

CLEARWATER FISH HATCHERY
ANNUAL REPORT
2005 CHINOOK AND 2006 STEELHEAD



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TABLE OF CONTENTS

	<u>Page</u>
BROOD YEAR 2005 CHINOOK REPORT	1
ABSTRACT	1
Clearwater	1
Powell	1
South Fork (Red River/Crooked River)	1
Eggs Retrieved from other Facilities	2
INTRODUCTION	3
Funding Source	3
Location	3
OBJECTIVES	3
Mitigation Goals	3
Idaho Department of Fish and Game Objectives	4
FACILITY DESCRIPTION.....	4
General Hatchery Description	4
Clearwater Hatchery	5
Crooked River	5
Powell	5
Red River	5
Production Capacities by Unit	6
Clearwater Hatchery	6
Crooked River	6
Powell	6
Red River	7
WATER SUPPLY	7
Clearwater	7
Crooked River	7
Powell	7
Red River	8
Water Quality Analysis	8
STAFFING	8
ADULT CHINOOK COLLECTION	8
South Fork of the Clearwater River	8
Powell	9
ADULT HOLDING	9
SPAWNING AND EGG TRANSPORT	9
South Fork of the Clearwater River	10
Powell	10

TABLE OF CONTENTS (Continued)

	<u>Page</u>
INCUBATION	10
Clearwater Hatchery	10
Eggs Transferred from other Facilities	11
EARLY REARING	11
FINAL REARING	11
FISH HEALTH	12
PATHOLOGIST REPORT	12
FISH MARKING	13
FISH DISTRIBUTION	13
Lower Crooked River Full-term Smolts	13
Upper Crooked River Full-term Smolts	13
Powell Full-term Smolts	13
Red River Full-term Smolts	14
Selway River Full-term Smolts	14
BROOD YEAR 20065 STEELHEAD REPORT	15
ABSTRACT	15
SYNOPTIC HISTORY	15
Clearwater Hatchery	15
Brood Source	15
Disease History	15
Spawning	15
INCUBATION	15
EARLY REARING	16
FINAL REARING	16
FISH HEALTH	17
FISH MARKING	17
FISH DISTRIBUTION	18
ACKNOWLEDGEMENTS	19

TABLE OF CONTENTS (Continued)

Page

LIST OF APPENDICES

Appendix A1. Brood Year 2006 steelhead water temperatures, March 2006 – April 2007	21
Appendix A2. Brood Year 2005 Chinook water temperatures, August 2005 – April 2007	21
Appendices B1,B2,B3. Water temperatures at trap facilities, 2005	22
Appendix C1. Clearwater Hatchery water quality analysis taken from the hatchery facility on August 4, 1004	23
Appendix C2. Upper Crooked River rearing pond water quality analysis report	24
Appendix C3. Powell adult holding pond water quality analysis report	25
Appendix C4. Red River adult holding pond water quality analysis report	26
Appendix D1. Crooked River Chinook run timing 2005	27
Appendix D2. South Fork (Red River/Crooked River) Chinook length frequency, 2005	28
Appendix E1. Red River Chinook run timing, 2005	29
Appendix E2. South Fork Chinook summary of fish trapped, released, spawned and disposition of carcasses, Brood Year 2005	30
Appendix F1. Summary of spring Chinook salmon returns to Crooked River by Brood Year	31
Appendix F2. Summary of spring Chinook returns to Red River by Brood Year	32
Appendix G1. Powell and Crooked Fork Creek Chinook run timing, 2005	33
Appendix G2. Powell and Crooked Fork creek Chinook length frequency, 2005	34
Appendix G3. Powell Chinook summary of fish trapped, released, spawned and disposition of carcasses for Powell and Crooked Fork adult traps, Brood Year 2005	35
Appendix H. Summary of spring Chinook returns to Powell by Brood Year	36
Appendix I1. 2005 South Fork Chinook spawning record	37
Appendix I2. 2005 Powell Chinook spawning record	38
Appendix J. Production cost for BY-05 Chinook and BY-06 North Fork steelhead	39
Appendix K1. Powell By-05 Chinook, summary of fish autopsy, Spring 2007 release	40
Appendix K2. Selway BY-05 Chinook, summary of fish autopsy, Spring 2005 release	41
Appendix K3. South Fork BY-05 Chinook, summary of fish autopsy, Spring 2007 release	42
Appendix L. Clearwater Fish Hatchery BY-05 spring Chinook fish marking and summary	43
Appendix M. Brood Year 2006 steelhead (B) eggs received from Dworshak National Fish Hatchery	44
Appendix N. Steelhead BY-06 summary of autopsy report, Spring 2005 release	45
Appendix O. Brood Year 2006 North Fork steelhead marking and distribution	46

2005 CHINOOK BROOD YEAR REPORT

ABSTRACT

Clearwater

Spring Chinook Salmon (*Oncorhynchus tshawytscha*) are reared at Clearwater Fish Hatchery (CFH) and typically brought on station as either green or eyed eggs. Chinook were reared on station and released as smolts.

Powell

Two adult traps were operated in the Lochsa basin. The Crooked Fork trap was installed on June 16, 2005 and the trap was taken out of operation on September 23, 2005.

The Walton Creek weir was installed on May 27, 2005 and taken out of operation on September 9, 2005. The run total for both traps was 241 fish of which there were 29 jacks and 212 adults. A total of 36 fish were released and 205 were held for production. A total of 82 females were spawned 1 of which was culled at spawning, 2 were culled due to high BKD levels, and 79 were kept for production producing 310,039 green eggs.

A total of 373,977 full-term smolts were released from Powell Pond on March 23 through April 4, 2007.

South Fork (Red River / Crooked River)

Adults returning to Crooked River and Red River weirs were combined into one South Fork stock starting in 1997. Starting with BY-98, Chinook stocks from Powell were used to backfill the South Fork populations.

The Red River weir was installed on March 14, 2005 and taken out of operation September 14, 2005. The run total of 155 fish was combined with the returning adults from Crooked River. Of the total, 13 Chinook were released.

The Crooked River weir was installed on March 14, 2005 and taken out of operation September 14, 2005. The run total of 166 fish was combined with returning adults from Red River. Of the total, 26 Chinook were released.

The South Fork had a run total of 321 fish. A total of 39 fish were released. All remaining fish were held for spawning. A total of 128 females were spawned 2 of which were culled at spawning, 3 were culled due to high BKD levels, and 123 were kept for production producing 485,624 green eggs.

A total of 375,759 full-term smolts was released from the Red River pond on March 31 through April 6, 2007.

A total of 133,829 full-term smolts was released from Crooked River raceways on March 29, 2007; and 517,092 full-term smolts were released below the Crooked River weir from March 29 through March 30, 2007.

A total of 269,349 full-term smolts was released on the lower Selway River on April 2 through April 3, 2007 by the Nez Perce Tribe.

Eggs Received from other facilities

A total of 801,353 eyed-eggs was transferred from Rapid River Fish Hatchery between September 26 and October 11, 2005 to assist Clearwater Fish Hatchery in egg needs.

A total of 155,423 eyed-eggs was transferred from Dworshak National Fish Hatchery on November 23, 2005 to assist Clearwater Fish Hatchery in egg needs.

INTRODUCTION

Funding Source

Construction responsibility for the Lower Snake River Compensation Plan (LSRCP) was assigned to the Walla Walla District, Army Corps of Engineers (Corps), while responsibility for fish hatchery Operation and Maintenance (O&M) funding was to be accomplished by "one of the Federal fishery agencies." The Corps, National Marine Fisheries Service (NMFS), and the U.S. Fish and Wildlife Service (USFWS) settled the question of O&M funding in 1977 with the signing of an interagency agreement. The agreements stated that the USFWS would budget for and administer O&M funding for LSRCP fish hatchery programs (responsibility for administration and O&M for fish passage and wildlife programs remains with the Corps).

The size and complexity of the overall facility has significantly increased from the beginning with three remote satellites to four with an initial construction value of \$8.5 million. There has also been the land acquisition and construction of the main hatchery valued at \$43.153 million and the completion of the hydroelectric plant on the hatchery water intake valued at \$10 million. Several completion contracts by the Army Corps of Engineers and construction by our staff have added \$4.5 million of additional improvements to the facility bringing the estimated value to \$66.153 million.

Location

Clearwater Fish Hatchery is on the north bank of the North Fork of the Clearwater River, 1.5 miles downstream from Dworshak Dam, 72.5 river miles upstream from Lower Granite Dam, and 504 river miles upstream from the mouth of the Columbia River.

Crooked River satellite facility is 20 miles downstream of Red River. The trap is one-half mile upstream of the mouth of Crooked River, a tributary of the South Fork of the Clearwater River. The juvenile rearing ponds are ten miles upstream from the Crooked River adult trap. Crooked River is 172.5 river miles upstream from Lower Granite Dam and 604 river miles upstream from the mouth of the Columbia River.

Powell satellite facility is 122 river miles east of CFH at the headwaters of the Lochsa River. Missoula, Montana, which is 45 miles east, is the closest town. Powell is 192.5 river miles upstream from Lower Granite Dam and 624 river miles upstream from the mouth of the Columbia River.

Red River satellite facility is 15 miles east of Elk City, Idaho, 186 river miles upstream from Lower Granite Dam, and 618 miles from the mouth of the Columbia River.

OBJECTIVES

Mitigation Goals

The annual LSRCP goal of CFH and its satellite facilities is to return 12,000 adult Chinook salmon and 14,000 "B" steelhead above Lower Granite Dam.

Idaho Department of Fish and Game Objectives

The objectives of Idaho Department of Fish and Game (IDFG) for CFH are to reestablish historic fish runs into the upper Clearwater River tributaries, to enhance the wild spawning population, and to increase sport and tribal fishing opportunities.

FACILITY DESCRIPTION

General Hatchery Description

Clearwater Hatchery

Clearwater Fish Hatchery is the final facility built by the U.S. Army Corps of Engineers under the LSRCP. This facility is also the largest of the LSRCP hatcheries built.

The hatchery office building consists of two parts. The dormitory section includes four bunkrooms with maximum capacity of 15 people, a living room, dining room, kitchen, shower rooms, and laundry room. The administration portion consists of office space with a visitor center and entry lobby.

The shop area includes a vehicle maintenance shop, a smaller mechanical repair shop, wood shop, and locker room.

The hatchery building also houses an incubation room and walk-in freezer. A screen and equipment storage building is on the west end of the hatchery.

There are seven residences on the hatchery grounds. Each residence also has a storage building.

Isolation incubation building is for receiving eggs with unknown disease status and a chemical storage building for storing barrels of formalin and chlorine.

Two 1.8-mile long pipelines run upstream to the Dworshak Dam. The pipelines go up the face of the dam to an elevation of 1,357 feet, then through the dam into the reservoir. The 18-inch pipe (secondary supply) is stationary at an elevation of 1,357 feet with a screened inlet to keep out debris. This pipe supplies cool water to the hatchery. The 48-inch flexible plastic pipe (primary supply) is suspended from a floating platform with a winch attached to the platform. A winch raises and lowers the intake of the pipe to the level of desired water temperature. This pipe supplies warm water (50 to 58° F) to the hatchery during the summer and fall.

Approximately 200 yards upstream from the hatchery is a distribution structure designed to reduce the 286-psi of the high-pressure supply lines to the gravity flow of 7 psi to the hatchery. The structure consists of a primary and secondary chamber. The primary and secondary pipelines have each been outfitted with a hydroelectric generator and put into operation June 2000. The two generators will produce approximately 2400 KW of electricity.

A 73,600 ft³ cleaning sedimentation pond is used to settle out the solids produced by the hatchery. A 414,000 ft³ final sedimentation pond settles waste from the total flow of hatchery operation and the out flow of the cleaning sediment.

In 2000, a 2,040 ft² structure was constructed. The sides of the new building are four military transport containers, two on each side, welded end to end. They support a roof spanning a 51-ft x 40-ft area creating a new covered storage area.

In 2004, a 2,100 ft² truck shed was constructed. This building is used for winter storage of hatchery trucks and other miscellaneous equipment.

In 2006, a 420 ft² ground maintenance shed was constructed. This building is used for chemical storage and grounds maintenance equipment storage.

Crooked River

There are two separate sites to this facility. The first is the adult trap and a support cabin located one-half mile upstream of the mouth of Crooked River. The weir at this location consists of removable posts and panels supported by an iron bridge across Crooked River. There are no holding ponds at the site, and all fish are either released directly from the trap or transported to Red River holding ponds.

Ten miles upstream from the adult trap are two raceways for summer rearing and spring acclimation of smolts. There is a cleaning waste pond and final settling pond to meet EPA water quality standards. Additional facilities include a garage, shop, walk-in freezer, and a support cabin.

Powell

The Powell facility is at the confluence of Crooked Fork Creek and Colt Killed Creek (White Sands), which form the Lochsa River. There is one rearing pond for summer rearing and spring acclimation of smolts. A water supply diversion and intake screen structure are on Walton Creek, and a pump house is on Colt Killed Creek. A weir diverts fish that come up into Walton Creek into the fish ladder and fish trap. The fish trap is connected to two adult holding ponds and a covered spawning area. A floating weir that spans across the Lochsa River is stored at the facility for use when needed. Also on site are a formalin storage building and a support cabin with a walk-in freezer.

