CLEARWATER FISH HATCHERY

ANNUAL REPORT

2007 CHINOOK AND 2008 STEELHEAD

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LOWER SNAKE RIVER
COMPENSATION PLAN
Hatchery Program

IDFG
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2007 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 are reared on station and released as parr, pre-smolts, and smolts.

Powell

Two adult traps were operated in the Lochsa basin. The Crooked Fork trap was installed on June 14, 2007 and the trap was taken out of operation on September 22, 2007.

The Walton Creek weir was installed on May 29, 2007 and taken out of operation on September 22, 2007. The run total for both traps was 1250 fish of which there were 279 jacks and 971 adults. A total of 14 fish were released and 1231 were held for production. A total of 521 females were spawned 1 of which was culled at spawning, 7 were culled due to high BKD levels and 4 were culled for bad eggs leaving 514 for production producing 2,000,753 green eggs.

A total of 404,115 full-term smolts were released from Powell Pond on March 23 through April 1, 2009.

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 Brood Year 1998, Chinook stocks from Powell were used to backfill the South Fork populations.

The Red River weir was installed on March 12, 2007 and taken out of operation September 14, 2007. The run total of 545 fish was combined with the returning adults from Crooked River. Of the total, 21 Chinook were released.

The Crooked River weir was installed on March 15, 2007 and taken out of operation September 20, 2007. The run total of 366 fish was combined with returning adults from Red River. Of the total, 14 Chinook were released.

The South Fork had a run total of 911 fish. A total of 35 fish were released. All remaining fish were held for spawning. A total of 142 females were spawned 0 of which were culled at spawning, 2 were culled due to high BKD levels and 1 for dead eggs, and 139 were kept for production producing 517,118 green eggs.

A total of 134 adult females were killed in an accidental fish kill on August 9, 2007.

A total of 404,856 full-term smolts were direct released into Red River on April 8 through April 9, 2009 due to ice on the pond.

No full term smolts were released from Upper Crooked River raceways in 2009. Beginning in 2009 all Crooked River releases were moved to the lower facility due to low interrogation rates from smolts released at the upper facility. 703,101 full-term smolts were released below the Crooked River weir April 6 through April 8, 2009.

A total of 298,711 parr were released on the Upper Selway River on June 23, June 26, and June 30, 2008 by the Nez Perce Tribe.

A total of 399,257 full-term smolts were released on the lower Selway River on April 2 through April 3, 2009 by Clearwater Fish Hatchery staff.

A total of 234,151 full term smolts were released in Clear Creek on March 30, 2009.

A total of 133,437 pre-smolts were transferred to the Nez Perce Tribal Hatchery on September 10, 2008.

Eggs Received from Other Facilities

A total of 160 females were spawned at Rapid River Fish Hatchery and then transferred to CFH on August 27, 2007 to assist with CFH egg needs. One female was culled for BKD and one was culled for dead eggs. A total of 578,457 eyed eggs were kept for production.

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 Marines 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

CFH 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 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 produce approximately 2400 KW of electricity.

A 198,940 cubic foot (27,600 sq ft) off line sedimentation pond is used to settle out the solids produced by the hatchery. A 814,650 cubic foot (103,500 sq ft) full flow sedimentation pond settles waste from the total flow of hatchery operation and the out flow of the off line sedimentation pond.

In 2000, a 2,040 square foot storage 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 x 40 foot area creating a covered storage area for equipment and hatchery supplies.

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

In 2006, a 420 square foot 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.

In 2008, a 10' x 12' storage shed was constructed near the trap at the lower facility and a facility perimeter fence was also installed.

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 cubic feet. The maximum flow available to the steelhead raceways is 40 cfs. The 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 cubic feet. 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 cubic feet 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 cubic feet 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 cubic feet. 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 cubic feet. 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 cubic feet 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 cubic feet and a holding capacity of 960 adult chinooks. 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 cubic feet 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 cubic feet 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

CFH receives water through two supply pipelines from Dworshak Reservoir. The warm water intake is attached to a floating platform and can be adjusted from ten feet to sixty 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 $CaCO_3$) of 16 mg/l, 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 (Appendix C2, C3 and C4).

STAFFING

CFH has eight permanent staff employees; this includes one Hatchery Manager 2, 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 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 15, 2007 and September 20, 2007. A total of 366 fish were trapped.

The Red River trap was installed on March 12, 2007 and taken out of operation on September 14, 2007. A total of 545 fish were trapped.

Age class breakdown of this run included: 357 I-ocean males; 0 I-ocean females (<64 cm); 136 II-ocean males, 242 II-ocean females, 15 II-ocean unknowns (64-82 cm); 92 III-ocean males, 62 III-ocean females, and 7 III-ocean unknowns (83+ cm) (D1, D2, E1, E2, F1 and F2).

Powell

During 2007, 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 29, 2007 and taken out of operation September 22, 2007. The Crooked Fork trap was installed June 14, 2007 and taken out of operation September 22, 2007. A total of 1250 fish (279 jacks and 971 adults) were trapped at Powell and Crooked Fork.

Trapping protocols for the Powell trap included ponding for broodstock all ad-clipped 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 for CFH to Powell for production. All naturals/wild fish were released upstream.

Age class breakdown of this run included: 277 I-ocean males, 2 I-ocean females (<64 cm); 311 II-ocean males, 498 II-ocean females, 6 II-ocean unknown (64 – 82 cm); 92 III-ocean males, and 59 III-ocean females (83+ cm) and 5 III-ocean unknowns (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 200 at a rate of 10 mg/kg 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 140 ppm, and fish at Powell were treated at 120 ppm.

SPAWNING AND EGG TRANSPORT

Powell utilized a 1:1 spawning ratio for males and females in 2007. This was done in accordance to the genetic protocol for a brood year with more than 100 females.

South Fork stock utilized a 1:1 spawning ratio for males and females in 2007. 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 400 broodstock fish (200 South Fork, 200 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 7, 2007 and the last September 5, 2007. A total of 142 females were spawned. Pre-spawn mortality for the South Fork stock was 194 fish (22.3% pre-spawning mortality). A total of 134 of the 194 pre-spawn mortalities were from an accidental fish kill that occurred at CFH on August 9, 2007. 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 6, 2007 and the last September 4, 2007. A total of 526 females were spawned. Pre-spawn mortality was 72 fish (5.83% pre-spawn mortality). Fish carcasses not showing clinical signs of BKD were placed in the Lochsa and tributaries to add nutrients to the stream (Appendix G3).

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 gallons per minute.

Females were screened for BKD using Elisa techniques. Females with an optical density (O.D.) of 0.25 or higher were culled. The BKD tests resulted in culling of 7 females at Powell and 2 females from the South Fork. Using an average fecundity of 3,661 eggs per fish, these culled females accounted for 32,949 green eggs.

A total of 2,542,933 green eggs were incubated from BY07 spring Chinook salmon. Overall development from green eggs to eyed-eggs was 2,387,495 for a total eye-up percentage of 93.89%. The South Fork stock achieved 95.38% eye-up and Powell 93.48% eye-up (Appendix I1).

Beginning on the third day of incubation, all egg lots were treated with formalin to reduce fungal development. Treatments were administered every other day at a 1:600 concentration (1667-ppm) for 15 minutes and continued until shocking.

Eye-up occurred at approximately 500 T.U.'s 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 T.U.'s. Swim-up fry were transferred to the early rearing vats at approximately 1,750 T.U.'s.

Eggs Transferred from other facilities

In 2007**,** a total of 160 females were spawned at Rapid River Fish Hatchery and then transferred to Clearwater Fish Hatchery on August 27, 2007 to assist with Clearwater Fish Hatchery egg needs.

At the CFH the Rapid River eggs were disinfected in 100-PPM Argentyne for fifteen minutes, tempered to ambient incubation temperature (45 to 50^{o} F), and placed in egg trays.

A total of one female was culled in incubation for BKD and one for dead eggs. Eggs from 158 females were kept for hatchery production.

A total of 625,573 green eggs were collected and resulted in 578,457 eyed eggs for a total eye-up of 92.47%. Mean fecundity was 3,960 eggs per female (Appendix I3)

EARLY REARING

Swim up fry were ponded in hatchery vats at approximately 36,000 to 45,000 fish per vat. A total of 2,617,736 fry were ponded after additional culling to a full hatchery and they were segregated by stock and release strategies in 60 vats over an eight month period. A survival rate of 96.58% from eyed egg to ponding was achieved.

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 30 days to help prevent drop outs and help initiate feeding. After one month flows were turned up to 92 gpm and by month four, turned up 120 gpm which remained until the fish were moved outside. Flow indices were held below 1.50 while the density index never exceeded 0.3 during the entire early rearing period. Water temperatures during early rearing were between 40.3 – 55.4ºF (Appendices A2).

Starting with Brood Year 2006, the feed supplier that produced the starter feeds the hatchery personnel had been using was discontinued. A replacement feed needed to be found therefore a feed study was performed this year to determine the best starter feed.

The study compared Bio-Oregon’s Bio Vita and Rangen’s Soft Moist starter feeds. Although, the study was designed to carry into final rearing, a decision was made to discontinue the study after 125 days because the Rangen fed fish had nearly double the mortality (4,361 vs. 2,454 fish), grew significantly slower and had a worse conversion (1.4 vs. 0.99) than the Bio-Vita.

All Chinook except the Selway parr were moved outside during the marking process. Marking took place at two different times which included April 30 thru May 5, 2008 for the Powell pre-smolt/full term smolts study program, Selway FTS and the surplus Chinook to be transferred to Nez Perce Tribal Hatchery. A total of 637,673 fish were marked at this time. The Powell pre-smolt/FTS study release site was changed to the Clear Creek release site in March 2009. These fish received a four-day oxytetracycline feeding for skeletal marking.

