

CLEARWATER FISH HATCHERY
ANNUAL REPORT
2002 CHINOOK AND 2003 STEELHEAD

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2002 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 parr, pre-smolts, or smolts.

Powell

Two adult traps were operated in the Lochsa basin. The Crooked Fork trap was installed on 7/9/2002, and the trap was taken out of operation on 9/23/2002.

The Walton Creek weir was installed on 5/30/2002 and taken out of operation on 8/26/2002. The run total for both traps was 1,394 fish of which there were 36 jacks and 1,358 adults. A total of 411 fish were released to spawn naturally, and 983 were held for production. A total of 554 females were spawned of which 503 were kept for production and 51 were culled due to high BKD levels, producing 1,930,703 green eggs.

A total of 385,292 pre-smolts and 376,797 full-term smolts from Powell stock chinook were released from Powell Pond on 9/16/2003 and 3/25-4/8/2004.

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 3/6/2002 and taken out of operation 8/30/2002. The run total of 623 fish were combined with the returning adults from Crooked River. Of the total, 100 chinook were released upstream to spawn naturally.

The Crooked River weir was installed on 3/30/2002 and taken out of operation 8/31/2002. The run total of 1,336 fish were combined with returning adults from Red River. Of the total, 170 chinook were released to spawn naturally.

The South Fork had a run total of 1,959 fish. A total of 270 fish were released to spawn naturally. All remaining fish were held for spawning. A total of 485 females were spawned of which 433 females were kept for production, and 52 females were culled due to high BKD levels, producing 1,726,885 green eggs.

A total of 354,868 full-term smolts were released from the Red River pond on 4/7-4/9/2004.

A total of 750,317 full-term smolts were released from Crooked River raceways on 3/30-4/2/2004.

Idaho Supplementation Studies (ISS)

A total of 154,974 parr were released in the Lochsa basin for the ISS program. A total of 16,290 were released in Pete King Creek on 7/28/2003; 16,532 were released in Squaw Creek on 7/28/2003; and 122,152 were released in Colt Killed Creek on 7/29/2003 and 7/30/2003.

A total of 108,323 pre-smolts were released from the Red River pond on 9/26/2003.

A total of 234,361 pre-smolts were released from the Crooked River raceways 9/17/2003.

A total of 56,174 smolts were released in Papoose Creek on the Lochsa on 4/8/2004.

Nez Perce Tribal Programs

A total of 35,000 eyed eggs were transferred to the Nez Perce Tribal Hatchery to test new plumbing and rearing facilities.

A total of 821,879 parr were reared at Clearwater by the Nez Perce Tribe production crew. This included 365,476 (CWT only) transferred to the Nez Perce Tribal Hatchery on 5/20/2003 and 5/28/2003; 72,666 (CWT only) transferred to Newsome Creek Satellite on 5/29/2003; 158,307 (CWT only) transferred to Yoosa Creek Satellite on 6/2-3/2003; 225,430 (non-marked) direct released in Mill Creek on 6/12-13/2003.

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 Corps' estimated cost for construction of CFH and three satellite facilities was to be \$43,153,000 (Joe McMichael's report December 1991).

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 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 16 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 cubic foot cleaning sedimentation pond is used during cleaning to settle out the settleable solids produced by the hatchery. A 414,000 cubic foot final sedimentation pond settles waste from the total flow of hatchery operation and the out flow of the cleaning sediment.

In 2000, a new 2,040 square foot 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 new covered storage area.

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 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 6-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 216,000 cubic feet. This area will rear a maximum capacity of 2.4 million steelhead smolts with 0.3-density index (DI) (Piper 1986). A flow of approximately 1.67 cubic feet per second (cfs) is available for each raceway, but this flow will only allow 1.7 million steelhead to be reared in these raceways without exceeding the flow index (FI) of 1.2 (Piper). 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 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 designed rearing capacity of these raceways is 1.5 million smolts at a 0.3 DI (Piper). 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 40 double stack Heath incubators with a total of 640 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. This part of the facility can rear 5.9 million fish to 287 fish/lb. at a 0.3 DI. 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.

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 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 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

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°F 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 39° to 70°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 right for the gravity intake is 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 42° to 58°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 39°F 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 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

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, Laborers, Grounds Maintenance Worker, 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 and opercle punching and releasing all ventral clipped and unmarked fish above the weirs. Any fish with no mark, having a CWT, were opercle punched and released below the weirs.

The Crooked River weir and trap were in operation between 3/30/2002 and 8/31/2002. A total of 1,336 fish were trapped.

The Red River trap was installed on 3/6/2002 and taken out of operation on 8/30/2002. A total of 623 fish were trapped.

Age class breakdown of this run included: 39 I-ocean males; 5 I-ocean females (<64 cm); 585 II-ocean males, 922 II-ocean females, 10 II-ocean unknowns (64-82 cm); 233 III-ocean males, 164 III-ocean females, and 1 III-ocean unknown (83+ cm) (D1, D1a, D2, D2a, E1, E1a, E2, F1 and F2).

Powell

During 2001, 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 5/30/2002 and taken out of operation 8/26/2002. The Crooked Fork trap was installed 7/9/2002 and taken out of operation 9/23/2002. A total of 1,394 fish (36 jacks and 1,358 adults) were trapped at Powell and Crooked Fork.

Trapping protocols for the Powell trap included ponding for broodstock or recycling into the sport fishery all ad-clipped fish and opercle punching and releasing all ventral clipped and 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 at Powell for production or recycling into the sport fishery. All naturals / wild fish were released upstream.

Age class breakdown of this run included: 33 I-ocean males, 3 I-ocean females (<64 cm); 404 II-ocean males, 746 II-ocean females, 6 II-ocean unknowns (64 – 82 cm); 164 III-ocean males, 36 III-ocean females, and 2 III-ocean unknowns (83+ cm) (Appendices G1, G1a, G2, G2a, G3, and H).

ADULT HOLDING

All South Fork production fish were temporarily held at Red River and then transported to Clearwater Hatchery for final holding and spawning. Some South Fork stock were held and spawned at Red River for NPT production by NPT staff and CFH staff.

All fish were injected with Erythromycin 200 at a rate of 20 mg/kg at trapping to inhibit BKD. Fish were treated with a formalin drip for one hour every other day to prevent fungal growth. Fish held at Clearwater were treated at 150 ppm, and fish at Powell were treated at 120 ppm. After sorting, fish were treated daily at the same concentration and duration until all females were spawned.

SPAWNING AND EGG TRANSPORT

A 1:1 male/female spawning ratio was used (CFH genetics protocol for more than 100 females) at both facilities during 2001. A second male was added after one minute, as a backup in case the first was not fertile.

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 and 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 (Appendix I).

South Fork of the Clearwater

Chinook were sorted twice per week for ripeness. The first fish was spawned 8/6/2002 and the last 9/6/2002. A total of 485 females were spawned. Pre-spawn mortality for the South Fork stock was 375 fish (19% pre-spawning mortality). Most of the mortalities came from fish trapped during a one-week period during a major flood event. A total of 70 fish died from jaundice as a result of the Erythromycin injection. 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 8/5/2002 and the last 8/26/2002. A total of 554 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 37 fish (2.6% 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 gallons per minute.

Females were screened for BKD using Elisa techniques. Females with optical density (O.D.) over 0.130 on the South Fork stock and 0.120 on the Powell stock were culled. The BKD tests resulted in culling of 41 females at Powell and 42 females from the South Fork. Using an average fecundity of 4,000 eggs per fish, these culled females accounted for 332,000 green eggs, which was 10.96% of the entire egg take.

A total of 3,028,970 green eggs were incubated from BY02 spring chinook salmon. Overall development from green eggs to eyed-eggs was 2,906,538 for a total eye-up percentage of 95.96%. The South Fork stock achieved 97.9% eye-up, Powell 94.0% eye-up (Appendix I).

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 (T.U.'s).

A second culling took place prior to ponding of which 302,905 Powell eggs (62 females) were discarded to further reduce BKD levels to hatchery capacities. With 165,491 eyed eggs transferred to NPTH programs, this left 2,433,142 eggs/fry for Clearwater production.

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 (Appendix I).

Nez Perce Tribe

The NPT had a total of 628,618 green eggs from BY 02 spring chinook salmon. Overall development from green eggs to eyed-eggs was 596,419 for a total eye-up percentage of 94.88%. Red River achieved a 92.7% eye-up, Powell a 96.2% eye-up (Appendix Ia).

An additional 35,000 eyed eggs were transferred to the Nez Perce Tribal Hatchery on 10/21/2003 to aid in testing of the new incubation facility. An additional 135,491 eyed eggs were transferred to the tribe before ponding to ensure that they met production levels. A total of 766,910 eyed eggs were received by the tribe from CFH production (including numbers from green eggs given).

EARLY REARING

Swim up fry were ponded in hatchery vats at approximately 39,000 to 59,000 fish per vat. A total of 2,365,572 fry were segregated by stock and release strategies in 46 vats over a four-month period. This gave us a survival of 97.2% 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 1.47 while the density index never exceeded .31 during the entire early rearing period. Water temperatures during early rearing were between 44° and 56° F (appendix A1 & A2).

Most of the chinook were moved outside during the marking process. Some of the smaller groups were marked but remained in vats until release. The inventory number was adjusted after the marking program to 821,879 for the Nez Perce Tribe and 2,435,614 for the Clearwater Hatchery for a total of 3,257,493 as a result of the hand count.

FINAL REARING

At marking, Powell stock was used to fill all Lochsa River programs. South Fork programs were filled with South Fork stock. The Nez Perce Tribe programs were filled with fish from Clearwater Hatchery. All CFH chinook were marked between April 21, 2003 and June 18, 2003.

Most full-term smolts from the BY02 chinook were fed two 28-day Erythromycin prophylactic treatments. Three raceways were only fed once (University of Idaho fish study), and the parr/pre-smolts were only fed once. Bio Oregon Biodiet grower feed was used throughout the final rearing period. The parr and pre-smolts were fed full rations until release. The full term smolts were fed full rations through marking every other day during medicated feed treatments and were fed four days on feed and three days off feed the remainder of the time. The final 3 months of feeding was done with feed laced with a special vitamin pack to aid in smolting. Total feed used in early and final rearing was 152,463 pounds yielding 129,347 pounds of fish reared for a final conversion of 1.18 (Appendix J). Total cost was \$155,797.63 not including Nez Perce Tribe's cost for their portion of the feed.

The goal was to keep water temperatures below 55° F to reduce growth rates; temperatures varied from 38° to 57° F during the final rearing period with an estimated 2.1 cfs of water supplied to each raceway. During October and November, the top 75 feet of the lake (intake only goes down to 50 feet) warmed up to 61° F then slowly decreased. There was not enough secondary water to cool down the chinook bank below 57° F during this time.

Parr chinook were released in July at three different locations. The Idaho Supplementation Study (ISS) program involved 154,974 fish and 225,430 for the Nez Perce Tribe programs for a total of 380,404 parr released. A total of 727,976 pre-smolts were released 9/16-26/2003. Clearwater Fish Hatchery (CFH) production took 385,292; ISS used 342,684. Chinook pre-smolts to be released at Powell and Crooked River were reared at the satellites throughout the summer. Those released at Red River were held at the satellite during two weeks in September only. A total of 1,538,156 smolts were released in March and April of 2004 at 4 different locations. CFH production released 2,421,106 fish.

FISH HEALTH

The BY02 spring chinook reared at CFH were from low BKD parentage with O.D. below 0.130 on the South Fork and 0.120 on the Lochsa. All chinook eggs above this O.D. were culled.

All parr and pre-smolts received one 28-day Erythromycin prophylactic feed treatment, and all but three raceways received two 28-day Erythromycin feed treatments. Six raceways of production during the second feeding were used by the University of Idaho (Christine Moffet) to look at other bacteria that might be present after treatments. Three raceways were fed 2.25% Aquamycin, and three were not fed a second treatment.

An Ichthyophthirius (ICH) outbreak occurred at Upper Crooked River in the pre-smolt release group during August 2003. A formalin treatment strategy was carried out for three weeks where the fish were treated every other day between 200-250 ppm. By release, no ICH could be found on any live fish. Total mortality from the epizootic was 9,000 fish.

PATHOLOGIST REPORT

Diseases Encountered and Treatment. Losses to infectious agents were not encountered at the Clearwater Hatchery during this rearing cycle. Chinook salmon received one or two prophylactic treatments of erythromycin medicated feed treatments to control *Renibacterium salmoninarum* (RS). Each of these prophylactic treatments was for 28 days at a target dose of 100 mg/kg/day. *Myxobolus cerebralis* was not detected in juvenile fish reared at Clearwater Hatchery. Etiologic agents were not detected in juvenile Chinook salmon reared at Clearwater Hatchery.

Renibacterium salmoninarum was detected in brood South Fork of the Clearwater spring Chinook salmon during routine spawning examinations. The eggs from high BKD females (ELISA optical densities above 0.13) were destroyed. The culling rate was at 19%. Prespawning mortality was at 19%. This mortality was up from 13% in 2001. Suspected causes of prespawning mortality were elevated water temperatures, trauma during migration (head burn), and jaundice. Infectious hematopoietic necrosis virus (IHNV) was detected in 12 of 62 fish examined. These positive fish were not culled from the program. All eggs are disinfected with iodophor and thus eliminate these viral replicating agents. *Myxobolus cerebralis* was not detected in adult spring Chinook salmon spawned at Clearwater Hatchery.

Organosomatic Index. See Appendices K1-K6.

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

Other Assessments. A study was initiated to test the difference in RS levels in juvenile Chinook salmon after being fed one or two prophylactic applications of erythromycin-medicated feed. Fish that only received one application of medicated feed (28 days at 100 mg/kg/day) were fed the medicated feed at the same time the second medicated feeding was being applied to the other experimental group. Kirkegaard Perry Laboratory (KPL) mother batch 2 antibodies were used to perform the ELISA culling program on the BY' 02 Crooked River spring Chinook salmon. There appears to be no difference between experimental groups in prevalence or intensity of infection. This study should be expanded to all Chinook salmon stocks reared at Clearwater Hatchery in 2004. If significant differences cannot be detected between future experimental groups, Clearwater Hatchery should rear all groups with one prophylactic feeding of erythromycin-medicated feed. This would save approximately \$20,000 spent on the first application of medicated feed. Another consideration is the appropriate use of antibiotics. In the future the IDFG ELISA culling program should be challenged with a trial investigating not utilizing a prophylactic application of erythromycin medicated feed. It is suspected that the criteria for ELISA culling of Chinook salmon, performed by the EFHL, is strict enough to eliminate BKD epizootics without the prophylactic use of antibiotics.

Crooked River Satellite

Diseases Encountered and Treatment. Etiologic agents were not detected during routine inspection examinations including preliberation sampling, except for *Ichthyophthirius multifiliis*, the causative agent of “Ich” in the BY’ 02 Crooked River spring Chinook salmon. Signs of disease were noticed in the first week of September 2004. The epizootic continued until release at the end of September 2004 despite treatment with formalin at 200 ppm. Mortality reached 400+ fish/day.

Organosomatic Index. See Appendices K1 and K2.

Acute Losses. Acute losses were not experienced during this rearing cycle at Crooked River Satellite.

Chronic losses to *Ichthyophthirius multifiliis* (Ich) reached a 400 fish per day. Formalin appeared to reduce losses but did not eliminate the infestation.

Other Assessments. Due to the severity of *Ichthyophthirius multifiliis* infestation, the Clearwater crew may want to avoid a fall release program at Crooked River except for a short acclimation period once the temperatures drop out of the 60°F range.

POWELL SATELLITE

Diseases Encountered and Treatment. Broodyear 2002 Powell spring Chinook salmon were acclimated at this satellite during this reporting period. Etiologic agents were not detected during routine inspection examinations including preliberations (fall and spring).

