FISHERY RESEARCH

LOWER SNAKE RIVER COMPENSATION PLAN CHINOOK SALMON FISH HATCHERY EVALUATIONS—IDAHO

Combined Annual Reports

Report Period October 1, 1992 to September 30, 1999

Chris Harrington
Sr. Fisheries Research Biologist

Brian Leth
Sr. Fisheries Research Biologist

Tracy Petering
Technical Records Specialist

Paul Kline
Principal Fisheries Research Biologist

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Lower Snake River Compensation Plan
Chinook Salmon Fish Hatchery Evaluations—Idaho

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By

Chris Harrington
Brian Leth
Tracy Petering
Paul Kline

Idaho Department of Fish and Game
600 South Walnut Street
P.O. Box 25
Boise, ID 83707

To

U.S. Fish and Wildlife Service
Lower Snake River Compensation Plan Office
1387 S. Vinnell Way, Suite 343
Boise, ID 83709

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INTRODUCTION

The U.S. Army Corps of Engineers constructed four hydroelectric dams (Ice Harbor, Lower Monumental, Little Goose, and Lower Granite) on the lower Snake River between 1962 and 1975. Fishery managers and biologists expected the survival of downstream migrating smolts and upstream migrating adults to be reduced by dam construction and operation and the alteration of the river ecosystem. The Lower Snake River Compensation Plan (LSRCP) was authorized by the Water Resources Development Act of 1976 (90 Stat. 2917) to compensate for the reduced survival and anadromous fish losses caused by dam construction and operation. The primary compensation tool specified in the LSRCP was a hatchery mitigation program. In 1977, the U.S. Fish and Wildlife Service (USFWS) was given budgeting and administration responsibility for operation and maintenance funding of LSRCP fish hatchery programs through an interagency agreement among the U.S. Army Corps of Engineers, National Marine Fisheries Service (NMFS), and the USFWS.

The LSRCP hatchery program specifies the use of fish hatcheries to produce and release large numbers of juvenile anadromous salmonids to meet adult return goals. Adult return goals established by the LSRCP are 8,000 summer Chinook salmon *Oncorhynchus tshawytscha*, 50,700 spring Chinook salmon, and 18,300 fall Chinook salmon to the Snake River basin. To achieve these goals, the Idaho Department of Fish and Game (IDFG) and the USFWS currently operate four hatcheries and five satellite facilities in Idaho: McCall Fish Hatchery and the South Fork Salmon River trap; Dworshak National Fish Hatchery; Clearwater Fish Hatchery and the Red River, Crooked River, and Powell satellite facilities; and Sawtooth Fish Hatchery and the East Fork Salmon River satellite facility (Figure 1). Clearwater Fish Hatchery, the final hatchery authorized under the LSRCP, became operational in 1992. Non-LSRCP Chinook salmon hatcheries are operated by Idaho Power Company (IPC) (Rapid River, Oxbow, and Pahsimeroi fish hatcheries) and the USFWS (Kooskia National Fish Hatchery) (Figure 1).

Specific information pertaining to LSRCP programs at USFWS and IPC facilities are reported under separate covers. However, where appropriate, we include selected information from these programs in this report.

The LSRCP includes a Hatchery Evaluation Study (HES) component to monitor and evaluate the mitigation hatchery program. The primary objective of the HES is to determine the best hatchery management practices that allow the mitigation hatcheries to meet the LSRCP and IDFG anadromous fisheries goals. Tasks directed at satisfying the primary objective are divided into two categories: 1) monitoring and documentation, and 2) investigation. We monitor and document hatchery practices for each brood year or cohort of fish. Investigation tasks are generally manipulative experiments involving modified or alternative hatchery practices that show potential for increasing adult returns and achieving LSRCP and IDFG goals.

This report summarizes Chinook salmon HES activities carried out from October 1, 1992 through September 30, 1999. This time window includes all juvenile Chinook salmon releases and adult returns that occurred between 1993 and 1999. Specific objectives identified in Cooperative Work Agreement 14110-6-J009 and covered in this report are as follows:

Objective 1. Document the success of the IDFG-LSRCP program in meeting specific adult return goals.

Objective 2. Identify factors limiting hatchery success and recommend possible improvements based on existing knowledge and experimentation.

Subobjective 2.1 Continue ongoing documentation and monitoring to determine the relationships between adult returns and hatchery practices, characteristics of hatchery products, and juvenile survival.

Subobjective 2.2 Conduct controlled studies (short-term experiments) to determine the relationships between adult returns and hatchery practices, characteristics of hatchery products, and juvenile survival.

METHODS

Hatchery Operations Documentation

Information on selected hatchery operations, including juvenile rearing and release, weir management, and spawning protocols, was obtained from written and oral communication with hatchery personnel. Written documents from which we extracted relevant information included "Run" and "Brood Year" reports from Clearwater, McCall, Rapid River, Oxbow, Pahsimeroi, and Sawtooth fish hatcheries; monthly hatchery rearing summaries; stocking slips; the Idaho Release and Recovery Database; and memoranda pertaining to trapping, spawning, rearing, and release operations. Personal communications through formal and informal meetings provided additional information. We attempted to avoid duplication of hatchery documents while highlighting information (e.g., fish health) that may have affected adult return characteristics. Documentation includes number of eggs taken, size of juvenile fish, strain, tagging or marking of experimental groups, number of fish released, and location of fish releases.

Fish Culture Practices

Fish culture methods for spawning, incubation, and rearing applied at IDFG anadromous fish hatcheries followed accepted standard practices (Leitritz and Lewis 1976; Piper et al. 1982).

Spawning protocols also followed existing, hatchery-specific practices. Mature, adult Chinook salmon were typically spawned one male to one female as they ripened. However, eggs from individual females were sometimes split into two subfamilies, fertilized with milt from unique males, and recombined following fertilization. In some cases, “backup” males were used to fertilize eggs from individual females following a period of time to allow milt from primary males to fertilize eggs. If supplementation broodstock were developed for the IDFG Idaho Supplementation Studies (ISS) project (Lutch et al. 2003), which occurred during several years of the reporting period, spawning plans were developed to accommodate the supplementation studies design as well as to satisfy hatchery broodstock needs and to comply with Endangered Species Act (ESA) permit or biological opinion guidelines. If adult escapement was low (e.g., <100 females), factorial crosses were sometimes utilized to minimize genetic drift and the loss of genetic diversity (Kapuscinski and Jacobson 1987). Following fertilization, eggs were typically water-hardened in a 100 ppm iodophor solution for a minimum of 30 minutes.

Egg incubation stacks generally utilized catch basins to prevent silt and fine sand from circulating through incubation trays. Forty-eight hours after incubation, eggs were treated a minimum of three times per week with formalin to control the spread of fungus. Formalin treatments were discontinued at eye-up. Once eggs reach the eyed stage of development, they were shocked to identify dead and unfertilized eggs, which were enumerated and removed.

Swim-up fry were typically transferred from incubation trays to vats at approximately 1,650 Fahrenheit temperature units. Spring Chinook salmon were generally transferred to outside rearing raceways when they reached approximately 77 mm in length (3 in). As fish grew, they were split to additional raceways and raceway sections and flows were increased.

Fish were fed commercial diets produced by different manufacturers, and rations typically followed suggested feeding rates for specific water temperatures. A prophylactic treatment of Erythromycin-medicated feed was typically administered to juvenile Chinook salmon for two 21 to 28 d periods prior to release as full-term smolts. Fish reared for presmolt or parr releases typically received one antibiotic feeding rather than two. Fish sample counts were conducted as needed to ensure that actual growth tracked with projected growth, though in general, fish were handled as little as possible.

Chemical therapeutants were used prophylactically as well as being used for the treatment of infectious diseases. Before initiating treatments, the use of chemical therapeutants was discussed with an IDFG fish health professional. Fish necropsies were performed, as needed, as part of the diagnostic services provided by the IDFG Eagle Fish Health Laboratory.

Between 45 and 30 d prior to release, a 60 fish preliberation sample was taken from each hatchery to assess the prevalence of viral replicating agents and to detect the pathogens responsible for bacterial kidney disease (BKD) *Renibacterium salmoninarum* and whirling disease *Myxobolus cerebralis*. In addition, an organosomatic index was developed for each release lot (Goede and Barton 1987). Fish health inspection services were provided by the IDFG Eagle Fish Health Laboratory.

Routine events related to the culture of Chinook salmon are not presented in the results section of this report. Only noteworthy departures from typical fish culture practices as well as notable fish health-related events are reported.

Fish Marking and Tagging

Marking and tagging of juvenile Chinook salmon usually began when the fish exceeded an average weight of approximately 2.3 g (200 fish/lb). Marking generally involved altering fish to produce a visually identifiable feature that remained intact throughout the lifetime of the animal (typically a fin clip). Tagging included adding any piece of material to the fish that would allow an inspector to identify the fish. Tags could be external such as visual implant tags and Jaw tags or internal such as coded-wire or passive integrated transponder (PIT) tags. The type of mark or tag used was related to the marking purpose. During the reporting period, all hatchery-origin Chinook salmon received some form of mark or tag.

Starting with release year 1993, all hatchery-origin fish were marked or tagged to identify their origin. Therefore, the origin of jack returns in 1994, jack and two-ocean returns in 1995, and all returns in 1996 could be identified by marks or tags on the fish. Groups of juvenile Chinook salmon received PIT tags to assist with the evaluation of out-migration survival to

downstream dams that had PIT tag interrogation capability. Coded-wire tags were implanted into portions of the adipose fin clipped Chinook salmon to assist with stock identification and the reconstruction of specific brood year information such as survival from release to adult. Additionally, coded-wire tags were used in specific experiments such as the ISS project (Lutch et al. 2003). Coded-wire tagging generally occurred at the same time as, or a few months later than, adipose fin clipping, since tagging required juvenile Chinook salmon to be larger than about 3.0 g (150 fish/lb).

Hatchery Chinook salmon that were produced from wild- or natural-origin parents or by crossing wild- or natural-origin parents with hatchery-origin parents were not marked with an adipose clip. Progeny from these crosses received elastomer tags, coded-wire tags, or ventral fin clips. The only elastomer tagging on Chinook salmon during the reporting period was performed at the McCall Fish Hatchery and was associated with the Nez Perce Tribe's Johnson Creek program. Elastomer tags were implanted in the tissue posterior to the eye, though a small number of fish were also tagged along the jaw line as an experimental mark.

Juvenile Fish Releases

Chinook salmon releases generally fall into two categories: volitional release and direct release. Juvenile Chinook salmon destined for volitional release must be reared or transferred to raceways or ponds adjacent to receiving waters. Volitional release usually involves the partial removal of dam boards located at the outlet of the rearing environment. Fish select to out-migrate past the outlet structure volitionally. After several days to a few weeks, fish remaining in the rearing structure (those that did not choose to volitionally emigrate) are forced into the receiving water. Hatcheries employing this type of release strategy during the reporting period included Rapid River Fish Hatchery, Clearwater Fish Hatchery (at the three satellite facilities), Pahsimeroi Fish Hatchery, and Sawtooth Fish Hatchery.

Direct release can include the forced release of fish directly from hatchery rearing raceways or ponds to receiving waters (no volitional option) or the transportation and release of juvenile fish to receiving waters away from rearing facilities. This strategy does not allow juvenile Chinook salmon the option of choosing when to enter the river. Hatcheries employing this technique for at least a portion of their total releases include all LSRCP, IPC, and USFWS hatcheries except Pahsimeroi Fish Hatchery; however, only McCall Fish Hatchery used direct releases as their sole strategy during the reporting period.

Composition of Adult Returns

Age Determinations—Age composition of returning jack and adult Chinook salmon were determined using length frequency distributions specific to each hatchery facility (Table 1). The age notations we use throughout the text and tables for adults refer to the total age of the fish and assume all juvenile smolts are age 1+. Therefore, the age of the fish is the recovery year minus the brood year.

Sex Composition—Hatchery personnel provided the sex composition data we report. Sex ratios were calculated for total adult returns, including and excluding jacks (three-year-old males), and for specific age groups where appropriate. In some years, for some locations, sex composition data was based on a subsample of gender identified adults. This was done because spring run Chinook are generally trapped before they have matured enough to

manifest sex specific morphology, so the sex ratio is determined for the subset of Chinook that are spawned rather than the whole set of those that are trapped. Summer run Chinook are trapped later in the year when they have matured sufficiently to be able to determine their sex with a high degree of accuracy. Therefore, the sex ratio for the summer run Chinook is generally determined at trapping. Sex composition data was not available for recoveries at Dworshak National Fish Hatchery, so only total recoveries were reported for that facility.

Fish Origin—We classified any Chinook salmon bearing an external mark, typically an adipose or ventral fin clip, as a hatchery-origin fish. However, visual implant and elastomer tags were also used to identify specific hatchery-origin fish in the later years of the reporting period. In addition, some hatchery origin fish had no external mark but did have a coded-wire tag inserted in their snout. Any Chinook that had either of these two tag types were classified as hatchery-origin, even if they had all of their fins intact. Hatchery-origin fish were generally referred to as reserve or production fish. The terms reserve and production were used in reference to a hatchery-origin Chinook salmon that could be legally harvested in a sport fishery. Supplementation fish referred to Chinook salmon that were part of the ISS and were not intended to contribute to sport fisheries. ISS Chinook salmon were differentially marked from production fish, usually with a ventral fin clip or with a coded-wire tag and no external mark. For a more detailed explanation of the ISS program, refer to Lutch et al. 2003.

