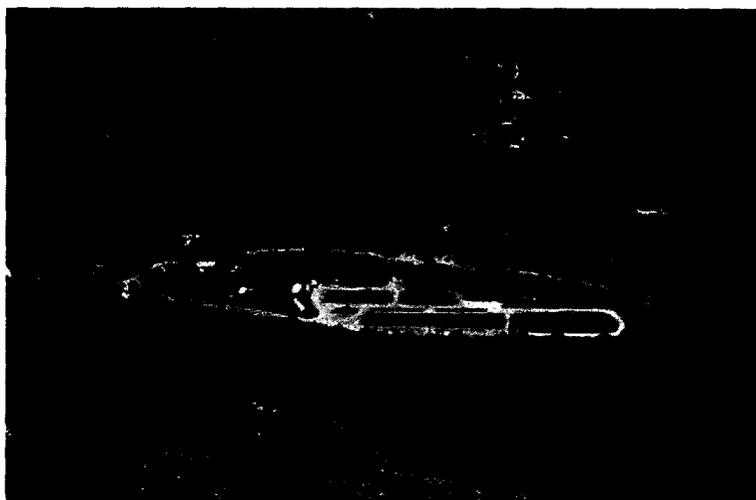


# **RAPID RIVER FISH HATCHERY**

## **2002 BROOD YEAR REPORT**



By

Ralph E. Steiner, Fish Hatchery Manager 2  
Nicola A. Johnson, Fish Hatchery Assistant Manager

February 2009  
09-116

## TABLE OF CONTENTS

ABSTRACT .....	1
INTRODUCTION .....	3
Funding Source .....	3
Location .....	3
Objectives .....	3
FACILITY DESCRIPTION.....	3
Recommended Facility Improvements .....	4
Water Supply .....	5
Water Source .....	5
Water Supply .....	5
Staffing .....	6
FISH PRODUCTION .....	6
Adult Collection .....	6
Spring Chinook Salmon Returns to Rapid River .....	6
Spring Chinook Salmon Transferred from Hells Canyon .....	8
Inventory of Ancillary Species Trapped in Rapid River .....	8
Fisheries .....	9
Adult Holding .....	9
Adult Treatments.....	9
Prespawning Mortality.....	9
Salmon Spawning .....	10
Incubation .....	10
Early Rearing .....	11
Final Rearing .....	12
Feed Use and Conversion .....	12
Fish Health.....	12
Diseases Encountered and Treatment .....	13
Organosomatic Index .....	13
Acute and Chronic Losses.....	13
Other Assessments .....	13
Fish Marking .....	14
Fish Distribution .....	14
Egg Transfers.....	14
Fingerling Transfers .....	14
Smolt Releases .....	15
Cost of Production .....	15
HISTORICAL INFORMATION .....	16

## TABLE OF CONTENTS

ACKNOWLEDGMENTS .....	17
LITERATURE CITED.....	18
APPENDICES .....	19
Appendix 1. Rapid River Hatchery production capacity. ....	20
Appendix 2. Rapid River Hatchery pond volume. ....	20
Appendix 3. Rapid River Hatchery adult holding pond temperatures (°F) for 2002. ....	20
Appendix 4. Rapid River water quality analysis. ....	21
Appendix 5. Rapid River releases and recaptures during 2002. ....	23
Appendix 6. Rapid River Fish Hatchery releases outside Salmon River Basin in 2002. ....	25
Appendix 7. Rapid River marked spring Chinook salmon run timing for 2002.....	26
Appendix 8. Chinook salmon returns to Rapid River trap during 2002.....	27
Appendix 9. Rapid River spring Chinook salmon broodstock lengths for 2002. ....	28
Appendix 10. Length-frequency of Rapid River Fish Hatchery broodstock for 2002. ....	29
Appendix 11. Rapid River Hatchery returns with jaw tags during 2002.....	30
Appendix 12. Rapid River Hatchery returns with VI, radio, or floy tags during 2002. ....	31
Appendix 13. Injuries to Chinook salmon returning to Rapid River Hatchery for 2002. ..	31
Appendix 14. Rapid River unmarked Chinook salmon run timing for 2002. ....	32
Appendix 15. Rapid River unmarked Chinook salmon lengths for 2002.....	33
Appendix 16. Rapid River steelhead run timing for 2002. ....	34
Appendix 17. Adult steelhead returns to Rapid River during 2002.....	35
Appendix 18. Rapid River steelhead fork lengths for 2002. ....	36
Appendix 19. Length-frequency of steelhead returning to Rapid River trap during 2002. ....	37
Appendix 20. Rapid River bull trout run timing for 2002.....	38
Appendix 21. Adult bull trout returns to Rapid River trap during 2002.....	39
Appendix 22. Rapid River bull trout lengths for 2002.....	40
Appendix 23. Length-frequency of adult bull trout returning to Rapid River during 2002. ....	41
Appendix 24. Species trapped in Rapid River during 2002.....	42
Appendix 25. Causes of prespawning mortality at Rapid River Hatchery for 2002,.....	42
Appendix 26. Cumulative prespawning mortality at Rapid River Fish Hatchery for 2002, ....	43
Appendix 27. Rapid River broodstock ELISA results for 2002, ....	44
Appendix 28. Rapid River Hatchery egg enumeration for 2002, ....	45
Appendix 30. Rapid River Hatchery final raceway loading densities (5/31/03),.....	46
Appendix 31. Rapid River Hatchery initial pond loading densities (6/19/03 to 7/18/03), ..	47
Appendix 32. Rapid River Hatchery pond loading densities at release (3/15/04), .....	47
Appendix 33. Feed for Brood Year 2002 at Rapid River Hatchery, .....	48
Appendix 34. Eagle Fish Health Laboratory inspection results for Brood Year 2002,.....	49
Appendix 35. Preliberation organosomatic index for Brood Year 2002, .....	50
Appendix 36. Rapid River Hatchery marking summary for Brood Year 2002, .....	51
Appendix 37. Smolts released from Rapid River Hatchery in 2004 (brood year 2002), ..	52

## TABLE OF CONTENTS

Appendix 38. Egg to release survival at Rapid River Hatchery for brood year 2002, .....	53
Appendix 39. Cost of production at Rapid River Hatchery for brood year 2002, .....	53
Appendix 40. Returns to Rapid River Hatchery from 1964 to 2002, .....	54
Appendix 41. Returns to Rapid River Hatchery by Brood Year, .....	55
Appendix 42. Ten year average feed and growth data for Rapid River Hatchery, .....	57
Appendix 43. Release and transfer summary for Rapid River Hatchery for 1964-2002, .....	58

## ABSTRACT

The production of spring Chinook salmon (*Oncorhynchus tshawytscha*) smolts at Rapid River Fish Hatchery (RRFH) partially fulfills Idaho Power Company's (IPC) mitigation responsibility for impacts to anadromous fish associated with the construction and operation of the Hells Canyon Dam Complex. The RRFH is owned and funded by IPC and operated by the Idaho Department of Fish and Game (Department).

The RRFH fish trap operated from March 20 to September 12, 2002. From May 3 to August 28, 6600 (225 jacks and 6,375 adults) marked spring Chinook salmon were trapped. During trapping, 2,856 were marked and returned to the Salmon and Little Salmon Rivers to re-enter fisheries and 388 were recaptured. An additional 503 were transported to Boise by RRFH personnel. After a single mortality during transport, 496 were released into the Boise River and 6 were released at the Morrison Knudson Nature Center. The Nez Perce Tribe transported 231 to the Clearwater River drainage for release. The Shoshone Bannock Tribe received 250 for subsistence. Finally, 5 were sacrificed for a study of nitrogen embolisms conducted by the U.S. Department of Energy Pacific Northwest National Laboratory.

There were 3,143 Rapid River returns held and an additional 27 fish received from Oxbow Fish Hatchery yielding 3,170 fish ponded. They and the 5 study fish were used to generate length- frequency, age-class and sex ratio statistics for the 2002 run. Records were kept on a subsample of 3,153. The adult sex ratio of the subsample was 1,385 males (43.9%), and 1,768 females (56.1%). The age-class structure was 118 three-year-olds (3.7%), 2,878 four-year-olds (91.3%), and 157 five-year-olds (5.0%).

Ancillary species were trapped in 2002. From May 20 to August 13, 285 unmarked Chinook salmon were trapped and released into Rapid River above the weir. Of these, 13 were recaptured. The age-class composition of the unmarked salmon was 2 three-year-olds, 274 four-year-olds, and 9 five-year-olds. The adult sex ratio was 138 males and 145 females. From March 21 to July 29, 320 steelhead (*Oncorhynchus mykiss*) were trapped. The sex ratio by origin of the returning steelhead was 39 wild males, 67 wild females, 130 hatchery males, and 84 hatchery females. Wild steelheads were released above the weir. Hatchery steelheads were released into the Little Salmon River. From May 29 to July 27, 359 bull trout (*Salvelinus confluentus*) were trapped and released above the weir.

Fisheries were open on the Snake, Salmon, and Little Salmon Rivers in 2002. The Department estimated harvest of 1,478 marked spring Chinook salmon in the Salmon River, 4,889 in the Little Salmon River, and 105 in the Snake River. Nez Perce Tribal officials reported subsistence and commercial harvest of 2,799 Chinook salmon.

Prespawning mortality of the 3,153 recorded broodstock was 624 fish or 19.8%. The sex ratio was 234 males (7.4%), 390 females (12.4%).

Spawning occurred from August 16 to September 12, 2002. A total of 1,305 females were spawned producing a total egg take of 4,596,671 green eggs. Eggs from 263 females were culled (926,379 eggs) leaving 3,670,292 green eggs from 1042 females. Average fecundity was 3,522 eggs/ female and eye-up was 3,217,320 or 87.7%.

Fingerlings were marked and moved from raceways to rearing ponds in June and July 2003. Markers reported 3,608,831 were Adipose-clipped and 340,462 were also coded-wire-tagged. In February 2004, 51,972 received PIT tags for CSS.

From March 17- April 28, 2004, 3,562,154 smolts were released including: 499,956 into the Snake River below Hells Canyon Dam, 300,140 into the Little Salmon River, and 2,762,058 into Rapid River.

**Authors:**

**Ralph E. Steiner  
Fish Hatchery Manager 2**

**Nicola A. Johnson  
Assistant Fish Hatchery Manager**

## **INTRODUCTION**

### **Funding Source**

The Rapid River Fish Hatchery (RRFH) was constructed in 1964 by Idaho Power Company (IPC) to mitigate for the loss of spring Chinook salmon (*Oncorhynchus tshawytscha*) due to construction of Brownlee, Oxbow, and Hells Canyon dams. Mitigation mandated by the Federal Energy Regulatory Commission requires IPC to provide funds for the annual production of three million spring Chinook salmon smolts at this facility. These fish are designated for release into Rapid River, the Little Salmon River, and the Snake River below Hells Canyon Dam. The RRFH is staffed and operated by the Idaho Department of Fish and Game (Department) and funded by IPC.

### **Location**

The RRFH is located in Idaho County seven miles southwest of Riggins, Idaho. It lies on Rapid River, a tributary of the Little Salmon River. Travel distance by river to the ocean is approximately 600 miles.

### **Objectives**

The main objectives of RRFH are:

1. To produce three million spring Chinook salmon smolts annually at an average size of 20 fish/ pound (fpp) to be released at designated sites.
2. To trap and spawn adult spring Chinook salmon returning to Rapid River.
3. To evaluate strategies and techniques for rearing spring Chinook salmon.
4. To provide eggs and/or fish for supplementation purposes.

## **FACILITY DESCRIPTION**

Fish rearing facilities at RRFH consist of 52 vertical double-stack incubators, 12 outdoor concrete raceways (6 ft x 90 ft), and two earthen rearing ponds with concrete walls (RP). The RP are divided into six sections: RP-1A and RP-1B (42 ft x 188 ft each), RP-2A and RP-2D (35 ft x 197 ft), and RP-2B and RP-2C (37 ft x 173 ft each). Holding facilities for adult salmon

consist of two holding ponds (HP) including one concrete holding pond HP-1 (80 ft x 25 ft), and one earthen holding pond, HP-2 (40 ft x 150 ft). The holding ponds provide space for up to 4,000 adult salmon. Production capacity by unit is listed in Appendix 1 and rearing space by unit is shown in Appendix 2.

The RRFH obtains adult salmon for broodstock from a fish trap located 1.5 miles downstream from the hatchery on Rapid River. It is designed to trap and hold adult fish migrating upstream. The fish trap consists of a permanent concrete velocity barrier, a seven-step fish ladder, and a two-stage trap. Adult salmon are transferred from the trap to a 1,000-gallon tanker-truck using an Alaska Steep Pass Ladder, which allows fish to move from the trap to a 500-gallon bucket that is lifted by a crane with a 2-ton electric hoist and discharged into the truck. The fish trap is designed to provide unimpeded migration around the velocity barrier when trapping is not in progress. In addition to trapping in Rapid River, RRFH receives fish from Oxbow Fish Hatchery (OFH) that are trapped in the Snake River below Hells Canyon Dam.

### **Recommended Facility Improvements**

There are two areas for improvement of the facility that have existed for many years. One relates to adult salmon holding and handling and the other to general hygiene and disease control. Although the ten year average (by decade) for prespawning mortality has generally decreased over the past forty years it has been highly variable. Records have been kept continuously since 1969. The overall average through 2008 is 5.1% and the range is from 0.8% to 37.0%. Minimizing loss of adult fish during holding is a priority. Examination of prespawning mortality records reveals that an increase occurs after first sort and subsequent handling of the adult females. Gathering adults for sorting requires netting all adult fish in a large seine each spawn day. This causes handling stress twice each week during the spawning season. An improved system for crowding adult fish would reduce stress from sorting and the associated prespawning mortality. The solution for this problem will require replacement of HP-2 to provide for improved crowding and a more sanitary environment for holding adult salmon. Properly planned this could also increase flexibility for sequestering groups of adults. The other area of improvement involves the way in which water is supplied to fingerlings in RP-1 and adults in HP-2. Water entering the RP-1/HP-2 system must pass through the raceways. When fingerlings are in the raceways, the RP-1/HP-2 system receives their effluent. This creates a sanitation problem as detritus and fish waste from sweeping raceways is directed into RP-1 and HP-2. Direct supply to RP-1 or diversion of raceway effluent would solve this problem.

Additional improvements were needed as the result of flooding during 2003 that washed out part of the fish trap compound and damaged the velocity weir. During the winter of 2003 – 2004 repairs were made including other necessary improvements. The wooden velocity weir was replaced with a concrete structure that included larger side walls. Utility power supply was replaced with underground service including additional service panels. Replacement of yard lighting and the trap dormitory were included in the project.

## Water Supply

### **Water Source**

The headwaters of Rapid River originate in Adams County and flow through an undeveloped canyon before reaching the hatchery. The Rapid River drainage is protected as part of the Wild and Scenic Rivers Act. It is not subjected to perturbations, such as logging or development. Rapid River generally provides adequate water for rearing salmon however the steep gradient of the drainage makes it a highly variable river. Spring runoff and flash floods can be violent and carry a tremendous volume of silt into the hatchery. During the spring of 2003 a significant flood event occurred at the end of May while Brood Year 2002 fingerlings were in the raceways. Snowpack that year was at or near one hundred percent of normal and most of the snow persisted until late May due to a cool spring. At the end of May several days of record high temperatures over one hundred degrees were followed by severe thunderstorms. Rapid River, the Little Salmon River, and Salmon River all rose quickly to flood stage and were extremely turbid. May 29 and May 30 the flood in Rapid River crested and logs that accumulated in the drainage over many years passed through the hatchery head pond. The flooding and associated debris load was the worst in many years. Local residents compared the event to 1974 when flooding caused damage to parts of the hatchery. All boards and posts were removed from the dam at the hatchery head pond. The hatchery intake was manned around-the-clock for several days but plugged significantly for several hours. Damage occurred at the fish trap where parts of the side walls of the velocity weir were washed out. Large logs that remained in Rapid River near the intake for the gravity incubation line were removed with a crane on September 2. Rapid River flows are monitored by a gauging station upstream from the hatchery operated by the United States Forest Service (USFS) Nez Perce National Forest Office in Grangeville, Idaho. Hydrographic records for 2003 show that flow exceeded 1,000 ft<sup>3</sup>/s for five days and peaked at 1,346 ft<sup>3</sup>/s on May 29. The average for that date from 2000 through 2008 excluding 2003 is 475 ft<sup>3</sup>/s. High water for 2002 crested on May 29 at 587 ft<sup>3</sup>/s. Water temperature in Rapid River also varies considerably. The minimum in January 2002 was 34.0°F and the maximum in August was 62.0°F. Pond temperatures during adult holding are shown in Appendix 3.