Renibacterium salmoninarum was detected utilizing ELISA technology. This Department utilizes ELISA-based culling to limit losses to bacterial kidney disease (BKD). During 2003, the brood Powell spring Chinook salmon were culled at a 12% rate, utilizing a 0.12 (and above) optical density culling point. Prespawning mortality decreased to 3% from 12% in 2001. Suspected causes of this prespawning mortality were elevated water temperatures, trauma acquired during migration (including head burn), and sport and tribal fisheries. Infectious hematopoietic necrosis virus was detected in 3 of 63 fish sampled. Since these fish are a part of the Clearwater Hatchery program, the eggs produced by these females were not culled. All eggs are disinfected with iodophor to eliminate pathogens.

Organosomatic Index. See Appendices K3 and K4.

Acute Losses. Neither acute nor chronic losses were experienced at this satellite during the reporting period.

Other Assessments. A 10% loss to prespawning mortality is expected in stocks being held in IDFG facilities. In recent years prespawning mortality has been elevated at several different hatcheries. It will be important to identify the source of the mortality at each facility and develop strategies to eliminate it. Hatchery personnel, permanent and temporary, will need to be trained in identification of trauma sources and signs of disease. This will be especially important for the Clearwater Hatchery staff that will be working at the satellites.

RED RIVER SATELLITE

Diseases Encountered and Treatment. Only a preliberation sample of BY' 02 Chinook salmon was taken at this facility during this reporting period. Viral replicating agents and MC were not detected in these fish prior to release.

Organosomatic Index. See Appendices K5 and K6.

Acute Losses. Neither acute nor chronic losses were experienced at this facility during this rearing cycle. Red River satellite no longer rears salmon during the summer months. Yearly epizootics, caused by *Ichthyophthirius multifiliis*, have forced the hatchery staff to manage around the parasite. Only short acclimation periods of two weeks are utilized to imprint salmon to return to this station.

Other Assessments. Prespawning mortality in Chinook salmon has been a problem periodically in the Clearwater Hatchery system. A detailed examination to the causes of this mortality will be important in the future. Once determined, hatchery staff should be able to manage around this mortality and provide enough eggs to service Clearwater Hatchery's needs.

FISH MARKING

A total of 2,393,598 spring chinook were marked. Marks include: 1,830,343 Adipose (Ad) clipped; 86,838 coded wire tagged (CWT); 108,512 right ventral (RV) clipped; and 375,905 left ventral (LV) clipped (Appendix L).

Chinook were marked from early rearing vats (inside) into final rearing raceways (outside). Spring marking started on 4/21/2003 and was completed on 4/30/2003. Summer marking started on 6/2/2003 and was completed on 6/18/2003. Fish ranged in size from 114 to 84 fpp. A total of 1,700 were Passive Integrated Transponder (PIT) tagged.

FISH DISTRIBUTION

Releases from CFH occurred in three different life stages:

	<u>CFH</u>	<u>NPTH</u>
Transfer to NPTH		596,449
Parr	154,974	225,430
Pre-smolt	727,976	0
Full term smolt	<u>1,538,156</u>	0
Total	2,421,106	821,879

Parr

Clearwater Production

A total of 16,290 fish (47.0 fpp) were released into Pete King Creek on the Lochsa on 7/28/2003. All parr were CWT tagged with no fin clips and 1,000 were PIT tagged (Appendix L).

A total of 16,532 fish (50 fpp) were released into Squaw Creek on the Lochsa on 7/28/2003. All parr were CWT tagged with no fin clips and 700 were PIT tagged (Appendix L).

A total of 122,152 fish (45 fpp) were released into Colt Killed Creek (White Sands) on 7/29/2003 and 7/30/2003. All parr were RV clipped and 700 were PIT tagged (Appendix L).

Nez Perce Tribe Production

A total of 365,476 fish (117.2 fpp) were transferred to the Nez Perce Tribal Hatchery on 5/20/2003 and 5/28/2003. All parr were CWT tagged before being transferred.

A total of 72,666 fish (115 fpp) were transferred to the Nez Perce Tribe's Newsome Creek acclimation ponds on 5/29/2003. All parr were CWT tagged before being transferred.

A total of 158,307 fish (115 fpp) were transferred to the Nez Perce Tribe's Yoosa Creek acclimation ponds on 6/2-3/2003. All parr were CWT tagged before being transferred.

A total of 225,430 fish (107.9 fpp) were direct released in Mill creek on the South Fork of the Clearwater on 6/12-13/2003. These fish were released with no marks.

Fall Pre-Smolt

Crooked River

A total of 234,361 fish (40 fpp) were released into Crooked River on 9/17/2003. All pre-smolts were LV clipped and 499 were PIT tagged (Appendix L).

Powell

A total of 385,292 fish (19.7 fpp) were released into Walton Creek on 9/16/2003. All pre-smolts were ad-clipped and 700 were PIT tagged (Appendix L).

Red River

A total of 108,323 fish (34 fpp) were released into Red River on 9/26/2003. All pre-smolts were RV clipped and 600 were PIT tagged (Appendix L).

Full Term Smolt

Crooked River

A total of 750,317 smolts (16.06 fpp) were released into Crooked River. Smolts were transported to Crooked River 3/30 through 4/2 and forced released daily. All smolts were ad-clipped and 300 fish carried PIT tags (Appendix L).

Powell

A total of 376,797 smolts (15.48 fpp) were released into Walton Creek. Smolts were transported to Powell 3/25 through 3/29. A volitional release was started on March 30 and continued until the remaining fish were forced out of the pond on April 2. All smolts were ad-clipped and 300 fish carried PIT tags (Appendix L).

Red River

A total of 354,868 smolts (15.54 fpp) were released into Red River. Smolts were transported to Red River 3/29 through 3/30. On 4/9/2004, the pond was drained and all remaining smolts were released. All smolts were ad-clipped and 300 fish carried PIT tags (Appendix L).

Papoose Creek

A total of 56,174 smolts (16.25 fpp) were direct released at Papoose Creek on the Lochsa on 4/8/2004. All smolts were CWT tagged with no external clips and 800 carried PIT tags (Appendix L).

BROOD YEAR 2003 STEELHEAD REPORT

ABSTRACT

Clearwater Hatchery received 1,481,444 eyed brood year 2003 North Fork B-run steelhead eggs from Dworshak National Fish Hatchery (DNFH). A total of 1,062,075 pre-smolts and smolts from the North Fork stock were released on 9/26/2003 and from 4/16/2004 through 4/27/2004; 337,265 at Red House hole; 103,718 at Kooskia Hatchery on Clear Creek; 260,602 at Red River; 257,005 at Crooked River; 25,962 at Mill Creek (S.F. Clearwater); 25,961 at Meadow Creek (S.F. Clearwater); 51,562 at Lolo Creek. The average size of fish was 4.42 fpp for a total of 238,896 pounds, and the average length was 218 mm.

A total of 252,158 pounds of feed was fed with a cost of \$130,347.72 to produce 238,896 pounds of fish at Clearwater Hatchery. The conversion rate was 1.05. Survival from eyed egg to release was 93.2%.

Clearwater Hatchery received 1,278,577 green brood year 2003 North Fork B-run steelhead eggs from Dworshak National Fish Hatchery for the southern Idaho steelhead hatcheries. After culling and picking, 1,147,191 eyed eggs were shipped to Magic Valley Hatchery and Hagerman National Hatchery.

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 3/20/2003 and 3/27/2003 (Appendix M). The eggs from DNFH lots five and six were incubated approximately 17 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 1,545,221 unpicked eyed eggs were received, and after picking netted 1,481,444 eggs for an eye-up of 95.9% (Appendix M). During incubation, steelhead eggs were on primary water only.

A total of 1,278,577 green 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. 932,191 eyed eggs were shipped to Magic Valley, 215,000 eyed eggs were shipped to Hagerman National, and 15,000 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 90.9%.

EARLY REARING

A total of 1,111,504 fish were ponded in early rearing. Survival from green egg to ponding was 90.7%, and from eyed egg to ponding was 95.7%. At swim-up, unfed fry from Dworshak stock B-run steelhead were moved to vats. All fry were divided as evenly as possible (37,023 to 41,407 fish/vat). The initial DI was .07 and FI was .30. Fish were held in the hatchery vats until July when they were marked and moved to twenty steelhead raceways (3-12 east and 3-12 west). Average length of the fish at the end of early rearing was 3.54 inches (90 mm). The fish averaged 64 fpp.

The DI of the Dworshak steelhead ranged from 0.12 to 0.37, and the FI ranged from .30 to 1.49

Bio Oregon's Biodiet Grower was used during the entire rearing period.

Water temperatures for the early rearing period ranged from 48° to 56° F (Appendix A2).

FINAL REARING

The juvenile Dworshak stock B-run steelhead were moved to outside steelhead raceways 3-12 east and 3-12 west. During July, the move was done in conjunction with fin clipping and CWT tagging to avoid double stressing the fish. Fin clipping was done in 10-hour shifts per day with the new MATS trailer. 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 0.12 to .30, and the FI ranged from 0.38 to 1.54. These indexes were recalculated monthly and were never allowed to exceed DI of 0.30 or FI of 1.60.

Water temperatures during final rearing period were maintained to keep temperatures as close to 57°F as possible (Appendix A2). Reservoir water temperatures climbed in early October to 61° F, and then they began to drop in mid November and bottomed out in January at 38°F. Temperatures began to slowly increase in early April and had reached 52°F by late April. Estimated water flows per raceway were 2.2 cfs.

Fish were fed Bio Oregon's BioVita dry feed until released. A total of 226,000 pounds of feed was used during final rearing producing 215,238 pounds of gain at a cost of \$110,170.32. A total of 252,158 pounds of feed was used throughout the entire rearing period to produce 238,896 pounds of fish at a cost of \$130,347.72. The overall conversion rate from fry to smolt was 1.05. Percent body weight fed ranged from .24% to 2.02% (Appendix J).

This was the first brood year that the entire steelhead production was fed Bio Oregon products feed from start to finish. The fish responded well to the feed, and the end result was the largest steelhead smolt ever produced at CFH.

FISH HEALTH PATHOLOGIST REPORT

Flavobacterium psychrophilum, the etiologic agent of cold water disease, was detected in the BY03 North Fork of the Clearwater steelhead trout B group. Lesions were noticed in these fish, but mortality was not elevated and thus medicated feed was not warranted.

Steelhead are not spawned at Clearwater Hatchery. Green eggs are acquired from DNFH. The females are tested for viral replicating agents at the Eagle Fish Health Laboratory (EFHL). Eggs from females that test positive for viral replicating agents were culled from the Clearwater Hatchery program. Eggs from 1 female of the 215 fish spawned were culled because of IHNV detection.

Neither acute losses nor chronic losses were experienced at this facility during this rearing cycle. (Appendix N).

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	Pre-smolt	22,599	0	0
Red House Hole	Smolt	246,610	68,056	297
Clear Creek	Smolt	103,718	0	0
Red River	Smolt	103,419	0	2,313
Crooked River	Smolt	87,133	67,045	299
TOTALS		563,479	135,101	2,909

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	CWT/ELASTOMER	PIT TAGS
Red River (acclimated)	Smolt	51,667	53,651 Blue Left	2,512
Red River (non-acclimated)	Smolt	0	51,865 Orange Left	2,531
Crooked River	Smolt	102,827	0	300
Meadow Creek	Smolt	0	25,961 Orange Right	1,051
Mill Creek	Smolt	0	25,962 Orange Right	1,489
Lolo Creek	Smolt	51,562	0	297
TOTALS		206,056	157,439	8,180

FISH DISTRIBUTION

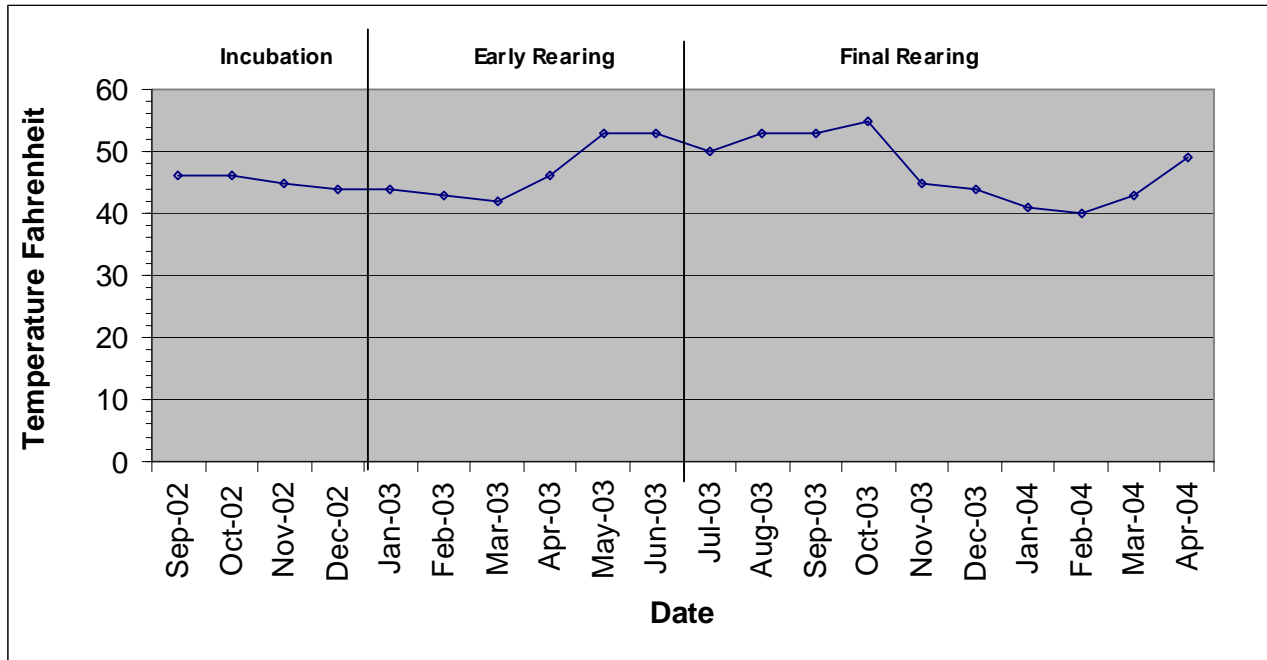
On 9/26/2003, a total of 22,599 (17.0 fpp) surplus Dworshak B-run steelhead were direct released in the South Fork of the Clearwater River at Red House Hole. On 4/19-20/2004, a total of 314,666 (4.32 fpp) Dworshak B-run steelhead were direct released at the Red House hole plant site (approximately 3.5 miles upstream of Highway 13 and 14 junction) on the lower South Fork of Clearwater River. A total of 103,718 (4.02 fpp) Dworshak B-run steelhead were direct released into Clear Creek at Kooskia Hatchery on 4/21/2004. There were 260,602 fish, which averaged 4.64 fpp, released at Red River between 4/16-26/2004 and an additional 257,005 fish, which averaged 4.33 fpp, released at Crooked River between 4/20-23/2004. The 51,562 fish, which averaged 4.42 fpp, released at Lolo Creek were transported by NPTH on 4/26/2004. A total of 25,961 fish, which averaged 4.33 fpp, and 25,962 fish, which averaged 4.33 fpp, were released on 4/27/2004 at Meadow and Mill Creeks on the South Fork of the Clearwater. There was very little crowding and hauling mortality from the fish transportation to the release sites (Appendix O).