Red River

The Red River facility consists of four structures: freezer/storage building, a work shop/garage area, a formalin storage building, and a support cabin.

The adult holding facility consists of two raceways with a holding capacity of 350 adult fish. A removable tripod and panel weir blocks fish passage across Red River and diverts them into the fish ladder. There is one rearing pond for summer rearing and spring acclimation of smolts.

Production Capacities by Unit

Clearwater Hatchery

The steelhead raceways consist of 300-ft x 10-ft x 4.5-ft deep raceways supplied by a center head raceway with an east and west bank of 12 raceways each. A total rearing space of 24 raceways is 324,000 ft³. The maximum flow available to the steelhead raceways is 40 cfs. All water for these raceways flow through degassing towers and then into the head raceway. These raceways are supplied with water from both intakes.

Chinook raceways are 200-ft x 10-ft x 3-ft deep. Eleven raceways have a total rearing space of 66,000 ft³. The raceways are supplied with water from both primary and secondary intakes and a mixing chamber, which allows for the control of water temperature to rear Chinook. The estimated flow per raceway is 2.4 cfs.

The adult holding facility consists of two ponds with a combined capacity of 8,000 ft³ and a maximum holding capacity of 800 adult salmon. There is also a covered spawning area with two live wells for on-site egg taking. This facility is supplied with water from the tailrace of the juvenile Chinook raceways. Estimated flow per pond is 3.5 cfs.

The incubation room contains 48 double stack Heath incubators with a total of 768 trays available for egg incubation. The maximum capacity of this facility is five million green eggs. The incubation room is supplied with both water sources to provide the desired temperature for incubation with a flow of 5 to 6 gpm per stack.

Isolation incubation consists of 15 double stack Heath Incubators with a total of 240 trays available for egg incubation. The maximum capacity of this facility is 1.5 million green eggs. The isolation incubation room is supplied with both water sources to provide the desired temperature for incubation with a flow of 5 to 6 gpm per stack.

Early rearing consists of sixty concrete vats. Each measures 40-ft x 4-ft x 3 ft deep and contains 480 ft³ of rearing space. The vats are supplied with water from each intake and have a flow of approximately 120 gpm per vat when all vats are in use. An incubation jar is plumbed directly into them. The 60 incubator jars have a total capacity of 2.6 million eggs with a flow of 15 gpm per jar. Each vat is equipped with automatic feeders controlled by adjustable time clocks.

Crooked River

The Crooked River acclimation facility has two raceways, measuring 145-ft x 20 ft-x 4-ft deep, for a total of 23,200 ft³. These raceways have a capacity of 700,000 juvenile Chinook with a DI of 0.29. Water flow per raceway is 6 cfs. Each raceway is outfitted with three automatic Nielson feeders. The adult trapping facility measures 10 ft x 12 ft x 4 ft deep with a total of 480 ft³. Water flow for the adult facility is 10 cfs. This facility has no provision for adult holding.

Powell

The rearing pond measures 165 ft x 65 ft x 5 ft deep and has 53,625 ft³ of rearing space. The maximum design capacity is 500,000 fish with a DI of 0.092. Water flow through this pond is 6.24 cfs. A catwalk across the length of the pond supports eight automated Nielson feeders.

The two adult ponds, measuring 100-ft x 20-ft x 4-ft 8-in deep, have a volume of 9,500 ft³ and a holding capacity of 960 adult Chinook. The adult trap measures 12-ft x 6-ft x 4-ft deep and is supplied with 6.24 cfs of water.

Red River

The adult holding facility consists of two ponds, measuring 10 ft x 45 ft x 4 ft deep, with a total of 3,400 ft³ of holding space and a trap area 8 ft x 16 ft x 4 ft deep. These ponds have a holding capacity of 350 fish. A removable tripod and panel weir blocks fish passage and diverts them into the fish ladder. One half of the weir consists of floating panels and the other half is removable tripods and panels. Water flow through the ponds is 4.09 cfs.

The rearing pond measures 170 ft x 70 ft x 4 ft 6 in. deep and has 53,550 ft³ of rearing space. The maximum design capacity is 500,000 fish with a DI of 0.092. This pond has a hypalon plastic liner with eight to ten inch diameter cobblestones on the inclined banks. The bottom of the pond is a bare liner, which aids in pond vacuuming. A catwalk runs the entire length of the rearing pond and holds eight automatic Nielson feeders.

WATER SUPPLY

Clearwater

Clearwater Fish Hatchery receives water through two supply pipelines from Dworshak Reservoir. The warm water intake is attached to a floating platform and can be adjusted from five feet to fifty feet below the surface. The cool water intake is stationary at 245 feet below the top of the dam. An estimated 9 cfs of water is provided by the cool water supply and 70 cfs of water from the warm water supply. The cool water supply has remained fairly constant between 38° and 45°F. The warm water can reach 80°F but is adjusted regularly to maintain 56°F for as long as possible throughout the year. When water temperatures drop in the fall, the intake will be moved to the warmest water available until water temperatures rise in the spring (Appendix A1 and A2). All water is gravity flow to the hatchery.

Crooked River

Crooked River rearing raceways are supplied by an intake 200 yards upstream of the raceways. The water rights stipulate 10 cfs from April 1 to June 30 and 6 cfs from July 1 to Oct. 1 at the rearing facility. Temperatures ranged from 46.8° to 71°F (Appendix B1). All temperatures were taken at the adult trap. All water supplied to both facilities is gravity flow.

Powell

The intake is 100 yards upstream from the facility. Powell's water rights for the gravity intake are 6.24 cfs from gravity flow system on Walton Creek and 2.5 cfs from a supply pumped out of Colt Killed Creek. Two 7.5 horsepower pumps can be used to supply Walton Creek with water from Colt Killed Creek during periods of low water. Water temperatures ranged from 45.2° to 55°F from Walton Creek (Appendix B3).

Red River

Red River is supplied by gravity flow from an intake at the bottom of the South Fork of Red River, 225 yards upstream from the facility. The water right for the facility is 8.18 cfs. During low flow in the summer, about 5 cfs is available to the hatchery. Temperatures ranged from 43.2° to 72°F (Appendix B2).

Water Quality Analysis

The water quality analysis at CFH was done by the State of Idaho, Department of Health and Welfare in Boise; Anatek Labs in Moscow, Idaho, did the satellite facilities.

The samples were taken from the hatchery incubation supply line June 1994 (Appendix C1).

Clearwater Hatchery water supply has a total alkalinity (as CaCO₃) of 16 ppm, which is very low regarding fish culture.

Water quality analysis was taken at Crooked River, Powell, and Red River rearing facilities from the intake in 1998 (Appendices C2, C3 and C4).

STAFFING

Clearwater Fish Hatchery has eight permanent staff employees; this includes one Hatchery Manager, two Assistant Hatchery Managers, one Utility Craftsman, three Fish Culturists, and an Office Specialist II. The rest of the crew consists of temporary employees with positions of Fishery Technicians, Maintenance Craftsman, Biological Aides, Grounds Maintenance Workers, and Clearwater River Youth Program students. Under the supervision of CFH, each satellite facility (Red River, Crooked River, and Powell) is manned by one temporary worker.

ADULT CHINOOK COLLECTION

South Fork of the Clearwater River

The Crooked River and Red River production populations were combined in 1997. Trapping protocols for the South Fork traps are as follows:

Trapping protocols for the South Fork traps included ponding all Ad-clipped and no clip/cwt fish for CFH and opercle punching and releasing all ventral clipped and unmarked fish above the weirs.

The Crooked River weir and trap were in operation between March 14, 2005 and September 14, 2005. A total of 166 fish were trapped.

The Red River trap was installed on March 14, 2005 and taken out of operation on September 14, 2005. A total of 155 fish were trapped.

Age class breakdown of this run included: 55 I-ocean males; 2 I-ocean females (<64 cm); 99 II-ocean males, 126 II-ocean females, 1 II-ocean unknowns (64-82 cm); 17 III-ocean

males, 20 III-ocean females, and 1 III-ocean unknowns (83+ cm) (Appendices D1, D2, E1, E2, F1 and F2).

Powell

During 2005, two adult traps were installed in the Lochsa basin. A picket weir was installed on Crooked Fork Creek approximately one mile upstream of twin bridges. This was an effort to reduce hatchery straying in that basin.

The trap on Walton Creek was installed on May 27, 2005 and taken out of operation September 9, 2005. The Crooked Fork trap was installed June 16, 2005 and taken out of operation September 23, 2005. A total of 241 fish (29 jacks and 212 adults) were trapped at Powell and Crooked Fork.

Trapping protocols for the Powell trap included ponding for broodstock all ad-clipped fish and no clip/cwt fish for CFH and opercle punching and releasing all unmarked fish into the Lochsa. All opercle-punched fish that returned to the trap were ponded for production. Trapping protocols for the Crooked Fork trap included transporting and ponding all ad-clipped fish and no clip/cwt fish for CFH to Powell for production. All naturals/ wild fish were released upstream.

Age class breakdown of this run included: 27 I-ocean males, 2 I-ocean females (25 in); 83 II-ocean males, 76 II-ocean females, 2 II-ocean unknown (25 – 32 in); 32 III-ocean males, 18 III-ocean females, and 1 III-ocean unknown (33 in) (Appendices G1, G2, G3, and H).

ADULT HOLDING

All Powell production fish were held at Powell for spawning.

All South Fork production fish were temporarily held at Red River and then transported to Clearwater Hatchery for final holding and spawning.

All fish were injected with Erythromycin 100 at a rate of 20 ppm at trapping to inhibit BKD. Fish were treated with a formalin drip for one hour every day to prevent fungal growth. Fish held at Clearwater were treated at 150 ppm, and fish at Powell were treated at 120 ppm.

SPAWNING AND EGG TRANSPORT

Powell utilized a 2:1 spawning ratio for males and females in 2005. This was done in accordance to the genetic protocol for a brood year with less than 100 females.

South Fork stock utilized a 1:1 spawning ratio for males and females in 2005. This was done in accordance to the genetic protocol for a brood year with more than 100 females.

At Powell, eggs were placed in egg tubes and coolers with 100-ppm iodine solution for one hour. After water hardening, water was drained and green eggs were placed in fresh water and transported to CFH for incubation. The transport vehicle was met at the front gate where egg tubes were removed from transport coolers and placed in clean egg coolers containing tempered 100-ppm Argentyne solution for 10 minutes. Then eggs, at one female per tray, were placed in individual Heath egg trays in the incubation room. At Clearwater, eggs were placed in

individual buckets and water hardened with 100-ppm iodine solution for one hour. After water hardening, the eggs were placed in incubators at one female per tray.

Tissue and ovarian samples were collected at the time of spawning. These samples were mailed overnight to Eagle Fish Health Lab for BKD and virus testing.

A total of 462 broodstock fish (266 South Fork, 196 Powell) were sampled for genetics. All samples were shipped to the Eagle Genetics Lab for analysis.

South Fork of the Clearwater

Chinook were sorted twice per week for ripeness. The first fish was spawned August 9, 2005 and the last September 7, 2005. A total of 128 females were spawned. Pre-spawn mortality for the South Fork stock was 11 fish (3.9% pre-spawning mortality). All carcasses not showing clinical signs of BKD were returned to either Crooked River or Red River to add nutrients to the system (Appendix E2).

Powell

Fish were checked twice per week for ripeness. The first fish was spawned on August 4, 2005 and the last September 9, 2005. A total of 82 females were spawned. Fish carcasses not showing clinical signs of BKD were placed in the Lochsa and tributaries to add nutrients to the stream (Appendix G3). Pre-spawn mortality was 4 fish (1.95% pre-spawn mortality).

INCUBATION

Clearwater Hatchery

Green eggs were placed into Heath egg trays with one female's eggs per tray. All Heath stacks were operated at approximately 5.5 gpm.

Females were screened for BKD using Elisa techniques. Females with an optical density (O.D.) over 0.6 on the South Fork stock and 0.6 on the Powell stock were culled. Females with an optical density (O.D.) over 0.25 but under 0.6 were kept for segregated rearing. The BKD tests resulted in culling of 2 females at Powell and 3 females from the South Fork. Using an average fecundity of 4,000 eggs per fish, these culled females accounted for 20,000 green eggs.

A total of 795,663 green eggs were incubated from BY05 spring Chinook salmon. Overall development from green eggs to eyed-eggs was 762,073 for a total eye-up percentage of 95.78%. The South Fork stock achieved 97.17% eye-up and Powell 93.60% eye-up (Appendix I1).

Beginning on the third or fourth day of incubation, all egg lots were treated with formalin to reduce fungal development. Treatments were administered three times per week at a 1:600 concentration (1667-ppm) for 15 minutes and continued until each egg lot reached 800 temperature units (TUs).

Eye-up occurred at approximately 500 TUs at which time all egg lots were shocked, then picked and enumerated by an electronic egg picker. Prior to hatching, all eyed-eggs were

picked twice weekly. Hatching occurred at approximately 1,000 TUs. Swim-up fry were transferred to the early rearing vats at approximately 1,750 TUs.