Fish Health Monitoring—Adult Chinook salmon held for spawning were typically spawned within two months of arrival. Fish health monitoring at spawning included sampling for viral, bacterial, and parasitic disease agents. Ovarian fluid was sampled from females and used in viral assays. Kidney samples were taken from all females spawned and used in bacterial assays. Head wedges were taken from a representative number of fish spawned and used to assay for presence/absence of the parasite responsible for whirling disease. All Chinook salmon ponded for possible spawning received an injection of Galamycin at 20 mg/kg. Adult Chinook salmon received a minimum of three formalin treatments (120 to 170 ppm) per week to control the spread of fungus and ectoparasites. Tissue samples collected from adult female Chinook salmon spawned at IDFG hatcheries were assayed at the Eagle Fish Health Laboratory, Eagle, Idaho. The IDFG standards required that all eggs tested for BKD by Enzyme-Linked Immunosorbent Assay (ELISA) methods with optical density values exceeding 0.25 be culled in 2001 (K. Johnson, IDFG, personal communication). This culling threshold varied over the reporting period depending on management objectives.

Fish Disposition

In this reporting period (1992-1999), adult returns reached holding capacity at some hatchery facilities, requiring releases of excess fish. Some hatchery-origin fish were recycled back through fisheries, allowing anglers additional harvest opportunity. Others were out-planted in other streams where escapement of naturally produced fish was extremely low. All recycled fish released downstream were opercle-punched to identify them as previously trapped fish. Some hatchery-origin jacks were killed for consumptive uses and distributed to the Nez Perce Tribe, the Shoshone-Bannock Tribe, and various local health and welfare organizations.

Harvest

Adult Chinook return numbers were too low to support sport harvest in most basins during the current reporting period. Fisheries did occur on the Little Salmon River, the South

Fork of the Salmon River, and portions of the Clearwater River during some years of the reporting period. To develop SARs and to accurately reconstruct Chinook salmon returns for years when sport fishing seasons occurred, we included estimates of harvest along with weir recoveries. Harvest estimates were derived using different techniques in different years and rivers. Mandatory check stations were the most common means used during the reporting period to estimate the total number of Chinook salmon harvested. Roving creel surveys were the only other method used.

Mandatory check stations have the advantage that, in theory, every fish harvested is identified, so there is no error associated with expansion of these figures. However, there is always an error associated with unmeasured noncompliance with the mandatory check. Roving creel surveys include some level of sampling error as harvest estimates rely on the expansion of a sample of information collected from anglers. However, roving creel surveys can be far less costly in time and effort to conduct than mandatory check stations and can be much less intrusive to anglers. In general, mandatory check stations were used in those fisheries where only a very few surplus Chinook salmon were available to the fishery, and where the fishery was conducted in a very short stretch of river, such as the North Fork of the Clearwater, or on a stretch of river with limited access, such as the Little Salmon and South Fork of the Salmon rivers.

Accounting for harvest and weir returns will likely underestimate the true number of returning adult Chinook salmon to terminal locations, as unaccounted for loss from natural dropout, straying, illegal harvest, and loss due to disease will not be included in estimates.

Juvenile Out-migration Conditions

Snake River water flow during smolt out-migration is a significant factor affecting survival of Idaho's anadromous fishes (Raymond 1979; Berggren and Filardo 1993). In this report, we report flow information for the years covered in the reporting period. We obtained river flow data from the Fish Passage Center (FPC) (http://www.fpc.org/adult_history/YTD-LGR) and the Columbia River Data Access in Real Time (DART) (http://www.cqs.washington.edu/dart/dart.html) databases.

Two periods were defined by Petrosky (1991) to summarize juvenile out-migration flows at LGR. The "peak" period, April 15 to May 5, was defined as the period of time during which 50% of the emigration of yearling Chinook salmon occurs. The "extended" period, April 20 to May 30, includes most of the known out-migration of wild- and natural-origin yearling Chinook salmon.

Out-migration Timing and Juvenile Survival

We estimated juvenile out-migration timing and survival to Lower Snake River dams using PIT tags. Idaho Department of Fish and Game fish marking personnel conducted PIT tagging of hatchery Chinook salmon at Idaho-LSRCP facilities approximately two months prior to release. Tagging at the federal facilities was conducted either by IDFG personnel or by USFWS personnel. PIT tagging procedures were consistent between the two groups.

Fish size (fork length) and other relevant mark information was collected at tagging and was submitted to the PIT Tag Information System (PTAGIS) (http://www.psmfc.org/pittag/) database maintained by the Pacific States Marine Fisheries Commission in Gladstone, Oregon. Release information for tag groups was obtained from hatcheries and was submitted to the

PTAGIS by the tag coordinator or their delegate. We retrieved PIT tag interrogation data from the PTAGIS for use in this report.

The detection (interrogation) rate of PIT-tagged juvenile salmonids at three Lower Snake River dams and one Columbia River dam served as a relative or minimum survival index. The index was considered relative or minimum because: 1) an unknown (but we believe small) number of PIT-tagged fish that die in the hatchery prior to release may go undetected, although all juvenile mortalities recovered in the hatcheries are scanned for PIT tags; 2) a small and variable number (probably around 0.1% based on tags found in the McCall hatchery raceways following the release of PIT-tagged Chinook salmon) of PIT-tagged fish shed their tags in the days immediately following tagging; 3) not all fish pass through PIT tag detectors at the dams; 4) less than 1% of PIT tags fail (Prentice et al. 1986) or are lost between tagging and arrival at detection sites; 5) some fish arrive while detection gear is not being operated; and 6) mortality occurs between dams.

Median travel time to Lower Granite Dam was calculated for each of the PIT tag groups released during the reporting period. Interrogation rates were calculated for each PIT tag group by dividing the number of unique interrogations at Lower Granite, Little Goose, Lower Monumental, and McNary dams by the number of PIT-tagged Chinook salmon released, multiplied by 100.

Smolt-to-Adult Return Rates

Within the text, we identify releases as parr, presmolts, or smolts and provide juvenile release-to-adult return estimates based on this terminology. The terms parr and presmolts refer to Chinook salmon in their first summer or fall of life, respectively. Smolts are juveniles released in their second spring of life. Most hatchery-reared spring and summer Chinook salmon in Idaho and throughout the Columbia basin are released as smolts. For some hatchery release groups during this reporting period, large numbers of smolts were marked with PIT tags as part of non-LSRCP studies conducted using these fish. These large PIT tag groups can be used to calculate SARs. Additionally, the ratios of juveniles released to adults recovered for coded-wire-tagged and total smolts can be used to calculate SARs.

Smolt-to-adult return rates are typically calculated by dividing the number of marked or tagged returning adults by the number of marked or tagged smolts that could have contributed to the observed adult return. Smolt-to-adult return rates can be developed using different interrogation or observation locations Release-to-weir SARs compare the number of returning adults recovered at a hatchery weir to the number of smolts released at the weir, whereas release-to-Lower Granite Dam SARs compare the number of adults returning to Lower Granite Dam to the number of smolts released from the hatcheries. Release-to-Lower Granite Dam SARs are typically based on PIT tag returns, whereas release-to-weir SARs are typically based either on coded-wire tag recoveries or on total recoveries.

The release-to-weir SAR method is used in this report. While this technique will underestimate the total number of adults returning to the state, since it does not take into account harvest, straying, or prespawning mortality, it is probably a more appropriate method to estimate the contribution of individual hatchery programs in the absence of sufficient PIT tag data.

Prior to 1996, not all returning hatchery fish could be distinguished based on marks or tags. For those years, total adult recoveries were used in place of hatchery adults, even though

this will overestimate SARs for those years because a portion of the adults will be of natural-origin. This was done because the alternative method of using coded-wire tag SARs as a surrogate for total hatchery SARs was determined to underestimate true SARs by amounts greater than 50%, and was further biased by the size of the tagged adults included.

Starting with release year 1993, all hatchery fish were marked. Therefore, the origin of jack returns in 1994, jack and two-ocean returns in 1995, and all returns in 1996 could be identified. For those returns where the origin of the fish could be determined, the actual weir counts of marked hatchery-origin fish were used. The error in this technique is that the age determination of adults based on length frequency is not exact. While jacks can usually be distinguished from older fish, two- and three-ocean fish can have a substantial overlap in length frequency. Also, it is likely that a small portion of hatchery-origin fish were misclipped as juveniles and were incorrectly classified as natural-origin when they were recovered as adults.

Estimates of Chinook salmon harvested in fisheries were added into the total adults recovered at weirs for all years that had a fishery. All adults recovered in the Little Salmon River fishery were included in the Rapid River Fish Hatchery weir count, while all adults recovered in the South Fork Salmon River fishery were included in the McCall Fish Hatchery weir count. However, for the Clearwater River fisheries, the numbers were not so clear because Chinook harvested in the fishery could have been released from Clearwater, Dworshak National, or Kooskia National fish hatcheries. In general, the coded-wire tags recovered from these fisheries were used to determine the portion of the catch originating from each hatchery. However, in some years, there were few or no coded-wire tags in fish originating from the Clearwater Fish Hatchery available to the fishery, whereas there were a large number of tags from Dworshak and Kooskia National fish hatcheries. To resolve this issue, an estimated portion of the unmarked return was assigned to Clearwater Fish Hatchery. This estimate was calculated by determining the proportion of total hatchery-origin Chinook smolts in the Clearwater basin that were released by Clearwater Fish Hatchery. It was assumed that the performance of all marked Chinook smolts released in the Clearwater River basin were roughly equal, and therefore, a similar proportion of the adult Chinook return was contributed by Clearwater Fish Hatchery production.

No SAR estimates were determined for either presmolt releases or releases at locations other than hatchery weirs. Smolt-to-adult return rates for off-site releases are probably similar to SARs for fish released at hatchery weirs. However, since few if any adults are recovered from off-site releases, accurate SAR calculations are very difficult to develop. For presmolt releases, SARs are only appropriate if some measure of survival from presmolt to smolt is developed. We considered the error around developing such estimates too large to justify including subsmolts in SAR calculations. Based on juvenile PIT tag detections, survival of juveniles to LGD from presmolt releases is generally less than 10% and often less than 5%.

It should be noted that returning six-year-old (four-ocean) Snake River spring/summer Chinook salmon have been documented but generally account for a very small segment of the brood year return and are not included in the SAR estimates. Lastly, although we freely use the term smolt in reference to yearling Chinook salmon, some fish show no signs of smoltification at release and may not immediately emigrate. Kiefer et al. (2002) reported that a small percent of wild-origin Snake River Chinook salmon appear to rear for two years in fresh water prior to smolting. It is possible that a small number of hatchery-origin smolts would also remain in fresh water for a second year prior to migration.

Weir Management Protocols

The IDFG and LSRCP cooperators develop weir management protocols to establish how Chinook salmon will be handled at hatchery weirs. Protocols are determined after considering a number of input variables such as: the number of hatchery- and natural-origin Chinook salmon estimated to return to weirs, management objectives for specific drainages and subbasins, presence/absence of specific research efforts, and requirements associated with managing salmon under the ESA. Protocols change over time and are generally set prior to the trapping season. As such, the following text presents weir management protocols (in general) for the adult hatchery weirs operated in Idaho during the reporting period.

The Snake River spring/summer Chinook salmon evolutionarily significant unit (ESU) was listed as threatened under the ESA on April 22, 1992 (correction published June 3, 1992). Clearwater spring Chinook salmon and Rapid River Hatchery stock were not included in the ESU. Since the reporting period covered in this report falls within the period following ESA listing, weir management protocols presented below were developed with this in mind.

McCall Fish Hatchery

Weir management protocols at the McCall Fish Hatchery were developed to address State management and LSRCP and NOAA Fisheries objectives as well as to accommodate ISS and the Nez Perce Tribe's Johnson Creek programs.

Three groups of Chinook salmon adults were collected at the South Fork Salmon River weir: natural (unmarked), supplementation (coded-wire tag marked or ventral fin clipped), and hatchery reserve (adipose fin-clipped). Supplementation broodstocks were developed according to supplementation study genetic criteria at the McCall Fish Hatchery as part of the cooperative ISS project.

Natural escapement criteria drove the selection process for creating the supplementation broodstock. Typically, this entailed releasing all natural-origin adult returns above the South Fork Salmon River weir to spawn naturally. The component of the adult return released above the weir to spawn could also include up to 50% of hatchery or supplementation origin adults. An effort was made to maintain a minimum of 20 pairs of Chinook salmon spawners in the natural environment (upstream of the South Fork Salmon River weir) with a preferred target of at least 25 pairs. Surplus supplementation adult returns were passed over the weir to supplement natural production up to, but not exceeding, the number of natural-origin equivalents. Supplementation adults surplus to management criteria for the South Fork Salmon River were utilized for other purposes such as out-planting. Juvenile targets of supplementation broodstock were estimated to match natural smolt production upstream of the weir.

