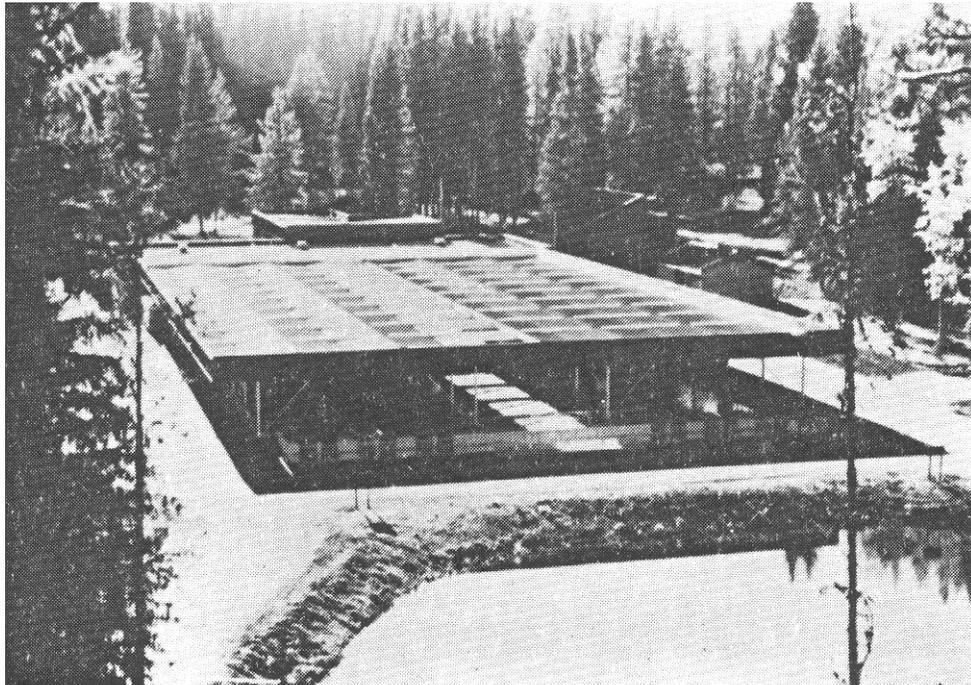




LOWER SNAKE RIVER
COMPENSATION PLAN
Hatchery Program

McCALL FISH HATCHERY

1997 Summer Chinook Salmon Brood Year Report



by

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ABSTRACT

The South Fork Salmon River weir and trap were installed on July 7, 1997 and removed at the conclusion of trapping on September 10, 1997. The ladder was closed on September 2, 1997.

Chinook salmon *Oncorhynchus tshawytscha* spawning at the trap commenced on August 8 and concluded on September 10, 1997. A total of 3,659 returning chinook salmon were trapped, measured, and recorded during this period. The overall average eye-up from eggs taken was 82.2%.

Of the 3,659 fish trapped, 1,598 were females, of which 615 were ponded and 968 were trucked or released. The pre-spawn mortality for females was 9.4%. There were 2,016 adult males trapped of which 931 were ponded and 1,109 were trucked or released. The pre-spawn mortality for the males was 7.1%. There were 45 jacks trapped (according to length frequency criteria); 11 were released, 15 were used for spawning. Due to the extremely low number of jacks, none were given to the tribes or to charitable organizations.

Of the females ponded 563 were spawned, with an average fecundity rate of 4,497 eggs per female, resulting in 2,523,059 green eggs taken.

During April 1999, there were 1,182,611 brood year 1997 smolts weighing 49,492 pounds transported and released at Knox Bridge on the South Fork Salmon River. In August of 1998, 49,872 supplementation parr weighing 333 pounds, were released in a supplementation acclimation pond near Stolle Meadows.

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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. Funding for LSRCP is administered to the Idaho Department of Fish and Game (IDFG) by the U.S. Fish and Wildlife Service (USFWS).

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 received 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 visitors center with restrooms, a flow chart for a self-guided tour, and historical information signs. Three residences for permanent personnel are 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) with 320 cubic feet of rearing area per vat.
3. Two concrete rearing ponds 196-ft x 40.5-ft x 4-ft (water depth) with 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 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 four temporary employees to assist during the busy season.

TRAPPING AND SPAWNING

The weir and trap on the South Fork Salmon River was installed on July 7, 1997. Trapping continued through September 2, 1997 with the first fish trapped on July 8. Normal trap installation is usually around June 20 with the fish arriving shortly thereafter. The peak of the run for 1997 was July 16.

