



**CLEARWATER FISH HATCHERY
ANNUAL REPORT**

2000 CHINOOK AND 2001 STEELHEAD

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2000 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 June 20, 2000 and the trap was taken out of operation on September 19, 2000.

The Walton Creek weir was installed on June 1, 2000 and taken out of operation on September 18, 2000. The run total for both traps was 1,602 fish, of which there was 324 jacks, 1,278 adults. A total of 262 fish were released to spawn naturally and 50 jacks were given to the food bank. All remaining fish were held for spawning. A total of 551 females (43 culls for high BKD) were spawned, producing 2,035,086 green eggs.

A total of 559,630 pre-smolts and 349,890 full-term smolts from Powell stock chinook were released from Powell pond on October 1, 2001 and April 10, 2002.

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. Stocks were combined due to high rate of straying. The integrity of all supplementation and natural fish were maintained in their native streams.

The Red River weir was installed on June 1, 2000 and taken out of operation September 14, 2000. The run total of 315 fish was combined with the returning adults from Crooked River. A total of 33 chinook were released to spawn naturally (28 upstream, 5 downstream).

The Crooked River weir was installed on March 15, 2000 and taken out of operation September 18, 2000. The run total of 1,157 fish were combined with returning adults from Red River. A total of 270 chinook were released to spawn naturally.

The South Fork had a run total of 1,472 fish. A total of 303 fish were released to spawn naturally. A total of 120 jacks were released in Newsome Creek and 124 at Stites for the fishery, and 30 jacks were given to the food bank, all remaining fish were held for spawning. A total of 376 females were spawned, of which 198 females were kept for production, and 178 females were culled due to high BKD levels, producing 715,014 green eggs.

A total of 350,318 full-term smolts were released from the Red River pond April 10 through April 12, 2002.

A total of 726,489 full-term smolts were released from Crooked Rive April 10 through April 12, 2002.

North Fork Clearwater

A total of 206,473 smolts were direct released in the North Fork of the Clearwater on April 9, 2002.

Idaho Supplementation studies (ISS) and Nez Perce Tribe

A total of 329,686 parr were released in the Lochsa basin for the ISS program. A total of 17,025 were released in Pete King Creek on July 24, 2001, 13,919 were released in Squaw Creek on July 24, 2001, and 298,742 were released in Colt Killed Creek on July 25 and 26, 2001.

A total of 103,811 parr were released in the upper Selway for the Nez Perce tribe program on July 17, 2001.

A total of 84,238 pre-smolts were released from the Red River pond on September 28, 2001.

A total of 155,887 pre-smolts from the Powell stock were released from the Crooked River raceways September 28, 2001.

A total of 57,461 smolts were released in Papoose Creek on the Lochsa on April 10, 2002.

A total of 662,487 smolts were released in the Clearwater Basin for the Nez Perce Tribe production. This included 149,1845 that were released at Lolo Creek on April 2, 2002, 40,433 were released at Mill Creek (SF Clearwater) on April 2, 2002, 74,555 were released at Newsome Creek (SF Clearwater) on April 4, 2002, 101,473 were released at Boulder Creek (Lochsa) on April 5, 2002 and 296,841 were released at Meadow Creek (Selway) on April 16, 2002.

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INTRODUCTION

Funding Source

Construction responsibility for the Lower Snake River Compensation Plan (LSRCP) was assigned to the Walla Walla District, US Army Corps of Engineers (USACE), 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 US Fish and Wildlife Service (USFWS) settled the question of O&M funding in 1977 with the signing of an interagency agreement. The agreement 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 USACE 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 located 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 is the closest town, which is 45 miles east. 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 LSRCP goal for CFH and its satellite facilities is to return 12,000 adult salmon and 14,000 "B"-run steelhead above Lower Granite Dam.

Idaho Department of Fish and Game Objectives

The objectives of Idaho Department of Fish and Game (Department) 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 fish opportunities.

FACILITY DESCRIPTION

General Hatchery Description

Clearwater Hatchery

Clearwater Fish Hatchery is the final facility built by the US Army Corps of Engineers (USACE) under the Lower Snake River Compensation Plan (LSRCP). This facility is also the largest of the LSRCP hatcheries built.

The hatchery office building consists of two parts. a dormitory section includes four bunkrooms with maximum capacity of 16 people, a living room, dining room, a kitchen, shower rooms, and a 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 located at the west end of the hatchery.

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

The 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 ft, then through the dam into the reservoir. The 18-inch pipe (secondary supply) is stationary at an elevation of 1,357 ft with a screened inlet to keep out debris. This pipe supplies cool water to the hatchery. The 48-inch flexible plastic pipe 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°F 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 seven psi to the hatchery. The structure consists of primary and secondary chambers. 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 2,400 KW of electricity.

A 73,600 cubic foot (cuft) cleaning sedimentation pond is used during cleaning to settle out the settleable solids produced by the hatchery. A 414,000 cuft 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 (sqft) 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 5ft x 40-ft area creating a new covered storage area. The two side areas are a nice addition of waterproof storage. The end of one side was partitioned off to house archived documents.

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, a walk-in freezer to store fish food, and a support cabin with kitchen, dining room, living room, bathroom, and bedroom.

Powell

The Powell facility is located 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 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 is a support cabin with a kitchen, dining room, living room, bedroom, bathroom, and walk-in freezer to store fish feed. During the summer of 1994 the Corps of Engineers constructed a 16-ft x 14-ft formalin storage building.

Red River

The Red River facility consists of four structures. A freezer/storage building which houses a walk-in-freezer, 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. This pond has a hypalon plastic liner with eight-inch to ten-inch diameter cobblestones on the inclined banks. The bottom of the pond is a bare liner, which aids in pond vacuuming.

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. The 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 flows 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. Eleven raceways have a total rearing space of 66,000 cuft. 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 per raceway.

The adult holding facility consists of two ponds with a combined capacity of 8,000 cuft 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 8 gpm per stack.

Early rearing consists of sixty concrete vats. Each measures 40-ft x 4-ft x 3-ft and contains 480 cuft 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 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, for a total of 23,200 cuft. 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 cuft. 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 cuft of rearing space. The normal loading of 320,000 fish produces the best looking smolts and a DI significantly less than 0.3. 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 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, with a total of 3,400 cuft of holding space and a trap area measuring 8-ft x 16-ft x 4-ft. 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.

A rearing pond, measuring 170-ft x 70-ft x 4-ft 6 inches, will rear a maximum of 320,000 chinook smolts. The maximum design capacity is 500,000 fish with a DI of 0.092. Maximum water flow through this pond is 6.24 cfs. This pond has a hypalon plastic liner with 8- to 10-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 warmwater intake is attached to a floating platform and can be adjusted from five ft to forty ft below the surface. The cool water intake is stationary at 245 ft below the top of the dam. An estimated 10-cfs of water is provided by the cool water supply and 70 cfs of water

from the warmwater 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 (Appendices 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 at Crooked River. The water rights stipulate 10 cfs from April 1 to June 30 and six cfs from July 1 to October 1 at the rearing facility. Temperatures ranged from 42°F to 64°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 43°F to 58°F from Walton Creek (Appendix B2).

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 five cfs is available to the hatchery. Temperatures ranged from 42°F to 65°F (Appendix B3).

Water Quality Analysis

The water quality analysis at CFH was done by the State of Idaho, Department of Health and Welfare in Boise, and 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; 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, Biological Aides, Laborers, Grounds Maintenance Worker, and Clearwater River Youth Program students. One temporary employee mans the Red River, Crooked River, and Powell facilities each, which are supervised from CFH.

ADULT CHINOOK COLLECTION

South Fork of the Clearwater River

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

The first weir management plans included ponding all chinook trapped. None of the right ventral (RV) or left ventral (LV) clipped or unmarked chinook were injected with Erythromycin at trapping and were to be released above the weir later.

On June 22, 2000, the Department decided that the ventral clipped fish would be retained for production, and the unmarked fish would be injected and released upstream of the two weirs. All jacks not treated with Formalin would be hauled to Stites and released for the fishery. All jacks treated with Formalin would later be hauled to Newsome Creek and released for natural spawning above the weir installed by Nez Perce Tribal Fisheries (NPTF).

On June 26, 2000, all chinook were sorted and fish that hadn't been previously injected were inoculated. The unmarked Red River trapped chinook were released above the weir, the unmarked Crooked River chinook were transported to upper Crooked River and released, and 120 jacks were right opercle punched and released above the weir at Newsome Creek.

Since the South Fork adult holding ponds can only hold 400 adult fish at a time, adults were transported to CFH and held for spawning.

The weir management plan called for releasing only unmarked chinook above the weir at Red River and unmarked chinook at Crooked River along with 16 pairs of production fish to spawn naturally. On July 24, 2000, a decision was made to release another 18 pairs of production fish above the weir at Crooked River. On August 8, 2000, a decision was made to release 10 more females were released above the weir at Crooked River. On August 22, 2000, a decision was made to release any fish trapped at Crooked River above the weir from that date on.

The Crooked River weir and trap was in operation between March 15 and September 18, 2000. A total of 1,157 fish were trapped.

The Red River trap was installed on June 1 and taken out of operation on September 14, 2000. A total of 315 fish (182 jacks and 133 adults) were trapped.

Age class breakdown of this run included: 656 I-ocean males, 3 I-ocean females (<64 cm), 286 II-ocean males, 496 II-ocean females and 8 II-ocean unknowns (64-82 cm), 19 III-ocean males and 4 III-ocean females (83+ cm) (Appendices D1, D1a, D2, D2a, E1, E1a, E2, F1, and F2).

Powell

During 2000, 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 June 1, 2000 and taken out of operation on September 18, 2000. The Crooked Fork trap was installed on June 20, 2002 and taken out of operation on September 19, 2000. A total of 1,602 fish (324 jacks and 1,278 adults) were trapped.

Trapping protocols for the Powell trap included ponding all Ad-clipped fish and opercle punching and releasing all ventral clipped and unmarked fish back 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. All ventral-clipped fish were released below the trap and all naturals/wild fish were released upstream.

Age-class breakdown of this run included: 323 I-ocean males and one I-ocean female (<64 cm), 389 II-ocean males, 766 II-ocean females and 28 II-ocean unknowns (64–82 cm), 70 III-ocean males, 22 III-ocean females and 3 III-ocean unknowns (83+ cm) (Appendices G1, G1a, G2, G2a, G3, and H).

ADULT HOLDING

All the South Fork production chinook were temporarily held at Red River and then transported to CFH for final holding and spawning. The Lochsa production fish were held at Powell. A total of 120 adults and 10 jacks were transported from Powell and held with South Fork chinook for spawning.

All fish were injected with Erythromycin 200 at a rate of 20 mg/kg at trapping to inhibit Bacterial Kidney Disease (BKD). Fish were treated with a Formalin drip for one hour every other day to prevent fungal growth. Fish held at CFH 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 2000. 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 CFH, 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 one tray per female.

