1,562
Two Ocean										
Male / Female	AD	15 / 3	5 / 1	781 / 542	152 / 192	0	1 / 2	1 / 10	6 / 17	961 / 767
	OM	0	0	0	0	3 / 17	0	0	0	3 / 17
	NO	2 / 0	0	0	0	98 / 65	0	0	0	100 / 65
Total		17 / 3	5 / 1	781 / 542	152 / 192	101 / 82	1 / 2	1 / 10	6 / 17	1,064 / 849
Three Ocean										
Male / Female	AD	0	0	51 / 95	4 / 20	0	0	0 / 1	0	55 / 116
	OM	0	0	0	0	10 / 26	0	0	0	10 / 26
	NO	0	0	0	0	23 / 40	0	0	0	23 / 40
Total		0	0	51 / 95	4 / 20	33 / 66	0	0 / 1	0	88 / 182

Note: Re-traps not included in table.

Disposition Key:

KO = Killed other, e.g. research, disease, or spawned out.

PO = Poned; generally fish held for spawning purposes.

RA = Fish released upstream of the weir.

RB = Released Below; hatchery fish released below the weir (SFSR).

RO = Released Other; hatchery fish held for subsistence and recycling below weir.

D = Dead, trap mortality.

KS = Killed for the Shoshone-Bannock Tribe.

KN = Killed for the Nez Perce Tribe.

Table 3. Fish Released Upstream.

Fish Type	OM	NO	Total
Female	43	105	148
Male	13	121	134
Jacks	3	52	55
Total	59	278	337

Mark Type Key:

AD = adipose clip, hatchery fish.

OM = no clip with coded micro-wire tag, supplementation fish.

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

A total of 1,820 SFSR stock adults were held for hatchery production. Pre-spawn mortality for the females was 8.1%, with 9.8% for the males. Improved handling and adult holding techniques contributed to the lower pre-spawn mortality rate. 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. An extra disposition tube was also installed for this process, plus additional shade cover.

Spawning operations began on August 17th and concluded on September 5th. Tuesdays and Fridays were reserved for spawning. A total of 6 spawn days were needed to spawn 335 South Fork females of which eggs from 293 of these females were retained for hatchery production. Eggs were collected from hatchery (ad clip) only.

Spawning procedures remained relatively consistent with recent years. All spawned out carcasses were returned to the South Fork Salmon River immediately below the trap water intake. Approximately 37 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 into activation buckets for approximately two minutes. The eggs were then recombined and placed in an iodine (100ppm) 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. Females were bled prior to spawning to prevent blood from inhibiting fertilization.

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. Eight females were found to be high BKD positive during incubation and their eggs, paired with those from seven other females, were culled prior to hatching resulting in the loss of 52,555 eggs. Eggs from 14 low BKD positive females (ELISA 0.128 – 0.249) were culled to achieve full hatchery rearing capacity. These females were paired with 13 additional females and resulted in culling 99,811 eyed eggs. In all, eggs from 42 females were culled during incubation. In addition nine females were culled during spawning operations (5 BKD visual cull and 4 for egg quality). Overall average fecundity was 4,560 eggs per female and average eye up was 84.8 %

Incubator flows were set at a 5 gpm rate, and incubators were loaded at 2 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 (TU) and were then shocked, picked, and enumerated. Hatching began at approximately 925 TU.

JOHNSON CREEK TRAPPING AND SPAWNING

Nez Perce fisheries personnel transferred 52 unmarked summer chinook salmon trapped at the Johnson Cr. weir to the South Fork facility for brood stock. A total of 28 females, 21 adult males and 3 jacks were transferred. 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 excessive sorting of South Fork males during spawning. Johnson Creek females were held along with SFSR females throughout the spawning process. All Johnson Cr. fish were uniquely marked to distinguish them from South Fork stock. Multiple marks were used to ensure positive identification. Two adipose clipped SFSR stock fish were trapped at the Johnson Cr. trap and transferred to the South Fork facility where they were dispatched and returned to the South Fork for nutrient enhancement.