Eggs Transferred from other facilities

Due to the poor adult return in 2005, a total of 956,776 eyed-eggs (801,353 Rapid River stock, 155,423 Dworshak stock) were transferred to Clearwater Hatchery.

EARLY REARING

Swim up fry were ponded in hatchery vats at approximately 38,000 to 52,000 fish per vat. A total of 1,685,365 fry were segregated by stock and release strategies in 36 vats over a seven-month period. This gave us a survival of 98.05% from eyed egg to ponding.

Fish were started on feed within 24 to 48 hours of ponding in a full-length vat with baffles in place. Initial water flows were set at 46 gallons per minute (gpm) for approximately 10 days to initiate feeding then increased to 92 gpm on day eleven. A final increase to 120 gpm occurred after several months where it remained until the fish were moved outside. Flow indices were held at or below 1.50 while the density index never exceeded 0.5 during the entire early rearing period. Water temperatures during early rearing were between 41.5° and 57.5° F (Appendices A2).

All of the Chinook were moved outside during the marking process. The inventory number was adjusted to 1,673,082 after the marking program as a result of the hand count. The resulting hand count number revealed a discrepancy of 32,873 more fish.

FINAL REARING

At marking, Powell and Rapid River stocks were used to fill the Lochsa River program; South Fork and Rapid River stocks were used to fill the South Fork programs; and Rapid River and Dworshak stocks were used to fill the Selway program. All CFH Chinook were marked between July 10, 2006 and July 24, 2006.

All full-term smolts from the BY05 Chinook were fed one 28-day Erythromycin prophylactic treatment after marking. Bio Oregon Biodiet grower feed was used throughout the final rearing period. The full term smolts were fed full rations through marking and were fed five days on feed and two days off feed the remainder of the time. Total feed used in early and final rearing was 116,732 pounds yielding 106,857 pounds of fish reared for a final conversion of 1.09 (Appendix J). Total cost was \$116,517.08.

The goal was to keep water temperatures below 55° F to reduce growth rates; temperatures varied from 52° to 41.5° F during the final rearing period with an estimated 2.1 cfs of water supplied to each raceway.

A total of 1,670,006 smolts were released in March and April of 2007 at five different locations.

FISH HEALTH

The BY05 Chinook reared at CFH were from low BKD parentage with O.D. below 0.25 on the South Fork, 0.25 on the Lochsa, and 0.6 on the Selway. All Chinook eggs above this O.D. were culled. The Selway release group included a moderate BKD group which consisted of 8 females from Rapid River Hatchery and one female from Powell. This moderate BKD group was segregate reared until marking.

All Chinook received one 28-day Erythromycin prophylactic feed treatment following marking, and the Dworshak stock and BKD moderate group received two.

PATHOLOGIST REPORT

Diseases Encountered and Treatments

Brood Powell Spring Chinook Salmon (collected 2005): These adult fish received an intra-peritoneal injection of erythromycin at a dose rate 20 ppm to limit pre-spawning mortality. Pre-spawning mortality was limited to 2% this year. Clearwater staff implemented a daily treatment of formalin at 167 ppm for one hour that allowed fish with severe head burn to not only survive but to heal the wound.

IHNV was detected in 14 of 60 females examined. Eighty-two females were spawned at Powell; three (3.66%) females had high ELISA optical densities. The eggs from the female with the highest optical density (2.489) was culled, while the eggs from the 0.666 and 0.474 females were placed in a high BKD segregation group destined for release in the Selway River.

Juvenile Powell Spring Chinook Salmon Brood year 2005: Disease problems were not encountered in the BY'05 Powell spring Chinook salmon. These fish received one or two erythromycin medicated feed treatments for pre-emptive control of *Renibacterium*. The target dose rate was 100 ppm/day for 28 days. Disease agents were not detected during inspection or preliberation inspection sampling.

Brood South Fork of the Clearwater Spring Chinook Salmon (collected 2005): These adult fish received an intra-peritoneal injection of erythromycin at a dose rate of 20 ppm to limit pre-spawning mortality. Pre-spawning mortality was limited to 4% this year. Clearwater staff implemented a daily treatment of formalin at 167 ppm for one hr that allowed fish with severe head burn to not only survive but to heal the wound.

IHNV was detected in 14 of 60 females examined. Eighty-two females were spawned at Powell; three (3.66%) females had high ELISA optical densities. *Myxobolus cerebralis* was not detected in a 20 fish sample.

Juvenile South Fork of the Clearwater Spring Chinook Salmon Brood year 2005: Disease problems were not encountered in the BY'05 South Fork of the Clearwater spring Chinook salmon. These fish received one or two erythromycin medicated feed treatments for pre-emptive control of *Renibacterium*. The target dose rate was 100 ppm/day for 28 days. Disease agents were not detected during inspection or preliberation inspection sampling.

Juvenile Selway Spring Chinook Salmon Brood year 2005: Disease problems were not encountered in the BY'05 fish destined for the Selway River. These fish received one or two erythromycin medicated feed treatments for pre-emptive control of *Renibacterium*. The target

dose rate was 100 ppm/day for 28 days. Disease agents were not detected during inspection or preliberation inspection sampling.

Organosomatic Index. (Appendix K1, K2, K3).

Acute Losses. Neither acute nor chronic losses were experienced at this facility.

Other Assessments. An investigation has been initiated into limiting prophylactic feeding of erythromycin to one application. It is being suggested that prophylactic applications of erythromycin medicated feed will cease. The prior investigations conducted at this facility have provided valuable insight into the reduction of medicated to Chinook salmon.

FISH MARKING

A total of 1,673,082 Chinook were marked. Marks included 1,231,769 Adipose (Ad) clipped, 351,155 ad-clipped/coded wire tagged (ad/cwt), and 90,158 no clip/coded wire tagged (no/cwt) fish (Appendix L).

Chinook were marked from early rearing vats (inside) into final rearing raceways (outside). Marking started on July 10, 2006 and was completed on July 24, 2006. Fish averaged 100 fpp in size. A total of 45,477 were Passive Integrated Transponder (PIT) tagged.

FISH DISTRIBUTION

Releases from CFH occurred in one life stage:

	<u>CFH</u>
Pre-smolt	<u>0</u>
Full term smolt	<u>1,670,006</u>
Total	<u>1,670,006</u>

Lower Crooked River Full term smolts

A total of 517,092 smolts (16.00 fpp) were released below the Crooked River weir. Smolts were transported to lower Crooked River on March 29 through March 30, 2007 and released daily. All smolts were ad-clipped, 42,425 were ad clipped and coded wire tagged and 14,993 fish carried PIT tags (Appendix L).

Upper Crooked River Full term smolts

A total of 133,829 smolts (16.00 fpp) were released at the Upper Crooked River facility. Smolts were transported to Upper Crooked River on March 29, 2007 and released daily. All smolts were ad-clipped and 499 fish carried PIT tags (Appendix L).

Powell Full term smolts

A total of 373,977 smolts (15.40 fpp) were released into Walton Creek. Smolts were transported to Powell on March 22 through March 26, 2007. A volitional release was started on March 22, 2007 and continued until the remaining fish were forced out of the pond on April 4,

2007. All smolts were ad-clipped 86,655 were ad clipped and coded wire tagged and 15,000 fish carried PIT tags (Appendix L).

Red River Full term smolts

A total of 375,759 smolts (15.40 fpp) were released into Red River. Smolts were transported to Red River from March 26 through March 28, 2007. On April 6, 2007, the pond was drained and all remaining smolts were released. All smolts were ad-clipped, 42,049 were ad clipped and coded wire tagged and 14,977 fish carried PIT tags (Appendix L).

Selway Full term smolts

A total of 269,349 smolts (15.40 fpp) were direct released into the lower Selway River by the Nez Perce Tribe from April 2 through April 3, 2007. A total of 179,432 were ad clipped and coded wire tagged, and 89,917 were coded wire tagged only (Appendix L).

BROOD YEAR 2006 STEELHEAD REPORT

ABSTRACT

Clearwater Hatchery received 1,138,372 eyed brood year 2006 North Fork B-run steelhead eggs from Dworshak National Fish Hatchery (DNFH). A total of 868,375 smolts from the North Fork stock were released from April 12, 2007 through April 19, 2007; 272,819 at Red House hole; 251,646 at Red River; 235,107 at Crooked River; 52,415 at Lolo Creek; 28,050 at Meadow Creek; and 28,338 at Mill Creek. The average size of fish was 4.98 fpp for a total of 174,521 lbs, and the average length was 203.45 mm.

A total of 163,108 pounds of feed was fed with a cost of \$105,863.12 to produce 174,521 lbs of fish at Clearwater Hatchery. The conversion rate was 0.94. Survival from eyed egg to release was 89.6%.

Clearwater Hatchery received 1,520,414 green brood year 2006 North Fork B-run steelhead eggs from Dworshak National Fish Hatchery for the southern Idaho steelhead hatcheries. After culling and picking, 1,200,551 eyed eggs were shipped to Magic Valley Hatchery, Hagerman National Fish Hatchery, and Potlatch.

SYNOPTIC HISTORY

Clearwater Hatchery

Brood Source

Dworshak National Fish Hatchery was the source for North Fork stock B-run steelhead eggs.

Disease History

Dworshak Hatchery has a long history of Infectious Hematopoietic Necrosis Virus (IHNV). Therefore, Clearwater Hatchery only accepts steelhead eggs from IHNV-negative females and follows a strict disinfecting protocol when transporting them onto the station.

Spawning

When eggs were being collected for Clearwater Fish Hatchery at DNFH, one of our crew assisted with their spawning operation. We collected, packaged, and shipped all the disease samples by airmail to Eagle Fish Health Lab.

INCUBATION

Unpicked eyed steelhead eggs were received from Dworshak Hatchery in two shipments on March 22, 2006 and March 29, 2006 (Appendix M). The eggs from DNFH lots four and five were incubated approximately 15 days at Dworshak until the eggs eyed-up. All eggs from negative IHNV females were disinfected and transported to Clearwater Fish Hatchery. The transport vehicle was met at the front gate, and egg baskets were removed from egg coolers and placed in clean egg coolers containing tempered 100-ppm Argentyne solution for 10 minutes. The clean egg coolers were then taken to the incubation room, and eggs were placed into Heath egg trays with approximately 5,000 eggs per basket, and water flows through each

stack were set at six gallons per minute. A total of 1,191,536 unpicked eyed eggs were received and after picking netted 1,138,378 eggs for an eye-up of 95.54% (Appendix M). This number was culled down to 968,694 to reduce surplus. During incubation, steelhead eggs were on primary water only.

A total of 1,520,414 green eggs yielding 1,423,882 eyed-eggs were collected from Dworshak National Fish Hatchery for the Magic Valley and Hagerman National Fish Hatcheries. These eggs were incubated in cold water at CFH until the eyed stage. A total of 965,551 eyed eggs were shipped to Magic Valley, 215,000 were shipped to Hagerman National, and 20,000 were given to the Potlatch pulp and paper workers to be used in egg boxes for school educational purposes. Total eye-up on these eggs was 93.65%.

EARLY REARING

A total of 906,726 fish were ponded in early rearing. Survival from eyed egg to ponding was 93.6%. At swim-up, unfed fry from Dworshak stock B-run steelhead were moved to vats. All fry were divided as evenly as possible into 22 vats (36,000 per vat). Two raceways in the steelhead bank (4E and 5E) had fry directly ponded into them from incubation to evaluate a direct outside-ponding strategy. The initial DI was .15 and FI was .60. Fish were held in the hatchery vats until July when they were marked and moved to 16 steelhead raceways (6-12 east and 4-12 west). Average length of the fish at the end of early rearing was 3.42 inches (82.3 mm). The fish averaged 65 fpp.

The DI of the Dworshak steelhead ranged from 0.15 to 0.52, and the FI ranged from .60 to 1.85.

Bio Oregon's Biodiet Grower was used for the first 4 weeks of feeding. Then Bio Oregon's Biovita was used for the remainder of early rearing.

Water temperatures for the early rearing period ranged from 47° to 57.5° F (Appendix A1).

FINAL REARING

The juvenile Dworshak stock B-run steelhead were moved to outside steelhead raceways 6-12 east and 4-12 west. During July and August, the move was done in conjunction with fin clipping and CWT tagging to avoid double stressing the fish. Fin clipping was done in 16-hour shifts per day. Baffles were removed from vats; fish were then moved to the clipping trailers using the transfer tanks. The Red River, Crooked River, Mill Creek, and Meadow Creek (SF) supplementation fish were not clipped, but were inventoried during the move outside.

The DI of the Dworshak steelhead ranged from 0.11 to 0.30, and the FI ranged from 0.46 to 1.34. These indexes were recalculated monthly and were never allowed to exceed DI of 0.30 or FI of 1.70.

Water temperatures during final rearing period were maintained to keep temperatures as close to 57°F as possible (Appendix A2). Estimated water flows per raceway were 2.2 cfs.

Fish were fed Bio Oregon's Biovita dry feed through 2.0mm (16 fpp) and then fed Skretting Biodry 3000 until release. A total of 163,108 lbs of feed was used throughout the entire rearing period to produce 174,521 lbs of fish at a cost of \$105,863.12. The overall feed conversion rate from fry to smolt was 0.94 (Appendix J).