Tissue and ovarian samples were collected at the time of spawning. These samples were air mailed the next day 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 August 4 and the last on October 6. A total of 198 females were spawned. Pre-spawn mortality for the South Fork stock was 116 fish (8.9% pre-spawning mortality). All carcasses not showing clinical signs of BKD were returned to either Crooked River or Red River to add nutrients to the system (Appendix E2).

Powell

Fish were checked twice per week for ripeness. The first fish was spawned on August 3 and the last on August 28. A total of 551 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 274 fish (19.4% pre-spawn mortality).

Eggs Received

During the 2000 spawning season, eyed-eggs from low BKD parentage were received from Rapid River and Lyons Ferry hatcheries. Clearwater Fish Hatchery received a total of 913,538 eyed-eggs from Rapid River and 676,014 eyed-eggs from Lyons Hatchery (Rapid River stock) (Appendix I).

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 (gpm).

Females were screened for BKD using Elisa techniques. Females with optical density (OD) over 0.3 were culled. The BKD tests resulted in culling of 43 females at Powell and 178 females from the South Fork or approximately 884,000 green eggs (23.8% of egg take).

A total of 4,339,652 eggs (2,750,100 green eggs and 1,589,552 eyed-eggs) were incubated from BY 2000 spring chinook salmon. Overall development from green eggs to eyed-eggs numbered 2,379,681 for a total eye-up percentage of 86.5%. South Fork achieved 82.3% eye-up, Powell 88% 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 accumulated 800 thermal units (TUs).

Eye-up occurred at approximately 500 TUs at which time all egg lots were shocked, picked, and enumerated with an egg picker. Prior to hatching, all eyed-eggs were picked twice weekly. Hatching occurred at approximately 1,000 TUs. Swim-up fry were transferred to the early rearing vats at approximately 1,750 TUs (Appendix I).

EARLY REARING

At swim-up, fry were ponded in hatchery vats. Vats were loaded with fry at approximately 45,000 to 856,000 fish per vat. A total of 3,834,404 swim-up fry were ponded into 56 vats over a five-month period. Fish were segregated by stock at ponding. Fish were started on feed in a full-length vat with baffles in place. Initial water flows were set at 46 gpm for approximately 10 days to start the fry on feed. Water flows were increased to 92 gpm on day 11 and then increased to 120 gpm after several months. The vats remained set at that rate until the fish were moved outside. Flow indices were held at or below 1.5 while DI never exceeded 0.3 during the entire early rearing period. Most of the chinook were moved outside during fish marking. Some of the smaller groups were marked and moved back into the vats until release. Fish marking took place over an eleven-week window.

Water temperatures for the early rearing period ranged from 40°F to 56°F (Appendices A1 and A2).

FINAL REARING

Chinook were released from CFH at three different life stages. Parr (n=433,497) were released in July 2001 at four different locations for the Idaho Supplementation Study (ISS) program (n=329,686) and Nez Perce Tribe (n=103,811) programs. Pre-smolts (n=993,965) were released in late September and early October 2001 at six different locations for production (n=559,630) ISS (n=240,125) and Nez Perce Tribe (n=194,210) programs. Chinook pre-smolts released at Powell and Crooked River were held at the satellites throughout the summer, and the Red River pre-smolts were held during September only at the Satellite. Smolts (n=2,353,118) were released in April 2002 at ten different release locations for production (n=1,633,170), Nez Perce tribe programs (n=662,487) and ISS (n=57,461_ programs.

At marking, Powell stock was used to fill all the Lochsa River programs. On the South Fork, South Fork stock, Powell stock and Rapid River stock were used to fill the south Fork programs. The Nez Perce Tribe programs were filled with fish from Lookingglass and Rapid River hatcheries. All chinook were marked between April 2 and June 14, 2001.

The parr and pre-smolt released chinook were fed one 28-day Erythromycin prophylactic treatment, and the smolts were fed two.

Bio Oregon's BioDiet grower feed was used throughout the final rearing period. The parr and pre-smolts were fed full rations until release, and the full term smolts were fed full rations through marking and during medicated feed treatments, but fed four days on feed and three days off feed until one month from fish transport. The final two weeks of feeding was done with feed laced with a special vitamin pack that will aid in smolting.

All final rearing raceways were set up with jump screens and floating shade structures (3-4 per pond) to reduce stress and increase available shade to fish. Shade was available over approximately twenty percent of the pond surface. Shade was removed in late December when the winter sun was low in the horizon.

Water temperatures during the final rearing period were kept as cool as possible to reduce growth rates. Every effort was made to stay below 55°F. Hatchery water temperatures varied from 40°F to 55°F during the final rearing period (Appendices A1 and A2). An estimated 2.2 cfs of water was supplied to each raceway.

Total feed used in early and final rearing was 252,457 lbs at a cost of \$161,162.57 (not including Nez Perce Tribes cost for their portion of the feed), for a final conversion rate of 1.29 (Appendix J).

FISH HEALTH

The BY2000 spring chinook reared at CFH were from low BKD parentage with OD below 0.3. All chinook eggs above this OD were culled.

All parr and pre-smolts received one 28-day Erythromycin medicated feed treatment prior to release.

All full term chinook, received two 28-day Erythromycin medicated feed treatments. All fish were fed Bio-Oregon's feed with 4.5% Aquamycin-100. The fish were fed between 75 mg and 150 mg Erythromycin per kilogram of fish weight to comply with Investigational New Animal Drug (INAD) specifications.

No fish health problems were detected during the rearing of Brood Year 2000 chinook.

PATHOLOGIST REPORT

Diseases Encountered and Treatment. On June 13, 2001, a diagnostic trip at Crooked River Satellite found the fish infected with aeromonads, pseudomonads, and *F. psychrophilum*. Since the first prophylactic erythromycin medicated feed treatment was being applied and was effective against these bacteria, no other treatments were applied. Brood chinook were carriers of *Renibacterium salmoninarum* and Infectious Hematopoietic Necrosis Virus (IHNV). ELISA optical densities were used to cull suspect high jeopardy eggs.

Acute Losses. Acute losses were experienced at Crooked River Saleellite (April 3, 2002) during a hypoxic event caused by icing at the facility's water intake. Approximately 5,000 chinook were killed during this event when ice that formed at the top and bottom of the pond broke free and trapped the fish against the outflow screen.

Organosomatic Index. (Appendices K1, K2, K3, K4, K5, and K6)

FISH MARKING

A total of 3,780,580 spring chinook were marked. Marks included: 2,490,821 Adipose (Ad) clips; 750,892 Coded Wire Tags (CWT); 84,238 right ventral (RV) clips and 454,629 left ventral (LV) clipped (Appendix L).

Chinook were marked from early rearing vats (inside) into final rearing raceways (outside). Marking started on April 2 and was completed on June 15. Fish ranged in size from 80 to 175 fpp. A total of 10,583 fish were Passive Integrated Transponder (PIT) tagged.

FISH DISTRIBUTION

Releases from CFH occurred in three different life stages:

Parr	433,497
Pre-smolt	993,965
Full term smolt	<u>2,353,118</u>
Total	3,780,580

Parr

Clearwater Production

A total of 17,025 fish (63.59 fpp) were released into Pete King Creek on the Lochsa River on July 24, 2001. All parr were CWT tagged with no fin clips and 1,000 were PIT tagged (Appendix L).

A total of 13,919 fish (61.04 fpp) were released into Squaw Creek on the Lochsa on July 24, 2001. All parr were CWT tagged with no fin clips and 700 were PIT tagged (Appendix L).

A total of 298,742 fish (29.42 fpp) were released into Colt Killed Creek (White Sands) on July 25 and 26, 2001. All parr were LV clipped and 700 were PIT tagged (Appendix L).

Nez Perce Tribe

A total of 103,811 fish (69.30 fpp) were released into the upper Selway on July 17, 2001. All parr were ad-clipped only (Appendix L).

Fall Pre-Smolt

Crooked River

A total of 155,887 fish (19.5 fpp) were released into Crooked River on September 28, 2001. All pre-smolts were LV-clipped and 500 were PIT tagged (Appendix L).

Powell

A total of 559,630 fish (29.3 fpp) were released into Walton Creek on October 1, 2001. All pre-smolts were ad-clipped and 700 were PIT tagged (Appendix L).

Red River

A total of 84,238 fish (27.4 fpp) were released into Red River on September 28, 2001. All pre-smolts were RV-clipped and 500 were PIT tagged (Appendix L).

Nez Perce Tribe

A total of 104,720 fish (51.26fpp) were released in Boulder Creek on the Lochsa on October 10, 2001. All pre-smolts were ad-clipped only (Appendix L).

A total of 89,490 fish (52.5 fpp) were released in Meadow Creek on the Selway River on October 11. All pre-smolts were ad-clipped only and 1,825 were PIT tagged (Appendix L).

Full Term Smolt

Crooked River

A total of 726,489 smolts (15.28 fpp) were released into Crooked River. Smolts were transported to Crooked River April 2 through April 5, 2002. Fish were released volitionally April 10. On April 12 the pond was drained and all remaining smolts were released. All smolts were Ad-clipped and 300 fish carried PIT tags (low BKD) (Appendix L).

Powell

A total of 349,890 smolts (15.34 fpp) were released into Walton Creek. Smolts were transported to Powell March 27 through March 30, 2002. After approximately two weeks of acclimation, fish were released on April 10. All smolts were Ad-clipped and CWT tagged, and 300 fish carried PIT-tags (Appendix L).

Red River

A total of 350,318 smolts (15.34 fpp) were released into Red River. Smolts were transported to Red River from March 30 through April 1, 2002. Fish were released volitionally April 10, 2002. On April 12 the pond was drained and all remaining smolts were released. All smolts were Ad-clipped and 300 fish carried PIT tags (Appendix L).

North Fork Clearwater

A total of 206,473 smolts (19.5 fpp) were direct released at the Ahsahka boat ramp on the North Fork below Dworshak Dam on April 9, 2002. All the smolts were ad-clipped (Appendix L).

Papoose Creek

A total of 57,461 smolts (15.0 fpp) were direct released at Papoose Creek on the Lochsa on April 10, 2002. All the smolts were CWT tagged with no external clips, and 750 fish carried PIT tags (Appendix L).

Nez Perce Tribe Production

A total of 149,185 smolts (16.1 fpp) were direct released at Lolo Creek on April 2, 2002. All the smolts were CWT tagged with no external clips and 1,000 fish carried PIT tags.

A total of 40,433 smolts (15.0 fpp) were direct released at Mill Creek on the South Fork on April 2, 2002. All the smolts were CWT tagged with no external clips.

A total of 101,473 smolts (17.5 fpp) were direct released at Boulder Creek on the Lochsa on April 5, 2002. All the smolts were CWT tagged with no external clips.

A total of 74,555 smolts (16.9 fpp) were direct released at Newsome Creek on the South Fork on April 4, 2002. All the smolts were CWT tagged with no external clips and 1,000 fish carried PIT tags.

