



McCALL FISH HATCHERY

2005 Summer Chinook Salmon Brood Year Report



by

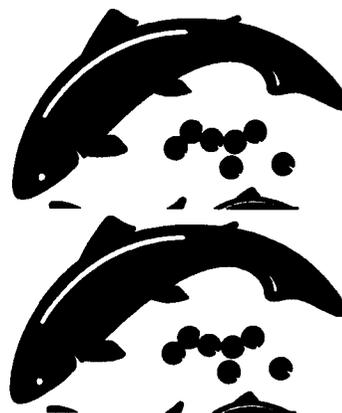
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IDFG
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TABLE OF CONTENTS

Page

ABSTRACT.....	
INTRODUCTION	
OBJECTIVES.....	
FISH REARING FACILITIES	
WATER SUPPLY.....	
STAFFING	
TRAPPING AND SPAWNING	
FISH PRODUCTION.....	
Early Rearing.....	
FISH HEALTH.....	
Diseases Encountered and Treatment.....	
Organosomatic Index.....	
Acute Losses.....	
Other Assessments.....	
FISH MARKING	
FISH DISTRIBUTION	
EXPERIMENTS.....	
CONCLUSION	
RECOMMENDATIONS.....	
APPENDICES.....	

APPENDICES

- Appendix 1. 2005 summer chinook returns to McCall Fish Hatchery, South Fork Salmon River, based on R-mix data and length frequency data age distribution of brood year.

APPENDICES (Continued)

- Appendix 2. Lengths of brood year 2005 fish trapped at McCall Fish Hatchery by mark type
- Appendix 3. Length frequency for brood year 2005 summer chinook broodstock at the South Fork of The Salmon River Trap, according to mark type recorded at McCall Fish Hatchery
- Appendix 4. McCall Fish Hatchery 2005 Summer Chinook Run Timing, South Fork Salmon River
- Appendix 5. McCall Fish Hatchery South Fork Salmon River chinook run timing by origin
- Appendix 6. Historic hatchery releases and returns logged at McCall Fish Hatchery
- Appendix 7. Summer chinook distribution in the South Fork of the Salmon River logged at McCall Fish Hatchery
- Appendix 8. Brood year 2005 chinook survival from green eggs to released smolts
- Appendix 9. Temperature range from August 2005 Through April 2007 at McCall Fish Hatchery
- Appendix 10. Water analysis at McCall Fish Hatchery
- Appendix 11. Brood year 2005 production cost table
- Appendix 12. Brood year 2005 marked fish that were released
- Appendix 13,a., b. Summary of fish autopsy

ABSTRACT

The South Fork Salmon River trapping season began on June 10th with the weir installation and opening of the trap. Trapping operations concluded on September 14, 2005.

Chinook salmon *Oncorhynchus tshawytscha* spawning at the trap commenced on August 16 and concluded on September 6, 2005. A total of 3,214 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 88.8%.

Of the 3,214 fish trapped: 1,474 were females, of which 744 were ponded; 130 were released above the weir, while the remaining hatchery females were used for fishery recycle or subsistence giveaway. There were 13 females that died in the trap. The pre-spawn mortality for females was 7.4%. There were 1,249 adult males trapped of which 120 were released above the weir, 958 were ponded for spawning, with the remaining hatchery males also used for fishery recycle or subsistence. The pre-spawn mortality for the males was 11.6%. There were 491 jacks trapped (according to length frequency criteria). 382 were released upstream of the weir, 34 were used for spawning, with the majority being recycled through the fishery. Due to the high numbers of reserve adults and jacks, there were 885 given to the tribes or charitable organizations.

From the females ponded, 438 South Fork stock were spawned with an average fecundity rate of 4,602 eggs per female, resulting in 2,001,830 green eggs taken. There were 33 Johnson Creek females held and spawned, resulting in 126,000 eyed eggs. There were 337,950 eyed reserve eggs produced for the Sho-Ban tribal egg box program.

During the period of March 19, through March 22, 2006, there were 1,087,170 brood year 2005 smolts weighing 56,850 pounds transported and released at Knox Bridge. Nez Perce tribal fishery personnel transported 120,415 (4,476 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 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 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 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, thus 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 six temporary employees to assist during the busy field season.

TRAPPING AND SPAWNING

The 2005 trapping season started on June 10, with the ponds set up and water turned on in the fish ladder, and weir installation. The first fish was trapped on June 20. Trapping continued through September 14, 2005. Normal trap installation is usually around June 20 with the fish arriving shortly thereafter. The peaks of the run for 2005 were July 7, and August 23.