The second round of Chinook marking took place between May 29 and June 6, 2008. At this time, a total of 1,563,844 fish were moved outside for the Powell, Red River and Crooked River full term smolt programs. A total of 47,770 fish were marked outside along with 85,667 fish with no marks for the Nez Perce Tribal Hatchery presmolt transfer program.

A total of 304,906 Selway parr were moved outside on May 2, 2008. During time period of June 18-21, 2008, 100% of the Selway Parr was marked with a four-day oxytetracycline feeding.

The inventory number was adjusted to 2,592,090 Chinook after the marking program as a result of the machine count. The resulting machine count revealed a discrepancy of 24,554 more fish.

FINAL REARING

At marking, Powell stock was used to fill the Powell FTS program; Powell stock was used to fill the Powell pre-smolt/FTS study program; Powell stock was used to fill the Selway FTS program; South Fork and Powell stock were used to fill the Red River and Crooked River FTS programs; Powell and South Fork stock were used to fill the surplus Chinook transferred to the Nez Perce Tribal Hatchery and Rapid River stock was used to fill the Selway parr program.

All parr, pre-smolts/FTS study and all but six raceways (n=423,122) of full-term smolts from the BY07 Chinook were fed a 28-day erythromycin prophylactic treatment after marking. Bio-Oregon Biodiet grower (dry) feed was used throughout the final rearing period. The full term smolts were fed full rations prior to marking and were fed four day on feed and three days off feed the remainder of the time. Total feed used in early and final rearing was 183,737 pounds yielding 138,857 pounds of fish reared for a final conversion of 1.32 (Appendix J). Total cost was $200,483.

The goal was to keep water temperatures below 55° F to reduce growth rates; temperatures varied from 37º to 52º F during the final rearing period with an estimated 2.0 cfs of water supplied to each raceway.

A total of 298,711 parr were released in June of 2008 at one location.

A total of 133,437 pre-smolt sized fish were transferred to the Nez Perce Tribal Hatchery in September 2008.

A total of 2,145,538 smolts were released in March and April of 2009 at five different locations.

FISH HEALTH

The BY07 Chinook reared at CFH were from low BKD parentage with Optical Densities (OD) below 0.25 from both the South Fork and the Powell stocks. All Chinook eggs at or above this OD were culled.

All but six raceways (n=423,122) of Chinook received one 28-day Erythromycin pre-emptive feed treatment following marking. The six raceways that were not fed a medicated feed treatment were part of a statewide study to determine benefits of this treatment. Samples were collected periodically by the State Pathologist.

FISH HEALTH SECTION CLEARWATER HATCHERY

Diseases Encountered and Treatments.

Brood Powell Spring Chinook salmon (collected 2007): These adult fish received an intra-peritoneal injection of erythromycin at a dose rate 20 mg/kg to limit pre-spawning mortality. Pre-spawning mortality was limited to 5.83% this year. Clearwater staff implemented a daily treatment of formalin at 120 ppm for one hr that allowed fish with severe head burn to not only survive but to heal the wound.

IHNV was detected in 0 of 90 females examined (both ovarian fluids and tissues). Three hundred three females were spawned at Powell; 30 (10%) females had high ELISA optical densities. The eggs from females with optical densities above 0.249) were culled. *Myxobolus cerebralis* was not detected in the 20 fish sampled for this pathogen.

Juvenile Powell Spring Chinook salmon Brood year 2007: Disease problems were not encountered in the BY'07 Powell spring Chinook salmon. These fish received one medicated feed treatments for prophylactic control of *Renibacterium.* The target dose rate was 100 mg/kg/day for 28 days. Disease agents were not detected during inspection or pre-liberation inspection sampling.

The original Powell pre-smolt/FTS study group's release location was changed to Clear Creek. Therefore this group received an additional application of oxytetracycline feed for skeletal marking. The target dose for this application was 10 mg/100 lbs biomass for 4 days.

Brood South Fork of the Clearwater Spring Chinook Salmon (collected 2007): These adult fish received an intra-peritoneal injection of erythromycin at a dose rate of 20 mg/kg to limit pre-spawning mortality. Pre-spawning mortality was at 22.3% this year.

IHNV was not detected in 0 of 90 females examined. Nine percent of the spawned females (50/558) from the South Fork of the Clearwater spring Chinook stock of salmon had high ELISA optical densities. The eggs from these females were culled. *Myxobolus cerebralis* was not detected in a 20 fish sample.

Juvenile South Fork of the Clearwater Spring Chinook salmon Brood year 2007: Disease problems were not encountered in the BY'07 South Fork of the Clearwater spring Chinook salmon. These fish received one or zero erythromycin medicated feed treatments for prophylactic control of *Renibacterium.* The target dose rate was 100 mg/kg/day for 28 days. Disease agents were not detected during inspection or pre-liberation inspection sampling. No differences were detected between erythromycin medicated feed treated groups versus groups not fed erythromycin medicated feed in DFAT and ELISA testing.

Juvenile Selway Spring Chinook salmon Brood year 2007: Disease problems were not encountered in the BY'07 fish destined for the Selway River. Disease agents were not detected during inspection or pre-liberation inspection sampling.

An additional application of oxytetracycline feed was applied to this group of fish for skeletal marking. The target dose for this application was 10 g/100 lbs biomass for 4 days.

Organosomatic Index. See attachments.

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

Other Assessments. An investigation has been initiated into limiting prophylactic feeding of erythromycin. Results of this investigation suggest that prophylactic applications of erythromycin medicated feed could be stopped without any deleterious effect. The prior investigations conducted at this facility have provided valuable insight into the reduction of medicated feed to Chinook salmon.

FISH MARKING

A total of 2,199,517 Chinook were externally marked. Marks included 1,474,024 Adipose (Ad) clipped, 625,493 ad-clipped/coded wire tagged (ad/cwt), and 100,000 no clip/coded wire tagged (no/cwt) fish. In addition, 298,711 Chinook were fed oxytetracycline medicated feed in early June, along with 234,151 fish in March for skeletal marking (Appendix L).

Chinook were marked from early rearing vats (inside) into final rearing raceways (outside). Marking started on April 30, 2008 and was completed on June 6, 2008. Fish averaged 110 fpp in size. A total of 68,725 were Passive Integrated Transponder (PIT) tagged.

FISH DISTRIBUTION

Releases from CFH occurred in three life stages:

	CFH
Parr	298,711
Pre-smolt	0
Transfers	133,437
Full term smolt	2,145,538
Total	**2,577,686**

Upper Selway River Parr Release

A total of 298,711 parr (85 fpp) were released by Nez Perce Tribal personnel in the McGruder Corridor on June 23, 26 and 30, 2008. All the parr were skeletal marked with oxytetracycline. No PIT Tags were put in this group (Appendix L).

Nez Perce Tribal Fish Transfer

A total of 133,437 pre-smolt sized fish (36 fpp) were transferred to the Nez Perce Tribal Hatchery on September 10, 2008. A total of 47,770 fish were ad-clipped with the remaining fish receiving no marks (Appendix L).

Red River Pre-Smolt Release

No pre-smolts were released from Red River in 2008.

Powell Pond Pre-Smolt Release

No pre-smolts were released from Powell in 2008. The original pre-smolt release group was reared to full term smolts at Clearwater Fish Hatchery beginning in 2008. These fish were reared on the steelhead bank in warmer second use water below the Selway FTS. A Flow Index Study was performed on these raceways to determine how well these fish performed compared to raceways reared on the Chinook bank where there is cooler second use water.

These fish were released at Clear Creek on March 30,2009. A total of 234,151 smolts (16.00 fpp) were released.

Lower Crooked River Full Term Smolts

A total of 703,101 smolts (17.10 fpp) were released below the Crooked River weir. Smolts were transported to lower Crooked River on April 6 through April 8, 2009 and released daily. All smolts were ad-clipped, 63,039 were ad clipped and coded wire tagged and 15,086 fish carried PIT tags (Appendix L).

Upper Crooked River Full Term Smolts

No smolts were released at the Upper Crooked River facility in 2009.

Powell Full Term Smolts

A total of 201,998 Chinook (16.73 fpp) were transferred to the Powell rearing pond March 23 through March 24, 2009. These fish were held as a volitional release until April 1, 2009. At this time 202,117 Chinook (16.42 fpp) were transferred to the Powell rearing pond and the entire pond was released that same night.

A total of 404,115 were released. A total of 196,636 were Ad-clipped, 207,478 were Ad clipped and coded wire tagged, 11,985 were PIT tagged (Appendix L).

Red River Full Term Smolts

A total of 404,856 smolts (17.10 fpp) were released into Red River. Smolts were transported to Red River on April 8 through April 9, 2009. All fish were direct released due to ice on the pond. All smolts were ad-clipped, 66,086 were ad clipped and coded wire tagged and 15,088 fish carried PIT tags (Appendix L).

Selway Full Term Smolts

A total of 399,257 smolts (16.42 fpp) were direct released into the lower Selway River by Clearwater Fish Hatchery staff on April 2 through April 3, 2009. A total of 149,787 were ad clipped only, 149,920 were ad clipped and coded wire tagged, 99,550 were coded wire tagged only and 14,941 were PIT tagged (Appendix L).