FISH HEALTH

Diseases Encountered and Treatments.

Brood North Fork of the Clearwater Steelhead B Group (collected 2006): IHNV was detected in 1 of 187 brood females sampled at Dworshak NFH.

Juvenile North Fork of the Clearwater Steelhead B Group Brood Year 2006: Pathogens were not detected during routine inspections or during preliberation inspection prior to release. (Appendix N).

Other Assessments. Feeds that have been used in steelhead production have allowed Clearwater staff to produce these fish and get them to an appropriate size by release. The challenge in coming years, with shortages of fish protein and fish oils, will to produce as high a quality fish.

FISH MARKING

The steelhead production at Clearwater was split this year between production and supplementation.

The production fish are all marked for sport harvest with an adipose fin clip, and they are as follows:

Release site	Release size	Adipose clips	CWT/AD/LV	Pit tags
Red House Hole	Smolt	205,956	68,104	
Clear Creek	Smolt	0	0	0
Red River	Smolt	100,774	0	
Crooked River	Smolt	85,857	66,272	
TOTAL		392,587	134,376	

The supplementation fish are not marked for harvest, and many don't have any marking at all. They are as follows:

Release site	Release size	Non-Clipped	Non Clipped/CWT	Pit tags
Red River	Smolt	152,230	0	
Crooked River	Smolt	62,975	21,402	
Meadow Creek	Smolt	28,396	0	
Mill Creek	Smolt	28,395	0	
Lolo Creek	Smolt	55,263	0	
TOTAL		327,259	21,402	

FISH DISTRIBUTION

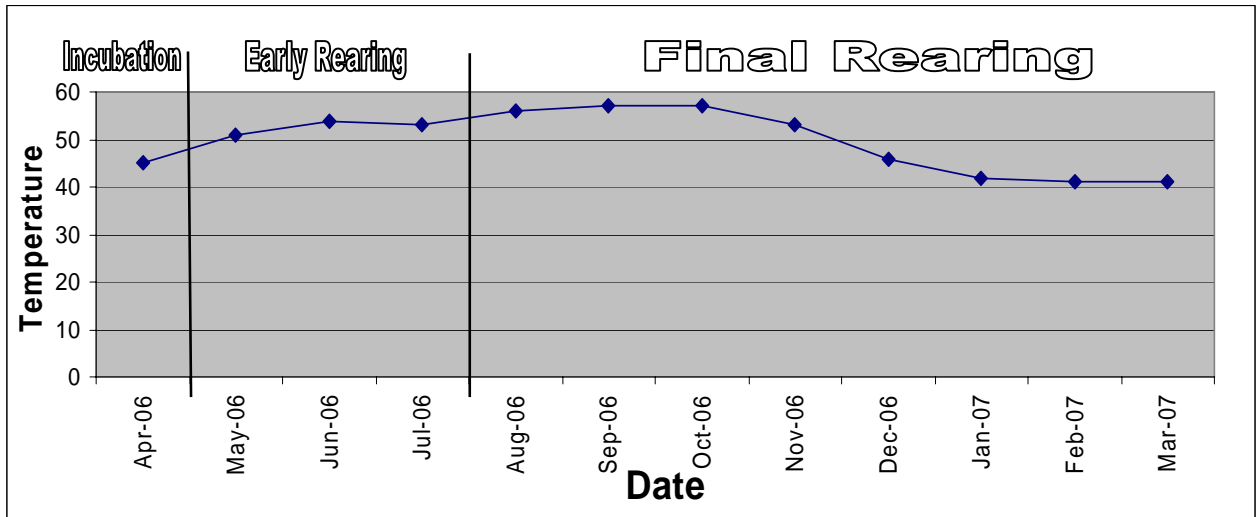
From April 13 through April 17, 2007 a total of 272,819 Dworshak B-run steelhead, which averaged 4.59 fpp, were direct released at the Red House Hole plant site (approximately 3.5 miles upstream of Highway 13 and 14 junctions) on the lower South Fork of the Clearwater River. There were 251,646 fish, which averaged 5.22 fpp, released at Red River between April 15 and April 17, 2007. There were 235,107 fish, which averaged 4.94 fpp, released at Crooked River between April 12 and April 17, 2007. There were 52,415 fish, which averaged 5.60 fpp, released at Lolo Creek which were transported by NPTH on April 19, 2007. A total of 28,050 fish, which averaged 5.61 fpp, were released at Meadow Creek on April 17, 2007. A total of 28,338 fish, which averaged 5.61 fpp, were released on April 17, 2007 at Mill Creek. There was very little crowding and hauling mortality from the fish transportation to the release sites (Appendix O).

ACKNOWLEDGEMENTS

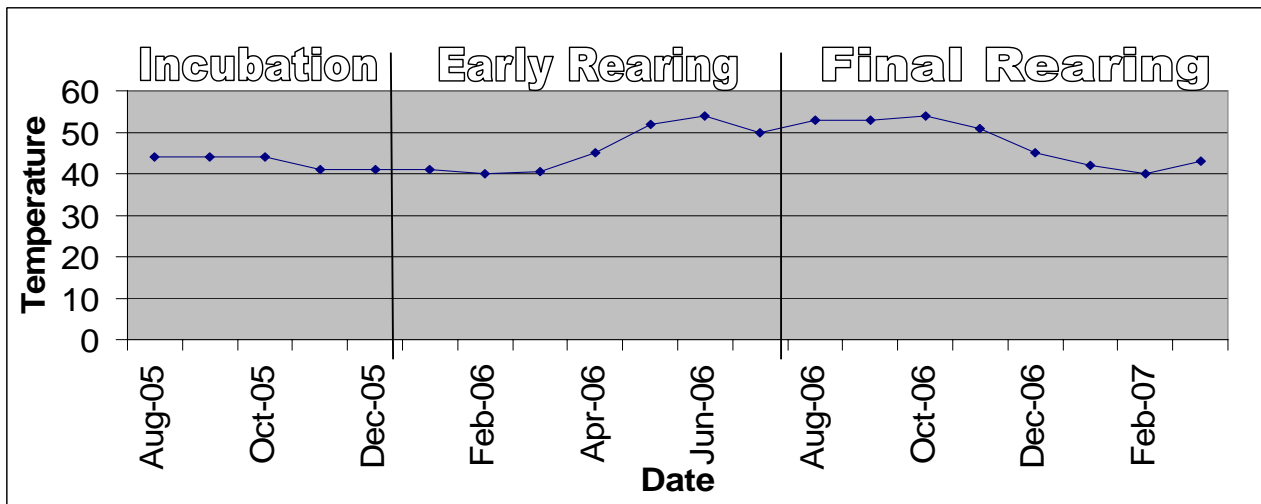
Clearwater Fish Hatchery acknowledges the following people who contributed to the success of these programs. The hatchery crew consists of: Jerry McGehee - Hatchery Manager; Brad George and Randy Hutzenbiler - Assistant Hatchery Managers; Cassie Sundquist, Chris Shockman, Tim Klucken, and Ron Hopper - Fish Culturists; Ernie Yost - Utility Craftsman; Walter Boore - Office Specialist II; Chad Henson, Holly Smith, Charles Ball, and Lacey Alberts - Fish Technicians; Theresa Elliott, Bob Schloss, Britney Hicks, Max Bausch, Jenny Hole, Mike Tetwiler, Steve Moore, Dan Green, Chris Stamper, Carrie Licht, Steve Duty, Jeff Jenni, Matt Wilson, Morgan Fife, Brandon Binder, Jessica Young, Jennifer Vafiades, Steve Green, and Jesse Willmott - Bio-aides; Kim West and Tim Lee - Grounds Maintenance Workers; Fred Hough and Joe Calaprice - Maintenance Craftsman.

APPENDICES

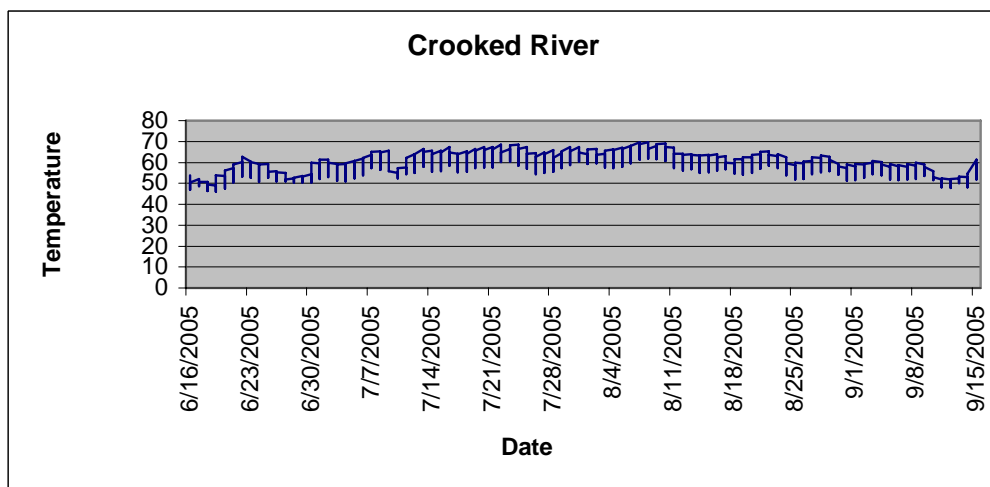
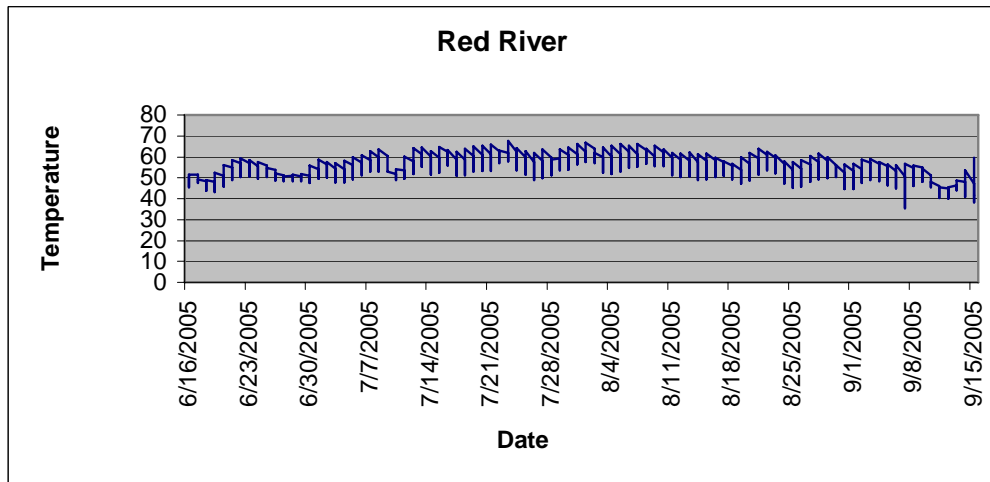
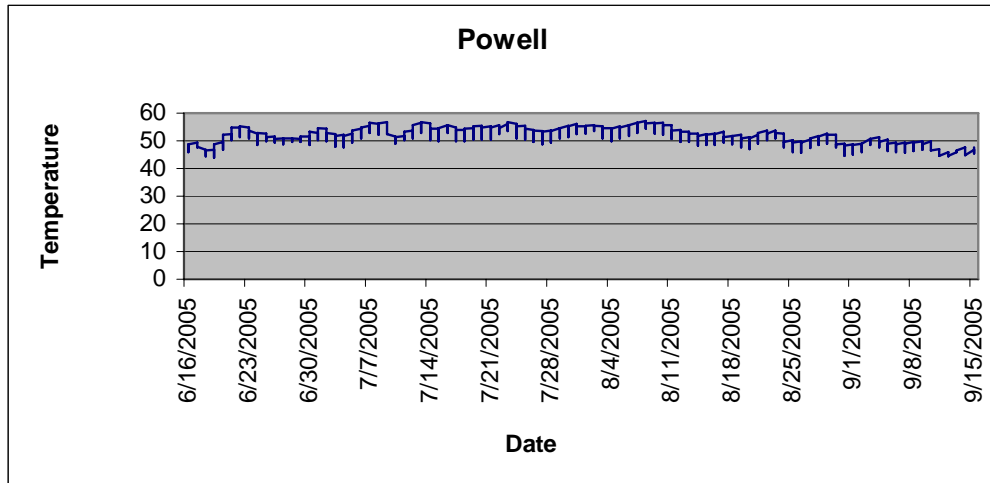
Appendix A1. Brood Year 2006 Steelhead Water Temperatures, March 2006-April 2007



Appendix A2. Brood Year 2005 Chinook Water Temperatures, August 2005-April 2007



Appendix B1,B2,B3. Satellite Water Temperatures 2005.



Appendix C1. Clearwater Hatchery water quality analysis taken from the hatchery rearing facility on August 4, 1994.