A total of 116,617 green eggs were collected from 25 females and returned to MCFH for incubation. There were no eggs from the Johnson Creek stock were culled for BKD. Eye up was 82.1% producing 95,741 good eggs. Fecundity was 4,665 eggs per female. Pre-spawn mortality on the females was 10.7 % (3/28) and 4.2 % (1/32) for the males.

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 temperature units (TU). 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 are 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 are started on Skretting BioVita #0 and appear to be doing well. The fish appear to start on feed a little slower than the past. Once they start feeding actively, they appear to do well.

Fish are moved to the outside rearing ponds mid June and mid July. They are adipose clipped, coded wire tagged (CWT), and enumerated as they are 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 2009 for the BY07 South Fork 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 South Fork Trap were given an intra-peritoneal injection of erythromycin at a target dose of 10

mg/kg to limit pre-spawning mortality due to BKD. Pre-spawning mortality was measured at 9% at the South Fork Trap in 2007.

Renibacterium was detected during routine brood stock inspections at the South Fork Trap during 2007. Eggs from females with ELISA optical densities greater than 0.25 were culled from production in the South Fork summer Chinook (8, 2.4%). The Johnson Creek summer Chinook had zero females with an ELISA value above 0.25. Due to excess eggs, the culling point was reduced to 0.127. Thus an additional 99,811 eggs (27 females) were culled from the SFSU production. Neither IHNV nor *Myxobolus cerebralis* were detected in SFSR SU or JC SU brood fish.

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

ORGANOSOMATIC INDEX.

See attachment.

ACUTE LOSSES.

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

OTHER ASSESSMENTS.

DFAT and ELISA values were almost identical for all treatment groups at preliberation sampling. We will continue to investigate the effects of reduction of erythromycin feed. We will be looking for other means of reducing BKD without the use of medicated feed. The Eagle Fish Health Laboratory will develop a method of BKD surveillance using DFAT and Polymerase Chain Reaction to detect early disease development within these fish.

Pre-spawning mortality was approximately 9% for 2007. McCall staff has been diligent in reducing handling. This has brought pre-spawning mortality down from the 30% range to less than ten per cent in the last four years. *Ichthyophthirius multifiliis* has been on the increase for several years in Idaho. It will be important to be vigilant and ready to deal with this parasite .

FISH MARKING

The fish marking crew was here in June and July and marked approximately 1.11 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 51,868 fish. The breakdown of tagged released fish appears in Appendix 10.

FISH DISTRIBUTION

The brood year 2007 smolt hauling operation began on March 23 and concluded on the evening of March 25. There were approximately twenty-five loads of fish hauled in three days. The river conditions were clear and low at the time of release. All together there were 1,106,700 brood year 2007 smolts at 21.25 fish per pound totaling 52,126 pounds released

(Appendix 5). The Sho –BanTribe did not receive any eyed eggs this season due to the Dollar creek drainage being burned, allowing for potential high silt loads during spring runoff.

Nez Perce Tribal fishery personnel transported 91,080 smolts weighing 3,253 pounds to Johnson Creek on March 16 through 18, for release.

EXPERIMENTS

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

CONCLUSIONS

The brood year 2007 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 over-all 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. On June 1, the new weir panels were lowered into place for trapping for the first time. There were no significant design or mechanical flaws observed, the bridge and weir structure performed as expected

There was extreme forest fire activity in the vicinity of the trap facility forcing mandatory evacuation of all personnel on August 3. Limited access was allowed, under escort, to check the condition of the fish in the holding ponds. The water continued to flow, and spawning was successfully completed under extremely smoking conditions. The fire burned completely around the compound but no structures were damaged, thanks to the efforts of the U.S. Forest Service fire crew and their sprinkler system.

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. Age distribution of 2007 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	1,563	1,562	0	0
4	990	1,064	784	849
5	161	88	248	182
Totals	2,714	2,714	1,032*	1,031

CWT data based on 582 snouts recovered at the trap and from the fishery, using R-mix.