ABSTRACT

CHF received 1,133,366 eyed brood year 2008 North Fork B-run steelhead eggs from Dworshak National Fish Hatchery (DNFH). A total of 835,636 smolts from the North Fork stock were released from April 13,2009 through April 28, 2009; 263,999 Red House Hole; 131,803 at Red River; 73,287 at Upper Crooked River; 50,250 at Lolo Creek; 25,354 at Newsome Creek; and 25,354 at Mill Creek. The average size of fish was 4.68 fpp for a total of 178,554 pounds, and the average length was 215 mm.

A total of 167,684 pounds of feed was fed with a cost of $200,228 to produce 178,554 pounds of fish at Clearwater Hatchery. The conversion rate was 0.94. Survival from eyed egg, after culling, to release was 73.7%.

CHF received 1,367,984 green brood year 2008 North Fork B-run steelhead eggs from Dworshak National Fish Hatchery for the southern Idaho steelhead hatcheries. After culling and picking, 1,084,017 eyed eggs were shipped to Magic Valley Hatchery and Hagerman National Fish Hatchery.

SYNOPTIC HISTORY

Clearwater Hatchery

Brood Source

DNFH has been the source for North Fork stock B-run steelhead eggs since April, 1992.

Disease History

DNFH 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 CFH 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 11, 2008 and March 13, 2008 (Appendix M). The eggs from DNFH

lots Six and Six A 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 1,225,982 unpicked eyed eggs were received and after picking netted 1,133,366 eggs for an eye-up of 92.45% (Appendix M). This number was culled down to 951,290 to reduce surplus. During incubation, steelhead eggs were on primary water only.

A total of 1,367,984 green eggs yielding 1,242,899 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 869,017 eyed eggs were shipped to Magic Valley, 215,000 were shipped to Hagerman National. No eggs 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 90.86%.

EARLY REARING

A total of 923,261 fish were ponded in early rearing. Survival from eyed egg to ponding was 93.68%. At swim-up, unfed fry from Dworshak stock B-run steelhead were moved to vats. This was the second year of using dry starter feed on Steelhead. Fry were divided as evenly as possible into 22 vats (39,000 per vat). The initial DI was .10 and FI was .35. 106,703 steelhead were direct ponded into raceways 4-5 west. The remaining fish were held in the hatchery vats until August when they were marked and moved to 15 steelhead raceways (5-12 east and 6-12 west). Average length of the fish at the end of early rearing was 3.09 inches. The fish averaged 97.85 fpp.

The DI of the Dworshak steelhead ranged from 0.10 to 0.39, and the FI ranged from 0.35 to 1.5.

Bio Oregon's BioVita Fry was used for the duration of feeding.

Water temperatures for the early rearing period ranged from 48° to 53° F (Appendix A1).

FINAL REARING

The juvenile DNFH stock B-run steelheads were moved to outside steelhead raceways 5-12 east and 4-12 west. During 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 DNFH steelhead ranged from .15 to .27, and the FI ranged from .35 to 1.5. 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 56^{o}F as possible (Appendix A2). Water flows were measured at 2.0 cfs per raceway.

Fish were fed Bio Oregon's BioVita dry feed through release. A total of 167,684 pounds of feed was used throughout the entire rearing period to produce 178,150 pounds of fish at a cost of $200,228. The overall feed conversion rate from fry to smolt was 0.94 (Appendix J).

FISH HEALTH

PATHOLOGIST REPORT

Diseases Encountered and Treatments.

Brood North Fork of the Clearwater Steelhead B Group (collected 2008): IHNV was detected in brood females sampled at Dworshak NFH whose eggs were destined to be reared at Clearwater Hatchery. Thirty-two fish of the 265 brood fish sampled (12%) were found to be carriers of IHNV. The eggs from IHNV positive fish were culled from the Clearwater Hatchery Steelhead program and these viral replicating agent detections were reported to the APHIS veterinarian-in-charge.

Juvenile North Fork of the Clearwater Steelhead B Group Broodyear 2007: Pathogens were not detected during routine inspections or during preliberation inspection prior to release.

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	Pit tags
Red House Hole	Smolt	139,499	124,500	7,077
Peasley Creek	Smolt	143,066	122,523	7,156
TOTAL		282,565	247,023	14,233

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	131,803	----------	3,568
U. Crooked River	Smolt	52,071	21,216	1,986
Newsome Creek	Smolt	25,354	----------	0
Mill Creek	Smolt	25,354	----------	0
Lolo Creek	Smolt	50,250	----------	1,398
TOTAL		284,832	21,216	6,952

FISH DISTRIBUTION

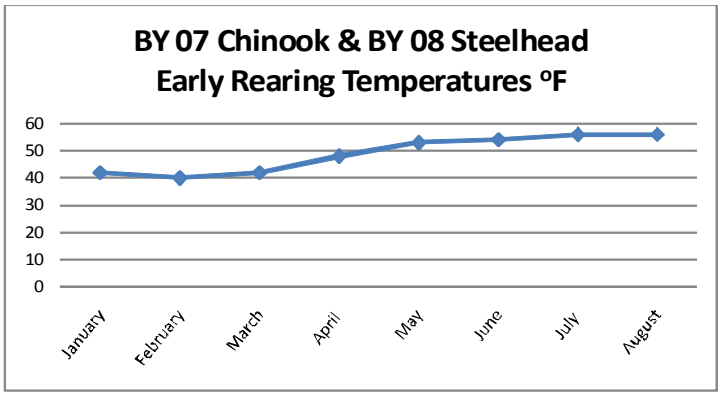
On April 16 through April 17, 2009 a total of 263,999 Dworshak B-run steelhead, which averaged 4.69 fpp, were direct released at the Red House Hole plant site (approximately 3.5 miles upstream of Highway 13 and 14 junctions) on the lower South Fork of the Clearwater River. There were 131,803 fish, which averaged 4.69 fpp, released at Red River between April 13 and April 14, 2009. There were 73,287 fish, which averaged 4.41 fpp, released at Upper Crooked River between April 17 and April 20, 2009. There were 50,250 fish, which averaged 4.81 fpp, released at Lolo Creek which were partially transported by NPTH on April 28, 2009. A total of 25,354 fish, which averaged 4.81 fpp, were released at Newsome Creek on April 20, 2009. A total of 25,354 fish, which averaged 4.81 fpp, were released on April 20, 2009 at Mill Creek. There were 265,589 fish, which averaged 4.73 fpp released at Peasley Creek on April 14-16, 2009. There was very little crowding and hauling mortality from the fish transportation to the release sites (Appendix O).

ACKNOWLEDGEMENTS

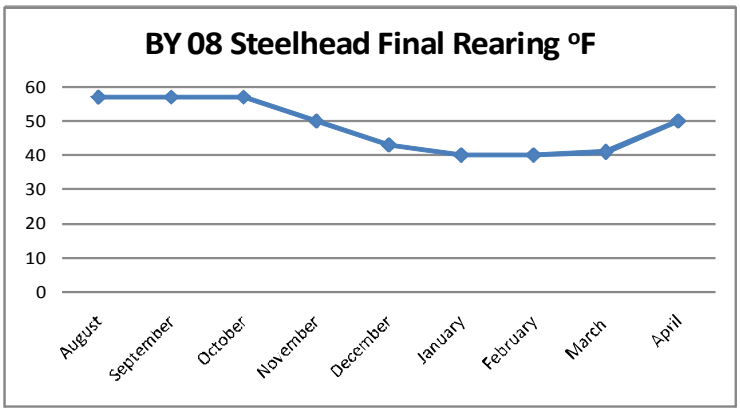
CFH acknowledges 48 people who contributed to the success of these programs. The hatchery crew consists of: Jerry McGehee - Hatchery Manager; Brad George, Randy Hutzenbiler, and Cassie Sundquist - Assistant Hatchery Managers; Chris Shockman, Chad Henson, and Jordan Rider - Fish Culturists; Ernie Yost - Utility Craftsman; Walter Boore and Millie Brookshier - Office Specialist II; Holly Stanton Smith - Fish Technician; Theresa Elliott, Jenny Hole, Steve Moore, Steve Duty, Jeff Jenni, Jennifer Vafiades, Jesse Willmott, Josh Scott, Jerek Richardson, Nathan Kaufmann, Jason Sperber, Josh Danielson, Jerry Thayer, Steven Lee, Nichole Madrid, Kevin Miller, Phil Willumsen, Rebekah Waltman, Chip Roth, Jerod Morris, Heath Hopkins, Danielle Rogers, Gabe Otis, Sue Roth, Max Baush, Leanna Meeker - Bio-aides; Sarah Nemeth and Jesse Faler Summer Youth; Tim Lee - Grounds Maintenance Workers; Fred Hough, Charles Ball, Chris Clark, Eric, Pease - Maintenance Craftsman: Pam Rowsell – Custodian: Dick Bittick, Gary Ady, Ted Brown, Keith Hedrick, and Orville Foster - Drivers.