There were 3,214 fish trapped; 1,474 (46%) were females and 1,740 (54%) were males. A total of 491 male fish (28.2%) were jacks (three-year-old-fish) according to length frequency criteria. There were 130 females, 120 adult males, and 132 jacks released upstream of the weir.

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 2,960 marked (92.1%) and 254 (7.9%) unmarked fish. Of the 2,829 AD clipped reserve fish trapped 139 (4.9%) were noted as having a partial adipose fin. In addition there were 98 (55 females and 43 males) previously trapped and released adipose clipped fish that were re-trapped. Re-trapped fish numbers were considerably lower than last year (623). Of the tags recovered or detected, 123 were PIT tags, 388 CWT, and 21 radio tags. The CWT recovered were from the fishery and the trap.

A total of 120 CWT tags were detected in unclipped fish that were either supplementation fish reared through par at the Stolle acclimation pond from brood years 2001 and 2002, or from a supplementation group, BY 2002 reared through smolt at the McCall Hatchery. These fish were recorded as supplementation fish in the database. Detection and recovery of the tags was important to identify potential year class survival and return rates between brood years. One of the PIT tags detected was from a Johnson Creek stray identified with a right eye fluorescent orange elastomer. This fish was given to the Nez Perce fisheries personnel to be returned to Johnson Creek.

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, 951 (120 males, 130 females, 132 jacks) were released above the weir, at the time of trapping. The percent release for unmarked males and females was 68% and 34% respectively. A 1:1 ratio was required by NMFS in the IDFG trapping permit. There were 616 reserve fish transported to a site near Dollar Creek and a site upstream of, Goat Creek to be recycled through the fishery. ShoBan tribe representatives received 337,950 eyed reserve eggs from McCall Hatchery, for placement into in-stream egg incubation boxes located in the South Fork Salmon River drainage. There were 885 reserve adult and jack salmon killed for consumptive purposes and given to tribal and non-profit organizations

A total of 1,702 SFSSR stock adults were held for hatchery production. Pre-spawn mortality for the females was 7.4%, with 11.6% 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. Nez Perce fisheries personnel held 75 summers Chinook salmon trapped from Johnson Cr. on site at the South Fork trap, 37 females and 36 males (2 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 Cr. fish were uniquely marked to distinguish them from South Fork stock. Multiple marks were used to ensure positive identification. A total 142,940 green eggs were collected from 33 females. There were no females culled due high BKD ELISA values. Eye up was 88.2% and fecundity was 4,332 eggs/female. Spawning operations began on August 16 and concluded on September 6. Tuesdays and Fridays were reserved for spawning. A total of 7 spawn days were needed to spawn 438 South Fork females, resulting in 2,001,830 green eggs.

Spawning procedures remained relatively consistent with recent years. Reserve fish were spawned with reserve fish. Hatchery staff tried to spawn unmarked fish with ventral clips (supplementation) when possible 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 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.

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 0.145 or greater were culled out from the population. A total of 42 females returned ELISA values of 0.145 or greater. Three hatchery females were culled during spawning operations. Trays with double females lost two fish, bringing the total effective number of females culled to 84. Overall average fecundity was 4,602 eggs/female and average eye up was 88.8 %.

Incubator flows were set at a five gallon per minute 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.

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 TU. Flows for the vats are set at 80 gallons per minute 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-inch 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. 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 2.4% increase in production numbers, determined at marking, resulting in an additional 26,037 fish on hand. By the end of September, there were 1,088,609 fish on station. There also 120,698 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 2007 for the BY'05 South Fork and Johnson Creek summer Chinook programs. Either one or no prophylactic treatments of erythromycin medicated feed were applied to Chinook salmon to control *Renibacterium salmoninarum*, the causative agent of Bacterial Kidney Disease. The target dose of 100 mg/kg for 28 days was applied to roughly one half of the South Fork of the Salmon River summer Chinook (SFSR SU) salmon and all of the Johnson Creek summer Chinook salmon (JC SU). 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.

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 the South Fork summer Chinook (11, 2.53%). The Johnson Creek summer Chinook did not have any ELISA positive females detected in 34 fish sampled. Due to excess eggs, the culling point was reduced to 0.145. Thus an additional 138,000 eggs were culled from production. IHNV was not detected in SFSR SU or JC SU brood fish.