ANALYSIS LEVELS	RESULTS (ppm)	DATE ANALYZED	REARING
Alkalinity	16.0	08/04/94	120 - 400 ppm
Ammonia (as N)	<0.005	08/04/94	0.0125
Arsenic	<0.01	08/04/94	N/A
Barium	<0.1	08/04/94	N/A
Cadmium	<0.001	08/04/94	<.0004 ppm
Calcium	3.8	08/12/94	N/A
Chloride	0.9	08/12/94	N/A
Chromium	<0.01	08/04/94	0.1
Color (C.U.)	15	08/12/94	N/A
Copper	<0.02	08/04/94	<.006 ppm
Cyanide	<0.005	08/12/94	N/A
Detergents (surfactant)	<0.08	08/9/94	N/A
Fluoride	<0.1	08/30/94	N/A
Hardness	14.0	08/04/94	120 - 400 ppm
Hydrogen Sulfide	<0.01	08/15/94	N/A
Iron	<0.02	08/11/94	N/A
Lead	<0.005	08/04/94	<0. 03 ppm
Magnesium	<0.8	08/11/94	N/A
Manganese	<0.01	08/11/94	N/A
Mercury	<0.0005	08/11/94	<.002 ppm
Nitrogen Nitrate	<0.013	08/18/94	0.2 ppm
Potassium	0.5	08/12/94	N/A
Selenium	<0.005	08/10/94	N/A
Silica	11	08/30/94	N/A
Silver	<0.001	08/17/94	N/A
Sodium	1.5	08/17/94	N/A
Sulfate	<1	08/26/94	N/A
Total Dissolved Solids	28	08/11/94	80 ppm
Zinc	<0.005	08/10/94	0.03 ppm
pH (pH units)	7.20	08/09/94	6.5 - 8.0

Appendix C2. Upper Crooked River rearing pond water quality analysis report.

PRIMARY CONTAMINANTS ANALYSIS

Contaminant	Result	MDL	Method	Date
Antimony (0.006)	---	0.001	EPA 200.8	07/02/97
Nickel	---	0.001	EPA 200.8	07/02/97
Arsenic (0.05)	ND	0.005	EPA 200.8	07/02/97
Selenium (0.05)	ND	0.005	EPA 200.8	07/02/97
Barium (2)	0.029	0.01	EPA 200.8	07/02/97
Sodium	2.9	1	EPA 200.8	07/02/97
Beryllium (0.004)	---	0.001	EPA 200.8	07/02/97
Thallium (0.02)	---	0.001	EPA 200.8	07/02/97
Cadmium (0.005)	ND	0.001	EPA 200.8	07/02/97
Cyanide (0.2)	ND	0.01	EPA 200.8	07/02/97
Chromium (0.1)	0.002	0.005	EPA 200.8	07/02/97
Fluoride (4.0)	ND	0.1	EPA 300.0	06/27/97
Mercury (0.002)	ND	0.001	EPA 200.8	07/02/97

SECONDARY CONTAMINANTS

Chloride	ND	0.001	EPA 300.0	06/27/97
Ammonia/N	ND	0.1	EPA 350.2	07/01/97
Color 2		0.005	EPA110.2	06/27/97
Calcium	3.6	1	EPA 200.8	07/02/97
Sulfide (HS)	ND	0.01	EPA 376.1	06/27/97
Hardness (CaCO3)	12	5	2340 B 0	7/02/97
Iron	0.26	0.05	EPA 236.1	07/02/97
Magnesium	0.6	1	EPA 200.8	07/02/97
Manganese	0.01	0.001	EPA 200.8	07/02/97
pH	6.9		EPA 150.1	07/02/97
Odor	---	1	EPA 140.1	
Potassium	0.15	1	EPA 200.8	06/27/97
Surfactants	ND	0.05	SM5540C	06/27/97
Silica(SiO3)	6.8	1	EPA 200.8	07/02/97
TDS	18	1	EPA 160.1	06/27/97
Lead	0.002	0.001	EPA 200.8	07/02/97
Zinc	0.012	0.001	EPA 200.8	07/02/97
Copper	0.016	0.001	EPA 200.8	07/02/97
Sulfate	ND	1	EPA 300.0	06/27/97
Conductivity(uS/cm)	25	10	EPA 120.1	06/27/97
Aluminum	---	0.001	EPA 200.8	07/02/97
Langlier Index	---			
Alkalinity	12	5	EPA 310.1	06/27/97
Silver	ND	0.01	EPA 200.8	07/02/97
Turbidity(NTU)	---	0.5	EPA 180.1	

Laboratory Reporting Codes:

Results are ppm (ppm) unless otherwise noted

ND - Not detected within the sensitivity of the instrument

--- = No analysis performed for this contaminant

Numerical Entry = Detection at level indicated

MCL (numbers in parenthesis) = EPA maximum contaminant level

Appendix C3. Powell adult holding pond water quality analysis report.

Contaminant	PRIMARY CONTAMINANTS		ANALYSIS	
	Result	MDL	Method	Date
Antimony(0.006)	---	0.001	EPA 200.8	07/02/97
Nickel	---	0.001	EPA 200.8	07/02/97
Arsenic (0.05)	ND	0.005	EPA 200.8	07/02/97
Selenium(0.05)	ND	0.005	EPA 200.8	07/02/97
Barium (2)	0.009	0.01	EPA 200.8	07/02/97
Sodium	1.9	1	EPA 200.8	07/02/97
Beryllium (0.004)	---	0.001	EPA 200.8	07/02/97
Thallium(0.02)	---	0.001	EPA 200.8	07/02/97
Cadmium(0.005)	ND	0.001	EPA 200.8	07/02/97
Cyanide(0.2)	ND	0.01	EPA 200.8	07/02/97
Chromium (0.1)	0.002	0.005	EPA 200.8	07/02/97
Fluoride(4.0)	ND	0.1	EPA 300.0	06/27/97
Mercury (0.002) ND		0.001	EPA 200.8	07/02/97
SECONDARY CONTAMINANTS				
Chloride	ND	0.001	EPA 300.0	06/26/97
Ammonia/N	ND	0.1	EPA 350.2	07/01/97
Color	4	0.005	EPA110.2	06/26/97
Calcium	4.2	1	EPA 200.8	07/02/97
Sulfide(HS)	ND	0.01	EPA 376.1	06/26/97
Hardness(CaCO3)	14	5	2340 B	07/02/97
Iron	0.15	0.05	EPA 236.1	07/02/97
Magnesium	0.7	1	EPA 200.8	07/02/97
Manganese	0.009	0.001	EPA 200.8	07/02/97
pH	---		EPA 150.1	
Odor	---	1	EPA 140.1	
Potassium	0.07	1	EPA 200.8	07/02/97
Surfactants	ND	0.05	SM5540C	06/26/97
Silica(SiO3)	5	1	EPA 200.8	07/02/97
TDS	15	1	EPA 160.1	06/26/97
Lead	0.002	0.001	EPA 200.8	07/02/97
Zinc	0.006	0.001	EPA 200.8	07/02/97
Copper	0.016	0.001	EPA 200.8	07/02/97
Sulfate	ND	1	EPA 300.0	06/26/97
Conductivity(uS/cm)	27.2	10	EPA 120.1	06/25/97
Aluminum	---	0.001	EPA 200.8	07/02/97
Langlier Index	---			
Alkalinity	---	5	EPA 310.1	
Silver	ND	0.01	EPA 200.8	07/02/97
Turbidity(NTU)	---	0.5	EPA 180.1	

Laboratory Reporting Codes:

Results are ppm (ppm) unless otherwise noted

ND - Not detected within the sensitivity of the instrument

--- = No analysis performed for this contaminant

Numerical Entry = Detection at level indicated

MCL (numbers in parenthesis)= EPA maximum contaminant level

Appendix C4. Red River adult holding pond water quality analysis report.

PRIMARY CONTAMINANTS ANALYSIS					
Contaminant	Result	MDL	Method	Date	
Antimony (0.006)	---	0.001	EPA 200.8	07/16/97	
Nickel	---	0.001	EPA 200.8	07/16/97	
Arsenic (0.05)	ND	0.005	EPA 200.8	07/16/97	
Selenium(0.05)	ND	0.005	EPA 200.8	07/16/97	
Barium (2)	0.03	0.01	EPA 200.8	07/16/97	
Sodium	3.2	1	EPA 200.8	07/16/97	
Beryllium (0.004)	---	0.001	EPA 200.8	07/16/97	
Thallium(0.02)	---	0.001	EPA 200.8	07/16/97	
Cadmium(0.005)	ND	0.001	EPA 200.8	07/16/97	
Cyanide(0.2)	ND	0.01	EPA 200.8	07/16/97	
Chromium (0.1)	0.001	0.005	EPA 200.8	07/16/97	
Fluoride(4.0)	ND	0.1	EPA 300.0	07/03/97	
Mercury (0.002)	ND	0.001	EPA 200.8	07/16/97	
Nitrate /N	ND	0.5	EPA 300.0	07/03/97	
SECONDARY CONTAMINANTS					
Chloride	ND	0.001	EPA 300.0	07/03/97	
Ammonia/N	ND	0.1	EPA 350.2	07/01/97	
Color	15	0.005	EPA110.2	07/03/97	
Calcium	3.92	1	EPA 200.8	07/16/97	
Sulfide(HS)	ND	0.01	EPA 376.1		
Hardness(CaCO3)	13	5	2340 B	07/16/97	
Iron	0.37	0.05	EPA 236.1	07/16/97	
Magnesium	0.76	1	EPA 200.8	07/16/97	
Manganese	0.014	0.001	EPA 200.8	07/16/97	
pH	7.06		EPA 150.1	07/03/97	
Odor	---	1	EPA 140.1		
Potassium	0.53	1	EPA 200.8	07/16/97	
Surfactants	---	0.05	SM5540C		
Silica(SiO3)	7.9	1	EPA 200.8	07/16/97	
TDS	21	1	EPA 160.1	07/03/97	
Lead	0.002	0.001	EPA 200.8	07/16/97	
Zinc	0.016	0.001	EPA 200.8	07/16/97	
Copper	0.016	0.001	EPA 200.8	07/16/97	
Sulfate	ND	1	EPA 300.0	07/03/97	
Conductivity(uS/cm)	32	10	EPA 120.1	07/03/97	
Aluminum	---	0.001	EPA 200.8	07/16/97	
Langlier Index	---				
Alkalinity	---	5	EPA 310.1		
Silver	ND	0.01	EPA 200.8	07/16/97	
Turbidity(NTU)	1.4	0.5	EPA 180.1	07/03/97	

Laboratory Reporting Codes:

Results are ppm (ppm) unless otherwise noted

ND - Not detected within the sensitivity of the instrument

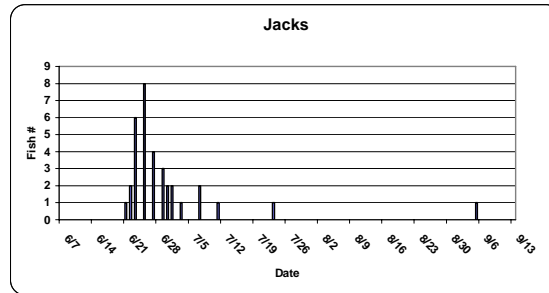
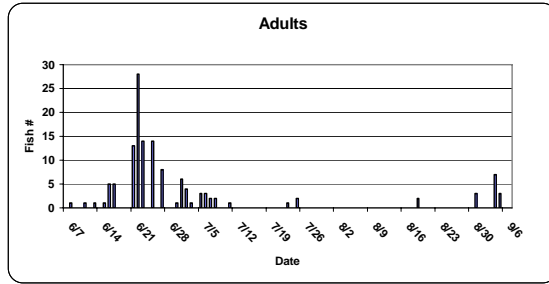
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Numerical Entry = Detection at level indicated

MCL (numbers in parenthesis)= EPA maximum contaminant level

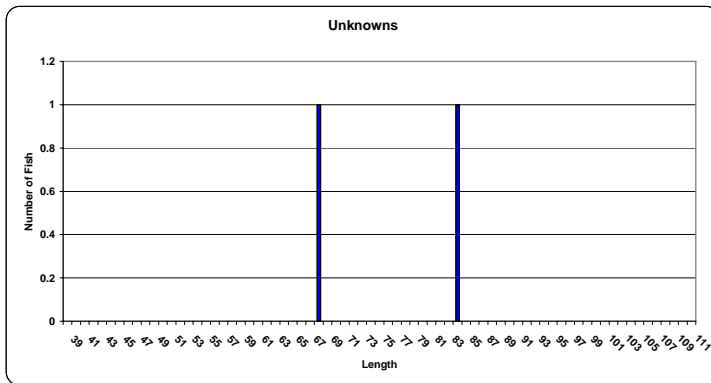
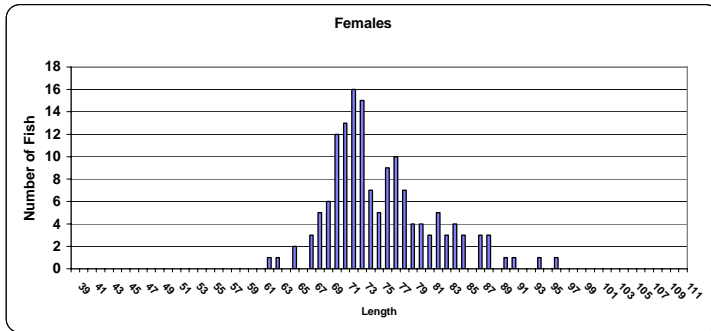
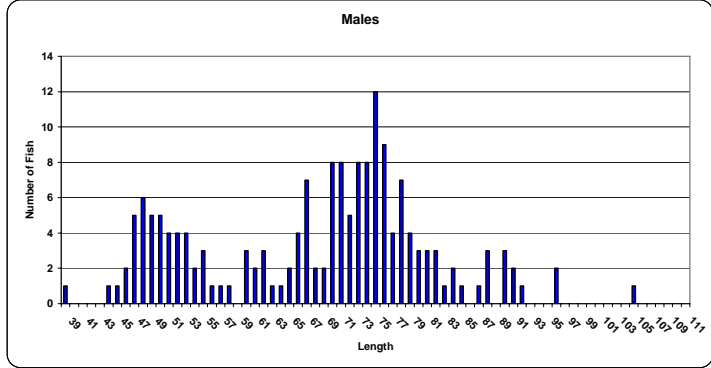
Appendix D1. Crooked River Chinook Run Timing 2005.