ACKNOWLEDGEMENTS

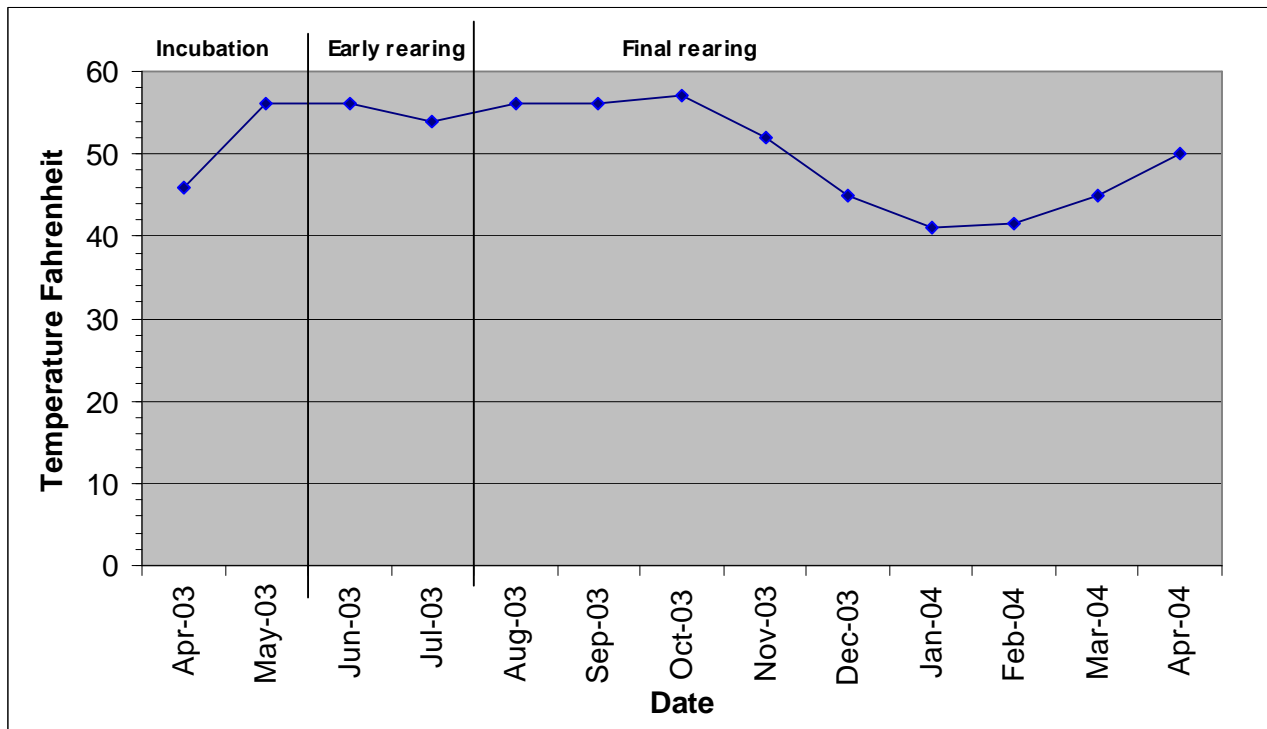
The Clearwater Hatchery has a crew of 33 people and are all assigned a wide variety of responsibilities. Everyone on station has contributed to the success of the program. The hatchery crew consists of: Jerry McGehee - Hatchery Manager; Brad George and Randy Hutzenbiler - Assistant Hatchery Managers; Jeff Houck, Chris Shockman, and Pat Moore - Fish Culturists; Ernie Yost - Utility Craftsman; Walter Boore - Office Specialist II; Ron Hopper, Chad Henson, and Don West - Fish Technicians; Theresa Elliott, Gary Duke, Bob Schloss, Daryn Call, Lacey Alberts, Brian Peterson, Stacey Osborn, Deb Ryland, Britney Hicks, John & Connie Daly, Kieth Jackson, Paul Bentley, Barb & Joe Zimiga, Mike Hamilton, and Tim Lee - Bio-aides; Charles Ball, Kim West, Chris Lozar - Grounds Maintenance Workers; Fred Hough, Maintenance Craftsman.

APPENDICES

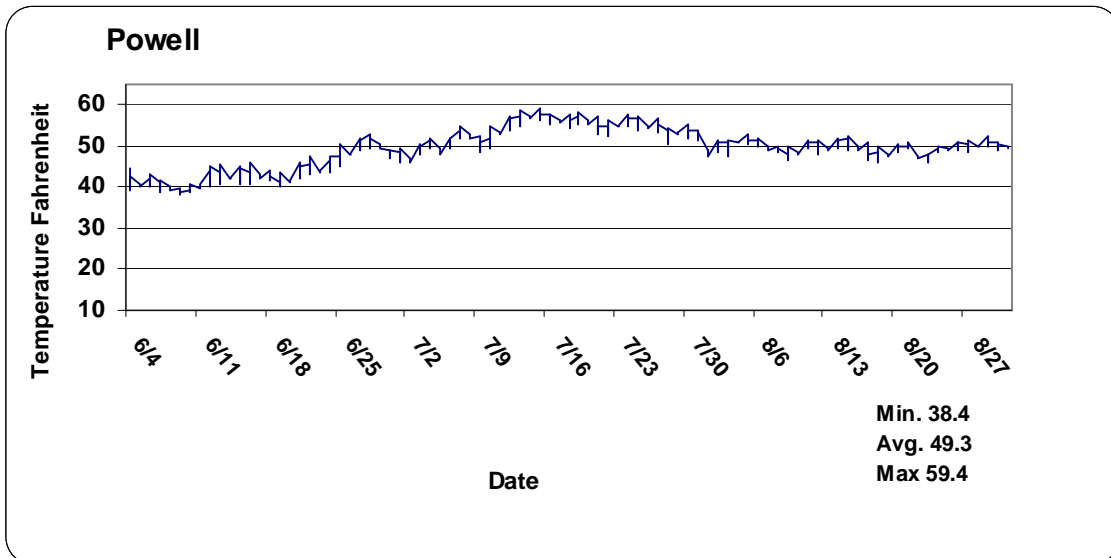
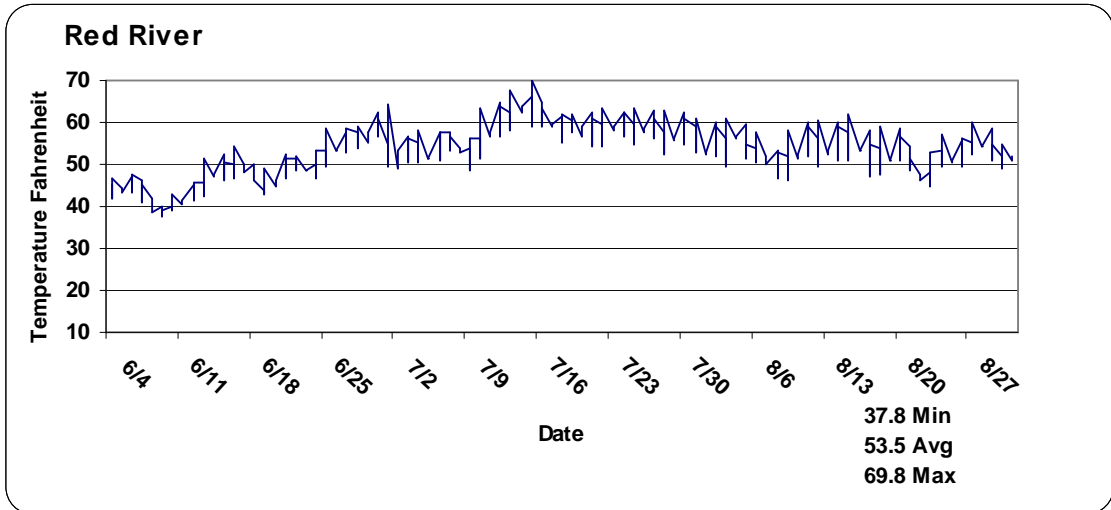
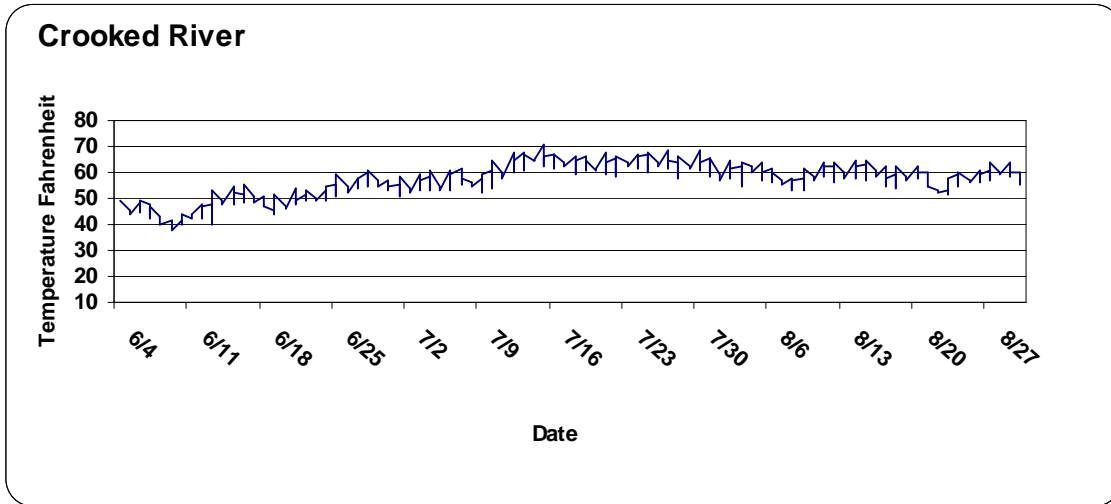
Appendix A1. Brood Year 2002 Chinook water temperatures, Sept 2002-April 2004



Appendix A2. Brood Year 2003 Steelhead water temperatures, April 2003-April 2004



Appendix B1, B2 and B3. Water temperatures at trap facilities.



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 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.

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)	0.009	0.01	EPA 200.8	07/02/97
Sodium	.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	.016	0.001	EPA 200.8	07/02/97
Sulfate	D	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

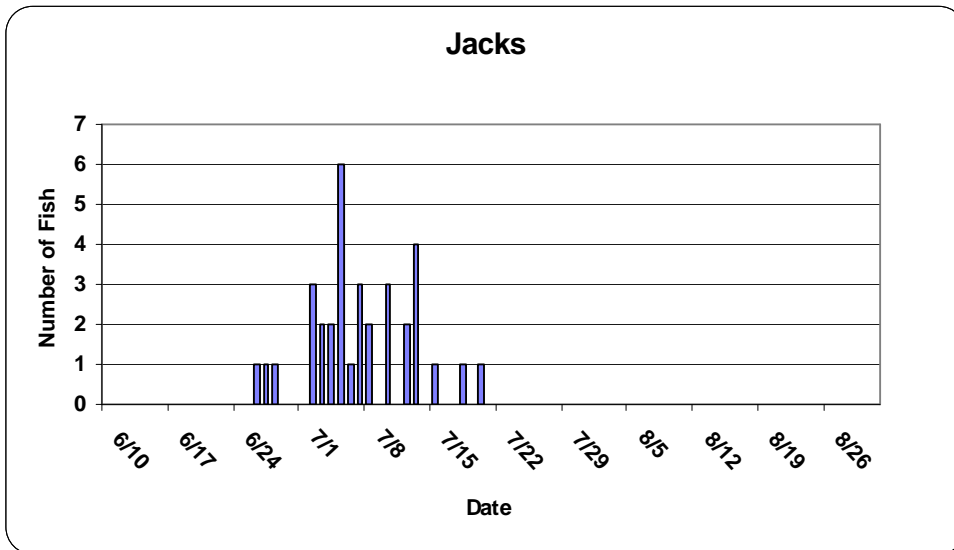
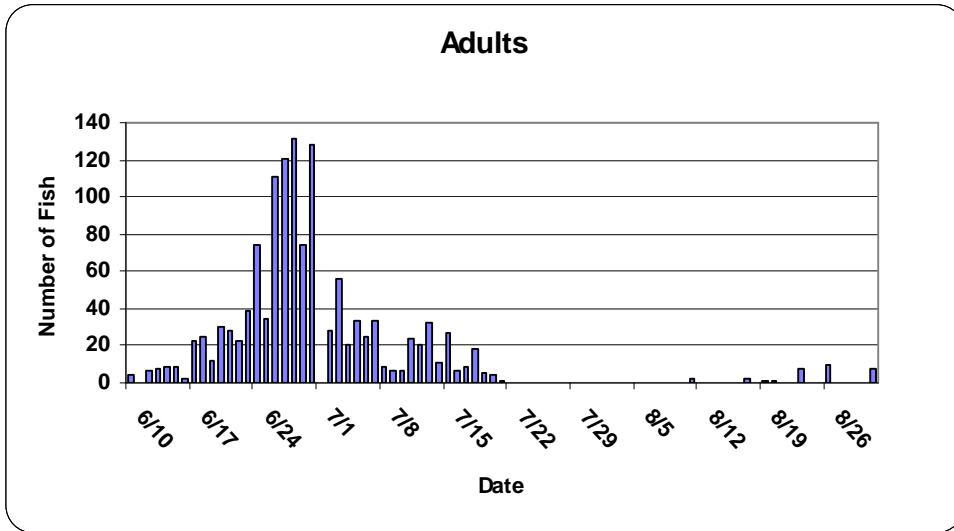
Numerical Entry = Detection at level indicated

MCL (numbers in parenthesis)= EPA maximum contaminant level

Appendix D1. Crooked River chinook run timing 2002.

Date	Adult	Jack	Total	Date	Adult	Jack	Total
6/10	4	0	4	7/24	0	0	0
6/11	0	0	0	7/25	0	0	0
6/12	6	0	6	7/26	0	0	0
6/13	8	0	8	7/27	0	0	0
6/14	9	0	9	7/28	0	0	0
6/15	9	0	9	7/29	0	0	0
6/16	2	0	2	7/30	0	0	0
6/17	23	0	23	7/31	0	0	0
6/18	25	0	25	8/1	0	0	0
6/19	12	0	12	8/2	0	0	0
6/20	30	0	30	8/3	0	0	0
6/21	28	0	28	8/4	0	0	0
6/22	23	0	23	8/5	0	0	0
6/23	39	0	39	8/6	0	0	0
6/24	74	0	74	8/7	0	0	0
6/25	35	0	35	8/8	0	0	0
6/26	111	1	112	8/9	0	0	0
6/27	121	1	122	8/10	0	0	0
6/28	131	1	132	8/11	2	0	2
6/29	74	0	74	8/12	0	0	0
6/30	128	0	128	8/13	0	0	0
7/1	0	0	0	8/14	0	0	0
7/2	28	3	31	8/15	0	0	0
7/3	56	2	58	8/16	0	0	0
7/4	21	2	23	8/17	2	0	2
7/5	33	6	39	8/18	0	0	0
7/6	25	1	26	8/19	1	0	1
7/7	33	3	36	8/20	1	0	1
7/8	9	2	11	8/21	0	0	0
7/9	6	0	6	8/22	0	0	0
7/10	7	3	10	8/23	8	0	8
7/11	24	0	24	8/24	0	0	0
7/12	21	2	23	8/25	0	0	0
7/13	32	4	36	8/26	10	0	10
7/14	11	0	11	8/27	0	0	0
7/15	27	1	28	8/28	0	0	0
7/16	6	0	6	8/29	0	0	0
7/17	9	0	9	8/30	0	0	0
7/18	18	1	19	8/31	8	0	8
7/19	5	0	5	TOTAL	1301	35	1336
7/20	4	1	5				
7/21	1	0	1				
7/22	1	0	1				
7/23	0	1	1				

Appendix D1a. Crooked River run timing graph 2002.

