



RAPID RIVER FISH HATCHERY

2004 BROOD YEAR REPORT



By

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TABLE OF CONTENTS

ABSTRACT.....	3
INTRODUCTION	5
FUNDING SOURCE.....	5
LOCATION.....	5
OBJECTIVES	5
FACILITY DESCRIPTION.....	5
RECOMMENDED FACILITY IMPROVEMENTS	6
WATER SUPPLY	6
Water Source.....	6
Water Supply	7
STAFFING	7
FISH PRODUCTION.....	8
ADULT COLLECTION	8
Spring Chinook Salmon Returns to Rapid River.....	8
Spring Chinook Salmon Transferred from Hells Canyon	10
Inventory of Ancillary Species Trapped in Rapid River	10
Fisheries	11
ADULT HOLDING.....	11
Adult Treatments.....	11
Prespawning Mortality.....	12
SALMON SPAWNING	12
INCUBATION	12
EARLY REARING.....	13
FINAL REARING	14
FEED USE AND CONVERSION	14
FISH HEALTH	15
Diseases Encountered and Treatment	15
Organosomatic Index.....	15
Acute Losses	15
FISH MARKING	16
FISH DISTRIBUTION	16
Egg Transfers	16
Fingerling Transfers	16
Smolt Releases.....	16
COST OF PRODUCTION.....	17
HISTORICAL INFORMATION.....	18
ACKNOWLEDGMENTS.....	19
LITERATURE CITED	20
APPENDICES.....	21
Appendix 1. Rapid River Hatchery production capacity.....	22
Appendix 2. Rapid River Hatchery pond volume.....	22
Appendix 3. Rapid River Hatchery adult holding pond temperatures (°F) for 2004.....	22
Appendix 4. Rapid River water quality analysis.....	23
Appendix 5. Rapid River marked Chinook run timing for 2004.....	25
Appendix 6. Chinook salmon returns to Rapid River trap during 2004.....	26

TABLE OF CONTENTS

Appendix 7. Rapid River marked Chinook salmon broodstock lengths for 2004.	27
Appendix 8. Length-frequency of Rapid River Fish Hatchery broodstock for 2004.	28
Appendix 9. Rapid River Hatchery returns in 2004 with VI, radio, or floy tags.	29
Appendix 10. Injuries to Chinook salmon returning to Rapid River Hatchery in 2004.	29
Appendix 11. Rapid River unmarked Chinook salmon run timing for 2004.	30
Appendix 12. Rapid River unmarked Chinook salmon lengths for 2004.	31
Appendix 13. Rapid River steelhead run timing for 2004.	32
Appendix 14. Adult steelhead returns to Rapid River during 2004.	33
Appendix 15. Rapid River steelhead fork lengths for 2004.	34
Appendix 16. Length-frequency of steelhead returning to Rapid River trap during 2004. ...	35
Appendix 17. Rapid River bull trout run timing for 2004.	36
Appendix 18. Adult bull trout returns to Rapid River trap during 2004.	37
Appendix 19. Rapid River bull trout lengths for 2004.	38
Appendix 20. Length-frequency of adult bull trout returning to Rapid River during 2004.	39
Appendix 21. Species trapped in Rapid River during 2004.	40
Appendix 22. Causes of prespawning mortality at Rapid River Hatchery for 2004.	40
Appendix 23. Cumulative prespawning mortality at Rapid River Fish Hatchery for 2004. ...	41
Appendix 24. Rapid River broodstock ELISA results for 2004.	42
Appendix 25. Rapid River Hatchery egg enumeration for 2004.	43
Appendix 26. Rapid River Hatchery initial raceway loading densities (12/27/04-03/07/05). 44	
Appendix 27. Rapid River Hatchery final raceway loading densities (6/15/05-6/30/05).	44
Appendix 28. Rapid River Hatchery initial pond loading densities (6/15/05 to 6/30/05).	45
Appendix 29. Rapid River Hatchery pond loading densities at release (3/15/06).	45
Appendix 30. Feed for brood year 2004 at Rapid River Hatchery.	46
Appendix 31. Eagle Fish Health Laboratory inspection results for brood year 2004.	47
Appendix 32. Preliberation organosomatic index for Brood Year 2004.	48
Appendix 33. Rapid River Hatchery marking summary for brood year 2004.	49
Appendix 34. Smolts released from Rapid River Hatchery in 2006 (Brood Year 2004).	50
Appendix 35. Egg to release survival at Rapid River Hatchery for brood year 2004.	51
Appendix 36. Cost of production at Rapid River Hatchery for brood year 2004.	51
Appendix 37. Returns to Rapid River Hatchery from 1964 to 2004.	52
Appendix 38. Returns to Rapid River Hatchery by Brood Year.	53
Appendix 39. Ten year average feed and growth data for Rapid River Hatchery.	55
Appendix 40. Release and transfer summary for Rapid River Hatchery By Brood Year for 1964-2004.	56

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 17 to September 21, 2004. From April 27 to September 1, 2,805 (431 three-year-old males, 860 four-year-old males, 1,464 four-year-old females, 18 five-year-old males, and 32 five-year-old females) marked spring Chinook salmon were trapped. Of these, 88 were marked with a right operculum punch and release into the Little Salmon River to re-enter fisheries. Five of the released fish were recaptured. A total of 2,722 fish were ponded from Rapid River. An additional 386 (385 adults and 1 jack) were received from Oxbow Fish Hatchery (OFH). Of the total 3,108 fish held, 233 jacks were killed and given to tribal agencies. This left 2,875 fish for broodstock. Records of sex and length were kept for the broodstock and the jacks that were given away, however 44 fish were unaccounted for leaving records for 3,064 fish. The age-class structure of this 3,064 fish subsample was 406 three-year-olds (13%) 2,601 four-year-olds (85%), and 57 five-year-olds (2%). The adult sex ratio (excluding jacks) was 984 adult males (37%), and 1,674 females (63%).

Ancillary species were trapped in 2004. From May 6 to August 28, 112 unmarked Chinook salmon were trapped and released into Rapid River above the weir. The age-class composition of the unmarked Chinook salmon was 3 three-year-olds and 109 four-year-olds. The adult sex ratio was 66 males and 43 females. From March 22 to June 8, 185 steelhead (*Oncorhynchus mykiss*) were trapped. The sex ratio by origin of the returning steelhead was 55 wild males, 65 wild females, 39 hatchery males, and 26 hatchery females. Wild steelhead were released above the weir. Hatchery steelhead were released into the Little Salmon River. From May 4 to August 2, 240 bull trout (*Salvelinus confluentus*) were trapped and released above the weir. There was a mountain whitefish (*Prosopium williamsoni*) trapped on June 28 and a rainbow trout (*Oncorhynchus mykiss*) trapped on May 4. Both were released into Rapid River above the weir.

In 2004, there were fisheries on the Snake River from Lewiston to Heller Bar and in Hells Canyon. There were fisheries on the Salmon River that included a fishery upstream from the confluence of the Little Salmon River to the confluence of Vinegar Creek. There was also a fishery on the Little Salmon River. The Department's creel survey estimated harvest of 150 marked spring Chinook salmon on the Snake River in the Lewiston to Heller Bar fishery and 3,069 on the Salmon River, of which 128 were harvested upstream from the Little Salmon River. There were 1,997 harvested on the Little Salmon River. There was no creel survey in Hells Canyon. In addition to non-treaty fisheries there was a tribal fishery in Rapid River. Nez Perce Tribal officials reported subsistence and commercial harvest of 4,990 marked and 16 unmarked Chinook salmon.

Prespawning mortality of the 3,108 fish ponded was 592 fish or 19.0%. The sex ratio was 177 males (6%) and 415 females (13%).

Spawning occurred from August 16 to September 13, 2004. A total of 1,222 females were spawned producing a total egg take of 4,394,312 green eggs. Eggs from 95 females

(341,620 eggs) were culled leaving 4,052,511 green eggs from 1,127 females. After primary pick off, 3,777,779 eyed eggs remained. Average fecundity was 3,596 eggs/female and eye-up was 93.2%. Excellent eye-up and low cull rate yielded inventory in excess of mitigation needs. To resolve this, 170 additional females were culled reduce numbers to meet current mitigation requests for smolt release. The final eyed egg inventory was 3,179,711.

Brood Year 2004 fingerlings were marked and moved from raceways to rearing ponds from June 15 to June 30, 2005. Markers reported 3,146,971 were Adipose-clipped and 110,866 were also coded-wire-tagged. From February 6 through February 9, 2006, 51,884 were PIT tagged by the Department and on February 15, 44,800 were PIT tagged by Biomark Inc.

From March 14 to April 21, 2006, 3,130,528 smolts were released including: 400,000 into the Snake River below Hells Canyon Dam, 200,000 into the Little Salmon River, and 2,530,528 into Rapid River. Survival from swim-up to release was 98.7%.

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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 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/ lb (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 each), 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.

Water Supply

Water Source

The head waters 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. 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. Snow pack was average and runoff occurred over a long period of relatively even flows making the 2004 high water season the most benign in recent years. Hydrographic records for 2004 show that flows peaked at 572 ft³/s on June 6. Water temperature in Rapid River also varies considerably. The minimum in January 2004 was 33.6° F and the maximum in August was 61.0 °F. Pond water temperatures during adult holding are shown in Appendix 3.

Water Supply

Both RRFH and the adult trap located downstream from RRFH are supplied with surface water diverted from Rapid River. Water for production at the hatchery is obtained through one 30-inch pipe and one 24-inch pipe. A 5-ft high wooden diversion dam upstream of the hatchery provides the necessary hydraulic head to supply the facility via gravity flow. The RRFH has specific water rights of 28 ft³/s of water under Idaho Department of Water Resources (IDWR) water right number A78-02074. Water diverts from the river through the 30-inch pipe into a collection box where it is distributed to the early rearing raceways, incubation building (via one of two electric pumps in the headrace of the raceways), the adult holding ponds and one of the final rearing ponds. The second final rearing pond receives water through the 24-inch pipe. The incubation building can also receive water through a gravitational flow filter bed that gravity feeds river water from further upstream of the diversion dam or from a gasoline-operated pump which takes water from the headrace of the raceways. The gravitational flow pipe and gasoline-operated pump provide a redundant water supply to the incubation building during electrical failures. Water discharges from the facility either to Rapid River or to Shingle Creek, a tributary to Rapid River. Discharges are monitored under National Pollutant Discharge Elimination System permit. The adult trap has specific water rights of 18.6 ft³/s of water under IDWR water right number A78-07013. Water is diverted from Rapid River via gravity flow through a seven-step fish ladder and a two-stage trap and then discharges back into Rapid River. Water quality parameters are listed in Appendix 4.

Staffing

RRFH employs three classified positions which are a Fish Hatchery Manager 2, an Assistant Fish Hatchery Manager, and a Fish Culturist. 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 17 through September 21, 2004. The trapping operation was interrupted periodically for sand removal however this year the trap was not closed more than 6 hours at any one time.