There were 3,659 fish trapped; 1,598 (43.7%) were females, and 2,061 (56.3%) were males. A total of 45 male fish (2%) were jacks (three-year-old fish) according to length frequency criteria. There were 237 females, 304 adult males, and six jacks released upstream of the weir. There were 577 females, 612 adult males, and four jacks transported downstream of the weir and released. Of these fish, 206 females and 206 males were released for natural spawning after the consumptive season closed. The rest were recycled through the fishery. There were also 154 females, 200 adult males, and one jack transported to the Boise and Payette rivers to create a consumptive fishery. This is the first consumptive salmon fishery on the South Fork of the Salmon River since the mid-sixties.

Trap data obtained from the fish included fork length, sex, and mark type. The fish were also checked for internal and external tags. A hypural length and weight measurement was obtained from a small number of fish as well. Listed fish received a numbered tag attached to the opercle with stainless steel staples; the reserve fish were also tagged late in the run to insure the spawn take would be representative of the entire run.

There were 29 fish trapped which had radio transmitters (19), jaw tags (8), or PIT tags (2). Thirteen of the fish with transmitters also had visual implant tags above the left eye. Transmitter tagged fish were part of a migration study on Chinook and sockeye salmon being conducted by the University of Idaho.

Of the 3,659 fish trapped, 235 snouts were removed from adipose fin-clipped (AD) fish indicating coded-wire tags (CWT). These were sent to the lab in Lewiston, Idaho for tag removal.

The age-class determination by length frequency was used at the trap site during initial trapping. The CWT recovery data and scale analysis show an overlap of age-classes originally determined using length frequency (Appendix 1).

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

Of the total number of supplementation fish released 257 (140 male, 117 female) were released at the weir. This includes fish that were released immediately after trapping (same day) and fish that were originally held in the ponds and later released. All unmarked fish releases were

done immediately after trapping. The percent release for unmarked males and females were 67% and 66% respectively.

Pre-spawns mortality was 9.4% for the females and 7.1% for the males. Fish that were held in the ponds and later released were included in the calculation for pre-spawn mortality. Spawning activities started on August 8 and finished on September 10, 1997. There were ten spawning days during this period. Five females were culled on-site; four reserve fish for bacterial kidney disease and one supplementation fish for having already spawned out. Two supplementation females were given to the Sho-Ban tribe for distribution to stream egg boxes. Nez Perce fisheries workers were present during several spawn days to collect sperm for cryogenics preservation. A total of 2,523,059 green eggs were taken from 561 females for an average fecundity rate of 4,497 eggs per female. There were 34 unmarked females, three left ventral clipped, 148 right ventral clipped fish spawned for supplementation research, 374 for reserve or production fish. The average eye-up rate was 86.2%. A total of 922 adult males and 15 jacks were used in the spawning operation. All eggs taken were water-hardened for one hour in a 200 ppm titrateable iodine solution prior to being transported to the hatchery. The fecundity rate is estimated at 4,500 eggs per female until the eye-up stage is reached and the eggs are enumerated. At eye-up, the eggs are shocked by siphon, picked with an electronic picker, and enumerated by displacement and an electronic counter. The overall eye-up totaled 2,032,722 eggs for the eggs kept at McCall hatchery. The Sho-Ban tribe received 201,652 reserve eggs and 132,375 supplementation eggs. Most of the eggs that were released to the Sho-Ban tribe were incubated at Sawtooth hatchery. Spawning mortalities were returned to the river both above and below the weir for nutrient enhancement.

All of the spawned females were disease sampled by pathologists from the Eagle Lab. Fish with ELISA values of 0.4 or greater were considered high positive for bacterial kidney disease (BKD). A total of 141,013 eggs were culled out due to BKD.

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

Eggs eyed-up at approximately 600 thermal units (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 the first part of May and in mid-July. They are adipose clipped, ventral clipped, coded wire tagged (CWT), and enumerated as they are moved to the ponds. There were 49,872 supplementation fish moved to the Stolle Meadows acclimation pond for release in early October. The Nez Perce Tribal Fishery transported 10,434 parr to Dollar Creek and 44,933 parr to Buckhorn Creek on July 30 and August 5. An additional 158,000 parr will be released in early October by the tribe. By the end of August, there were 1,340,370 fish on station. Approximately 320,000 of these are supplementation fish (appendix 13).