Appendix A. Rearing Temperatures

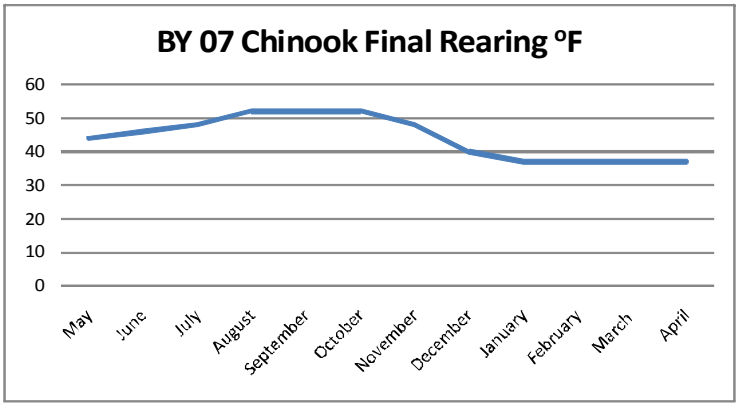
Month	Temperature °F
January	42
February	40
March	42
April	48
May	53
June	54
July	56
August	56



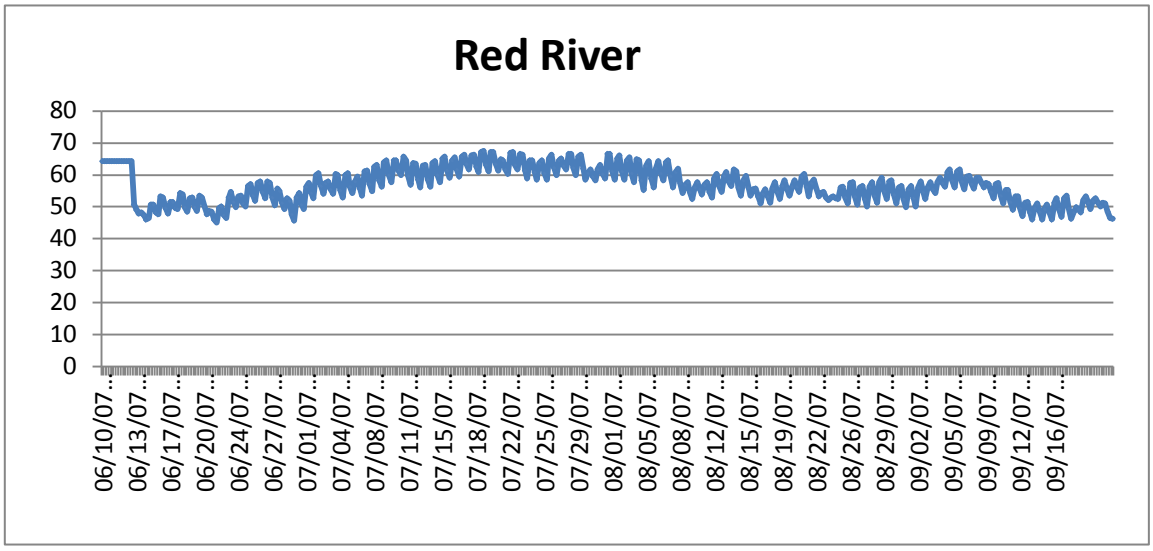
Month	Temperature °F
August	57
September	57
October	57
November	50
December	43
January	40
February	40
March	41
April	50

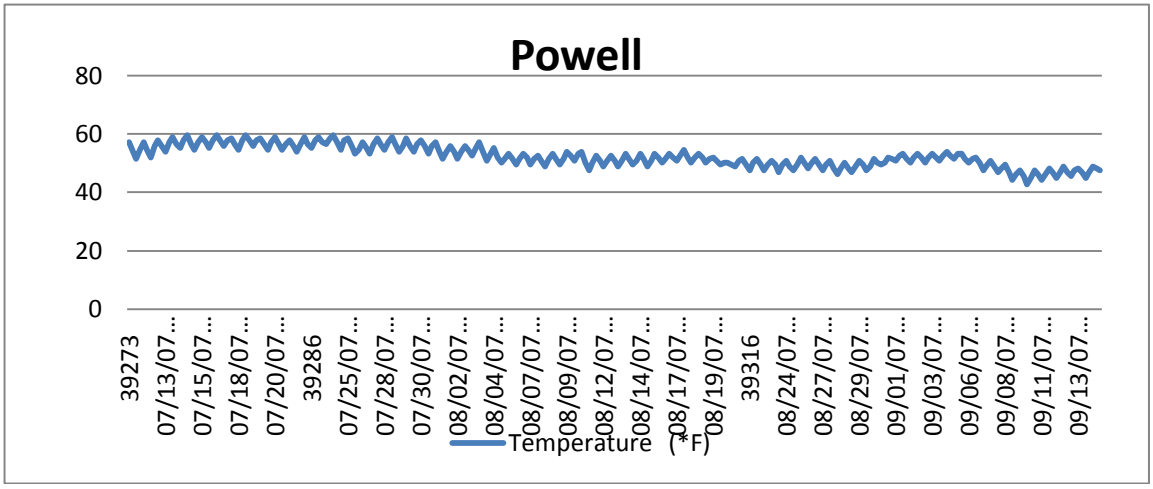


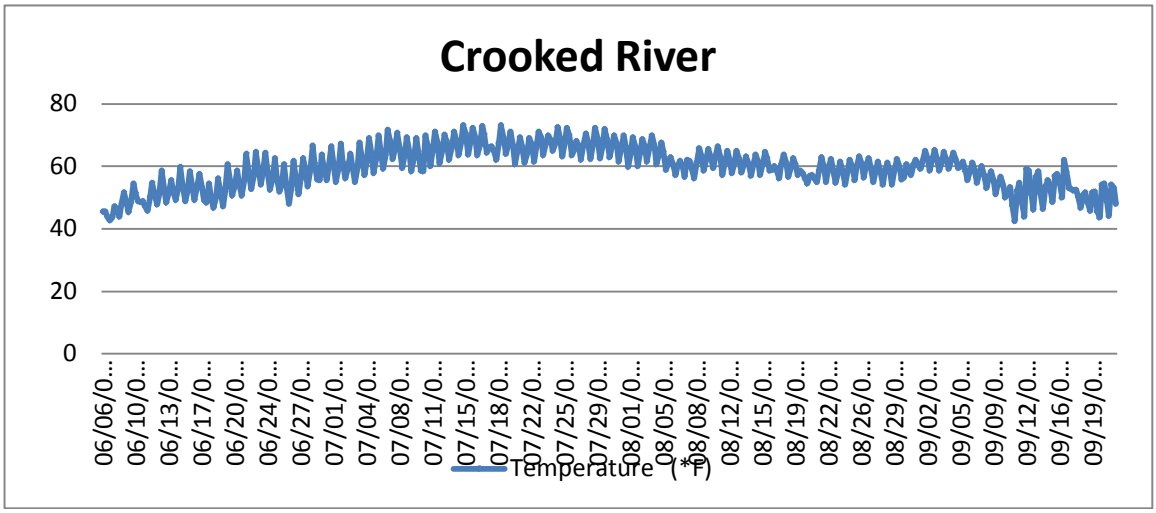
Month	Temperature °F
May	44
June	46
July	48
August	52
September	52
October	52
November	48
December	40
January	37
February	37
March	37
April	37



Appendix B1, B2, B3 Satellite Water Temperatures 2007







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

ANALYSIS	RESULTS (mg/l)	DATE ANALYZED	REARING LEVELS
Alkalinity	16.0	08/04/94	120 - 400 mg/l
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 mg/l
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 mg/l
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 mg/l
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 mg/l
Magnesium	<0.8	08/11/94	N/A
Manganese	<0.01	08/11/94	N/A
Mercury	<0.0005	08/11/94	<.002 mg/l
Nitrogen Nitrate	<0.013	08/18/94	0.2 mg/l
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 mg /l
Zinc	<0.005	08/10/94	0.03 mg/l
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 mg/L (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	Result	MDL	Method	Date
	PRIMARY CONTAMINANTS		ANALYSIS	
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 mg/L (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

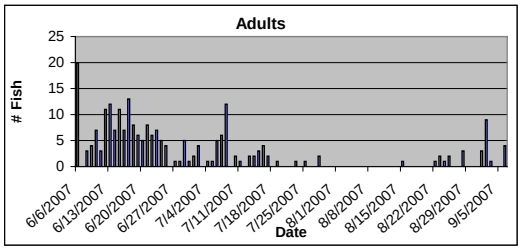
Chloride	ND	0.001	EPA 300.0	07/03/97
Ammonia/N	ND	0.1	EPA 350.2	07/01/97
Color	15	0.005	EPA110.2	07/03/97
Calcium	3.92	1	EPA 200.8	07/16/97
Sulfide(HS)	ND	0.01	EPA 376.1	
Hardness(CaCO3)	13	5	2340 B	07/16/97
Iron	0.37	0.05	EPA 236.1	07/16/97
Magnesium	0.76	1	EPA 200.8	07/16/97
Manganese	0.014	0.001	EPA 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

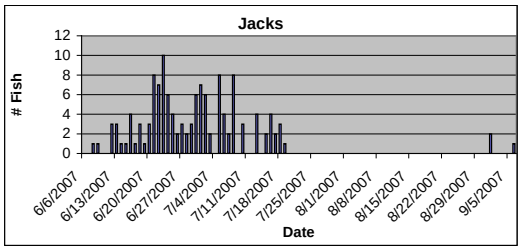
Laboratory Reporting Codes:
Results are mg/L (ppm) unless otherwise noted
ND - Not detected within the sensitivity of the instrument
- - - = No analysis performed for this contaminant
Numerical Entry = Detection at level indicated
MCL (numbers in parenthesis)= EPA maximum contaminant level

Appendix D1. Crooked River Run Timing 2007.