Preliberation ELISA sampling detected 0/4+ pools for all Chinook salmon stocks reared at this facility. 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 8% for 2005. 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 three years. *Ichthyophthirius multifiliis* has been on the increase for several years. 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 1.14 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 51,733 fish. The breakdown of tagged released fish appears in Appendix 13. Nez Perce Tribal Fishery personnel tagged 394 fry from our production group with "mini" PIT to determine how small a fish could be and be tagged and still survive. There were 372 fish released with the regular release containing these tags.

FISH DISTRIBUTION

The brood year 2005 smolt hauling operation began on March 19 and concluded on the evening of March 22. There were approximately twenty-eight loads of fish hauled in four days. The river conditions were clear and low at the time of release. All together there were 1,087,170 brood year 2005 smolts at 19.12 fish per pound totaling 56,850 pounds released. (Appendix 7).

Nez Perce Tribal fishery personnel transported 120,415 smolts weighing 4,476 pounds to Johnson Creek on March 12 through 14, for release.

APPENDICES

Appendix 1. Age distribution of 2005 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	510	491	0	0
4	1,146	1,131	1,165	1,246
5	84	118	309	228
Totals	1,740	1,740	1,474	1,474

*CWT data based on 388 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

<68 cm = three-year-olds
 68-85 cm = four-year-old males
 >85 cm = five-year-old males
 <84 cm = four-year-old females
 ≥84 cm = five-year-old females

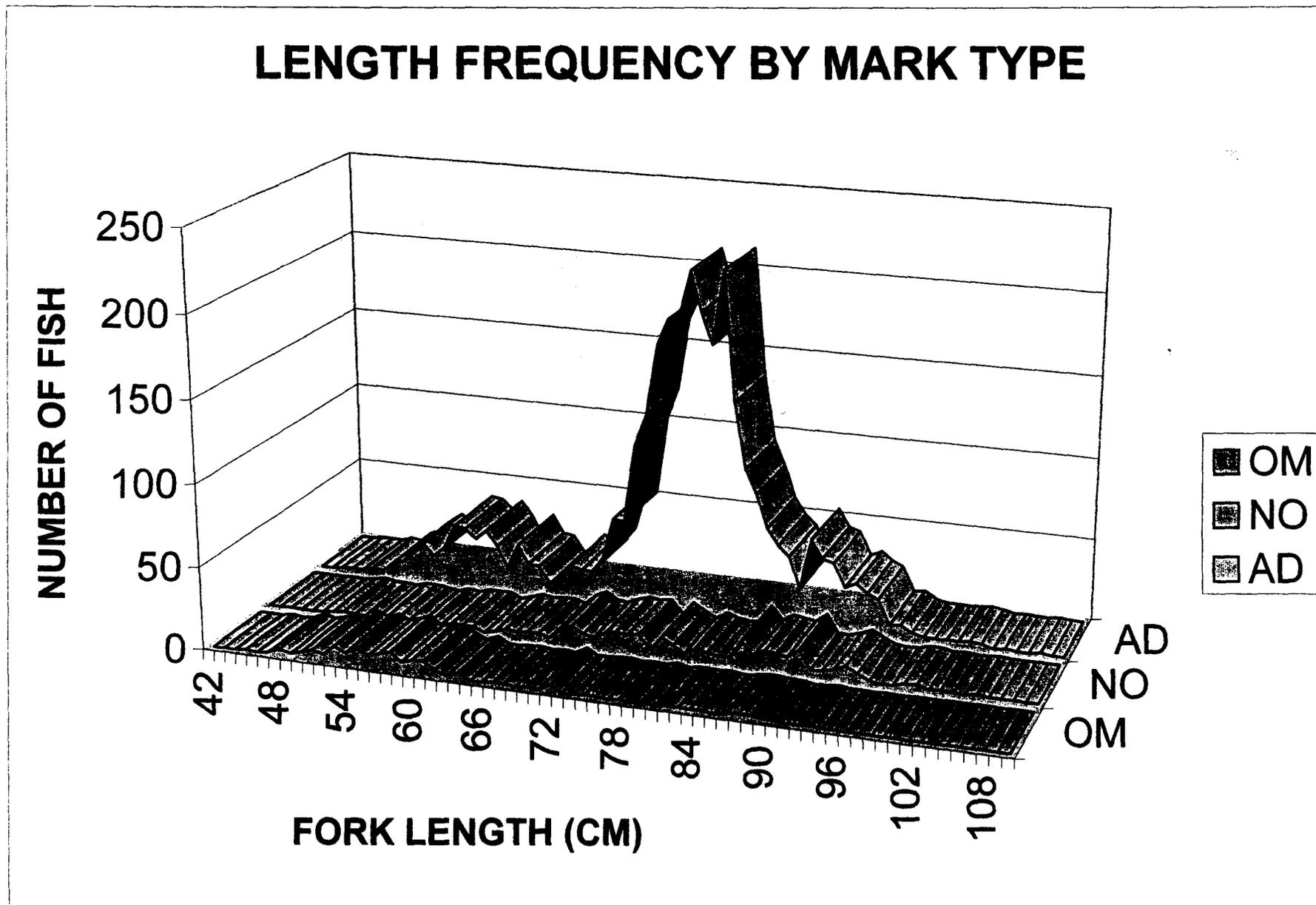
Appendix 2. Lengths of brood year 2005 fish trapped at McCall Hatchery by mark type.