A total of 296,841 smolts (15.21 fpp) were direct released at Meadow Creek on the Selway on April 16 and April 26, 2002. All the smolts were CWT tagged with no external clips and 1,008 fish carried PIT tags (Appendix L).

BROOD YEAR 2001 STEELHEAD REPORT

ABSTRACT

Clearwater Fish Hatchery (CFH) received 1,039,672 BY2001 North Fork B -run steelhead eyed-eggs from Dworshak National Fish Hatchery (DNFH). A total of 575,071 smolts from the North Fork stock were released from April 19 through April 29; 138,769 at Red House Hole, 40,499 at Kooskia Hatchery on Clear Creek, 181,316 at Red River 136,027 at Crooked River, 34,000 at Mill Creek (SF Clearwater), 26,460 at Meadow Creek (SF Clearwater) and 18,000 at Lolo Creek. The size of fish at release for the one-year rearing cycle was 7.84 fpp, for a total of 73,373 lbs and average length was 182 mm.

A total of 113,018 lbs of feed was fed with a cost of \$47,477.58 to produce 73,373 lbs of fish at CFH. The conversion rate was 1.54.

Authors:

Brad George, Assistant Hatchery Manager
Chris Shockman, Fish Culturist
Rene'e Hedrick, Office Specialist

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, CFH 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, two of our crew assisted with their spawning operation. We collected and packaged all the disease samples to ship by airmail to Eagle Fish Health Lab.

Incubation

Eyed steelhead eggs were received from Dworshak Hatchery from March 23 through April 9, 2002 in three weekly shipments (Appendix M). The eggs from DNFH lots six through eight were incubated approximately 17 days at Dworshak until the eggs eyed-up. All eggs from IHNV-negative 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 8,500 eggs per basket, water flows through each stack were set at six gallons per minute (gpm). A total of 1,039,672 eggs were received (Appendix M). During incubation, steelhead eggs were on primary water only. Heavy losses of eggs occurred during incubation and swim-up.

EARLY REARING

At swim-up, unfed fry from Dworshak stock B-run steelhead were moved to vats 25 through 30, and 40 through 56 and were divided as evenly as possible (42,000 to 45,000 fish per vat). The initial DI was 0.04 and FI was 0.18. Fish were held in the hatchery vats until

August when they were marked and moved to twelve steelhead raceways (8-12 east and 9-12 west). Average length of the fish at the end of early rearing was 4.26 inches (108 mm). The fish averaged 38.8 fpp.

Water temperatures for the early rearing period ranged from 50°F to 57° F (Appendix A2).

Rangen starter and grower, and Moore-Clark Nutra starter feed were used to feed these fish during the early rearing period, in which 14,327 pounds of feed were used to achieve a feed conversion of 1.39 for a cost of \$10,085 (Appendix J).

FINAL REARING

The juvenile Dworshak stock B-run steelhead were moved to outside steelhead raceways 8 through 12-east and 9 through 12-west. During August, the move was done in conjunction with fin clipping and CWT tagging to avoid double stressing the fish. Fin clipping was done in eight-hour shifts per day. Baffles were removed from vats; fish were then moved to the clipping trailers using the transfer tanks. The Red River and Crooked River fish were not clipped, but were inventoried during the move outside.

The DI of the Dworshak steelhead ranged from 0.16 to 0.32 and the FI ranged from 0.71 to 1.2. These indexes were recalculated bi-weekly and were never allowed to exceed DI of 0.33 or FI of 1.5.

Water temperatures during final rearing period were maintained to keep temperatures as close to 57°F as possible (Appendix A2). Reservoir water temperatures began to drop in late October and bottomed out in January at 41°F. Temperatures began to slowly increase in early April and had reached 44°F by late-April. Estimated water flows per raceway were 3.0 cfs.

Fish were fed dry feed until released. A total of 98,691 lbs of feed was used during final rearing producing 63,113 lbs of gain at a cost of \$37,393.10. A total of 113,018 lbs of feed was used throughout the entire rearing period to produce 73,373 lbs of fish at a cost of \$47,477.58. The overall conversion rate from fry to smolt was 1.54. Percent body weight fed ranged from 0.75 to 8% (Appendix J).

FISH HEALTH

Brood year 2001 steelhead were not challenged by epizootics by bacterial, viral, or mycotic infectious agents (Appendix N).

Elevated mortalities warranted a diagnostic (6/24/01) visit to the main hatchery for BY01 NF CLW STB. *F. Psychrophilum* was found in 7/8 fish examined. The main source mortality appeared to be caused not by the bacteria, but by broom trauma. Workers revisited cleaning technique and mortalities ceased. Steelhead spawned at Dworshak National Fish Hatchery were found to be positive for IHNV (8/100). The eggs from the eight positive females were culled.

An egg quality team has been assembled to ascertain the cause of poor survival of North Fork Clearwater Steelhead B-run, primarily at Magic Valley Hatchery, but also Clearwater Hatchery. Some of the parameters being scrutinized are incubation water temperature, water chemistry, spawning methods, and culture practices. This cooperative effort should be able to identify problems and implement corrective measures to either raise a healthy North Fork Clearwater Steelhead B-run at these facilities or identify a replacement stock that will perform as needed.

FISH MARKING

North Fork stock steelhead released into the South Fork of the Clearwater River were all Ad clipped, 60,000 were CWT tagged and 320 were PIT tagged. The Clear Creek release fish were all Ad-clipped only (Appendix O).

The steelhead released at Red River were Ad-clipped (30,000), 150,000 were unmarked, and 299 were PIT tagged. The Crooked River released fish were Ad-clipped (21,000), 85,000 no clips, 20,000 CWT tagged with no clip, and 601 were PIT tagged.

The Mill Creek (SF) released fish (34,000) were not marked. The Meadow Creek (SF) released fish (26,000) and the Lolo Creek released fish (18,000) were not marked.

FISH DISTRIBUTION

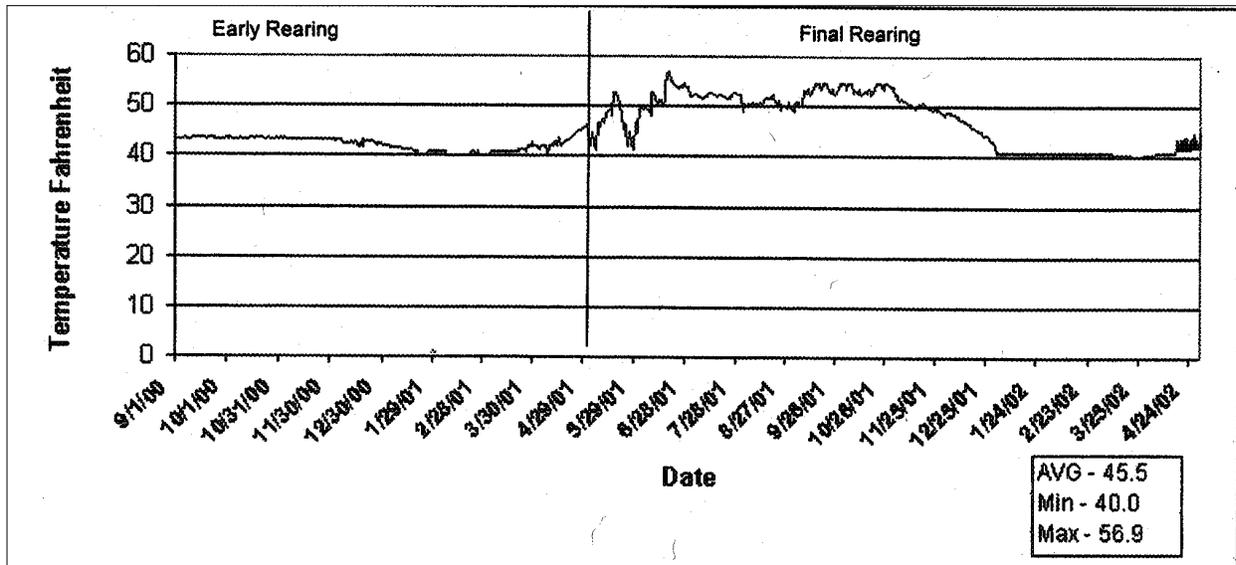
On April 19, a total of 138,769 (7.0 fpp) Dworshak B-run steelhead were direct released at the Red House Hole plant site (approximately 3.5 miles upstream of Highway 13 and 14 junction) on the lower South Fork of Clearwater River. A total of 40,499 (6.2 fpp) Dworshak B-run steelhead were direct released into Clear Creek at Kooskia Hatchery on April 19. There were 181,316 fish released on April 25 at Red River, which averaged 9.75 fpp, and an additional 136,027 fish were released at Crooked River on April 26 which averaged 6.57 fpp. There was very little crowding and hauling mortality from the fish transportation to the release sites (Appendix O).

ACKNOWLEDGEMENTS

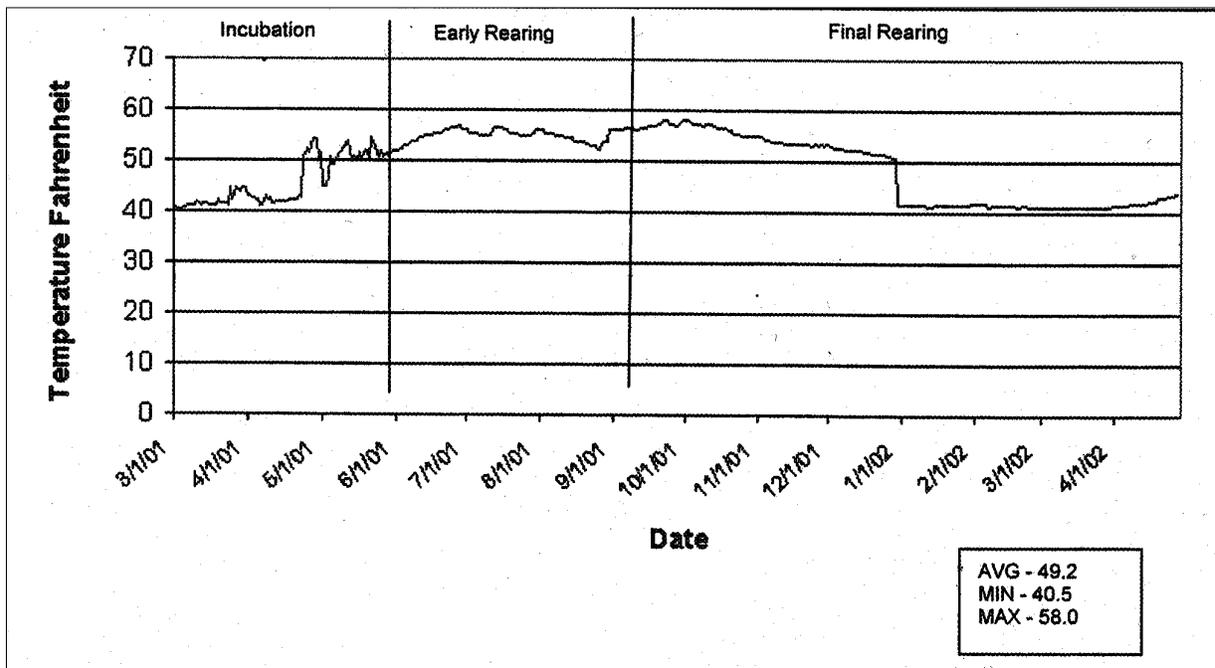
The Clearwater Hatchery has a crew of 22 people and are all assigned a wide variety of responsibilities. Everyone on station has contributed to the success of the program. The hatchery crew consists of: Jerry McGehee - Hatchery Manager; Brad George and Tom Tighe, Assistant Hatchery; Managers, CalLee Davenport, Zach Olson and Chris Shockman, Fish Culturist; Ernie Yost, Utility Craftsman; Rene'e Hedrick , Office Specialist II; Ron Hopper, Bryan Grant and Don West, Fish Technicians; Theresa Elliott, Fred Hough, Stacey Osborn, Chad Henson, Adam Motick, Jamie Mitchell and Bob Schloss, Bio-aides; Ben Daly and Charles Ball, Laborers; and Connie Daly, Grounds Maintenance Worker;