In 2004, 2,805 (431 jacks and 2,374 adults) marked Chinook salmon were trapped between April 27 and September 1. The peak of the run was the last week of June. Marked spring Chinook salmon were transported to holding ponds at the hatchery. During the early part of the run, 88 hatchery fish were returned to the Little Salmon River to re-enter the fisheries. These fish were removed from the trap, marked with a right operculum punch to identify recaptures, loaded onto tanker trucks, and released upstream of the confluence of Rapid River. Subsequently, 5 fish were recaptured and transported to the hatchery along with the remaining 2,717 marked Chinook salmon. In 2004, no RRFH fish were used to supplement wild spawning. The Nez Perce Tribe received 128 jacks and the Shoshone Bannock Tribe received 105 jacks for subsistence distribution. Subsistence fish were killed and scanned for tags when they were picked up. Released fish, and subsistence 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 2004 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 2,805 returns to the RRFH (Appendices 5, and 6). Other trapping statistics including fork length, injuries, marks, and tags were also recorded at the trap. 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. Fin clips were all adipose fin (AD) clips. All RRFH fish placed in HP-1 and HP-2 were measured for fork length as they were removed from the ponds during spawning or as prespawning mortalities. Subsistence fish were measured as they were picked up.

In addition to the 2,722 marked Rapid River returns ponded, 386 (1 jack and 385 adults) were received from OFH yielding 3,108 fish held. Of these, 233 jacks were sequestered and given to tribal agencies. The remaining 2,875 were held for broodstock. There were 44 fish unaccounted for as they were removed from the holding ponds making the subsample for sex ratio and age-classes 3,064 fish. During August, the hatchery experienced intrusions from black

bears (*Ursus americanus*). At least some of the unaccounted fish as well as some minor damage to hatchery property is attributed to the bears. 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 of the subsample (excluding jacks) was 984 males (37%) and 1,674 females (63%). The age-class composition was 406 (13%) three-year-olds (< 58 cm), 2,601 (85%) four-year-olds (59-86 cm), and 57 (2%) five-year-olds (> 86 cm) (Appendices 7 and 8). Extending the adult sex ratio of the subsample for which records were kept to the 2004 Rapid River Hatchery run and assuming jacks (enumerated by actual count) are all three-year-old males, yields age by sex breakdown of: 431 three-year-old males, 860 four-year-old males, 1,464 four-year-old females, 18 five-year-old males, and 32 five-year-old females.

Ancillary species were collected, recorded, measured, marked, and released. Unmarked Chinook salmon, wild steelhead (*Oncorhynchus mykiss*), bull trout (*Salvelinus confluentus*), mountain whitefish (*Prosopium williamsoni*), and a rainbow trout (*Oncorhynchus mykiss*) were released into Rapid River above the weir. 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 tags were detected in 141 fish (5% of the Rapid River Run) and the data was uploaded directly to the PTAGIS database operated by the Pacific States Marine Fisheries Commission. The percentage of PIT tags in Rapid River release groups by return age was: 2% for three-year-olds, 2% for four-year olds, and 8% for five-year-olds. Of that 8%, 2% were part of a release group for the Comparative Survival Study (CSS) (Bonneville Power Administration (BPA) Project 199602000) and is comparable to the previous two years. The remaining 6% were released as part of a delayed mortality study funded by the US Army Corps of Engineers (USACE Walla Walla, WA office). Marked smolts for the USACE study were captured during downstream migration and should not be considered in evaluations of returning fish. The ponded fish were scanned for CWT. Snouts with CWT were collected from 155 fish (5% of the ponded fish) and placed in labeled plastic bags. The percentage of CWT in Rapid River release groups by return age was: 4% for three-year-olds, 12% for four-year olds, and 15% for five-year-olds. The snout bags were cataloged and held until the end of the spawning season when they were taken to the fish marking lab in Lewiston. Six fish arrived at Rapid River with radio transmitters and no floy tags were observed in 2004 (Appendix 9).

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 80 nitrogen burns, 171 gaff wounds 376 fishhooks, and 127 gill net scars (Appendix 10).

Spring Chinook Salmon Transferred from Hells Canyon

During 2004, 386 (1 jack and 385 adults) 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 in 2004 jacks returned from a release of 299,854 smolts in 2003. Four-year-olds returned from a release of 500,195 smolts in 2002. Five-year-olds returned from release year 2001, in which no RRFH smolts were released into Hells Canyon. Trapping operations were started at Hells Canyon Dam in order to include the Snake River component of the run in the hatchery broodstock, for distribution, and for run analysis. The Hells Canyon trap operated for 12 days between May 10 and July 7, 2004 trapping 1,445 spring Chinook salmon including 1,338 marked hatchery adults, 88 marked hatchery jacks, and 19 unmarked wild adults.

Inventory of Ancillary Species Trapped in Rapid River

From May 6 through August 28, 2004, 112 unmarked Chinook salmon entered the RRFH fish trap (Appendices 6 and 11). They were anesthetized, measured to the nearest centimeter fork length (Appendices 8 and 12), 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 112 unmarked Chinook salmon was 3 three-year-olds (3%), and 109 four-year-olds (97%). The adult sex ratio (excluding jacks) was 66 males (61%), 43 females (39%).

From March 22 through June 8, 2004, 185 adult steelhead were trapped (Appendices 13 and 14) and measured to the nearest centimeter fork length (Appendices 15 and 16). The steelhead run included 120 wild fish and 65 hatchery fish. The sex ratio by origin was 55 wild males, 65 wild females, 39 hatchery males, and 26 hatchery females. Hatchery steelhead including unmarked hatchery steelhead (determined by morphology) were transported to the Little Salmon River and released at least one mile upstream from the confluence of Rapid River. Wild steelhead were released into Rapid River upstream of the weir. All released steelhead received a right operculum punch to identify recaptures. Two were recaptured.

A total of 240 bull trout were trapped from May 4 through August 2, 2004 (Appendices 17, and 18). Of these, 11 were recaptured a second time. They ranged in size from 25 cm to 65 cm total length (Appendices 19 and 20). 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. In 2004 a mountain whitefish was trapped on June 28 and a rainbow trout was trapped on May 4. An inventory of all species trapped in 2004 is shown in Appendix 21.

Fisheries

In 2004, there were fisheries on the Snake River from Lewiston to Heller Bar and in Hells Canyon. There were fisheries on the lower Salmon River that included a fishery upstream from the confluence of the Little Salmon River to Vinegar Creek that did not target Rapid River fish. There was also a fishery on the Little Salmon River. The Department's creel survey estimated harvest of 150 marked spring Chinook salmon on the lower Snake River in the Lewiston to Heller Bar fishery and 3,069 on the lower Salmon River, of which 128 were harvested upstream from the Little Salmon River. The survey further estimated that 121 of the fish harvested in the Salmon River upstream from the Little Salmon River were RRFH returns. There were 1,997 harvested on the Little Salmon River. There was no survey conducted in Hells Canyon. For more information regarding the fisheries contact the Department's McCall Regional Office or the Clearwater Regional Office. In addition to non-treaty fisheries there was a tribal fishery in Rapid River. Nez Perce Tribal officials reported subsistence and commercial harvest of 4,990 marked and 16 unmarked Chinook salmon (IDFG database, unpublished, Alan Byrne).

Adult Holding

Adult Treatments

The holding period extended from May 4 to September 13, 2004. Hatchery personnel removed fish from the trap daily and processed them on site. They were handled as little as possible and processed while the fish were immersed. All marked spring Chinook salmon placed in HP-1, HP-2 or released above the trap were anesthetized with 40-mg/L 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 starting the day before adding fish to lower background flora on aquatic plants and pond fixtures. Treatments commenced at three days/week when fish were added, increased to five days/week in mid-June, and increased to seven days/week from the start of July until September 8. Treatments were omitted on spawn days for the pond that was being spawned. Treatments consisted of pre-charging ponds with formalin to 167 mg/L then introducing formalin into inflow water at a rate of 167 mg/L for one hour. During holding, water temperature ranged from 41.7°F to 61.0°F (Appendix 3). Carcasses were frozen in a freezer trailer and taken to a rendering plant in Caldwell Idaho at the conclusion of the spawning season.

Prespawning Mortality

Prespawning mortality at RRFH in 2004 was 592 fish or 19% of the 3,108 fish held. After August 23 males were not considered prespawning mortality due to senescence. The sex ratio was 177 males (6%) and 415 females (13%). Prespawning mortality was largely due to wounds, nitrogen embolism related mycosis, bacterial kidney disease (BKD), and gaff wounds.

Hatchery personnel performed cursory necropsies of all prespawning mortalities. Causal factors for prespawning mortality are shown in Appendix 22. A profile of cumulative prespawning mortality is shown in Appendix 23. As fish were removed from the ponds they were scanned for CWT and snouts were collected from 155 fish in which a CWT was detected. The snouts 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 2004, 1,249 female spring Chinook salmon were processed from August 16 to September 13. Of these 27 were destroyed and their eggs rejected because they showed gross evidence of disease. The remaining 1,222 females were spawned. Spawning followed standard procedure recommended by the Integrated Hatchery Operations Team (IHOT) for random cross of two males for each 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 the eggs 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 1,222 spawned females were sampled at spawning for BKD. Samples were analyzed by enzyme-linked immunosorbent assay (ELISA) (Appendix 24).

Incubation

The total egg take for 2004 was 4,394,312 green eggs from 1,222 females (based on average fecundity). Eggs from 95 of the females (341,620 eggs based on average fecundity) were culled. The remaining 1,127 females produced 4,052,511 green eggs (Appendix 25).

Eggs from 837 females to be incubated to eye-up at RRFH were water hardened for 30 minutes in 100-mg/L 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 59 females with an optical density (o.d.) ≥ 0.250 o.d. were culled. Another 8 were culled for gross pathology. Eggs from

the remaining 770 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. A Jensorter™ Model BCM egg counter was used to inventory live eggs. Dead eggs were enumerated by average weight. After counting, the eggs were returned to clean trays. The 770 females produced 2,902,843 green eggs. After primary pick of 178,745 dead eggs, 2,724,098 eyed eggs remained. Eye-up was 93.8% and the average fecundity was 3,770 eggs/female.

During spawning, green eggs from 385 females were transported to OFH for initial incubation. They were placed in EggTube™ containers and water hardened in 100-mg/L iodophore for one hour in EggBox™ coolers. The iodophore was displaced with well water and ice was added to lower the temperature to 45°F for the trip to OFH where they were disinfected in 100-mg/L iodophore and placed in vertical stack incubators adjusted to 5 gal/min. About 97,092 eggs (based on average fecundity) from 27 females with o.d. ≥ 0.250 were culled and an additional female was culled by mistake. This left 1,149,668 green eggs from 357 females. The eggs were incubated to eye-up and picked using a salt path. Both live and dead eggs were enumerated using a Jensorter™ Model BCM egg counter. After primary pick of 95,967 un-eyed eggs, 1,053,701 eyed-eggs remained. After picking, the eyed eggs were returned to clean trays. All of the eggs at OFH were incubated at a rate of one female per tray. As picking of each lot was completed, the eyed-eggs were returned to RRFH. Average eye-up was 91.7% and average fecundity was 3,220 eggs/female.