Date	Jack	Adult	Total
6/6/2007	0	20	20
6/7/2007	0	0	0
6/8/2007	1	3	4
6/9/2007	1	4	5
6/10/2007	0	7	7
6/11/2007	0	3	3
6/12/2007	3	11	14
6/13/2007	3	12	15
6/14/2007	1	7	8
6/15/2007	1	11	12
6/16/2007	4	7	11
6/17/2007	1	13	14
6/18/2007	3	8	11
6/19/2007	1	6	7
6/20/2007	3	5	8
6/21/2007	8	8	16
6/22/2007	7	6	13
6/23/2007	10	7	17
6/24/2007	6	5	11
6/25/2007	4	4	8
6/26/2007	2	0	2
6/27/2007	3	1	4
6/28/2007	2	1	3
6/29/2007	3	5	8
6/30/2007	6	1	7
7/1/2007	7	2	9
7/2/2007	6	4	10
7/3/2007	2	0	2
7/4/2007	0	1	1
7/5/2007	8	1	9
7/6/2007	4	5	9
7/7/2007	2	6	8
7/8/2007	8	12	20
7/9/2007	0	0	0
7/10/2007	2	3	5
7/11/2007	0	1	1
7/12/2007	0	0	0
7/13/2007	4	2	6
7/14/2007	0	2	2
7/15/2007	2	3	5
7/16/2007	4	4	8
7/17/2007	2	2	4
7/18/2007	3	0	3
7/19/2007	1	1	2
7/20/2007	0	0	0
7/21/2007	0	0	0
7/22/2007	0	0	0

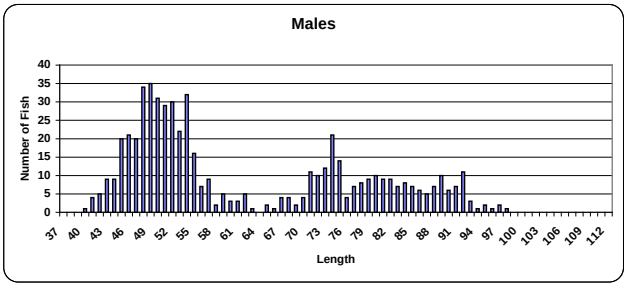
Date	Jack	Adult	Total
7/23/2007	0	1	1
7/24/2007	0	0	0
7/25/2007	0	1	1
7/26/2007	0	0	0
7/27/2007	0	0	0
7/28/2007	0	2	2
7/29/2007	0	0	0
7/30/2007	0	0	0
7/31/2007	0	0	0
8/1/2007	0	0	0
8/2/2007	0	0	0
8/3/2007	0	0	0
8/4/2007	0	0	0
8/5/2007	0	0	0
8/6/2007	0	0	0
8/7/2007	0	0	0
8/8/2007	0	0	0
8/9/2007	0	0	0
8/10/2007	0	0	0
8/11/2007	0	0	0
8/12/2007	0	0	0
8/13/2007	0	0	0
8/14/2007	0	0	0
8/15/2007	0	1	1
8/16/2007	0	0	0
8/17/2007	0	0	0
8/18/2007	0	0	0
8/19/2007	0	0	0
8/20/2007	0	0	0
8/21/2007	0	0	0
8/22/2007	0	1	1
8/23/2007	0	2	2
8/24/2007	0	1	1
8/25/2007	0	2	2
8/26/2007	0	0	0
8/27/2007	0	0	0
8/28/2007	0	3	3
8/29/2007	0	0	0
8/30/2007	0	0	0
8/31/2007	0	0	0
9/1/2007	2	3	5
9/2/2007	0	9	9
9/3/2007	0	1	1
9/4/2007	0	0	0
9/5/2007	0	0	0
9/6/2007	1	4	5
TOTAL	**131**	**235**	**366**

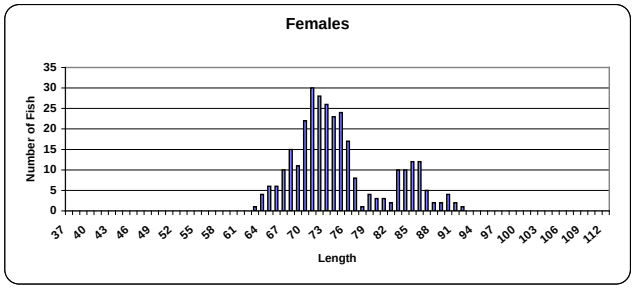


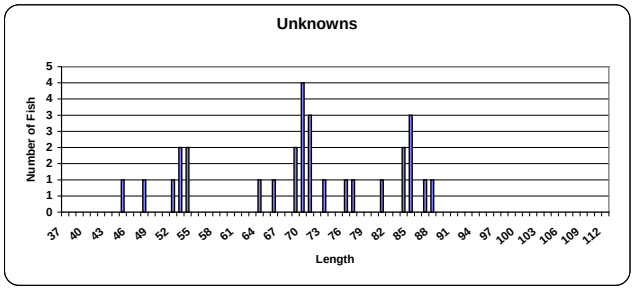


Appendix D2. South Fork Chinook Length Frequency 2007.

LENGTH	MALES	FEMALES	UNKNOWN	TOTAL
37	0	0	0	0
38	0	0	0	0
39	0	0	0	0
40	1	0	0	1
41	4	0	0	4
42	5	0	0	5
43	9	0	0	9
44	9	0	0	9
45	20	0	1	21
46	21	0	0	21
47	20	0	0	20
48	34	0	1	35
49	35	0	0	35
50	31	0	0	31
51	29	0	0	29
52	30	0	1	31
53	22	0	2	24
54	32	0	2	34
55	16	0	0	16
56	7	0	0	7
57	9	0	0	9
58	2	0	0	2
59	5	0	0	5
60	3	0	0	3
61	3	0	0	3
62	5	0	0	5
63	1	1	0	2
64	0	4	1	5
65	2	6	0	8
66	1	6	1	8
67	4	10	0	14
68	4	15	0	19
69	2	11	2	15
70	4	22	4	30
71	11	30	3	44
72	10	28	0	38
73	12	26	1	39
74	21	23	0	44
75	14	24	0	38
76	4	17	1	22
77	7	8	1	16
78	8	1	0	9
79	9	4	0	13
80	10	3	0	13
81	9	3	1	13
82	9	2	0	11
83	7	10	0	17
84	8	10	2	20
85	7	12	3	22
86	6	12	0	18
87	5	5	1	11
88	7	2	1	10
89	10	2	0	12
90	6	4	0	10
91	7	2	0	9
92	11	1	0	12
93	3	0	0	3
94	1	0	0	1
95	2	0	0	2
96	1	0	0	1
97	2	0	0	2
98	1	0	0	1
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	0	0	0	0
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	**578**	**304**	**29**	**911**

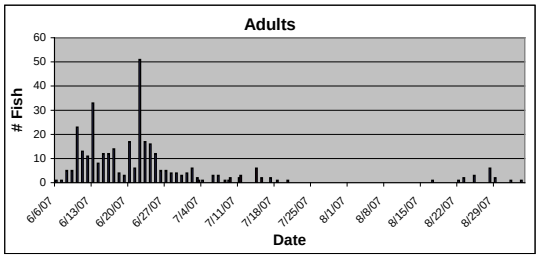


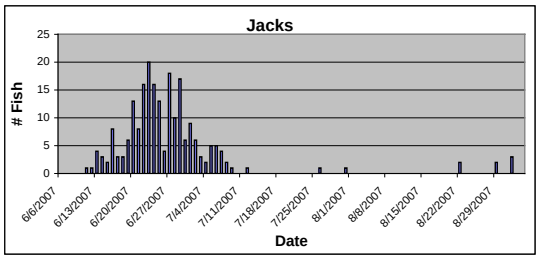




Appendix E1. Red River Chinook Run Timing 2007.

Date	Adult	Jack	Total	Date	Adult	Jack	Total
6/6/2007	1	0	1	7/21/2007	0	0	0
6/7/2007	1	0	1	7/22/2007	0	0	0
6/8/2007	5	0	5	7/23/2007	0	0	0
6/9/2007	5	0	5	7/24/2007	0	0	0
6/10/2007	23	0	23	7/25/2007	0	0	0
6/11/2007	13	1	14	7/26/2007	0	1	1
6/12/2007	11	1	12	7/27/2007	0	0	0
6/13/2007	33	4	37	7/28/2007	0	0	0
6/14/2007	8	3	11	7/29/2007	0	0	0
6/15/2007	12	2	14	7/30/2007	0	0	0
6/16/2007	12	8	20	7/31/2007	0	1	1
6/17/2007	14	3	17	8/1/2007	0	0	0
6/18/2007	4	3	7	8/2/2007	0	0	0
6/19/2007	3	6	9	8/3/2007	0	0	0
6/20/2007	17	13	30	8/4/2007	0	0	0
6/21/2007	6	8	14	8/5/2007	0	0	0
6/22/2007	51	16	67	8/6/2007	0	0	0
6/23/2007	17	20	37	8/7/2007	0	0	0
6/24/2007	16	16	32	8/8/2007	0	0	0
6/25/2007	12	13	25	8/9/2007	0	0	0
6/26/2007	5	4	9	8/10/2007	0	0	0
6/27/2007	5	18	23	8/11/2007	0	0	0
6/28/2007	4	10	14	8/12/2007	0	0	0
6/29/2007	4	17	21	8/13/2007	0	0	0
6/30/2007	3	6	9	8/14/2007	0	0	0
7/1/2007	4	9	13	8/15/2007	0	0	0
7/2/2007	6	6	12	8/16/2007	0	0	0
7/3/2007	2	3	5	8/17/2007	1	0	1
7/4/2007	1	2	3	8/18/2007	0	0	0
7/5/2007	0	5	5	8/19/2007	0	0	0
7/6/2007	3	5	8	8/20/2007	0	0	0
7/7/2007	3	4	7	8/21/2007	0	0	0
7/8/2007	0	2	2	8/22/2007	1	2	3
7/9/2007	1	1	2	8/23/2007	2	0	2
7/10/2007	0	0	0	8/24/2007	0	0	0
7/11/2007	2	0	2	8/25/2007	3	0	3
7/12/2007	0	1	1	8/26/2007	0	0	0
7/13/2007	0	0	0	8/27/2007	0	0	0
7/14/2007	0	0	0	8/28/2007	6	0	6
7/15/2007	0	0	0	8/29/2007	2	2	4
7/16/2007	0	0	0	8/30/2007	0	0	0
7/17/2007	2	0	2	8/31/2007	0	0	0
7/18/2007	0	0	0	9/1/2007	1	3	4
7/19/2007	0	0	0	9/2/2007	0	0	0
7/20/2007	0	0	0	9/3/2007	1	0	1
				TOTAL	**326**	**219**	**545**





Appendix E2. South Fork Chinook Summary of Fish Trapped, Released, Spawned and Disposition of Carcasses, Brood Year 2007.