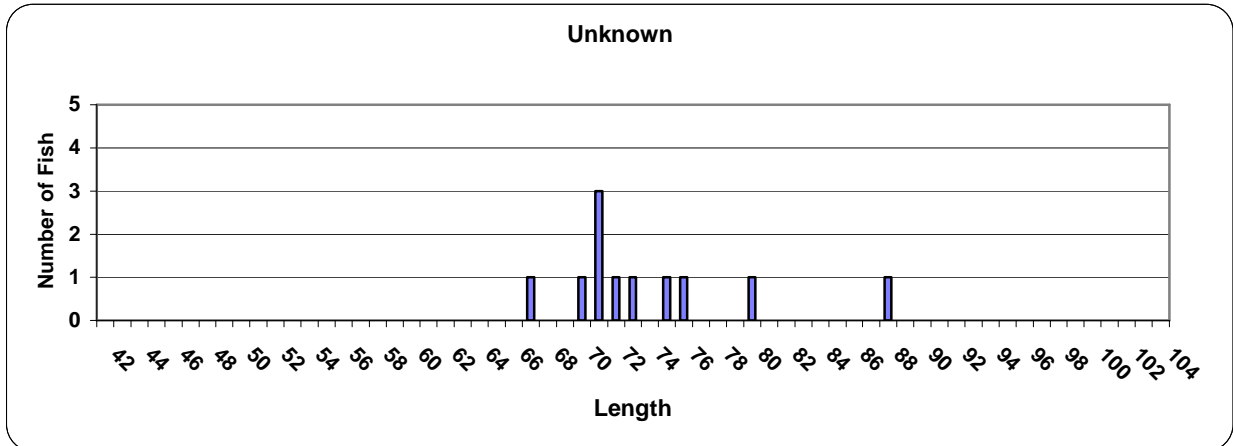
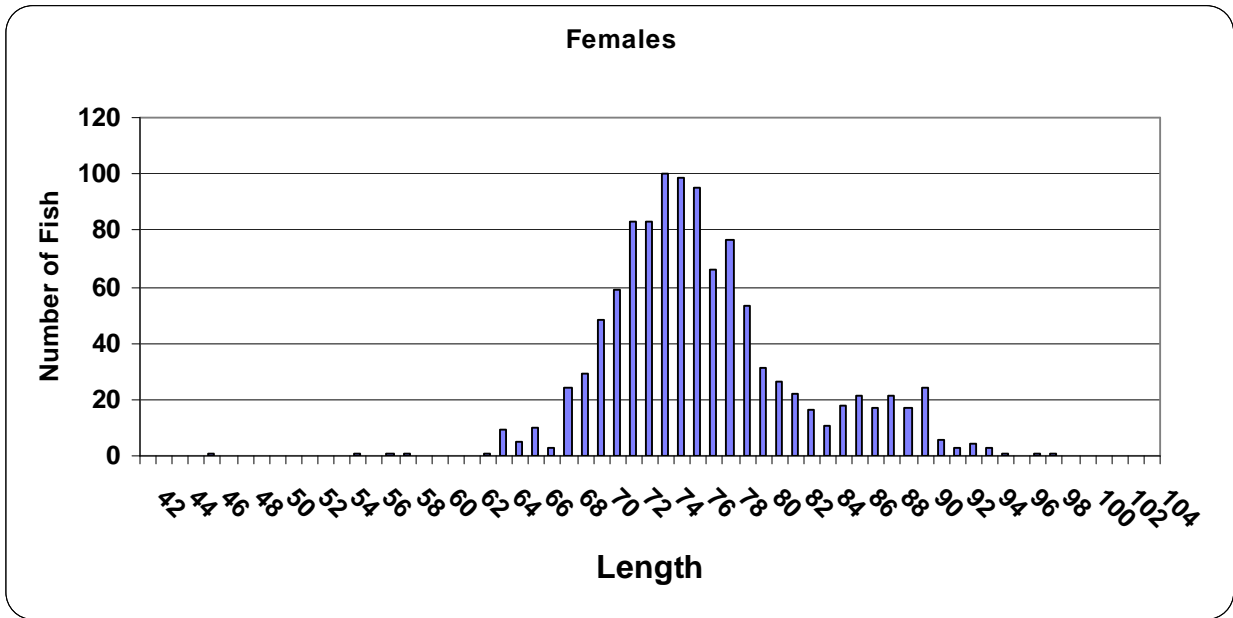
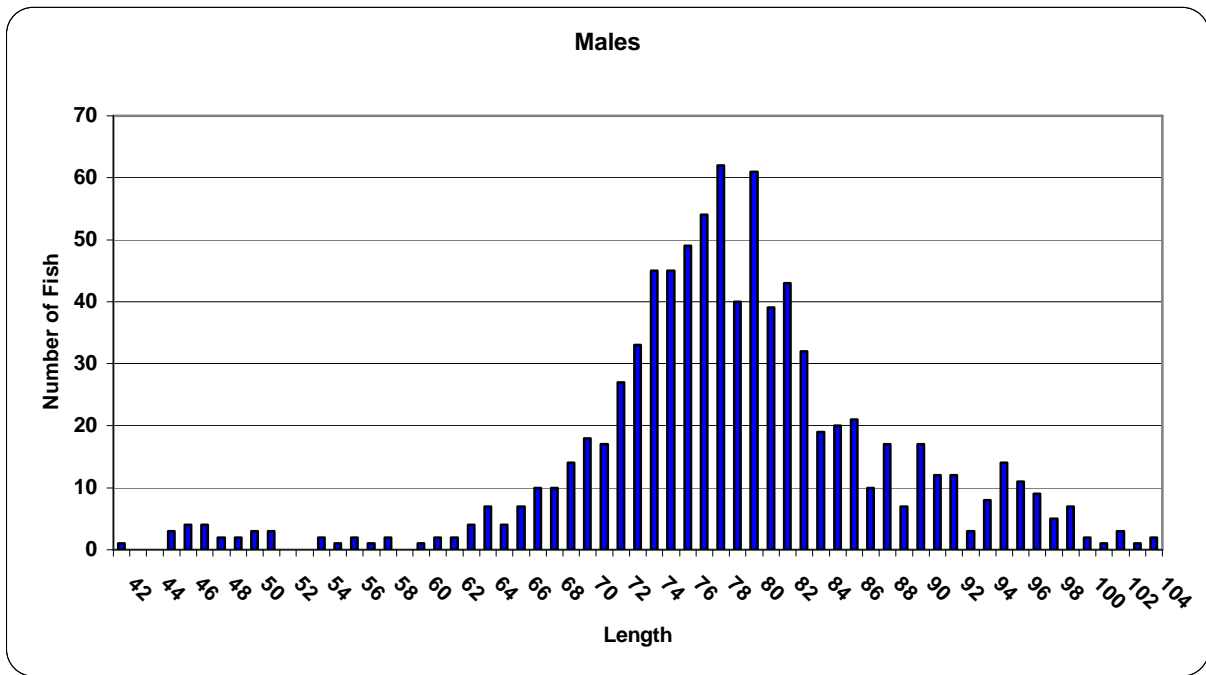


Appendix D2. South Fork (Red River/Crooked River) chinook length frequency.

Length	Males	Females	Unk	Total
42	1	0	0	1
43	0	0	0	0
44	0	0	0	0
45	3	0	0	3
46	4	1	0	5
47	4	0	0	4
48	2	0	0	2
49	2	0	0	2
50	3	0	0	3
51	3	0	0	3
52	0	0	0	0
53	0	0	0	0
54	2	0	0	2
55	1	1	0	2
56	2	0	0	2
57	1	1	0	2
58	2	1	0	3
59	0	0	0	0
60	1	0	0	1
61	2	0	0	2
62	2	0	0	2
63	4	1	0	5
64	7	9	0	16
65	4	5	0	9
66	7	10	0	17
67	10	3	1	14
68	10	24	0	34
69	14	29	0	43
70	18	48	1	67
71	17	59	3	79
72	27	83	1	111
73	33	83	1	117
74	45	100	0	145
75	45	99	1	145
76	49	95	1	145
77	54	66	0	120
78	62	77	0	139
79	40	53	0	93
80	61	31	1	93
81	39	26	0	65
82	43	22	0	65
83	32	16	0	48
84	19	11	0	30
85	20	18	0	38

Length	Males	Females	Unk	Total
86	21	21	0	42
87	10	17	0	27
88	17	21	1	39
89	7	17	0	24
90	17	24	0	41
91	12	6	0	18
92	12	3	0	15
93	3	4	0	7
94	8	3	0	11
95	14	1	0	15
96	11	0	0	11
97	9	1	0	10
98	5	1	0	6
99	7	0	0	7
100	2	0	0	2
101	1	0	0	1
102	3	0	0	3
103	1	0	0	1
104	2	0	0	2
TOTAL	857	1091	11	1959

Appendix D2a. South Fork (Red River / Crooked River) Length Frequency Graph.

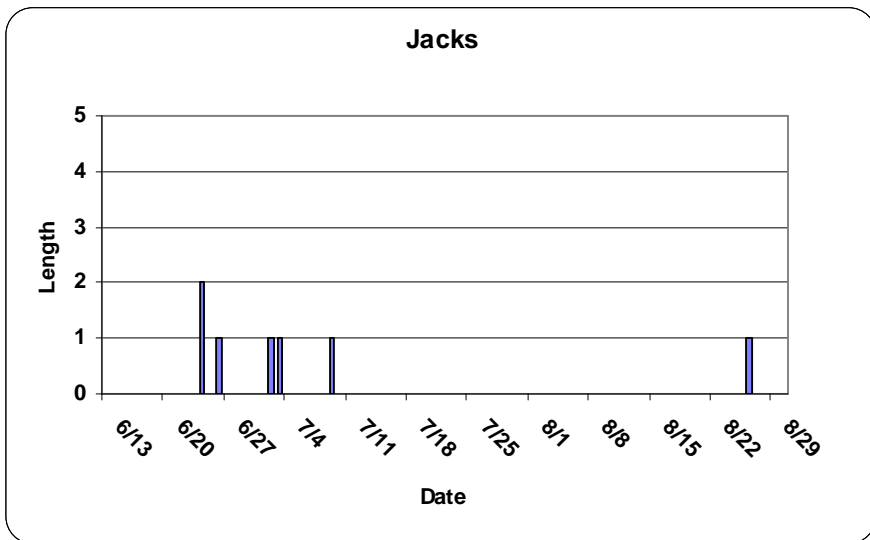
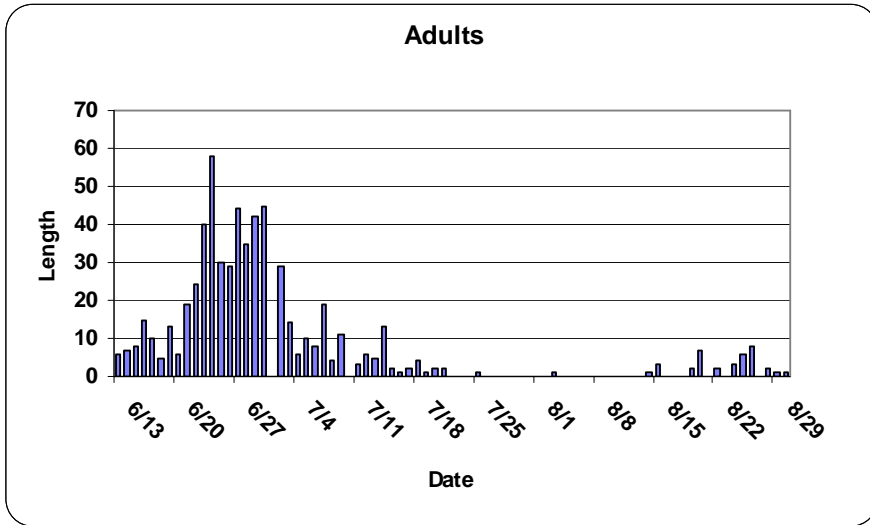


Appendix E1. Red River chinook run timing, 2002.

Date	Adult	Jack	Total
6/13	6	0	6
6/14	7	0	7
6/15	8	0	8
6/16	15	0	15
6/17	10	0	10
6/18	5	0	5
6/19	13	0	13
6/20	6	0	6
6/21	19	0	19
6/22	24	0	24
6/23	40	0	40
6/24	58	2	60
6/25	30	0	30
6/26	29	1	30
6/27	44	0	44
6/28	35	0	35
6/29	42	0	42
6/30	45	0	45
7/1	0	0	0
7/2	29	1	30
7/3	14	1	15
7/4	6	0	6
7/5	10	0	10
7/6	8	0	8
7/7	19	0	19
7/8	4	0	4
7/9	11	1	12
7/10	0	0	0
7/11	3	0	3
7/12	6	0	6
7/13	5	0	5
7/14	13	0	13
7/15	2	0	2
7/16	1	0	1
7/17	2	0	2
7/18	4	0	4
7/19	1	0	1
7/20	2	0	2
7/21	2	0	2
7/22	0	0	0
7/23	0	0	0
7/24	0	0	0
7/25	1	0	1
7/26	0	0	0

Date	Adult	Jack	Total
7/27	0	0	0
7/28	0	0	0
7/29	0	0	0
7/30	0	0	0
7/31	0	0	0
8/1	0	0	0
8/2	0	0	0
8/3	1	0	1
8/4	0	0	0
8/5	0	0	0
8/6	0	0	0
8/7	0	0	0
8/8	0	0	0
8/9	0	0	0
8/10	0	0	0
8/11	0	0	0
8/12	0	0	0
8/13	0	0	0
8/14	1	0	1
8/15	3	0	3
8/16	0	0	0
8/17	0	0	0
8/18	0	0	0
8/19	2	0	2
8/20	7	0	7
8/21	0	0	0
8/22	2	0	2
8/23	0	0	0
8/24	3	0	3
8/25	6	0	6
8/26	8	1	9
8/27	0	0	0
8/28	2	0	2
8/29	1	0	1
8/30	1	0	1
TOTAL			
L	616	7	623

Appendix E1a. Red River timing graph 2002.



Appendix E2. South Fork chinook summary of fish trapped, released, spawned and disposition of carcasses, Brood Year 2002.

TOTAL SOUTH FORK FISH TRAPPED:

Crooked River	1336
Red River	623
TOTAL	1959

AGE CLASSES	FEMALES	MALES	UNK	TOTAL
3 Years = (<64 cm)	5	39	0	44
4 Years = (64 - 82 cm)	922	585	10	1517
5 Years = (> 82 cm)	164	233	1	398
	1091	857	11	1959

FISH DISPOSITION FEMALES:

	Crooked River	Red River	CFH	TOTAL
MORTALITY	3	66	188	254
RELEASED	192	125	31	317
	TOTAL 195	TOTAL 254	TOTAL 642	1091

*This includes 15 females spawned by CFH personnel for NPT production

FISH DISPOSITION MALES:

	Crooked River	Red River	CFH	TOTAL
MORTALITY	7	26	88	121
RELEASED	194	151	0	345
	TOTAL 201	TOTAL 230	TOTAL 426	857

SEX UNKNOWN

Released Crooked R	3
Released Red R	8
TOTAL	11

TOTAL DISPOSITION

1959

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

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		
	Spr 2000	399,060								
		488,359								
1999	Fall 2000	105,507	37**	2002	334	2003		2004		
	Spr 2001	84,649								
		190,156								
2000	Fall 2001	155,887	156	2003		2004		2005		
	Spr 2002	726,489								
2001	Fall 2002	169,768		2004		2005		2006		
	Spr 2003	629,687								
2002	Fall 2003	234,361		2005		2006		2007		
	Spr 2004	750,317								

(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

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	Number		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		2002	222	2003		
	Spr 2000	159,051			494**					
		234,032								
1999	Fall 2000	68,684	7**	2002	40	2003		2004		
2000	Fall 2001	84,238	36	2003		2004		2005		
	Spr 2002	350,318								
2001	Fall 2002	85,064		2004		2005		2006		
	Spr 2003	351,066								
2002	Fall 2003	108,323		2005		2006		2007		
	Spr 2004	354,868								

(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

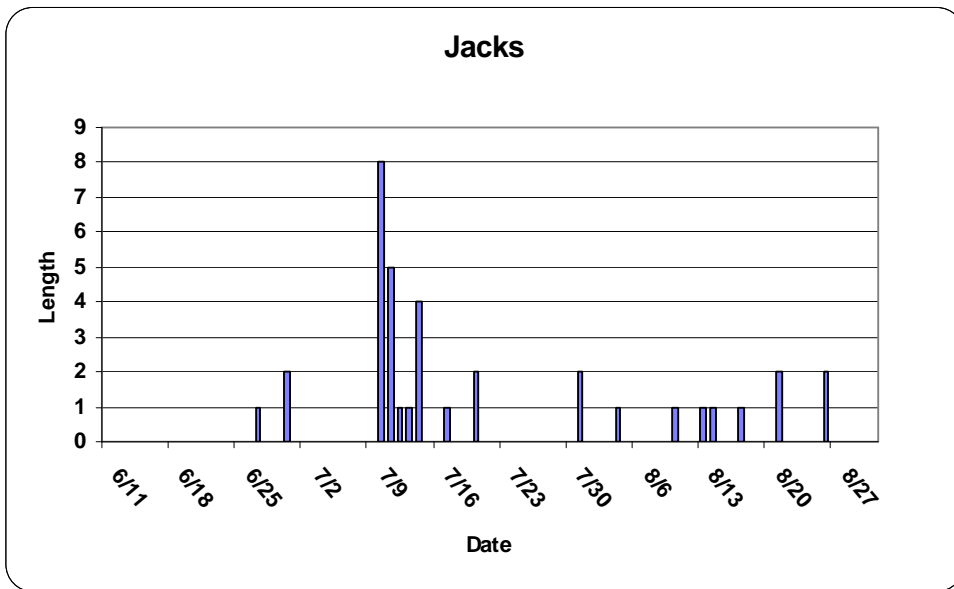
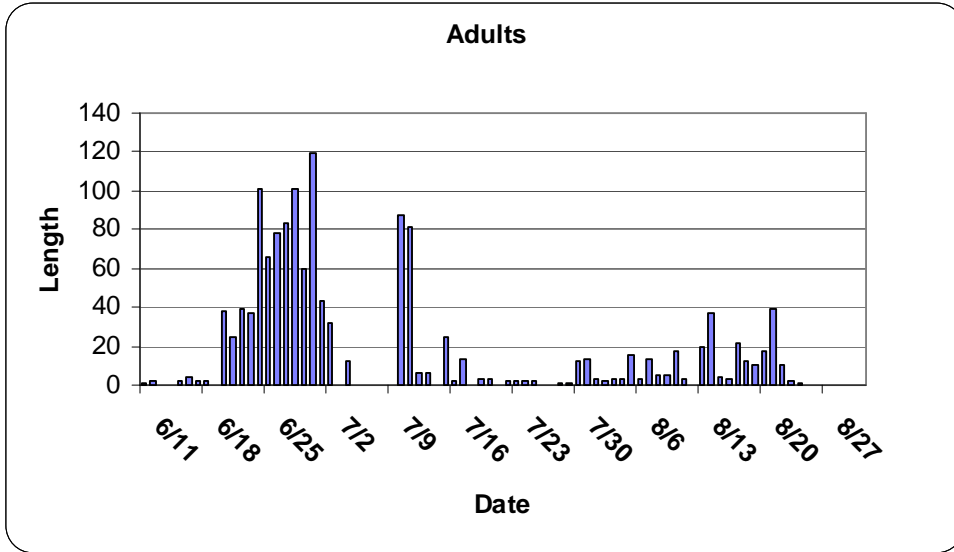
These numbers do not match run report numbers. Each one has been corrected to reflect straying from other stocks.