### **Water Supply**

Surface water for production at RRFH is obtained from Rapid River through one 30-inch and one 24-inch pipeline. A 5-ft wooden diversion dam provides the necessary hydraulic head to supply surface water to the rearing units via gravitational flow. Under a state license, RRFH has water rights for 28 ft<sup>3</sup>/s for the hatchery and 18.6 ft<sup>3</sup>/s for the fish trap. This water is diverted from Rapid River and then returned after passing through the facilities. Water for incubation is pumped from the headrace of the raceway system by one of two 5600-Watt electric pumps. A gasoline-operated pump and gravitational flow from a filter bed upstream from the hatchery intake provide water during electric utility failures. Water quality parameters are listed in

Appendix 4. Effluent is monitored according to U.S. Environmental Protection Agency National Pollutant Discharge Elimination System permit.

### **Staffing**

Three classified employees, a Fish Hatchery Manager II, an Assistant Fish Hatchery Manager, and a Fish Culturist staff RRFH. Approximately seven temporary employees are hired each year. Housing accommodations include three residences for the classified staff and a 75-ft x 16-ft manufactured home for temporary employees.

## **FISH PRODUCTION**

### **Adult Collection**

#### **Spring Chinook Salmon Returns to Rapid River**

The RRFH fish trap operated from March 20 through September 12, 2002. The trapping operation was terminated after removing fish on May 29 due to flooding and restarted June 4. The trap entry was closed overnight on one occasion to prevent overloading the holding area with fish.

In 2002, 6,600 (225 jacks and 6375 adults) marked Chinook salmon were trapped between May 3 and August 28. The peak of the run was the third week of June. Marked spring Chinook salmon were transported to holding ponds at the hatchery. A cross-section of the run was held for broodstock. The large number of hatchery returns required trapped fish to be released for fisheries or spawning supplementation. These fish were removed from the trap, marked with a right operculum punch, loaded onto trucks, and released. A total of 2,856 fish were released into the local fisheries by RRFH personnel including; 1,064 released into the Salmon River and 1,792 into the Little Salmon River. Trap counts showed that 388 fish (13%) were recaptured (Appendix 5) making the total marked spring Chinook processed, including recaptures, to 6988. A total of 503 were removed from the trap and loaded directly onto RRFH trucks for release in the Boise area. After a single hauling mortality, 6 were released at the Morrison Knudsen Nature Center and 496 were released into the Boise River. The Nez Perce Tribe transported 231 to the Selway River (Appendix 6). Another 250 (232 adults and 18 jacks) were given to the Shoshone Bannock Tribe for subsistence and 5 (2 females and 3 males, all four-year-olds) were sacrificed for a nitrogen burn study conducted by researchers from the United States Department of Energy Pacific Northwest National Laboratory (PNNL). Subsistence and study fish were killed and scanned for tags when they were picked up. Released fish, subsistence fish, and study fish were not anesthetized or injected.

Data collection must be compatible with the need to return fish to fisheries or distribute them for subsistence quickly and without treatment. Hatchery management and research staff met before the 2002 run to establish data collection standards that would meet agency needs and be feasible, given time and fish quality constraints. It was agreed that data collected for research and hatchery evaluation purposes should be collected at spawning and entered into a database. This sub-sample was not formally randomized but was representative of the run so statistics can reasonably be applied to the entire run.

Information about run timing and the total number of returns was collected at the trap and is based on all 6,600 returns to the RRFH (Appendices 7, and 8). Other trapping statistics including fork length, injuries, marks, and tags were recorded at the trap. All RRFH fish placed in HP-1 and HP-2 but not those distributed directly from the trap were measured for fork length. The entire run was scanned for passive integrated transponder (PIT) tags and scrutinized for jaw-tags, visual identification (VI) tags, radio transmitters, and fin clips. The fin clips observed were all adipose fin (AD) clips.

There were 3,143 marked Rapid River returns held and 27 received from OFH yielding 3,170 broodstock. Records were kept as the fish were removed from the holding ponds during spawning or as prespawning mortalities and on the 5 fish sacrificed at the trap for the PNNL study. At the end of the season the total number of records was 3,153 leaving 22 fish unaccounted for. They were probably moribund fish removed by raccoons or bears late in the spawning season when large numbers of males drop out. The sub-sample for sex ratio and age-classes was the 3,153 for which records were kept. Polymodal analysis of length-frequencies helped with age-class determination but was inconclusive due to the low number of five-year-old fish. Additional age-class criteria were based on coded-wire-tag (CWT) return data and historical records. The adult sex ratio was 1,385 males (43.9%), 1768 females (56.1%). The age-class composition was 118 (3.7%) three-year-olds (< 60 cm), 2,878 (91.3%) four-year-olds (60-86 cm), and 157 (5.0%) five-year-olds (> 86 cm) (Appendices 9 and 10).

Ancillary species were collected, recorded, measured, marked, and released. Unmarked Chinook salmon, wild steelhead (*Oncorhynchus mykiss*) and bull trout (*Salvelinus confluentus*) were released into Rapid River above the weir at the fish trap. Hatchery steelhead including unmarked hatchery fish (determined by morphology) were released into the Little Salmon River at least one mile above its confluence with Rapid River.

Tag information was recorded for all fish entering RRFH trap. PIT-tag data were collected and submitted to the Department's Research Office at Nampa Idaho. Forty-one salmon with jaw tags were trapped this year (Appendix 11), 13 arrived with radio transmitters, and 3 with floy tags (Appendix 12).

Injuries were documented throughout the trapping season. They were recorded at the trap and included both marked and unmarked Chinook salmon. When multiple injuries were present on the same fish, they were recorded separately. Injuries consisted of 78 nitrogen burns, 83 gaff wounds and various other types of injuries (Appendix 13). This year 79 fishhooks were recorded.

## **Spring Chinook Salmon Transferred from Hells Canyon**

During 2002, 27 adult marked spring Chinook salmon were trapped below Hells Canyon Dam and transported to RRFH. They were added to the broodstock and not tracked separately. The release history for Hells Canyon indicated that the 2002 run should have been mostly five-year-old (three-ocean) fish from a release of 300,000 RRFH Brood Year 1997 smolts in 1999. The RRFH did not release smolts into the Snake River in 2000 or 2001. Trapping operations were started at Hells Canyon Dam in order to include the Snake River component of the run in the hatchery broodstock and for run analysis. The Hells Canyon trap was closed after the first week of July.

## **Inventory of Ancillary Species Trapped in Rapid River**

From May 20 through August 13, 2002, 285 unmarked Chinook salmon entered the RRFH fish trap (Appendices 8 and 14). They were anesthetized, measured to the nearest centimeter fork length (Appendices 9 and 15), injected with antibiotic, and released above the weir into Rapid River. They received a right operculum punch to identify recaptures. Thirteen were recaptured and released. The age-class composition of the 285 unmarked Chinook salmon was 2 three-year-olds (0.7%), 274 four-year-olds (96.1%), and 9 five-year-olds (3.2%). The adult sex ratio was 138 males (48.8%), 145 females (51.2%).

From March 21 through July 29, 2002, 320 adult steelhead were trapped (Appendices 16 and 17) and measured to the nearest centimeter fork length (Appendices 18 and 19). The steelhead run included 106 wild fish and 214 hatchery fish. The sex ratio by origin was 39 wild males, 67 wild females, 130 hatchery males, and 84 hatchery females. Hatchery steelhead including 56 unmarked hatchery steelhead (determined by morphology) were transported to the Little Salmon River and released at least one mile above the confluence of Rapid River. Wild steelheads were released into Rapid River upstream of the weir. All released steelhead received a right operculum punch to identify recaptures. There were 63 recaptures including 3 wild fish that dropped back below the velocity weir in Rapid River and 60 hatchery fish that returned from the Little Salmon River.

A total of 359 bull trout were trapped from May 29 through July 27, 2002 (Appendices 20, and 21). Of these, 10 were recaptured a second time. They ranged in size from 29 cm to 65 cm total length (Appendices 22 and 23). The USFS Rocky Mountain Research Station (RMRS) continued a study of bull trout movement this year. Personnel from RRFH supported their project by trapping adults, scanning for PIT tags, record keeping, and by assisting with other aspects of their study. As part of this cooperative program, the RMRS supplied a staff member who coordinated the bull trout operations at the trap and assisted with other trap and hatchery operations. Further information about their study should be obtained from the RMRS Office in Boise, Idaho. An inventory of all species trapped in 2002 is shown in Appendix 24.

## **Fisheries**

Fisheries on the Salmon and Little Salmon rivers were productive in 2002. The Little Salmon season extended from April 25 through August 4. Total catch was estimated at 7,406 with 4,889 harvested. The Salmon River season extended from April 25 through June 16. Total catch was 1,867 with 1,478 harvested. This year the Snake River was open for fishing. Catch on the Snake River was estimated at 184 with harvest of 105. For more information regarding the fisheries contact the Department's McCall Regional Office or the Clearwater Regional Office. Nez Perce Tribal officials reported subsistence and commercial harvest of 2,799 fish.

## **Adult Holding**

### **Adult Treatments**

The adult holding period extended from May 16 to September 12, 2002. Hatchery personnel removed fish from the trap daily and processed them on site. The fish were handled as little as possible and processed while the fish were immersed. All Chinook salmon placed in HP-1, HP-2 or released above the trap were anesthetized with 40-ppm MS-222, and measured to the nearest cm fork length. They were also given an intraperitoneal injection of Erythromycin-base injectable Gallimycin-100 at 20 mg/kg. This was administered according to veterinary extra-label usage as prescribed by the Department's Caldwell Wildlife Laboratory. Neither fish removed from the trap and released to supplement fisheries, nor those donated for subsistence were anesthetized or injected.

Formalin was administered to the holding ponds three times each week from June 3 to July 1. From July 1 through September 2, this was increased to five days each week. Treatment consisted of precharging ponds with formalin to 170 ppm then introducing formalin into inflow water at a rate of 170 ppm for one hour. During holding, water temperature ranged from 42.1°F to 62.0°F (Appendix 3). The Walco Co. hauled carcasses to a landfill in Payette, Idaho twice each week.

### **Prespawning Mortality**

Prespawning mortality at RRFH in 2002 was 624 fish or 19.8% of the 3,153 fish held and recorded. After August 24 males were not considered prespawning mortality. The sex ratio was 234 males (7.4%) and 390 females (12.4%). Prespawning mortality was largely due to nitrogen embolism related mycosis and bacterial kidney disease (BKD).

Hatchery personnel performed cursory necropsies of all prespawning mortalities. Causal factors for prespawning mortality are shown in Appendix 25. A profile of cumulative prespawning mortality is shown in Appendix 26. As fish were removed from the ponds they were scanned for CWT and snouts were collected from 291 fish (9.2%) in which a CWT was detected. The snouts were placed in numbered plastic bags, cataloged, and held until the end of the spawning season when they were delivered to the Department's Fish Marking Laboratory at Lewiston, Idaho.

### **Salmon Spawning**

In 2002, 1,374 female spring Chinook salmon were processed from August 16 to September 12. Of these, 69 were destroyed and their eggs rejected because they showed gross evidence of BKD or other pathology. The remaining 1,305 females were spawned. Spawning followed standard procedure recommended by the Integrated Hatchery Operations Team (IHOT) for random cross of two males per female. This procedure was used to ensure that all females were fertilized with a fertile male. Females were killed with a blow to the head. The eggs from each female were placed a colander to drain off the ovarian fluid. Then they were transferred to a numbered bucket where they were fertilized with the milt from two males and mixed with 250 ml of temperature adjusted well water. Jacks were included for fertilization, and no male was used more than three times. Males were given a left operculum punch to identify them as having been spawned and then returned to the holding pond. All 1,305 spawned females were sampled at spawning for BKD. Samples were analyzed by enzyme-linked immunosorbent assay (ELISA) (Appendix 27). All fish removed during spawning were scanned for CWT and snouts were collected.

### **Incubation**

The 2002 egg take was 4,596,671 green eggs from 1,305 females (based on average fecundity). Eggs from 263 of the spawned females (926,379 eggs based on average fecundity) were culled. The remaining 1,042 females produced 3,670,292 green eggs (Appendix 28).

Eggs to be incubated to eye-up at RRFH were water hardened for 30 minutes in 100-ppm iodophore then placed in vertical double-stack incubators adjusted to a flow of 5 gal/min. Most of the eggs were incubated at a rate of one female/tray to segregate individuals pending results of ELISA studies although some trays received two females due to limited incubation space. As ELISA results were received, eggs from 51 females with an optical density (o.d.)  $\geq$  0.119 o.d. were culled. As the season progressed, eggs from 45 additional females with readings of 0.114 o.d. – 0.118 o.d. were culled. Another 60 were culled as part of two-female trays or for gross pathology. Eggs from the remaining 680 females at RRFH were incubated to eye-up then shocked at 500 daily temperature units (DTU) by pouring them from the trays into water. They were picked two days later using a salt bath or an electromechanical picker/counter. A Jensorter™ Model BCM egg counter was used to inventory eggs picked by salt bath. This year a side-by-side trial using a Jensorter™ Model JM4 sorter/counter and a Jensorter™ model BCM egg counter was performed. The results of the test indicated that at

this time the JM-4 picker/counter is not suitable for routine use at RRFH. With the addition of pressurized incubation water this type of device may be useful in the future. Dead eggs were enumerated by average weight. After counting, the eggs were returned to clean trays. This year a pick-off at 500 daily temperature units (DTU) and a second pick-off at 760 DTU were both included in the primary pick total. The 680 females produced 2,350,803 green eggs. After primary pick of 335,660 dead eggs, 2,015,143 eyed eggs remained. Eye-up was 85.7% and the average fecundity was 3,457 eggs/female. The RRFH has incubation space for about 3.3 million eggs (based on single female/tray incubation). Additional incubation space was required. To ensure space for eggs returning from OFH some trays were consolidated and returned at a rate of 2 females/tray.

During spawning eggs from 469 of the 1,305 females were transferred to OFH for incubation to the eyed stage. Before they were transported they were packed in EggTube™ containers and water hardened for one hour in 100-ppm iodophore in EggBox™ coolers. After water hardening, ice was added to adjust water temperature to 45°F. On arrival at OFH the eggs were disinfected in 100-ppm iodophore and transferred to incubation stacks. A total of 390,015 eggs (based on average fecundity) from 107 females were culled at OFH. The remaining 362 females produced 1,319,489 green eggs that were incubated to eye-up, picked using a salt bath, and enumerated using a Jensor™ Model BCM egg counter. The resulting 1,202,177 eyed eggs were returned to RRFH. After eggs were transported back to RRFH, they were disinfected in 100-ppm iodophore and placed in clean incubator trays. Eye-up at OFH was 91.0% and fecundity was 3,635 eggs/ female.

In summary a total of 1,305 females were spawned in 2002, from which 263 were culled. The remaining 1,042 females produced 3,670,292 green eggs. After picking off 452,942 dead eggs, 3,217,320 eyed eggs were reared at RRFH for Brood Year 2002 production. Overall eye-up was 87.7% and average fecundity was 3,522 eggs/female. Eggs returned from OFH were picked again at 760 DTU and all trays were picked at 1,000 DTU, and 1,500 DTU. Egg trays were rodded at least once a week after 300 DTU. Formalin was administered to each incubator stack starting three days after spawning at a rate of 1,667 ppm for 15 minutes three times each week. This procedure was discontinued after each lot accumulated 800 DTU. Mycosis was controlled, and fry were ponded at approximately 1,750 DTU.