FISH HEALTH

Diseased Encountered and Treatment

Fish health was excellent during the past brood year. One DFAT positive fish (*Renibacterium*) was found prior to the initial prophylactic erythromycin medicated feed treatment. No other DFAT positive fish were found at this facility during this brood year. *Ichthyophthirius multifiliis* was detected during a routine inspection. No treatment was applied since the water temperatures were dropping for the winter. Otherwise these fish experienced an uneventful disease history while at MCFH.

Organosomatic Index

Summary of Fish Autopsy (Appendix 14).

Acute Losses

Acute losses were not experienced by this facility during this brood year. Chronic losses should be attributed to aeromonads and pseudomonads.

Other Assessments

Better nutrition has eliminated the mortality known as "Spring Thing". The hatchery staff applies a vitamin-fortified feed during April and May which seems to alleviate any signs of the disease.

Prior to 1992, McCall Fish Hatchery was plagued by epizootics of *Renibacterium* (BKD). Since the implementation of ELISA-based segregation (culling), BKD epizootics have been limited to high BKD segregation groups. The ELISA-based segregation program should be incorporated into the Nez Perce Tribe's (NPT) Johnson Creek program. These programs should not be antagonistic, but complementary. Tribal programs should utilize the same criteria in producing Chinook as does McCall Fish Hatchery.

FISH MARKING

The fish marking crew was here in May and July and marked approximately 1.5 million fish. These fish received Ad clips, CWT/Ad-clips, CWT only, and Left Ventral (V) clips.

The marking crew returned in March and Passive Integrated Transponder (PIT) tagged 48,021 fish. The breakdown of tagged released fish appears in Appendix 13.

FISH DISTRIBUTION

The brood year 1997 smolt hauling operation began on April 5, 1999 with the release of the reserve and supplementation fish, and concluded on the evening of the April 8, 1999. There were approximately twenty-six loads of fish hauled in four days. The river conditions were excellent for the release. In all, 1,182,616 brood year 1997 smolts at 23.9 fish per pound totaling 49,482 pounds were released (Appendix 8).

EXPERIMENTS

The supplementation research carried over to the brood year 1997 chinook. This project was designed in an attempt to generate more returning adults to natural spawning grounds. Supplementation smolts are the prodigy of unmarked adults. These fish were isolated within the hatchery until they could be differentially marked to ensure that genetic crossover with hatchery production fish would not occur. When these fish return as adults, a portion will be kept for spawning purposes to continue this program. There were 128,084 smolts released in the supplementation group that received a left Ventral (LV) clip. These fish were released at the same time as the normal production group. In August 1998, there were two groups of supplementation parr, totaling 49,872 CWT only, released into an acclimation pond that was renovated near Stolle Meadows. These fish were put into the pond in two steps to ensure the pond would not experience problems similar to those encountered in 1977, which resulted in most of those fish escaping into the river within a few days of stocking. Minor losses occurred initially, but further remedial steps stopped apparent avenues of escape.

Low phosphate feed with a higher vitamin pack was utilized on the brood year 1997 fish with no adverse effects noted. This resulted in a reduction of total phosphorous in the hatchery effluent water to the minimum detectable amount (Appendix 11).

CONCLUSIONS

The brood year 1997 summer chinooks released from MCFH were in excellent condition at release time. The overall survival rate to Lower Granite Dam was estimated at 50.3% based on PIT tag recoveries at the dam. The isolation 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.

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 utilizing low phosphate feed. All of the chinook eggs that tested high-positive BKD were culled this year and this program should be continued as egg numbers will allow. The Gabion baskets need to be replaced to make a stable footing for the weir as the existing ones have rotted out over time.

APPENDICES

Appendix 1. Age distribution of 1997 summer chinook returns based on CWT and length frequency.

Age	Males		Females	
	CWT* Estimate	Length/ frequency Estimate	CWT Estimate	Length/ frequency Estimate
3	0	45	0	0
4	2,061	1,903	1,512	1,545
5	0	113	86	53
Totals	2,061	2,061	1,598	1,598

* CWT data based on 208 tags recovered from 229 snouts.
Length data is taken at trapping prior to first sort.

Age-class breakdown

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

Appendix 2. Lengths of brood year 1997 fish Trapped at McCall Fish Hatchery.