APPENDICES

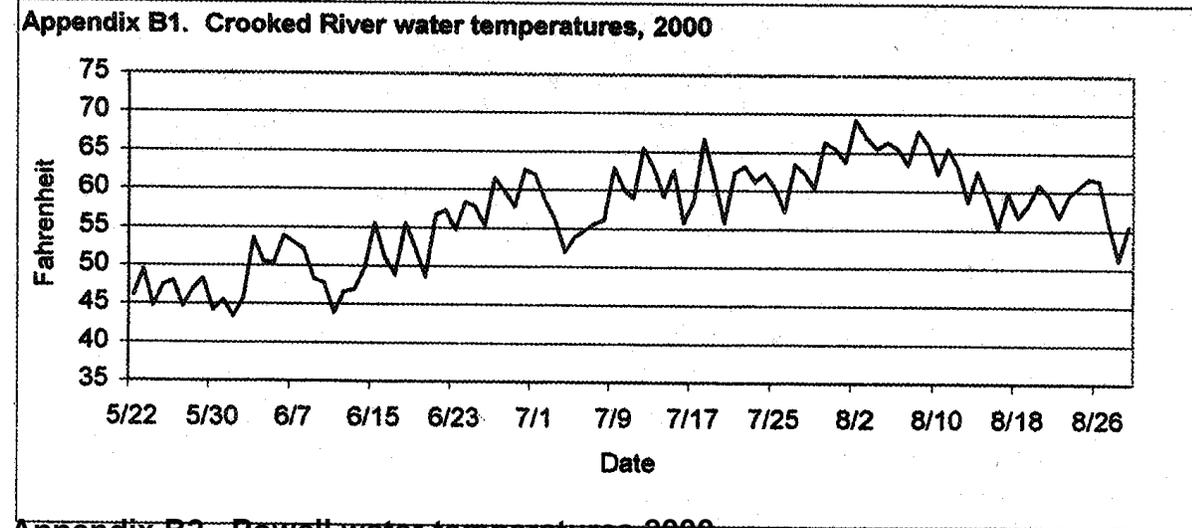
Appendix A1. Brood Year 2000 chinook water temperatures, September 2000 - April 2002



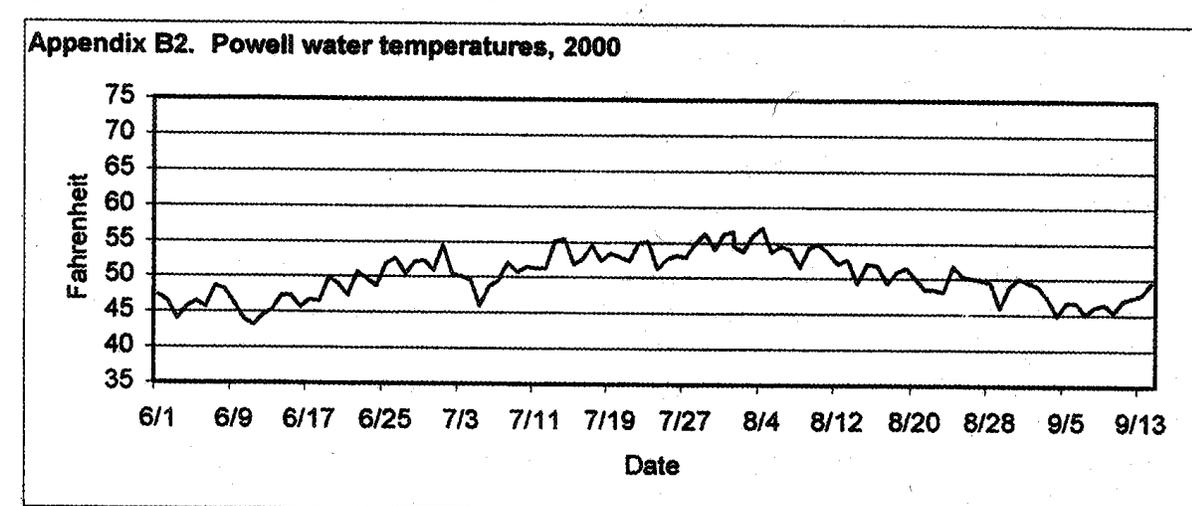
Appendix A2. Brood Year 2001 steelhead water temperature, March 2001 - April 2002.



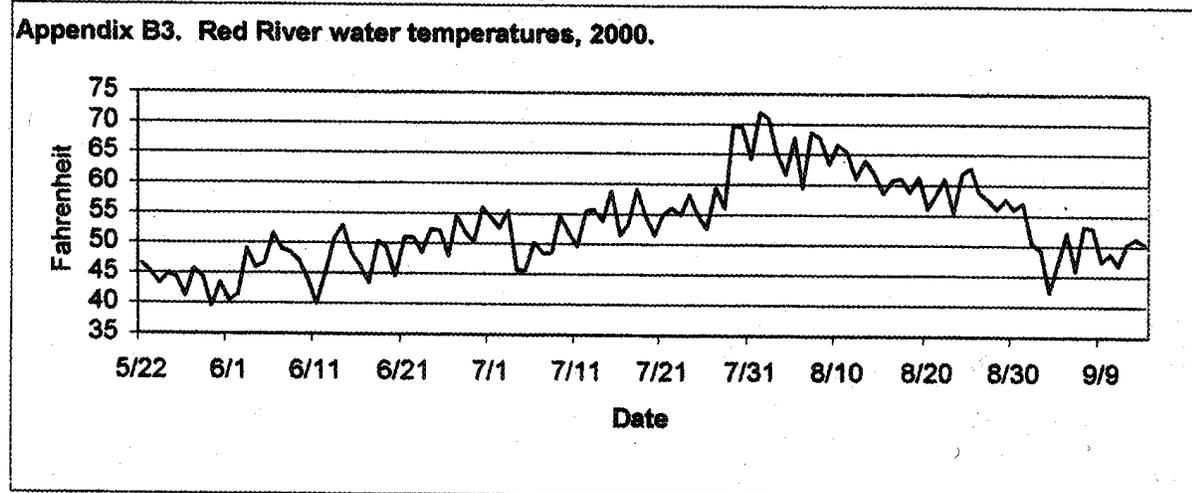
Appendix B1. Crooked River water temperatures 2000.



Appendix B2. Powell water temperatures 2000.



Appendix B3. Red River water temperatures 2000.



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	08/09/94	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	<.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	---	1.001	EPA 200.9	07/03/97
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	07/02/97
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	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

Contaminant	Result	MDL	Method	Date
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
				07/02/97
Aluminum	---	0.001	EPA 200.8	
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

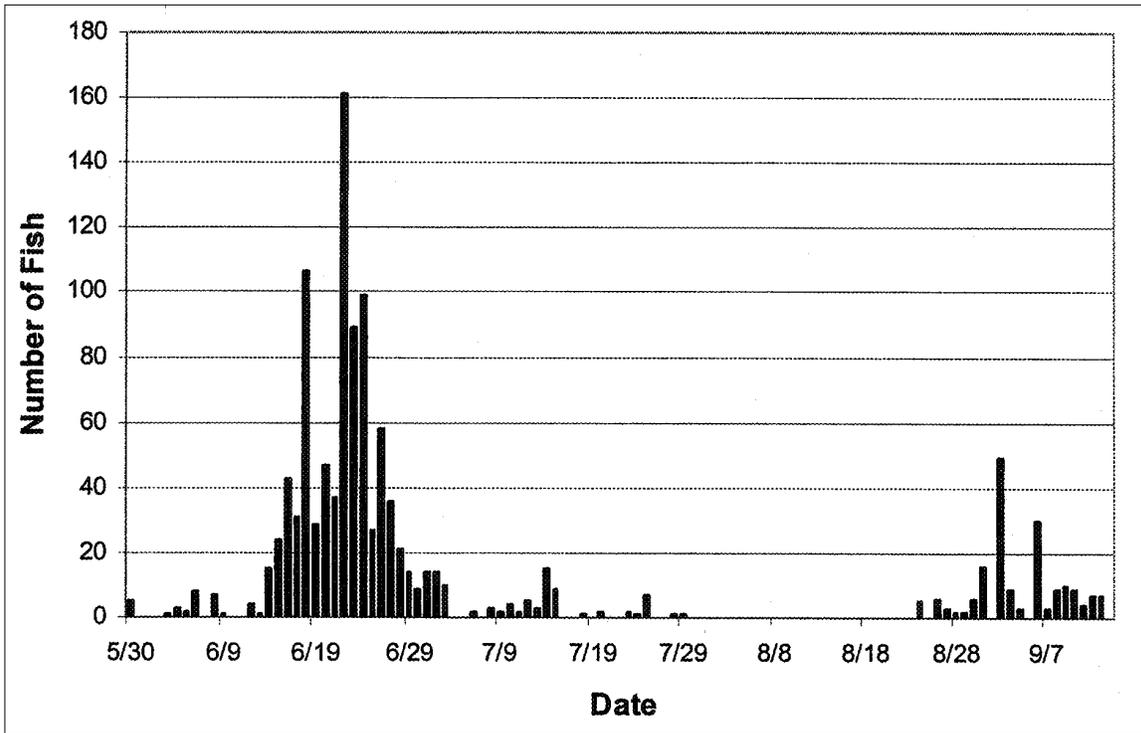
MCL (numbers in parenthesis)= EPA maximum contaminant level