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

Appendix G1. Powell and Crooked Fork Creek Chinook Run Timing, 2002.

Date	Adult	Jack	Total	Date	Adult	Jack	Total
6/11	1	0	1	7/24	2	0	2
6/12	2	0	2	7/25	2	0	2
6/13	0	0	0	7/26	0	0	0
6/14	0	0	0	7/27	0	0	0
6/15	2	0	2	7/28	1	0	1
6/16	4	0	4	7/29	1	0	1
6/17	2	0	2	7/30	12	0	12
6/18	2	0	2	7/31	13	2	15
6/19	0	0	0	8/1	3	0	3
6/20	38	0	38	8/2	2	0	2
6/21	25	0	25	8/3	3	0	3
6/22	39	0	39	8/4	3	1	4
6/23	37	0	37	8/5	15	0	15
6/24	101	0	101	8/6	3	0	3
6/25	66	0	66	8/7	13	0	13
6/26	78	0	78	8/8	5	0	5
6/27	83	1	84	8/9	5	0	5
6/28	101	0	101	8/10	18	1	19
6/29	60	0	60	8/11	3	0	3
6/30	119	2	121	8/12	0	0	0
7/1	43	0	43	8/13	20	1	21
7/2	32	0	32	8/14	37	1	38
7/3	0	0	0	8/15	4	0	4
7/4	12	0	12	8/16	3	0	3
7/5	0	0	0	8/17	22	1	23
7/6	0	0	0	8/18	12	0	12
7/7	0	0	0	8/19	10	0	10
7/8	0	0	0	8/20	17	0	17
7/9	0	0	0	8/21	39	2	41
7/10	87	8	95	8/22	10	0	10
7/11	81	5	86	8/23	2	0	2
7/12	6	1	7	8/24	1	0	1
7/13	6	1	7	8/25	0	0	0
7/14	0	4	4	8/26	0	2	2
7/15	25	0	25	8/27	0	0	0
7/16	2	0	2	8/28	0	0	0
7/17	13	1	14	8/29	0	0	0
7/18	0	0	0	8/30	0	0	0
7/19	3	0	3	8/31	0	0	0
7/20	3	2	5	TOTAL	1358	36	1394
7/21	0	0	0				
7/22	2	0	2				
7/23	2	0	2				

Appendix G1a. Powell and Crooked Fork Creek Chinook Run Timing Graph, 2002.

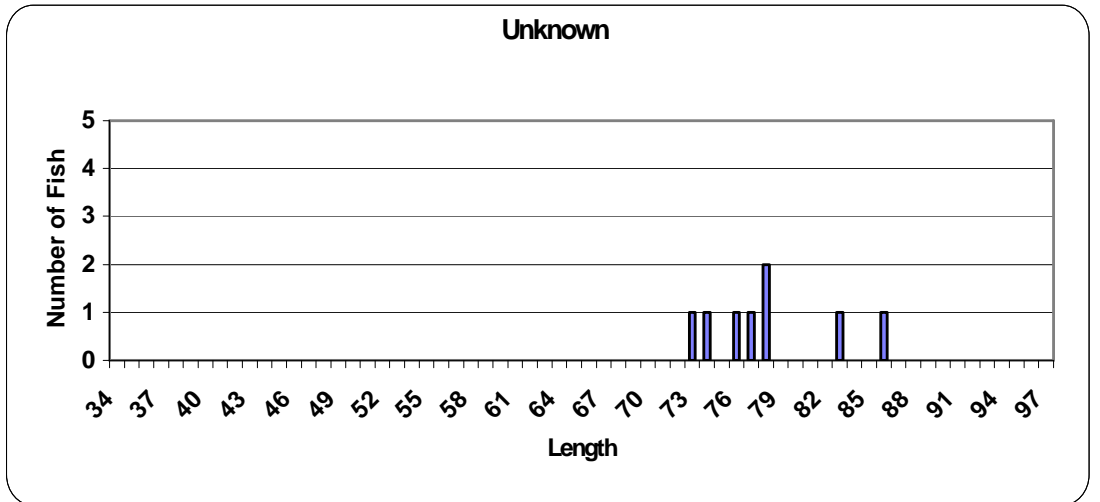
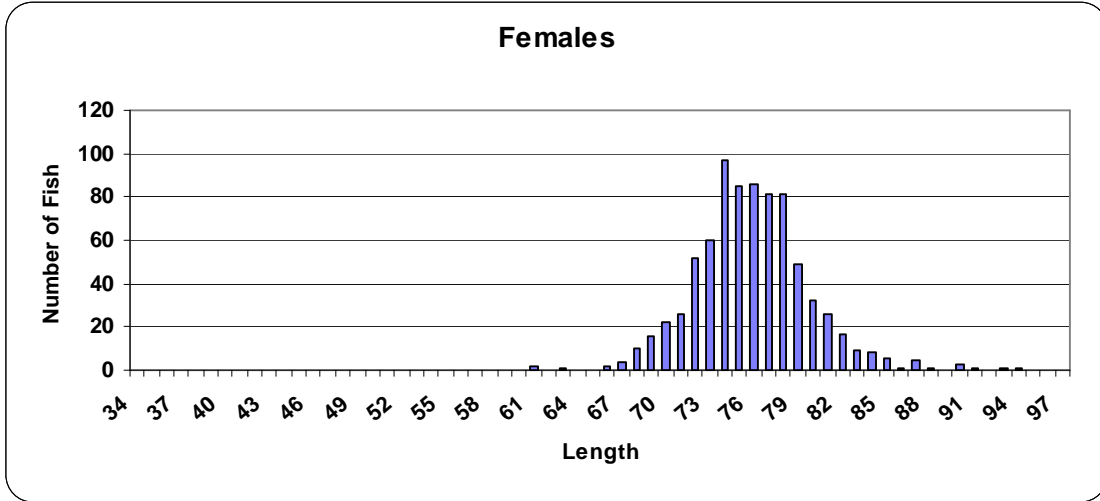
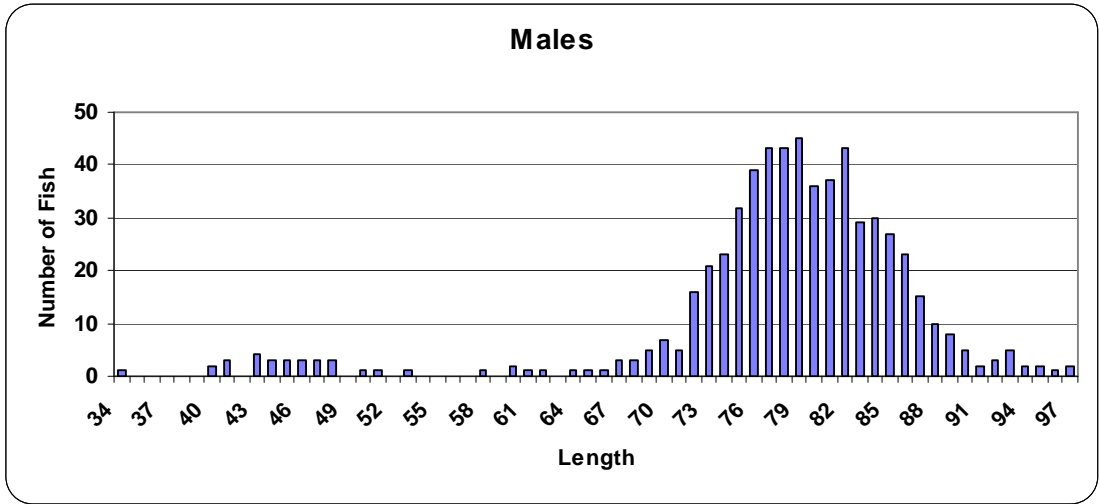


Appendix G2. Powell and Crooked Fork Creek chinook length frequency 2002.

Length	Males	Females	Unk	Total	Length	Males	Females	Unk	Total
34	1	0	0	1	83	29	9	1	39
35	0	0	0	0	84	30	8	0	38
36	0	0	0	0	85	27	6	0	33
37	0	0	0	0	86	23	1	1	25
38	0	0	0	0	87	15	5	0	20
39	0	0	0	0	88	10	1	0	11
40	2	0	0	2	89	8	0	0	8
41	3	0	0	3	90	5	3	0	8
42	0	0	0	0	91	2	1	0	3
43	4	0	0	4	92	3	0	0	3
44	3	0	0	3	93	5	1	0	6
45	3	0	0	3	94	2	1	0	3
46	3	0	0	3	95	2	0	0	2
47	3	0	0	3	96	1	0	0	1
48	3	0	0	3	97	2	0	0	2
49	0	0	0	0	TOTAL	601	785	8	1394
50	1	0	0	1					
51	1	0	0	1					
52	0	0	0	0					
53	1	0	0	1					
54	0	0	0	0					
55	0	0	0	0					
56	0	0	0	0					
57	0	0	0	0					
58	1	0	0	1					
59	0	0	0	0					
60	2	0	0	2					
61	1	2	0	3					
62	1	0	0	1					
63	0	1	0	1					
64	1	0	0	1					
65	1	0	0	1					
66	1	2	0	3					
67	3	4	0	7					
68	3	10	0	13					
69	5	16	0	21					
70	7	22	0	29					
71	5	26	0	31					
72	16	52	0	68					
73	21	60	1	82					
74	23	97	1	121					
75	32	85	0	117					
76	39	86	1	126					
77	43	81	1	125					
78	43	81	2	126					
79	45	49	0	94					
80	36	32	0	68					

81	37	26	0	63
82	43	17	0	60

Appendix G2a. Powell and Crooked Fork Creek Length Frequency, 2002.



Appendix G3. Powell Chinook summary of fish trapped, released,

**spawned and disposition of carcasses for Powell and Crooked
Fork adult traps, Brood Year 2002**

TOTAL FISH TRAPPED:	1296
Crooked Fork Creek:	<u>98</u>
TOTAL	1394

AGE CLASSES	FEMALES	MALES	UNKNOWN	TOTAL
3 Years = (<64 cm)	3	33	0	36
4 Years = (64 - 82 cm)	746	404	6	1156
5 Years = (> 83 cm)	36	164	2	202
TOTAL	784	601	8	1394

FISH DISPOSITION FEMALES:

SPAWNED	554
MORTALITY	22
KILLED/CULLED @ SPAWN	22
RELEASED	<u>187*</u>
TOTAL	785

*This includes 140 females spawned by CFH personnel for NPT.

FISH DISPOSITION MALES:

SPAWNED	371
MORTALITY	15
RELEASED	<u>215*</u>
TOTAL	601

*This includes 142 males spawned by CFH personnel for NPT (used for spawning first)

SEX UNKNOWN

RELEASED	8
TOTAL	<u>8</u>

TOTAL DISPOSITION 1394

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%
1990	Spr 1991 (c)	180,764								
	Fall 1991	358,400	8	1993	28	1994	1	1995	37	0.007%
	Spr 1992 (d)	150,800								
1991	Spr 1992 (e)	53,500								
	Fall 1992 (f)	562,700								
1991	Fall 1992 (f)	500	1	1994	1	1995	0	1996	2	0.400%
1992	Fall 1992 (g)									
	Spr 1994 (h)	144,823	12	1995	141	1996	129	1997	268	0.102%
	Spr 1994 (i)	61,060								
1993	Spr 1994 (j)	55,745								
		261,628								
	Fall 1994	311,690	45	1996	587	1997	310	1998	942	0.156%
1994	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	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								
1998		665,037								
	Spr 2000	293,522	78**	2001	1156**	2002	661**	2003	1895**	0.650%
1999	Spr 2001	212,648	36**	2002	788**	2003		2004		
2000	Fall 2001	559,630	129**	2003		2004		2005		
	Spr 2002	349,890								
2001	Fall 2002	526,733		2004		2005		2006		
	Spr 2003	350,665								
2002	Fall 2003	385,292		2005		2006		2007		
	Spr 2004	376,797								

(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 I. 2002 Chinook egg take and eye-up CFH.
(Saved in separate file)

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 B0	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	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 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

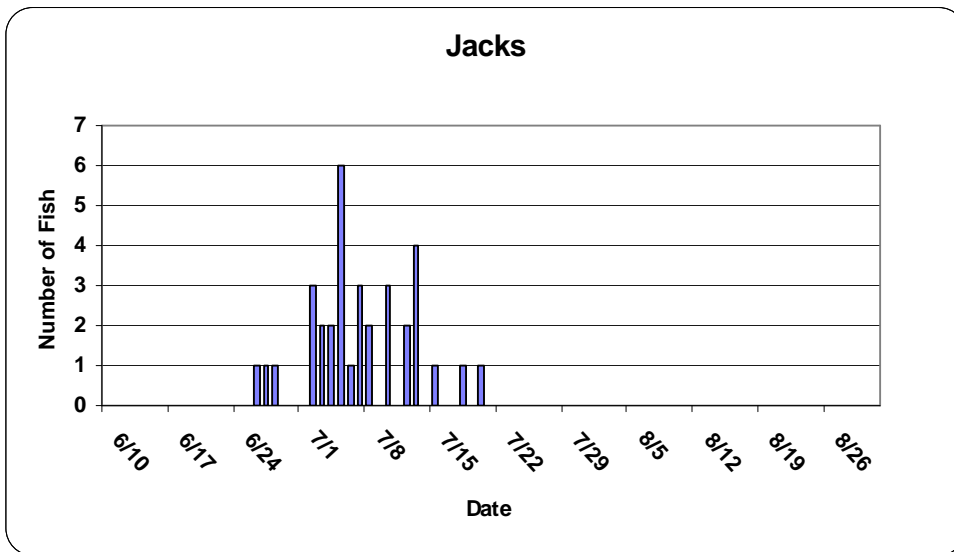
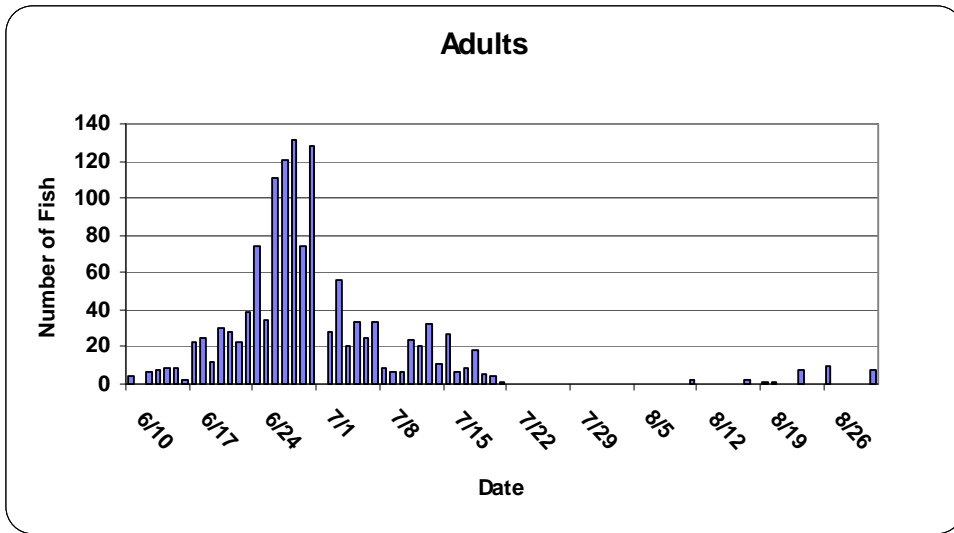
Numerical Entry = Detection at level indicated

MCL (numbers in parenthesis)= EPA maximum contaminant level

Appendix D1. Crooked River chinook run timing 2002.