Fork Length (cm)	Ad-clip	Supplementation	No Mark
44	1	0	0
45	1	1	0
46	1	0	0
47	3	1	0
48	2	4	1
49	8	2	2
50	10	4	1
51	18	6	1
52	23	4	0
53	16	10	2
54	22	7	2
55	37	10	1
56	36	7	0
57	30	9	2
58	36	11	1
59	27	6	3
60	14	8	3
61	29	8	3
62	18	4	0
63	17	1	2
64	7	4	4
65	11	0	3
66	20	0	4
67	18	1	4
68	18	1	2
69	27	0	8
70	53	1	11
71	52	0	7
72	101	4	6
73	120	0	9
74	164	0	11
75	180	1	10
76	183	1	11
77	210	0	3
78	186	1	11
79	167	0	7
80	212	2	3
81	133	0	7
82	93	1	5
83	78	1	4
84	58	1	4
85	48	1	15
86	42	0	7
87	23	1	11
88	54	2	10
89	43	2	9
90	41	1	14
91	27	1	3

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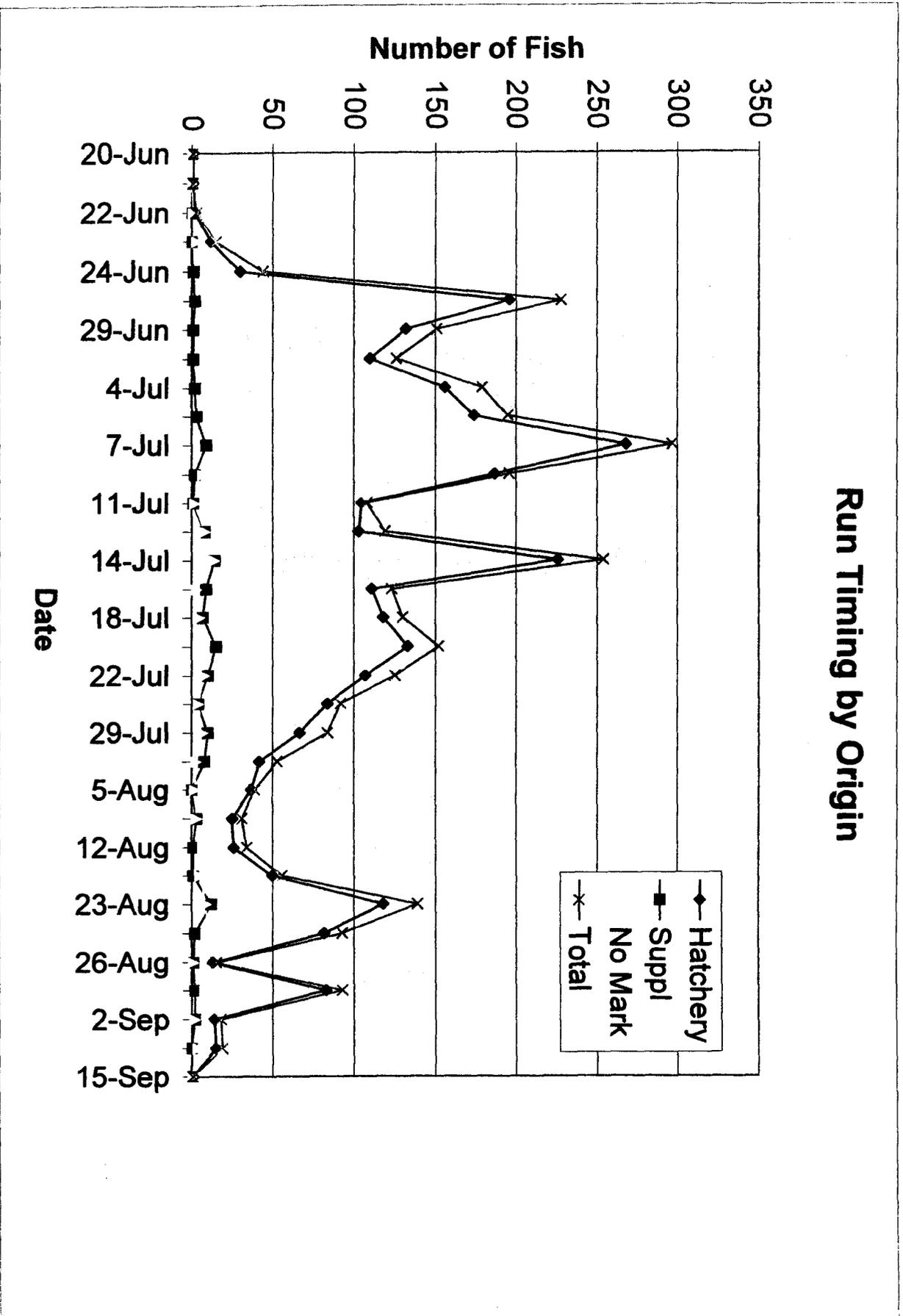
92	30	0	3
93	25	0	5
94	22	1	8
95	7	0	4
96	8	0	1
97	4	0	0
98	2	0	0
99	2	0	2
100	2	0	2
101	2	0	0
102	3	0	1
103	2	0	0
104	0	0	0
105	1	0	1
106	0	0	0
107	0	0	0
108	1	0	0
109	0	0	0
110	0	0	0
111	0	0	0
Totals	2829	131	254