In summary, a total of 1,222 females were spawned at RRFH in 2004, from which 95 were culled before eye-up. The remaining 1,127 females produced 4,052,511 green eggs. After primary picking off, 3,777,799 eyed eggs were reared at RRFH for Brood Year 2004 production. Overall eye-up was 93.2% and average fecundity was 3,596 eggs/female. The eggs were picked again at 760 DTU, 1,000 DTU, and 1,500 DTU. Egg trays were rodded at least weekly after 300 DTU. Formalin was administered to each incubator stack starting three days after spawning at a rate of 1,667 mg/L for 15 minutes three times each week. This procedure was discontinued after each lot accumulated 800 DTU. Mycosis was controlled. Excellent eye-up and low cull rate yielded inventory in excess of mitigation needs. To resolve this, 170 additional females (with the highest o.d values by ELISA) were culled to reduce inventory to meet current mitigation requests. The final eyed egg inventory was 3,179,711. Fry were ponded at approximately 1,750 DTU.

Early Rearing

Fry were ponded from December 27, 2004 through March 7, 2005. A total of 10 lots were ponded in 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/ft³/in. Initial water depth was adjusted to 24 in, and flow was set to 0.25 ft³/s. As the fish grew, water depth and flows were increased to a maximum depth of 36 in and flow of 1.62 ft³/s. The fingerlings remained in raceways until marking when they were transferred to rearing ponds. At the end of early rearing on June 15, 2005 the fingerlings averaged 222.7 fpp and 2.4 in total length. The average DI was 0.31 lb/ft³/in and the average flow index (FI) was 1.14 lb/gal/min/in. Initial raceway density is shown in Appendix 26 and final raceway density is shown in Appendix 27. Mortality during early

rearing was 24,215 fish or 0.8% 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 mg/L active chlorine before introducing fish. The fingerlings were transferred from raceways to ponds through four-inch aluminum pipe as they were marked. The marking crew reported that 3,146,971 fingerlings were marked and moved from June 15 through June 30, 2005. This total was a decrease of 1.5% 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 28. The fish averaged 117.3 fpp and 2.8 in total length at the end of marking, and grew to 19.6 fpp and 5.2 in total length at release. The volitional release began on March 15, 2006. The average DI before release was 0.21 lb/ft³/in, and the average FI was 2.39 lb/gal/min/in (Appendix 29). The maximum DI recommended by the Department (IHOT goal) at this facility is 0.30 lb/ft³/in. The maximum recommended FI for O₂-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 16,443 fish or 0.5% of the inventory reported at marking. Total mortality from swim-up through release was 40,658 fish or 1.3% of the adjusted swim-up.

Feed Use and Conversion

A total of 260,713 lb of feed was used for Brood Year 2004 fish before release. The overall feed conversion was 1.66. Specific data on feed types and sizes are listed in Appendix 30.

Three medicated feed treatments were administered to Brood Year 2004 fingerlings. Starting April 21, 2005 they received a 14-day treatment of oxytetracycline-medicated feed to at a rate of 3.75 g/100lb to limit mortalities caused by pseudomonades. This treatment protocol was approved by the Investigational New Animal Drug (INAD) 9332. Two prophylactic applications of erythromycin medicated feed were fed for 28 days to control *Renibacterium salmoninarum*. Starting May 17, 2005, and continuing for 28 days, they were fed 2.25% Aquamycin-100 at a rate of 2% body weight/day to yield a dose of 100 mg/kg/day Erythromycin. Then starting August 31, 2005, and continuing for 28 days, they were fed 4.5% Aquamycin-100 at a rate of 1% body weight/day to yield a dose of 100mg/kg/day Erythromycin. Both Aquamycin-100 treatments were performed according to guidelines set forth in INAD number 6013/4333 and were preceded by toxicity testing.

Fish Health

Portions of this section of the *Rapid River Hatchery 2004 Brood Year Report* are reproduced with permission from Mr. Doug Munson of the EFHL. A summary of EFHL inspection results for Brood Year 2004 juveniles and broodstock is shown in Appendix 31.

Diseases Encountered and Treatment

Two prophylactic applications of erythromycin medicated feed were fed for 28 days to control *Renibacterium salmoninarum* the causative agent of BKD. Brood fish spawned in 2004 were found to be carrying infectious hematopoietic necrosis virus (IHNV) (2/60 fish tested). These findings do not impact hatchery operation. The eggs from the IHNV positive females were disinfected with 100-mg/L solution of iodophore during water hardening and incorporated into production. These viral detections were reported to the Animal and Plant Health Inspection Service (APHIS) veterinarian-in-charge. The IHNV was not detected in Brood Year 2004 juveniles during routine sampling. Each brood fish received an intraperitoneal injection of Erythromycin base injectable Gallimycin-100 at 20 mg/kg. These injections are reported to the Department's staff veterinarian.

Two of 8 fish sampled by EFHL on March 2, 2005 for diagnostic purposes were found to have pseudomonades. An oxytetracycline medicated feed treatment at 3.75 g/100 lb of biomass fed was applied in April to control mortalities. One of 8 fish also carried *Flavobacterium psychrophilum*. This feed treatment was successful.

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 32.

Acute Losses

Neither acute nor chronic losses were experienced during Brood Year 2004 rearing.

Fish Marking

Protocol requires AD clips for all spring Chinook salmon reared at RRFH for Brood Year 2004. The marking crew reported 3,146,971 fish were AD-clipped and a CWT was placed in 110,866 fish (4.4% of the Rapid River release). Marking occurred from June 15 through June 30, 2005. After marking, 2,820 fish were sampled during monthly pound counts for a quality check of AD clips. The results showed 93.6% with full clips, 0.9% without clips, and 5.5% with marginal clips.

PIT tags were placed in 51,884 fish (2.0% of the Rapid River release) from February 6 through February 9, 2006 by the Department's clipping crew for CSS (BPA Project No. 199602000) and will be used for survival and return analysis. Another of 44,800 fish (1.8% of the Rapid River release) were PIT-tagged by Biomark, Inc on February 15, 2006 for the USACE (Contract No. DACW68-02-D-0002) and will be collected during downstream migration for comparative mortality studies. 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 33.

Fish Distribution

Egg Transfers

There were no Brood Year 2004 eggs transferred to or from RRFH.

Fingerling Transfers

There were no Brood Year 2004 fingerlings transferred to or from RRFH.

Smolt Releases

There were 3,130,528 Brood Year 2004 smolts (159,629 lb) released from RRFH in 2006 (Appendix 34). Of these 400,000 (18,950 lb) were loaded onto trucks and released into the Snake River at the USFS's boat ramp below Hells Canyon Dam from March 14 through March 17. Another 200,000 (9,500 lb) were loaded onto trucks and released into the Little Salmon River at the Pinehurst Bridge on old U.S Highway 95 immediately north of Pinehurst

Idaho on March 16 and March 18.. The remaining 2,530,528 (131,179 lb) were released volitionally from RRFH from March 14 through April 21, 2006

Final sample counts were taken before the start of release. The smolts averaged 19.6 fpp and 5.2 in total length. Rearing densities at the time of release are listed in Appendix 29. Based on visual observations, almost all the smolts emigrated volitionally from RP-1 and 99.0% from RP-2. The remaining fish were seined from RP-2. The last fish emigrated on April 21. Survival from marking to release was 99.5% and survival from adjusted swim-up to release was 98.7% (Appendix 35).

Before the volitional release, RRFH personnel assisted technicians from Biomark Inc. in placing a pair of PIT-tag antenna arrays in the outflow weir 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. PIT tag detections from the array indicate that outmigration of PIT-tagged fish was about 60% complete by March 31. Two thirds of the detections (22,328) occurred overnight during a storm March 27-28 that was accompanied by some local flooding and high turbidity.

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 36).

The total cost paid by IPC for September 1, 2004, through March 31, 2006, was \$1,487,524.21 (letter dated May 26, 2006 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 2004's percent of total monthly inventory for the same period was \$935,835.78, which is 62.9% 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 2004 the cost/1000 fish went from \$475.17 to \$298.94 and cost/lb went from \$9.32 to \$5.86.

HISTORICAL INFORMATION

As always, we have included some archival information for context. Historic information about returns by return year is listed in Appendix 37 and by Brood Year in Appendix 38. Average feed and growth statistics are listed in Appendix 39. Release and transfer information is listed in Appendix 40.

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 Conservation Officer Brian Holbrook 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.

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 ³	3,800,000 Fry
Rearing Ponds 1	54,625 ft ³	1,000,000 Smolts
Rearing Ponds 2	92,827 ft ³	2,000,000 Smolts
Adult Holding Pond 1	12,000 ft ³	1,000 Adults
Adult Holding Pond 2	24,000 ft ³	3,000 Adults

Appendix 2. Rapid River Hatchery pond volume.

Rearing/holding area	Volume (ft ³)
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 2004.

Month	Maximum	Minimum	Average	Ten-year average
May	51.1	41.7	45.3	46.6
June	54.3	42.6	48.5	50.2
July	58.7	48.7	52.3	54.3
August	61.0	50.0	54.8	55.7
September	55.8	45.7	50.3	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 ₃
Hardness	0.1	85	mg/L as CaCO ₄
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