Date	Adult	Jack	Total	Date	Adult	Jack	Total
6/10	4	0	4	7/24	0	0	0
6/11	0	0	0	7/25	0	0	0
6/12	6	0	6	7/26	0	0	0
6/13	8	0	8	7/27	0	0	0
6/14	9	0	9	7/28	0	0	0
6/15	9	0	9	7/29	0	0	0
6/16	2	0	2	7/30	0	0	0
6/17	23	0	23	7/31	0	0	0
6/18	25	0	25	8/1	0	0	0
6/19	12	0	12	8/2	0	0	0
6/20	30	0	30	8/3	0	0	0
6/21	28	0	28	8/4	0	0	0
6/22	23	0	23	8/5	0	0	0
6/23	39	0	39	8/6	0	0	0
6/24	74	0	74	8/7	0	0	0
6/25	35	0	35	8/8	0	0	0
6/26	111	1	112	8/9	0	0	0
6/27	121	1	122	8/10	0	0	0
6/28	131	1	132	8/11	2	0	2
6/29	74	0	74	8/12	0	0	0
6/30	128	0	128	8/13	0	0	0
7/1	0	0	0	8/14	0	0	0
7/2	28	3	31	8/15	0	0	0
7/3	56	2	58	8/16	0	0	0
7/4	21	2	23	8/17	2	0	2
7/5	33	6	39	8/18	0	0	0
7/6	25	1	26	8/19	1	0	1
7/7	33	3	36	8/20	1	0	1
7/8	9	2	11	8/21	0	0	0
7/9	6	0	6	8/22	0	0	0
7/10	7	3	10	8/23	8	0	8
7/11	24	0	24	8/24	0	0	0
7/12	21	2	23	8/25	0	0	0
7/13	32	4	36	8/26	10	0	10
7/14	11	0	11	8/27	0	0	0
7/15	27	1	28	8/28	0	0	0
7/16	6	0	6	8/29	0	0	0
7/17	9	0	9	8/30	0	0	0
7/18	18	1	19	8/31	8	0	8
7/19	5	0	5	TOTAL	1301	35	1336
7/20	4	1	5				
7/21	1	0	1				
7/22	1	0	1				
7/23	0	1	1				

Appendix D1a. Crooked River run timing graph 2002.

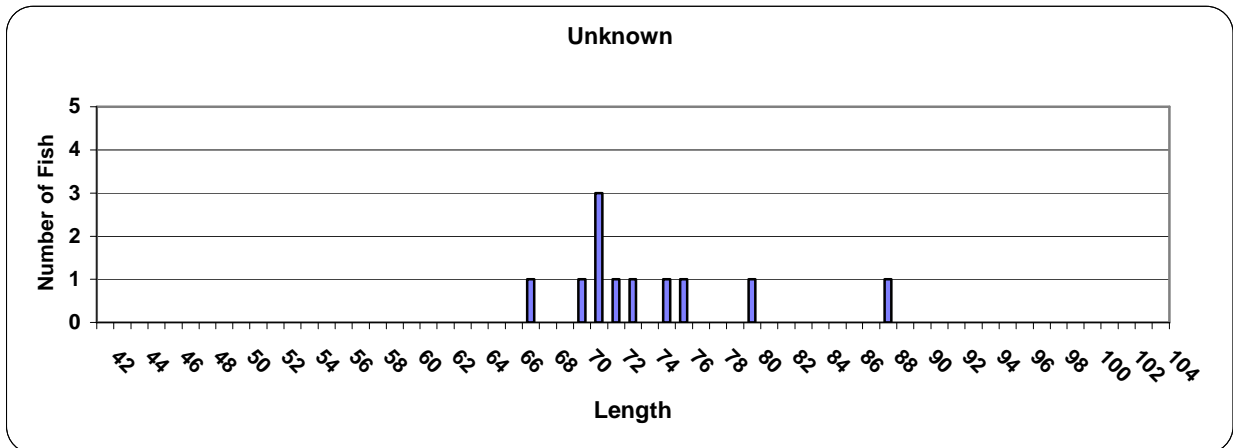
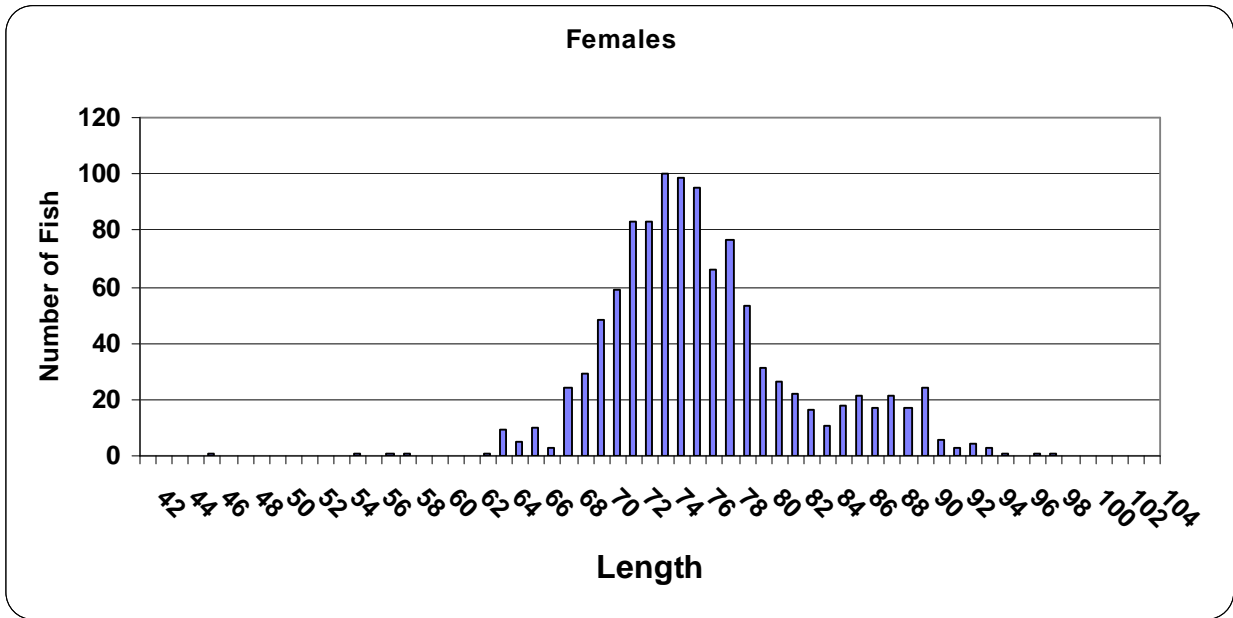
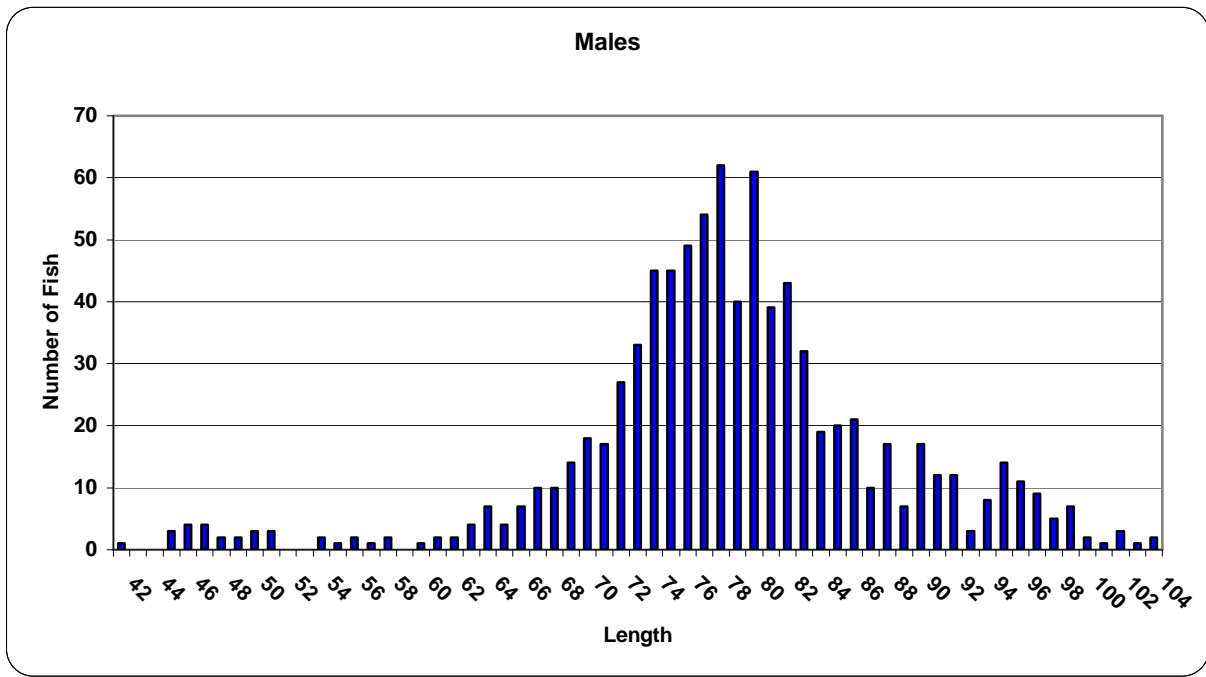


Appendix D2. South Fork (Red River/Crooked River) chinook length frequency.

Length	Males	Females	Unk	Total
42	1	0	0	1
43	0	0	0	0
44	0	0	0	0
45	3	0	0	3
46	4	1	0	5
47	4	0	0	4
48	2	0	0	2
49	2	0	0	2
50	3	0	0	3
51	3	0	0	3
52	0	0	0	0
53	0	0	0	0
54	2	0	0	2
55	1	1	0	2
56	2	0	0	2
57	1	1	0	2
58	2	1	0	3
59	0	0	0	0
60	1	0	0	1
61	2	0	0	2
62	2	0	0	2
63	4	1	0	5
64	7	9	0	16
65	4	5	0	9
66	7	10	0	17
67	10	3	1	14
68	10	24	0	34
69	14	29	0	43
70	18	48	1	67
71	17	59	3	79
72	27	83	1	111
73	33	83	1	117
74	45	100	0	145
75	45	99	1	145
76	49	95	1	145
77	54	66	0	120
78	62	77	0	139
79	40	53	0	93
80	61	31	1	93
81	39	26	0	65
82	43	22	0	65
83	32	16	0	48
84	19	11	0	30
85	20	18	0	38

Length	Males	Females	Unk	Total
86	21	21	0	42
87	10	17	0	27
88	17	21	1	39
89	7	17	0	24
90	17	24	0	41
91	12	6	0	18
92	12	3	0	15
93	3	4	0	7
94	8	3	0	11
95	14	1	0	15
96	11	0	0	11
97	9	1	0	10
98	5	1	0	6
99	7	0	0	7
100	2	0	0	2
101	1	0	0	1
102	3	0	0	3
103	1	0	0	1
104	2	0	0	2
TOTAL	857	1091	11	1959

Appendix D2a. South Fork (Red River / Crooked River) Length Frequency Graph.

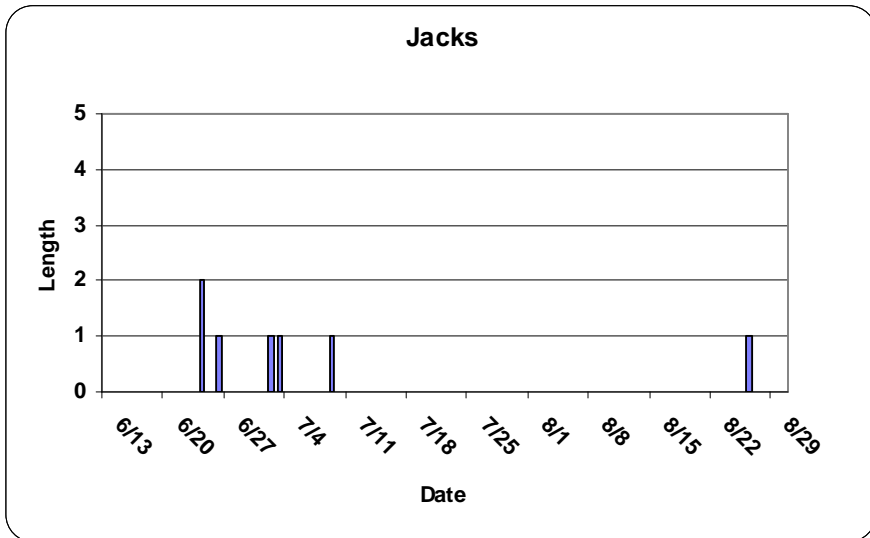
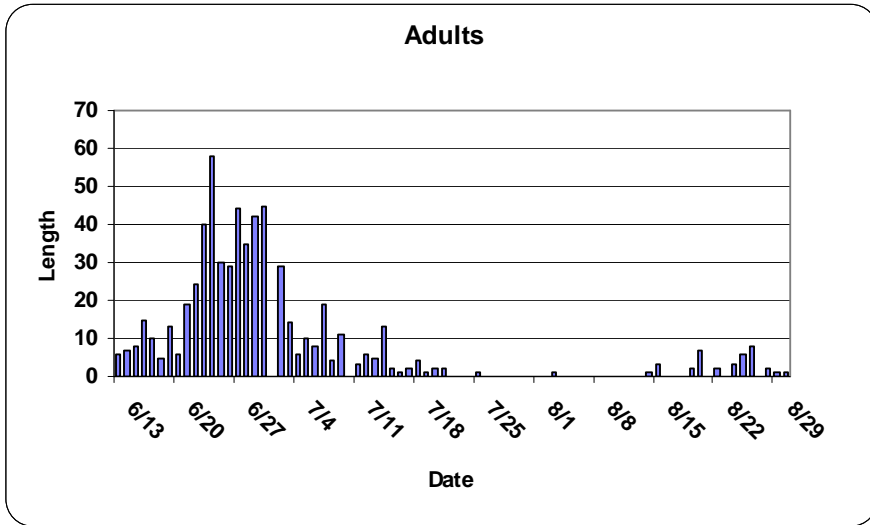


Appendix E1. Red River chinook run timing, 2002.