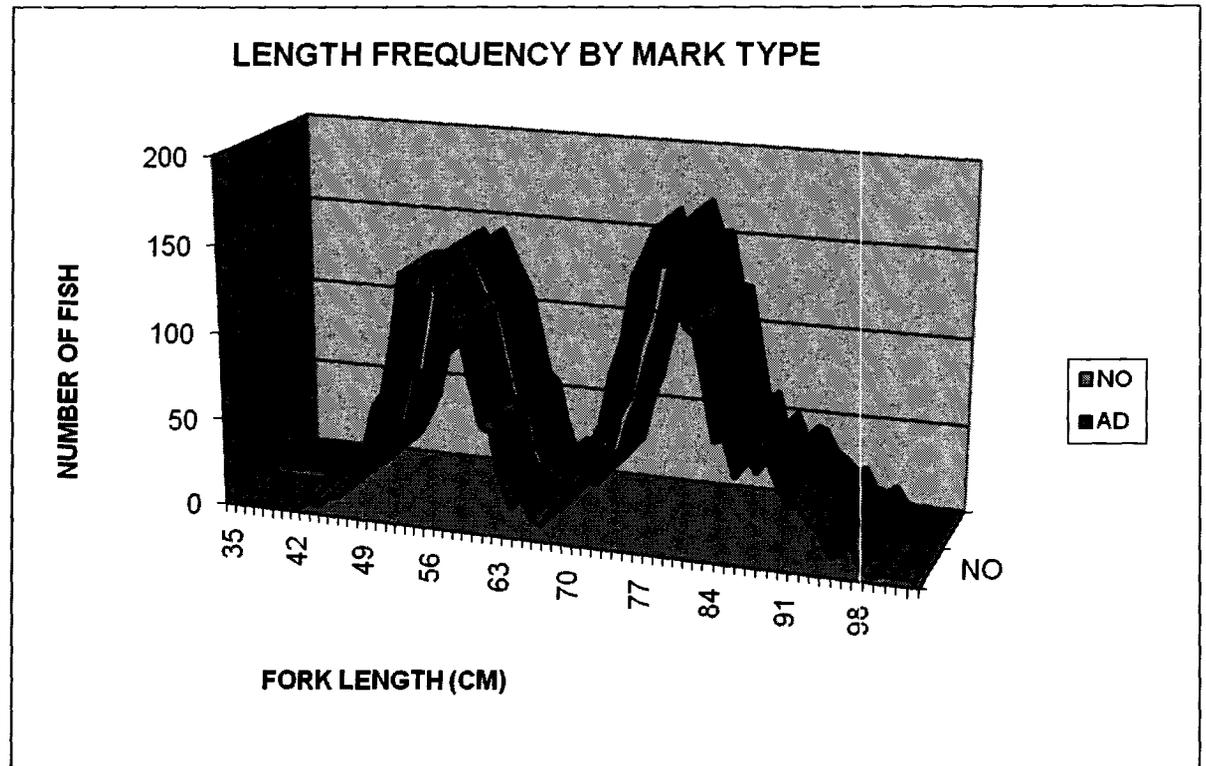
*One extra female was recorded by research.

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

Historical Age-class breakdown

- <67cm = 1 Ocean Male Only
- 66 & 90cm = 2 Ocean Male
- >90 cm = 3 Ocean Male
- <88 cm = 2 Ocean Female
- >87 cm = 3 Ocean Female

Appendix 2	Mark Type		
	Fork L.	AD	NO
35	1	0	1
36	0	0	0
37	0	0	0
38	0	0	0
39	0	0	0
40	0	0	0
41	1	0	1
42	1	0	1
43	3	1	4
44	3	0	3
45	9	0	9
46	9	0	9
47	15	1	16
48	26	0	26
49	39	2	41
50	64	1	65
51	69	5	74
52	98	5	103
53	138	4	142
54	141	1	142
55	128	4	132
56	142	6	148
57	131	3	134
58	119	1	120
59	109	3	112
60	84	1	85
61	59	2	61
62	54	3	57
63	28	2	30
64	12	3	15



65	21	3	24
66	9	1	10
67	7	0	7
68	12	5	17
69	12	6	18
70	26	9	35
71	25	7	32
72	49	9	58
73	64	5	69
74	89	10	99
75	108	8	116
76	135	17	152
77	160	4	164
78	169	9	178
79	151	8	159
80	152	8	160
81	122	5	127
82	121	2	123
83	88	7	95
84	57	11	66
85	61	7	68
86	38	9	47
87	50	10	60
88	36	15	51
89	43	16	59
90	41	4	45
91	30	5	35
92	26	7	35
93	19	8	27
94	21	3	24
95	10	0	10
96	8	3	11
97	12	6	18
98	3	1	4