Fork Length (cm)	Males	Females
45	1	
46	3	
47	2	
48	3	
49	1	
50	1	
51	3	
52	0	
53	3	
54	2	
55	1	
56	0	
57	3	
58	5	
59	3	
60	1	
61	1	
62	4	
63	3	
64	1	
65	3	
66	1	
67	7	1
68	7	1
69	12	0
70	15	5
71	23	4
72	30	9
73	47	19
74	65	38
75	72	57
76	101	67
77	138	108
78	126	129
79	149	146
80	168	195
81	179	182
82	162	160
83	132	134
84	120	119
85	93	74
86	73	39
87	67	35
88	65	14
89	52	9

Appendix 2. Lengths of brood year 97 fish trapped at McCall Fish Hatchery (continued)

Fork Length (cm)	Males	Females
90	45	12
91	25	4
92	11	5
93	9	12
94	9	4
95	4	5
96	1	3
97	2	2
98	1	2
99	2	2
100	1	0
101	0	0
102	0	1
103	0	0
104	0	0
105	2	0
106	0	1
107	0	0
108	1	0
TOTALS	2061	1598

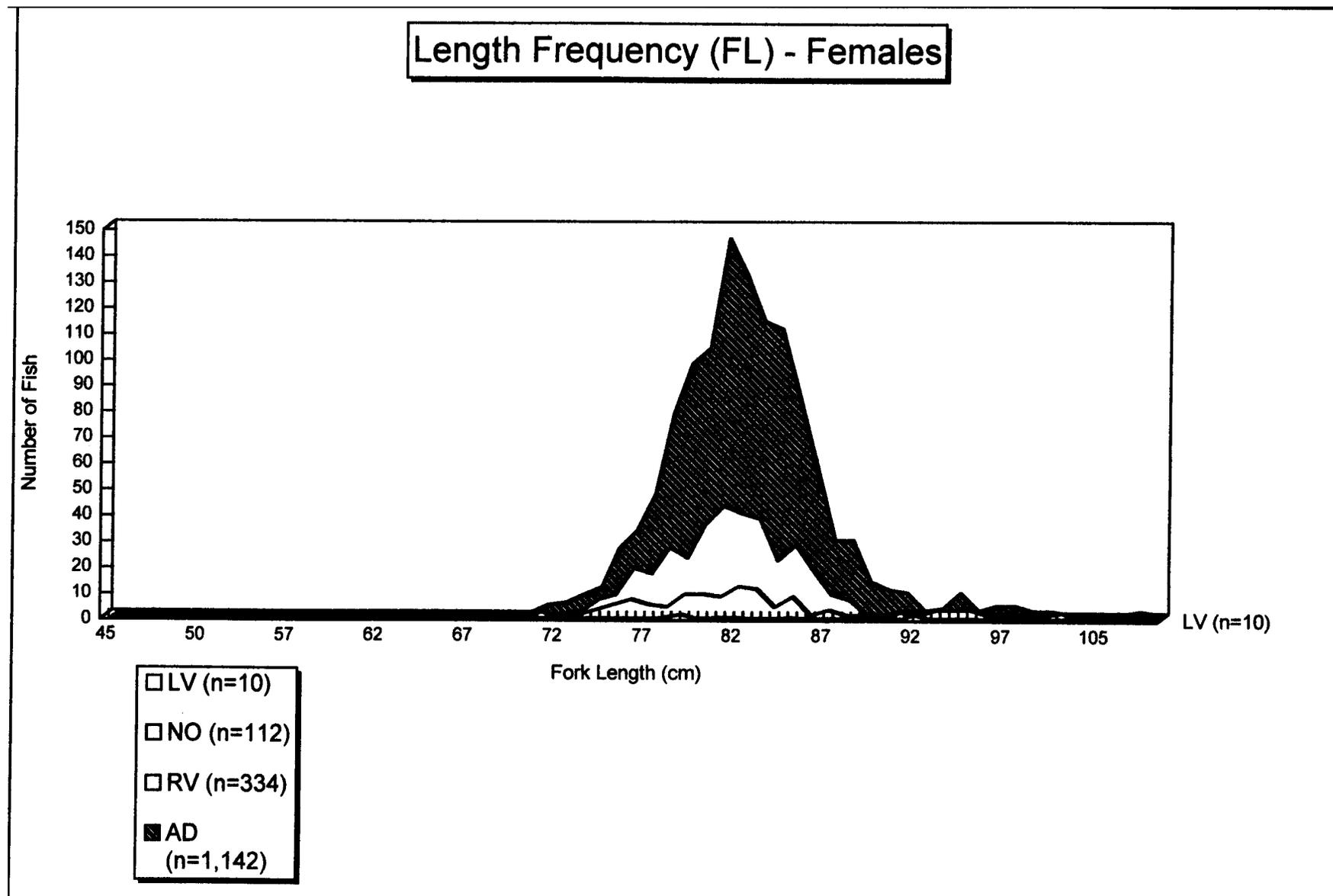
Appendix 3. Length frequency for brood year 1997 broodstock at the South Fork of the Salmon River trap, according to mark type.