Date	Adult	Jack	Total
6/13	6	0	6
6/14	7	0	7
6/15	8	0	8
6/16	15	0	15
6/17	10	0	10
6/18	5	0	5
6/19	13	0	13
6/20	6	0	6
6/21	19	0	19
6/22	24	0	24
6/23	40	0	40
6/24	58	2	60
6/25	30	0	30
6/26	29	1	30
6/27	44	0	44
6/28	35	0	35
6/29	42	0	42
6/30	45	0	45
7/1	0	0	0
7/2	29	1	30
7/3	14	1	15
7/4	6	0	6
7/5	10	0	10
7/6	8	0	8
7/7	19	0	19
7/8	4	0	4
7/9	11	1	12
7/10	0	0	0
7/11	3	0	3
7/12	6	0	6
7/13	5	0	5
7/14	13	0	13
7/15	2	0	2
7/16	1	0	1
7/17	2	0	2
7/18	4	0	4
7/19	1	0	1
7/20	2	0	2
7/21	2	0	2
7/22	0	0	0
7/23	0	0	0
7/24	0	0	0
7/25	1	0	1
7/26	0	0	0

Date	Adult	Jack	Total
7/27	0	0	0
7/28	0	0	0
7/29	0	0	0
7/30	0	0	0
7/31	0	0	0
8/1	0	0	0
8/2	0	0	0
8/3	1	0	1
8/4	0	0	0
8/5	0	0	0
8/6	0	0	0
8/7	0	0	0
8/8	0	0	0
8/9	0	0	0
8/10	0	0	0
8/11	0	0	0
8/12	0	0	0
8/13	0	0	0
8/14	1	0	1
8/15	3	0	3
8/16	0	0	0
8/17	0	0	0
8/18	0	0	0
8/19	2	0	2
8/20	7	0	7
8/21	0	0	0
8/22	2	0	2
8/23	0	0	0
8/24	3	0	3
8/25	6	0	6
8/26	8	1	9
8/27	0	0	0
8/28	2	0	2
8/29	1	0	1
8/30	1	0	1
TOTAL			
L	616	7	623

Appendix E1a. Red River timing graph 2002.



Appendix E2. South Fork chinook summary of fish trapped, released, spawned and disposition of carcasses, Brood Year 2002.

TOTAL SOUTH FORK FISH TRAPPED:

Crooked River	1336
Red River	<u>623</u>
TOTAL	1959

AGE CLASSES	FEMALES	MALES	UNK	TOTAL
3 Years = (<64 cm)	5	39	0	44
4 Years = (64 - 82 cm)	922	585	10	1517
5 Years = (> 82 cm)	164	233	1	398
	1091	857	11	1959

FISH DISPOSITION FEMALES:

	Crooked River	Red River	CFH	TOTAL
MORTALITY	3	66	188	254
RELEASED	192	125	31	317
	<u>195</u>	<u>254</u>	<u>642</u>	<u>1091</u>
	TOTAL	TOTAL	TOTAL	TOTAL

*This includes 15 females spawned by CFH personnel for NPT production

FISH DISPOSITION MALES:

	Crooked River	Red River	CFH	TOTAL
MORTALITY	7	26	88	121
RELEASED	194	151	0	345
	<u>201</u>	<u>230</u>	<u>426</u>	<u>857</u>
	TOTAL	TOTAL	TOTAL	TOTAL

SEX UNKNOWN

Released Crooked R	3
Released Red R	<u>8</u>
TOTAL	11

TOTAL DISPOSITION **1959**

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

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		
	Spr 2000	399,060								
		488,359								
1999	Fall 2000	105,507	37**	2002	334	2003		2004		
	Spr 2001	84,649								
		190,156								
2000	Fall 2001	155,887	156	2003		2004		2005		
	Spr 2002	726,489								
2001	Fall 2002	169,768		2004		2005		2006		
	Spr 2003	629,687								
2002	Fall 2003	234,361		2005		2006		2007		
	Spr 2004	750,317								

(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

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	Number	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		2002	222	2003		
	Spr 2000	159,051			494**					
		234,032								
1999	Fall 2000	68,684	7**	2002	40	2003		2004		
2000	Fall 2001	84,238	36	2003		2004		2005		
	Spr 2002	350,318								
2001	Fall 2002	85,064		2004		2005		2006		
	Spr 2003	351,066								
2002	Fall 2003	108,323		2005		2006		2007		
	Spr 2004	354,868								

(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

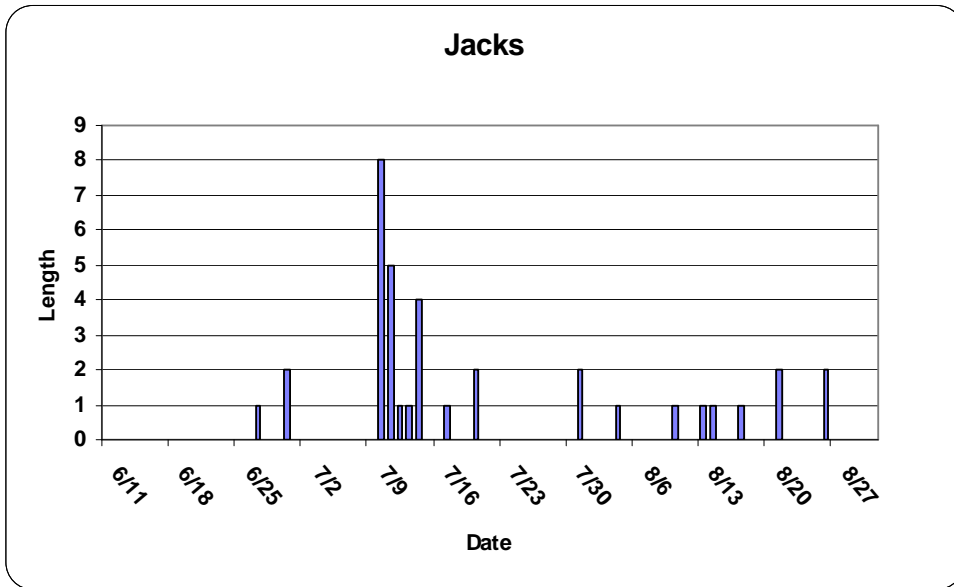
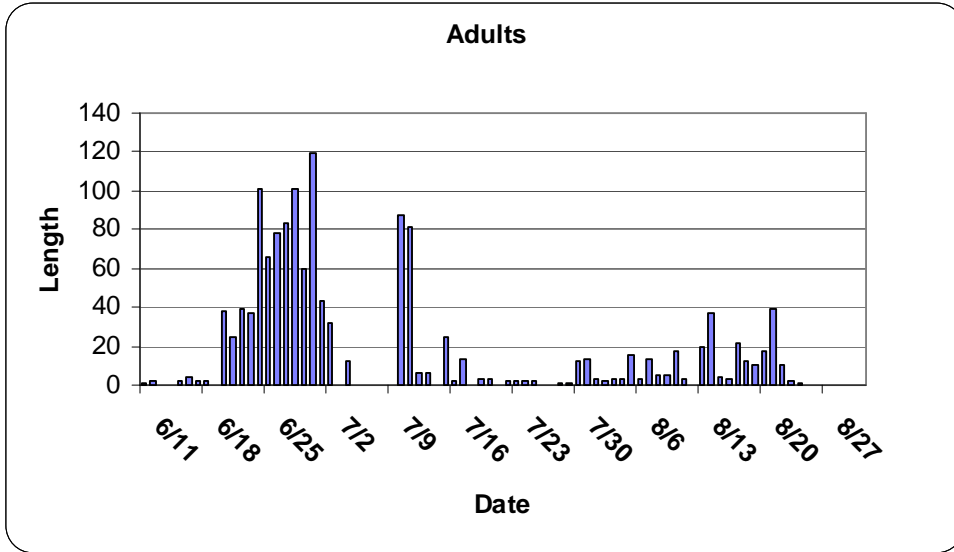
These numbers do not match run report numbers. Each one has been corrected to reflect straying from other stocks.

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

Appendix G1. Powell and Crooked Fork Creek Chinook Run Timing, 2002.

Date	Adult	Jack	Total	Date	Adult	Jack	Total
6/11	1	0	1	7/24	2	0	2
6/12	2	0	2	7/25	2	0	2
6/13	0	0	0	7/26	0	0	0
6/14	0	0	0	7/27	0	0	0
6/15	2	0	2	7/28	1	0	1
6/16	4	0	4	7/29	1	0	1
6/17	2	0	2	7/30	12	0	12
6/18	2	0	2	7/31	13	2	15
6/19	0	0	0	8/1	3	0	3
6/20	38	0	38	8/2	2	0	2
6/21	25	0	25	8/3	3	0	3
6/22	39	0	39	8/4	3	1	4
6/23	37	0	37	8/5	15	0	15
6/24	101	0	101	8/6	3	0	3
6/25	66	0	66	8/7	13	0	13
6/26	78	0	78	8/8	5	0	5
6/27	83	1	84	8/9	5	0	5
6/28	101	0	101	8/10	18	1	19
6/29	60	0	60	8/11	3	0	3
6/30	119	2	121	8/12	0	0	0
7/1	43	0	43	8/13	20	1	21
7/2	32	0	32	8/14	37	1	38
7/3	0	0	0	8/15	4	0	4
7/4	12	0	12	8/16	3	0	3
7/5	0	0	0	8/17	22	1	23
7/6	0	0	0	8/18	12	0	12
7/7	0	0	0	8/19	10	0	10
7/8	0	0	0	8/20	17	0	17
7/9	0	0	0	8/21	39	2	41
7/10	87	8	95	8/22	10	0	10
7/11	81	5	86	8/23	2	0	2
7/12	6	1	7	8/24	1	0	1
7/13	6	1	7	8/25	0	0	0
7/14	0	4	4	8/26	0	2	2
7/15	25	0	25	8/27	0	0	0
7/16	2	0	2	8/28	0	0	0
7/17	13	1	14	8/29	0	0	0
7/18	0	0	0	8/30	0	0	0
7/19	3	0	3	8/31	0	0	0
7/20	3	2	5	TOTAL	1358	36	1394
7/21	0	0	0				
7/22	2	0	2				
7/23	2	0	2				

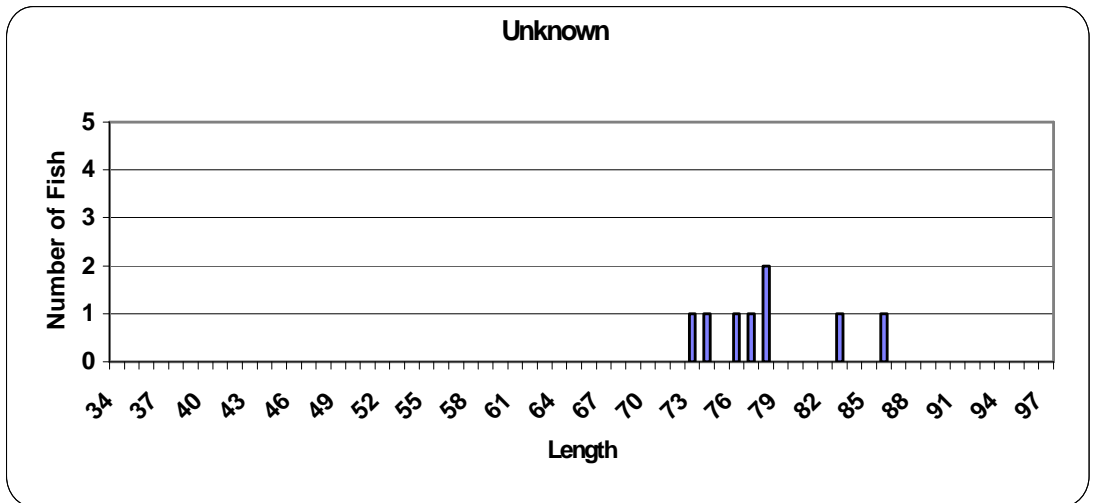
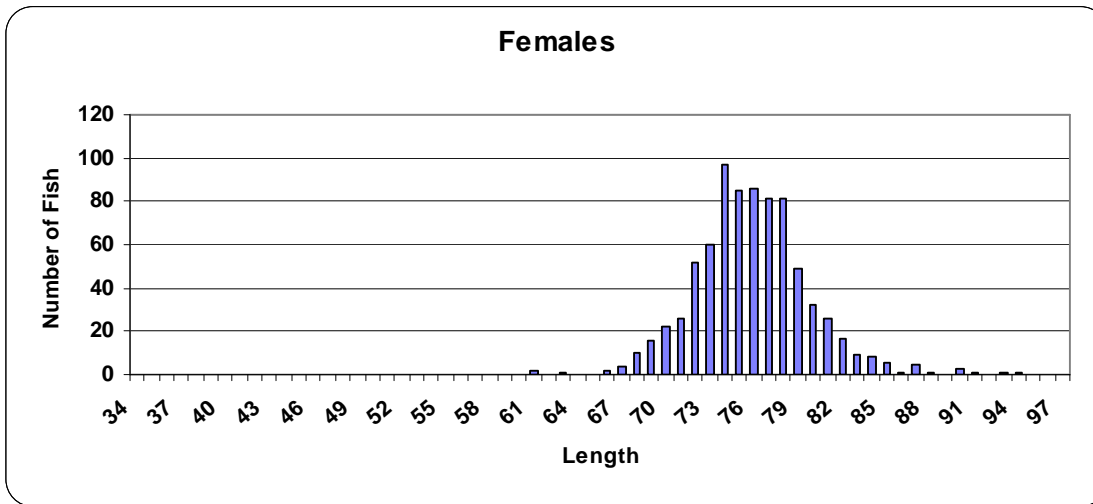
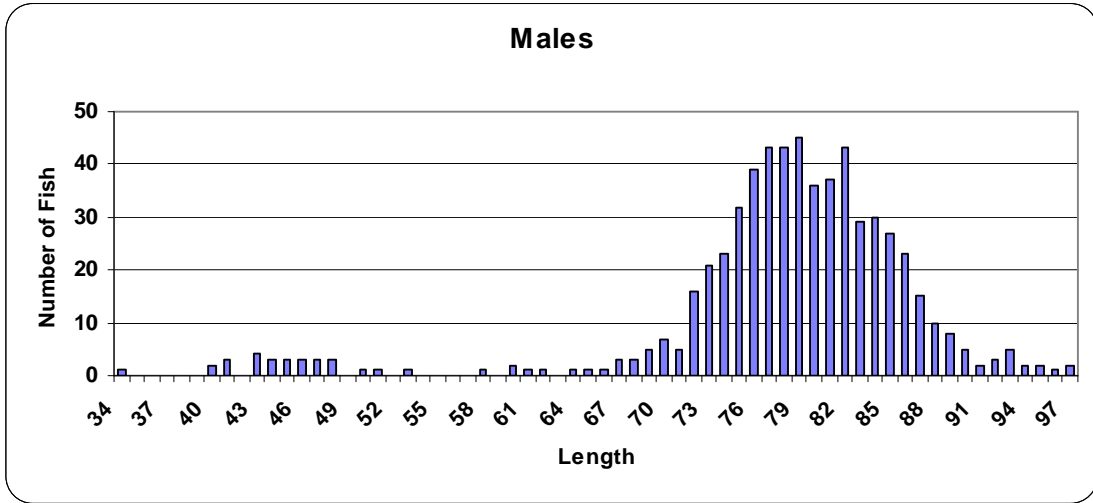
Appendix G1a. Powell and Crooked Fork Creek Chinook Run Timing Graph, 2002.



Appendix G2. Powell and Crooked Fork Creek chinook length frequency 2002.