### **Early Rearing**

Fry were ponded from January 6 through April 7, 2003. The first 4 lots were initially placed in one indoor vat then added to subsequent lots as they were transferred to 10 outdoor raceways. Fry were ponded in the upper half of the raceways to facilitate feed training. After they were acclimated and feeding well, raceway volume was increased to lower density indices (DI) below 0.3 lb/ft<sup>3</sup>/in. Initial water depth was adjusted to 24 in, and flow was set to 0.25 ft<sup>3</sup>/s. As the fish grew, water depth and flows were increased to a maximum depth of 36 in and flow of 1.62 ft<sup>3</sup>/s. The fingerlings remained in raceways until marking when they were transferred to rearing ponds. At the end of early rearing on May 31, 2003 the fingerlings averaged 247.7 fish/lb (fpp) and 2.4 in total lengths. The average DI was 0.31lb/ft<sup>3</sup>/in and the average flow index (FI) was 0.60 lb/gal/min/in. Initial raceway density is shown in Appendix 29 and final raceway density is shown in Appendix 30. Mortality during early rearing was 63,034 fish or

1.7% of the number ponded i.e. adjusted swim-up, which was back-calculated as the total inventory reported at marking plus the mortality recorded before marking.

### **Final Rearing**

Rearing ponds were disinfected with 200 ppm active chlorine before introducing fish. The fingerlings were transferred from raceways to ponds through a 4 in aluminum pipe as they were marked. The marking crew reported that 3,608,831 fingerlings were marked and moved from June 19 through July 18, 2003. This total was an increase of 20.4% from hatchery inventory calculated as electromechanically counted eyed eggs minus recorded mortality. As in the past, hatchery inventory was adjusted to the number reported at marking. Initial pond loading densities are reported in Appendix 31. The fish averaged 110.4 fpp and 3.1 in total length at the end of marking, and grew to 25.1 fpp and 5.0 in total length at release. The volitional release began on March 15, 2004. The average DI before release was 0.19 lb/ft<sup>3</sup>/in, and the average FI was 1.67 lb/gal/min/in (Appendix 32). The maximum DI recommended by the Department (IHOT goal) at this facility is 0.30 lb/ft<sup>3</sup>/in. The maximum recommended FI for O<sub>2</sub>-saturated water at 41 °F and 2,100 ft above sea level is 2.42 lb/gal/min/in. These parameters were within prescribed limits. Mortality during final rearing was 46,677 fish or 1.3% of the inventory reported at marking. Total mortality from swim-up through release was 109,711 fish or 3.0% of the adjusted swim-up.

### **Feed Use and Conversion**

A total of 200,202 lb of feed was used for Brood Year 2002 fish. The overall feed conversion was 1.41. Specific data on feed types and sizes are listed in Appendix 33.

Four medicated feed treatments were administered to Brood Year 2002 fingerlings. Starting April 17, 2003 and again starting June 26 they were fed medicated feed containing 4% TM-100 (oxytetracycline (OTC)). Starting May 8, 2003 they were fed medicated feed containing erythromycin as 2.25% Aquamycin-100 and starting August 15 they were fed medicated feed containing 4.5% Aquamycin-100.

### **Fish Health**

Portions of this section of the *Rapid River Hatchery 2002 Brood Year Report* are reproduced with permission from Mr. Doug Munson of the Eagle Fish Health Laboratory (EFHL). A summary of EFHL results for individual inspections of Brood Year 2002 juveniles and broodstock is shown in Appendix 34.

## Diseases Encountered and Treatment

Elevated losses in March of 2003 were attributed to *Flavobacterium psychrophilum* and *Pseudomonas aureofasciens* which categorizes this event into a combination of cold water disease (CWD) and a motile aeromonad septicemia (MAS). Mortality from this event was controlled with one application of oxytetracycline (OTC) medicated feed, at a rate of 3.75 g/100 lb/day for 10 days. In June a second occurrence of MAS attributed to *Pseudomonas sp* was treated with one application of OTC medicated feed at a rate of 10 g/100 lb/day for 14 days under protocol approved by the Investigational New Animal Drug (INAD) 9332. Saprolegniasis appeared in July and was controlled by application of 170-ppm formalin for 1 hour 3 days/week for two weeks. Two prophylactic applications of erythromycin medicated feed were fed for 28 days each to control *Renibacterium salmoninarum* under protocol approved for INAD 6013/4333

## Organosomatic Index

The Organosomatic Index in this context is a measure of fish health developed as part of the Autopsy Based Fish Health/Condition Assessment System (Goede and Houghton 1987). A summary of the fish autopsy is shown in Appendix 35.

## Acute and Chronic Losses

Chronic losses were experienced during March 2003 due to an episode of CWD and MAS. A flood event occurred the last week of May. Fish were subjected to low flows for several hours and extreme turbidity for several days. No acute mortality occurred. Stress from the event contributed to a second episode of MAS in June. Mortality remained elevated through the end of July (0.03%/ day). The first week of August mortality subsided to 0.003%/day. Acute losses were not experienced at this facility at any life stage of Brood Year 2002.

## Other Assessments

Pre-spawning mortality at this facility decreased from 34.6% in 2001 to 19.8% in 2002. A visual inspection by EFHL (June 2002) of brood spring Chinook salmon being held at RRFH indicated that a portion of these fish had a secondary mycosis in "head burn" injuries. This fungal infection led to pre-spawning mortality of affected fish. Infectious Hematopoietic Necrosis Virus (IHNV) and *Renibacterium salmoninarum* were detected in routine broodstock sampling. Pre-liberation samples did not detect *Renibacterium salmoninarum*, Infectious hematopoietic necrosis virus (IHNV), or *Myxobolus cerebralis* (MC).

## **Fish Marking**

Protocol requires AD clips for all spring Chinook salmon reared at RRFH for Brood Year 2002. The marking crew reported 3,608,831 fish were AD-clipped and a coded wire tag (CWT) was placed in 340,462. Marking occurred from June 19 through July 18, 2003. After marking, 3,480 fish were sampled during monthly pound counts for a quality check of AD-clips. The results showed 78.1% with full clips, 5.5% without clips, and 16.4% with marginal clips.

Passive integrated transponder (PIT) tags were placed in 51,972 fish from February 3 through February 6, 2004 for the comparative survival study (CSS). As the fish were marked, they were transferred from RP-2A to RP-2B. During the remainder of the final rearing period, all mortalities from RP-2B were collected and scanned for PIT tags.

Specific release information about marked fish is presented in Appendix 36. For more information regarding marking, consult the *Annual Release Summary of Marked Salmon and Steelhead* published by the Department.

## **Fish Distribution**

### **Egg Transfers**

Eggs from 469 females were transferred to OFH for incubation then returned (see Incubation) No other Brood Year 2002 eggs were transferred to or from RRFH.

### **Fingerling Transfers**

No Brood Year 2002 fingerling were transferred to or from RRFH.

## **Smolt Releases**

There were 3,562,154 smolts (141,963 lb) released from RRFH in 2004 (Appendix 37). Of these 499,956 (18,300 lb) were loaded onto trucks and released into the Snake River at the USFS's boat ramp below Hells Canyon Dam from March 15 through March 17. Another 300,140 (10,950 lb) were loaded onto trucks and released into the Little Salmon River above the confluence of Hazard Creek on March 18. The remaining 2,762,058 (112,713 lb) were released volitionally from RRFH from March 15 through April 21, 2004.

Final sample counts were taken before the start of release. The smolts averaged 25.1 fpp and 5.0 in fork length. Rearing densities at the time of release are listed in Appendix 32. Based on visual observations, almost all the smolts emigrated volitionally from RP-1 and 99% from RP-2. The remaining fish were seined from RP-2. The last fish emigrated on April 21. Survival from marking to release was 98.7% (Appendix 38).

Before the volitional release RRFH personnel assisted technicians from Biomark Inc. in placing a pair of PIT-tag antenna arrays in the tail of RP-2B. Out migration of PIT-tagged fish was monitored during volitional release and uploaded automatically to the PTAGIS database operated by the Pacific States Marine Fisheries Commission.

## **Cost of Production**

The total cost of production for any specific brood year is not a straight forward calculation of expenditure over a specific period at RRFH. The rearing cycle for a brood year-class is 19 months. Therefore, for any brood year, the cycle extends from September, when the eggs are taken, through March, nineteen months later when the smolts are released. In the past, cost of production has been reported as the total cost incurred by IPC for the entire 19-month period. Overlap in brood year-classes caused the expenditures for September through March of the first year, and the expenditures for September through March of the second year to be reported repeatedly in consecutive reports i.e. for more than one brood year. This resulted in inflated estimates of production cost because expenditures for 14 months of the 19-month rearing cycle were reported twice rather than being associated with production of a specific brood year. To address this, one approach would be to apportion each month's total expenditures by the percentage that a given brood year-class comprises of the total hatchery inventory during that month and report that portion of the expenditure once. In our report for Brood Year 1995, we proposed this apportionment plan. To assist, IPC supplied RRFH with expenditures listed by month (letter from Paul Abbott, IPC Hatchery Biologist, P.O. Box 70, Boise, Idaho). The resulting cost/pound that year was one third of the cost calculated using the traditional method. The results were presented at an IHOT evaluation meeting held March 8, 1996. The change was confusing for the participants because the cost of production was much less than in previous years. At that time RRFH was directed to continue reporting production cost using the traditional method so that values could be comparable to past data. We recommend continued discussion and list values for both methods in this report (Appendix 39).

The total cost paid by IPC for September 1, 2002, through March 30, 2004, was \$1,249,377.27 (letter dated June 22, 2004, from Paul Abbott, IPC Hatchery Biologist, P.O. Box 70, Boise, Idaho). This was used to calculate cost of production. For comparison, the cost apportioned by Brood Year 2002's percent of total monthly inventory for the same period was \$797,130.53, which is 63.8% of the cost calculated using the total amount, and addresses reporting expenditures twice. It also has the effect of smoothing estimates of cost/lb or cost/1000 fish released over years with greater or smaller inventory. This may be relevant because fixed costs are by definition similar from year to year while variable costs e.g., feed, are dependent on inventory. Using the revised method for Brood Year 2002 the cost/1000 fish went from \$350.73 to \$223.77 and cost/lb went from \$8.80 to \$5.62.

### **HISTORICAL INFORMATION**

We have included some archival information for context. Historic information about returns by return year is listed in Appendix 40 and by brood year in Appendix 41. Average feed and growth statistics are listed in Appendix 42. Release and transfer information is listed in Appendix 43.

## **ACKNOWLEDGMENTS**

The staff at RRFH would like to thank Mr. Paul Abbott and the fisheries staff at IPC for their support and assistance in helping us maintain and improve the hatchery facility. We would also like to thank Department personnel who helped us during the spawning and trapping season. Our gratitude goes to Officer Craig Mickelson and other Conservation Officers for security at the hatchery and trapping facilities. In addition, we extend our appreciation to Doug Munson and the EFHL staff for diagnostic work at the hatchery and assistance in preparing this document. This team effort helps Rapid River continue to be a successful hatchery.

Finally, mention should be made of the commitment demonstrated during flooding that occurred during the spring of 2003. The RRFH staff worked around-the-clock for days and was supported by other Department projects and people from the Riggins area. Department Hatcheries, Regional Offices, and Headquarters all provided additional staff to assist with high water operations and residents of the Riggins area helped out during the critical period. Survival of the fish was only possible because of this cooperative effort.

## LITERATURE CITED

Goede, R. W., and S. Houghton. 1987. ASUM: A computer program for the Autopsy-Based Fish Health/Condition Assessment System. Utah Division of Wildlife Resources Fisheries Experiment Station, 1465 West 200 North, Logan, Utah 84321.

## **APPENDICES**

**Appendix 1. Rapid River Hatchery production capacity.**

Rearing unit	Volume	Carrying capacity
Incubators	832 Trays	3,300,000 Eggs
Raceways (12)	1,890 ft <sup>3</sup>	3,800,000 Fry
Rearing Ponds 1	54,625 ft <sup>3</sup>	1,000,000 Smolts
Rearing Ponds 2	92,827 ft <sup>3</sup>	2,000,000 Smolts
Adult Holding Pond 1	12,000 ft <sup>3</sup>	1,000 Adults
Adult Holding Pond 2	24,000 ft <sup>3</sup>	3,000 Adults

**Appendix 2. Rapid River Hatchery pond volume.**

Rearing/holding area	Volume (ft <sup>3</sup> )
Rearing pond 1A	27,496
Rearing pond 1B	27,129
Rearing pond 2A	23,858
Rearing pond 2B	22,607
Rearing pond 2C	22,468
Rearing pond 2D	23,894
Adult holding pond 1	12,000
Adult holding pond 2	24,000

**Appendix 3. Rapid River Hatchery adult holding pond temperatures (°F) for 2002.**

Month	Maximum	Minimum	Average	Ten-year average
May	48.4	40.0	45.1	46.6
June	52.9	42.1	48.9	50.2
July	60.0	49.6	53.9	54.3
August	62.0	49.6	55.0	55.7
September	55.8	43.0	49.8	51.4

**Appendix 4. Rapid River water quality analysis.**

Analyte	PQL	Result	Units
Nitrate/N	0.1	ND	mg/L
Nitrite	0.1	ND	mg/L
Sulfate	0.1	19.9	mg/L
Orthophosphate	0.05	ND	mg/L
Ammonia/N	0.05	ND	mg/L
Alkalinity	10	69	mg/L as CaCO <sub>3</sub>
Hardness	0.1	85	mg/L as CaCO <sub>4</sub>
PH		7.63	mg/L
Hydrogen Sulfide	0.5	ND	mg/L
Res Chlorine	0.1	ND	mg/L
Arsenic	0.001	ND	mg/L
Cadmium	0.001	ND	mg/L
Chromium	0.001	ND	mg/L
Mercury	0.0001	ND	mg/L
Lead	0.001	ND	mg/L
Selenium	0.001	ND	mg/L
Silver	0.005	ND	mg/L
Iron	0.03	0.07	mg/L
Zinc	0.001	ND	mg/L
Cooper	0.001	ND	mg/L
Alpha-BHC	0.01	ND	µg/L
gamma-BHC (Lindane)	0.01	ND	µg/L
Heptachlor	0.01	ND	µg/L
Aldern	0.01	ND	µg/L
beta- BHC	0.01	ND	µg/L
Delta-BHC	0.01	ND	µg/L
Heptachlor Epoxide	0.01	ND	µg/L
Endosulfan I	0.01	ND	µg/L
4,4'-DDE	0.01	ND	µg/L
Dieldrin	0.01	ND	µg/L
Endfin	0.01	ND	µg/L
Endosulfan II	0.01	ND	µg/L
44,4'DDD	0.01	ND	µg/L
4,4'DDT	0.01	ND	µg/L
Endrin aldehyde	0.01	ND	µg/L
Endosulfin Sulfate	0.01	ND	µg/L
Methoxychlor	0.05	ND	µg/L

**Appendix 4. (Continued)**

Endrin Ketone	0.01	ND	µg/L
Chlordane	0.1	ND	µg/L
Toxaphene	0.1	ND	µg/L
Dichlorovos	0.5	ND	µg/L
Mevinphos	0.3	ND	µg/L
Demeton	0.1	ND	µg/L
Ethoprop	0.1	ND	µg/L
Phorate	0.1	ND	µg/L
EPN	0.1	ND	µg/L
Diazinon	0.1	ND	µg/L
Dimethoate	0.1	ND	µg/L
Disulfoton	0.1	ND	µg/L
Methyl Parathion	0.1	ND	µg/L
Ethyl Parathion	0.1	ND	µg/L
Ronnel	0.1	ND	µg/L
Malathion	0.1	ND	µg/L
Fenthion	0.1	ND	µg/L
Chlorpyrifos	0.1	ND	µg/L
Trichloronate	0.1	ND	µg/L
Stirophos	0.1	ND	µg/L
Tokuthion	0.1	ND	µg/L
Fensulfothion	0.1	ND	µg/L
Bolstar	0.1	ND	µg/L
Azinphos-Methyl	0.1	ND	µg/L
Coumaphos	0.1	ND	µg/L
Merphos	0.1	ND	µg/L
Naled	0.3	ND	µg/L
Sulfotep	0.1	ND	µg/L

PQL = Practical Quantitation Limit

ND = not detected (< PQL)