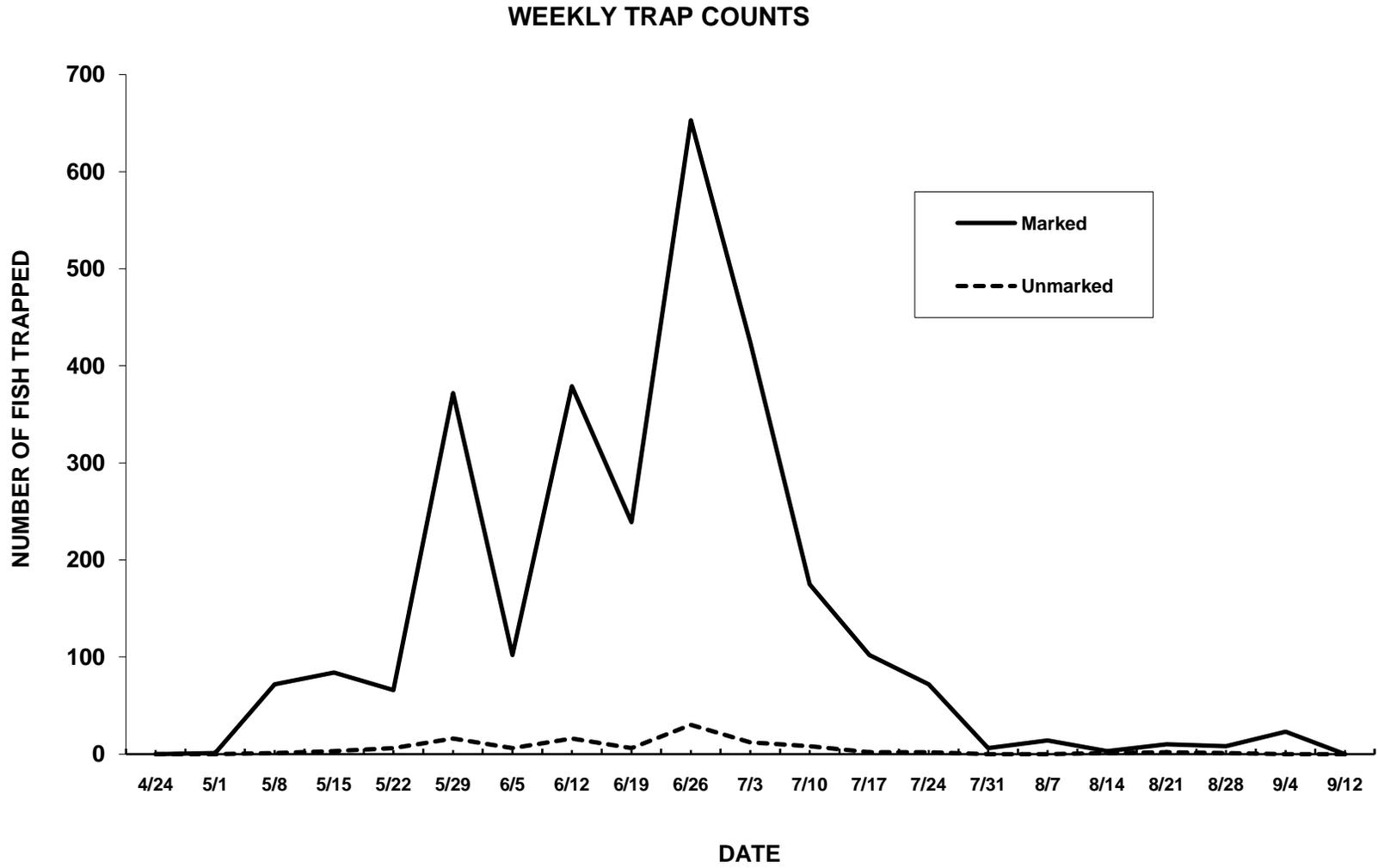
PQL = Practical Quantitation Limit

ND = not detected(< PQL)

Appendix 5. Rapid River marked Chinook run timing for 2004.

Week ending	Number of fish	Percent of marked Chinook salmon
April 24	0	0.00
May 1	1	0.04
May 8	72	2.57
May 15	84	2.99
May 22	66	2.35
May 29	372	13.26
June 5	102	3.64
June 12	379	13.51
June 19	239	8.52
June 26	653	23.28
July 3	424	15.12
July 10	175	6.24
July 17	102	3.64
July 24	72	2.57
July 31	6	0.21
August 7	14	0.50
August 14	3	0.11
August 21	10	0.36
August 28	8	0.29
September 4	23	0.82
September 11	0	0.00
Total	2,805	100.0

Appendix 6. Chinook salmon returns to Rapid River trap during 2004.



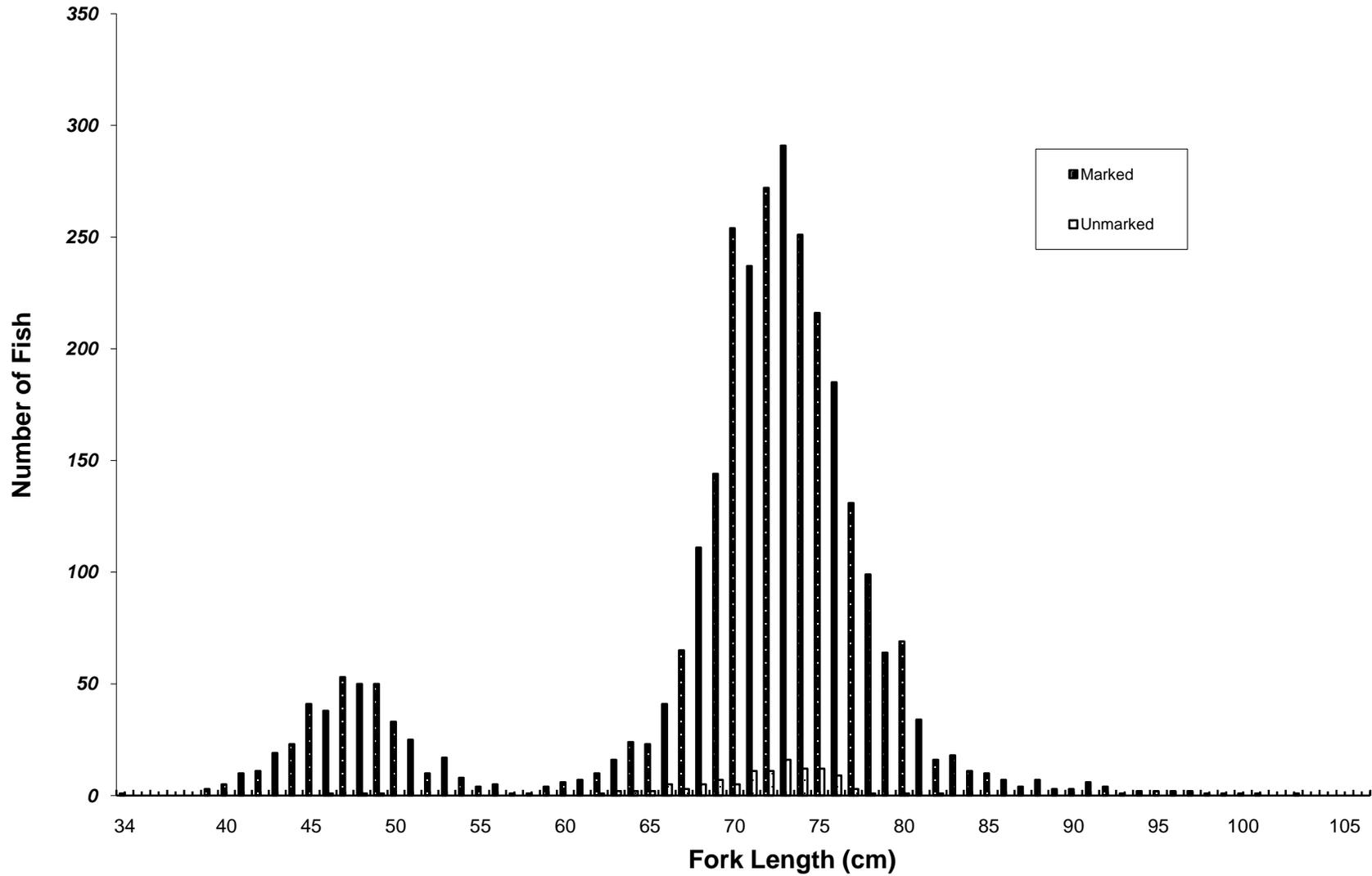
Appendix 7. Rapid River marked Chinook salmon broodstock lengths for 2004.

Fork length (cm)	Number of fish	Fork length (cm)	Number of Fish
< 50	304	88	7
50	33	89	3
51	25	90	3
52	10	91	6
53	17	92	4
54	8	93	1
55	4	94	2
56	5	95	2
57	1	96	2
58	1	97	2
59	4	98	1
60	6	99	1
61	7	100	1
62	10	> 100	1
63	16	<hr/> ^a Total 3,064	
64	24		
65	23		
66	41	<hr/> ^b Adult sex ratio	
67	65	406	Jacks
68	111	984 (37%)	Adult males
69	114	1,674 (63%)	Females
70	254	3,064 (100%)	Total
71	237	<hr/>	
72	272	Age-class data	
73	291	406 (13%)	Three-year-old
74	251	2,601 (85%)	Four-year-old
75	216	57 (2%)	Five-year old
76	185	3,064 (100%)	Total
77	131	<hr/>	
78	99	Age-class criteria	
79	64	< 58 cm =	Three-year old
80	69	59 to 86 cm =	Four-year-old
81	34	> 86 cm =	Five-year-old
82	16	<hr/>	
83	18		
84	11		
85	10		
86	7		
87	4		

^a This total includes fish received from Oxbow Fish Hatchery and jacks transferred for tribal subsistence distribution.

^b Adult sex ratio percentages do not include jacks.

Appendix 8. Length-frequency of Rapid River Fish Hatchery broodstock for 2004.



Appendix 9. Rapid River Hatchery returns in 2004 with VI, radio, or floy tags.

Trap date	VI tag number	Radio CH/code	PIT Tag #	Length (cm)	Sex	Disposition
06/21/04	None	23/209	3D9.1BF202D	75	Unknown	Hatchery
06/21/04	None	23/209	3D9.1BF1128	73	Unknown	Hatchery
06/23/04	None	17/124	3D9.1BF1432	72	Unknown	Hatchery
06/23/04	None	17/117	3D9.1BF13E3	68	M	Hatchery
07/07/04	None	23/107	3D9.1BF13C4	75	Unknown	Hatchery
07/21/04	None	23/059	3D9.1BF13DF	69	Unknown	Hatchery
Total	6 tags					

Appendix 10. Injuries to Chinook salmon returning to Rapid River Hatchery in 2004.

Nitrogen Blister	Gill net scar	Gaff wound	Fish hook
80	127	171	376

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

Appendix 11. Rapid River unmarked Chinook salmon run timing for 2004.

Week ending	Number of fish	Percent of unmarked Chinook salmon
May 1	0	0.00
May 8	1	0.89
May 15	3	2.68
May 22	6	5.36
May 29	16	14.29
June 5	6	5.36
June 12	16	14.29
June 19	6	5.36
June 26	30	26.79
July 3	12	10.71
July 10	8	7.14
July 17	2	1.79
July 24	2	1.79
July 31	0	0.00
August 7	0	0.00
August 14	1	0.89
August 21	2	1.79
August 28	1	0.89
September 4	0	0.00
Total	112	100.0

Appendix 12. Rapid River unmarked Chinook salmon lengths for 2004.