Date	Adult	Jack	Total	Date	Adult	Jack	Total
6/7	0	0	0	7/28	0	0	0
6/8	1	0	1	7/29	0	0	0
6/9	0	0	0	7/30	0	0	0
6/10	0	0	0	7/31	0	0	0
6/11	1	0	1	8/1	0	0	0
6/12	0	0	0	8/2	0	0	0
6/13	1	0	1	8/3	0	0	0
6/14	0	0	0	8/4	0	0	0
6/15	1	0	1	8/5	0	0	0
6/16	5	0	5	8/6	0	0	0
6/17	5	0	5	8/7	0	0	0
6/18	0	0	0	8/8	0	0	0
6/19	0	0	0	8/9	0	0	0
6/20	0	0	0	8/10	0	0	0
6/21	13	1	14	8/11	0	0	0
6/22	28	2	30	8/12	0	0	0
6/23	14	6	20	8/13	0	0	0
6/24	0	0	0	8/14	0	0	0
6/25	14	8	22	8/15	0	0	0
6/26	0	0	0	8/16	0	0	0
6/27	8	4	12	8/17	0	0	0
6/28	0	0	0	8/18	0	0	0
6/29	0	3	3	8/19	2	0	2
6/30	1	2	3	8/20	0	0	0
7/1	6	2	8	8/21	0	0	0
7/2	4	0	4	8/22	0	0	0
7/3	1	1	2	8/23	0	0	0
7/4	0	0	0	8/24	0	0	0
7/5	3	0	3	8/25	0	0	0
7/6	3	0	3	8/26	0	0	0
7/7	2	2	4	8/27	0	0	0
7/8	2	0	2	8/28	0	0	0
7/9	0	0	0	8/29	0	0	0
7/10	0	0	0	8/30	0	0	0
7/11	1	1	2	8/31	3	0	3
7/12	0	0	0	9/1	0	0	0
7/13	0	0	0	9/2	0	0	0
7/14	0	0	0	9/3	0	0	0
7/15	0	0	0	9/4	7	0	7
7/16	0	0	0	9/5	3	1	4
7/17	0	0	0	9/6	0	0	0
7/18	0	0	0	9/7	0	0	0
7/19	0	0	0	TOTAL	132	34	166
7/20	0	0	0				
7/21	0	0	0				
7/22	0	0	0				
7/23	1	1	2				
7/24	0	0	0				
7/25	2	0	2				
7/26	0	0	0				
7/27	0	0	0				



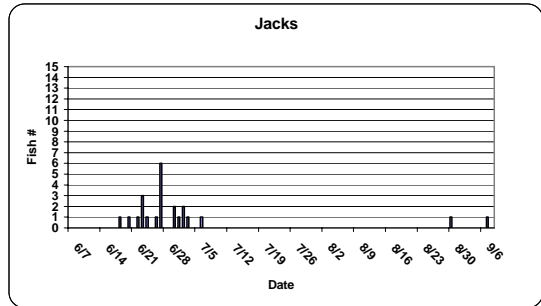
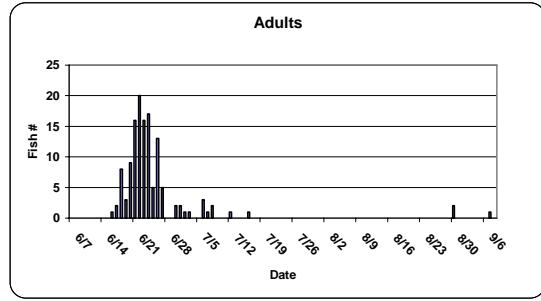
Appendix D2. South Fork length frequency 2005.
(Red River and Crooked River)

Length	Males	Females	Unk	Total
39	1	0	0	1
40	0	0	0	0
41	0	0	0	0
42	0	0	0	0
43	0	0	0	0
44	1	0	0	1
45	1	0	0	1
46	2	0	0	2
47	5	0	0	5
48	6	0	0	6
49	5	0	0	5
50	5	0	0	5
51	4	0	0	4
52	4	0	0	4
53	4	0	0	4
54	2	0	0	2
55	3	0	0	3
56	1	0	0	1
57	1	0	0	1
58	1	0	0	1
59	0	0	0	0
60	3	0	0	3
61	2	0	0	2
62	3	1	0	4
63	1	1	0	2
64	1	0	0	1
65	2	2	0	4
66	4	0	0	4
67	7	3	0	10
68	2	5	1	8
69	2	6	0	8
70	8	12	0	20
71	8	13	0	21
72	5	16	0	21
73	8	15	0	23
74	8	7	0	15
75	12	5	0	17
76	9	9	0	18
77	4	10	0	14
78	7	7	0	14
79	4	4	0	8
80	3	4	0	7
81	3	3	0	6
82	3	5	0	8
83	1	3	0	4
84	2	4	1	7
85	1	3	0	4
86	0	0	0	0
87	1	3	0	4
88	3	3	0	6
89	0	0	0	0
90	3	1	0	4
91	2	1	0	3
92	1	0	0	1
93	0	0	0	0
94	0	1	0	1
95	0	0	0	0
96	2	1	0	3
97	0	0	0	0
98	0	0	0	0
99	0	0	0	0
100	0	0	0	0
101	0	0	0	0
102	0	0	0	0
103	0	0	0	0
104	0	0	0	0
105	1	0	0	1
106	0	0	0	0
107	0	0	0	0
108	0	0	0	0
109	0	0	0	0
110	0	0	0	0
111	0	0	0	0
TOTAL	171	148	2	321



Appendix E1. Red River Chinook Run Timing 2005.

Date	Adult	Jack	Total	Date	Adult	Jack	Total
6/7	0	0	0	7/21	0	0	0
6/8	0	0	0	7/22	0	0	0
6/9	0	0	0	7/23	0	0	0
6/10	0	0	0	7/24	0	0	0
6/11	0	0	0	7/25	0	0	0
6/12	0	0	0	7/26	0	0	0
6/13	0	0	0	7/27	0	0	0
6/14	0	0	0	7/28	0	0	0
6/15	0	0	0	7/29	0	0	0
6/16	1	0	1	7/30	0	0	0
6/17	2	0	2	7/31	0	0	0
6/18	8	1	9	8/1	0	0	0
6/19	3	0	3	8/2	0	0	0
6/20	9	1	10	8/3	0	0	0
6/21	16	0	16	8/4	0	0	0
6/22	20	1	21	8/5	0	0	0
6/23	16	3	19	8/6	0	0	0
6/24	17	1	18	8/7	0	0	0
6/25	5	0	5	8/8	0	0	0
6/26	13	1	14	8/9	0	0	0
6/27	5	6	11	8/10	0	0	0
6/28	0	0	0	8/11	0	0	0
6/29	0	0	0	8/12	0	0	0
6/30	2	2	4	8/13	0	0	0
7/1	2	1	3	8/14	0	0	0
7/2	1	2	3	8/15	0	0	0
7/3	1	1	2	8/16	0	0	0
7/4	0	0	0	8/17	0	0	0
7/5	0	0	0	8/18	0	0	0
7/6	3	1	4	8/19	0	0	0
7/7	1	0	1	8/20	0	0	0
7/8	2	0	2	8/21	0	0	0
7/9	0	0	0	8/22	0	0	0
7/10	0	0	0	8/23	0	0	0
7/11	0	0	0	8/24	0	0	0
7/12	1	0	1	8/25	0	0	0
7/13	0	0	0	8/26	0	0	0
7/14	0	0	0	8/27	0	0	0
7/15	0	0	0	8/28	0	0	0
7/16	1	0	1	8/29	0	0	0
7/17	0	0	0	8/30	2	1	3
7/18	0	0	0	8/31	0	0	0
7/19	0	0	0	9/1	0	0	0
7/20	0	0	0	9/2	0	0	0
				9/3	0	0	0
				9/4	0	0	0
				9/5	0	0	0
				9/6	0	0	0
				9/7	1	1	2
				9/8	0	0	0
TOTAL	132	23	155				



Appendix E2. South Fork Chinook summary of fish trapped, released, spawned and disposition of carcasses, Brood Year 2005.

TOTAL SOUTH FORK FISH TRAPPED:

Crooked River	166
Red River	155
TOTAL	321

AGE CLASSES	FEMALES	MALES	UNK	TOTAL
3 Years = (<64 cm)	2	55	0	57
4 Years = (64 - 82 cm)	126	99	1	226
5 Years = (> 82 cm)	20	17	1	38
	148	171	2	321

FISH DISPOSITION FEMALES:

Crooked River	Red River	CFH	TOTAL
MORTALITY 0	MORTALITY 1	SPAWNED 126	126
		MORTALITY 6	7
		KILLED/CULLED @ SPAWN 2	2
RELEASED 8	RELEASED 5	RELEASED 0	13
TOTAL 8	TOTAL 6	TOTAL 134	148

FISH DISPOSITION MALES:

Crooked River	Red River	CFH	TOTAL
MORTALITY 0	MORTALITY 3	SPAWNED 143	143
		MORTALITY 1	4
RELEASED 17	RELEASED 7	SPAWN/RELEASE 0	24
TOTAL 17	TOTAL 10	TOTAL 144	171

FISH DISPOSITION UNKNOWN:

Crooked River	Red River	CFH	TOTAL
MORTALITY 0	MORTALITY 0	SPAWNED 0	0
		MORTALITY 0	0
RELEASED 1	RELEASED 1	SPAWN/RELEASE 0	2
TOTAL 1	TOTAL 1	TOTAL 0	2

TOTAL TRAP 321

Appendix F1. Summary of spring Chinook salmon returns to Crooked River by Brood Year.

Brood Year	Year Released	Number Released	3-yr-olds	Year Returned	4-yr-olds	Year Returned	5-yr-olds	Year Returned	Total by	
									return	% return from plant
1985	-----	-----		1988	-----	1989	4	1990	4	
1986	-----	-----		1989	23	1990	5	1991	28	
1987	Spr 1989 (a)	199,700	2	1990	13	1991	7	1992	22	0.011%
1988	Spr 1990 (b)	300,407	2	1991	208	1992	276	1993	486	0.162%
1989	Fall 1990 (c)	339,087	13	1992	119	1993	10	1994	142	0.042%
1990	Fall 1991 (a)	320,400	7	1993	15	1994	0	1995	22	0.002%
1991	-----	-----	1*	1994	0	1995	1	1996	1	0.000%
1992	Spr 1994 (d)	273,766	6	1995	241 (g)	1996	59	1997	306	0.112%
1993	Fall 1994	199,255								
	Fall 1994 (e)	216,280	94 (g)	1996	935	1997	213	1998	1274	0.134%
	Spr 1995	258,293								
	Spr 1995 (f)	279,615								
		953,443								
1994	Spr 1996	37,071	2	1997	22	1998	3	1999	27	0.073%
1995	Spr 1997	0	0	1998	0	1999	0	2000	0	0.00%
1996	Spr 1998	205,906	122	1999	637	2000	101	2001	860**	0.417%
1997	Fall 1998	162,119	454	2000	1878**	2001	276**	2002	2608**	0.340%
	Spr 1999	600,981								
		763,100								
1998	Fall 1999	89,299	34**	2001	1023**	2002	870**	2003	1927**	0.395%
	Spr 2000	399,060								
		488,359								
1999	Fall 2000	105,507	37**	2002	334**	2003	27**	2004	398**	0.209%
	Spr 2001	84,649								
		190,156								
2000	Fall 2001	155,887	156**	2003	479**	2004	14**	2005	649**	0.074%
	Spr 2002	726,489								
2001	Fall 2002	169,768	35**	2004	98**	2005	8**	2006		
	Spr 2003	629,687								
2002	Fall 2003	234,361	28**	2005	405**	2006		2007		
	Spr 2004	750,317								
2003	Fall 2004	64,263								
	Spr 2005	700,387	28**	2006						

(a) Transferred from Dworshak Hatchery

(b) Direct released from Kooskia Fish Hatchery

(c) Transferred from Dworshak and Rapid River hatcheries

(d) Eggs from Lookingglass Hatchery (Rapid River stock) reared at Clearwater Hatchery

(e) Eggs from Rapid River hatchery reared at Clearwater Hatchery

(f) Non-acclimated release

(g) These numbers do not match run report numbers. Each one has been corrected to reflect straying from other stocks.