## Appendix 5. Rapid River releases and recaptures during 2002.

Date	Recaptures		<sup>a</sup> Recruits	Total	<sup>b</sup> Disposition
	Adults	Jacks			
5/3			1	1	Adult to LSR
5/4-6-17			1,152	1,152	Adults Held
5/4-6/17			26	26	Jack Held
6/18			361	361	Adults Held
6/18			8	8	Jack Held
6/18			161	161	Adults SR
6/18			1	1	Jack SR
6/19			7	7	Adults Held
6/19			484	484	Adults SR
6/19			1	1	Jack SR
6/20			302	302	Adults SR
6/20			5	5	Jacks LSR
6/20			387	387	Adults LSR
6/21			396	396	Adults LSR
6/21			11	11	Jacks LSR
6/21			14	14	Adults SR
6/24	4		367	371	Adults Held
6/24			20	20	Jacks Held
6/24			5	5	<sup>c</sup> Nitro Study
6/26	39		188	227	Adults to Boise R. Adults to Morrison Knudsen Nature Center
6/26			6	6	Jacks to Boise R.
6/26			9	9	Adults to Boise R. 1 Haul Mort. 257 Released
6/27	20		238	258	Jacks to Boise R.
6/27			3	3	Adults LSR
6/27	14		83	97	Jacks LSR
6/27			3	3	Adults SR
6/27	14		77	91	Jacks SR
6/27			10	10	Adults Held
6/27	21		112	133	Jacks Held
6/27			2	2	Adults Held
6/28			8	8	Jacks LSR
6/28	52		345	397	Adults LSR
6/28			8	8	Jacks LSR
7/1	40		238	278	Adults LSR
7/1			16	16	Jacks LSR
7/1	35		197	232	Adults S.B.T.
7/1			18	18	Jacks S.B.T.
7/2	14		149	163	Adults Held

### Appendix 6. Rapid River Fish Hatchery releases outside Salmon River Basin in 2002.

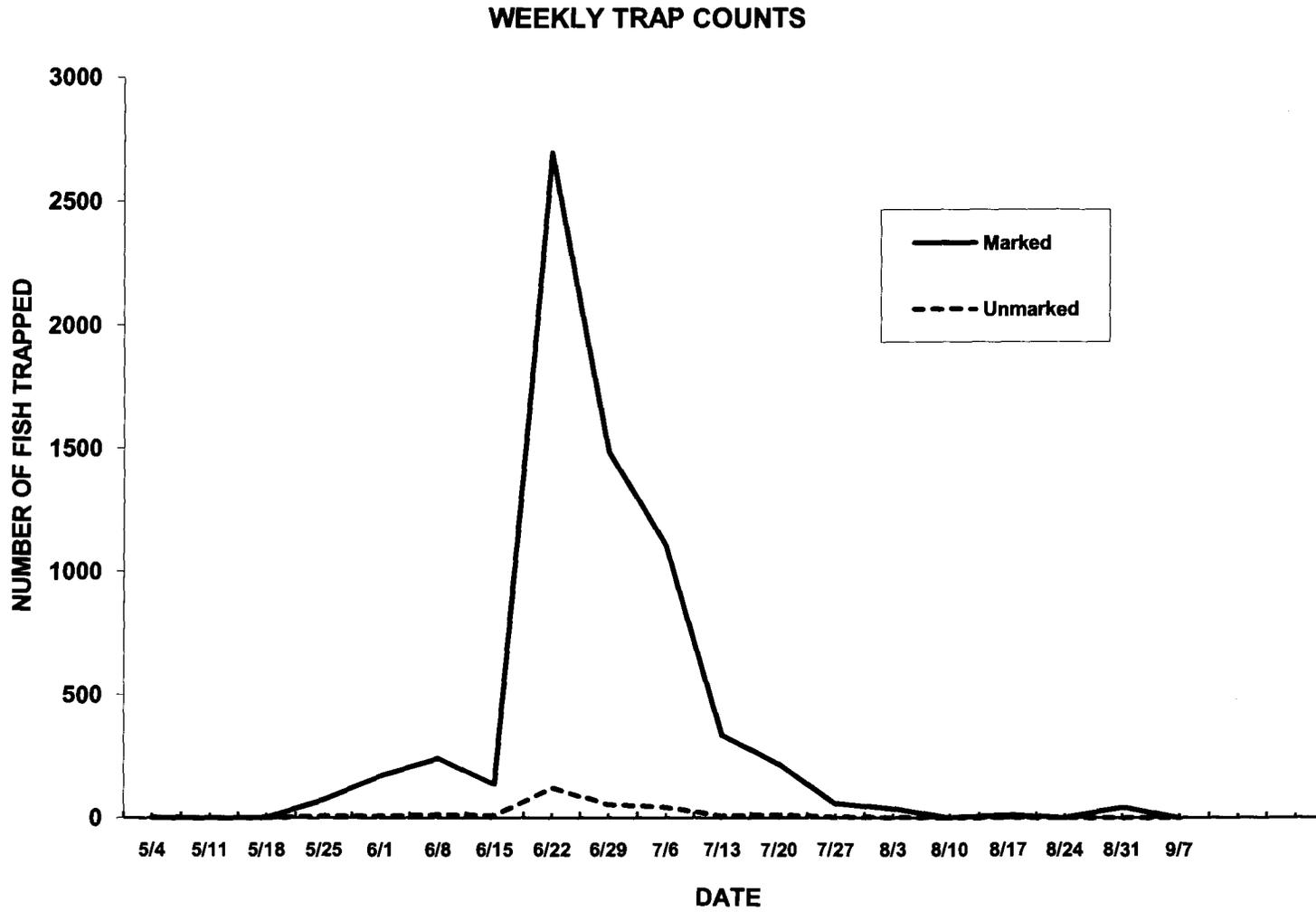
Date	Department catalog number	Stream	County	Region	Number of fish	Weight (lb)	Actual site	Remarks
6/26/02	1300000000	Educational Activities	Ada	3	6	90	Morrison Knudsen Nature Center	Transported by Rapid River Hatchery staff
6/26/02	1000040000	Boise R.	Ada	3	76	1140	Glenwood and Barber Park	Transported by Rapid River Hatchery staff
6/26/02	1000040000	Boise R.	Ada	3	160	2400	Glenwood and Barber Park	Transported by Bob Belveal
6/27/02	1000040000	Boise R.	Ada	3	<sup>a</sup> 180	2700	Glenwood and Barber Park	Transported by Bob Belveal
6/27/02	1000040000	Boise R.	Ada	3	80	1200	Glenwood and Barber Park	Transported by Rapid River Hatchery staff
7/9/02	0618150000	Selway R.	Idaho	2	231	3465	McGruder / Beaver point	Transported and released by Nez Perce Tribe
Total released outside the Little Salmon River and vicinity					733	10,995		

<sup>a</sup> Does not include 1 adult hauling mortality.

**Appendix 7. Rapid River marked spring Chinook salmon run timing for 2002.**

Week ending	Number of fish	Percentage of marked Chinook salmon
May 4	1	0.02
May 11	0	0.00
May 18	1	0.02
May 25	74	1.12
June 1	169	2.56
June 8	241	3.65
June 15	136	2.06
June 22	2,695	40.83
June 29	1,484	22.48
July 6	1,102	16.70
July 13	334	5.06
July 20	216	3.27
July 27	57	0.86
August 3	36	0.55
August 10	0	0.00
August 17	12	0.18
August 24	0	0.27
August 31	42	0.64
September 7	0	0.00
<b>Total</b>	<b>6,600</b>	<b>100</b>

**Appendix 8. Chinook salmon returns to Rapid River trap during 2002.**



**Appendix 9. Rapid River spring Chinook salmon broodstock lengths for 2002.**

Fork length (cm)	Number of fish	Fork length (cm)	Number of Fish
< 50	73	88	18
50	11	89	20
51	4	90	24
52	9	91	13
53	3	92	11
54	3	93	14
55	4	94	9
56	1	95	5
57	6	96	5
58	2	97	1
59	2	98	1
60	7	99	1
61	8	100	0
62	9	> 100	0
63	15	<sup>a</sup> Total	3,153
64	11		
65	20		
66	30		
67	57		
68	74		
69	115		
70	185		
71	212		
72	254		
73	270		
74	299		
75	294		
76	256		
77	187		
78	161		
79	102		
80	83		
81	52		
82	36		
83	41		
84	32		
85	31		
86	37		
87	35		

Adult Sex ratio	
1,385 ( 43.9%)	Males
1,768 ( 56.1%)	Females
3,028 (100.0%)	Total

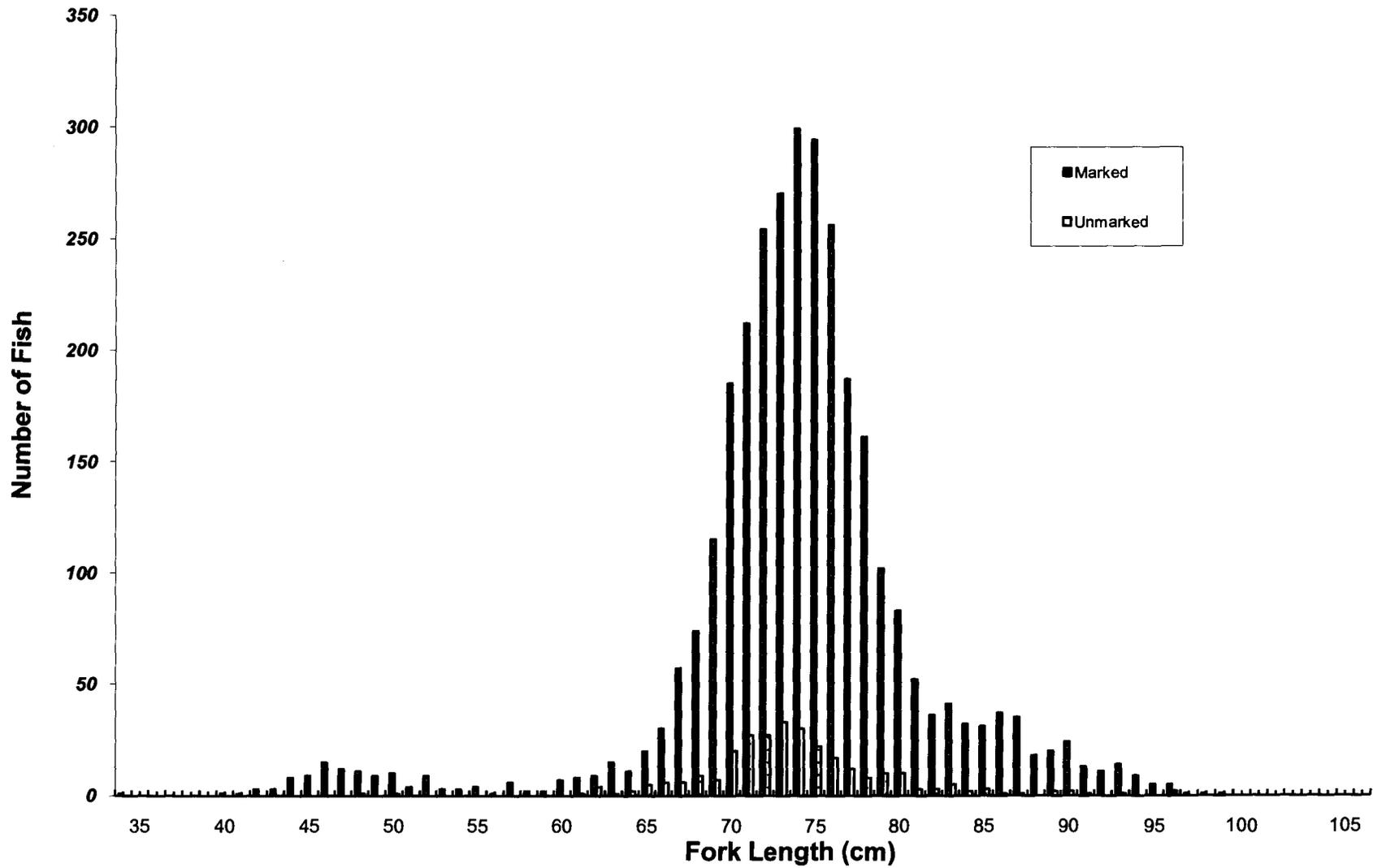
Age-class data	
118 ( 3.7%)	Three-year-old
2,878 ( 91.3%)	Four-year-old
157 ( 5.0%)	Five-year old
3,153 (100.0%)	Total

Age-class criteria	
< 60 cm =	Three-year old
61 to 86 cm =	Four-year-old
> 86 cm =	Five-year-old

<sup>a</sup> Includes fish received from Oxbow Hatchery and nitrogen burn study fish.

Appendix 10. Length-frequency of Rapid River Fish Hatchery broodstock for 2002.



**Appendix 11. Rapid River Hatchery returns with jaw tags during 2002.**

Trap Date	Recapture location	Jaw tag number	Color	Length (cm)	Sex	Disposition
06/07	R.R. Fish	01508	White	73	Unknown	Hatchery
06/14	R.R. Fish	02886	White	Unknown	Unknown	Hatchery
06/17	R.R. Fish	01586	Yellow	73	Unknown	Hatchery
06/17	R.R. Fish	01540	Red	72	Unknown	Hatchery
06/18	R.R. Fish	03547	White	78	Unknown	Hatchery
06/19	R.R. Fish	02504	Yellow	78	F	Rapid River
06/20	R.R. Fish	01076	Red	Unknown	Unknown	Salmon River
06/20	R.R. Fish	00567	Red	76	Unknown	Salmon River
06/20	R.R. Fish	01231	Yellow	76	F	Salmon River
06/20	R.R. Fish	01742	Yellow	73	F	Salmon River
06/20	R.R. Fish	00363	Yellow	74	F	Salmon River
06/21	R.R. Fish	01791	Yellow	70	F	Salmon River
06/21	R.R. Fish	03360	Yellow	71	F	Salmon River
06/21	R.R. Fish	02696	White	75	M	Salmon River
06/21	R.R. Fish	02299	Yellow	79	F	Salmon River
07/21	R.R. Fish	02546	Yellow	75	M	Salmon River
07/21	R.R. Fish	01204	Yellow	73	M	Salmon River
07/24	R.R. Fish	00155	Yellow	Unknown	Unknown	Hatchery
07/24	R.R. Fish	01271	Red	68	Unknown	Hatchery
07/24	R.R. Fish	02994	White	70	Unknown	Killed Nitro
07/26	R.R. Fish	00468	Red	73	F	Boise River
07/26	R.R. Fish	03638	White	72	F	Boise River
07/27	R.R. Fish	02419	Yellow	72	Unknown	Boise River
07/27	R.R. Fish	01738	Yellow	74	Unknown	Boise River
07/27	R.R. Fish	01466	Red	70	Unknown	L. Salmon
07/28	R.R. Fish	02485	Yellow	72	M	L. Salmon
07/01	R.R. Fish	01650	Yellow	76	M	Rapid River
07/01	R.R. Fish	Unknown	White	Unknown	Unknown	L. Salmon
07/01	R.R. Fish	01231	Yellow	76	F	L. Salmon
07/01	R.R. Fish	01821	Yellow	Unknown	M	L. Salmon
07/01	R.R. Fish	03699	White	Unknown	F	L. Salmon
07/01	R.R. Fish	00297	Red	Unknown	F	L. Salmon
07/02	R.R. Fish	06629	White	75	Unknown	Hatchery
07/02	R.R. Fish	01165	White	69	Unknown	Hatchery
07/03	R.R. Fish	01838	Yellow	72	M	Hatchery
07/03	R.R. Fish	00279	Red	74	M	Hatchery
07/10	R.R. Fish	01183	Red	75	M	Selway River
07/10	R.R. Fish	00370	Red	68	F	Selway River
07/11	R.R. Fish	02421	Yellow	64	F	Hatchery
07/15	R.R. Fish	01547	Red	72	F	Hatchery
07/17	R.R. Fish	01151	Yellow	80	M	Hatchery
Total	41 tags					

**Appendix 12. Rapid River Hatchery returns with VI, radio, or floy tags during 2002.**

Trap Date	VI tag number	Radio CH/code	Tag #	Length (cm)	Sex	Disposition
05/28/02	None	12/156	None	92	Unknown	Hatchery
06/17/02	None	15/3	3D91BF11E7	74	Unknown	Hatchery
06/20/02	None	12/35	1BF0FCC2F8	77	M	Salmon River
06/20/02	None	12/27	1BF11E823F	71	F	Salmon River
06/24/02	None	12/69	1BF1128400	75	Unknown	Hatchery
06/26/02	None	11/115	1BF112713F	79	Unknown	Boise River
06/27/02	None	14/45	1BF112C58	74	Unknown	L.Salmon
06/27/02	None	12/53	1BF11200B4	72	Unknown	Boise River
6/28/02	None	15/11	985.12000867	74	F	L Salmon
06/28/02	None	15/170	3D4.1BF1122	73	F	L. Salmon
06/28/02	None	25/28	3D4.1BF0EC	73	F	L Salmon
07/02/02	None	11/23	12008622401	72	Unknown	Hatchery
07/05/02	None	12/100	98512008706	71	F	L.Salmon
6/18/02	None		CRM-1082	79	F	Hatchery
06/15/02	None		CRM-1668	80	M	Hatchery
07/24/02	None		CRM-0612	76	F	Hatchery

**Appendix 13. Injuries to Chinook salmon returning to Rapid River Hatchery for 2002.**

Nitrogen Blister	Body injury	Gill net scar	Gaff wound	Fish hook	Lamprey mark
78	3	27	83	79	5

These numbers are from all 6887 Rapid River returns including marked and unmarked Chinook Salmon.