Appendix D1. Crooked River chinook run timing 2000

Date	Adults	Jacks	Total
05/30	5	0	5
05/31	0	0	0
06/01	0	0	0
06/02	0	0	0
06/03	1	0	1
06/04	3	0	3
06/05	2	0	2
06/06	6	2	8
06/07	0	0	0
06/08	3	4	7
06/09	0	1	1
06/10	0	0	0
06/11	0	0	0
06/12	1	3	4
06/13	1	0	1
06/14	10	5	15
06/15	15	9	24
06/16	30	13	43
06/17	21	10	31
06/18	74	33	107
06/19	17	12	29
06/20	23	24	47
06/21	16	21	37
06/22	91	70	161
06/23	50	39	89
06/24	32	67	99
06/25	12	15	27
06/26	28	30	58
06/27	24	12	36
06/28	10	11	21
06/29	7	7	14
06/30	5	4	9
07/01	10	4	14
07/02	10	4	14
07/03	7	3	10
07/04	0	0	0
07/05	0	0	0
07/06	2	0	2
07/07	0	0	0
07/08	0	3	3
07/09	0	2	2
07/10	3	1	4
07/11	1	1	2
07/12	2	3	5
07/13	2	1	3
07/14	11	4	15
07/15	7	2	9
07/16	0	0	0
07/17	0	0	0
07/18	1	0	1
07/19	0	0	0
07/20	2	0	2
07/21	0	0	0
07/22	0	0	0
07/23	2	0	2

Date	Adults	Jacks	Total
07/24	1	0	1
07/25	2	5	7
07/26	0	0	0
07/27	0	0	0
07/28	1	0	1
07/29	1	0	1
07/30	0	0	0
07/31	0	0	0
08/01	0	0	0
08/02	0	0	0
08/03	0	0	0
08/04	0	0	0
08/05	0	0	0
08/06	0	0	0
08/07	0	0	0
08/08	0	0	0
08/09	0	0	0
08/10	0	0	0
08/11	0	0	0
08/12	0	0	0
08/13	0	0	0
08/14	0	0	0
08/15	0	0	0
08/16	0	0	0
08/17	0	0	0
08/18	0	0	0
08/19	0	0	0
08/20	0	0	0
08/21	0	0	0
08/22	0	0	0
08/23	0	0	0
08/24	5	0	5
08/25	0	0	0
08/26	5	1	6
08/27	3	0	3
08/28	2	0	2
08/29	1	1	2
08/30	5	1	6
08/31	11	5	16
09/01	0	0	0
09/02	45	4	49
09/03	8	1	9
09/04	2	1	3
09/05	0	0	0
09/06	23	7	30
09/07	2	1	3
09/08	6	3	9
09/09	8	2	10
09/10	3	6	9
09/11	2	2	4
09/12	0	7	7
09/13	0	7	7
09/14	0	0	0
Total	683	474	1157

Appendix D1a. Crooked River Run Timing Graph, 2000.



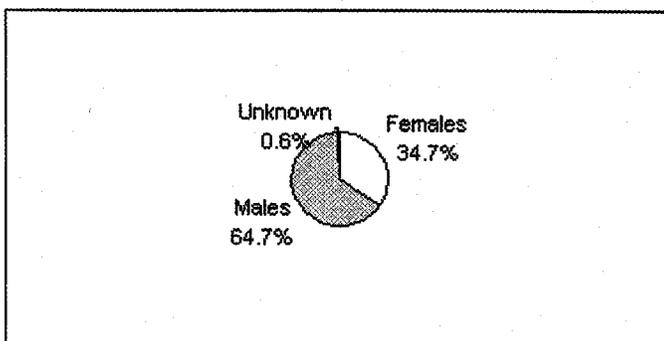
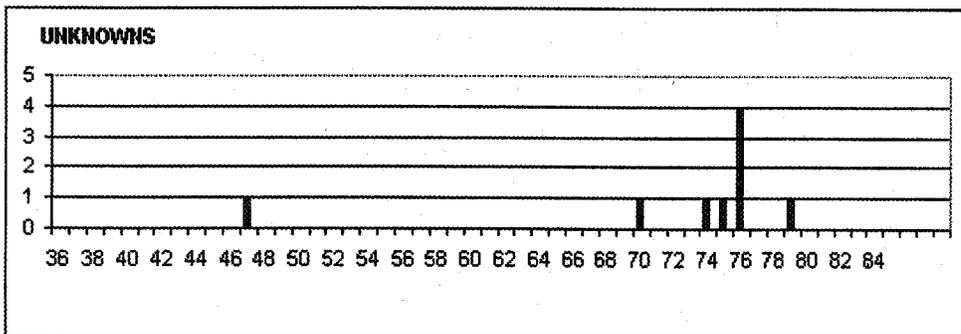
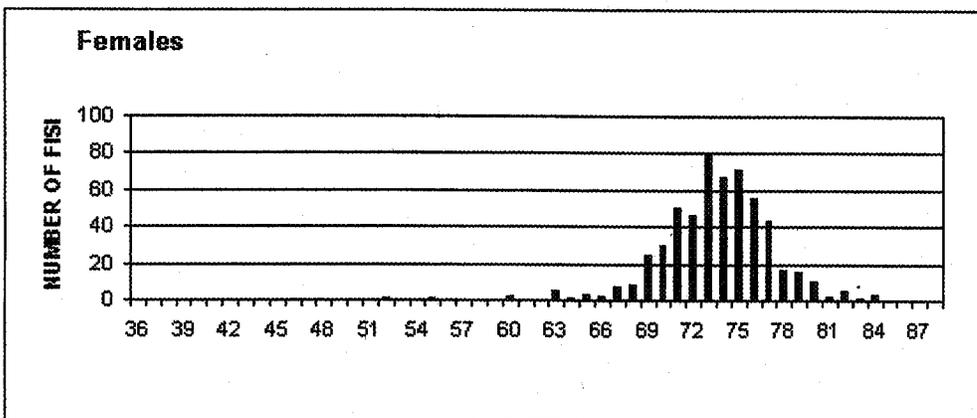
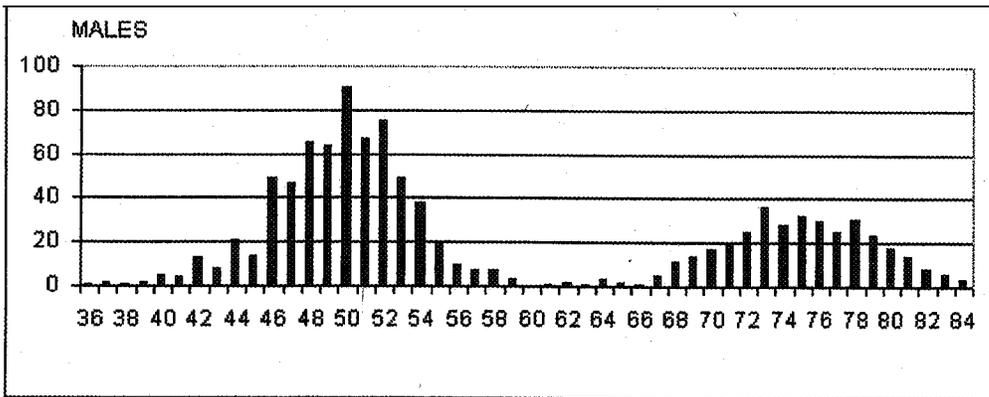
Appendix D2. South Fork (Red River/Crooked River) chinook length frequency.

Length (cm)	Females	Males	Unk	Total
36	0	1	0	1
37	0	2	0	2
38	0	1	0	1
39	0	2	0	2
40	0	5	0	5
41	0	4	0	4
42	0	13	0	13
43	0	8	0	8
44	0	21	0	21
45	0	14	0	14
46	0	49	0	49
47	0	47	1	48
48	0	65	0	65
49	0	64	0	64
50	0	90	0	90
51	0	67	0	67
52	1	75	0	76
53	0	49	0	49
54	0	38	0	38
55	1	19	0	20
56	0	10	0	10
57	0	7	0	7
58	0	7	0	7
59	0	3	0	3
60	2	0	0	2
61	0	1	0	1
62	0	2	0	2
63	5	1	0	6
64	1	3	0	4
65	3	2	0	5
66	2	1	0	3
67	7	5	0	12
68	8	11	0	19
69	25	14	0	39
70	30	17	1	48
71	51	20	0	71
72	46	25	0	71
73	79	36	0	115

Length (cm)	Females	Males	Unk	Total
74	67	28	1	96
75	71	32	1	104
76	56	30	4	90
77	43	25	0	68
78	17	31	0	48
79	15	23	1	39
80	10	18	0	28
81	2	14	0	16
82	5	8	0	13
83	1	6	0	7
84	3	3	0	6
85	0	5	0	5
86	0	2	0	2
87	0	2	0	2
88	0	1	0	1
TOTAL	551	1027	9	1587

*This includes 130 fish transferred from Powell
 NOTE: 13 females and 2 males were released and not measured.

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

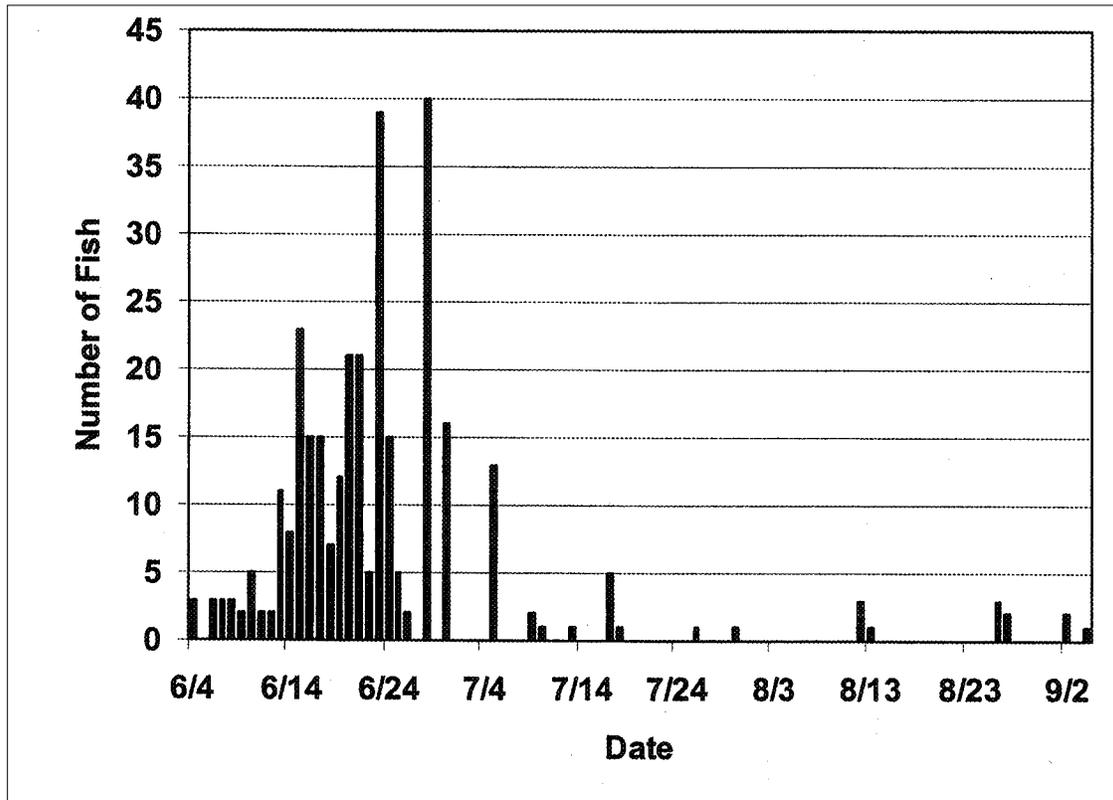


Appendix E1. Red River chinook run timing, 2000.