Fork Length (cm)	No. Mark	LV	RV	AD
45	0	0	0	1
46	0	3	0	0
47	0	2	0	0
48	0	3	0	0
49	0	0	0	1
50	0	1	0	0
51	0	0	0	3
52	0	0	0	0
53	0	1	0	2
54	0	2	0	0
55	0	0	0	1
56	0	0	0	0
57	0	1	0	2
58	0	4	0	1
59	0	1	0	2
60	0	0	0	1
61	0	1	0	0
62	1	1	1	1
63	0	1	0	2
64	0	0	0	1
65	2	0	0	1
66	1	0	0	0
67	2	1	2	3
68	2	0	1	5
69	4	0	2	6
70	2	0	8	10
71	4	0	2	21
72	8	0	5	26
73	10	0	16	40
74	7	0	26	70
75	14	0	34	81
76	20	0	36	112
77	21	3	50	172
78	19	3	48	185
79	15	0	65	215
80	18	1	75	269
81	25	2	71	263
82	23	1	65	233

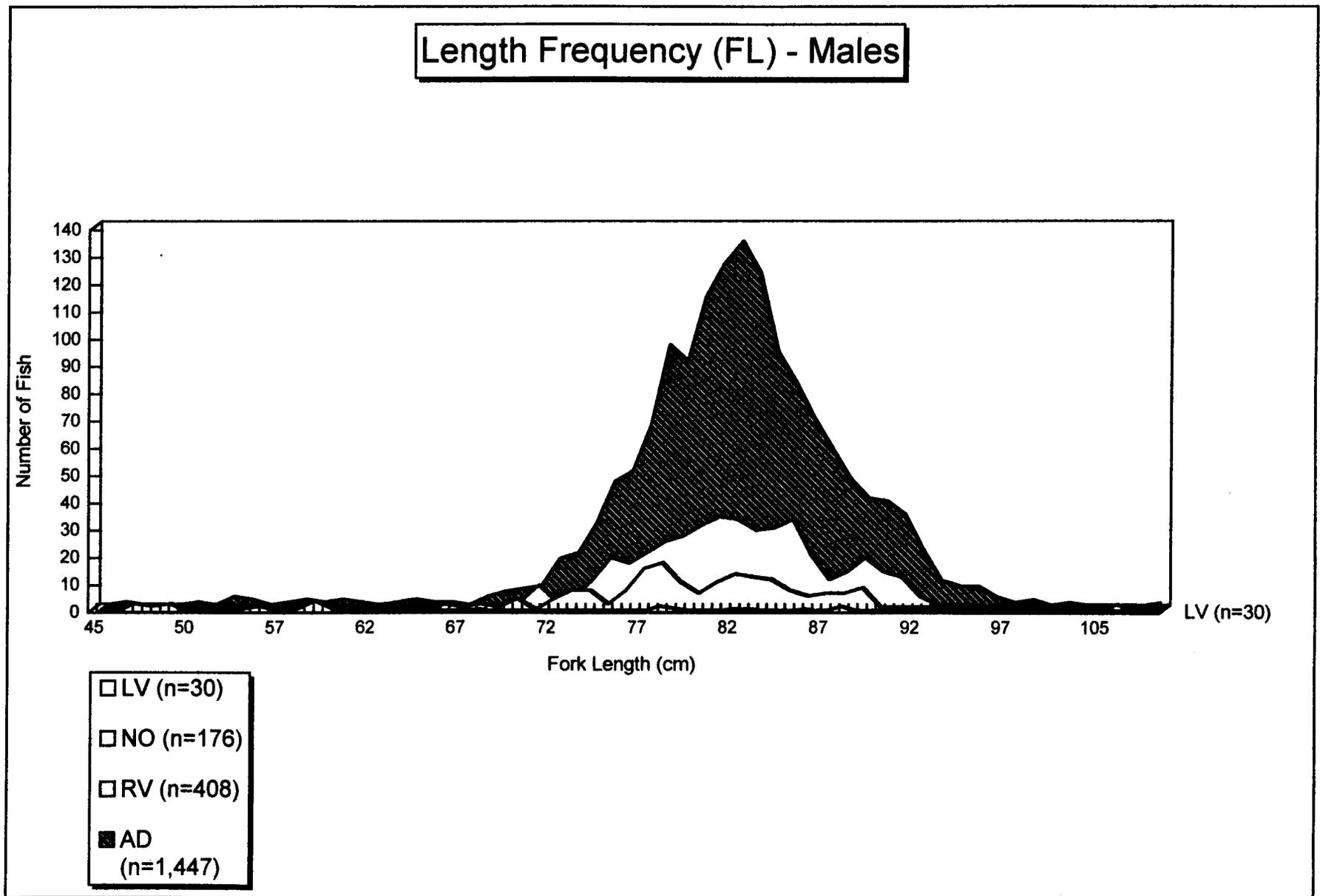
Appendix 3. (continued)