* Natural Fish

**Does not include fish caught in fishery or left in river

Appendix F2. Summary of spring Chinook returns to Red River by Brood Year.

Brood Year	Year Released	Number Released	Year	Year	Year	Year	Total by	% return		
Year	Released	Released	3-yr-olds	Returned	4-yr-olds	Returned	5-yr-olds	Returned	return	from plant
1982	Fall 1983	260,000	2	1985	(a)	1986	107	1987	109	0.036%
	Spr 1984	40,000								
1983	Spr 1985 (b)	80,000	(a)	1986	377	1987	259	1988	636	0.795%
1984	Spr 1986 (b)	136,800	35	1987	132	1988	74	1989	241	0.176%
1985	Fall 1986 (c)	96,400	3	1988	25	1989	13	1990	41	0.021%
	Spr 1987 (c)	96,800								
1986	Fall 1987	233,100	5	1989	38	1990	8	1991	51	0.022%
1987	Fall 1988	291,200	2	1990	9	1991	3	1992	14	0.005%
1988	Fall 1989	240,500	1	1991	31	1992	39	1993	71	0.029%
1989	Fall 1990	273,800	5	1992	99	1993	13	1994	117	0.025%
	Spr 1991 (d)	63,000								
	Spr 1991 (e)	124,000								
		460,800								
1990	Fall 1991	354,700	1	1993	18	1994	1	1995	20	0.004%
	Spr 1992 (f)	207,500								
		562,200								
1991	Fall 1992	6,000		1994	0	1995	0	1996	0	0.000%
1992	Fall 1993	22,246	3	1995	4 (g)	1996	45	1997	52	0.234%
1993	Fall 1994	320,755	5	1996	191	1997	42	1998	238	0.074%
1994	Spr 1996	24,002	2	1997	25	1998	2	1999	29	0.121%
1995	Spr 1997	2,983	1	1998	6	1999	22	2000	29	0.972%
1996	Spr 1998	51,208	15	1999	81	2000	66**	2001	162	0.316%
1997	Fall 1998	66,114	1	2000		2001		2002		
	Spr 1999	360,983	178	2000	1244**	2001	122**	2002	1545**	0.360%
1998	Fall 1999	74,981	23**	2001	494**	2002	222**	2003	739**	0.316%
	Spr 2000	159,051								
		234,032								
1999	Fall 2000	68,684	7**	2002	40**	2003	0	2004	47**	0.068%
2000	Fall 2001	84,238	36**	2003	527**	2004	18**	2005	581**	0.134%
	Spr 2002	350,318								
2001	Fall 2002	85,064	18**	2004	102**	2005	14**	2006		
	Spr 2003	351,066								
2002	Fall 2003	108,323	22	2005	644**	2006		2007		
	Spr 2004	354,868								
2003	Spr 2005	401,362	21**	2006						

(a) Trap was not installed in 1986 due to construction

(b) These fish wintered in the rearing pond

(c) These fish were Rapid River stock reared at Sawtooth and released directly into Red River with no acclimation

(d) Planted off bridge at ranger station, reared at Dworshak Hatchery, Clearwater Stock

(e) Planted off bridge at ranger station, reared at Kooskia, Clearwater Stock

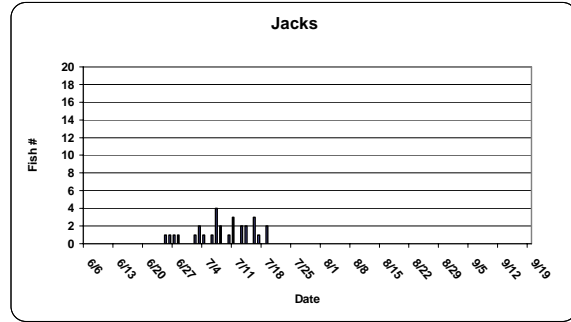
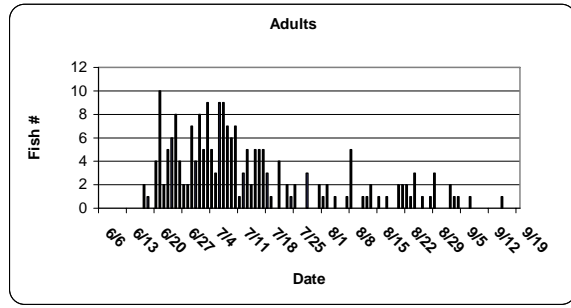
(f) Acclimated in rearing pond for 21 days, transferred from Dworshak

(g) These numbers do not match run report numbers. Each one has been corrected to reflect straying from other stocks.

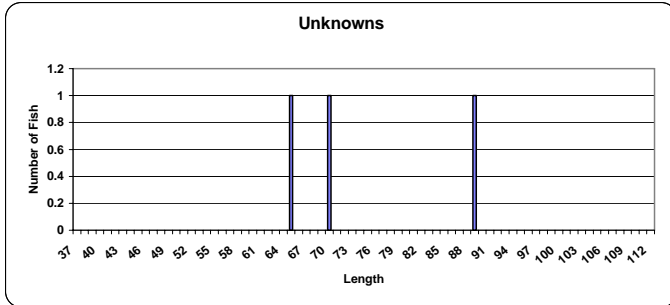
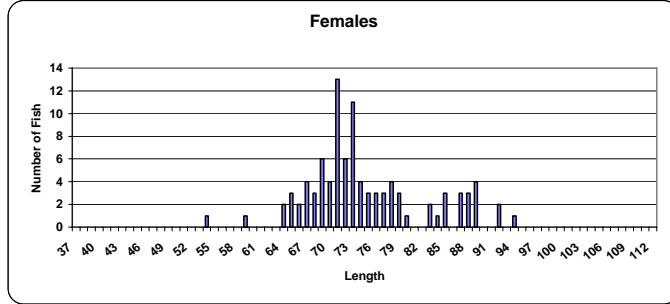
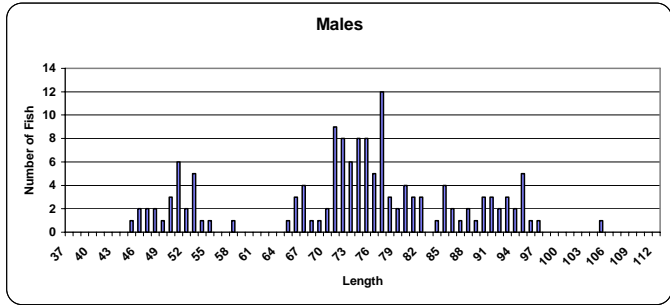
**Does not include fish caught in fishery or left in river.

Appendix G1. Powell / Crooked Fork Creek Chinook Run Timing 2005

Date	Adult	Jack	Total	Date	Adult	Jack	Total
6/6	0	0	0	7/28	3	0	3
6/7	0	0	0	7/29	0	0	0
6/8	0	0	0	7/30	0	0	0
6/9	0	0	0	7/31	2	0	2
6/10	0	0	0	8/1	1	0	1
6/11	0	0	0	8/2	2	0	2
6/12	0	0	0	8/3	0	0	0
6/13	0	0	0	8/4	1	0	1
6/14	0	0	0	8/5	0	0	0
6/15	0	0	0	8/6	0	0	0
6/16	0	0	0	8/7	1	0	1
6/17	2	0	2	8/8	5	0	5
6/18	1	0	1	8/9	0	0	0
6/19	0	0	0	8/10	0	0	0
6/20	4	0	4	8/11	1	0	1
6/21	10	0	10	8/12	1	0	1
6/22	2	0	2	8/13	2	0	2
6/23	5	0	5	8/14	0	0	0
6/24	6	0	6	8/15	1	0	1
6/25	8	1	9	8/16	0	0	0
6/26	4	1	5	8/17	1	0	1
6/27	2	1	3	8/18	0	0	0
6/28	2	1	3	8/19	0	0	0
6/29	7	0	7	8/20	2	0	2
6/30	4	0	4	8/21	2	0	2
7/1	8	0	8	8/22	2	0	2
7/2	5	1	6	8/23	1	0	1
7/3	9	2	11	8/24	3	0	3
7/4	5	1	6	8/25	0	0	0
7/5	3	0	3	8/26	1	0	1
7/6	9	1	10	8/27	0	0	0
7/7	9	4	13	8/28	1	0	1
7/8	7	2	9	8/29	3	0	3
7/9	6	0	6	8/30	0	0	0
7/10	7	1	8	8/31	0	0	0
7/11	1	3	4	9/1	0	0	0
7/12	3	0	3	9/2	2	0	2
7/13	5	2	7	9/3	1	0	1
7/14	2	2	4	9/4	1	0	1
7/15	5	0	5	9/5	0	0	0
7/16	5	3	8	9/6	0	0	0
7/17	5	1	6	9/7	1	0	1
7/18	3	0	3	9/8	0	0	0
7/19	1	2	3	9/9	0	0	0
7/20	0	0	0	9/10	0	0	0
7/21	4	0	4	9/11	0	0	0
7/22	0	0	0	9/12	3	0	3
7/23	2	0	2	9/13	2	0	2
7/24	1	0	1	9/14	1	0	1
7/25	2	0	2	9/15	1	0	1
7/26	0	0	0	9/16	0	0	0
7/27	0	0	0	TOTAL	212	29	241



Length	Males	Females	Unk	Total
37	0	0	0	0
38	0	0	0	0
39	0	0	0	0
40	0	0	0	0
41	0	0	0	0
42	0	0	0	0
43	0	0	0	0
44	0	0	0	0
45	1	0	0	1
46	2	0	0	2
47	2	0	0	2
48	2	0	0	2
49	1	0	0	1
50	3	0	0	3
51	6	0	0	6
52	2	0	0	2
53	5	0	0	5
54	1	1	0	2
55	1	0	0	1
56	0	0	0	0
57	0	0	0	0
58	1	0	0	1
59	0	1	0	1
60	0	0	0	0
61	0	0	0	0
62	0	0	0	0
63	0	0	0	0
64	0	2	0	2
65	1	3	1	5
66	3	2	0	5
67	4	4	0	8
68	1	3	0	4
69	1	6	0	7
70	2	4	1	7
71	9	13	0	22
72	8	6	0	14
73	6	11	0	17
74	8	4	0	12
75	8	3	0	11
76	5	3	0	8
77	12	3	0	15
78	3	4	0	7
79	2	3	0	5
80	4	1	0	5
81	3	0	0	3
82	3	0	0	3
83	0	2	0	2
84	1	1	0	2
85	4	3	0	7
86	2	0	0	2
87	1	3	0	4
88	2	3	0	5
89	1	4	1	6
90	3	0	0	3
91	3	0	0	3
92	2	2	0	4
93	3	0	0	3
94	2	1	0	3
95	5	0	0	5
96	1	0	0	1
97	1	0	0	1
98	0	0	0	0
99	0	0	0	0
100	0	0	0	0
101	0	0	0	0
102	0	0	0	0
103	0	0	0	0
104	0	0	0	0
105	1	0	0	1
106	0	0	0	0
107	0	0	0	0
108	0	0	0	0
109	0	0	0	0
110	0	0	0	0
111	0	0	0	0
112	0	0	0	0
TOTAL	142	96	3	241



Appendix G3. Powell Chinook summary of fish trapped, released, spawned and disposition of carcasses for Powell and Crooked Fork adult traps, Brood Year 2005.

TOTAL FISH TRAPPED:				
Powell				162
Crooked Fork Creek				79
		TOTAL		241
AGE CLASSES	FEMALES	MALES	UNK	TOTAL
3 Years = (<25 in)	2	27	0	29
4 Years = (25 – 32 in)	76	83	2	161
5 Years = (> 33 in)	18	32	1	51
TOTAL	96	142	3	241
FISH DISPOSITION FEMALES:				
SPAWNED				81
MORTALITY				4
KILLED/CULLED @ SPAWN				1
RELEASED				10
TOTAL				96
FISH DISPOSITION MALES:				
SPAWNED				119
MORTALITY				0
RELEASED				23
TOTAL				142
FISH DISPOSITION UNKNOWN:				
SPAWNED				0
MORTALITY				0
RELEASED				3
TOTAL				3
TOTAL DISPOSITION				241

All low BKD carcasses were scatter planted through the river system for nutrient enhancement.

Appendix H. Summary of spring Chinook returns to Powell by brood year.