**Appendix 14. Rapid River unmarked Chinook salmon run timing for 2002.**

Week ending	Number of fish	Percentage of unmarked Chinook salmon
May 4	0	0.0
May 11	0	0.0
May 18	0	0.0
May 25	9	3.2
June 1	7	2.5
June 8	13	4.6
June 15	10	3.5
June 22	121	42.5
June 29	55	19.3
July 6	43	15.1
July 13	9	3.2
July 20	12	4.2
July 27	4	1.4
August 3	1	0.4
August 10	0	0.0
August 17	1	0.4
Total	285	100

**Appendix 15. Rapid River unmarked Chinook salmon lengths for 2002.**

Fork length (cm)	Number of fish	Fork length (cm)	Number of fish
< 50	1	88	0
50	1	89	2
51	0	90	2
52	0	91	1
53	0	92	0
54	0	93	1
55	0	94	0
56	0	95	0
57	0	96	2
58	0	97	0
59	0	98	0
60	0	99	0
61	1	100	0
62	4	> 100	0
63	1	<b>Total</b>	<b>285</b>
64	2		
65	5		
66	6		
67	6		
68	9		
69	7		
70	20		
71	27		
72	27		
73	33		
74	30		
75	22		
76	17		
77	12		
78	8		
79	10		
80	10		
81	3		
82	3		
83	5		
84	2		
85	3		
86	1		
87	1		

Adult sex ratio	
138 ( 48.8%)	Males
145 ( 51.2%)	Females
283 (100.0%)	*Total

Age-class data	
2 ( 0.7%)	Three-year-old
274 ( 96.1%)	Four-year-old
9 ( 3.2%)	Five-year old
285 (100.0%)	Total

Age-class criteria	
< 60 cm =	Three-year old
60 to 86 cm =	Four-year-old
> 86 cm =	Five-year-old

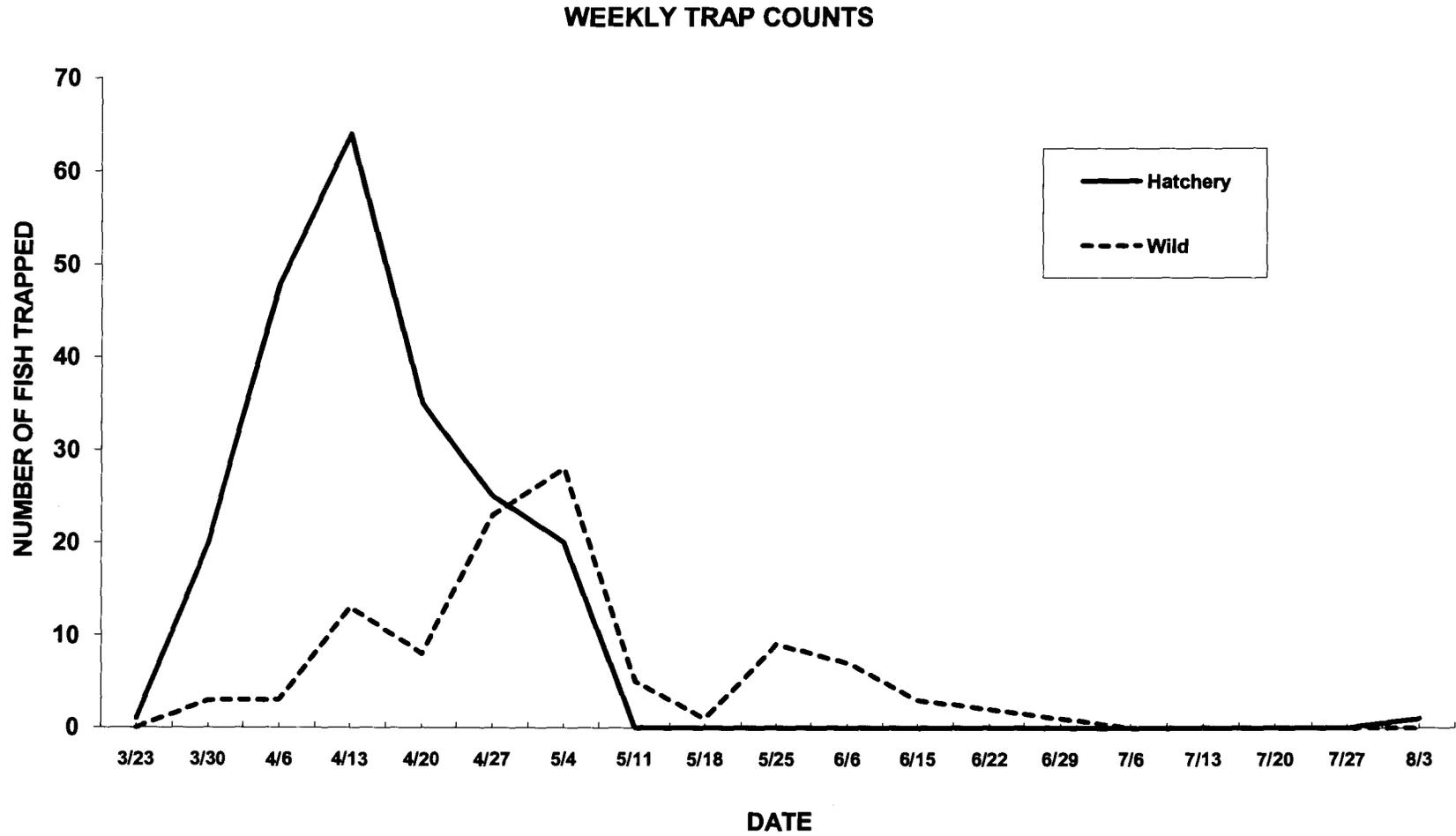
This table includes all salmon released above Rapid River Trap.

**Appendix 16. Rapid River steelhead run timing for 2002.**

Week ending	<sup>a</sup> Number of hatchery fish	Percentage of steelhead run	Number of wild fish	Percentage of steelhead run
March 23	1	0.31	0	0.00
March 30	20	6.27	3	0.94
April 6	48	15.05	3	0.94
April 13	64	20.06	13	4.06
April 20	35	10.97	8	2.50
April 27	25	7.84	23	7.19
May 4	20	6.27	28	8.75
May 11	0	0.00	5	1.56
May 18	0	0.00	1	0.31
May 25	0	0.00	9	2.81
June 6	0	0.00	7	2.19
June 15	0	0.00	3	0.94
June 22	0	0.00	2	0.63
June 29	0	0.00	1	0.31
July 6	0	0.00	0	0.00
July 13	0	0.00	0	0.00
July 20	0	0.00	0	0.00
July 27	0	0.00	0	0.00
August 3	1	0.00	0	0.31
Total by origin	214	66.77	106	33.23
Total steelhead		320		

<sup>a</sup> Hatchery steelhead include marked and unmarked fish.

**Appendix 17. Adult steelhead returns to Rapid River during 2002.**

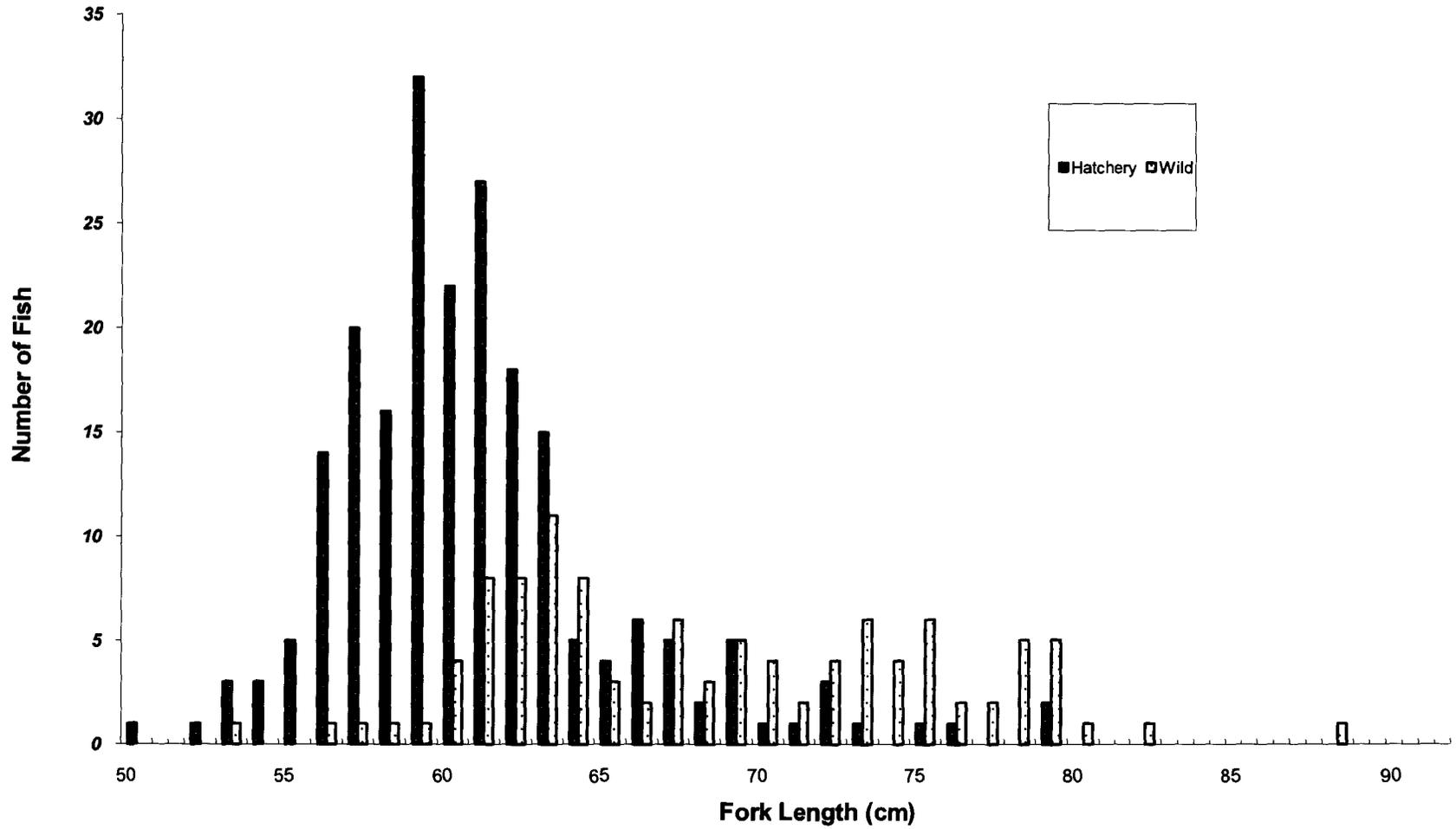


**Appendix 18. Rapid River steelhead fork lengths for 2002.**

Fork length (cm)	<sup>a</sup> Hatchery		Wild	
	Male	Female	Male	Female
50	1			
51				
52	1			
53	3		1	
54	1	2		
55	4	1		
56	8	6		1
57	14	6		1
58	10	6		1
59	14	18	1	
60	14	8	2	2
61	18	9	3	5
62	14	4	4	4
63	11	4	3	8
64	2	3	4	4
65	4			3
66	3	3	2	
67	2	3	4	2
68	1	1	2	1
69	2	3	3	2
70		1		4
71	1		1	1
72	1	2	2	2
73		1	1	5
74				4
75	1			6
76		1	1	1
77				2
78			1	4
79		2	3	2
80				1
81				
82				1
83				
84				
85				
86				
87				
88			1	
89				
column total	130	84	39	67
origin total	214		106	
total run	320			

<sup>a</sup> Hatchery fish include marked and unmarked fish.

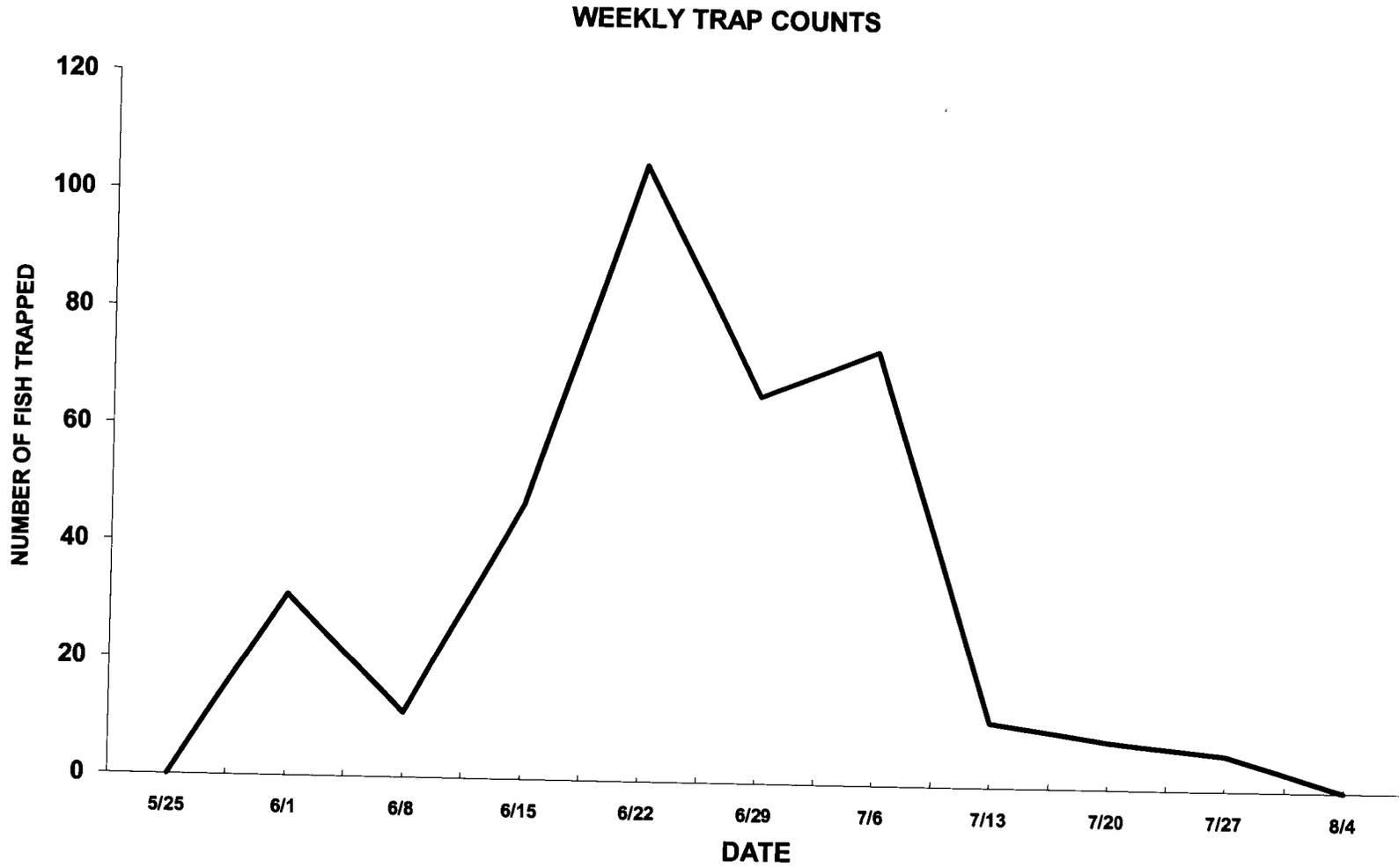
Appendix 19. Length-frequency of steelhead returning to Rapid River trap during 2002.