Spawning ratios of one male to one female or two males to one female were used. Each female subfamily was fertilized using a different male. Following fertilization, subfamily eggs were recombined into one container, disinfected in 100 ppm iodophor for 60 minutes, and packed in perforated egg tubes for transportation to incubator stacks at the McCall Fish Hatchery.

Sawtooth Fish Hatchery

Weir management protocols at the Sawtooth Fish Hatchery were developed to address State management and LSRCP and NOAA Fisheries objectives, as well as to accommodate the ISS program.

Annually, an effort was made to maintain a minimum of 20 pairs of Chinook salmon spawners in the natural environment (upstream of the South Fork Salmon River weir) with a preferred target of at least 25 pairs minimum. This was typically accomplished by releasing 67% of wild- or natural-origin adults, then supplementation adults, then hatchery or reserve adults until the target was achieved.

Additionally, the composition of adults released upstream of the weir to spawn naturally was designed to not exceed a ratio of 50% hatchery-origin adults. In years where natural-origin adult escapement was low (e.g., fewer than 35 pairs), supplementation adults were released upstream to achieve the escapement target if they were available. If fewer than 10 pairs of natural-origin adults were available to release upstream, then any combination of supplementation and hatchery reserve adults were released to bring the total escapement number to 20 fish (10 pairs) as long as the total number of hatchery-origin adults did not exceed the number of natural-origin adults.

Sawtooth Fish Hatchery weir management protocols also stipulated that no unmarked fish be retained to develop supplementation broodstocks if the predicted adult return was less than 100 adults.

Clearwater Fish Hatchery and Satellite Facilities

Indigenous Chinook salmon populations were virtually or totally eliminated by Lewiston Dam (1927-1940). Because of this, all spring Chinook salmon within the Clearwater subbasin have come from nonindigenous stocks and are excluded from the ESU encompassing other spring/summer stocks throughout the Snake River basin. However, the Clearwater River stocks represent an important effort aimed at restoring an indigenous fish population to an area from which they had been extirpated. Founding hatchery stocks used for spring Chinook salmon re-introductions were primarily obtained from the Rapid River Hatchery. Initially, however, spring Chinook stocks imported for restoration came from Carson, Big White, Little White, or other spring Chinook captured at Bonneville. Genetic analyses confirm that existing natural spring Chinook salmon in the Clearwater River subbasin are derived from reintroduced Snake River stocks (Matthews and Waples 1991). As such, Clearwater Fish Hatchery and satellite facility weir protocols have been developed by IDFG management, research, and hatchery staff to address State and LSRCP management needs. Since Clearwater Fish Hatchery has no adult capture facility at the hatchery, all adult trapping for the Clearwater Fish Hatchery broodstock collection occurred at offsite satellite facilities (Red River, Crooked River, and Powell).

Prior to 1997, Red River and Crooked River Chinook salmon were treated as two distinct stocks in the South Fork Clearwater River, while adult salmon recovered at the Powell satellite facility were treated as a third distinct stock. Beginning in 1997, the Red River and Crooked River stocks were combined into the South Fork Clearwater stock, because juveniles released at either facility often tended to return to the other release site as adults. This simplified spawning of adults, because all adults from the two facilities could be pooled together prior to

spawning. While the Powell stock has remained separate, shortfalls in production numbers in the South Fork or Powell stocks have been occasionally made up by adding surplus smolts from the other stock.

At the South Fork Clearwater River satellite facilities (Crooked River and Red River), all ventral fin clipped adults were passed above adult weirs for natural spawning. Adipose fin clipped, hatchery adults that were surplus to the needs of the program were released above trapping sites, recycled through the sport fishery, or out-planted according to management agreements.

At the Powell satellite facility, all ventral fin clipped adults were released back into the Lochsa River. All natural adults (all fins intact) were released into the Lochsa River upstream of Walton Creek. Adipose fin clipped, hatchery adults that were surplus to the needs of the program were released or out-planted according to management agreements.

Spawning ratios of one male to one female were used unless the broodstock population contained less than 100 females. If the spawning population contained less than 100 females, then eggs from each female were split into two roughly equal subfamilies. Each subfamily was fertilized by a different male then recombined for incubation. When the broodstock population contained 25 to 50 females, the eggs from each female were split into three equal subfamilies. Each subfamily was fertilized by a different male then recombined for incubation. When the broodstock population contained 25 females or less, the eggs from each female were divided into four equal subfamilies. Each subfamily was fertilized by a separate male. Generally, at least five to ten percent of the jacks were used for spawning to maintain genetic diversity. Also, if possible, an effort was made to use all returning hatchery-origin adults for spawning.

Dworshak National Fish Hatchery

During the reporting period, all Chinook salmon trapped at the Dworshak weir were retained until broodstock needs were met. Surplus fish were available for out-planting, but surpluses did not exist prior to 1997, and only minimal surpluses existed after 1997. Surplus Chinook salmon trapped at the Dworshak weir were recycled through the fishery in 1997 and/or transferred to the Nez Perce Tribe for out-planting (R. Roseberg, USFWS, personal communication).

Rapid River Fish Hatchery

Rapid River stock spring Chinook salmon were not included in the Snake River spring/summer Chinook salmon ESU. During the reporting period, weir management protocols at the Rapid River Fish Hatchery were relatively uncomplicated. Natural-origin Chinook salmon, as determined by the presence of an adipose fin, were passed above the weir to spawn naturally. Hatchery-origin Chinook salmon were ponded for spawning or recycled through sport fisheries. Chinook salmon that were recycled through the sport fishery received an identifiable external mark, which generally consisted of an opercula punch or notch.

Prior to the onset of mass marking (1993 at Rapid River), the wild-origin run in Rapid River was defined as a summer run. In general, adults returning prior to July 15 were considered hatchery-origin spring Chinook salmon, while adults returning after July 15 were considered wild summer Chinook salmon. However, during the early years of this program, adult run designation

was determined more by the broodstock needs of the hatchery, and this cutoff date was not strictly adhered to (T. Rogers, IDFG, personal communication). The identification of hatchery-origin adult Chinook salmon and the management of Rapid River stocks became much more definitive in the mid-1990s once mass marked adults began returning.

Fry at Rapid River were typically ponded to early rearing raceways beginning in early winter and continuing into early spring. Fish were transferred to the final rearing ponds during fish marking, which generally took place toward the end of June. Smolt releases took place during March and April of the year following marking. Rapid River Fish Hatchery employs a volitional release strategy that involves removing the screens at the bottom ends of the final rearing ponds, which allows the smolts to migrate into the river over the course of a couple of weeks. At the end of this volitional migration period, any smolts remaining in the pond are forced out using nets. This technique was employed for all Rapid River releases during the reporting period.

Pahsimeroi Fish Hatchery

Pahsimeroi Fish Hatchery weir management was influenced by the presence of an ESA-listed natural-origin run of Chinook salmon in the Pahsimeroi River in addition to IDFG management objectives, Idaho Power Company mitigation objectives, and the ISS project. Weir management protocols for the reporting period were designed to minimize potential impacts to the natural stock. However, mass marking of hatchery-produced Chinook salmon was not implemented until release year 1993. Therefore, it was not possible to positively identify the origin of the entire run until 1996. During the first three years of the reporting period, when the origin of adults returning to the weir could not be definitively determined, it is likely that both hatchery- and wild-origin adults were released upstream of the weir. Weir management protocols for the Pahsimeroi Fish Hatchery included guidelines similar to those described for the Sawtooth Fish Hatchery and the South Fork Salmon River Satellite for developing supplementation broodstocks associated with the ISS.

Oxbow Fish Hatchery

Oxbow Fish Hatchery acts as a satellite trapping facility for Rapid River Fish Hatchery. During the reporting period, adipose fin clipped Chinook salmon trapped at the Hells Canyon facility on the Snake River were transported to Rapid River Fish Hatchery and held for spawning. Any natural-origin Chinook trapped at the Hells Canyon facility were returned to the river.

RESULTS

Hatchery Operations Documentation

Fish Culture Practices

McCall Fish Hatchery—Fish culture practices at McCall Fish Hatchery remained fairly constant across the reporting period. Chinook salmon fry were moved from the incubators into the inside concrete vats about three days prior to first feeding, and the vat volume available to the fry was extended as densities rose. Growth during the winter months was typically slow due to the cold water, but it increased considerably as warming occurred in the spring.

The spawning protocol at McCall Fish Hatchery during the reporting period was to split the eggs from each female and fertilize each half with a different male (G. McPherson, IDFG, personal communication). This was done to increase the number of total crosses in the population with the intention of maintaining genetic diversity. This practice could also reduce the losses incurred if any of the males used proved to be infertile.

During the entire reporting period, juvenile Chinook salmon being raised at McCall Fish Hatchery were marked and enumerated as they were being moved from the inside vats out into the final rearing ponds. This practice served to reduce the stress by requiring only one handling for marking and moving fish. In earlier years, the fry were sometimes moved into the final rearing ponds and then netted back out again for marking, a practice that could increase stress and mortality in the juvenile salmon.

Fish marking occurred in two stages: the first stage in the spring and the second stage in early summer. The first stage included the bulk of the fish at a time when they were too small to be coded-wire tagged. These fish were marked as described in the section on fish marking and placed in the ponds for final rearing. The purpose of the first stage was largely to reduce densities in the indoor vats and allow the fish remaining in the indoor vats time to grow large enough to be coded-wire tagged. Tagging typically occurred in early July.

Fish health, which is reported on in greater detail in the fish health section, was generally good across the reporting period. The only significant disease issue was periodic, manageable outbreaks of BKD. These outbreaks were treated with a variety of antibiotics, with generally good results. Tetany from erythromycin toxicity was only observed once, and it had no observable lasting effect. Treatments did not noticeably disrupt the order of operation of normal hatchery culture practices during any of the years of the reporting period, though BKD segregated rearing was practiced during some years.

Sawtooth Fish Hatchery—During the reporting period, fish marking at Sawtooth Fish Hatchery generally did not occur during the time window when parr were moved to larger rearing environments, as happened at most other Idaho Chinook hatcheries. This may have increased the stress on the fish, but no significant disease outbreaks were noted with the exception of brood year 1992.

During the reporting period, Sawtooth Fish Hatchery staff periodically dealt with minor BKD outbreaks, but no significant outbreak of BKD was noted in any year. However, strict segregation and testing for BKD was emphasized in all years of the reporting period. The only significant mortality event noted for the reporting period was an epizootic that resulted in a 53% loss of brood year 1992 Chinook salmon (Snider and Coonts 1998). The causative agent for this outbreak appeared to be one or both of two *Aeromonas* species *A. hydrophila* and *A. sobria*.

The adult trap at the East Fork Salmon River satellite facility was operated through 1997. Due to low numbers of returning adults, no adults were held for spawning at that facility between 1994 and 1997. Trapping at the satellite facility was discontinued during the final two years of the reporting period due to low adult returns and concerns over stopping natural-origin adults attempting to pass the weir.

Because of the low numbers of adult Chinook salmon spawned at the main hatchery and satellite during most of this reporting period, spawning protocols were adjusted to minimize the loss of genetic diversity in the resulting progeny. Prior to brood year 1996, then again in 1998,

eggs from each female were divided into two subfamilies. Each subfamily was fertilized with milt from one unique male. In 1996, 1997, and 1999, eggs from each female were divided into four different subfamilies and fertilized with four different males. After fertilization, all eggs from a single female, regardless of the number of males used for fertilization, were recombined into a single lot and held in a single incubation tray pending the determination of BKD status of the female parent. However, eggs from females that tested positive for BKD were not destroyed but were reared in isolation.

Due to their pathogen-free well water supply (available for egg incubation and early rearing only), and the availability of incubation and rearing space (a result of low numbers of returning spawners), Sawtooth Fish Hatchery hosted eggs and juveniles from other facilities in many years of the reporting period. Most notably, Chinook salmon eggs from Pahsimeroi Fish Hatchery were transferred to Sawtooth Fish Hatchery to be raised until they exceeded approximately 77 mm (3 in) in size to avoid contracting whirling disease, which is prevalent in the Pahsimeroi Fish Hatchery rearing ponds. In 1997, adult salmon were received from Rapid River Fish Hatchery and mixed origin fish from Rapid River/Lookingglass hatcheries. These adults were spawned to produce eggs for a Nez Perce Tribal program (Snider et al. 1999).

Lastly, in 1997, Sawtooth Fish Hatchery received green eggs from the South Fork Salmon River trap operated by McCall Fish Hatchery. The bulk of these eggs were transferred to the Shoshone-Bannock tribe for use in an experimental egg box program. The remainder of the eggs were returned to McCall Fish Hatchery as eyed eggs.

During much of the reporting period, Sawtooth Fish Hatchery Chinook salmon juveniles were used as part of an experiment designed to study the effects of rearing in an environment that simulated more natural conditions (Vidergar et al. 2003). This involved painting cobble patterns on some raceway floors and incorporating shade structures. Differential survival between the treated and untreated raceways was examined to see whether the treatments resulted in benefit to either smolt survival during juvenile migration or adult returns.