DATE	ADULT	JACKS	TOTAL
6/4	2	1	3
6/5	0	0	0
6/6	3	0	3
6/7	3	0	3
6/8	3	0	3
6/9	0	2	2
6/10	5	0	5
6/11	2	0	2
6/12	2	0	2
6/13	6	5	11
6/14	6	2	8
6/15	16	7	23
6/16	11	4	15
6/17	10	5	15
6/18	7	0	7
6/19	9	3	12
6/20	9	12	21
6/21	1	20	21
6/22	4	1	5
6/23	8	31	39
6/24	6	9	15
6/25	3	2	5
6/26	2	0	2
6/27	0	0	0
6/28	7	33	40
6/29	0	0	0
6/30	0	16	16
7/1	0	0	0
7/2	0	0	0
7/3	0	0	0
7/4	0	0	0
7/5	2	11	13
7/6	0	0	0
7/7	0	0	0
7/8	0	0	0
7/9	0	2	2
7/10	1	0	1
7/11	0	0	0
7/12	0	0	0
7/13	0	1	1
7/14	0	0	0
7/15	0	0	0
7/16	0	0	0
7/17	1	4	5
7/18	1	0	1
7/19	0	0	0
7/20	0	0	0

DATE	ADULT	JACKS	TOTAL
7/21	0	0	0
7/22	0	0	0
7/23	0	0	0
7/24	0	0	0
7/25	0	0	0
7/26	0	1	1
7/27	0	0	0
7/28	0	0	0
7/29	0	0	0
7/30	0	1	1
7/31	0	0	0
8/1	0	0	0
8/2	0	0	0
8/3	0	0	0
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	3	3
8/13	0	1	1
8/14	0	0	0
8/15	0	0	0
8/16	0	0	0
8/17	0	0	0
8/18	0	0	0
8/19	0	0	0
8/20	0	0	0
8/21	0	0	0
8/22	0	0	0
8/23	0	0	0
8/24	0	0	0
8/25	0	0	0
8/26	1	2	3
8/27	0	2	2
8/28	0	0	0
8/29	0	0	0
8/30	0	0	0
8/31	0	0	0
9/1	0	0	0
9/2	2	0	2
9/3	0	0	0
9/4	0	1	1
TOTAL	133	182	315

Appendix E1a. Red River Run Timing Graph, 2000.



Appendix E2. South Fork chinook summary of fish trapped, released, spawned and disposition of carcasses, Brood Year 2000.

TOTAL FISH TRAPPED: 1472

AGE CLASSES	<u>FEMALES</u>	<u>MALES</u>	<u>UNKNOWN</u>
Unknown	13	2	0
3 Years = (<64 cm)	3	655	1
4 Years = (64 - 82 cm)	483	284	8
5 Years = (> 83 cm)	4	19	0
	<u>503</u>	<u>960</u>	<u>9</u>

FISH DISPOSITION FEMALES:

Spawned	376	
Mort	61	
Released	<u>126</u>	
TOTAL	563	*

FISH DISPOSITION MALES:

Spawned	397	
Mort	54	
Released	577	
Killed	<u>2</u>	
TOTAL	1030	*

UNKNOWN SEX DISPOSITION:

Mort	1	
Released	<u>8</u>	
	9	

*Includes the 60 females and 70 males transferred from Powell.

All spawning carcasses were disposed in Red River and Crooked River

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 Fall 1994 (e)	199,255 216,280	94 (g)	1996	935	1997	213	1998	1274	0.134%
	Spr 1995 Spr 1995	258,293 <u>279,615</u> <u>953,443</u>								
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	0.000%
1996	Spr 1998	205,906	122	1999	637	2000	101	2001	860**	0.417%
1997	Fall 1998 Spr 1999	162,119 <u>600,981</u> <u>763,100</u>	454	2000	1978**	2001		2002		
1998	Fall 1999 Spr 2000	89,299 <u>399,060</u> <u>488,359</u>	34**	2001		2002		2003		
1999	Fall 2000 Spr 2001	105,507 <u>84,649</u> <u>190,156</u>		2002		2003		2004		
2000	Fall 2001 Spr 2002	155,887 726,489		2003		2004		2005		

(a) Transferred from Dworshak Hatchery

(b) Direct released from Kooskia Fish Hatchery

(c) Transferred from Dworshak and Rapid River hatcheries

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

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

(f) Non-acclimated release

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

*Natural Fish.

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

Appendix F2. Summary of spring chinook returns to Red River by brood year.

Brood Year	Year Released	Number Released	3-yr-olds	Year Returned	4-yr-olds	Year Returned	5-yr-olds	Year Returned	Total by return plant	% return from
1982	Fall 1983 Spr 1984	260,000 40,000	2	1985	a	1986	107	1987	109	0.036%
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) Spr 1987 (c)	96,400 96,800	3	1988	25	1989	13	1990	41	0.021%
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 Spr 1991 (d) Spr 1991(e)	273,800 63,000 124,000	5	1992	99	1993	13	1994	117	0.025%
		<u>460,800</u>								
1990	Fall 1991 Spr 1992 (f)	354,700 207,500	1	1993	18	1994	1	1995	20	0.004%
		<u>562,200</u>								
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		2000	66**	2001	162	0.316%
1997	Fall 1998 Spr 1999	66,114 360,983	1 178	2000 2000	1244**	2001 2001		2002 2002		
1998	Fall 1999 Spr 2000	74,981 159,051	23**	2001		2002		2003		
		<u>234,032</u>								
1999	Fall 2000	68,684		2002		2003		2004		
2000	Fall 2001 Spr 2002	84,238 350,318		2003		2004		2005		

(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 National Fish Hatchery, Clearwater Stock

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

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

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

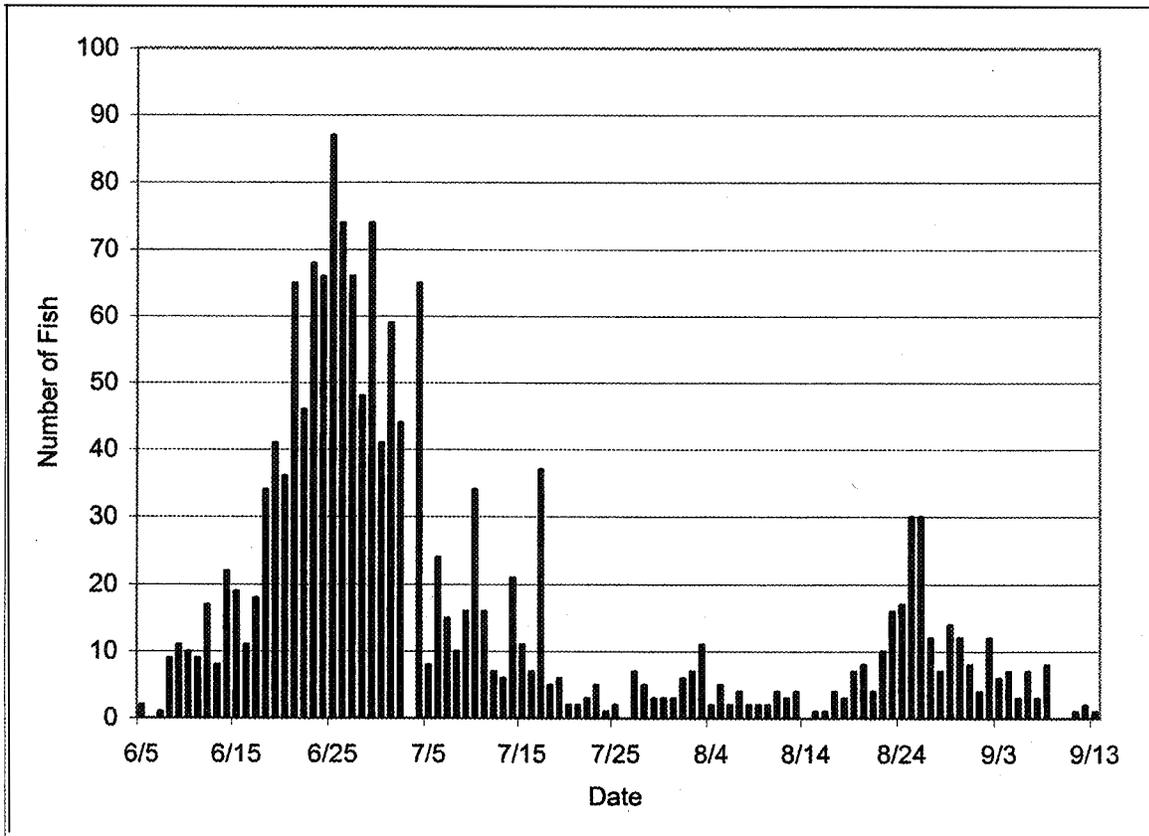
**Does not include fish caught in fishery or left in river.

Appendix G1. Powell and Crooked Fork Creek chinook run timing 2000.