Fork Length (cm)	No. Mark	LV	RV	AD
83	15	0	50	201
84	15	1	59	164
85	6	1	36	124
86	9	0	18	85
87	7	2	19	74
88	9	1	18	51
89	1	0	13	47
90	3	0	13	41
91	2	2	4	21
92	4	0	1	11
93	4	0	2	15
94	4	0	1	8
95	2	0	1	6
96	0	0	0	4
97	1	0	0	3
98	2	0	0	1
99	3	0	0	1
100	1	0	0	0
101	0	0	0	0
102	0	1	0	0
103	0	0	0	0
104	0	0	0	0
105	2	0	0	0
106	0	0	0	1
107	0	0	0	0
108	0	0	0	1
TOTAL	288	40	742	2589

Appendix 4. South Fork Salmon River summer chinook length frequency graph BY97.



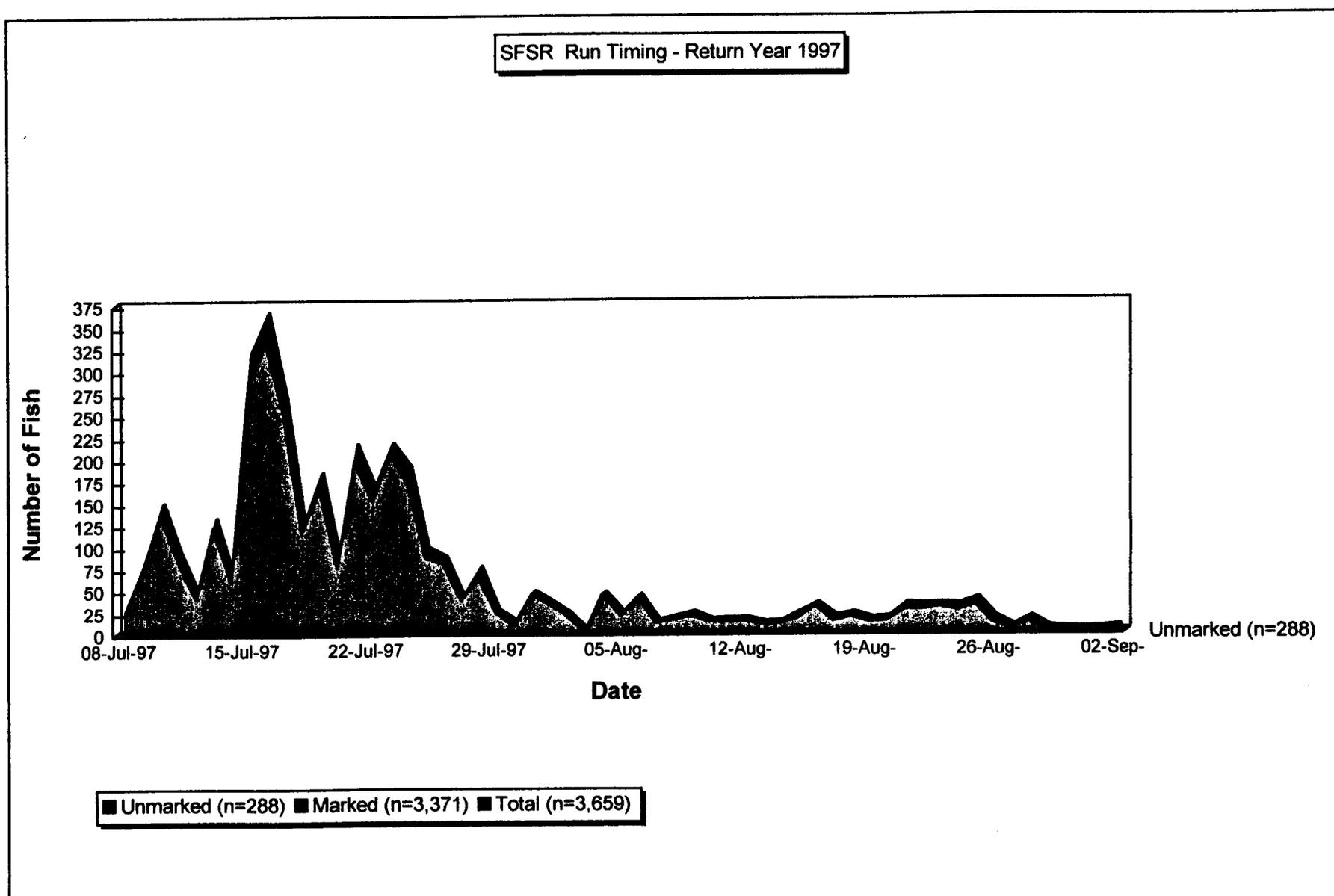
Appendix 4. South Fork Salmon River summer chinook length frequency graph BY97 (continued).