Clearwater Fish Hatchery and Satellite Facilities—Due to the recent inception of the program, large numbers of eggs from Rapid River Fish Hatchery were received during the first few years of the reporting period to supplement eggs produced from adults returning to Clearwater Fish Hatchery satellite facilities. In addition to these stock augmentation eggs, eggs were periodically received from BKD-positive fish spawned at the Rapid River Fish Hatchery. These small groups of eggs from BKD-positive parents were transferred to the Clearwater Fish Hatchery to be reared in isolation. Juvenile Chinook salmon produced this way were all returned to the Rapid River Fish Hatchery or Hells Canyon Dam for release.

One of the unique aspects of the diverse program at Clearwater Fish Hatchery is the stringent protocols observed to prevent disease from entering the facility. Unlike all of the other Chinook hatcheries in the system with the exception of McCall Fish Hatchery, the Clearwater Fish Hatchery receives multiple stocks of fish from several drainages, while receiving its water from a different drainage altogether (the North Fork of the Clearwater). All of the Chinook eggs reared at Clearwater Fish Hatchery come in from remote facilities. These eggs are transported in a variety of containers, which are not allowed onto the Clearwater Fish Hatchery grounds. Instead, all transported eggs are transferred into clean containers either at the gate into the facility or through a hole in the fence around the facility. The eggs and egg containers are bathed in an iodophor solution to disinfect them before they are brought into the hatchery building. In this way, material used in collecting the eggs, from whatever source, is never

allowed onto the hatchery grounds, and any diseases transferred accidentally on the equipment remain outside the fish hatchery grounds.

The spawning protocol in place during the reporting period for all Chinook trapped at the Clearwater Fish Hatchery satellite facilities incorporated a sliding scale (J. McGehee, IDFG, personal communication). If there were more than 100 pairs, spawning occurred at a 1:1 male to female ratio. If the number of pairs was less than 100 but greater than 50, the eggs from each female were divided in half, and each half was spawned with a separate male. This created a 2:1 male to female ratio. If the number of pairs was less than 50, but greater than 25, the eggs were split three ways, creating a 3:1 ratio. If there were less than 25 pairs of adults, the eggs from each female were split four ways to create a 4:1 ratio.

Juvenile Chinook salmon are marked and enumerated as they are being transferred to final rearing raceways. This process is designed to minimize the stress of marking and transfer.

Dworshak National Fish Hatchery—Hatchery operations at Dworshak National Fish Hatchery are documented thoroughly in brood year reports produced by the USFWS Idaho Fisheries Research Office (FRO). However, these brood year reports follow a single brood year from release through completion of adult returns. As such, brood year reports cannot be completed until all adults have returned—five years after the eggs were produced. Therefore, brood year reports are not complete for the entire reporting period. However, the brood year reports produced by the FRO are very detailed and cover all aspects of trapping, spawning, rearing, marking, health, release, and migration.

The reporting period covered several years in the early and mid-90s where adult returns to Dworshak National Fish Hatchery were very low. Accordingly, most adult Chinook salmon were spawned. Culling to destroy eggs produced from high BKD parents was not possible in most of these years, but was implemented when sufficient adults returned (e.g., 1997). During years when high BKD groups were reared, sufficient hatchery incubation and rearing space was available to provide reasonably good isolation.

The standard spawning protocol at Dworshak National Fish Hatchery, for Chinook recovered either there or at Kooskia National Fish Hatchery, is to cross one male with one female. This protocol has been followed throughout the 90s, though in very low run years, occasionally a male had to be used for two females.

Adult Chinook salmon trapped at the USFWS Kooskia National Fish Hatchery were transferred to Dworshak National Fish Hatchery for spawning, incubation, and rearing. This practice was implemented to avoid fish health risks associated with rearing fish on Clear Creek water at the Kooskia facility (Jones et al. 2004). Kooskia and Dworshak stocks were not mixed at the Dworshak National Fish Hatchery. Furthermore, eggs taken from Kooskia adults that tested positive for BKD were not returned to the Kooskia National Fish Hatchery but were raised to smolt stage at the Dworshak National Fish Hatchery.

Dworshak National Fish Hatchery receives its incubation and rearing water from the North Fork of the Clearwater River. When river water temperature is warm, Chinook salmon grow rapidly and may exceed their release target size. To retard growth during the warm water periods, intermittent feeding strategies were implemented, which resulted in smolts with little or no fat reserves (Jones et al. 2000; Jones et al. 2001b). Low fat reserves were suspected of impairing out-migration performance and were a cause for concern during the reporting period.

In response, feeding regimes were altered to increase fat reserves but also to maintain target size at release.

Rapid River Fish Hatchery—Hatchery operations at Rapid River Fish Hatchery remained fairly constant throughout the reporting period, with no significant changes or additions. However, during the mid-90s, due to relatively low adult returns, hatchery staff adjusted adult holding protocols, as described below, in an attempt to reduce prespawning mortality. These adjustments, which could not be maintained in larger adult return years, appeared to be successful. Though this is somewhat anecdotal, this suggests that physical alterations of adult holding facilities would improve the success of the hatchery program in general.

The Rapid River Fish Hatchery maintains two adult holding ponds. The smaller pond (HP-1) is a fenced and shaded concrete structure. The second and larger pond (HP-2) is a slope-sided, partially shaded, gravel and cobble bottomed pond. The smaller holding pond is more easily disinfected and, because of its construction and shade covering, is more conducive to handling adult Chinook salmon and reducing handling stress. Unfortunately, HP-1 has a capacity of only 1,000 adult Chinook salmon, so it is insufficient for holding the entire broodstock in any years when numbers exceeded this limit. Adults trapped in 1995, 1996, and 1999 numbered few enough that they could be held exclusively in HP-1, and prespawning mortalities for these years ranged from a low of 0.8% in 1999, to 7.2% in 1996 (Lowell et al. 1998b, 1998c; Steiner et al. 2001). These figures compare favorably with the 18.7% average prespawn mortality for the years 1970 through 1994 that was reported by Lowell et al. (1998c).

The improved adult survival in those years when only HP-1 was used suggests that alterations to HP-2 might improve overall adult survival in large run years. Since HP-1 can only hold about 1,000 adults, and approximately 2,500 adults are needed to meet egg numbers at Rapid River Fish Hatchery, improving adult survival in HP-2 would increase the ability of the hatchery to meet broodstock goals, especially in years where the run is at or just above the 2,500 number of adults needed for broodstock.

Throughout the reporting period, an aggressive and successful attempt was made to reduce the incidence of BKD in juvenile rearing groups at Rapid River Fish Hatchery. This was done partially through disinfection of the juvenile ponds as conditions permitted. However, the major effort involved culling of eggs from females with moderate to high ELISA values. In years where adult returns and eyed-egg numbers were comparatively low, fertilized eggs produced from females with moderate to high ELISA values were not destroyed but were transferred to the Clearwater Fish Hatchery where they could be raised in isolation. In years when adult returns were comparatively high (1997), BKD culling protocols were more stringent, and segregated rearing was not necessary.

During 1992 and 1993, adult Chinook salmon and eggs were transferred to Clearwater Fish Hatchery and Dworshak National Fish Hatchery to supplement production in the South Fork Clearwater and Lochsa rivers. In 1997, adult returns greatly exceeded broodstock needs. Surplus adults were marked with a caudal punch and recycled through the sport fishery to make them available for angler harvest. Adult returns in other years of the reporting period were comparatively low, necessitating the transfer of all trapped fish from the collection weir on Rapid River to the main hatchery for holding and spawning.

The typical spawning protocol at Rapid River is to have each male fertilize two females, and have every female fertilized by two males (R. Steiner, IDFG, personal communication). The way this is accomplished is simple to perform, but difficult to explain. The hatchery personnel

start by selecting two males and one female. The eggs from the female are placed in a container and both males are used to fertilize those eggs, then one of the males is released. After that, a new male and new female are chosen, and the eggs from the new female are put into the next container. The male retained from the first female is used along with the newly selected male to fertilize the new batch of eggs, then the newly selected male is retained for the next eggs, and the first male is disposed of. This spawning protocol is intended to ensure against infertile males, since two males are available for each set of eggs.

This spawning protocol was in place for the entire reporting period with the exception of 1995. The very low number of females recovered in 1995 was such that the spawning protocol was changed to a split random cross with eggs from each female being split four ways and spawned with multiple males. This was done to maximize the available crosses and minimize genetic loss.

Pahsimeroi Fish Hatchery—Hatchery operations changed significantly at Pahsimeroi Fish Hatchery during the reporting period. During the first two years of the reporting period (1992 and 1993), there were constant, chronic disease outbreaks that resulted in the loss of large numbers of juvenile Chinook salmon (Moore and Engemann 1995; Bertellotti and Engemann 1998). The source of disease (primarily BKD) was linked to the water supply, which was raw water from the Pahsimeroi River. Additionally, the Pahsimeroi River was known to be positive for *M. cerebralis*, the parasite responsible for causing whirling disease. In response, beginning in the early 1990s a program was initiated to transfer eyed-eggs from Pahsimeroi Fish Hatchery Chinook salmon spawning events to the Sawtooth Fish Hatchery for incubation and early rearing. The pathogen-free well water used for incubation and early rearing at the Sawtooth Fish Hatchery virtually eliminates disease risks associated with the water supply.

Spawning protocols at Pahsimeroi Fish Hatchery changed almost every year during the reporting period (D. Engemann, IDFG, personal communication). In 1992, most of the spawning was a simple 1:1 male to female cross, but towards the end of the run, two males were used to enhance fertility. In 1993, the entire run was spawned at a 1:1 ratio, without any use of multiple males at any time. There was no spawning in 1994, because all adults were passed above the weir; then in 1995, the entire run was spawned by pooling the milt from two males and using the pooled milt to fertilize each female. This technique ensures against infertile males. The spawning in 1996 resembled that in 1995, but the milt wasn't pooled prior to fertilization. In 1997, the first three spawn sessions used a 1:1 cross, while for the remainder, the eggs of each female were split into two groups, and each group was spawned with a separate male. This technique of splitting the eggs and using different males was used for all spawning in 1998 and 1999.

Pahsimeroi Fish Hatchery Chinook salmon raised at Sawtooth Fish Hatchery were hatched and reared on well water until they reached approximately 77 mm (3 in) in length. They were then transferred to outside raceways supplied with Salmon River water. While BKD and whirling disease were present in the river water supply to the Sawtooth Fish Hatchery, tests conducted by the IDFG Fish Health Laboratory have shown that risks of contracting either disease are lower in the Salmon River than in the Pahsimeroi River during the majority of the calendar year. Juvenile Pahsimeroi Fish Hatchery Chinook salmon were transferred back from Sawtooth Fish Hatchery to the Pahsimeroi Fish Hatchery holding ponds generally right after fish marking in September. The following spring, the ponds were opened to the Pahsimeroi River, and the juvenile Chinook were allowed to emigrate volitionally.

During the reporting period, the management of adults trapped at the facility's weir followed protocols similar to those described above for the Sawtooth Fish Hatchery.

Oxbow Fish Hatchery—During the reporting period, Oxbow Fish Hatchery acted primarily as a satellite trapping facility for Rapid River Fish Hatchery. Adult Chinook trapped at Oxbow Fish Hatchery (Hells Canyon trap) were hauled to Rapid River Fish Hatchery, placed in adult holding pond HP-1, and subsequently spawned. As noted above, this holding pond is more "fish-friendly" and generally results in fewer adults lost to prespawn mortality. For the entire reporting period, adults recovered from Oxbow Fish Hatchery were not segregated from adults recovered at Rapid River Fish Hatchery.

A portion of the smolts raised and marked at the Rapid River Fish Hatchery are transported and released in the Snake River downstream of the Hells Canyon adult trap. During the reporting period, no spring Chinook salmon were raised at the Oxbow Fish Hatchery nor were the smolts transported from the Rapid River Fish Hatchery held there prior to release. However, in 1993, Rapid River Fish Hatchery did not have sufficient incubator space to accommodate their entire green egg take. This lack of incubation space was a result of an IDFG protocol to rear eggs from only one female per incubator tray as part of the BKD management program (Lowell et al. 1998a).

Fish Marking and Tagging

McCall Fish Hatchery—The majority of LSRCP Chinook salmon released by the McCall Fish Hatchery were production fish and received an adipose fin clip to indicate their hatchery origin (Appendix A, Table 1a-g). In all years covered by this report, up to 300,000 juvenile Chinook salmon received a coded-wire tag to indicate their inclusion in a stock assessment study associated with the US-Canada Pacific Salmon Treaty. In addition to these releases, a portion of the fish released each year were part of the ISS. Supplementation study fish generally received either a right or left ventral fin clip. Deviations from, or additions to, this operational plan are described below.

An evaluation of coded-wire tag marking was conducted during brood years 1988-1991, which predates this report, but evaluations of adult returns from this marking occurred during the reporting period and warrant mention here.