Date	Adults	Jacks	Total
6/5	2	0	2
6/6	0	0	0
6/7	1	0	1
6/8	9	0	9
6/9	11	0	11
6/10	10	0	10
6/11	9	0	9
6/12	17	0	17
6/13	6	2	8
6/14	22	0	22
6/15	15	4	19
6/16	10	1	11
6/17	16	2	18
6/18	31	3	34
6/19	39	2	41
6/20	33	3	36
6/21	54	11	65
6/22	37	9	46
6/23	49	19	68
6/24	55	11	66
6/25	62	25	87
6/26	67	7	74
6/27	57	9	66
6/28	40	8	48
6/29	58	16	74
6/30	36	5	41
7/1	36	23	59
7/2	34	10	44
7/3	0	0	0
7/4	56	9	65
7/5	8	0	8
7/6	18	6	24
7/7	15	0	15
7/8	10	0	10
7/9	16	0	16
7/10	12	22	34
7/11	16	0	16
7/12	7	0	7
7/13	6	0	6
7/14	21	0	21
7/15	11	0	11
7/16	7	0	7
7/17	7	30	37
7/18	5	0	5
7/19	6	0	6
7/20	2	0	2
7/21	2	0	2
7/22	3	0	3
7/23	5	0	5
7/24	1	0	1
7/25	2	0	2
7/26	0	0	0
7/27	7	0	7
7/28	5	0	5
7/29	3	0	3

Date	Adults	Jacks	Total
7/30	3	0	3
7/31	3	0	3
8/1	5	1	6
8/2	7	0	7
8/3	2	9	11
8/4	2	0	2
8/5	2	3	5
8/6	1	1	2
8/7	3	1	4
8/8	0	2	2
8/9	2	0	2
8/10	2	0	2
8/11	4	0	4
8/12	3	0	3
8/13	3	1	4
8/14	0	0	0
8/15	1	0	1
8/16	1	0	1
8/17	4	0	4
8/18	3	0	3
8/19	7	0	7
8/20	8	0	8
8/21	4	0	4
8/22	10	0	10
8/23	11	5	16
8/24	11	6	17
8/25	22	8	30
8/26	21	9	30
8/27	10	2	12
8/28	5	2	7
8/29	11	3	14
8/30	8	4	12
8/31	5	3	8
9/1	2	2	4
9/2	5	7	12
9/3	2	4	6
9/4	4	3	7
9/5	2	1	3
9/6	2	5	7
9/7	1	2	3
9/8	6	2	8
9/9	0	0	0
9/10	0	0	0
9/11	0	1	1
9/12	2	0	2
9/13	1	0	1
Total	1278	324	1602

Appendix G1a. Powell and Crooked Fork Creek Chinook Run Timing Graph, 2000



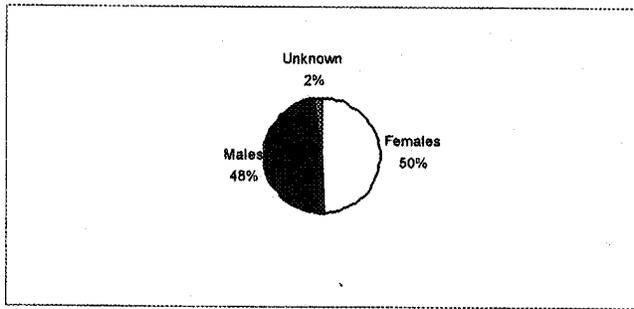
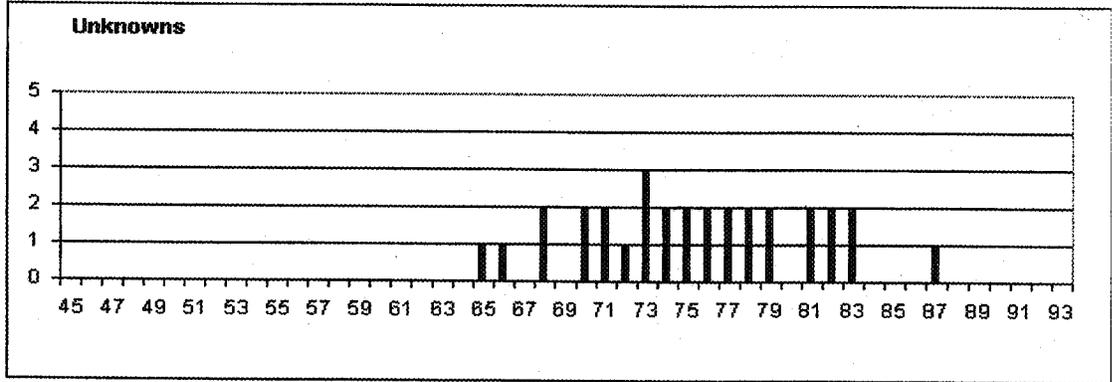
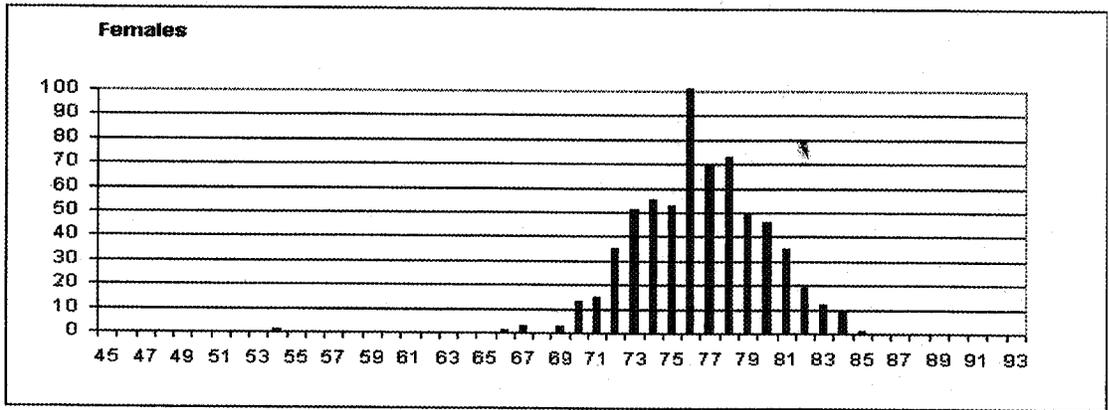
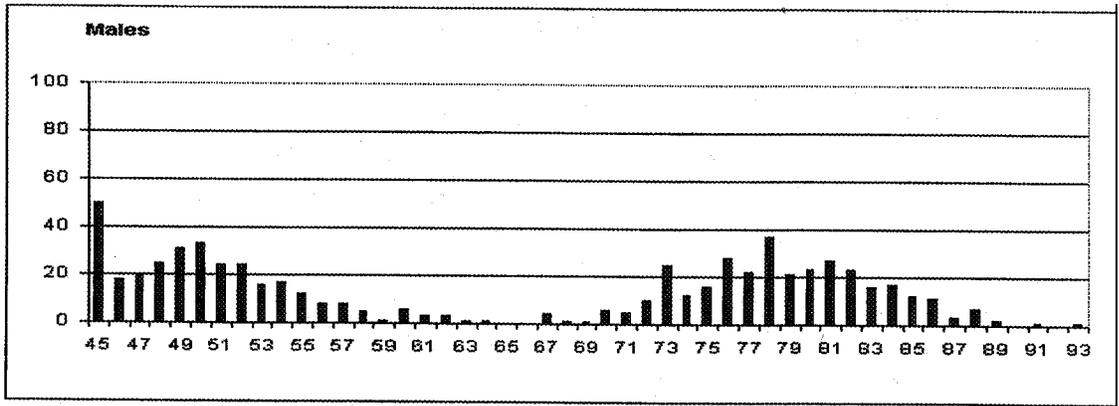
Appendix G2. Powell and Crooked Fork Creek chinook length frequency

Length (cm)	Females	Males	Unk	Total
45	0	50	0	50
46	0	18	0	18
47	0	20	0	20
48	0	25	0	25
49	0	31	0	31
50	0	33	0	33
51	0	24	0	24
52	0	24	0	24
53	0	16	0	16
54	1	17	0	18
55	0	12	0	12
56	0	8	0	8
57	0	8	0	8
58	0	5	0	5
59	0	1	0	1
60	0	6	0	6
61	0	3	0	3
62	0	3	0	3
63	0	1	0	1
64	0	1	0	1
65	0	0	1	1
66	1	0	1	2
67	3	4	0	7
68	0	1	2	3
69	3	1	0	4
70	13	6	2	21
71	15	5	2	22
72	35	10	1	46
73	51	25	3	79
74	55	12	2	69
75	53	16	2	71
76	103	28	2	133
77	70	22	2	94
78	73	37	2	112
79	50	21	2	73
80	46	23	0	69
81	35	27	2	64
82	19	23	2	44
83	12	16	2	30
84	9	17	0	26

Length (cm)	Females	Males	Unk	Total
85	1	12	0	13
86	0	11	0	11
87	0	3	1	4
88	0	7	0	7
89	0	2	0	2
90	0	0	0	0
91	0	1	0	1
92	0	0	0	0
93	0	1	0	1
TOTAL	648	637	31	1316

*NOTE: 80 females and 76 males were released and not measured.

Appendix G2a. Powell and Crooked Fork Creek Length Frequency Graph, 2000.



Appendix G3. Powell chinook summary of fish trapped, released, spawned and disposition of carcasses for Powell and Crooked Fork adult traps, Brood Year 2000.

TOTAL FISH TRAPPED: 1602

AGE CLASSES	FEMALES	MALES	UNKNOWN
Unknown*	80	76	0
3 Years = (<64 cm)	1	304	0
4 Years = (64 - 82 cm)	626	262	31
5 Years = (> 83 cm)	22	70	0
Transferred to South Fork	60	70	0
TOTAL	789	782	31

*Released before determining sex

FISH DISPOSITION FEMALES:

Spawned	551
Mortality	70
Killed	0
Transferred	60
Released	108
TOTAL	789

FISH DISPOSITION MALES:

Spawned	335
Mortality	204
Killed	50
Transferred	70
Released	123
TOTAL	782

UNKNOWN SEX DISPOSITION:

Releases 31

*includes 29 jacks given to food bank and 21 jacks given to Nez Perce Tribe

All spawning carcasses with no clinical signs of BKD were disposed of in the Lochsa River basin

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

Brood Year	Year Released	Number Released	3-yr-olds	Year Returned	4-yr-olds	Year Returned	5-yr-olds	Year Returned	Total by return	% return from plant
1984	Spr 1986	-----		1987		1988	16	1989	16	
1985	Spr 1987	-----		1988	111	1989	20	1990	131	
1986	Spr 1988 (a)	200,100	27	1989	157	1990	10	1991	194	0.097%
1987	Spr 1989 (b)	200,639	2	1990	16	1991	15	1992	33	0.016%
1988	Fall 1989	314,500	7	1991	249	1992	288	1993	544	0.173%
1989	Fall 1990	307,100	6	1992	204	1993	57	1994	267	0.054%
	Spr 1991 (c)	180,764								
1990	Fall 1991	358,400	8	1993	28	1994	1	1995	37	0.007%
	Spr 1992 (d)	150,800								
	Spr 1992 (e)	53,500								
		<u>562,700</u>								
1991	Fall 1992 (f)	500	1	1994	1	1995	0	1996	2	0.400%
	Fall 1992 (g)									
1992	Spr 1994 (h)	144,823	12	1995	141	1996	129	1997	268	0.102%
	Spr 1994 (i)	61,060								
	Spr 1994 (j)	55,745								
		<u>261,628</u>								
1993	Fall 1994	311,690	45	1996	587	1997	310	1998	942	0.156%
	Spr 1995	290,417								
		<u>602,107</u>								
1994	Spr 1996	232,731	2	1997	177	1998	53	1999	232	0.099%
1995	Spr 1997	3,549	1	1998	8	1999		2000		
1996	Spr 1998	244,847	119	1999		2000		2001		
1997	Fall 1998	330,555		2000						
	Spr 1999	334,482								
		<u>665,037</u>								
1998	Spr 2000	293,522		2001						
1999	Spr 2001	212,648		2002		2003		2004		
2000	Fall 2001	559,630		2003		2004		2005		
	Spr 2002	349,890								