99	1	0	1
100	2	1	3
101	1	1	2
102	1	2	3
103	1	0	1
104	0	0	0
105	0	0	0
106	0	0	0
108	1	0	1
TOTALS	3465	280	3745

McCall Fish Hatchery 2007 Summer Chinook run timing, South Fork Salmon

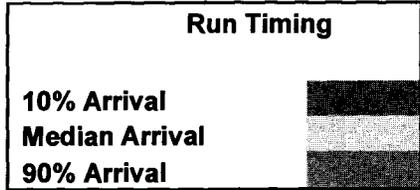
Appendix 3 River.

Females				Males			
Date	Origin			Date	Origin		
	Hatchery	Natural	Grand Total		Hatchery	Natural	Grand Total
14-Jun-07	0	1	0	14-Jun-07	0	0	0
18-Jun-07	0	5	5	18-Jun-07	4	1	5
20-Jun-07	10	4	14	20-Jun-07	6	7	13
21-Jun-07	14	6	20	21-Jun-07	21	4	25
22-Jun-07	17	5	22	22-Jun-07	22	5	27
24-Jun-07	50	13	63	24-Jun-07	97		121
25-Jun-07		3	30	25-Jun-07	60	9	69
27-Jun-07	41	7	48	27-Jun-07		9	80
29-Jun-07	42	5	47	29-Jun-07	132	6	138
01-Jul-07	74	7	81	01-Jul-07	154	9	163
02-Jul-07	57	6	63	02-Jul-07	103	9	112
03-Jul-07	22	7	29	03-Jul-07	45	4	49
05-Jul-07	56	5	61	05-Jul-07	127	15	142
06-Jul-07	61	10	71	06-Jul-07	109	8	117
09-Jul-07	21	2	23	09-Jul-07	91	3	94
10-Jul-07	44	1	45	10-Jul-07	133	5	138
13-Jul-07	91	5	96	13-Jul-07	256	7	263
15-Jul-07	18	0	18	15-Jul-07	52	0	52
16-Jul-07	53	4	57	16-Jul-07	164	11	175
17-Jul-07	1	0	1	17-Jul-07	3	0	3
18-Jul-07	30	1	31	18-Jul-07	79	5	84
23-Jul-07	37	0	37	23-Jul-07	150	5	155
26-Jul-07	3	0	3	26-Jul-07	15	1	16
31-Jul-07	18	1	19	31-Jul-07	130	7	137
08-Aug-07	5	1	6	08-Aug-07	94	1	95
10-Aug-07	0	0	0	10-Aug-07	9	0	9
17-Aug-07	1	0	1	17-Aug-07	22	1	23
20-Aug-07	6	0	6	20-Aug-07	54	3	57
21-Aug-07	5	0	5	21-Aug-07	56	3	59
24-Aug-07	57	3	60	24-Aug-07	49	4	153
27-Aug-07	39	2	41	27-Aug-07	65	4	69

31-Aug-07	20	1	21
05-Sep-07	4	0	4
10-Sep-07	2	0	2
	926	105	1031

31-Aug-07	52	4	56
05-Sep-07	10	1	11
10-Sep-07	4	0	4
	2539	175	2714

Returns			
	<i>Males</i>	<i>Females</i>	<i>Total</i>
<i>Hatchery</i>	2539	926	3465
<i>Natural</i>	175	105	280
<i>Total</i>	2714	1031	3745
Install	1-Jun		
Remove	10-Sep		
First fish	14-Jun		
Last fish	10-Sep		



Appendix 4 Historic hatchery releases and returns tagged at McCall Fish Hatchery

Brood	Release	Number	Year	Year	Year	Year	Year	
Year	Year	of Fish	3-year-olds	Returned	4-year-olds	Returned	5-year-olds	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	0	2009
2005	2007	1,087,170	1,965*	2008	0	2009	0	2010
2006	2008	1,060,540	0	2009	0	2010	0	2011
2007	2009	1,106,700	0	2010	0	2011	0	2012

* Hatchery fish trapped only.