The study was conducted using Chinook from brood years (1988-1990) at McCall Fish Hatchery, and was intended to investigate the survival impact of the extensive coded-wire tagging program on Idaho Chinook, because there was evidence suggesting that coded-wire tagging might significantly reduce the survival of both Chinook salmon and steelhead trout (K. Ball, IDFG, unpublished data). Oxytetracycline was used to mark the control fish used in this experiment because it was thought to produce a readily identifiable mark without incurring the handling, anesthetic, or physical stress associated with other mass marking techniques available. The complete design for this study can be found in Cannamela (1992), along with further operational considerations in Cannamela and Krusa-Malle (1993).

The study showed slightly lower survival for coded-wire-tagged Chinook relative to OTC-marked Chinook for brood years 1988 (SAR 0.50% vs. 0.35%) and 1990 (SAR 0.004% vs. 0.003%). Brood year 1989 Chinook showed the opposite pattern (SAR 0.18% vs. 0.20%) (Table 9). However, only brood year 1988 showed a significant difference.

There were problems with evaluating returns from both of these groups. The coded-wire-tagged Chinook used in the study received adipose clips as the sole indicator of the presence of

a coded-wire tag. Therefore, incorrectly clipped fish would cause the coded-wire tag component of the run to be undercounted. Similarly, there was no way to measure the undercount of OTC-marked adults. A study intended for 1991, which would have attempted to measure the undercount of OTC-marked adults, was not carried through. Therefore, both study groups were probably undercounted, and the bias for the treatment and control would not have the same magnitude, but the magnitude cannot be accurately estimated for either treatment of control.

Beginning in 1995, large numbers of PIT tags (up to 55,000) were used as part of the Comparative Survival Study (CSS). This investigation is guided by a multiagency oversight committee including IDFG, Washington Fish and Wildlife Service, Columbia River Inter-Tribal Fisheries Commission, Oregon Department of Fish and Wildlife, and the Fish Passage Center to examine survival through different segments of the migration corridor in the lower Snake and Columbia rivers.

During the period from 1996 through 1999, coded-wire tagging associated with the US-Canada Treaty was greatly reduced. Approximately 60,000 Chinook salmon received a coded-wire tag as opposed to the normal number of 300,000. This was done in part due to reduced numbers of juveniles available for participation in the study.

Beginning in 1997, approximately 60,000 Visual Implant Elastomer tags were used in two different body locations on ISS Chinook salmon (*in lieu* of a ventral fin clip). All supplementation study Chinook salmon received a red elastomer tag behind the right eye; however, about 4,700 fish also received a red elastomer tag in the jaw line. The jaw tagging was conducted to evaluate the retention of elastomer placed in this location. Elastomer tagging behind the eye is a slow and demanding process that is difficult to do on small fish, which means that the fish have to be allowed to grow considerably larger for this type of mark compared to fin clips or coded-wire tags. The use of the elastomer jaw tag was being evaluated because it seemed easier to administer on small juveniles. The tag was readily visible on juveniles, as well, but no adults were ever identified from this group. The small numbers marked with the jaw mark could account for the lack of detection, but the mark in the juveniles spread along the length of the jaw. As the fish grew, the tag might have been spread out along the growing jaw to the point where the elastomer material was too diffuse to be detectable. Furthermore, on the dark jaws of a Chinook, it is possible that natural pigment could have covered the elastomer material, a problem that does not exist for the clear tissue behind the eye.

In 1998, supplementation marking was increased with the start of supplementation releases to Stolle Ponds and Buckhorn Creek, though the supplementation release at Buckhorn Creek was not part of the ISS program. All supplementation releases to Buckhorn Creek and most of the supplementation releases to Stolle Pond received coded-wire tags only. See Appendix A, Table 1F for a complete breakdown of marks to either location. Further evaluation of elastomer tags in both the normal eye placement as well as the experimental jaw placement continued in 1998. There were no fins clipped on these fish.

Sawtooth Fish Hatchery—In general, juvenile Chinook salmon were reared at the Sawtooth Fish Hatchery for two primary purposes (LSRCP general production and the ISS) during the current reporting period. Production juveniles received adipose fin clips all years, and in 1992 through 1994, a portion were coded-wire tagged as part of the US-Canada Treaty process (Appendix A, Table 2A-B). US-Canada tagging was discontinued beginning in 1995 due to low numbers of available fish. In 1999, coded-wire tags began to be used as an evaluation tool in production releases. In most years of the reporting period, evaluation groups were PIT tagged to evaluate out-migration survival.

Juvenile Chinook that were part of the ISS program received ventral fin clips to distinguish them from production fish. Supplementation releases generally occurred in the Salmon River approximately 20 kilometers upstream from the Sawtooth Fish hatchery (Blaine County Bridge and Busterback release sites), whereas adipose fin-clipped production releases occurred at the hatchery weir. Beginning in 1998, both general production and ISS juveniles were released at the hatchery weir. Evaluation groups of PIT-tagged supplementation fish were released in most years of the reporting period. Deviations from or additions to this operational plan are described below. Mark and release information for each year is summarized in Appendix A, Tables A-G.

In 1994, East Fork Salmon River releases were moved well upstream of the satellite facility to address concerns that fish did not have adequate time in the river to imprint properly. This was also a concern for fish being released from Sawtooth.

The release of supplementation study smolts upstream of the satellite facility on the East Fork Salmon River continued in 1995 though a different location, seven miles upstream of the weir, was tried. This was the last year of the reporting period that fish were released in the East Fork Salmon River.

Approximately 25,000 adipose fin clipped juvenile Chinook salmon were released in the headwaters of the West Fork Yankee Fork of the Salmon River in 1995 as part of an agreement with the Shoshone-Bannock Tribes.

Low returns of adult Chinook salmon to the Sawtooth weir between 1994 and 1996 meant that the numbers of juveniles released from 1996 through 1998 were very small. All of the fish released during this time received adipose clips, though they were designated as supplementation fish. This deviation from standard practice reflected the fact that numbers at the hatchery had dropped to the point where a separate production run was not feasible.

In 1997, in addition to Sawtooth Fish Hatchery weir and Blaine County Bridge releases, 5,145 smolts were released at the Pahsimeroi Fish Hatchery. These fish were Pahsimeroi summer Chinook salmon that had been raised at Sawtooth Fish Hatchery to avoid risks associated with contracting whirling disease at the Pahsimeroi Fish Hatchery. This was the only Pahsimeroi group raised to full-term smolts at Sawtooth Fish Hatchery during the reporting period. In other years when the Sawtooth Fish Hatchery reared Pahsimeroi juveniles, fish were returned in the fall prior to the spring release.

Beginning in 1999, supplementation releases were relocated to the Salmon River immediately downstream of the hatchery weir. Also in 1999, supplementation fish received a coded-wire tag, but no fin clip. Production releases were adipose fin clipped and coded-wire tagged in 1999 as part of the NATURES rearing study.

Clearwater Fish Hatchery and Satellite Facilities—The Clearwater Fish Hatchery operates three satellite facilities (Powell, Crooked River, and Red River). All Chinook salmon releases from the Clearwater Fish Hatchery took place at these satellite facilities, whereas fish marking and tagging usually took place at the Clearwater Fish Hatchery prior to transporting fish to the satellite facilities for release. Parr, presmolts, and smolts were all typically released from satellite facilities.

Crooked River and Red River are both tributaries to the South Fork Clearwater River. Chinook released from these satellite facilities do not show any particular affinity, at return, for their specific release site. Over the course of the reporting period, attempts to segregate these two facilities by applying different marks to fish from each facility tapered off. In 1997, Crooked River and Red River stocks were combined to form the South Fork stock.

The Powell satellite facility is located on the upper Lochsa River and is distinct from the South Fork Clearwater satellites. Chinook salmon released at Powell have a high affinity for the Lochsa River and little straying to South Fork satellites occurs.

There were two major marking strategies at the Clearwater Fish Hatchery during the reporting period (LSRCP production and the ISS). Production fish received an adipose fin clip (and some portion were coded-wire tagged) and were available to sport fisheries if sufficient adults returned to Idaho to provide a surplus over broodstock needs. Supplementation fish received either a left or a right ventral clip, and generally did not receive coded-wire tags (Appendix A, Table 3A-G). Releases at any particular location often alternated between left and right ventral clips from year to year, so that adult age could be readily determined upon return. Deviations from or additions to this operational plan are described below.

In 1993, extensive parr and presmolt releases occurred. Parr releases to two sites in Meadow Creek were cooperative efforts with the Nez Perce Tribe and directed at establishing their Meadow Creek Chinook program (J. McGehee, IDFG, Clearwater Fish Hatchery, personal communication). These fish received an adipose fin clip, and a portion received coded-wire tags. Other presmolt releases were associated with the ISS. Fish released in the vicinity of the Powell satellite to meet supplementation study objectives received a left ventral fin clip. Supplementation juveniles released at the Red River satellite received a right ventral fin clip. No fish were released at the Crooked River facility in 1993.

Juvenile Chinook salmon released at Powell, Crooked River, and Red River satellite facilities in 1994 received coded-wire tags and adipose fin clips, right ventral fin clips, and left ventral fin clips, respectively. Production fish received adipose fin clips and a portion received coded-wire tags. Nez Perce Tribe Meadow Creek releases continued in 1994.

In 1995, right ventral fin clipped fish were released into Newsome Creek for the Nez Perce Tribal supplementation program. Right ventral fin clipped supplementation fish were also released at Papoose Creek on the Lochsa River and in the American River. Adipose fin clipped juveniles were released at the Crooked River satellite facility in 1995. A substantial portion of these fish were coded-wire tagged.

Juvenile Chinook salmon were released at the Powell, Crooked River, and Red River satellite facilities in 1996. Powell releases were adipose fin clipped and largely coded-wire tagged. Crooked River releases were adipose fin clipped and Red River releases were right ventral fin clipped. Approximately 13,000 fish released from Clearwater Fish Hatchery satellite facilities in 1996 were PIT tagged as part of the Comparative Survival Study. This was the only year where Clearwater Fish Hatchery was involved with this study.

Clearwater Fish Hatchery also released approximately 68,000 Rapid River stock smolts in the Snake River at the Hells Canyon trap operated by the Oxbow Fish Hatchery. Eggs for this release originated from high BKD females spawned at Rapid River Fish Hatchery. Eggs were transferred to the Clearwater Fish Hatchery for isolation rearing.

Just over 20,000 fish were released from Clearwater Fish Hatchery facilities in 1997. All fish were released with an adipose fin clip and contributed to meeting production objectives. No supplementation fish were released in 1997 and no coded-wire tags were applied. This year was also the first release year for adipose fin clipped juveniles in the Magruder Corridor of the Selway River. These fish originated from a cooperative project with the Nez Perce Tribe involving the development of progeny from wild, captive-reared adults.

Beginning in 1998, Nez Perce Tribe supplementation releases received only coded-wire tags (no fin clips). Releases occurred in Pete King Creek and Squaw Creek off the Lochsa River and the Magruder Corridor of the Selway River. Additionally, coded-wire tag only Chinook salmon juveniles were released at Warm Springs Bridge in the Little Salmon River.

Left and right ventral fin clipped fish were released at the Red River satellite. Right ventral fin clipped fish were released at the Crooked River satellite and adipose fin clipped fish were released at the Powell satellite. A considerable portion of Powell releases received coded-wire tags. As occurred in 1996, the Clearwater Fish Hatchery reared and released approximately 300,000 juvenile Rapid River stock Chinook salmon in the Snake River at the Hells Canyon trap.

Coded-wire tag only fish releases for the Nez Perce Tribe conducted in 1999 occurred in Mill Creek, Lolo Creek, Newsome Creek off the South Fork Clearwater River, and in Boulder Creek off the Lochsa River. Walton Creek, a tributary of the Lochsa River, received approximately 300,000 adipose fin clipped Rapid River stock juveniles. A considerable portion of these fish also received coded-wire tags. Red River and Crooked River satellite facilities received right and left ventral fin clipped juveniles, respectively. The Powell satellite received adipose fin clipped juveniles; many of which were coded-wire tagged.

Dworshak National Fish Hatchery—Generally, Chinook salmon reared at the Dworshak National Fish Hatchery are all released in the North Fork Clearwater River adjacent to the hatchery. In past years, some Chinook salmon were released at off-site locations, but none of these releases occurred between 1993 and 1999.

During the reporting period, all Chinook salmon raised at the Dworshak National Fish Hatchery received an adipose fin clip to indicate their hatchery origin. A portion of the Chinook salmon also received coded-wire tags (Appendix A, Table 4A-G). Tagging was performed for stock identification purposes or specific studies carried out by hatchery personnel. Deviations from or additions to this operational plan are described below.

Smolt releases in 1993 and 1994 were distributed over one month of time. The protracted release schedule resulted from concern expressed by the National Marine Fisheries Service that Chinook salmon released late in the season survived better than those released early in the season. Researchers at Dworshak National Fish Hatchery tested this theory by spreading their releases out, applying an appropriate tagging design to their fish released at specific times. Findings were contrary to what the National Marine Fisheries Service had hypothesized; fish released early in the season returned at a higher rate than fish released late in the season (R. Roseberg, USFWS, Dworshak National Fish Hatchery, personal communication).

No further studies were carried through to completion at Dworshak National Fish Hatchery during the reporting period.