Fork length (cm)	Number of fish	Fork length (cm)	Number of fish
< 50	3	88	0
50	0	89	0
51	0	90	0
52	0	91	0
53	0	92	0
54	0	93	0
55	0	94	0
56	0	95	0
57	0	96	0
58	0	97	0
59	0	98	0
60	0	99	0
61	0	100	0
62	1	> 100	0
63	2	Total	112
64	2		
65	2		
66	5		
67	3		
68	5		
69	7		
70	5		
71	11		
72	11		
73	16		
74	12		
75	12		
76	9		
77	3		
78	1		
79	0		
80	1		
81	0		
82	1		
83	0		
84	0		
85	0		
86	0		
87	0		

^a Adult sex ratio		
3		Jacks
66	(61%)	Adult males
43	(39%)	Females
112		Total

Age-class data		
3	(3%)	Three-year-old
109	(97%)	Four-year-old
0		Five-year old
112	(100.0%)	Total

Age-class criteria	
< 57 cm =	Three-year old
58 to 85 cm =	Four-year-old
> 85 cm =	Five-year-old

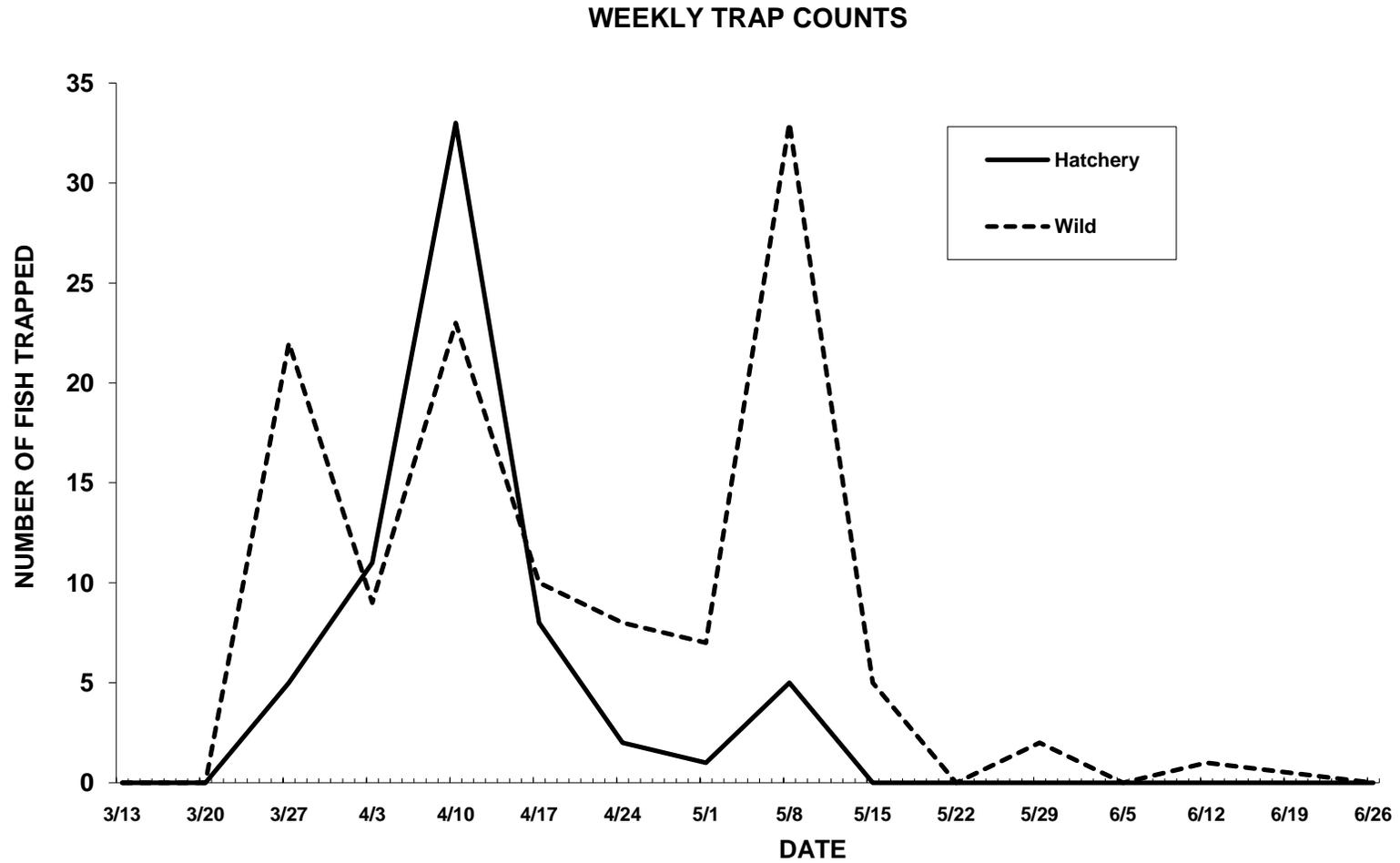
^a Adult sex ratio percentages do not include jacks.

Appendix 13. Rapid River steelhead run timing for 2004.

Week ending	^a Number of hatchery fish	Percent of Steelhead run	Number of wild fish	Percent of Steelhead run
March 13	0	0.0	0	0.00
March 20	0	0.00	0	0.00
March 27	5	2.70	22	11.89
April 3	11	5.95	9	4.86
April 10	33	17.84	23	12.43
April 17	8	4.32	10	5.41
April 24	2	1.08	8	4.32
May 1	1	0.54	7	3.78
May 8	5	2.70	33	17.84
May 15	0	0.00	5	2.70
May 22	0	0.00	0	0.00
May 29	0	0.00	2	1.08
June 5	0	0.00	0	0.00
June 12	0	0.00	1	0.54
June 26	0	0.00	0	0.00
July 3	0	0.00	0	0.00
July 10	0	0.00	0	0.00
July 17	0	0.00	0	0.00
July 24	0	0.00	0	0.00
Total by origin	65	35.13	120	64.85
Total steelhead		185		

^a Hatchery steelhead include marked and unmarked fish (determined by morphology).

Appendix 14. Adult steelhead returns to Rapid River during 2004.

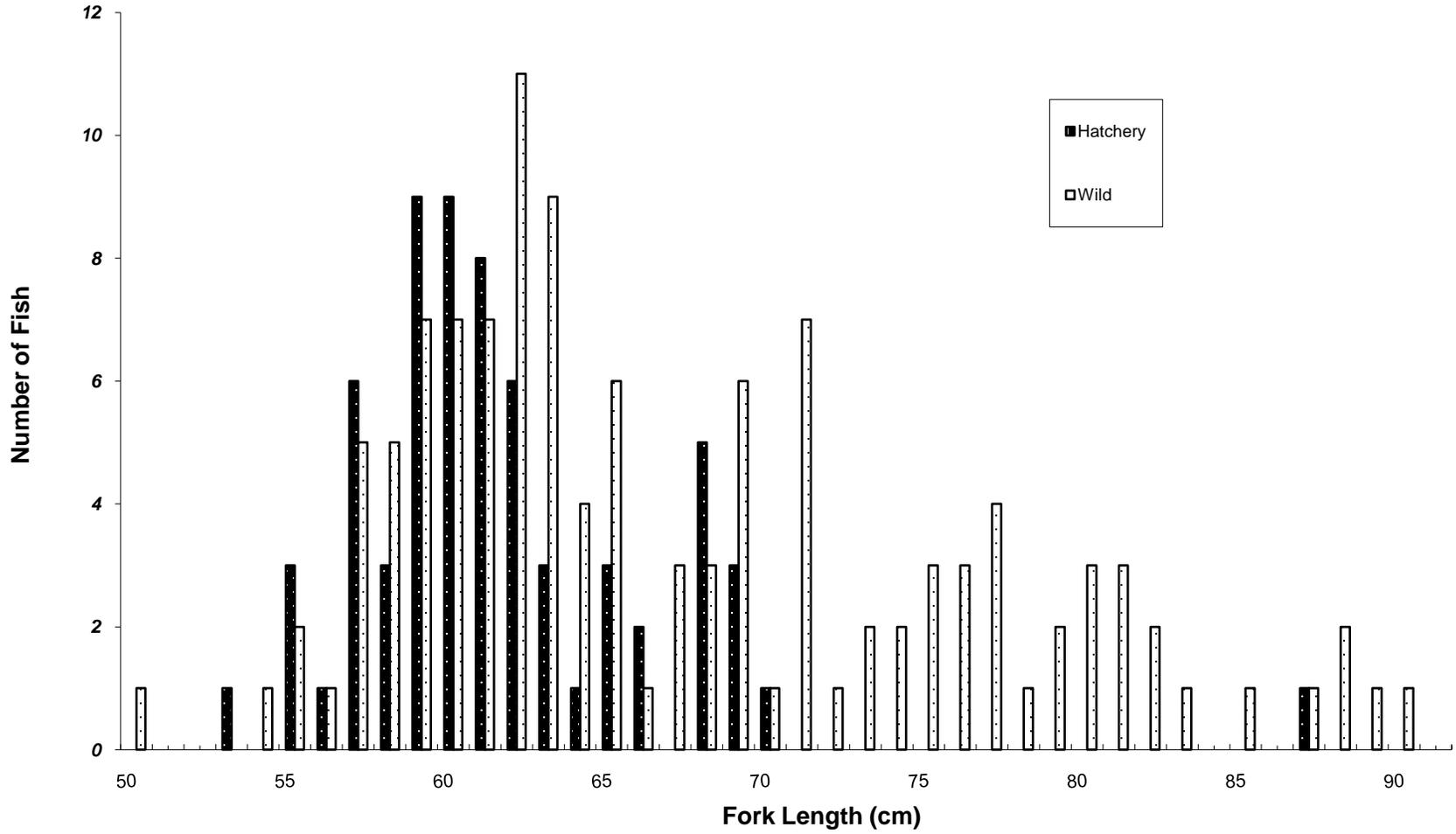


Appendix 15. Rapid River steelhead fork lengths for 2004.

Fork length (cm)	Hatchery		Wild	
	Male	Female	Male	Female
50			1	
51				
52				
53	1			
54				1
55	2	1	1	1
56		1		1
57	6		3	2
58	2	1	3	2
59	3	6	6	1
60	5	4	4	3
61	5	3	2	5
62	4	2	5	6
63	3		5	4
64	1		3	1
65	2	1	3	3
66	1	1		1
67			3	
68	3	2		3
69	1	2	3	3
70		1	1	
71			2	5
72				1
73				2
74			1	1
75			1	2
76			1	2
77				4
78			1	
79				2
80				3
81			2	1
82				2
83				1
84				
85				1
86				
87		1	1	
88			2	
89				1
90			1	
column total	39	26	55	65
origin total	65		120	
Total run	185			

^a Hatchery fish include marked and unmarked fish.