TOTAL SOUTH FORK FISH TRAPPED:

Crooked River	366
Red River	545
TOTAL	**911**

AGE CLASSES	FEMALES	MALES	UNK	TOTAL
3 Years = (<64 cm)	0	350	7	357
4 Years = (64 - 82 cm)	242	136	15	393
5 Years = (> 82 cm)	62	92	7	161
	304	**578**	**29**	**911**

FISH DISPOSITION FEMALES:

Crooked River		Red River		CFH		TOTAL
				SPAWNED	142	**142**
MORTALITY	0	MORTALITY	0	MORTALITY	160	**160**
				KILLED/CULLED @ SPAWN	0	**0**
RELEASED	2	RELEASED	0	RELEASED	0	**2**
TOTAL	**2**	**TOTAL**	**0**	**TOTAL**	**302**	**304**

FISH DISPOSITION MALES:

Crooked River		Red River		CFH		TOTAL
				SPAWNED	334	**334**
MORTALITY	1	MORTALITY	0	MORTALITY	33	**34**
RELEASED	4	RELEASED	4	SPAWN/RELEASE	0	**8**
				FOOD BANK	202	**202**
TOTAL	**5**	**TOTAL**	**4**	**TOTAL**	**569**	**578**

FISH DISPOSITION UNKNOWNS:

Crooked River		Red River		CFH		TOTAL
				SPAWNED	0	**0**
MORTALITY	0	MORTALITY	0	MORTALITY	0	**0**
RELEASED	12	RELEASED	17	SPAWN/RELEASE	0	**29**
TOTAL	**12**	**TOTAL**	**17**	**TOTAL**	**0**	**29**

TOTAL TRAP	911

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	141**	0.017%
	Spr 2003	629,687								
2002	Fall 2003	234,361	28**	2005	405**	2006	84**	2007	517**	0.052%
	Spr 2004	750,317								
2003	Fall 2004	64,263								
	Spr 2005	700,387	28**	2006	144**	2007	78**	2008	250**	0.033%
2004	Spr 2006	749,461	138**	2007	451**	2008		2009		
2005	Spr 2007	650,921	135**	2008		2009		2010		

2006	Spr 2008	708,496	2009	2010	2011
2007	Spr 2009	703,101	2010	2011	2012

(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	3-yr-olds	Year Returned	4-yr-olds	Year Returned	5-yr-olds	Year Returned	Total by return	% 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	134**	0.031%
	Spr 2003	351,066								
2002	Fall 2003	108,323	22	2005	644**	2006	77**	2007	743**	0.160%
	Spr 2004	354,868								
2003	Spr 2005	401,362	21**	2006	249**	2007	103**	2008	373*	0.093*
2004	Spr 2006	423,603	219**	2007	623**	2008		2009		
2005	Spr 2007	375,759	136**	2008		2009		2010		
2006	Fall 2007	122,215		2009		2010		2011		
2006	Spr 2008	424,725								
2007	Spr 2009	404,856		2010		2011		2011		

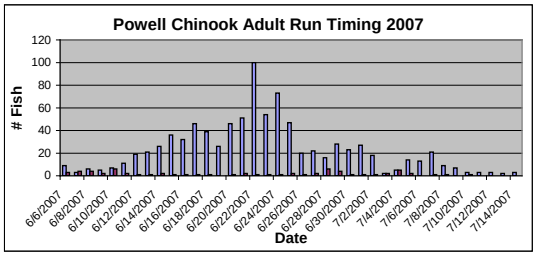
(a) Trap was not installed in 1986 due to construction
(b) These fish wintered in the rearing pond
(c) These fish were Rapid River stock reared at Sawtooth and released directly into Red River with no acclimation
(d) Planted off bridge at ranger station, reared at Dworshak Hatchery, Clearwater Stock
(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.

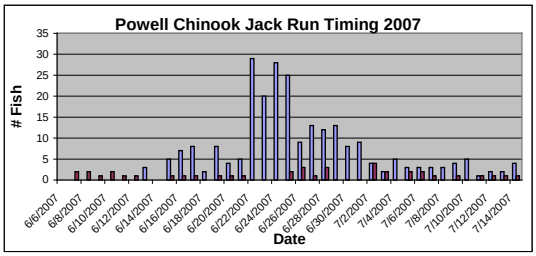
**Does not include fish caught in fishery or left in river.

Appendix G1. Powell Chinook Run Timing 2007.

Date	Adults	Jacks	Total
6/6/2007	9	0	9
6/7/2007	3	0	3
6/8/2007	6	0	6
6/9/2007	5	0	5
6/10/2007	7	0	7
6/11/2007	11	0	11
6/12/2007	19	0	19
6/13/2007	21	3	24
6/14/2007	26	0	26
6/15/2007	36	5	41
6/16/2007	32	7	39
6/17/2007	46	8	54
6/18/2007	39	2	41
6/19/2007	26	8	34
6/20/2007	46	4	50
6/21/2007	51	5	56
6/22/2007	100	29	129
6/23/2007	54	20	74
6/24/2007	73	28	101
6/25/2007	47	25	72
6/26/2007	20	9	29
6/27/2007	22	13	35
6/28/2007	16	12	28
6/29/2007	28	13	41
6/30/2007	23	8	31
7/1/2007	27	9	36
7/2/2007	18	4	22
7/3/2007	2	2	4
7/4/2007	5	5	10
7/5/2007	14	3	17
7/6/2007	13	3	16
7/7/2007	21	3	24
7/8/2007	9	3	12
7/9/2007	7	4	11
7/10/2007	3	5	8
7/11/2007	3	1	4
7/12/2007	3	2	5
7/13/2007	2	2	4
7/14/2007	3	4	7

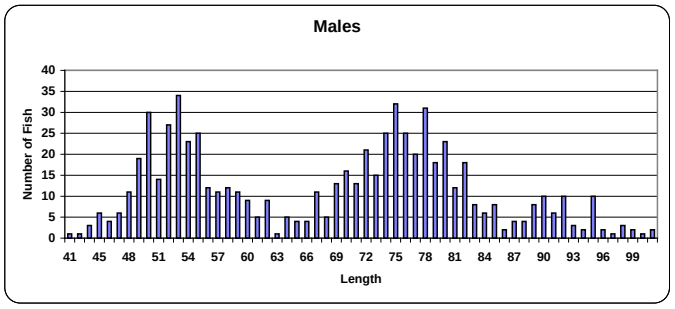
Date	Adults	Jacks	Total
7/15/2007	3	0	3
7/16/2007	4	2	6
7/17/2007	4	2	6
7/18/2007	2	1	3
7/19/2007	6	2	8
7/20/2007	2	1	3
7/21/2007	1	1	2
7/22/2007	1	0	1
7/23/2007	2	0	2
7/24/2007	1	1	2
7/25/2007	1	1	2
7/26/2007	1	1	2
7/30/2007	1	0	1
8/2/2007	0	1	1
8/5/2007	1	1	2
8/18/2007	2	1	3
8/19/2007	1	0	1
8/20/2007	1	0	1
8/21/2007	1	0	1
8/22/2007	2	2	4
8/23/2007	1	3	4
8/24/2007	2	1	3
8/26/2007	6	3	9
8/27/2007	4	0	4
8/28/2007	1	0	1
8/29/2007	1	0	1
8/31/2007	1	4	5
9/1/2007	2	2	4
9/2/2007	5	0	5
9/3/2007	2	2	4
9/4/2007	0	2	2
9/5/2007	1	1	2
9/6/2007	1	0	1
9/7/2007	0	1	1
9/8/2007	1	0	1
9/12/2007	0	1	1
9/16/2007	0	1	1
9/17/2007	0	1	1
9/19/2007	0	1	1
Total	**961**	**289**	**1250**

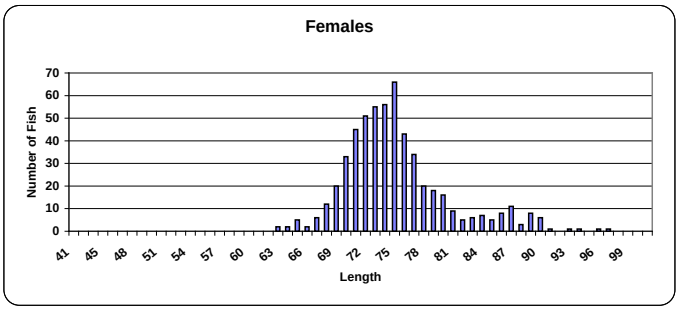


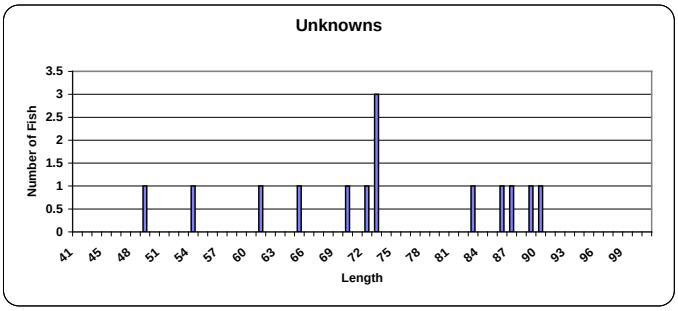


Appendix G2. Powell / Crooked Fork Creek Chinook Length Frequency 2007.