Length	Males	Females	Unk	Total	Length	Males	Females	Unk	Total
34	1	0	0	1	83	29	9	1	39
35	0	0	0	0	84	30	8	0	38
36	0	0	0	0	85	27	6	0	33
37	0	0	0	0	86	23	1	1	25
38	0	0	0	0	87	15	5	0	20
39	0	0	0	0	88	10	1	0	11
40	2	0	0	2	89	8	0	0	8
41	3	0	0	3	90	5	3	0	8
42	0	0	0	0	91	2	1	0	3
43	4	0	0	4	92	3	0	0	3
44	3	0	0	3	93	5	1	0	6
45	3	0	0	3	94	2	1	0	3
46	3	0	0	3	95	2	0	0	2
47	3	0	0	3	96	1	0	0	1
48	3	0	0	3	97	2	0	0	2
49	0	0	0	0	TOTAL	601	785	8	1394
50	1	0	0	1					
51	1	0	0	1					
52	0	0	0	0					
53	1	0	0	1					
54	0	0	0	0					
55	0	0	0	0					
56	0	0	0	0					
57	0	0	0	0					
58	1	0	0	1					
59	0	0	0	0					
60	2	0	0	2					
61	1	2	0	3					
62	1	0	0	1					
63	0	1	0	1					
64	1	0	0	1					
65	1	0	0	1					
66	1	2	0	3					
67	3	4	0	7					
68	3	10	0	13					
69	5	16	0	21					
70	7	22	0	29					
71	5	26	0	31					
72	16	52	0	68					
73	21	60	1	82					
74	23	97	1	121					
75	32	85	0	117					
76	39	86	1	126					
77	43	81	1	125					
78	43	81	2	126					
79	45	49	0	94					
80	36	32	0	68					
81	37	26	0	63					
82	43	17	0	60					

Appendix G2a. Powell and Crooked Fork Creek Length Frequency, 2002.



Appendix G3. Powell Chinook summary of fish trapped, released, spawned and disposition of carcasses for Powell and Crooked Fork adult traps, Brood Year 2002

TOTAL FISH TRAPPED:	1296
Crooked Fork Creek:	<u>98</u>
TOTAL	1394

AGE CLASSES	FEMALES	MALES	UNKNOWN	TOTAL
3 Years = (<64 cm)	3	33	0	36
4 Years = (64 - 82 cm)	746	404	6	1156
5 Years = (> 83 cm)	36	164	2	202
TOTAL	784	601	8	1394

FISH DISPOSITION FEMALES:

SPAWNED	554
MORTALITY	22
KILLED/CULLED @ SPAWN	22
RELEASED	<u>187*</u>
TOTAL	785

*This includes 140 females spawned by CFH personnel for NPT.

FISH DISPOSITION MALES:

SPAWNED	371
MORTALITY	15
RELEASED	<u>215*</u>
TOTAL	601

*This includes 142 males spawned by CFH personnel for NPT (used for spawning first)

SEX UNKNOWN

RELEASED	8
TOTAL	<u><u>8</u></u>

TOTAL DISPOSITION **1394**

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%
1990	Spr 1991 (c)	180,764								
	Fall 1991	358,400	8	1993	28	1994	1	1995	37	0.007%
	Spr 1992 (d)	150,800								
1991	Spr 1992 (e)	53,500								
	Fall 1992 (f)	562,700								
1991	Fall 1992 (f)	500	1	1994	1	1995	0	1996	2	0.400%
1992	Fall 1992 (g)									
	Spr 1994 (h)	144,823	12	1995	141	1996	129	1997	268	0.102%
	Spr 1994 (i)	61,060								
1993	Spr 1994 (j)	55,745								
		261,628								
	Fall 1994	311,690	45	1996	587	1997	310	1998	942	0.156%
1994	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	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								
1998		665,037								
	Spr 2000	293,522	78**	2001	1156**	2002	661**	2003	1895**	0.650%
1999	Spr 2001	212,648	36**	2002	788**	2003		2004		
2000	Fall 2001	559,630	129**	2003		2004		2005		
	Spr 2002	349,890								
2001	Fall 2002	526,733		2004		2005		2006		
	Spr 2003	350,665								
2002	Fall 2003	385,292		2005		2006		2007		
	Spr 2004	376,797								

(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 I. 2002 Chinook egg take and eye-up CFH.
(Saved in

separate

file)

Appendix J. Production cost for BY-02 Chinook and BY-03 North Fork Steelhead.

Rearing to Release:

	CHINOOK BY-02	North Fork Steelhead BY-03
Number Produced	2,421,106	1,062,075
Weight	129,347	238,896
% Mortality (From eyed eggs)	3.88%	28.3%
Conversion Rate	1.18	1.05

FOOD FED AND WEIGHT GAINED

	Chinook (BY-02)	North Fork Steelhead (BY-03)
Period Fed	December 2002-March 2004	May 2003-April 2004
Feed Used lbs.	152,463	252,158
Weight Gain	129,347	238,896
Feed Cost	\$155,797.63	\$130,347.72

Total Feed Cost

Total Budget (-) C.O.

Average Cost per pound only

Chinook: \$1.20

For rearing of BY02CH

Steelhead: \$0.55

For rearing of BY03SH

* Includes Nez Perce Tribe's food fed.

** Does not include Nez Perce Tribe's expenditures for feed.

Cost Per 1,000 fish using entire budget

Chinook \$ 181.00

Steelhead \$ 526.00

Combined \$ 286.00

Appendix K1. Crooked River Brood Year 2002 chinook, summary of fish autopsy, fall 2003 release

Summary of Fish Autopsy

ACCESSION NO: 03-370 LOCATION: CrR
 SPECIES: sc AUTOPSY DATE: 9/11/2003
 STRAIN: CR 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	47.88	1.30	0.03
LEUCOCRIT	0.00	0.00	0.00
SERUM PROTEIN	6.89	0.26	0.04

*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	20	0	20
B1	0	F	0	S	0	1	0	1	0	R	20	1	0	S	0	B	0	1	0
B2	0	C	0	L	0	2	0	2	5	G	0	2	0	M	0	C	0	2	0
E1	0	M	0	S&L	0			3	9	NO	0			G	0	D	0	3	0
E2	0	P	0	I	0	Mean=0.00		4	5	E	0	Mean=0.00		U	0	E	0		
H1	0	OT	0	OT	0					OT	0			T	0	F	0	Mean=0.00	
H2	0			O	0			Mean=3.25								OT	0		
M1	0																		
OT	0																		

SUMMARY OF NORMALS

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

GENERAL REMARKS:

FINS: GONADS:
 SKIN: OTHER:

Appendix K2. Crooked River Brood Year 2002 spring chinook summary of fish autopsy, spring 2004 releases

Summary of Fish Autopsy

ACCESSION NO: 04-140 LOCATION: CLW
 SPECIES: sc AUTOPSY DATE: 2/26/2004
 STRAIN: CR 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	44.54	3.75	0.08
LEUCOCRIT	0.00	0.00	0.00
SERUM PROTEIN	6.86	1.26	0.18

*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	20	0	20
B1	0	F	0	S	0	1	0	1	0	R	20	1	0	S	0	B	0	1	0
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	18	NO	0			G	0	D	0	3	0
E2	0	P	0	I	0	Mean=0.00		4	1	E	0	Mean=0.00		U	0	E	0		
H1	0	OT	0	OT	0					OT	0			T	0	F	0	Mean=0.00	
H2	0			O	0			Mean=3.0								OT	0		
M1	0																		
OT	0																		

SUMMARY OF NORMALS

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

GENERAL REMARKS:

FINS:

GONADS:

SKIN:

OTHER: Fish at 16.5 FPP

Appendix K3. Powell Brood Year 2002 chinook, summary of fish autopsy, fall 2003 release

Summary of Fish Autopsy

ACCESSION NO: 03-371 LOCATION: pow
 SPECIES: sc AUTOPSY DATE: 9/11/2003
 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	47.00	1.40	0.03
LEUCOCRIT	0.00	0.00	0.00
SERUM PROTEIN	6.20	1.60	0.26

*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	20	0	20
B1	0	F	0	S	0	1	0	1	0	R	20	1	0	S	0	B	0	1	0
B2	0	C	0	L	0	2	0	2	5	G	0	2	0	M	0	C	0	2	0
E1	0	M	0	S&L	0			3	8	NO	0			G	0	D	0	3	0
E2	0	P	0	I	0	Mean=0.00		4	7	E	0	Mean=0.00		U	0	E	0		
H1	0	OT	0	OT	0					OT	0			T	0	F	0	Mean=0.00	
H2	0			O	0			Mean=3.1								OT	0		
M1	0																		
OT	0																		

SUMMARY OF NORMALS

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

GENERAL REMARKS:

FINS:

GONADS:

SKIN:

OTHER:

Appendix K4. Powell Brood Year 2002 chinook, summary of fish autopsy, spring 2004 release

Summary of Fish Autopsy

ACCESSION NO: 04/142 LOCATION: POW
 SPECIES: SC AUTOPSY DATE: 3/27/2004
 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	44.40	4.08	0.09
LEUCOCRIT	0.00	0.00	0.00
SERUM PROTEIN	7.57	1.12	0.15

*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	19	0	20
B1	0	F	0	S	0	1	0	1	0	R	20	1	0	S	0	B	0	1	0
B2	0	C	0	L	0	2	0	2	1	G	0	2	0	M	0	C	1	2	0
E1	0	M	0	S&L	0			3	16	NO	0			G	0	D	0	3	0
E2	0	P	0	I	0	Mean=0.00		4	3	E	0	Mean=0.00		U	0	E	0		
H1	0	OT	0	OT	0					OT	0			T	0	F	0	Mean=0.00	
H2	0			O	0			Mean=3.1								OT	0		
M1	0																		
OT	0																		

SUMMARY OF NORMALS

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

GENERAL REMARKS:

FINS:

GONADS:

SKIN:

OTHER: Fish at 16.0 FPP

Appendix K5. Red River Brood Year 2002 summary of fish autopsy, fall 2003 release

Summary of Fish Autopsy

ACCESSION NO: 02-467 LOCATION: RdR
 SPECIES: sc AUTOPSY DATE: 9/18/2003
 STRAIN: SF 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	49.20	0.44	0.23
LEUCOCRIT	0.00	0.00	0.00
SERUM PROTEIN	6.50	1.00	0.11

*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	20	0	0
B1	0	F	0	S	0	1	0	1	0	R	20	1	0	S	0	B	0	1	0
B2	0	C	0	L	0	2	0	2	3	G	0	2	0	M	0	C	0	2	0
E1	0	M	0	S&L	0			3	10	NO	0			G	0	D	0	3	0
E2	0	P	0	I	0	Mean=0.00		4	7	E	0	Mean=0.00		U	0	E	0		
H1	0	OT	0	OT	0					OT	0			T	0	F	0	Mean=0.00	
H2	0			O	0			Mean=3.2								OT	0		
M1	0																		
OT	0																		

SUMMARY OF NORMALS

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

GENERAL REMARKS:

FINS: GONADS:
 SKIN: OTHER:

Appendix K6. Red River Brood Year 2002 spring chinook summary of fish autopsy, spring 2004 release

Summary of Fish Autopsy

ACCESSION NO: 04-143 LOCATION: RdR
 SPECIES: SC AUTOPSY DATE: 3/29/2004
 STRAIN: SF 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	44.70	3.90	0.09
LEUCOCRIT	0.00	0.00	0.00
SERUM PROTEIN	7.32	1.10	0.15

*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	20	0	20
B1	0	F	0	S	0	1	0	1	0	R	20	1	0	S	0	B	0	1	0
B2	0	C	0	L	0	2	0	2	0	G	0	2	0	M	0	C	0	2	0
E1	0	M	0	S&L	0			3	16	NO	0			G	0	D	0	3	0
E2	0	P	0	I	0	Mean=0.00		4	4	E	0	Mean=0.00		U	0	E	0		
H1	0	OT	0	OT	0					OT	0			T	0	F	0	Mean=0.00	
H2	0			O	0			Mean=3.2								OT	0		
M1	0																		
OT	0																		

SUMMARY OF NORMALS

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

GENERAL REMARKS:

FINS:

GONADS:

SKIN:

OTHER: Fish at 16.4 FPP

Appendix L. Clearwater Fish Hatchery BY-02 spring chinook fish marking and distribution summary.

DATE PLANTED	RELEASE SITE	LENGTH	TOTAL POUNDS	NUMBER PER/LB	TOTAL PLANTED	MARKS
7/28/2003	Pete King Cr	4.13	346	47.00	16,290	100% CWT; 1,000 Pit
7/28/2003	Squaw Cr	4.00	330	50	16,532	100% CWT; 700 Pit
7/29-31/2003	Colt Killed Cr	4.00	2,714	45	122,152	100% LV
9/16/2003	Walton Cr	5.25	19,558	19.7	385,292	100% ad clip; 700 Pit
9/17/2003	Crooked R	4.15	5,859	40	234,361	100% LV; 499 Pit
9/26/2003	Red R	4.38	3,186	34	108,323	100% RV; 600 pit
TOTAL/AVG		4.32	31,993	47	882,950	
3/30-4/2/2004	Crooked R	5.37	46,720	16.06	750,317	100% ad clip; 299 Pit
3/25-4/8/2004	Walton Cr	5.44	24,341	15.48	376,797	100% ad clip; 293 Pit
4/7-9/2004	Red R	5.44	22,836	15.54	354,868	100% ad clip; 296 Pit
4/8/2004	Papoose Cr	5.35	3,457	16.25	56,174	100% CWT; 800 Pit
TOTAL/AVG		5.40	97,354	15.83	1,538,156	

Appendix M. Brood Year 2003 steelhead (B) eggs received from Dworshak National Fish Hatchery.

EGG TAKE NUMBER	SPAWN DATE	EYED EGG DELIVER DATE	NUMBER OF EYED EGGS	TEMPERATURE UNITS
5	3/04/03	3/20/03	690,996	330
6	3/11/03	3/27/03	790,448	330
TOTAL			1,481,444	

STOCK	NUMBER OF EYED EGGS KEPT	RELEASED SMOLTS	PERCENT SURVIVAL
Dworshak	1,139,236	1,062,075	93.2%

Appendix N. Steelhead brood year 2003 summary of autopsy report, spring 2004 Releases

Summary of Fish Autopsy

ACCESSION NO: 04-141 LOCATION: CLW
 SPECIES: STB AUTOPSY DATE: 3/26/2004
 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	44.10	3.34	0.08
LEUCOCRIT	0.00	0.00	0.00
SERUM PROTEIN	6.50	1.60	0.25

*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	18	N	20	0	20	0	0	B	0	0	20	N	20	A	0	0	20
B1	0	F	2	S	0	1	0	1	0	R	20	1	0	S	0	B	20	1	0
B2	0	C	0	L	0	2	0	2	0	G	0	2	0	M	0	C	0	2	0
E1	0	M	1	S&L	0			3	1	NO	0			G	0	D	0	3	0
E2	0	P	0	I	0	Mean=0.00		4	19	E	0	Mean=0.00		U	0	E	0		
H1	0	OT	0	OT	0					OT	0			T	0	F	0	Mean=0.00	
H2	0			O	0			mean=3.95								OT	0		
M1	0																		
OT	0																		

SUMMARY OF NORMALS

	20	18	20	20	20	20	20	20	20	20	20	20	20
SEX		M: 0			F: 0					U: 0			

GENERAL REMARKS:

FINS:

GONADS:

SKIN:

OTHER: Fish at 4.6 FPP

Appendix O. Brood Year 2003 North Fork steelhead marking and distribution.

DATE PLANTED	RELEASE SITE	LENGTH	TOTAL POUNDS	NUMBER PER/LB	TOTAL PLANTED	MARKS
9/26/2003	Red House Hole SF Clearwater	5.50	1,329	17	22,599	100% ad clip
TOTAL/AVG		5.50	1,329	17	22,599	

4/16-26/2004	Red R	8.67	24,149	4.28	103,419	100% ad clip
4/16-26/2004	Red R	8.25	21,190	4.97	105,318	51,667 unmarked; 53,651 cwt/elastomer
4/26/2004	Red R	8.34	10,760	4.82	51,865	100% cwt/elastomer
4/20-23/2004	Crooked R	8.70	36,410	4.23	154,178	67,045 cwt/ad/LV; 87,133 ad only
4/20-23/2004	Crooked R	8.53	22,827	4.50	102,827	100% unmarked
4/19-20-2004	Red House Hole SF Clearwater	8.64	72,773	4.32	314,666	68,056 cwt/ad/LV; 246,610 ad only
4/21/2004	Clear Cr	8.86	25,800	4.02	103,718	100% ad only
4/27/2004	Meadow Cr	8.64	5,996	4.33	25,961	Cwt/elastomer
4/27/2004	Mill Cr	8.64	5,996	4.33	25,962	Cwt/elastomer
4/26/2004	Lolo Cr	8.58	11,666	4.42	51,562	100% unmarked
TOTAL/AVG		8.59	237,567	4.42	1,039,476	