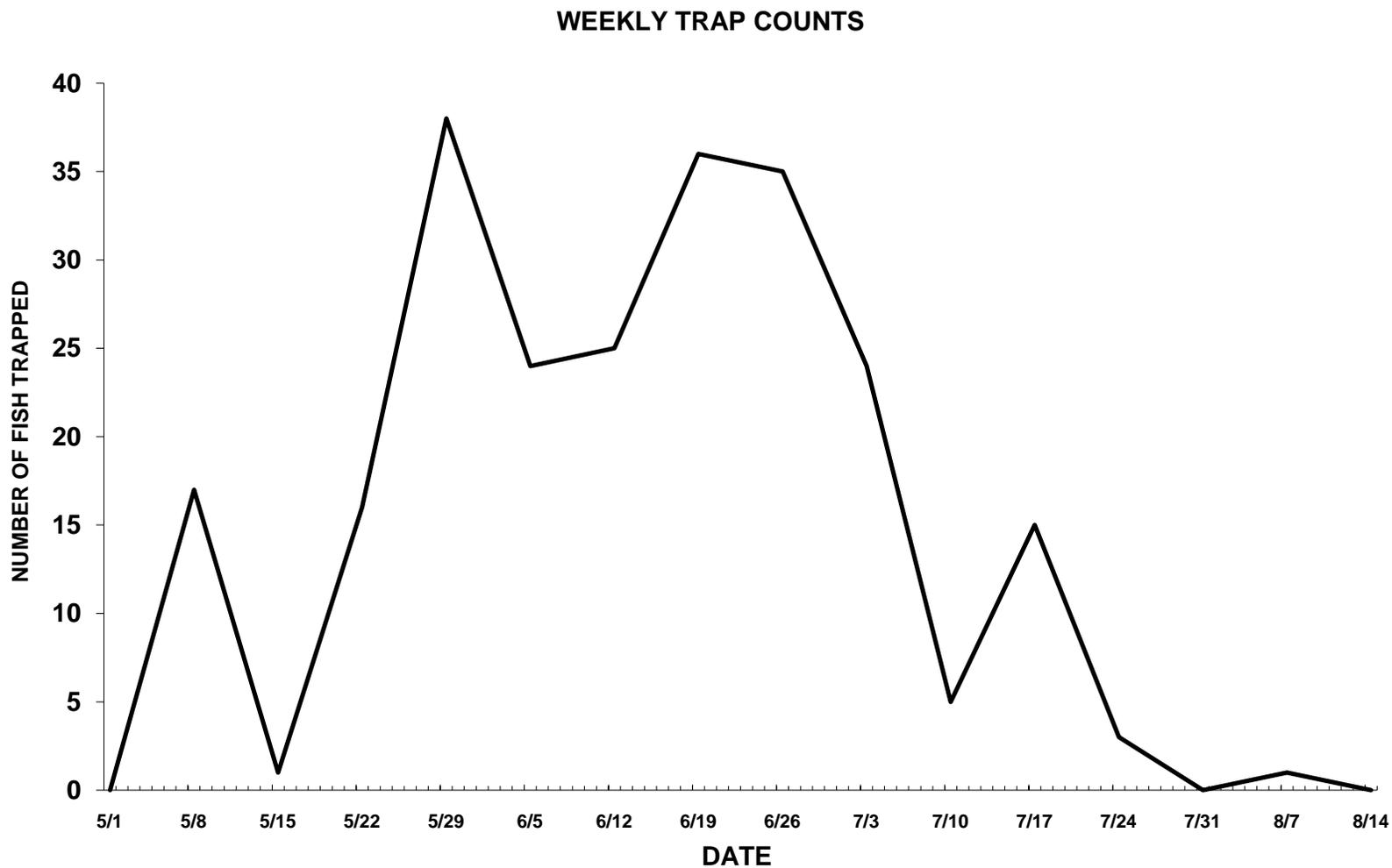
Appendix 16. Length-frequency of steelhead returning to Rapid River trap during 2004.



Appendix 17. Rapid River bull trout run timing for 2004.

Week ending	Number of fish	Percent of bull trout run
May 1	0	0.0
May 8	17	7.0
May 15	1	0.4
May 22	16	6.7
May 29	38	15.8
June 5	24	10.0
June 12	25	10.4
June 19	36	15.0
June 26	35	14.6
July 3	24	10.0
July 10	5	2.1
July 17	15	6.3
July 24	3	1.3
July 31	0	0.0
August 7	1	0.4
Total	240	100.0

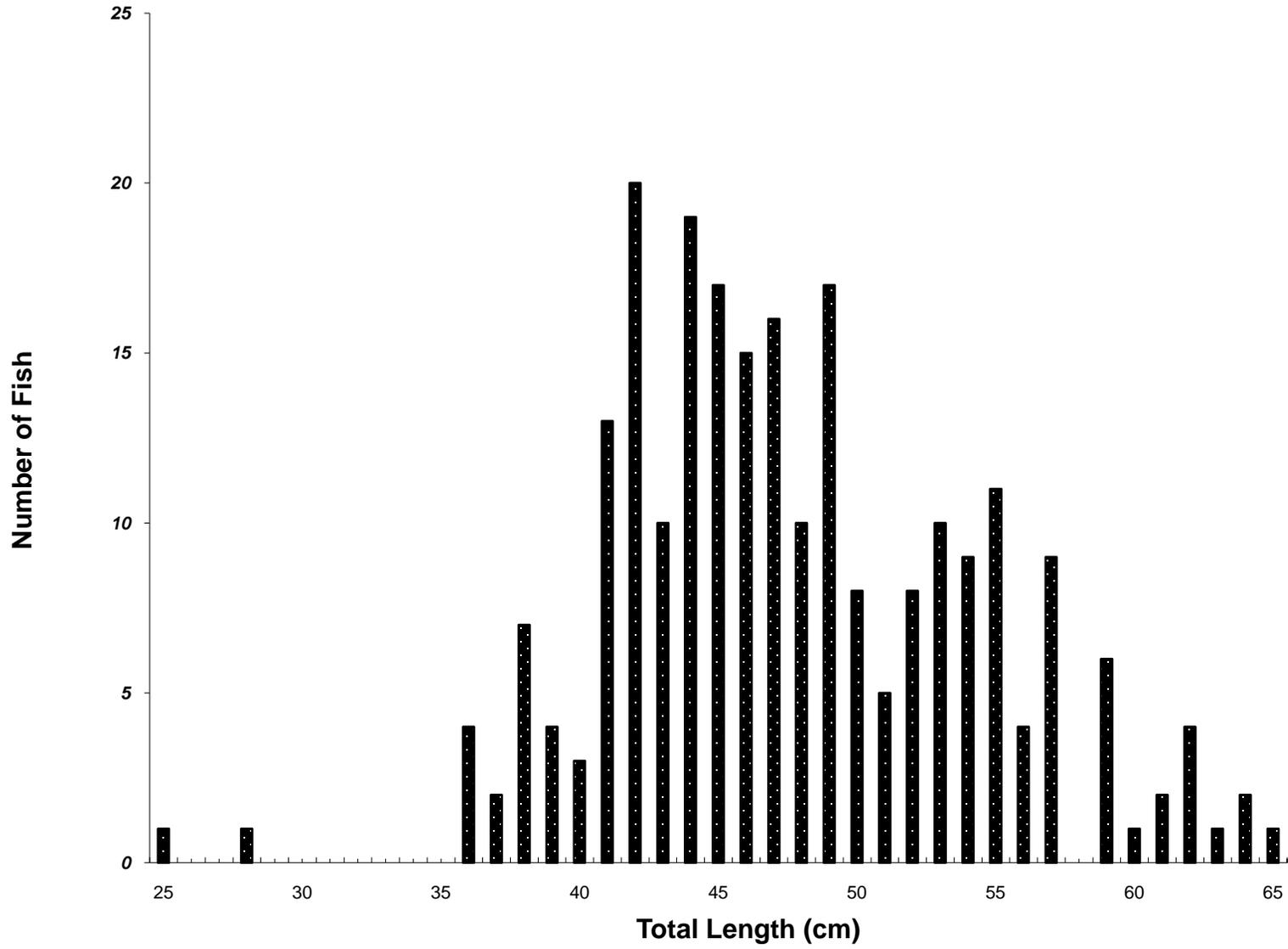
Appendix 18. Adult bull trout returns to Rapid River trap during 2004.



Appendix 19. Rapid River bull trout lengths for 2004.

Total length (cm)	Number of fish	Total length (cm)	Number of fish
25	1	45	17
26	0	46	15
27	0	47	16
28	1	48	10
29	0	49	17
30	0	50	8
31	0	51	5
32	0	52	8
33	0	53	10
34	0	54	9
35	0	55	11
36	4	56	4
37	2	57	9
38	7	58	0
39	4	59	6
40	3	60	1
41	13	61	2
42	20	62	4
43	10	63	1
44	19	64	2
		65	1
Total			240

Appendix 20. Length-frequency of adult bull trout returning to Rapid River during 2004.



Appendix 21. Species trapped in Rapid River during 2004.

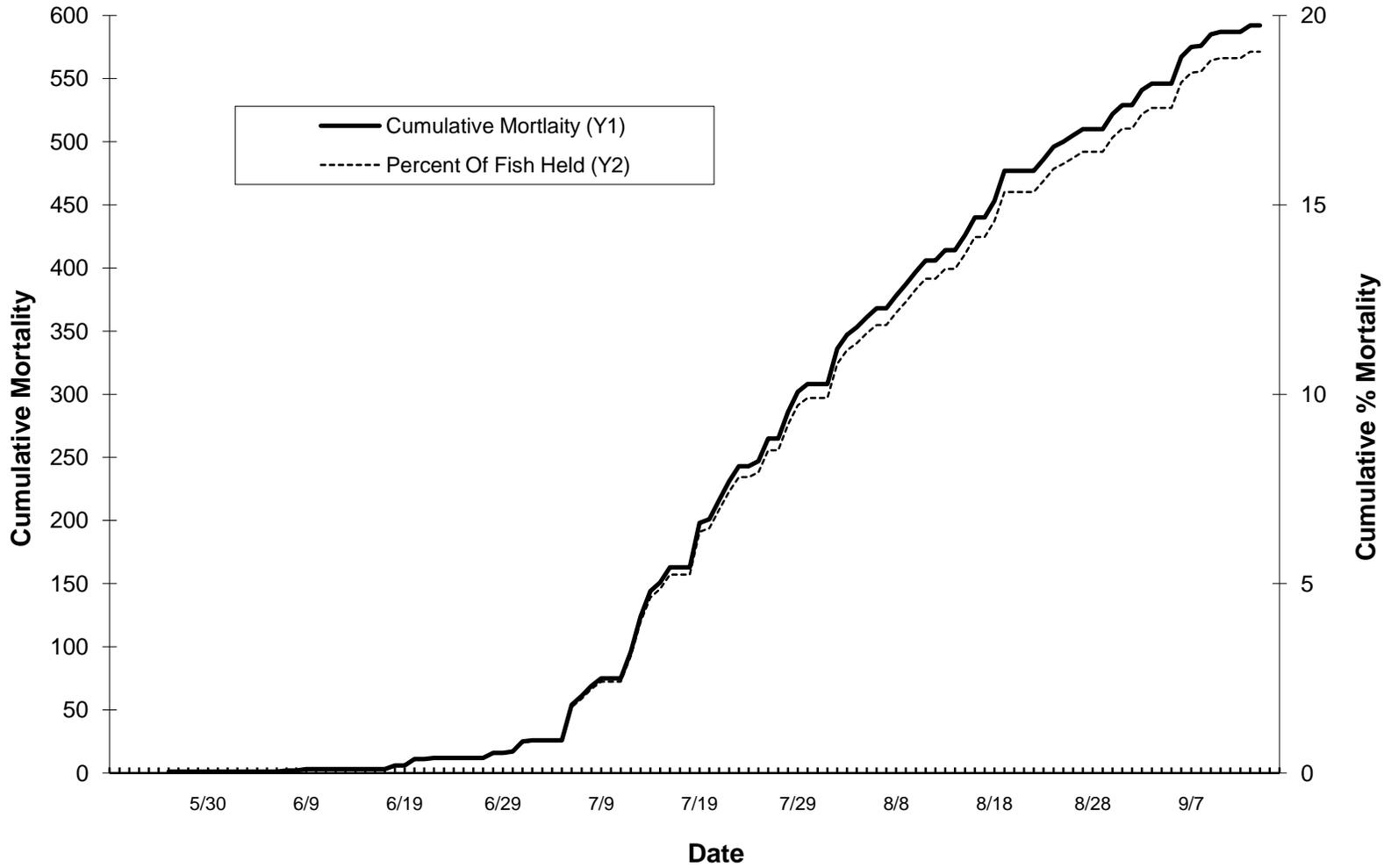
Species	Number trapped
Marked chinook	2,805
Unmarked chinook	112
Steelhead	185
Bull trout	240
Whitefish	1
Rainbow trout	1

This table does not include recaptures.