Length	Males	Females	Unk	Total
41	1	0	0	1
42	1	0	0	1
44	3	0	0	3
45	6	0	0	6
46	4	0	0	4
47	6	0	0	6
48	11	0	0	11
49	19	0	1	20
50	30	0	0	30
51	14	0	0	14
52	27	0	0	27
53	34	0	0	34
54	23	0	1	24
55	25	0	0	25
56	12	0	0	12
57	11	0	0	11
58	12	0	0	12
59	11	0	0	11
60	9	0	0	9
61	5	0	1	6
62	9	0	0	9
63	1	2	0	3
64	5	2	0	7
65	4	5	1	10
66	4	2	0	6
67	11	6	0	17
68	5	12	0	17
69	13	20	0	33
70	16	33	1	50
71	13	45	0	58
72	21	51	1	73
73	15	55	3	73
74	25	56	0	81
75	32	66	0	98
76	25	43	0	68
77	20	34	0	54
78	31	20	0	51
79	18	18	0	36
80	23	16	0	39
81	12	9	0	21
82	18	5	0	23
83	8	6	1	15
84	6	7	0	13
85	8	5	0	13
86	2	8	1	11
87	4	11	1	16
88	4	3	0	7
89	8	8	1	17
90	10	6	1	17
91	6	1	0	7
92	10	0	0	10
93	3	1	0	4
94	2	1	0	3
95	10	0	0	10
96	2	1	0	3
97	1	1	0	2
98	3	0	0	3
99	2	0	0	2
100	1	0	0	1
101	2	0	0	2
TOTAL	**677**	**559**	**14**	**1250**







Appendix G3. Powell Chinook Summary of Fish Trapped, Released, Spawned and Disposition of Carcasses for Powell and Crooked Fork Adult Traps, Brood Year 2007.

TOTAL FISH TRAPPED:	
Powell	1186
Crooked Fork Creek	64
TOTAL	**1250**

AGE CLASSES	**FEMALES**	**MALES**	**UNK**	**TOTAL**
3 Years = (<64 cm)	2	274	3	279
4 Years = (64 - 82 cm)	498	311	6	815
5 Years = (> 82 cm)	59	92	5	156
	559	**677**	**14**	**1250**

FISH DISPOSITION FEMALES:	
SPAWNED	526
MORTALITY	31
KILLED/CULLED @ SPAWN	2
RELEASED	0
TOTAL	**559**

FISH DISPOSITION FEMALES:	
SPAWNED	545
MORTALITY	39
SPAWN/RELEASE	0
FOOD BANK	93
TOTAL	**677**

FISH DISPOSITION UNKNOWNS:	
SPAWNED	0
MORTALITY	0
SPAWN/RELEASE	14
TOTAL	**14**

TOTAL DISPOSITION	1250

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	193**	0.022%
	Spr 2003	350,665								
2002	Fall 2003	385,292	27**	2005	422**	2006	156**	2007	605**	0.079%
	Spr 2004	376,797								
2003	Fall 2004	343,967	78**	2006	815**	2007	204**	2008	1097**	0.147%
	Spr 2005	403,917								
2004	Fall 2005	347,299	279**	2007	928**	2008		2009		

	Spr 2006	423,633							
Brood	**Year**	**Number**		**Year**		**Year**		**Yeard**	**Total by**	**%Return**
Year	**Released**	**Released**	**3-yr-olds**	**Returned**	**4-yr-olds**	**Returned**	**5-yr-olds**	**Returned**	**Return**	**From Plant**
2005	Spr 2007	373,977	178**	2008		2009		2010		
2006	Fall 2007	384,520		2009		2010		2011		
	Spr 2008	223,714								
2007	Spr 2009	404,115		2010		2011		2012		

(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 2007 for South Fork.

SOUTH FORK (Red River / Crooked River).

			BKD Females Culled		Other Females Culled						
Lot	Spawn Date	Total Females	Table	Incubation	Table	Incubation	Females Kept	Green Eggs	Eyed Eggs	Percent Eye Up	Fecundity
1	8/7/07	**4**	0	0	0	0	4	17,622	17,210	97.7	4,406
2	8/10/07	**2**	0	0	0	0	2	6,524	6,401	98.1	3,262
3	8/14/07	**12**	0	0	0	0	12	51,663	46,853	90.7	4,305
4	8/17/07	**40**	0	1	0	0	39	151,739	144,190	95.0	3,891
5	8/21/07	**33**	0	0	0	0	33	136,913	131,450	96.0	4,149
6	8/24/07	**20**	0	1	0	1	18	62,407	61,171	98.0	3,467
7	8/28/07	**17**	0	0	0	0	17	62,000	60,726	98.0	3,647
8	8/31/07	**7**	0	0	0	0	7	25,826	22,649	87.7	3,689
9	9/5/07	**7**	0	0	0	0	7	27,486	26,468	96.3	3,927
Total/Average		***142***	***0***	***2***	***0***	***1***	***139***	***542,180***	***517,118***	***95.38%***	***3860.3***

APPENDIX I2. Chinook Spawning Record 2007 for Powell.

POWELL

			BKD Females Culled		Other Females Culled						
Lot	Spawn Date	Total Females	Table	Incubation	Table	Incubation	Females Kept	Green Eggs	Eyed Eggs	Percent Eye Up	Fecundity
1	8/6/2007	**11**	0	0	0	0	11	45,146	38,570	85.4	4,104
2	8/9/2007	**18**	0	1	0	0	17	65,354	62,615	95.8	3,844
3	8/13/2007	**110**	1	0	0	0	109	441,425	397,158	90.0	4,050
4	8/16/2007	**99**	0	0	0	1	98	392,762	371,229	94.5	4,008
5	8/20/2007	**128**	0	4	0	1	123	470,270	441,564	93.9	3,823
6	8/23/2007	**47**	0	1	0	1	45	166,394	159,398	95.8	3,698
7	8/27/2007	**72**	0	1	0	0	71	261,585	246,416	94.2	3,684
8	8/30/2007	**26**	0	0	0	1	25	99,469	97,196	97.7	3,979
9	9/4/2007	**15**	0	0	0	0	15	58,348	56,231	96.4	3,890
Total/Average		***526***	***1***	***7***	***0***	***4***	***514***	***2,000,753***	***1,870,377***	***93.48%***	***3,899***

APPENDIX I3. Chinook spawning record 2007 for green eggs transferred from Rapid River.

Green Egg Transfer From Rapid River

			BKD Females Culled		Other Females Culled						
Lot	Spawn Date	Total Females	Table	Incubation	Table	Incubation	Females Kept	Green Eggs	Eyed Eggs	Percent Eye Up	Fecundity
1	8/28/07	**159**	0	1	0	0	158	625,573	578,457	92.47%	3,959
Total/Average		***159***	***0***	***1***	***0***	***0***	***158***	***625,573***	***578,457***	***92.47%***	***3,959***

Appendix J. Production cost for BY-07 Chinook and BY-08 North Fork Steelhead.

Rearing to Release:

	CHINOOK BY-07	**North Fork Steelhead BY-08**
Number Produced	2,577,686	835,636
Weight	135,343	178,150
% Mortality (From eyed eggs)	1.53%	26.3%
Conversion Rate	1.36	0.94

FOOD FED AND WEIGHT GAINED

	Chinook (BY-07)	**North Fork Steelhead (BY-08)**
Period Fed	December 2007-March 2009	May 2008-April 2009
Feed Used lbs.	183,737	167,684
Weight Gain	135,343	178,150
Feed Cost	**$200,483.00**	**$200,228.65**

Total Feed Cost: **$400,711.65**

Average Feed Cost per pound Weight Gain Only:
Chinook: **$1.48**
Steelhead: **$1.12**

Cost Per 1,000 fish using entire budget (-) C.O.
Chinook **$205.58**
Steelhead **$576.75**

Total BY07 Chinook Rearing Cost **$529,918**
Total BY08 Steelhead Rearing Cost **$481,957**
BY07 Chinook & BY08 Steelhead Combined Rearing Cost
Total Budget (-) C.O.: **$1,011,875**

Cost per pound for Rearing Total Budget (-) C.O.
Chinook **$3.92**
Steelhead **$2.71**

Appendix K1. Summary of Fish Autopsy South Fork Clearwater

ACCESSION NO:	09-056	LOCATION:	CLW
SPECIES:	sc	AUTOPSY DATE:	3/17/2009
STRAIN:	SFCLW	AGE:	juv
UNIT:	10A,8B,5A,4B	SAMPLE SIZE:	60
RIVER FOR AUTOPSY:	Prelib.		
INVESTIGATOR(S):	Munson		
REMARKS:			

	MEAN	STANDARD DEVIATION	COEFFICIENT OF VARIATION
LENGTH	0.00	0.00	0.00
WEIGHT	0.00	0.00	0.00
KTL*	0.00	0.00	0.00
CTL*	0.00	0.00	0.00
HEMATOCRIT			
LEUCOCRIT	0.00	0.00	0.00
SERUM PROTEIN			

*EXPRESSED AT KTL TIMES 10 TO THE FIFTH POWER
**CONVERTED FROM KTL; EXPRESSED AS CTL TIMES 10 TO FOUTH POWER

EYES		GILLS		PSEUDO-BRANCHS		THYMUS		FAT		MESEN. SPLEEN		GUT		HIND KIDNEY		LIVER		BILE	
N	60	N	60	N	60	0	60	0	0	B	2	0	60	N	60	A	1	0	36
B1	0	F	0	S	0	1	0	1	0	R	18	1	0	S	0	B	19	1	24
B2	0	C	0	L	0	2	0	2	1	G	0	2	0	M	0	C	0	2	0
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	57	E	0	Mean=0.00		U	0	E	0		
H1	0	OT	0	OT	0					OT	0			T	0	F	0	Mean=0.4	
H2	0			O	0			Mean=3.93								OT	0		
M1	0																		
OT	0																		

SUMMARY OF NORMALS

60	60	60	60	60	60	60	60	60	60
SEX	M: 0		F: 0		U: 0				

GENERAL REMARKS:

FINS:

GONADS:

SKIN:

OTHER: No difference in ELISA values between medicated and non-medicated.