Appendix 5. McCall Fish Hatchery 1997 summer chinook run timing, South Fork Salmon River.

Date	Number Trapped	Date	Number Trapped
7/8	31	8/9	21
7/9	81	8/10	13
7/10	146	8/11	14
7/11	89	8/12	14
7/12	42	8/13	10
7/13	129	8/14	11
7/14	63	8/15	21
7/15	316	8/16	31
7/16	363	8/17	16
7/17	266	8/18	20
7/18	124	8/19	14
7/19	180	8/20	15
7/20	83	8/21	31
7/21	213	8/22	22
7/22	164	8/23	31
7/23	214	8/24	30
7/24	187	8/25	37
7/25	95	8/26	15
7/26	84	8/27	5
7/27	39	8/28	15
7/28	73	8/29	4
7/29	23	8/30	3
7/30	11	8/31	2
7/31	45	9/1	3
8/1	33	9/2	5
8/2	20	9/3	0
8/3	0		
8/4	44		
8/5	21		
8/6	41		
8/7	12		
8/8	16		
TOTALS			3,659

Appendix 6. McCall Fish Hatchery South Fork Salmon River chinook run timing graph BY97



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

Brood Year	Release Year	Number of Fish	3-year-olds	Year Returned	4-year-olds	Year Returned	5-year-olds	Year Returned	Percent Returned
1978	1980	124,800	124	1981	462	1982	161	1983	0.598
1979	1981	248,926	48	1982	272	1983	221	1984	0.217
1980	1982	122,247	504	1983	713	1984	151	1985	1.119
1981	1983	183,896	595	1984	1,259	1985	203	1986	1.119
1982	1984	269,880	828	1985	1,265	1986	202	1987	0.850
1983	1985	564,405	1,222	1986	2,117	1987	893	1988	0.674
1984	1986	970,348	386	1987	1,392	1988	191	1989	1.255
1985	1987	958,300	50	1988	252	1989	30	1990	0.035
1986	1988	1,060,400	495	1989	911	1990	154	1991	0.147
1987	1989	975,000	28	1990	237	1991	25	1992	0.029
1988	1990	1,032,500	821	1991	2,617	1992	1,311	1993	0.030
1989	1991	708,600	206	1992	1,364	1993	299	1994	0.263
1990	1992	901,500	28	1993	158	1994	5	1995	0.021
1991	1993	607,298	70	1994	201	1995	37	1996	0.050
1992	1994	1,060,163	101	1995	424	1996	166	1997	0.065
1993	1995	1,074,584	738	1996	3,448	1997	555	1998	0.441
1994	1996	585,654	45	1997	343	1998	0	1999	--
1995	1997	238,367	76	1998	0	1999	0	2000	--
1996	1998	393,872	0	1999	0	2000	0	2001	--
1997	1999	1,182,615	0	2000	0	2001	0	2002	--

Appendix 8. Summer chinook distribution in the South Fork of the Salmon River logged at McCall Fish Hatchery.