**Appendix 20. Rapid River bull trout run timing for 2002.**

Week ending	Number of fish	Percentage of bull trout run
May 25	0	0.0
June 1	31	8.6
June 8	11	3.1
June 15	47	13.1
June 22	105	29.2
June 29	66	18.4
July 6	74	20.6
July 13	11	3.1
July 20	8	2.2
July 27	6	1.7
August 4	0	0.0
Total	359	100.0

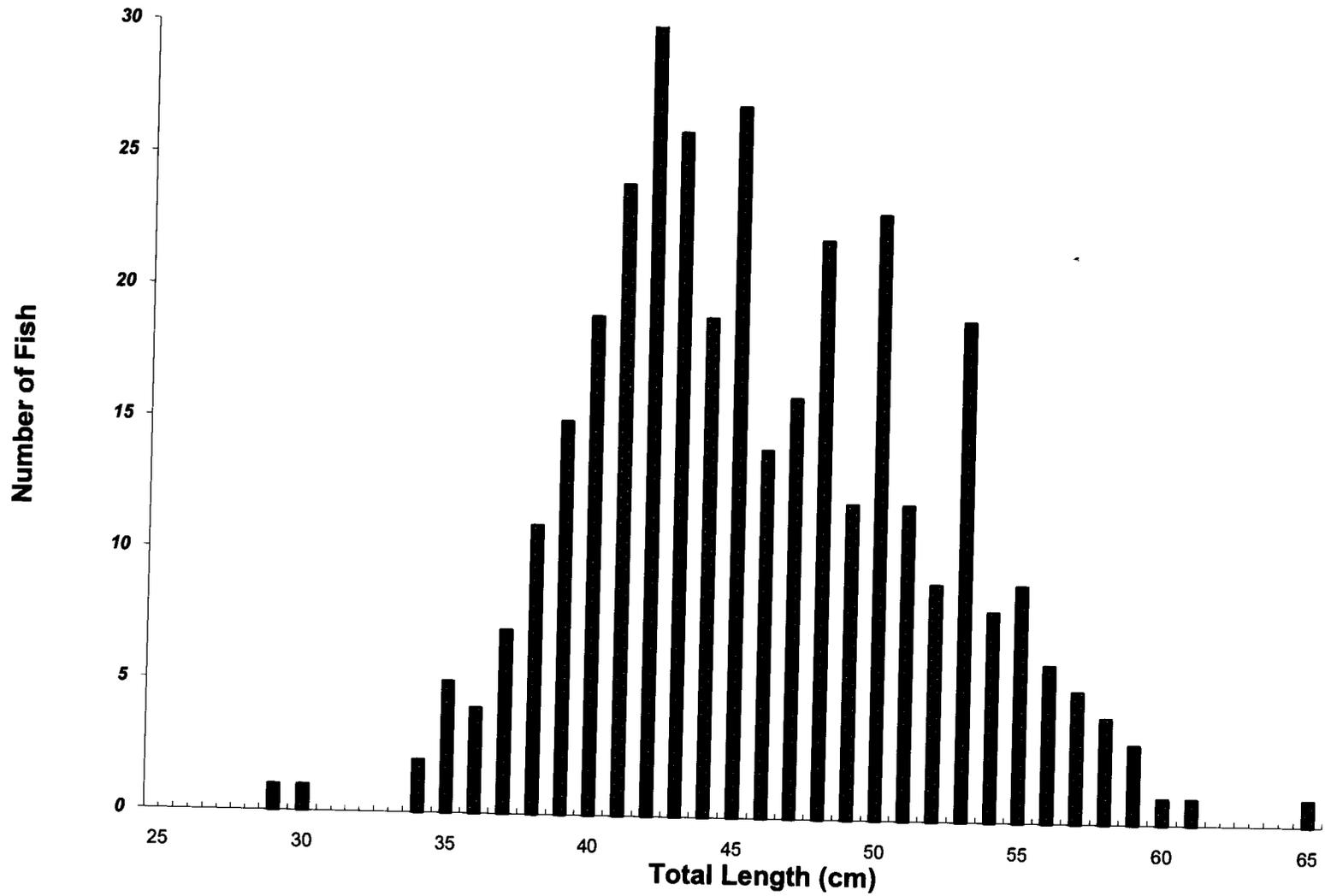
Appendix 21. Adult bull trout returns to Rapid River trap during 2002.



**Appendix 22. Rapid River bull trout lengths for 2002.**

Total length (cm)	Number of fish	Total length (cm)	Number of fish
25	0	45	27
26	0	46	14
27	0	47	16
28	0	48	22
29	1	49	12
30	1	50	23
31	0	15	12
32	0	52	9
33	0	53	19
34	2	54	8
35	5	55	9
36	4	56	6
37	7	57	5
38	11	58	4
39	15	59	3
40	19	60	1
41	24	61	1
42	33	62	0
43	26	63	0
44	19	64	0
		65	1
<b>Total</b>			<b>359</b>

Appendix 23. Length-frequency of adult bull trout returning to Rapid River during 2002.



**Appendix 24. Species trapped in Rapid River during 2002.**

Species	Number trapped
Marked spring Chinook salmon	6,600
Unmarked Chinook salmon	285
Steelhead	320
Bull trout	359

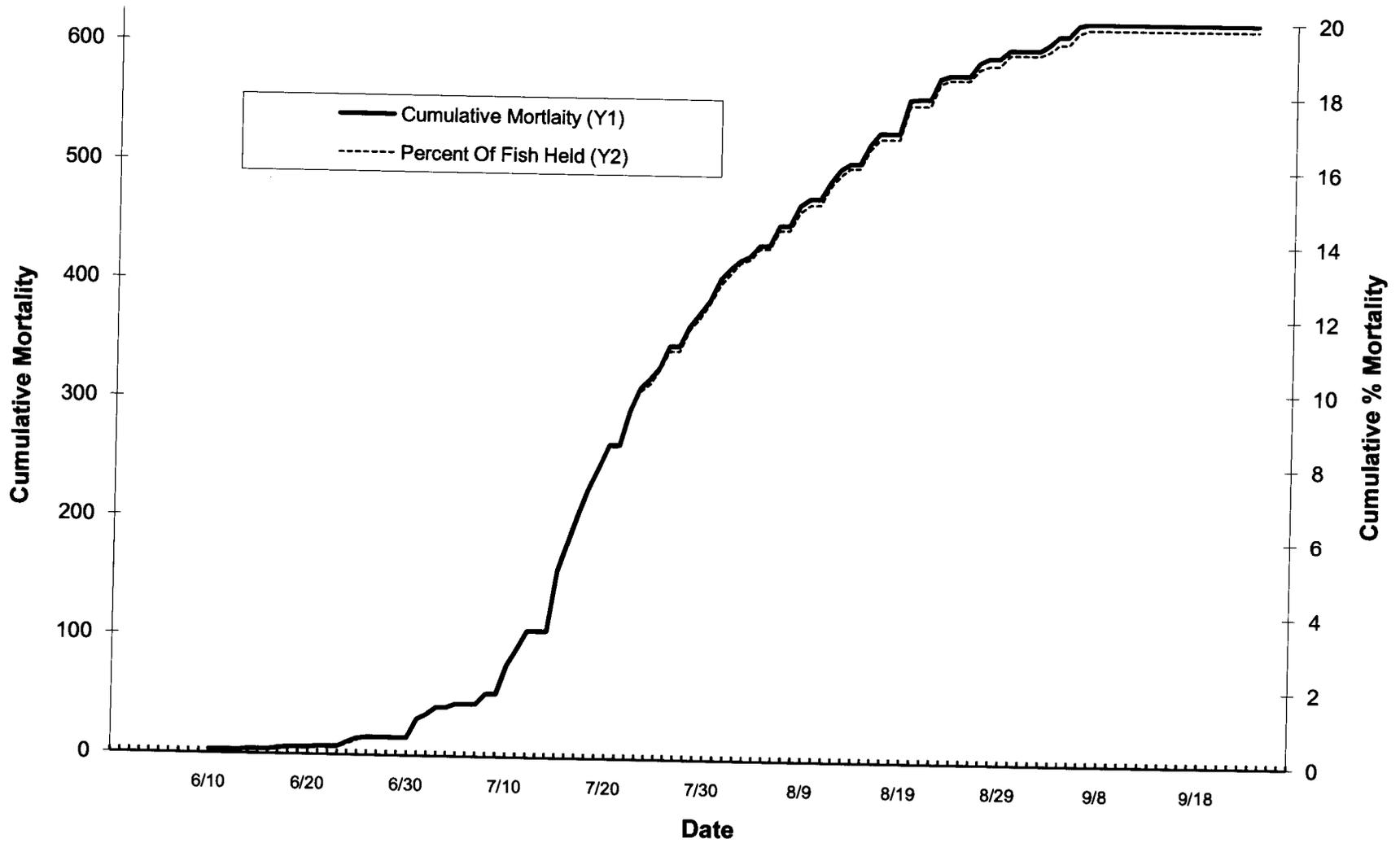
This table does not include recaptures.

**Appendix 25. Causes of prespawning mortality at Rapid River Hatchery for 2002,**

Cause	Number of fish	*Percentage of fish held
Nitrogen Embolism	105	3.12
Jaundice	1	0.03
Injury	2	0.06
Bacterial Kidney Disease	217	6.59
Unknown	299	9.51
Total	624	19.79

\*Percentages are of 3143 fish held for spawning.

Appendix 26. Cumulative prespawning mortality at Rapid River Fish Hatchery for 2002,



**Appendix 27. Rapid River broodstock ELISA results for 2002,**

Lot number	Date sampled	Number sampled	Negative		Positive	
			0-0.114	Low 0.114-0.119	High > 0.119	
1	8/12	8	5			3
2	8/13	5	4			1
3	8/15	5	5			0
4	8/16	14	13			1
5	8/19	35	33			2
6	8/20	20	16			4
7	8/22	74	71			3
8	8/23	29	27	1		1
9	8/26	185	167	4		14
10	8/27	79	57	7		15
11	8/29	363	324	13		26
12	8/30	156	134	4		18
13	9/2	155	137	3		15
14	9/3	74	47	10		17
15	9/5	57	41	2		14
16	9/6	26	18	0		8
17	9/9	12	8	1		3
18	9/15	5	0	0		5
19	9/16	3	0	0		3
<b>Total</b>		<b>1305</b>	<b>1,107</b>	<b>45</b>		<b>153</b>

Samples were taken from all 1,305 females spawned. Eggs were culled from females with ELISA results of greater than 0.118 in lots 1-7 then greater than 0.114 in lots 8-19. There were 65 additional females culled which were incubated in two female trays with culled females. Eggs were culled from 263 females.

**Appendix 28. Rapid River Hatchery egg enumeration for 2002,**

Eggs taken at Rapid River Hatchery in 2002.							
Lot	Spawn date	Number eyed	Primary Pick	Number green	Percent eyed	Average fecundity	Number of females
1	8/12	16,944	3,086	20,030	84.6	5,008	4
2	8/13	15,759	4,584	20,343	77.5	5,086	4
3	8/15	12,078	1,790	13,868	87.1	2,774	5
4	8/16	34,143	5,908	40,051	85.2	3,081	13
5	8/19	90,612	10,269	100,881	89.8	3,057	33
6	8/20	48,247	2,694	50,941	94.7	3,184	16
7	8/22	218,621	27,256	245,877	88.9	3,463	71
8	8/23	90,253	13,239	103,492	87.2	3,980	26
9	8/26	552,047	95,307	647,354	84.6	3,808	165
10	8/27	214,460	32,081	246,541	87.0	4,403	57
11	8/29	705,467	133,088	838,555	84.1	2,620	322
12	8/30	455,749	33,855	489,604	93.1	3,654	92
13	9/2	386,294	54,775	441,069	87.6	3,645	120
14	9/3	154,550	16,880	171,430	90.2	3,571	48
15	9/5	141,136	8,877	150,013	94.1	3,750	42
16	9/6	65,111	3,215	68,326	95.3	3,796	18
17	9/9	15,849	6,068	21,917	72.3	3,653	6
<b>Total</b>		<b>3,217,320</b>	<b>452,972</b>	<b>3,670,292</b>	<b>87.7</b>	<b>3,522</b>	<b>1,042</b>

The table in this appendix includes only eggs held to eye-up and counting. It does not include eggs from 263 females that were culled before eye-up and enumeration.

Appendix 29. Rapid River Hatchery initial raceway loading densities (1/6/03–4/7/03),

Raceway	Inflow (ft <sup>3</sup> /sec)	Number of fish	Weight (lb)	Density Index	Flow Index
2	0.36	317,343	181.38	0.28	0.93
3	0.35	311,371	177.93	0.27	0.94
4	0.36	306,633	175.22	0.27	0.90
5	0.34	307,181	175.53	0.27	0.96
6	0.35	304,077	173.76	0.27	0.92
7	0.33	302,763	173.01	0.27	0.97
8	0.33	306,964	175.41	0.27	0.99
9	0.34	304,432	173.96	0.27	0.95
10	0.35	307,820	175.90	0.27	0.93
11	0.32	291,942	166.82	0.26	0.97
Total		3,060,526	1748.92		

Inventory data are based on egg enumeration values when final fish were added to each raceway.

Appendix 30. Rapid River Hatchery final raceway loading densities (5/31/03),

Raceway	Inflow (ft <sup>3</sup> /sec)	Number of fish	Weight (lb)	Density Index	Flow Index
2	1.90	317,719	1,630	0.39	0.74
3	1.90	309,943	1,505	0.37	0.70
4	1.90	304,548	1,357	0.34	0.65
5	1.90	305,414	1,301	0.33	0.63
6	1.90	300,770	953	0.27	0.51
7	1.90	258,054	905	0.25	0.47
8	1.90	304,559	1,208	0.32	0.60
9	1.90	301,829	1,068	0.29	0.55
10	1.90	305,413	1,155	0.23	0.58
11	1.90	289,243	1,020	0.28	0.53
TOTAL		2,997,492	12,102		

The inventory data in this appendix are based on egg enumeration minus recorded mortality.

**Appendix 31. Rapid River Hatchery initial pond loading densities (6/19/03 to 7/18/03),**

Pond	Inflow (ft <sup>3</sup> /sec)	Number of fish	Weight (lb)	Density Index	Flow Index
RP-1A	9.10	661,192	5,634	0.07	0.45
RP-1B	8.10	654,151	6,001	0.07	0.51
RP-2A	8.70	573,751	5,570	0.07	0.45
RP-2B	8.70	543,591	5,033	0.07	0.88
RP-2C	8.70	550,284	4,913	0.07	0.91
RP-2D	8.70	625,862	5,538	0.07	0.50
TOTAL		3,608,831	32,689		

The Inventory data in this appendix are based on the number of fish marked as reported by the Department's Fish Marking Lab in October of 2003. It is an increase of 611,339 fish or 20.4% from hatchery inventory and an increase of 11,790 fish from the number reported by the Department's Fish Marking Lab after marking in July 2003. This total was used for adjusted hatchery inventory and subsequent release numbers.