Appendix 3. Length Frequency by Mark Type



Appendix 4 McCall Fish Hatchery 2005 Summer Chinook run timing, South Fork Salmon River.

Date	Number Trapped
6/20	1
6/21	1
6/22	3
6/23	15
6/24	44
6/27	228
6/29	151
7/1	126
7/4	179
7/6	195
7/7	297
7/8	196
7/11	108
7/12	119
7/14	254
7/15	123
7/18	130
7/20	152
7/22	125
7/25	92
7/29	84
8/1	53
8/5	39
8/8	31
8/12	34
8/19	56
8/23	139
8/25	93
8/26	15
8/30	93
9/2	18
9/6	19
9/15	1
Totals	3,214



Appendix 6. Historic hatchery smolt releases and returns logged at McCall Hatchery

Brood Year	Release Year	Number of Fish	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	1,182,615	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	346	2005
2001	2003	1,053,660	904	2004	2,377	2005	116	2006
2002	2004	1,088,810	491	2005	1,740	2006	0	2007
2003	2005	1,047,530	295	2006	0	2007	0	2008
2004	2006	1,096,130	0	2007	0	2008	0	2009

Appendix 7. Summer Chinook distribution in the South Fork of the Salmon River from McCall Hatchery

Destination	Weight	Number/pound	Number released
Knox Bridge	16,800	19.12	321,216
Knox Bridge	16,800	19.12	321,216
Knox Bridge	16,800	19.12	321,216
Knox Bridge	6,450	19.12	123,522
	56,850		1,087,170

Appendix 8. Brood year 2005 summer chinook survival from green eggs to released smolts.

Number of Green Eggs	Number of Eyed Eggs	Percent Survival	Ponded	Percent Survival	Released Smolts	Percent Survival
2,001,830	1,777,700	88.80%	1,089,357	99.10%	1,087,170	82.20%

*Totals do not include culled eggs from green egg total, eyed eggs to Sho-Bans.

Appendix 9. Temperature range from August 2005 to April 2007.

Date	Temperature
Aug-05	51.0
Sep-05	48.7
Oct-05	45.5
Nov-05	43.0
Dec-05	39.5
Jan-06	38.0
Feb-06	37.0
Mar-06	38.0
Apr-06	40.0
May-06	44.5
Jun-06	51.0
Jul-06	51.0
Aug-06	53.0
Sep-06	50.0
Oct-06	47.5
Nov-06	42.5
Dec-06	40.0
Jan-07	39.0
Feb-07	38.0
Mar-07	39.0
Apr-07	40.0

Appendix 10. 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	0.01	<0.10			

Appendix 11. Brood year 2005 production cost table.