Appendix 22. Causes of prespawning mortality at Rapid River Hatchery for 2004.

Cause	Number of fish	Percent of fish held
Bacterial Kidney Disease	27	0.9
Jaundice	8	0.3
Embolism/mycosis	210	6.8
Gaff Wound	35	1.1
Unknown	312	10.0
Total	592	19.0

Appendix 23. Cumulative prespawning mortality at Rapid River Fish Hatchery for 2004.



Appendix 24. Rapid River broodstock ELISA results for 2004.

Lot Number	Date sampled	Number sampled	Negative	Positive
			<0.250	≥0.250
1	8/16	13	12	1
2	8/19	22	19	3
3	8/23	67	61	6
4	8/24	28	25	3
5	8/26	98	93	5
6	8/27	52	49	3
7	8/30	169	163	6
8	8/31	82	76	6
9	9/7	226	211	16
10	9/9	72	62	10
14	9/13	8	8	0
Oxbow 10	9/9	67	61	6
Oxbow 11	9/6	170	164	6
Oxbow 12	9/7	95	83	12
Oxbow 13	9/9	53	49	3
Total		1,222	1,136	86

Eggs from the 86 females with ELISA results ≥ 0.25 were culled.

Appendix 25. Rapid River Hatchery egg enumeration for 2004.

Rapid River eggs eyed at Rapid River Hatchery in 2004.							
Lot	Spawn date	Number Eyed	Primary pick	Number green	Percent eyed	Average fecundity	Number of females
1	8/16	42,737	5,092	47,829	89.4	3,986	12
2	8/19	57,149	16,861	74,010	77.2	3,895	19
3	8/23	222,068	13,697	235,765	94.2	3,865	61
4	8/24	78,004	6,834	84,838	91.9	3,394	25
5	8/26	323,783	30,959	354,742	91.3	3,814	93
6	8/27	166,685	7,124	173,809	95.9	3,547	49
7	8/30	593,259	35,045	628,304	94.4	3,855	163
8	8/31	264,087	15,001	279,088	94.6	3,672	76
9	9/2	754,995	35,792	790,787	95.5	3,766	210
10	9/3	221,331	12,340	233,671	94.7	3,769	62
Total		2,724,098	178,745	2,902,843	93.8	3,770	770

Rapid River eggs eyed at Oxbow Hatchery in 2004.							
Lot	Spawn date	Number Eyed	Primary Pick	Number green	Percent eyed	Number eggs / tray	Number of females
Lot 10	9/3	183,735	23,863	207,598	88.5	3,403	61
Lot 11	9/6	480,008	37,026	517,034	92.8	3,153	164
Lot 12	9/7	254,583	24,621	279,204	91.2	3,364	83
Lot 13	9/9	135,375	10,457	145,832	92.8	2,976	49
Total		1,053,701	95,967	1,149,668	91.7	3,220	357

Total eggs taken at Rapid River Hatchery in 2004							
Total		3,777,799	274,712	4,052,511	93.2	3,596	1,127

This data does not include eggs from 95 females that were culled including 86 females with optical densities by ELISA ≥ 0.250 , all 8 females from the Lot 14 (the final lot) that were of poor quality, and 1 additional female that was culled by mistake.

Appendix 26. Rapid River Hatchery initial raceway loading densities (12/27/04-03/07/05).

Raceway	Inflow (ft ³ /sec)	Number of fish	Weight (lb)	Density Index	Flow Index
2	0.31	302,419	204	0.29	1.13
3	0.31	311,535	210	0.30	1.21
4	0.31	315,367	212	0.30	1.16
5	0.31	318,728	215	0.31	1.17
6	0.31	321,186	216	0.31	1.22
7	0.31	313,514	211	0.30	1.17
8	0.31	317,521	214	0.30	1.19
9	0.31	310,023	209	0.30	1.16
10	0.31	314,213	212	0.30	1.17
11	0.31	299,932	202	0.29	1.12
Total		3,124,438	2,105		

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

Appendix 27. Rapid River Hatchery final raceway loading densities (6/15/05-6/30/05).

Raceway	Inflow (ft ³ /sec)	Number of fish	Weight (lb)	Density Index	Flow Index
2	1.20	299,158	1,593	0.32	1.13
3	1.10	308,822	1,564	0.32	0.96
4	1.10	313,311	1,494	0.31	1.19
5	1.10	316,537	1,329	0.29	1.11
6	1.10	318,291	1,410	0.30	1.16
7	1.10	311,452	1,377	0.29	1.13
8	1.10	315,310	1,445	0.31	1.17
9	1.10	307,690	1,228	0.27	1.04
10	1.10	312,003	1,266	0.28	1.07
11	1.10	297,649	1,216	0.27	1.02
TOTAL		3,100,223	13,922		

The inventory data in this appendix are based on egg enumeration minus recorded mortality of 24,215.

Appendix 28. Rapid River Hatchery initial pond loading densities (6/15/05 to 6/30/05).

Pond	Inflow (ft ³ /sec)	Number of fish	Weight (lb)	Density Index	Flow Index
RP-1A	5.3	579,747	4,426	0.06	0.71
RP-1B	5.3	601,326	5,369	0.07	0.82
RP-2A	6.3	491,896	4,353	0.07	0.56
RP-2B	6.3	487,358	4,351	0.07	1.12
RP-2C	6.3	484,147	4,567	0.07	1.05
RP-2D	6.3	502,497	3,750	0.06	0.51
TOTAL		3,146,971	26,816		

The Inventory data in this appendix are based on the number of fish marked as reported by the Department's Fish Marking Lab on June 27, 2006. It is an increase of 46,748 fish or 1.5% from hatchery inventory. This total was used for adjusted hatchery inventory and subsequent release numbers

Appendix 29. Rapid River Hatchery pond loading densities at release (3/15/06).

Pond	Inflow (ft ³ /sec)	Number of fish	Weight (lb)	Density Index	Flow Index
RP-1A	8.8	592,827	31,185	0.22	1.54
RP-1B	8.8	599,970	30,225	0.22	1.47
RP-2A	7.0	497,669	26,042	0.21	1.61
RP-2B	7.0	477,113	24,967	0.22	3.16
RP-2C	7.0	460,634	22,415	0.19	2.88
RP-2D	7.0	502,315	24,794	0.20	1.51
TOTAL		3,130,528	159,628		

Appendix 30. Feed for brood year 2004 at Rapid River Hatchery.

Product		^a Amount used	Unit price	Total Cost
Size/type	Additives			
BioDiet:				
No. 2 Starter		820 kg	2.398	\$1,966.36
No. 3 Starter		1,140 kg	2.398	\$2,733.72
1.0 mm Grower		1,140 kg	1.958	\$2,232.12
1.0 mm Grower	TM	640 kg	3.102	\$1,985.28
1.3 mm Grower		580 kg	1.870	\$1,084.60
1.3 mm Grower	Aquamycin-100	4,220 kg	4.092	\$17,268.24
1.5 mm Grower		5,500 kg	1.738	\$9,559.00
1.5 mm Grower	Auqamycin-100			\$ 0.00
1.5 mm Grower	TM			\$ 0.00
BioMoist:				
1.5 mm Grower	^b EIBS PAC			\$ 0.00
2.0 mm Grower	^b EIBS PAC			\$ 0.00
2.0 mm Grower	TM EIBS PAC	73,300 lb	0.805	\$59,006.50
2.5 mm Grower	^b EIBS PAC			\$ 0.00
2.5 mm Grower	Aquamycin-100 ^b EIBS PAC			\$ 0.00
3.0 mm Grower	^b EIBS PAC	45,700 lb	0.565	\$25,820.50
3.0 mm Grower	^b EIBS PAC	77,000 lb	0.595	\$45,815.00
3.0 mm Grower	^b EIBS PAC Low Pollution	5,450 lb	0.865	\$4,714.25
3.0 mm Feed	Aquamycin-100 ^b EIBS PAC	28,375 lb	2.065	\$58,594.38
^c Total		260,713 lb		\$230,779.95

^a Feed units are given in kg or lb as provided by manufacturer

^b EIBS PAC = 5 x C and B12, and 10 x Folic Acid.

^c 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 260,713 lb of feed fed.

Appendix 31. Eagle Fish Health Laboratory inspection results for brood year 2004.

Brood year	Log stock number	I	H	N	P	N	A	V	H	S	B	K	D	F	U	R	E	R	M	C	W	D	M	A	S	W	H	D	CSH	Comments		
<u>Juvenile samples</u>																																
RRSC 05-044	-	-																													NO PATHOGENS DETECTED; VIRO 0/10,DFAT 0/10, BACT 0/10	
RRSC 05-048																															CWD,MAS;FLAVOBACTERIUM PSYCHROPHILUM 1/8, PSEUDOMONAS SPP, 2/8	
RRSC 05-218																															NO PATHOGENS DETECTED;DFAT 0/10,BACTE 0/10	
RRSC 05-448	-	-																													NO PATHOGENS DETECTED;VIRO 0/10,DFAT 0/10,BACTE 0/10	
RRSC 06-054	-	-																													MYXOBOLUS;VIRO 0/20,DFAT 0/20,ELISA 0/20,BACTE 0/20,PTD-MYXOB 4/4 x5	
RRSC 06-106	-	-																													VIRO 0/10,DFAT 0/14,ELISA 0/10,AEROMONAS HYDROPHILA 7/12,FLAVOBACTERIUM PSYCHROPHILUM 5/12	
<u>Brood samples</u>																																
RRSC 04-362																																BKD;ELSA 60/98 (LOW 57, HIGH 3)
RRSC 04-366																																BKD; ELISA 26/52 (LOW 23,HIGH 3)
RRSC 04-373																																BKD; ELISA 75/170 (LOW 70, HIGH 5)
RRSC 04-374																																BKD; ELISA 33/82 (LOW 27, HIGH 6)
RRSC 04-384																																- BKD; ELISA 175/226 (LOW 161, HIGH 14)
RRSC 04-389																																BKD; ELISA 60/141 (LOW 45, HIGH 15)
RRSC 04-390																																BKD; ELISA 45/170 (LOW 40, HIGH 5)
RRSC 04-398																																BKD; ELISA 44/95 (LOW 35, HIGH 9)
RRSC 04-401																																BKD; ELISA 17/53 (LOW 14,HIGH 3)
RRSC 04-465																																RS;ELISA 8/9 (LOW 8)

Appendix 32. Preliberation organosomatic index for Brood Year 2004.