Brood Year	Year Released	Number Released	3-yr-olds	Year Returned	4-yr-olds	Year Returned	5-yr-olds	Year Returned	Total by return	% return from plant
1984	Spr 1986	-----		1987		1988	16	1989	16	
1985	Spr 1987	-----		1988	111	1989	20	1990	131	
1986	Spr 1988 (a)	200,100	27	1989	157	1990	10	1991	194	0.097%
1987	Spr 1989 (b)	200,639	2	1990	16	1991	15	1992	33	0.016%
1988	Fall 1989	314,500	7	1991	249	1992	288	1993	544	0.173%
1989	Fall 1990	307,100	6	1992	204	1993	57	1994	267	0.054%
	Spr 1991 (c)	180,764								
1990	Fall 1991	358,400	8	1993	28	1994	1	1995	37	0.007%
	Spr 1992 (d)	150,800								
	Spr 1992 (e)	53,500								
		562,700								
1991	Fall 1992 (f)	500	1	1994	1	1995	0	1996	2	0.400%
	Fall 1992 (g)									
1992	Spr 1994 (h)	144,823	12	1995	141	1996	129	1997	268	0.102%
	Spr 1994 (i)	61,060								
	Spr 1994 (j)	55,745								
		261,628								
1993	Fall 1994	311,690	45	1996	587	1997	310	1998	942	0.156%
	Spr 1995	290,417								
		602,107								
1994	Spr 1996	232,731	2	1997	177	1998	53	1999	232	0.099%
1995	Spr 1997	3,549	1	1998	8	1999	88 (k)	2000	97	2.73%
1996	Spr 1998	244,847	119	1999	877	2000	56**	2001	1052	0.430%
1997	Fall 1998	330,555	300	2000	2210**	2001	202**	2002	2712**	0.410%
	Spr 1999	334,482								
		665,037								
1998	Spr 2000	293,522	78**	2001	1156**	2002	661**	2003	1895**	0.650%
1999	Spr 2001	212,648	36**	2002	788**	2003	215**	2004	1039**	0.489%
2000	Fall 2001	559,630	129**	2003	1364**	2004	42**	2005	1535**	0.169%
	Spr 2002	349,890								
2001	Fall 2002	526,733	48**	2004	131*	2005	14**	2006		
	Spr 2003	350,665								
2002	Fall 2003	385,292	27**	2005	422**	2006		2007		
	Spr 2004	376,797								
2003	Fall 2004	343,967	78**	2006		2007				
	Spr 2005	403,917								

- (a) Rapid River stock reared at Dworshak
 - (b) Clearwater stock reared at Kooskia and Dworshak
 - (c) Clearwater reared at Kooskia; acclimated in rearing pond
 - (d) Acclimated 21 days in rearing pond before release into Walton Cr, transferred from Dworshak
 - (e) Not acclimated, transferred to rearing pond and immediately released
 - (f) These smolts were released from the rearing pond to Walk Creek
 - (g) Released at headwaters of Crooked Fork Creek
 - (h) Acclimated 17 days, volitional release 5 days, released in Walton Cr.
 - (i) Non-acclimated, transferred to rearing pond and immediately released
 - (j) Released directly into Walton Cr.
 - (k) Most of these five-year-olds were large four-year-olds
- ** Does not include fish caught in fishery or left in river

Appendix I1. Chinook spawning record 2005 for South Fork.

SOUTH FORK (Red River / Crooked River).

Lot	Spawn Date	Total Females	Poor Eggs	BKD Culling	Females Kept	Green Eggs	Eyed Eggs	Percent Eye Up	Fecundity
			Table	Incubation	Production	Production	Production	Production	Production
1	8/9/05	5	0	0	5	24,618	24,000	97.5%	4,924
2	8/12/05	7	1	0	6	23,654	22,855	96.6%	3,942
3	8/16/05	11	0	1	10	41,439	38,976	94.1%	4,144
4	8/19/05	13	0	0	13	49,500	48,693	98.4%	3,808
5	8/23/05	46	0	1	45	169,666	165,822	97.7%	3,770
6	8/26/05	22	0	1	21	79,416	77,977	98.2%	3,782
7	8/30/05	13	1	0	12	45,737	44,531	97.4%	3,811
8	9/2/05	6	0	0	6	22,834	20,805	91.1%	3,806
9	9/6/05	4	0	0	4	17,585	17,064	97.0%	4,396
10	9/7/05	1	0	0	1	2,115	2,089	98.8%	2,115
*Marking adjustment						9,060	9,060		
Sub-Total		128	2	3	123	485,624	471,872	97.2%	3,948
Total			5		123	485,624	471,872		

*At marking, a discrepancy of +9,060 fish was discovered

Appendix I2. Chinook spawning record 2005 for Powell.

POWELL

			Poor Eggs	BKD Culling	Females Kept	Green Eggs	Eyed Eggs	Percent Eye Up	Fecundity
Lot	Spawn Date	Total Females	Table	Incubation	Production	Production	Production	Production	Production
1	8/4/05	5	0	0	5	25,838	23,743	91.9%	5,168
2	8/8/05	4	0	1	3	9,175	8,170	89.0%	3,058
3	8/11/05	8	0	0	8	30,269	26,236	86.7%	3,784
4	8/15/05	11	0	0	11	51,102	47,891	93.7%	4,646
5	8/18/05	24	1	1	22	89,900	85,610	95.2%	4,086
6	8/22/05	13	0	0	13	45,270	43,161	95.3%	3,482
7	8/25/05	9	0	0	9	31,212	29,699	95.2%	3,468
8	8/29/05	6	0	0	6	19,220	18,063	94.0%	3,203
9	9/6/05	1	0	0	1	3,685	3,563	96.7%	3,685
10	9/9/05	1	0	0	1	4,520	4,217	93.3%	4,520
*Marking adjustment						(152)	(152)	100.0%	
Sub-Total		82	1	2	79	310,039	290,201	93.6%	3,925
Total			3		79	310,039	290,201		

38

*At marking, a discrepancy of -152 fish was discovered

Appendix J. Production cost for BY-05 Chinook and BY-06 North Fork Steelhead.

Rearing to Release:

	CHINOOK BY-05	North Fork Steelhead BY-06
Number Produced	1,670,006	868,375
Weight	106,857	174,521
% Mortality (From eyed eggs)	2.84%	10.36%
Conversion Rate	1.09	0.94

FOOD FED AND WEIGHT GAINED

	Chinook (BY-05)	North Fork Steelhead (BY-06)
Period Fed	January 2006-March 2007	May 2006-April 2007
Feed Used lbs.	116,732	163,108
Weight Gain	106,857	174,521
Feed Cost	<u>\$116,517.08</u>	<u>\$105,863.12</u>

Total Feed Cost: **\$222,380.20**

Total BY05 Chinook Rearing Cost **\$379,398**

Total BY06 Steelhead Rearing Cost **\$536,468**

Average Feed Cost per pound

BY05 Chinook & BY06 Steelhead

Weight Gain Only:

Combined Rearing Cost

Chinook: **\$1.09**

Total Budget (-) C.O.: **\$915,866**

Steelhead: **\$0.61**

Cost per 1,000 fish using entire budget (-) C.O.

Cost per pound for Rearing

Total Budget (-) C.O.

Chinook **\$227.18**

Chinook **\$3.55**

Steelhead **\$617.78**

Steelhead **\$3.07**

Appendix K1. Powell Brood Year 2005, summary of fish autopsy, spring 2007 release.

Summary of Fish Autopsy

ACCESSION NO: 07-075 LOCATION: POW
 SPECIES: SC AUTOPSY DATE: 3/23/2007
 STRAIN: POW 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	49.80	2.11	0.04
LEUCOCRIT	0.00	0.00	0.00
SERUM PROTEIN	7.90	0.49	0.05

*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	17
B1	0	F	0	S	0	1	0	1	0	R	20	1	0	S	0	B	19	1	2
B2	0	C	0	L	0	2	0	2	1	G	0	2	0	M	0	C	1	2	1
E1	0	M	0	S&L	0			3	2	NO	0			G	0	D	0	3	0
E2	0	P	0	I	0	Mean=0.00		4	17	E	0	Mean=0.00		U	0	E	0		
H1	0	OT	0	OT	0					OT	0			T	0	F	0	Mean=0.2	
H2	0			O	0			Mean=3.8								OT	0		
M1	0																		
OT	0																		

SUMMARY OF NORMALS

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

GENERAL REMARKS:

FINS: GONADS:
 SKIN: OTHER:

Appendix K3. South Fork Brood Year 2005, summary of fish autopsy, spring 2007 release.

Summary of Fish Autopsy

ACCESSION NO: 07-076 LOCATION: CLW
 SPECIES: sc AUTOPSY DATE: 3/23/2007
 STRAIN: SFCLW 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	50.55	2.99	0.05
LEUCOCRIT	0.00	0.00	0.00
SERUM PROTEIN	8.10	0.76	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	0	0	20	N	20	A	0	0	12
B1	0	F	0	S	0	1	0	1	0	R	20	1	0	S	0	B	20	1	6	
B2	0	C	0	L	0	2	0	2	0	G	0	2	0	M	0	C	0	2	2	
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	16	E	0	Mean=0.00		U	0	E	0			
H1	0	OT	0	OT	0					OT	0			T	0	F	0	Mean=.5		
H2	0			O	0			Mean=3.8								OT	0			
M1	0																			
OT	0																			

SUMMARY OF NORMALS

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

GENERAL REMARKS:

FINS: GONADS:

SKIN: OTHER:

Appendix L. Clearwater Fish Hatchery BY-05 Spring Chinook fish marking and distribution summary

Date	Site	Number Released	Stock	Length	FPP	Pounds	Marks	Raceway	Comments
3/29/2007	Upper Crooked R	133,829	SF Cr/Rapid R	5.39	16.00	8,364	133,330 ad; 499 ad/pit	11A & B	Fish held for 10 hours then released.
3/29-30/2007	Lower Crooked R	517,092	SF Cr/Rapid R	5.39	16.00	32,318	459,674 ad; 42,425 ad/cwt, 14,993 ad/pit	7A-10A, 7B-10B	Direct release.
3/23-4/4/2007	Walton Cr	373,977	Powell/Rapid R	5.46	15.40	24,284	272,322 ad; 86,655 ad/cwt, 15,000 ad/pit	1-3 A&B	Volitional 3/23; Forced on 4/4/2007.
3/31-4/6/2007	Red R	375,759	SF Cr/Rapid R	5.46	15.40	24,400	318,733 ad; 42,049 ad/cwt, 14,977 ad/pit	4-6 A&B	Volitional 3/31; Forced on 4/6/2007.
4/2-4/3/2007	Lower Selway R	269,349	Dwor/Rapid R	5.46	15.40	17,490	179,432 ad/cwt; 89,917 no/cwt	2-3 E&W	Direct release; hauled by NPT.
TOTAL/ AVERAGE		1,670,006		5.43	15.63	106,857			

Appendix M. Brood Year 2006 steelhead (B) eggs received from Dworshak National Fish Hatchery.

EGG TAKE NUMBER	SPAWN DATE	EYED EGG DELIVER DATE	NUMBER OF EYED EGGS	TEMPERATURE UNITS
4	3/7/2006	3/22/2006	501,923	330
5	3/14/2006	3/29/2006	636,449	330
TOTAL			1,138,372	

STOCK	NUMBER OF EYED EGGS KEPT	RELEASED SMOLTS	PERCENT SURVIVAL
Dworshak	968,694	868,375	89.64%

Appendix N. Steelhead Brood Year 2006, summary of fish autopsy, spring 2007 release.

Summary of Fish Autopsy

ACCESSION NO: 07-077 LOCATION: CLW
 SPECIES: STB AUTOPSY DATE: 3/23/2007
 STRAIN: NF CLW 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	41.03	1.77	0.04
LEUCOCRIT	0.00	0.00	0.00
SERUM PROTEIN	7.33	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	20	0	20	N	20	A	20	0	13
B1	0	F	0	S	0	1	0	1	0	R	0	1	0	S	0	B	0	1	4
B2	0	C	0	L	0	2	0	2	0	G	0	2	0	M	0	C	0	2	2
E1	0	M	0	S&L	0			3	2	NO	0			G	0	D	0	3	1
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=.55	
H2	0			O	0			Mean=3.9								OT	0		
M1	0																		
OT	0																		

SUMMARY OF NORMALS

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

GENERAL REMARKS:

FINS: GONADS:
 SKIN: OTHEI Nice looking fish.

Appendix O. Brood Year 2006 North Fork Steelhead marking and distribution.

Date	Site	Number Released	Stock	Length	FPP	Pounds	Marks	Raceway	Comments
4/15-17/2007	Red River	100,329	Dworshak B	7.95	5.11	19,634	100,029 AD; 300 AD/PIT	9E-10E	Vol;Forced 4/17
4/15-17/2007	*Red River	151,317	Dworshak B	7.84	5.33	28,390	300 PIT	6E-8E	Vol;Forced 4/17
4/13-17/2007	Red House Hole	272,819	Dworshak B	8.24	4.59	59,438	204,696 AD; 67,823 AD/CWT/LV; 300 AD/PIT	4W-9W	Direct
4/15-17/2007	*Crooked R (Upper)	83,811	Dworshak B	7.97	4.96	16,897	21,299 CWT; 299 PIT	11E-12E	Vol;Forced 4/17
4/12-13/2007	Crooked R (Lower)	151,296	Dworshak B	8.05	4.92	30,751	84,911 AD; 66,085 AD/CWT/LV; 300 AD/PIT	10W-12W	Direct
4/17/2007	*Meadow Cr	28,050	Dworshak B	7.70	5.61	5,000	297 PIT	5E	Direct
4/17/2007	*Mill Cr	28,338	Dworshak B	7.70	5.61	5,051	300 PIT	5E	Direct
4/19/2007	*Lolo Cr	52,415	Dworshak B	7.71	5.60	9,360	300 PIT	4E	Direct; Hauled by NPT; 2,525 loss during transport.
TOTAL/ AVERAGE		868,375		7.90	4.98	174,521			

* supplementation

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