Destination	Weight	Number/pound	Number released
Stolle Pond	333	149.7	49,872
Knox Bridge	11,368	23.9	271,700
Knox Bridge	11,569	23.9	276,500
Knox Bridge	11,368	23.9	271,700
Knox Bridge	15,176	23.9	362,711
NPT	87	120.4	10,434
NPT	299	147.1	44,944
NPT	2,936	53.9	158,240
TOTAL RELEASED	53,135		1,446,101

Appendix 9. Brood year 1997 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
2,532,059	2,173,735	86.20%	1,447,670	85.20%	*1,182,611	70.60%

*Does not include Stolle pond fish or NPT release fish or eggs given to Sho-Ban tribe.

Appendix 10. Temperature range from August 1997 to April 1999 at McCall Fish Hatchery.

Date	Temperature
Aug-97	51.8
Sep-97	47.9
Oct-97	45.6
Nov-97	44.6
Dec-97	39.9
Jan-98	37.5
Feb-98	37.0
Mar-98	37.5
Apr-98	38.0
May-98	41.3
Jun-98	47.3
Jul-98	55.1
Aug-98	51.9
Sep-98	50.7
Oct-98	46.3
Nov-98	43.7
Dec-98	39.7
Jan-99	38.5
Feb-99	38.0
Mar-99	38.5
Apr-99	38.5

Appendix 11. Water Analysis at McCall Fish Hatchery, 1997.

Date	pH	Ammonia	Nitrate	Nitrite	Total Phosphate	Total Nitrogen	KJEL Hardness	CaCO₂ 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	<0.001	<0.05	<0.10			
1994	6.9	<0.05	<0.1	<0.001	0.01	<0.10			

Appendix 12. Brood year 1997 production cost table for McCall Fish Hatchery.

Number Of Fish	Pounds Of Feed	Cost Of Feed	Pounds Of Fish	Conversion	Total Cost	Cost/ 1,000	Cost/ Pound
1,446,101	65,926.00	\$6,816.00	53,135	1.32	\$433,305.00	\$299.66	\$6.57

Appendix 13. Brood year 1997 marked fish that were released by McCall Fish Hatchery.

Date	Number of Fish Marked	Mark	Purpose	Number Marked Fish Released	Site/Group Released
5/18-5/21	727,101	AD	Identification	715,812	1,182,611
7/20-7/30	300,112	AD/CWT	US-Canada	299,287	1,182,611
2/16-2/19/99	48,021	AD/PIT	Migration	47,929	1,182,611
7/20-7/30	128,520	LV	Supplementation	127,490	1,182,611
2/16/99	595	LV/PIT	Supplementation	594	1,182,611
7/20-7/30	50,000	No/CWT	Supplementation	49,872	49,872
7/20-7/30	10,472	No/CWT	NPT	10,434	10,434
7/20-7/30	45,000	No/CWT	NPT	44,944	44,944
7/20-7/30	158,810	No/CWT	NPT	158,240	158,240
7/20-7/30	39,623	No/CWT	NPT	39,428	1,182,611
TOTAL	1,508,254			1,446,101	1,446,101

Appendix 14. Summary of fish autopsy

SUMMARY OF FISH AUTOPSY

ACCESSION NO: 99-057 LOCATION: McCall
 SPECIES: Chinook Summer AUTOPSY DATE: 3/19/1999
 STRAIN: South Fork of the Salmon River AGE: juv
 UNIT: All ponds sampled SAMPLE SIZE: 20
 RIVER FOR AUTOPSY: preliberation
 INVESTIGATOR(S): Munson
 REMARKS: Blood parameters not assayed, centrifuge down.

	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 THE FOURTH POWER

EYES		GILLS		PSEUDO-BRANCHES		THYMUS		FAT		MESEN. SPLEEN		GUT		HIND KIDNEY		LIVER		BILE	
N	20	N	20	N	20	0	20	0	0	B	20	0	20	N	20	A	0	0	0
B1	0	F	0	S	0	1	0	1	1	R	0	1	0	S	0	B	18	1	0
B2	0	C	0	L	0	2	0	2	0	G	0	2	0	M	0	C	2	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	1	E	0	Mean=0.00		U	0	E	0		
H1	0	OT	0	OT	0					OT	0			T	0	F	0	Mean=0.00	
H2	0			O	0			Mean=2.95								OT	0		
M1	0																		
OT	0																		

SUMMARY OF NORMALS

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

GENERAL REMARKS:

FINS: GONADS:

SKIN: OTHER:

Submitted by:

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