Appendix 5. Summer Chinook distribution in the South Fork of the Salmon River from McCall

Hatchery			
Destination	Weight	Number/pound	Number released
Knox Bridge	21,000	21.25	445,830
Knox Bridge	21,000	21.25	445,830
Knox Bridge	10,126	21.25	215,040
	52,126		1,106,700

Appendix 6. Brood year 2007 summer chinook survival from green eggs to released smolts.

Number of Green Eggs	Number of Eyed Eggs	Percent Survival	Ponded	Released Smolts	Percent Survival
1,348,107	1,143,607	84.83%	1,111,385	1,106,700	82.09%

*Totals do not include 152,366 culled eggs from green egg total.

Appendix 7. Temperature range from August 2007 to April 2009.

Date	Temperature
Aug-07	52.0
Sep-07	49.5
Oct-07	46.5
Nov-07	43.5
Dec-07	39.0
Jan-08	38.0
Feb-08	38.0
Mar-08	38.0
Apr-08	38.0
May-08	42.0
Jun-08	43.5
Jul-08	52.0
Aug-08	47.0
Sep-08	45.5
Oct-08	46.5
Nov-08	44.0
Dec-08	39.5

Jan-09	38.0
Feb-09	37.5
Mar-09	37.5
Apr-09	38.0

Appendix 8. Water analysis at McCall Fish Hatchery.

Date	pH	Ammonia	Nitrate	Nitrite	Total Phosphate	Total Nitrogen	KJEL Hardness	CaCO ₂ 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	<0.05	<0.10			
2008					0.005				
2009					0.009				

Appendix 9. Brood year 2007 production cost table.

Number of Fish	Pounds of Feed	Cost of Feed	Pounds of Fish	Conversion	Total Cost	Cost/1,000	Cost/Pound
1,106,700	44,311.00	\$58,100	52,126	0.85	\$363,882	\$329.01	\$6.98

Appendix 10. Brood year 2007 marked fish released.

Date	Number of Marks Applied	Mark	Purpose	Number Marked Fish Released	Site/group Released
6/09-6/13/08	551,473	AD	Identification	793,256	1,106,700
7/21-7/24/08	293,069	AD	Identification		
7/21-7/24/08	266,843	AD/CWT	US-Canada	261,750*	1,106,700
2/2-2/4/09	51,670	AD/PIT	Migration	51,694	1,106,700
2/24/2009	198	AD/PIT	Migration		
Total	<u>1,163,253</u>			<u>1,106,700</u>	<u>1,106,700</u>

* Shed rate of 1.72% applied to AD/CWT released.

Appendix 11a Summary of Fish Autopsy SFSU

Summary of Fish Autopsy

ACCESSION NO:	09-027	LOCATION:	MCCALL
SPECIES:	SU	AUTOPSY DATE:	2/25/2009
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	4	0	60	N	60	A	20	0	21
B1	0	F	0	S	0	1	0	1	2	R	56	1	0	S	0	B	32	1	36
B2	0	C	0	L	0	2	0	2	12	G	0	2	0	M	0	C	8	2	3
E1	0	M	0	S&L	0			3	23	NO	0			G	0	D	0	3	0
E2	0	P	0	I	0	Mean=0.00		4	23	E	0	Mean=0.00		U	0	E	0		
H1	0	OT	0	OT	0					OT	0			T	0	F	0	Mean=0.7	
H2	0			O	0			Mean=3.1								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		

*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	15
B1	0	F	0	S	0	1	0	1	3	R	53	1	0	S	0	B	51	1	36
B2	0	C	0	L	0	2	0	2	33	G	0	2	0	M	0	C	4	2	9
E1	0	M	0	S&L	0			3	17	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		
H1	0	OT	0	OT	0					OT	0			T	0	F	0	Mean=0.9	
H2	0			O	0			Mean=2.46								OT	0		
M1	0																		
OT	0																		

SUMMARY OF NORMALS

	60	60	60	60	60	60	60	60	60	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

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