**Appendix 32. Rapid River Hatchery pond loading densities at release (3/15/04),**

Pond	Inflow (ft <sup>3</sup> /sec)	Number of fish	Weight (lb)	Density Index	Flow Index
RP-1A	10.0	651,814	27,181	0.19	1.19
RP-1B	10.0	642,662	26,789	0.19	1.17
RP-2A	8.8	566,190	23,233	0.19	1.14
RP-2B	8.8	537,580	22,223	0.19	2.21
RP-2C	8.8	543,585	19,831	0.18	2.19
RP-2D	8.8	620,323	22,706	0.20	1.45
TOTAL		3,562,154	141,963		

**Appendix 33. Feed for Brood Year 2002 at Rapid River Hatchery,**

Product		<sup>a</sup> Amount used	Unit price	Total cost
Type/size	Additives			
<b>Moore-Clark</b>				
#0 Starter		200 Kg	.910	\$ 182.00
<b>BioDiet:</b>				
No. 2 Starter		698.8kg	2.23	\$1,558.32
No. 3 Starter		1038kg	2.23	\$2,314.74
No. 2 & No. 3	Bio Flake MC			
1.0 mm Grower		1157kg	1.78	\$2,059.46
1.0mm Grower	4% TM-100	319Kg	3.37	\$1,075.03
1.3 mm Grower		998kg	1.74	\$1,736.52
1.3 mm Grower	2.25 % Aquamycin-100	2,275.2kg	3.63	\$8,258.98
1.5 mm Grower		798Kg	1.60	\$1,276.80
1.5 mm Grower	2.25% Auqamycin-100	1597Kg	3.63	\$5,797.11
1.5 mm Grower	4% TM-100	2,575Kg	3.67	\$9,450.25
<b>BioMoist:</b>				
1.5 mm Grower	<sup>b</sup> EIBS PAC	7,000.0lb	0.74	\$5,180.00
2.0 mm Grower	<sup>b</sup> EIBS PAC	52,325.0lb	0.73	\$38,197.25
	4.5%			
2.0 mm Grower	Aquamycin-100	5,825.0lb	2.08	\$12,116.00
	EIBS PAC			
2.5 mm Grower	<sup>b</sup> EIBS PAC	12,075.0lb	0.65	\$7,848.75
	4.5% Aquamycin-			
2.5 mm Grower	100	19,675.0lb	1.99	\$39,153.25
	<sup>b</sup> EIBS PAC			
3.0 mm Feed	<sup>b</sup> EIBS PAC	82,625.0lb	0.63	\$12,116.00
<sup>c</sup> Total		200,202.0lb		\$114,611.25

<sup>a</sup> Feed units are given in kg or lb. as provided by manufacturer

<sup>b</sup> EIBS PAC = 5 x C and B12, and 10 x Folic Acid.

<sup>c</sup> Total includes 183,942 lb fed prior to the start of release and 16,260 fed after the start of release.

The feed conversion is based on size of fish at release and the 200,202.0 lb of feed fed.

**Appendix 34. Eagle Fish Health Laboratory inspection results for Brood Year 2002,**

Stock	Log number	IHN	IPN	EIBS	BKD	FUR	ERM	CWD	MAS	WHD	Comments
<b>Juvenile samples</b>											
RRSC	02-639										TOTAL GAS PRESSURE (TGP) 101%
RRSC	03-080	-	-		-	-	-	+	+		CWD; MAS; FLAVOBACTERIUM PSYCHROPHILUM 10/10, PSEUDOMONAS AUREOFACIENS 6/10
RRSC	03-193	-	-		-	-	-	-	+		MAS; VIRO 0/10, FAT 0/10, PSEUDOMONAS SPP 7/10
RRSC	03-236	-	-		-	-	-	-	+		MAS; VIRO 0/6, FAT 0/6, PSEUDOMONAS SPP 2/6
RRSC	03-459	-	-		-	-	-	-	-		NO PATHOGENS DETECTED; VIOR 0/10, FAT 0/10, BACTE 0/10
RRSC	03-499	-	-		-	-	-	-	+		MAS; FAT 0/10, SEROMONAS SOBRIA 2/10
RRSC	04-050	-	-		-	-	-	-	-		NO PATHOGENS DETECTED; VIRO 0/10, FAT 0/10, BACTE 0/10
RRSC	04-114	-	-		-					-	NO PATHOGENS DETECTED; VIRO 0/20, FAT 0/20, ELISA 0/20, PDT-MYXOB 0/20
<b>Brood samples</b>											
RRSC	02-366				+						BKD; ELISA 3/8 (HIGH 3)
RRSC	02-367				+						BKD; ELISA 2/5 (LOW 1, HIGH 1)
RRSC	02-368				+						NO PATHOGENS DETECTED; ELISA 0/5
RRSC	02-369				+						BKD; ELISA 1/14 (HIGH 1)
RRSC	02-381				+						BKD; ELISA 2/35 (HIGH 2)
RRSC	02-382				+						BKD; ELISA 8/20 (LOW 4, HIGH 4)
RRSC	02-391	+	-	-	+				-		BKD; IHNV 2/20 (3), IPNV 0/60, NAVHS 0/3, ELISA 9/74 (LOW 6,HIGH 3), PTD-WHD 0/20
RRSC	02-394				+						BKD; ELISA 6/29 (LOW 5, HIGH 1)
RRSC	02-399				+						BKD; ELISA 58/185 (LOW 44,HIGH 14)
RRSC	02-400				+						BKD; ELISA 60/79 (LOW 45,HIGH 15)
RRSC	02-417				+						BKD; ELISA 148/363 (LOW 122, HIGH 26)
RRSC	02-418				+						BKD; ELISA 69/156 (LOW 51, HIGH 18)
RRSC	02-419				+						BKD; ELISA 65/155 (LOW 50,HIGH 15)
RRSC	02-420				+						BKD; ELISA 68/74 (LOW 51, HIGH 17)
RRSC	02-429				+						BKD; ELISA 40/57 (LOW 26, HIGH 14)
RRSC	02-430				+						BKD; ELISA 16/26 (LOW 8, HIGH 8)
RRSC	02-441				+						BKD; ELISA 11/12 (LOW 8, HIGH 3)
RRSC	02-481				+						BKD; ELISA 5/5 (LOW1, HIGH 4)
RRSC	02-482				+						BKD; ELISA 3/3 (HIGH 3)

**Appendix 35. Preliberation organosomatic index for Brood Year 2002,**

Hematology						
Date	Hematocrit			Serum protein		
	<sup>a</sup> Mean	<sup>a</sup> SD	<sup>b</sup> CF	<sup>a</sup> Mean	<sup>b</sup> SD	<sup>c</sup> CF
03/10/04	43.8	5.64	0.13	6.96	1.34	0.19

<sup>a</sup> Standard deviation

<sup>b</sup> Coefficient of variation

**Combined autopsy summary**

Eyes		Gills		Pseudo-branches		Thymus		Mesen. fat		Spleen		Hind gut		Kidney		Liver		Bile	
N	20	N	19	N	20	0	20	0	0	B	4	0	20	N	20	A	0	0	20
B1	0	F	0	S	0	1	0	1	4	R	16	1	0	S	0	B	20	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	7	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=0.0
H2	0			O	0			2.55								OT	0		
M1	0																		
OT	0																		

**Summary of normals**

20	20	20	20	20	20	20	20	20	20	20	20
----	----	----	----	----	----	----	----	----	----	----	----

N = normal

OT = other

Thymus: 0 = no hemorrhage

Mesenteric fat: 0 = none, 1 = < 50% coverage, 2 = 50%, 3 = > 50%, 4 = 100%

Spleen: R = red, E = enlarged (EIBS enlarges spleens)

Hind gut: 0 = no inflammation

Liver: B = pail red

Bile: 0 = yellow bile < full bladder

**Appendix 36. Rapid River Hatchery marking summary for Brood Year 2002,**

Coded wire tag releases						
Release site	Date released	Number of fish marked	Release group mark code	Clip	Purpose	Pond
Rapid River	3/18/-4/21/04	58,188	10-74-75	AD	US-Canada	1A
Rapid River	3/18/-4/21/04	57,293	10-75-75	AD	US-Canada	1A
Rapid River	3/18/-4/21/04	58,423	10-76-75	AD	US-Canada	1A
Rapid River	3/18/-4/21/04	57,646	10-77-75	AD	US-Canada	1A
Rapid River	3/18/-4/21/04	56,322	10-78-75	AD	US-Canada	1A
Rapid River	3/18/-4/21/04	52,590	10-79-75	AD	US-Canada	1A
Total		340,462				

PIT tag releases						
Release site	Date released	<sup>a</sup> Number of PIT-tagged fish	Release group mark code	Clip	Purpose	Pond
Rapid River	3/15-4/21/04	51,972	AD only	AD	CSS	2B

<sup>a</sup> See the *Annual Release Summary of Marked Salmon and Steelhead* (unpublished Department document) for estimated numbers of marked fish released.

**Appendix 37. Smolts released from Rapid River Hatchery in 2004 (brood year 2002),**

Release site Date	Release Method	Number Released	Weight (lb)
3/15/04	Loaded to trucks from pond 2D and Released below Hells Canyon Dam.	166,652	6,100
3/16/04	Loaded to trucks from pond 2D and Released below Hells Canyon Dam.	166,652	6,100
3/17/04	Loaded to trucks from pond 2D and Released below Hells Canyon Dam.	166,652	6,100
<b>3/15-3/17/04</b>	<b>Total to Snake River</b>	<b>499,956</b>	<b>18,300.0</b>
3/18/04	Loaded to trucks from pond 2C and Released in the Little Salmon River.	300,140	10,950
<b>3/18/04</b>	<b>Total release into Little Salmon River</b>	<b>300,140</b>	<b>10,950</b>
3/18-4/21/04	Volitional release into Raid River		
	1A	651,814	27,181
	1B	642,662	26,789
	2A	566,190	23,233
	2B	537,580	22,223
	2C	243,445	8,882
	2D	120,367	4,405
	<b>Total release into Rapid River</b>	<b>2,762,058</b>	<b>112,713</b>
	<b>Total hatchery release</b>	<b>3,562,154</b>	<b>141,963lb</b>

**Appendix 38. Egg to release survival at Rapid River Hatchery for brood year 2002,**

Green eggs	Eyed eggs	Percent survival (eye-up)	Swim-up	<sup>a</sup> Percent survival	<sup>b</sup> Marked number	Released smolts	<sup>c</sup> Percent survival
3,670,292	3,217,320	87.7	3,060,526	83.4	3,608,831	3,562,154	98.7

<sup>a</sup> The number shown is survival from green eggs to swim-up. The survival from eyed eggs to swim-up was 95.1%.

<sup>b</sup> The reported number marked was an increase of 20.4% from hatchery inventory, which was based on electronic enumeration minus mortality to date at the start of marking.

<sup>c</sup> Percent survival from marking to release. Mortality from marking to release was 0.1%.

**Appendix 39. Cost of production at Rapid River Hatchery for brood year 2002,**

Number of fish	Weight of fish (lb)	Weight of feed (lb)	Cost of feed	Feed Conversion	<sup>a</sup> Total cost	Cost/ thousand fish	Cost/ pound
3,562,154	141,963	200,202	\$114,611.25	1.41	\$1,249,377.27	\$350.73	\$8.80
3,562,154	141,963	200,202	\$114,611.25	1.41	\$797,130.53	\$223.77	\$5.62

<sup>a</sup> Total cost in top row is the total expenditure by IPC from 9/1/2002 through 3/30/2004. This amount exceeds the cost associated with production of Brood Year 2002 due to overlap in Brood Year rearing cycles. Total cost in the second row is based on apportionment by brood year inventory (see discussion in the Cost of Production section). The total cost includes funds provided to the Department by IPC, as well as internal costs incurred by IPC. It does not include IPC capital outlay expenditures.

## Appendix 40. Returns to Rapid River Hatchery from 1964 to 2002,

Return year	Snake R. return (adults)	Rapid R. return (adults)	Rapid R. return (jacks)	Percent prespawning mortality	Females spawned	Eggs/female	Number of eggs taken
1964	349			16	182	4,874	887,000
1965	408			21	133	4,541	604,000
1966	1,5111			18	621	3,697	2,296,000
1967	974	1,039		11	581	3,537	2,055,000
1968	351	3,416	740	2	1,809	3,671	6,540,000
1969	672	2,817	1,043	8	1,415	3,655	5,151,697
1970		6,470	887	10	3,520	4,136	14,560,280
1971		3,357	1,754	19	1,722	3,507	6,038,785
1972		12,310	943	15	3,825	3,941	15,072,604
1973		17,054	286	37	3,454	3,912	13,510,465
1974		3,457	538	27	1,756	3,924	6,890,186
1975		4,428	573	7	2,184	3,894	8,503,606
1976		6,342	1,765	15	3,055	3,762	11,492,878
1977		7,767	437	11	3,781	3,745	14,160,330
1978		5,735	34	21	2,350	4,266	10,026,888
1979		3,054	350	31	1,141	4,950	5,648,722
1980		1,528	432	30	543	3,235	1,756,827
1981		3,087	176	7	1,666	3,675	6,122,273
1982		3,646	30	11	1,883	3,973	7,482,330
1983		1,864	94	15	859	4,015	3,449,471
1984		1,705	651	7	821	3,807	3,125,911
1985	673	6,376	351	8	2,962	3,741	11,535,461
1986	360	6,546	177	34	2,451	4,355	10,673,138
1987	534	3,808	210	30	1,133	4,379	5,656,145
1988	381	3,608	172	19	1,645	4,879	7,905,702
1989	86	2,372	428	11	1,082	4,139	4,478,045
1990		2,566	40	13	1,063	3,967	4,217,103
1991		1,675	238	10	657	3,886	2,553,218
1992	912	2,370	96	24	1,177	3,988	4,534,404
1993	411	4,451	17	17	1,737	4,090	6,404,312
1994	29	261	4	21	116	4,226	490,249
1995	35	70	59	7	35	3,771	132,002
1996	58	1,412	751	6	329	3,561	1,171,610
1997	788	10,510	10	10	1,138	3,930	4,472,573
1998	60	1,584	7	16	723	4,715	3,409,130
1999	22	224	639	0.8	138	4,406	608,084
2000	967	3,098	1,701	4.1	1226	3,900	4,780,850
2001	0	12,642	128	34.6	878	3,796	3,333,314
2002	27	6,466	137	19.8	1072	3,522	3,670,292

From 1985 on, total eggs taken includes those from Snake River adults transferred to RRFH.

### Appendix 41. Returns to Rapid River Hatchery by Brood Year,

Brood year	Year released	Release Into Rapid River	3-year-olds	Year returned	4-year-olds	Year returned	5-year-olds	Year returned	Returns to Rapid River	Percent return from release
1964	1966	588,000	1,309	1967	3,422	1968	197	1969	4,928	0.84
1965	1967	479,267	740	1968	2,620	1969	874	1970	4,234	0.88
1966	1968	1,460,150	1,043	1969	5,596	1970	364	1971	7,003	0.48
1967	1969	900,192	887	1970	2,992	1971	1,544	1972	5,423	0.60
1968	1970	3,172,000	1,754	1971	10,766	1972	4,403	1973	16,923	0.53
1969	1971	2,718,720	943	1972	12,654	1973	1,759	1974	15,356	0.56
1970	1972	2,809,200	285	1973	1,698	1974	386	1975	2,369	0.08
1971	1973	2,908,425	538	1974	4,206	1975	1,120	1976	5,864	0.20
1972	1974	2,707,917	573	1975	5,222	1976	634	1977	6,429	0.24
1973	1975	3,373,700	1,765	1976	7,110	1977	1,845	1978	10,720	0.32
1974	1976	3,358,940	437	1977	3,890	1978	2,413	1979	6,740	0.20
1975	1977	2,921,172	34	1978	598	1979	46	1980	678	0.02
1976	1978	2,412,678	350	1979	1,482	1980	146	1981	1,978	0.08
1977	1979	2,866,993	432	1980	3,068	1981	557	1982	4,057	0.14
1978	1980	2,604,823	176	1981	3,089	1982	1,206	1983	4,471	0.17
1979	1981	2,372,607	30	1982	838	1983	356	1984	1224	0.05
1980	1982	1,476,766	94	1983	1,349	1984	199	1985	1,642	0.11
1981	1983	2,998,103	651	1984	6,177	1985	1,456	1986	8,284	0.28
1982	1984	3,246,197	351	1985	5,090	1986	1,155	1987	6,596	0.20
1983	1985	2,491,238	177	1986	2,444	1987	1,557	1988	4,178	0.17
1984	1986	1,594,688	210	1987	2,051	1988	379	1989	2,640	0.17
1985	1987	2,836,400	172	1988	1,933	1989	135	1990	2,240	0.08
1986	1988	2,630,200	428	1989	2,431	1990	421	1991	3,280	0.12
1987	1989	2,319,500	40	1990	1,254	1991	161	1992	1,455	0.06
1988	1990	2,520,400	238	1991	2,209	1992	1,905	1993	4,352	0.17
1989	1991	2,564,900	96	1992	2,546	1993	122	1994	2,764	0.11
1990	1992	2,615,500	17	1993	139	1994	9	1995	165	0.01

## Appendix 41. Continued

Brood Year	Year Released	Release Into Rapid River	3-year-olds	Year returned	4-year-olds	Year returned	5-year-olds	Year returned	Returns to Rapid River	Percent return from release
1991	1993	2,060,300	4	1994	61	1995	2	1996	67	0.003
1992	1994	2,547,624	59	1995	659	1996	177	1997	895	0.04
1993	1995	2,786,919	751	1996	10,333	1997	1,322	1998	12,406	0.45
1994	1996	379,167	10	1997	262	1998	72	1999	344	0.09
1995	1997	85,840	7	1998	152	1999	12	2000	171	0.20
1996	1998	896,170	639	1999	3,086	2000	96	2001	3,821	0.43
1997	1999	2,847,283	1,701	2000	12,546	2001	157	2002	14,404	0.51
1998	2000	2,462,354	128	2001	2872	2002	2008	2003	5008	0.20
1999	2001	736,601	119	2002	504	2003	57	2004	680	0.09
2000	2002	2,669,476	140	2003	2,317	2004	51	2005	2,508	0.09
2001	2003	2,330,557	431	2004	1,527	2005	28	2006	1,986	0.09
2002	2004	2,762,058	109	2005	2,322	2006	701	2007	3,132	0.11

Returns to Rapid River are hatchery rack returns and do not account for harvest.