Number of Fish	Pounds of Feed	Cost of Feed	Pounds of Fish	Conversion	Total Cost	Cost/ 1,000	Cost/ Pound
1,087,170	58,916.00	\$55,368	56,850	1.05	\$399,856	\$367.85	\$7.03

Appendix 12. Brood year 2005 marked fish released.

Date	Number of Marks Applied	Mark	Purpose	Number Marked Fish Released	Site/group Released
6/05-6/15/06	828,453	AD	Identification	772,840	1,087,180
7/10-7/20/06	262,583	AD/CWT	US-Canada	262,225	1,087,180
2/12-2/13/07	51,827	AD/PIT	Migration	51,733	1,087,180
		AD/"mini"PIT	NPT Tag Study	372	1,087,180
Total	1,142,863			1,087,170	1,087,180

Appendix 13. Summary of fish autopsy (SFSU).

Summary of Fish Autopsy

ACCESSION NO:	07-040	LOCATION:	MCCALL
SPECIES:	SU	AUTOPSY DATE:	2/28/2007
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	41.90	1.80	0.05
LEUCOCRIT	0.00	0.00	0.00
SERUM PROTEIN	8.00	0.70	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	0	0	20	N	20	A	0	0	5
B1	0	F	0	S	0	1	0	1	1	R	20	1	0	S	0	B	20	1	14
B2	0	C	0	L	0	2	0	2	5	G	0	2	0	M	0	C	0	2	1
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	5	E	0	Mean=0.00		U	0	E	0		
H1	0	OT	0	OT	0					OT	0			T	0	F	0		Mean=0.8
H2	0			O	0			Mean=2.9								OT	0		
M1	0																		
OT	0																		

SUMMARY OF NORMALS

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: One application of ery 18.6 fish/lbs
 Ducks in pond

Appendix 13a. Summary of fish autopsy (SFSU)

Summary of Fish Autopsy

ACCESSION NO: 07-041 LOCATION: MCCALL
 SPECIES: SU AUTOPSY DATE: 2/28/2007
 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	41.10	2.00	0.05
LEUCOCRIT	0.00	0.00	0.00
SERUM PROTEIN	8.10	0.69	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	1	B	0	0	20	N	20	A	0	0	5
B1	0	F	0	S	0	1	0	1	1	R	20	1	0	S	0	B	20	1	14
B2	0	C	0	L	0	2	0	2	4	G	0	2	0	M	0	C	0	2	1
E1	0	M	0	S&L	0			3	11	NO	0			G	0	D	0	3	0
E2	0	P	0	I	0	Mean=0.00		4	3	E	0	Mean=0.00		U	0	E	0		
H1	0	OT	0	OT	0					OT	0			T	0	F	0		Mean=0.8
H2	0			O	0			Mean=2.7								OT	0		
M1	0																		
OT	0																		

SUMMARY OF NORMALS

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

GENERAL REMARKS:

FINS:

GONADS:

SKIN:

OTHER: No application of ery

19.26 fish/lbs

Appendix 13b. Summary of Johnson Creek fish autopsy.

Summary of Fish Autopsy

ACCESSION NO: 07-042 LOCATION: MCCALL
 SPECIES: SU AUTOPSY DATE: 2/28/2007
 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	41.11	5.02	0.11
LEUCOCRIT	0.00	0.00	0.00
SERUM PROTEIN	8.15	0.50	0.08

*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	1	0	20	N	20	A	0	0	2
B1	0	F	0	S	0	1	0	1	8	R	19	1	0	S	0	B	20	1	15
B2	0	C	0	L	0	2	0	2	8	G	0	2	0	M	0	C	0	2	3
E1	0	M	0	S&L	0			3	4	NO	0			G	0	D	0	3	0
E2	0	P	0	I	0	Mean=0.00		4	0	E	0	Mean=0.00		U	0	E	0		
H1	0	OT	0	OT	0					OT	0			T	0	F	0		Mean=1.05
H2	0			O	0			Mean=1.8								OT	0		
M1	0																		
OT	0																		

SUMMARY OF NORMALS

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

GENERAL REMARKS:

FINS:

GONADS:

SKIN:

OTHEI These fish received one ery treatment.