Rapid River Fish Hatchery—During the reporting period, all Chinook released from Rapid River hatchery were considered production fish. With a few exceptions noted below, all fish received an adipose clip to indicate their hatchery origin. Coded-wire tags were also applied to Rapid River fish beginning with release year 1993 as part of the US-Canada Treaty negotiation process. Deviations from or additions to this operational plan are described below. All marking and release numbers for each year are summarized in Appendix A, Table 5A-G.

All fish released from the Rapid River Fish Hatchery in 1993 received coded-wire tags. The majority of these tags were not magnetized; only fish tagged for the US-Canada Treaty agreement (approximately 300,000) received magnetized wire. Non-magnetized wire was used because of concerns raised by groups that sampled coded-wire-tagged adults as they crossed Lower Granite Dam. The concern was that too many tagged salmon would be recovered for them to handle them properly. However, demagnetized tags are very difficult to detect and the tagging process is prone to excessive error. Therefore, because demagnetized tags were used for this release, neither the actual number of tags released nor the number of adults recovered from this release could be accurately calculated.

In addition to the tagging described above, an experiment was conducted in 1993 to compare survival of adipose fin clipped fish to ventral fin clipped fish. All Chinook in each group received coded-wire tags, with 880,608 fish receiving an adipose fin clip and 866,602 fish receiving a left ventral fin clip. However, demagnetized coded-wire tags were used for both groups and the detection of adults was not reliable. Of the adults returning in 1994-1996, only 17 Chinook salmon were identified as having come from the adipose group and 13 from the ventral group. The difference between recovery rates for the two groups was minimal and since the use of demagnetized wire prevented an accurate count of the numbers of juveniles released in each group, the results of the study are worthless.

In 1995, in excess of 300,000 brood year 1993 Chinook salmon received coded-wire tags as part of the US-Canada Treaty agreement. These fish were also used in a different study to look at the survival effects of ventral fin clips versus adipose fin clips. This study was a repeat of the investigation conducted in 1993 but used magnetized wire, which was much easier to identify in adults when they returned. The adipose fin clipped group consisted of 298,404 Chinook salmon smolts while the left ventral fin clipped group consisted of 101,368 Chinook salmon smolts. One hundred sixty-one left ventral fin clipped adults (0.16% of fish released with tags) and 343 adipose fin clipped adults (0.11% of fish released with tags) returned to the Rapid River Fish Hatchery weir. Study findings indicated that fish that received a ventral fin clip outperformed fish that received an adipose fin clip. The study was not repeated, so the results were not replicated. The data from the 1993 release, though it shows the same pattern as the data from the 1995 release, is probably too unreliable to be considered a replicate.

In addition to the above tagging, about 90,000 of the 500,000 smolts released in the Snake River at Hells Canyon trap in 1995 received coded-wire tags. Lastly, about 1,000 smolts received PIT tags that were manually injected, while another 1,000 fish received PIT tags that were mechanically injected. This study was implemented to evaluate the placement of tags and survival of mechanically injected smolts. However, while the mechanical injection worked, mechanical injection was discontinued due to disease concerns. The inability to sterilize the injection needles between applications was thought to increase the risk of disease transmission during tagging, though no evidence of this was found (R. Duke, IDFG, personal communication).

Releases in 1996 and 1997 were reduced due to low adult returns. US-Canada coded-wire tagging was reduced commensurate with the reduction in smolt production. CSS PIT tagging was maintained, though, since numbers were adequate for this study.

In 1998 and 1999, smolt numbers had increased back to levels necessary to allow for marking of the full US-Canada group, as well as the full CSS study PIT-tag groups. No further studies were conducted during either of those years.

Pahsimeroi Fish Hatchery—During the reporting period, juvenile Chinook salmon at the Pahsimeroi Fish Hatchery were generally reared for one of two primary purposes: IPC general production and the ISS. Production juveniles received adipose fin clips, and supplementation study fish received ventral fin clips to distinguish them from production fish. Production and supplementation fish were typically released volitionally from the hatchery's ponds. Deviations from or additions to this operational plan are described below. All numbers and marks for each year can be found in Appendix A, Tables 6A-G.

In 1993, production and supplementation groups were released at the Pahsimeroi Fish Hatchery. A considerable number of production fish were coded-wire tagged as part of an experiment conducted to evaluate the efficacy of rearing juveniles at the Sawtooth Fish Hatchery to avoid risks associated with contracting whirling disease at early life stages. For this investigation, 30,028 Sawtooth-reared and 134,883 Pahsimeroi-reared smolts received coded-wire tags. Returns of adults with coded-wire tags were too low to carry out the evaluation (only one adult from the Pahsimeroi group was recovered and none from the Sawtooth group).

No unusual marking was performed on smolts released in either 1994 or 1995. There were no coded-wire tagging operations. Production fish received adipose clips, and supplementation fish received ventral clips.

In 1994, due to low adult returns, all Chinook captured were released above the weir to spawn naturally. No broodstock was collected this year, so no marking was performed.

In 1997, 1998, and 1999, all smolts released from the Pahsimeroi Fish Hatchery were adipose fin clipped and designated as supplementation releases. No fish were coded-wire tagged.

Oxbow Fish Hatchery—No Chinook salmon were reared at the Oxbow Fish Hatchery during the reporting period. Chinook released at the Oxbow Fish Hatchery's Hells Canyon trap were raised at the Rapid River Fish Hatchery. Release groups were adipose fin clipped and received coded-wire tags in release years 1993 (blank wire) and 1995.

Summary of Juvenile Releases

For comparative purposes and to evaluate the success of IDFG-operated hatcheries in the LSRCP program, we summarize juvenile release information for the reporting period October 1992 through September 1999 for both LSRCP and non-LSRCP hatcheries in Idaho operated by IDFG or the USFWS.

Figures 6-9 show the release numbers by hatchery versus the release target for that hatchery for each of the LSRCP hatcheries. In general, these figures show a very slight decline throughout the reporting period with occasional good years, which helped rebuild release numbers, interspersed with poor years where low return numbers meant that juvenile releases

fell well below production targets. However, only McCall, of all the LSRCP facilities, actually met or exceeded their juvenile release targets for any year during the reporting period. Therefore, even during the relatively good years of the period, most of the hatcheries failed to recover sufficient adults to produce the number of eggs needed to meet juvenile targets.

One exception to this pattern is Sawtooth Fish Hatchery, which saw a steady decline in juvenile numbers throughout the reporting period. Sawtooth Fish Hatchery did see the same rebound in production as the other hatcheries during 1999, but by that time, the declines of the previous years had been so great that the rebound was not as pronounced.

Summary of Adult Returns

For comparative purposes, and to evaluate the success of IDFG-operated hatcheries in the LSRCP program, we summarize adult return information for the reporting period October 1992 through September 1999 for both LSRCP and non-LSRCP hatcheries in Idaho operated by IDFG or the USFWS.

Table 2 shows the return numbers of all adult Chinook salmon returning to all of the hatchery weirs included in this report. The sex ratio is not available for all of the weirs covered in this table, because sexual dimorphism has not manifested sufficiently by the time of trapping for most runs of spring Chinook salmon. Therefore, for these facilities, while sex ratio can be determined in the fall at the time of spawning, it is not available at the time of trapping. This is not the case with all spring Chinook runs such as the Sawtooth Fish Hatchery run, which arrives slightly later in the year, and it is not the case with either of the summer Chinook runs at McCall or Pahsimeroi Fish Hatcheries.

Tables 4, 5, and 6 show the Chinook returns by year for the years 1990-2001 for each of the facilities covered in this report. Table 4 shows the combined totals of wild and hatchery origin adults. Table 5 shows hatchery-origin only returns while Table 6 shows wild- or natural-origin adults. For years prior to 1996, these latter two tables have to be read with some discretion, because determination of origin was somewhat imprecise prior to the advent of the mass marking of hatchery Chinook.

Hatchery returns for the LSRCP hatcheries are compared against return targets for the hatcheries in Figures 2-5. Only LSRCP hatcheries are included in this figure, because IPC facilities have release goals but not explicit adult return goals. The figures make clear that adult return goals have not been met during the reporting period. In the case of Clearwater Fish Hatchery, this can largely be attributed to the newness of the program. Considering that the hatchery was barely in place at the beginning of the reporting period and was still building its runs from outside sources (mainly Rapid River stocks), Clearwater Fish Hatchery could not be expected to return adequate numbers of adult Chinook.

McCall Fish Hatchery returned the best numbers relative to their return goals during the period, and recovered sufficient numbers of adults to fill their broodstock needs during several of the years of the reporting period, but even though their adult return goal is the lowest of any of the LSRCP hatcheries in this report, they still failed to achieve even half of their goal in the best year.

Overall, the poor performance in meeting adult Chinook goals can be attributed to a combination of factors. First, poor run performance during the reporting period meant that most of the facilities never managed to meet their juvenile production targets. Without adequate

numbers of juveniles released, there was no reasonable expectation of meeting adult return goals. Secondly, the adult objectives were originally set based on SAR objectives that were unreasonably high. Survival through the hydrosystem appeared to be considerably lower than the *a priori* estimates had anticipated, with the result that far fewer adults returned from a set of juveniles than was needed to meet adult return goals. Lastly, the ocean conditions may not have been as good as they had been prior to the reporting period, which would have reduced ocean survival to some extent during the reporting period.

Since the adult return goals are set well above the numbers required for the hatcheries to meet broodstock needs, it is possible to achieve juvenile production goals without hatcheries attaining adult production targets. All of the facilities, with the possible exception of Sawtooth Fish Hatchery, can probably be expected to produce juvenile Chinook salmon at full capacity after only a few better than average production years, despite the declines seen during the reporting period. However, the problem of lower than expected SARs is insurmountable through fish culture practices alone. To meet overall LSRCP replacement goals, far more hatcheries would be needed than currently exist, because the adult returns from current juvenile production are unlikely to attain the levels that were assumed when the current facilities were designed, without significant changes in the migration corridor.

Fish Health Monitoring

McCall Fish Hatchery—Over the reporting period, no unusual fish health incidents occurred at McCall Fish Hatchery. Bacterial kidney disease rearing segregation (based on female parent ELISA optical density value) was initiated in 1994. Segregation rearing greatly reduced both vertical and horizontal transmission of this disease, which had been a chronic problem in the past. One high BKD segregation group experienced elevated mortality in 1994 with no other incidents occurring during the remainder of the reporting period.

Another significant improvement, in addition to segregation rearing, occurred at the McCall Fish Hatchery in 1998 when diets fed to juvenile Chinook salmon were modified to contain an improved vitamin pack. Hatchery staff felt that this addition was likely responsible for reducing unexplained mortality thought to be associated with the absence of the diet vitamin component (McPherson et al. 1999).

Sawtooth Fish Hatchery—Sawtooth and East Fork Salmon River Chinook salmon reared at Sawtooth Fish Hatchery experienced good health during the reporting period. As described above for the McCall Fish Hatchery, better BKD management was implemented in 1994. During most years of the reporting period, chronic outbreaks of BKD occurred along with occasional detections of whirling disease and coldwater disease *Flavobacterium psychrophilum*. Low pathology levels were observed in all cases and mortality was minimal.

In 1995, an unusual epizootic occurred in one low BKD segregation group and was apparently the result of a missed prophylactic medicated feed treatment. Following treatment, the epizootic subsided and did not reappear.

In 1996, Pahsimeroi Fish Hatchery swim-up fry (rearing at the Sawtooth Fish Hatchery) contracted a fungal gas bladder disease, which was responsible for minor mortality.

Clearwater Fish Hatchery and Satellite Facilities—The Clearwater Fish Hatchery is a relatively new facility (1992) with an outstanding fish health record. However, the hatchery is

situated across the North Fork Clearwater River from the Dworshak National Fish Hatchery, which uses water from the North Fork Clearwater River and has experienced continuous fish health concerns associated with BKD and infectious hematopoietic necrosis virus (IHNV). Though the Clearwater Fish Hatchery is using a similar water source taken from Dworshak Reservoir on the North Fork, Clearwater Fish Hatchery has implemented strict protocols to manage disease risk, and they have not had the same disease issues that have been recurrent at Dworshak National Fish Hatchery.

During the reporting period, no disease outbreaks occurred among any of the Clearwater-derived stocks of Chinook salmon. In 1997, BKD caused acute losses in a high-BKD segregation group of Chinook salmon being raised at the Clearwater Fish Hatchery for the Rapid River Fish Hatchery (Johnson et al. 1999). In 1999, one group from Rapid River Fish Hatchery Chinook salmon experienced higher than background levels of mortality. This mortality was attributed to a mixed infection of coldwater disease and *Pseudomonas fluorescens* (Johnson et al. 2001).

In 1995 and 1996, low levels of eye anomalies (cataracts) were observed in juvenile Chinook salmon rearing at the Crooked River satellite facility (Johnson et al. 1998a, b). No causative agent for these cataracts was detected.

During years when unusually high stream flows occurred at the Powell satellite facility, very turbid water with high levels of suspended silt caused some loss of juvenile Chinook salmon.

Dworshak National Fish Hatchery—This facility continued to manage perennial fish health risks associated with BKD and IHNV. During the reporting period, no major disease outbreaks occurred. However, BKD was generally identified in prerelease (smolt) tissue samples each year (C. Clemens, USFWS, Idaho Fisheries Resource Office, personal communication).