- (a) Rapid River stock reared at Dworshak
- (b) Clearwater stock reared at Kooskia and Dworshak
- (c) Clearwater stock reared at Kooskia; acclimated in rearing pond
- (d) Acclimated 21 days in rearing pond before release into Walton Creek, 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 Creek
- (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. Brood year 2000 chinook egg take and eye-up

POWELL

Spawn Date	Number Females Spawned	Number Adult Males	Number Jacks	Number Females Culled	Number Production Females	Number Green Eggs	Number Eyed Eggs	
8/3	39	78	3	6	33	127,554	108,290	
8/7	40	80	1	2	38	128,573	103,819	
8/10	55	110	2	2	53	242,165	219,852	
8/14	121	242	30	17	104	466,223	390,794	
8/17	77	154	36	3	74	295,683	256,830	
8/21	155	310	36	10	145	568,789	523,801	
8/24	59	118	54	3	56	188,085	171,005	
8/28	5	10	4	0	5	18,014	17,073	
TOTAL	551	1,102	166	43	508	2,035,086	1,791,494	88.0%
						Fecundity = _____eggs/f	4,006	per/female

SOUTH FORK

8/4	1	2	0	0	1	2,847	1,564	
8/11	5	10	2	0	5	16,485	16,249	
8/18	4	4	0	1	3	12,905	8,149	
8/22	2	4	0	0	2	8,159	5,391	
8/25	5	8	1	1	4	11,127	10,756	
8/29	9	18	1	3	6	23,486	12,000	
9/1	9	18	0	6	3	12,999	11,742	
9/5	24	48	5	4	20	70,919	63,308	
9/8	27	54	9	5	22	78,631	65,518	
9/12	50	100	29	23	27	99,540	90,031	
9/15	46	92	11	18	28	108,661	97,819	
9/18	46	92	10	27	19	64,308	57,592	
9/22	59	118	39	33	26	97,764	71,154	
9/26	40	80	8	19	21	68,444	46,150	
9/29	29	58	25	21	8	26,621	19,440	
10/3	14	28	10	11	3	12,118	11,354	
10/6	6	12	5	6	0	0	0	
TOTAL	376	746	155	178	198	715,014	588,217	82.3%
						Fecundity = _____ eggs /f	3,611	per/female

*Adult males used more than once for spawning, jacks only once

Lyons Ferry-NPT		Rapid River eggs	
Date Received	Eggs Received	Date Received	Eggs Received
9/20	18,868	9/29	410,468
9/28	112,926	10/2	503,070
10/6	200,000		913,538
10/13	251,720		
10/20	92,500		
	676,014		

Appendix J. Production cost for BY-00 Chinook and BY-01 North Fork Steelhead.

Rearing to Release:

	Chinook BY-00	North Fork Steelhead BY-01
Number Produced	3,780,580	575,071
Weight	195,418	63,113
% Mortality (From eyed eggs)\	3.9%	44.7%
Conversion Rate	1.29	1.54

FOOD FED AND WEIGHT GAINED

	Chinook (BY-00)	North Fork Steelhead (BY-00)
Period Fed	November 2000-April 2002	May 2001-April 2002
Feed Used lbs.	2521,457*	113,018
Weight Gain	195,418	73,373
Feed Cost	<u>\$161,162.77**</u>	<u>\$47,478</u>

Total Feed Cost \$208,640.77

Average Cost per pound only

Chinook: \$0.82
 Steelhead: \$0.65

*Includes Nez Perce Tribes Food Fed.

**Does not include Nez Perce Tribes expenditures for Feed.

Cost Per 1,00 fish using entire budget

Chinook \$200.00
 Steelhead \$702.00
 Combined \$472.00

Appendix K2. Crooked River Brood Year 2000 spring chinook, summary of fish autopsy, Spring 2002 release

ACCESSION NO:	02-119	LOCATION:	Crooked River Satellite
SPECIES:	Chinook Spring	AUTOPSY DATE:	04/04/02
STRAIN:	SF CLW SC	AGE:	Juv
UNIT:	All ponds sampled	SAMPLE SIZE:	20
REASON FOR AUTOPSY:	prelib		
AUTOPSY:			
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	40.5	6.73	0.16
LEUCOCRIT	0.00	0.00	0.00
SERUM PROTEIN	9.24	2.61	.28

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

VALUES AS PERCENTS OF TOTAL SAMPLE

EYES		GILLS		PSEUDO-BRANCHS		THYMUS		MESEN. FAT		SPLEEN		HIND GUT		KIDNEY		LIVER		BILE	
N	20	N	20	N	20	0	20	0	0	B	0	0	20	N	20	A	0	0	0
B1	0	F	0	S	0	1	0	1	1	R	20	1	0	S	0	B	0	1	0
B2	0	C	0	L	0	2	0	2	2	G	0	2	0	M	0	C	20	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=3.15								OT	0		
M1	0																		
OT	0																		

SUMMARY OF NORMALS

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

GENERAL REMARKS:

FINS:	GONADS:
GOOD	
SKIN: LOSING SCALES	OTHER:

Appendix K4. Powell Brood Year 2000 chinook, summary of fish autopsy, Spring 2002 release.

ACCESSION NO: 02-121 **LOCATION:** Powell Satellite
SPECIES: Chinook Spring **AUTOPSY DATE:** 04/05/02
STRAIN: POW SC **AGE:** Juv
UNIT: All ponds sampled **SAMPLE SIZE:** 20
REASON FOR AUTOPSY: prelib
AUTOPSY:
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	45.4	6.28	0.138
LEUCOCRIT	0.00	0.00	0.00
SERUM PROTEIN	9.11	0.85	0.094

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

VALUES AS PERCENTS OF TOTAL SAMPLE

EYES		GILLS		PSEUDO-BRANCHS		THYMUS		MESEN. FAT		SPLEEN		HIND GUT		KIDNEY		LIVER		BILE	
N	20	N	20	N	20	0	20	0	0	B	0	0	20	N	20	A	0	0	0
B1	0	F	0	S	0	1	0	1	0	R	20	1	0	S	0	B	2	1	0
B2	0	C	0	L	0	2	0	2	4	G	0	2	0	M	0	C	18	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	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=3.15								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
SEX	M: 0			F: 0				U: 0							

GENERAL REMARKS:

FINS: GOOD
SKIN: LOSING SCALES
GONADS:
OTHER:

Appendix L. Clearwater Fish Hatchery BY2000 spring chinook fish marking and distribution summary

DATE PLANTED	RELEASE SITE	LENGTH	TOTAL POUNDS	NUMBER PER/LB	TOTAL PLANTED	MARKS
17-Jul-01	SELWAY R	3.45	1,498	69.30	103,811	Ad only
24-Jul-01	PETE KING CR	3.80	268	63.59	17,025	ALL CWT, NO AD, 1000 PIT
24-Jul-01	SQUAW CR	3.80	228	61.04	13,919	ALL CWT, NO AD, 700 PIT
25-Jul-01	COLT KILLED CR	4.50	10,192	29.42	298,742	All LV, 700 PIT
28-Sep-01	RED R	4.50	3,074	27.40	84,238	RV, 500 PIT
28-Sep-01	CROOKED R	5.04	7,986	19.52	155,887	LV, 500 PIT
01-Oct-01	WALTON CR	4.40	19,100	29.30	559,630	AD, 700 PIT
10-Oct-01	BOULDER CR	3.56	2,043	51.26	104,720	AD
11-Oct-01	MEADOW CR	4.00	1,704	52.5	89,490	AD, PIT 1825
TOTAL		4.84	46,093	31.00	1,427,462	

09-Apr-02	N.F. Clearwater	5.27	10,588	19.50	206,473	all ad-clipped
10-Apr-02	Walton Creek	5.70	22,809	15.34	349,890	All Ad clips, 300 PIT tags
10-Apr-02	Papoose Cr	5.75	3,830	15.00	57,461	cwt, no clips, 750 pit
4/10						
4/12/02	Crooked River	5.70	47,545	15.28	726,489	All ad clips, 300 PIT tags
4/10						
4/12/02	Red River	5.70	22,897	15.36	350,318	All ad clips, 300 PIT tags
TOTAL		5.73	107,669	15.70	1,690,631	

Released by NPT

02-Apr-02	Lolo Creek	5.62	9,249	16.13	149,185	All CWT, 1,000 Pit tags
02-Apr-02	Mill Creek	5.75	2,695	15.00	40,433	All CWT
05-Apr-02	Boulder Creek*	5.47	5,798	17.50	101,473	All CWT
04-Apr-02	Newsome Creek	5.53	4,411	16.90	74,555	All CWT, 1,000 Pit tags
16-Apr-02 - 26-Apr-02	Meadow Creek (Selway R)	5.70	19,503	15.22	296,841	All blank CWT, No clips, 1008 PIT
TOTAL		5.61	41,656	15.90	662,487	

*This includes the 20,000 that were to go to Warm Spring

Appendix M. Brood Year 2001 Steelhead (B) eggs received from Dworshak National Fish Hatchery

EGG TAKE NUMBER	SPAWN DATE	EYED EGG DELIVER DATE	NUMBER EYED EGGS	TEMPERATURE UNITS
6	3/5/01	3/23/01	447,083	373
7	3/12/01	3/30/01	223,051	375
8	3/19/01	4/9/01	221,067	374
Magic Valley	3/12/01	Green	148,471	Green
TOTAL			1,039,672	

STOCK	#EYED EGGS	RELEASED SMOLTS	PERCENT SURVIVAL
Dworshak	1,039,672*	575,071	55.3%

*includes 148,471 eyed-eggs taken from Magic Valley steelhead program (received green).

Appendix O. Brood Year 2001, North Fork steelhead marking and distribution.

SITE	DATE	LENGTH	POUNDS	NUMBER PER/LB	NUMBER PLANTED	MARKS
S F Clearwater (Red House Hole)	19-Apr-02	7.40	19,662	7.00	138,769	60K CWT, AD/LV, 80K Ad only, 302 pit
Clear Cr	19-Apr-02	7.70	6,532	6.20	40,499	All ad only
Red R	25-Apr-02	6.70	18,595	9.75	181,316	150K No clip, 30K Ad clip, 299 PIT
Crooked River	26-Apr-02	7.60	20,684	6.57	136,027	85K no clip, 20K CWT no clip, 21K Ad-clip, 601 PIT
TOTAL		7.35	65,473	7.58	496,611	

Releases by NPT

SITE	DATE	LENGTH	POUNDS	NUMBER PER/LB	NUMBER PLANTED	MARKS
Mill Cr	29-Apr-02	6.80	3,450	10.00	34,000	no clips
Meadow Cr	29-Apr-02	6.80	2,650	10.00	26,460	no clips
Lolo Cr	29-Apr-02	6.70	1,800	10.00	18,000	no clips
TOTAL		7.13	7,900	9.93	78,460	
		7.24	73,373	7.84	575,071	

Submitted by

Brad George
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Fish Culturist

Approved by:

Virgil K. Moore, Chief
Fisheries Bureau

Tom Rogers
Anadromous Fish Hatcheries Supervisor