**Appendix 42. Ten year average feed and growth data for Rapid River Hatchery,**

Month	Average water temperature (°F)	Density index	Flow index	<sup>a</sup> Feed conv.	Hatchery constant	<sup>b</sup> Daily length increase (in)	<sup>b</sup> Monthly length increase (in)	Condition factor C (x10 <sup>4</sup> )	Percent body weight fed	Number feedings per day	Average #/lb at end of month	Average length at end of month (in)
FEB	38	N.A.	N.A.	N.A.	1.98	0.0024	0.07	2.7	1.42	8	1109	1.50
MAR	41	0.24	0.59	1.07	2.26	0.0070	0.20	2.8	1.89	8	809	1.64
APR	44	0.29	0.64	1.02	3.23	0.0105	0.34	3.1	2.40	8	439	1.95
MAY	46	0.29	0.74	1.00	4.54	0.0151	0.29	3.1	2.30	8	271	2.29
JUN	49	0.0	0.69	1.20	7.10	0.0297	0.59	3.1	2.93	4	136	2.87
JUL	54	0.09	0.83	1.59	7.36	0.0155	0.47	3.6	2.75	4	79	3.43
AUG	55	0.12	1.33	1.59	7.82	0.0164	0.50	3.5	2.70	5	46	3.86
SEP	51	0.15	1.57	1.70	8.66	0.0170	0.51	3.5	2.00	5	36	4.31
OCT	46	0.16	1.69	1.71	5.03	0.0098	0.30	3.5	1.37	3	30	4.60
NOV	51	0.17	1.81	2.22	1.54	0.0023	0.07	3.5	0.47	2	28	4.67
DEC	38	0.17	1.88	4.46	2.12	0.0016	0.03	3.4	0.21	1	30	4.67
JAN	37	0.18	1.89	2.83	1.15	0.0013	0.03	3.4	0.21	1	29	4.69
FEB	38	0.18	2.01	1.24	1.47	0.0040	0.12	3.2	0.53	2	26	4.95
MAR	41	0.19	1.97	1.55	3.47	0.0074	0.22	3.2	0.92	2	22	5.19

<sup>a</sup> Feed conversion is expressed as feed weight over fish weight gain.

<sup>b</sup> Growth data may vary during periods of high water.

**Appendix 43. Release and transfer summary for Rapid River Hatchery for 1964-2002,**

Brood Year	No. eggs taken	Egg or fry plants and site	Smolt plants and site	Fish/pound
1964	887,000	None	588,000Rapid River	20.1
1995	60,400	None	479,267Rapid River	19.6
1966	2,296,000	None	1,460,150Rapid River	18.1
1967	2,055,000	None	900,192Rapid River	18.9
1968	6,540,000	757,376 eggs Clearwater H Channel	3,172,000Rapid River	22.6
1969	5,171,697	497,610 eggs Dworshak NFH to start	2,718,720Rapid River	21.6
1970	14,560,280	4,417,454 eggs Sweetwater Eye Stat.	2,809,200Rapid River	23.3
		2,224,119 eggs Kooskia NFH.	91,800Lochsa River	23.8
		526,516 eggs Hayden Cr. Hatchery		
		2,473,983 eggs Clearwater H Channel		
		4,607,736 eggs Rapid River Hatchery		
		200,520 fry Lemhi River		
		353,970 fry Decker Pond		
		100,094 fry Sandpoint Hatchery		
1971	6,038,785	600,496 eggs Hayden Cr. Hatchery	2,908,425Rapid River	26.7
		53,562 fry Lemhi River	197,303SF Clearwater	
		104,300 fry Red River		
		29,800 fry Ten Mile Creek		
		44,700 fry American River		
		14,900 fry Papoose Creek		
		59,600 fry Brushy Creek		
		44,700 fry Fish Creek		
		14,900 fry Post Office Creek		
		44,700 fry Squaw Creek (Lochsa)		
		61,500 fry Lochsa River		
		60,000 fry Ten Mile Creek		
		200,880 fry Sandpoint Hatchery		
		401,305 fry Decker Pond		
1972	15,072,604	5,256,662 eggs Sweetwater Eye Stat.	2,707,917Rapid River	25.9
		3,012,358 eggs Hayden Creek Hatchery		
		1,293,592 eggs Red River H Channel		
1973	13,510,464	3,915,900 eggs Sweetwater Eye Stat.	3,373,700Rapid River	30.6
		1,295,424 eggs Hayden Creek Hatchery	117,000SF Clearwater	
		104,760 eggs Hagerman Hatchery		
		502,200 eggs Crooked R. H Channel		
		702,000 eggs Kooskia NFH		
		806,400 eggs Hayden Creek Hatchery		
		504,000 eggs Minnesota walleye trade		
		210,734 fry Sandpoint Hatchery		
		206,360 fry Kooskia NFH		
		88,480 fry Ten Mile Creek.		
		18,200 fry Newsome Creek		
		633,000 fry Lemhi River		
		10,428 fry Capehorn Creek		
1974	6,890,186	809,400 eggs Hayden Creek Hatchery	3,358,940Rapid River	24.7
		407,012 eggs Indian Creek	205,700SF Clearwater	
		203,500 fry Sandpoint Hatchery		
		21,840 fry Capehorn Creek		
		59,962 fry Red River		
		30,750 fry Newsome Creek		
		10,250 fry Ten Mile Creek		
		1,140,300 fry Lemhi River		

**Appendix 43. continued**

Brood Year	No. eggs taken	Egg or fry plants and site		Smolt plants and site	Fish/pound					
1975	8,503,606	2,363,200	eggs	Sweetwater Eye Stat.	2,921,172Rapid River 249,750SF Clearwater	28.5				
		252,200	eggs	Mullan Hatchery						
		255,000	eggs	Hayden Creek Hatchery						
		280,659	eggs	Indian Creek H Chan.						
		4,906,492	eggs	Rapid River Hatchery						
		34,000	fry	Ten Mile Creek						
		156,000	fry	Lemhi River						
		65,960	fry	SF Clearwater River						
		412,800	fry	Decker Pond						
		209,950	fry	Sandpoint Hatchery						
		36,143	fry	Bear Valley Creek						
		1976	11,492,878	1,615,608			eggs	Mullan Hatchery	2,413,678Rapid River	28.9
				2,937,994			eggs	Sweetwater Eye Stat.		
261,900	eggs			Hayden Creek Hatchery						
261,900	eggs			Sandpoint Hatchery						
1,267,208	eggs			Mackay Hatchery						
47,008	fry			Univ. of Idaho						
311,850	fry			Mackay Hatchery						
104,500	fry			Lolo Creek						
501,600	fry			Red River Pond						
80,600	fry			SF Clearwater						
1977	14,160,330			2,633,400	eggs	Sweetwater Eye Stat.	2,866,993Rapid River 156,362White Sand Cr. 44,373Newsome Creek	30.2		
		2,287,800	eggs	Kooskia NFH						
		2,689,200	eggs	Mullan Hatchery						
		288,000	eggs	Hayden Creek Hatchery						
		20,700	eggs	Univ. of Idaho						
		1,007,340	eggs	Crooked River H Chan.						
		723,000	fry	Mackay Hatchery						
		50,800	fry	Decker Pond						
		200,025	fry	Red River Pond						
		265,600	fry	Lemhi River						
		1978	10,026,888	729,246	eggs	Hayden Creek Hatchery			2,604,823Rapid River 57,440White Sand Cr.	30.2
970,728	eggs			Mackay Hatchery						
1,540,282	eggs			Sweetwater Eye Stat.						
706,936	eggs			Dworshak NFH						
38,160	eggs			Univ. Of Idaho						
48,940	eggs			U of I Hayden Cr.						
1,250,010	eggs			Crooked River H Chan.						
249,696	eggs			Sweetwater Eye Stat.						
232,500	fry			Red River Pond						
10,000	fry			Ten Mile Creek						
1979	5,646,722			806,400	eggs	Hayden Creek Hatchery	2,372,607Rapid River 1,001,700Snake River	25.3 21.6		
		330,880	eggs	Dworshak NFH						
		293,249	fry	Red River Pond						
1980	1,756,827	None		1,473,733Rapid River	16.2					
1981	6,122,273	608,384	eggs	Pahsimeroi Hatchery	2,998,103Rapid River 250,020Snake River	20.6 16.8				
		256,608	eggs	Oxbow Hatchery						
		449,280	eggs	Dworshak NFH						
1982	7,420,450	493,346	eggs	Looking Glass (Ore)	3,246,197Rapid River 500,850Snake River	22.7 16.8				
		1,332,000	eggs	Pahsimeroi Hatchery						
		375,028	eggs	Dworshak NFH						
		125,055	eggs	Hagerman NFH						
		306,000	fry	Red River Pond						

### Appendix 43. continued

Brood Year	No. eggs taken	Egg or fry plants and site		Smolt plants and site	Fish/pound
1983	3,449,471	None		2,491,238Rapid River	19.7
				437,360Snake River	16.8
1984	3,125,911	None		1,594,688Rapid River	20.6
				140,000Snake River	22.7
				136,000Red River	15.1
1985	11,535,461	497,520	eggs Oregon	2,630,200Rapid River	20.2
		3,668,000	eggs Dworshak NFH	103,000Snake River	14.6
		2,450,907	eggs Sawtooth Hatchery		
		100,590	fry Boulder Creek		
		349,650	fry Crooked River		
		200,158	fry Eldorado Creek		
		55,123	fry Hopeful Creek		
		144,443	fry Crooked Fork Creek		7
		70,282	fry White Sand Creek		
		49,437	fry Ten Mile Creek		
		102,282	fry Newsome Creek		
		115,352	fry Brushy Fork Creek		
1986	10,673,138	2,368,400	eggs Dworshak NFH	2,630,200Rapid River	23.9
		712,905	eggs Sawtooth Hatchery	400,600Snake River	22.9
		348,600	fry Crooked Fork Creek		
		202,400	fry White Sand Creek		
		98,000	fry Big Flat Creek		
		238,900	fry Red River Pond		
1987	5,656,145	30,000	fry Little Salmon River	2,319,500Rapid River	20.6
		103,800	fry Lolo Creek	500,000Snake River	22.7
		53,200	fry Eldorado Creek		
		137,800	fry Crooked Fork Creek		
		62,200	fry Hopeful Creek		
		228,800	fry White Sand Creek		
		72,200	fry Big Flat Creek		
		113,800	fry American River		
		112,100	fry Newsome Creek		
		100,100	fry Meadow Creek		
		200,100	fry Crooked River		
		50,100	fry Red River		
		50,100	fry Yankee Fork		
		202,000	fry Brushy Fork		
		150,100	fry Ten Mile Creek		
		100,200	fry White Sand Creek		
1988	7,881,379	1,475,677	eggs Oregon Fish and Game	2,520,400Rapid River	17.4
		149,570	fry Little Salmon River	250,000Little Salmon	16.3
		100,278	fry Ten Mile Creek	551,200Snake river	15.1
		149,570	fry Little Salmon River		
		100,278	fry Ten Mile Creek		
		101,062	fry Crooked River		
		100,862	fry Crooked River		
		100,628	fry Newsome Creek		
		100,299	fry Boulder Creek		
		100,342	fry Boulder Creek		
		100,097	fry Newsome Creek		
		195,398	fry Brushy Fork		
		99,919	fry White Sand Creek		
		100,148	fry White Sand Creek		
		99,401	fry American River		
		51,369	fry American River		
		39,163	fry Meadow Creek		

### Appendix 43. continued

Brood Year	<sup>a</sup> No. eggs taken	Egg or fry plants and site		Smolt plants and site	Fish/pound	
1989	3,925,585	211,509	fry	Crooked River	2,564,900Rapid River	18.7
		548,876	fry	Sawtooth Hatchery	100,100Little Salmon	20.2
1990	4,271,103	200,000	eggs	Looking Glass Hatch.	500,500Snake River	20.2
		403,400	fry	Sawtooth Hatchery	2,615,500Rapid River	22.3
1991	2,553,218	3,050	fry	Hayden Creek Hatchery	500,500Snake River	22.3
		22,235	Eggs received		2,060,300Rapid River	18.4
1992	4,534,404	26,694	Eggs received			
		10,126	fry	Squaw Creek	200,300Snake River	16.9
		90,125	fry	White Sand Creek		
1992	4,534,404	942,897	eggs	Dworshak Hatchery	2,547,624Rapid River	22.2
					380,600Snake River	22.1
1993	7,103,702	2,176,157	eggs	Clearwater Hatchery	2,786,919Rapid River	24.5
					499,536Snake River	23.7
1994	490,249	58,791	eggs	Clearwater Hatchery	379,167Rapid River	27.0
1995	132,002	16,402	eggs	Clearwater Hatchery	85,840Rapid River	22.1
1996	1,171,610	168,754	eggs	Clearwater Hatchery	896,170Rapid River	22.3
1997	5,407,913	1,015,496	eggs	Clearwater Hatchery	2,847,283Rapid River	25.3
					200,000Little Salmon	20.8
					300,000Snake River	20.8
1998	3,720,135	510,848	eggs	Clearwater Hatchery	2,462,354Rapid River	19.2
1999	634,520				736,601Rapid River	18.8
		199,010	Eggs received			
2000	5,100,650	911,919	eggs	Clearwater Hatchery	2,669,476Rapid River	19.8
					300,018Little Salmon	18.6
2001	4,946,614				500,195Snake River	22.7
					2,330,557Rapid River	18.7
					199,900Little Salmon	21.1
2002	4,596,671				299,854Snake River	19.8
					2,762,058Rapid River	24.5
					300,140Little Salmon	27.4
				499,956Snake River	27.3	

<sup>a</sup> In 1992 RRFH started routine sampling of all spawned females for BKD by ELISA. Since that year, eggs from females that tested positive for BKD were transferred to other facilities for isolated rearing or culled. In some years culling has also occurred for other reasons e.g., inventory. The number of eggs taken includes culled eggs and is therefore total egg take. Egg transfers are included in this table. The number of culled eggs is not. More detailed information is available in individual brood year reports.

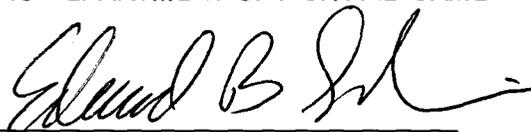
Prepared by:

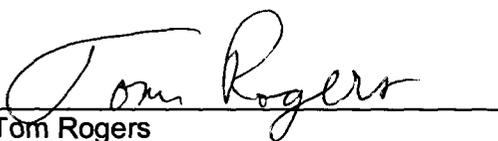
Ralph E. Steiner  
Fish Hatchery Manager II

Nicola A. Johnson  
Assistant Fish Hatchery Manager

Approved by:

IDAHO DEPARTMENT OF FISH AND GAME

  
Edward B. Schriever, Chief  
Fisheries Bureau

  
Tom Rogers  
Hatchery Supervisor