Rapid River Fish Hatchery—Chinook salmon reared at the Rapid River Fish Hatchery benefited from improved fish culture, segregation, and culling practices implemented during the reporting period. As noted earlier in this report, Rapid River Fish Hatchery has limited ability to segregate-rear juvenile Chinook salmon. In years where hatchery-produced returns were low across the Salmon and Clearwater basins, eggs from females with medium and high BKD ELISA optical density values were transferred to the Clearwater Fish Hatchery for isolation rearing, and were returned to either Hells Canyon or Rapid River as smolts. This kept potential problems away from the general production group at Rapid River Fish Hatchery.

Historically, an external mycosis referred to as “fuzzy-tail” was a recurring problem at this facility. While it was present in 1992, it was absent during the entire reporting period (1993–1999).

In 1995, motile aeromonad septicemia *Aeromonas sp*., *Pseudomonas sp*. was responsible for higher than usual mortality in juvenile Chinook salmon. Prompt attention and medicated feed treatment contained the outbreak (Lowell et al. 1998b). However, segregation of this group was maintained until release.

Brood year 1996 and 1997 juvenile Chinook salmon suffered low-level, chronic losses from motile aeromonad septicemia, and brood year 1997 suffered further losses from coldwater disease (Lowell et al. 1998c; Steiner et al. 2000). Treatment with oxytetracycline-medicated feed contained the diseases in both years.

Pahsimeroi Fish Hatchery—During the reporting period, Pahsimeroi Fish Hatchery did not have sufficient pathogen-free well water to incubate and rear Chinook salmon at production levels. As a result, this facility had perennial problems associated with the presence of whirling disease and BKD in the river water supply. While there were no significant fish health related losses to disease during the reporting period, major changes were implemented in an attempt to control whirling disease.

Prior to 1997, approximately one-half of the summer Chinook salmon intended for release at the Pahsimeroi Fish Hatchery were transported (as eyed-eggs) to the Sawtooth Fish Hatchery for incubation and early rearing on well water. The remaining Chinook salmon were reared in concrete raceways supplied with river water at the Pahsimeroi Fish Hatchery. Higher rates of BKD, whirling disease, and even bacterial gill disease were observed in some years in groups reared at the Pahsimeroi Fish Hatchery. Beginning in 1997, all Chinook salmon eggs produced at the Pahsimeroi Fish Hatchery were transported to Sawtooth Fish Hatchery for incubation and early rearing. When fish reached approximately 77 mm (3 in), they were transferred from well water to outside raceways supplied with water from the Salmon River. Fish were subsequently transferred in the fall to the Pahsimeroi Fish Hatchery for acclimation on water from the Pahsimeroi River prior to release.

Oxbow Fish Hatchery—No juvenile Chinook salmon were reared at the Oxbow Fish Hatchery during the reporting period.

Harvest

McCall Fish Hatchery

During the reporting period, there was only one fishery (1997) conducted on the South Fork of the Salmon River. An estimated 434 adult Chinook salmon were harvested in this fishery (Apperson and Wilson 1998). Mandatory check station information was used to develop this estimate.

Sawtooth Fish Hatchery

No sport or tribal fisheries occurred on the upper Salmon River or its tributaries during the reporting period.

Clearwater Fish Hatchery and Satellite Facilities

Sport fisheries were held in 1997 and 1998 on portions of the Clearwater River. Tribal harvest also occurred in 1996 and 1999, though no season was open for non-tribal members. Fish caught in Clearwater River fishing zones would have originated (predominately) from release groups produced by the Clearwater Fish Hatchery along with Dworshak and Kooskia national fish hatcheries. Coded-wire tags were used to separate the contribution of each of these three facilities wherever possible.

The 1997 sport-fishing season included portions of the North Fork, South Fork, and mainstem of the Clearwater River, as well as portions of the Lochsa River. The estimated

harvest was 738 fish (Barrett 1998). Catch, harvest, and fishing pressure information were collected from roving creel survey effort as well as from check stations. Coded-wire tags were recovered from 46 Chinook salmon (43 produced by Dworshak National Fish Hatchery and three produced by Kooskia National Fish Hatchery). The contribution the Clearwater Fish Hatchery made to the sport fishery was likely not observed due to the fact that the only coded-wire tags that could have been identified in 1997 would have come from an off-site release that occurred in Meadow Creek, a tributary of the Selway River. The vast majority of Clearwater Fish Hatchery Chinook that could have contributed to the fishery were not tagged, and therefore, not identifiable as to their point of origin.

In 1997, the Nez Perce Tribe reported harvesting 835 adult spring Chinook salmon in the North Fork of the Clearwater River (Jones et al. 2000). The vast majority of these Chinook salmon were probably of Dworshak National Fish Hatchery origin, though some of them could have been Clearwater or Kooskia National Fish Hatchery origin salmon that had either moved into the North Fork or were caught at the confluence. The Nez Perce Tribe also reported harvesting 12 adult spring Chinook salmon from Clear Creek, which are almost certainly of Kooskia National Fish Hatchery origin (Jones et al. 2001a). No coded-wire tags were recovered from any tribal fishery.

In 1998, a brief sport fishery was conducted on the North Fork and mainstem of the Clearwater River (Barrett 2000). The estimated harvest was only 99 Chinook salmon taken out of 135 caught. Angler information was collected through the use of mandatory check stations. Coded-wire tags were recovered from 45 Chinook salmon, of which 42 were produced by Dworshak National Fish Hatchery and one was produced by Clearwater Fish Hatchery. The relatively large proportion of tagged fish in the total harvest reflects the large tagging rate seen in 1995, since the majority of the harvested salmon were five-year-old fish. The remaining two tags were unreadable. Coded-wire tag recoveries would appear to suggest that the majority of the 1998 Clearwater River salmon harvest consisted of Dworshak National Fish Hatchery Chinook. However, the relative absence of adults produced by the Clearwater Fish Hatchery mostly reflects the low level of coded-wire tags implanted in juveniles that could have contributed to the 1998 fishery. Therefore, the true relative contribution of the two hatcheries is impossible to determine.

The Nez Perce tribe reported harvesting 182 adult Chinook salmon in 1998 from the North Fork Clearwater River (Jones et al. 2001b). Tribal harvest effort primarily targeted the area near the Dworshak National Fish Hatchery fish ladder, and was probably all Dworshak National Fish Hatchery produced Chinook, though it is possible that Clearwater and Kooskia National Fish Hatchery Chinook were intercepted in that fishery.

In 1996 and 1999, no general Chinook salmon sport fisheries were opened in the Clearwater River basin. However, the Nez Perce Tribe reported harvesting 24 and 93 Chinook salmon from the North Fork Clearwater River in each of those years, respectively (Jones et al. 2000, 2001b).

Rapid River Fish Hatchery

Sport and tribal fisheries occurred on the Little Salmon River in 1993, 1997, and 1998. Additionally, tribal fishing occurred in Rapid River in 1994 and 1999.

In 1993, an estimated 430 Chinook salmon were harvested by sport anglers (Janssen 1993). Angler information was collected by roving creel survey. The Nez Perce Tribe reported the harvest of 696 Chinook salmon.

In 1994, no sport fishing occurred on the Little Salmon River, but the Nez Perce Tribe reported the harvest of 51 Chinook salmon during a tribal harvest in Rapid River.

In 1997, sport and tribal fishing seasons occurred on the Little Salmon River. Sport anglers harvested an estimated 3,787 Chinook salmon (Janssen and Kiefer 1998) and the Nez Perce Tribe reported the harvest of 2,196 Chinook salmon. Additionally, the Shoshone-Bannock Tribes reported the harvest of approximately 10 Chinook salmon.

In 1998, sport anglers harvested an estimated 172 Chinook salmon in the Little Salmon River (Janssen and Kiefer 1999). The Nez Perce Tribe reported the harvest of 618 Little Salmon River Chinook salmon.

In 1999, return numbers were considered to be too low to allow a general harvest. However, the Nez Perce Tribe did hold a limited fishery and reported harvesting 88 Chinook salmon (IDFG, unpublished data).

Pahsimeroi Fish Hatchery

No sport or tribal fisheries occurred on the upper Salmon River or its tributaries during the reporting period.

Oxbow Fish Hatchery

No sport or tribal fisheries occurred on the Snake River downstream of the Hells Canyon Dam during the reporting period.

Juvenile Out-migration Conditions

Out-migration conditions generally improved across the reporting period. River flows at Lower Granite Dam were very low in 1992, but improved each year until 1997 (Table 3). River flows in 1998 were much lower than in 1997 but were still near the 25-year average. In 1999, flows improved again to above average.

One critical measure of out-migration conditions is the amount of spill that occurs at Snake River and mainstem Columbia River dams. As spill increases, a greater proportion of smolts pass over the spillways rather than going through the turbines or the juvenile bypass systems. One result of increased passage over the spillway is that PIT tag detections decline as spill increases. Studies suggest that hatchery smolts that pass over the spillway do no have the same survival performance as smolts that go through the fish bypass system (Berggren et al., 2006). River flows were too low to provide water for spill between 1992 and 1994, and the period when spill occurred in 1995 was minimal. Spill levels increased dramatically for the remainder of the reporting period (DART reference). All flow and spill data for the reporting period, as well as previous years included for reference, are included in Table 3.

Out-migration Timing and Juvenile Survival

Out-migration detections for PIT tagged groups provide a reliable comparison for survival between groups when the groups are released from the same place at the same time and arrive at interrogation sites at approximately the same time. However, comparisons between years for a single release site and comparisons between release sites for a single year can be made in a general sense, so long as it is understood that any observed differences may be due to influences other than differential survival. Unusual migration conditions could cause detections for any particular site to differ from year to year, with true survival remaining the same. However, consistent trends between sites and years could be identified so long as causality is not determined.

McCall Fish Hatchery

Detection rates for McCall Fish Hatchery smolts showed a rising trend across the reporting period (Appendix B, Table 1A-G). Smolts emigrating in 1992, 1993, and 1995 generally exhibited detection rates around 40%. The 1994 and 1996 were only slightly lower, with detection rates averaging 35%. However, migration year 1997 detection rates averaged 29%, although spill and flow rates were relatively high (Table 3) This comparatively low detection rate is likely explained by large numbers of smolts going over the spillways at the dam and bypassing the detectors during high flows. However, the median travel time to Lower Granite Dam for 1997 emigrants was actually longer than any other year in the reporting period, so other factors could have depressed the detection rates for that year.

Both migration years 1998 and 1999 showed detections around 49%, which is better than any previous year in the reporting period. Flows in both of those years were high, but not at the unusually high levels seen in 1997. However, median travel times in 1998 were normal, but median travel times in 1999 were nearly as high as in 1997. High flows should generally correspond to reduced travel times, higher survival, and lower detection rates. Comparing the performance of 1997, 1998, and 1999 demonstrates the variability within this conceptual model.

Migration year 1995 included the only presmolt releases during the reporting period. Appendix B, Table 1C shows how poor the detection of presmolts is when compared to full-term smolt releases. The smolt releases that year have detection rates around 40%. The presmolt releases, though released in the same area, have detection rates around 3.5%, less than one-tenth the rate of the smolt releases. This is assumed to reflect premigration mortality of the presmolts.

Sawtooth Fish Hatchery

Detections of juveniles migrating from Sawtooth Fish Hatchery were comparatively low for all years in the reporting period. The years 1997, 1998, and 1999 showed a marked improvement over 1993-1996, but overall detection rates for the best year (1998) did not exceed 50%. The highest detection rates (exclusive of 1998) averaged between 30% and 40% (Appendix B, Table 2A-G).

The majority of the PIT-tagged smolts emigrating in 1993 were released as presmolts, which usually have poor survival and low detections relative to full-term smolts. However, the PIT-tagged full-term smolts released in 1993 had detection rates that ranged from as low as 8%

to just over 21%, which is very low. The presmolt releases had detections from less than 1% to just greater than 12%.

There is no good explanation for why Chinook salmon smolts released from Sawtooth Fish Hatchery in the early and mid 90s had such comparatively low detection rates. Travel times were roughly similar between years, with only migration year 1998 emigrants exhibiting comparatively fast travel time. This anomaly could explain the high rate of detection for 1998 migrants, but that only serves to highlight how low the detections for the other years were. Comparisons with other fish hatcheries included in this report demonstrate that detections of PIT-tagged full-term smolts for most hatcheries during the reporting period were in the 30-50% range, while detections for Sawtooth Fish Hatchery only exceeded 30% during the three best years. Sawtooth Fish Hatchery smolts travel the greatest distance to reach Lower Snake River dams.

Clearwater Fish Hatchery and Satellite Facilities

Appendix B, Table 3A-G illustrates how variable PIT tag detection information is and how complicated it is to characterize the out-migration success of Clearwater Fish Hatchery release groups. During the reporting period, there were large numbers of parr and presmolt PIT tag release groups. Subsmolt releases are typically detected at much lower rates than full-term smolt releases, making it difficult to develop generalizations about juvenile migration characteristics.