Hematology						
Date	Hematocrit			Serum protein		
	^a Mean	^a SD	^b CF	^a Mean	^b SD	^c CF
03/01/06	46.10	4.50	0.09	10.40	1.21	0.11

^aStandard deviation

^bCoefficient of variation

Combined autopsy summary

Eyes	Gills	Pseudo- branches	Thymus	Mesen. fat	Spleen	Hind gut	Kidney	Liver	Bile
N 20	N 20	N 20	0 20	0 0	B 2	0 20	N 20	A 0	0 5
B1 0	F 0	S 0	1 0	1 1	R 18	1 0	S 0	B 18	1 10
B2 0	C 0	L 0	2 0	2 5	G 0	2 0	M 0	C 2	2 5
E1 0	M 0	S&L 0		3 8	NO 0		G 0	D 0	3 0
E2 0	P 0	I 0	Mean=0.00	4 6	E 0	Mean =0.00	U 0	E 0	
H1 0	OT 0	OT 0			OT 0		T 0	F 0	Mean=1.0
H2 0		O 0		2.95				OT 0	
M1 0									
OT 0									

Summary of normals

20	19	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 33. Rapid River Hatchery marking summary for brood year 2004.

Coded wire tag releases						
Release site	Date released	Number of fish marked	Release group mark code	Clip	Purpose	Pond
Rapid River	3/15/-4/21/05	55,765	10-68-79	AD	US-Canada	1A
Rapid River	3/15/-4/21/05	55,101	10-75-76	AD	US-Canada	1A
Total		110,866				

PIT tag releases						
Release site	Date released	Number of PIT-tagged fish	Release group mark code	Clip	Purpose	Pond
Rapid River	3/18-4/21/05	51,884	AD only	AD	CSS	2B
Rapid River	3/18-4/21/05	44,800	AD only	AD	USACE	2B
Total		96,684				

Appendix 34. Smolts released from Rapid River Hatchery in 2006 (Brood Year 2004).

Release site Date	Release method	Number Released	Weight (lb)
Snake River			
3/14/06	Loaded to trucks from pond 2D and Released below Hells Canyon Dam.	126,700	6,000
3/15/06	Loaded to trucks from pond 2D and Released below Hells Canyon Dam.	126,700	6,000
3/16/06	Loaded to trucks from pond 2D and Released below Hells Canyon Dam.	60,000	2,850
3/17/06	Loaded to trucks from pond 2D and Released below Hells Canyon Dam.	86,600	4,100
3/14/06-3/17/06	Total to Snake River	400,000	18,950
Little Salmon River			
3/16/06	Loaded to trucks from pond 2C and Released in the Little Salmon River.	113,900	5,400
3/18/06	Loaded to trucks from pond 2C and Released in the Little Salmon River.	86,100	4,100
3/16/06-3/18/06	Total release into Little Salmon River	200,000	9,500
Rapid River			
3/14/06-4/21/06	Volitional release into Rapid River		
	1A	592,827	31,185
	1B	599,970	29,844
	2A	497,669	25,505
	2B	477,113	25,504
	2C/2D	362,949	19,141
3/14/06-4/21/06	Total release into Rapid River	2,530,528	131,179
Total hatchery release		3,130,528	159,629

Appendix 35. Egg to release survival at Rapid River Hatchery for brood year 2004

^a Green eggs	^a Eyed eggs	^a Percent survival (eye-up)	^b Swim-up	^c Percent survival	^d Marked number	Released smolts	^e Percent survival
4,052,511	3,777,799	93.2	3,124,438	98.2	3,146,971	3,130,528	99.5

^a Includes only eggs spawned at Rapid River Fish Hatchery.

^b Swim-up includes fry ponded at Rapid River Fish Hatchery.

^c The number shown is survival from 3,179,711 eyed eggs remaining after culling an additional 598,088 eyed eggs from 170 additional females for inventory reduction.

^d The reported number marked was an increase of 1.5% from hatchery inventory, which was based on electronic enumeration minus mortality to date at the start of marking.

^e Survival is 99.5% after mortality from marking to release of 0.5%. Mortality from adjusted swim-up (3,171,186) to release was 1.3% yielding survival from swim-up to release of 98.7%.

Appendix 36. Cost of production at Rapid River Hatchery for brood year 2004.

Number of fish	Weight of fish (lb)	Weight of feed (lb)	Cost of feed	Feed Conversion	^a Total cost	Cost/ thousand fish	Cost/ pound
3,130,528	159,628	260,713	\$230,779.95	1.66	\$1,487,524.21	\$ 475.17	\$ 9.32
3,130,528	159,629	260,713	\$230,779.95	1.66	\$935,835.78	\$ 298.94	\$ 5.86

^a Total cost in top row is the total expenditure by IPC from 9/1/2004 through 3/30/2006. This amount exceeds the cost associated with production of Brood Year 2004 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 37. Returns to Rapid River Hatchery from 1964 to 2004.

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	1,226	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	1,072	3,522	3,670,292
2003	5	2,516	893	40.9	660	4,603	3,037,967
2004	386	2,374	431	19.0	1,127	3,596	4,052,511

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

Appendix 38. 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 38. 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	555	2002	14,802	0.52
1998	2000	2,462,354	128	2001	5820	2002	2010	2003	7958	0.32
1999	2001	736,601	225	2002	506	2003	50	2004	781	0.11
2000	2002	2,669,476	893	2003	2,324	2004	51	2005	3,268	0.12
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
2003	2005	2,761,430	209	2006	2,317	2007	344	2008	2,870	0.10
2004	2006	2,530,528	2,327	2007	3,431	2008	227	2009	5,985	0.24

Returns to Rapid River and percent return from release in this table are for hatchery rack returns and do not include harvest.

Appendix 39. Ten year average feed and growth data for Rapid River Hatchery.

Month	Average water temperature (°F)	Density index	Flow index	^a Feed conv.	Hatchery constant	^b Daily length increase (in)	^b Monthly length increase (in)	Condition factor C (x10 ⁴)	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	0.00	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

^a Feed conversion is expressed as feed weight over fish weight gain.

^b Growth data may vary during periods of high water.

Appendix 40. Release and transfer summary for Rapid River Hatchery By Brood Year for 1964-2004.

Brood Year	No. eggs taken	Egg or fry plants and site		Smolt plants and site		Fish/pound
1964	887,000	None		588,000	Rapid River	20.1
1995	60,400	None		479,267	Rapid River	19.6
1966	2,296,000	None		1,460,150	Rapid River	18.1
1967	2,055,000	None		900,192	Rapid River	18.9
1968	6,540,000	757,376	eggs Clearwater H Channel	3,172,000	Rapid River	22.6
1969	5,171,697	497,610	eggs Dworshak NFH to start	2,718,720	Rapid River	21.6
1970	14,560,280	4,417,454	eggs Sweetwater Eye Stat.	2,809,200	Rapid River	23.3
		2,224,119	eggs Kooskia NFH.	91,800	Lochsa 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			
		600,496	eggs Hayden Cr. Hatchery	2,908,425	Rapid River	26.7
		53,562	fry Lemhi River	197,303	SF 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.	2,707,917	Rapid 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.	3,373,700	Rapid River	30.6
		1,295,424	eggs Hayden Creek Hatchery	117,000	SF 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	3,358,940	Rapid River	24.7
		407,012	eggs Indian Creek	205,700	SF 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 40. 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.	2,921,172 Rapid River 249,750 SF 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	2,413,678 Rapid 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.	2,866,993 Rapid River 156,362 White Sand Cr. 44,373 Newsome 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			2,604,823 Rapid River 57,440 White 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	2,372,607 Rapid River 1,001,700 Snake River	25.3 21.6		
		330,880	eggs	Dworshak NFH						
		293,249	fry	Red River Pond						
1980	1,756,827	None		1,473,733 Rapid River	16.2					
1981	6,122,273	608,384	eggs	Pahsimeroi Hatchery	2,998,103 Rapid River 250,020 Snake 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)	3,246,197 Rapid River 500,850 Snake 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 40. continued.

Brood Year	No. eggs taken	Egg or fry plants and site		Smolt plants and site	Fish/pound
1983	3,449,471	None		2,491,238 Rapid River	19.7
				437,360 Snake River	16.8
1984	3,125,911	None		1,594,688 Rapid River	20.6
				140,000 Snake River	22.7
				136,000 Red River	15.1
1985	11,535,461	497,520	eggs Oregon	2,630,200 Rapid River	20.2
		3,668,000	eggs Dworshak NFH	103,000 Snake 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	2,630,200 Rapid River	23.9
		712,905	eggs Sawtooth Hatchery	400,600 Snake 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	2,319,500 Rapid River	20.6
		103,800	fry Lolo Creek	500,000 Snake 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	2,520,400 Rapid River	17.4
		149,570	fry Little Salmon River	250,000 Little Salmon	16.3
		100,278	fry Ten Mile Creek	551,200 Snake 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 40. continued.

Brood Year	^a No. eggs taken	Egg or fry plants and site		Smolt plants and site		Fish/pound				
1989	3,925,585	211,509	fry	Crooked River	2,564,900	Rapid River	18.7			
		548,876	fry	Sawtooth Hatchery	100,100	Little Salmon	20.2			
					500,500	Snake River	20.2			
1990	4,271,103	200,000	eggs	Looking Glass Hatch.	2,615,500	Rapid River	22.3			
		403,400	fry	Sawtooth Hatchery	500,500	Snake River	22.3			
1991	2,553,218	3,050	fry	Hayden Creek Hatchery	2,060,300	Rapid River	18.4			
		22,235	Eggs received							
		26,694	Eggs received							
1992	4,534,404	10,126	fry	Squaw Creek	200,300	Snake River	16.9			
		90,125	fry	White Sand Creek						
		942,897	eggs	Dworshak Hatchery	2,547,624	Rapid River	22.2			
1993	7,103,702	2,176,157	eggs	Clearwater Hatchery	2,786,919	Rapid River	24.5			
					499,536	Snake River	23.7			
1994	490,249	58,791	eggs	Clearwater Hatchery	379,167	Rapid River	27.0			
1995	132,002	16,402	eggs	Clearwater Hatchery	85,840	Rapid River	22.1			
1996	1,171,610	168,754	eggs	Clearwater Hatchery	896,170	Rapid River	22.3			
1997	5,407,913	1,015,496	eggs	Clearwater Hatchery	2,847,283	Rapid River	25.3			
					200,000	Little Salmon	20.8			
					300,000	Snake River	20.8			
1998	3,720,135	510,848	eggs	Clearwater Hatchery	2,462,354	Rapid River	19.2			
1999	634,520				736,601	Rapid River	18.8			
					199,010	Eggs received				
2000	5,100,650	911,919	eggs	Clearwater Hatchery	2,669,476	Rapid River	19.8			
					300,018	Little Salmon	18.6			
					500,195	Snake River	22.7			
2001	4,946,614				2,330,557	Rapid River	18.7			
					199,900	Little Salmon	21.1			
					299,854	Snake River	19.8			
2002	4,596,671				2,762,058	Rapid River	24.5			
					300,140	Little Salmon	27.4			
					499,956	Snake River	27.3			
2003	3,530,501	183,923	fingering	Selway River (NPT)	2,761,430	Rapid River	19.1			
					370,000	Eggs received		200,000	Little Salmon	24.4
					107,123	Eggs received		300,000	Snake River	20.8
2004	3,179,711				2,530,528	Rapid River	19.3			
					200,000	Little Salmon	21.1			
					400,000	Snake River	21.1			

^a 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.

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