Appendix K2. Summary of Fish Autopsy Powell

Summary of Fish Autopsy

ACCESSION NO:	09-057	LOCATION:	CLW
SPECIES:	SC	AUTOPSY DATE:	3/18/2009
STRAIN:	POW	AGE:	juv
UNIT:		SAMPLE SIZE:	60
RIVER FOR AUTOPSY:	Prelib.		
INVESTIGATOR(S):	Munson		
REMARKS:			

	MEAN	STANDARD DEVIATION	COEFFICIENT OF VARIATION
LENGTH	0.00	0.00	0.00
WEIGHT	0.00	0.00	0.00
KTL*	0.00	0.00	0.00
CTL*	0.00	0.00	0.00
HEMATOCRIT			
LEUCOCRIT	0.00	0.00	0.00
SERUM PROTEIN			

*EXPRESSED AT KTL TIMES 10 TO THE FIFTH POWER
**CONVERTED FROM KTL; EXPRESSED AS CTL TIMES 10 TO FOUTH POWER

EYES		GILLS		PSEUDO-BRANCHS		THYMUS		FAT		MESEN. SPLEEN		GUT		HIND KIDNEY		LIVER		BILE	
N	60	N	60	N	60	0	60	0	0	B	9	0	60	N	60	A	0	0	57
B1	0	F	0	S	0	1	0	1	0	R	51	1	0	S	0	B	51	1	0
B2	0	C	0	L	0	2	0	2	0	G	0	2	0	M	0	C	9	2	3
E1	0	M	0	S&L	0			3	4	NO	0			G	0	D	0	3	0
E2	0	P	0	I	0	Mean=0.00		4	56	E	0	Mean=0.00		U	0	E	0		
H1	0	OT	0	OT	0					OT	0			T	0	F	0	Mean=0.1	
H2	0			O	0			Mean=3.93								OT	0		
M1	0																		
OT	0																		

SUMMARY OF NORMALS

60	60	60	60	60	60	60	60	60	60
SEX	M: 0		F: 0		U: 0				

GENERAL REMARKS:

FINS: GONADS:

SKIN: OTHER:

Appendix L1. F129 Brood Year 2007 Releases

Date	Site	Number Released	Stock	Length	FPP	Pounds	Marks	Raceway	Comments
	RELEASE BYO7 CH full-term smolts								
3/30/2009	Clear Creek	234,151	Powell	5.91	16.00	14,634	234,151 Oxy-Tet, 147,123 AD, 87,028 AD/CWT, 6,642 AD/PIT, 4,914 AD/CWT/PIT	2EB, 1/2 of 3EB, 4EB, 2WB, 3WB	Direct Release
4/8-4/9/2009	Red River	404,856	South Fork	5.78	17.10	23,675	338,770 AD, 66,086 AD/CWT, 15,088 AD/PIT	4-6A, 4-6B	Acclimted in trucks, direct release
3/23-4/1/2009	Powell Pond Acclimated	201,998	Powell	5.84	16.73	12,073	97,624 AD, 104,374 AD/CWT, 2,709 AD/PIT, 3,281 AD/CWT/PIT	1A, 1B, 2B	Acclimated, forced release on 4/1/2009
4/1/2009	Powell Pond Direct R.	202,117	Powell	5.86	16.42	12,309	99,032 AD, 103,085 AD/CWT, 2,886 AD/PIT, 3,109 AD/CWT/PIT	2A, 3A, 3B	Direct Release
4/2-4/3/2009	Lower Selway	399,315	Powell	5.86	16.42	24,315	149,787 AD, 149,920 AD/CWT, 99,550 CWT, 9,970 AD/CWT/PIT, 4,971 CWT/PIT	2EA, 3EA, 4EA, 2WA, 3WA, 1/2 1EB	Direct Release
4/6-4/8/09	Lower Crooked River	703,101	South Fork	5.78	17.10	41,117	640,0062 AD, 63,039 AD/CWT, 15,082 AD/PIT	7-11A, 7-11B	Acclimated in trucks, direct release
	TOTAL	**2,145,538**				**128,123**			
	AVERAGE			**5.84**	**16.63**				
	RELEASE BYO7 CH parr								
6/23, 6/26, 6/30/2008	Selway Parr	298,711	Rapid River	3.30	85	3,514	298,711 Oxy-tet & noclip	1WA, 1EA	Hauled by NPT
	TOTAL	**298,711**				**3,514**			
	RELEASE BYO7 CH pre-smolts								
No BY07 Presmolts									
	TRANSFER BY07								
9/10/2008	NPTH	133,437	South Fork, Powell	4.5	36	3,706	47,770 AD, 85,667 noclip	1WB	Transferred to NPTH
	TOTAL	**133,437**				**3,706**			

Appendix M. Summary of Fish Autopsy North Fork Steelhead

Summary of Fish Autopsy

ACCESSION NO:	09-055	LOCATION:	CLW
SPECIES:	STB	AUTOPSY DATE:	3/16/2009
STRAIN:	NF CLW	AGE:	juv
UNIT:	7W,9W,8E,7W,8E	SAMPLE SIZE:	60
RIVER FOR AUTOPSY:	Prelib.		
INVESTIGATOR(S):	Munson		
REMARKS:			

	MEAN	STANDARD DEVIATION	COEFFICIENT OF VARIATION
LENGTH	0.00	0.00	0.00
WEIGHT	0.00	0.00	0.00
KTL*	0.00	0.00	0.00
CTL*	0.00	0.00	0.00
HEMATOCRIT			
LEUCOCRIT	0.00	0.00	0.00
SERUM PROTEIN			

*EXPRESSED AT KTL TIMES 10 TO THE FIFTH POWER
**CONVERTED FROM KTL; EXPRESSED AS CTL TIMES 10 TO FOUTH POWER

EYES		GILLS		PSEUDO-BRANCHS		THYMUS		FAT		MESEN. SPLEEN		GUT		HIND KIDNEY		LIVER		BILE	
N	60	N	60	N	60	0	60	0	0	B	58	0	60	N	60	A	60	0	39
B1	0	F	0	S	0	1	0	1	0	R	2	1	0	S	0	B	0	1	12
B2	0	C	0	L	0	2	0	2	2	G	0	2	0	M	0	C	0	2	9
E1	0	M	0	S&L	0			3	3	NO	0			G	0	D	0	3	0
E2	0	P	0	I	0	Mean=0.00		4	55	E	0	Mean=0.00		U	0	E	0		
H1	0	OT	0	OT	0					OT	0			T	0	F	0	Mean=0.5	
H2	0			O	0			Mean=3.88								OT	0		
M1	0																		
OT	0																		

SUMMARY OF NORMALS

60	60	60	60	60	60	60	60	60	60
SEX	M: 0		F: 0		U: 0				

GENERAL REMARKS:

FINS:

GONADS:

SKIN:

OTHEF One precocial male found.

Appendix N. F129 Brood Year 2008 Steelhead Releases

	RELEASE BYO8 SH full-term smolts								
Date	**Site**	**Number Released**	**Stock**	**Length**	**FPP**	**Pounds**	**Marks**	**Raceway**	**Comments**
04/13-04/14/2009	Red River	131,803	DWOR B	8.48	4.69	28,103	131,803 No Clip-3,569 No Clip/PIT	5-7E	acclimated in tanks-direct release
04/14-04/16/2009	Peasley Creek/SF. CLW	265,589	DWOR B	8.54	4.73	56,150	143,064 AD Only- 122,523 Ad/CWT- 2,184 AD/CWT/PIT-4,972 AD/PIT	8, 9, 12E, 11, 12W	direct release
04/17-04/20/2009	Upper Crooked R	73,287	DWOR B	8.69	4.41	16,618	52,071 No Clip-21,216 No Clip/CWT-1,986 NO Clip/PIT	10E, 11E	direct release
04/16-04/17/2009	Red House Hole	263,999	DWOR B	8.48	4.69	56,290	139,499 AD-124,500 AD/CWT-6,416 AD/PIT-674 AD/CWT/PIT	6-10W	direct release
4/20/2009	Newsome Creek	25,354	DWOR B	8.38	4.81	5,271	25354 No Clip-0 No Clip/PIT	1/2 of 4W	direct release
4/20/2009	Mill Creek	25,354	DWOR B	8.38	4.81	5,271	25354 No Clip-0 No Clip/PIT	1/2 of 4W	direct release
4/28/2009	Lolo Creek	50,250	DWOR B	8.38	4.81	10,447	50,250 No Clip-1398 No Clip/PIT	5W	mostly hauled by NPTH
	TOTAL	**835,636**				**178,150**			

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