Further complicating analysis of migration survival from Clearwater Fish Hatchery was the fact that there were no releases of PIT-tagged juveniles from Clearwater Fish Hatchery in the 1992, 1993, and 1996 migration years. Furthermore, there were very few full-term smolts containing PIT tags in the 1994 and 1997 migration years. Nevertheless, detection rates for full-term smolts averaged 48.6% in 1994 and 53.9% in 1997.

PIT tag detection rates for the years for which a large number of full-term smolts were released show that detections were relatively good for Clearwater Fish Hatchery when compared with other facilities in this report. Releases from the Powell Satellite facility had detections generally above 55%, while releases from the Red River and Crooked River satellite facilities were generally just under 50%. Off-site releases of full-term Chinook salmon smolts generally fell somewhere within or below this range, but release sites were too inconsistent to look at trends across years. It does appear that releases in the South Fork of the Clearwater River and its tributaries are detected at a somewhat lower rate than are releases in the Lochsa River and its tributaries, but there is insufficient data presented here to draw definitive conclusions.

Dworshak National Fish Hatchery

There were large numbers of Chinook released from Dworshak National Fish Hatchery with PIT tags during all years in the reporting period. Detection rates for these fish showed that migration success for smolts released from Dworshak National Fish Hatchery was comparatively strong (Appendix B, Table 4A-G).

Detections rates for smolts released from the Dworshak National Fish Hatchery during the reporting period were generally greater than 50%, with some release groups exceeding 60%. These high detection rates may be more indicative of the fact that the migration distance from Dworshak National Fish Hatchery to Lower Granite Dam is the shortest for any of the hatcheries in the system, rather than inferring that fish produced from this facility were more hearty or of

higher quality. However, it is interesting to note that the median travel time for Dworshak National Fish Hatchery smolts (across all years in the reporting period) was not appreciably lower than median travel times for smolts released from other Idaho-LSRCP hatcheries. Median travel times generally averaged between 20 and 30 d. Exceptions to this occurred in 1994 when the median travel time for Dworshak National Fish Hatchery smolts averaged approximately 10 d. In 1996 and 1997, median travel times averaged between 31 and 32 d.

Rapid River Fish Hatchery

The PIT tag detection rates for smolts released from the Rapid River Fish Hatchery during the reporting period were variable (Appendix B, Table 5A-G). Detection rates, spill, and median travel times are difficult to interpret. In general, detection rates were better than at any other Salmon River Chinook salmon hatchery (McCall, Pahsimeroi, and Sawtooth fish hatcheries). Detection rates in 1993 and 1995 averaged in excess of 50% and 60%, respectively, while 1992 and 1994 detection rates averaged 35% for both years. Little to no water was spilled in any of these four years, so migratory conditions appear to have been similar. In 1997, a year of comparatively high flow and spill, detection rates averaged only 27.8%. River conditions could easily account for these low detection rates. Median travel times to Lower Granite Dam were similar for 1997 and 1999 smolts while the median travel time for 1998 emigrants was comparatively longer. Detection rates were similar for 1998 and 1999 smolt groups and considerably lower for the 1997 release group.

Pahsimeroi Fish Hatchery

Detection rates for smolts released from the Pahsimeroi Fish Hatchery were relatively low when compared to other facilities with the exception of the Sawtooth Fish Hatchery. During the reporting period, Pahsimeroi Fish Hatchery release groups contained PIT tag groups in 1994, 1995, 1998, and 1999 (Appendix B, Table 6A-G). Detection rates observed in 1998 and 1999 were 36.5% and 48.2%, respectively. Detection rates for the remaining years (1994 and 1995) averaged approximately 20%. These low detection rates are probably indicative of the longer migration distance Pahsimeroi Fish Hatchery smolts travel to reach interrogation sites.

Oxbow Fish Hatchery

For the reporting period, the only smolts released in the Snake River at the Oxbow Fish Hatchery release site (downstream of Hells Canyon Dam) were reared at Rapid River Fish Hatchery. Smolts released in 1993 and 1995 contained PIT tag evaluation groups. Detection rates for smolts released during these years were comparable to detection rates observed for smolts released from the Rapid River Fish Hatchery. Detection information for these groups can be found in Appendix B, Table 7A and B. Hells Canyon releases are identified by the “HCD” release designation.

Smolt-to-Adult Return Rates

SAR information is summarized in Table 8.1-7, with a separate table for each LSRCP hatchery in the report. Each individual hatchery is discussed separately below; however, in general, the SARs for each facility were well below the level needed to make the adult return

objective for the facility. Only the last two release years (1998 and 1999) in the reporting period had SARs for some hatcheries that were at or above the expected SAR levels used in setting the design goals for those facilities.

McCall Fish Hatchery

SAR information for McCall Fish Hatchery can be found in Table 8.1 along with total hatchery return information by release year. The SAR reported in the table includes only the full-term smolt releases from the hatchery that were expected to return to the South Fork Salmon River Weir. This was possible because all presmolt releases during the reporting period were given unique, identifiable marks that allowed them to be distinguished from other releases.

The SARs for the last few years of the reporting period showed a strong improvement over all of the previous years. The SARs for the last two years was above 1%, whereas SARs for the earlier years were below 0.5%, and were generally below 0.1%, even for the years prior to 1996 when some natural-origin adults were included in the SAR calculation.

Sawtooth Fish Hatchery and East Fork Satellite

SAR information for full-term smolts released from Sawtooth Fish Hatchery can be found in Table 8.2a, while SAR information for full-term smolts released from the East Fork Satellite facility can be found in Table 8.2b. Presmolt releases have generally not occurred from either of these facilities, so the SARs in these tables give the complete picture for the facilities.

The SARs for smolts released from Sawtooth Fish Hatchery over the course of the reporting period range from a low of less than 0.01% for the smolts released in 1993, to 1.03% for the smolts released in 1997. However, the SAR for smolts released in 1997 may be inflated, since the number of smolts that made up the release was only 4,756. When the number released is very small, it takes very few incorrectly identified adult recoveries to have a relatively large effect on the SAR. In the case of 1997, it is likely that some of the adults identified as five-year-old returns may actually have been larger than normal four-year-olds from the 1998 release.

SARs for smolts released from the East Fork Satellite facility show the same low values as those seen during the earlier part of the reporting period for Sawtooth Fish Hatchery. Chinook releases at the East Fork facility were terminated after 1995, so there is no SAR information after that year. Therefore, the improved returns seen during the last few years at other facilities were not seen at the East Fork facility.

Clearwater Fish Hatchery and Satellites

There are no direct adult recoveries at the Clearwater Fish Hatchery. Instead, adult Chinook are trapped at the three satellite facilities: Crooked River, Red River, and Powell. However, adults trapped at the Crooked River facility were combined with those trapped at the Red River facility to make a combined South Fork Clearwater River SAR. This combination was done because adults released from either facility showed a fairly low affinity for their release location. Adults from these releases return reliably to the South Fork Clearwater River, but do not show a high affinity for the particular facility from which they were released.

Table 8.3a shows the SARs for the two South Fork Clearwater River facilities. During the reporting period, the SARs for the South Fork facilities ranged from less than 0.01% for the smolts released in 1993 up to 0.98% for the smolts released in 1997. However, like Sawtooth Fish Hatchery, the 1997 SAR value is probably inflated by some of the four-year-old fish from release year 1998 being misidentified as five-year-old 1997 fish.

Table 8.3b shows the SARs for the Powell facility during the reporting period. With the exception of the two anomalous years of 1997 and 1991, SARs for the facility were quite low but showed a general rising trend throughout the reporting period. This may reflect the fact that the reporting period begins near the inception of the Powell program, where runs were just becoming established. Since the fish used to create this run came from other basins, there is likely a certain amount of adaptation and selection over time for adults with the capacity to return to the correct site. Selection over time may be sufficient to account for the improvement in SARs from the 0.15% or less seen in the first five years to the 0.67% seen in 1999.

Both 1991 and 1997 had unusually high SARs. The 2.76% SAR seen for smolts released in 1997 is most likely caused by the misidentification of five-year-old fish. However, there is no obvious explanation for the SAR of 3.42% for the smolts released in 1991. There are several possibilities, but it is unlikely that this SAR reflects the true performance of the smolts released that year.

Dworshak National Fish Hatchery

During the reporting period, releases from Dworshak National Fish Hatchery were well established, and quite large, relative to the Clearwater Fish Hatchery releases (Table 8.4). In general, SARs to Dworshak National Fish Hatchery showed a steady improvement over the reporting period. The early years of the reporting period had the lowest SARs with the lowest being for the smolts released in 1993 which had an SAR of less than 0.01%, while the best SAR for the reporting period was seen for the smolts released in 1999, which had an SAR of 1.24%.

The unusually high SAR seen for the smolts released in 1997 at Sawtooth Fish Hatchery, and all Clearwater Fish Hatchery satellite facilities, was not seen to the same extent at Dworshak National Fish Hatchery. The number of five-year-old adults recovered from this release year does appear to be excessively large, which suggests that some of them were actually misidentified four-year-old adults recovered from the 1998 release; however, since the release numbers in 1997 were fairly large, the effect of these misidentified adults was much smaller than it had been at the other facilities.

Rapid River Fish Hatchery

Releases from Rapid River Fish Hatchery were fairly robust throughout the reporting period, often reaching the hatchery capacity mark of around 3 million smolts. Table 8.5 shows the smolt release and return figures for 1990 through 1999. Note that smolt releases at Rapid River Fish Hatchery itself are below the 3 million capacity mark, which is due to significant portions of the hatchery production being released at either Hells Canyon Dam on the Snake River or elsewhere in the system (Appendix A, Table 5). Only adults recovered at the Rapid River trap are included in Table 8.5, since these would be the only ones recovered from the hatchery release.

The middle of the reporting period, from about 1992 through 1996, showed reduced SARs for Rapid River Fish Hatchery Chinook returns. Both the early years of the reporting period, and especially the later years, had better returns. However, even the best year (1999) had an SAR of only 0.51%, which provided sufficient adults to meet broodstock needs and allow for a limited fishery but which was not at the levels anticipated in the design of any of the LSRCP facilities. This shows that SARs were consistent between LSRCP and non-LSRCP, facilities in Idaho during the current reporting period. Improvements of Rapid River Chinook runs during the latter years of the reporting period probably reflect improvements in migration and ocean conditions rather than improvements in hatchery practices, because overall SARs for the whole period more closely follow the migration conditions. Hatchery practices at Rapid River Fish Hatchery were well established by the early 90s and changed only slightly during the reporting period and thus were unlikely to have resulted in a large increase in survival.

Pahsimeroi Fish Hatchery

Table 8.6 shows releases and SARs for 1990 through 1999 at Pahsimeroi Fish Hatchery. Returns during the early years of the reporting period were very bad, often resulting in years when the weir management protocol (discussed in the section on weir management) required that all adults be released above the weir to spawn naturally. This meant that in 1992 and 1996 there were no smolts released.

Beginning with release year 1997, SARs at Pahsimeroi Fish Hatchery showed a marked improvement, with actual returns and SARs rising steadily for the last three years. By 1999, SARs had only reached 1.11%, which is much higher than most other years in the reporting period. This rising trend probably reflects improved migration and ocean conditions, as well as aggressive steps taken by Pahsimeroi Fish Hatchery personnel to deal with the fish health issues that may have weakened smolts released during the early years of the reporting period.

Oxbow Fish Hatchery

Oxbow Fish Hatchery does not raise any of the Chinook that it traps. All releases at the Hells Canyon Trap managed by Oxbow Fish Hatchery come from Rapid River Fish Hatchery. All adults trapped at the Hells Canyon Trap are returned to Rapid River for spawning. However, other Snake River strays, most notably from Looking Glass Fish Hatchery in Oregon are thought to be recovered at the Hells Canyon Trap, so the actual returns to Oxbow Fish Hatchery may in fact be inflated by locally adapted hatchery-origin strays, a situation which is not thought to occur to any great degree at any other trap covered in this report.

Spring Chinook releases and recoveries for Oxbow Fish Hatchery are shown in Table 8.7. Since the smolts released are not raised at the Oxbow Fish Hatchery rearing facility, the numbers are not restricted by the hatchery capacity. This means that the numbers can fluctuate quite a bit and generally reflect management decisions rather than egg take or losses from disease or predation.

The SARs for Oxbow Fish Hatchery fluctuate far more than that of any other facility covered in this reporting period. While 1999 was generally the best year for all the other facilities, it was below average for Oxbow Fish Hatchery at only 0.07%. The best year in the reporting period was 1993 with an SAR of 0.71%, though 1993 was not a very good year for any other facility in the report. This variability could be due to the influence of strays noted above.

SUMMARY

During the reporting period, no facility achieved their expected adult return goals, though the reasons for this were largely beyond the control of hatchery personnel. In most cases, juvenile production targets were also not met, which was usually a result of not being able to obtain sufficient adults to provide adequate numbers of eggs. In all cases, juvenile production targets can be reached with a few years of above average adult returns, because established hatchery practices and disease controls are in place to produce quality smolts with relatively minor losses from egg to smolt. Unfortunately, the best hatchery practices will be unable to meet adult return goals without dramatic improvements in smolt-to-adult survival.

By the early 1990s, all facilities in this report had implemented good disease prevention and segregation techniques and had implemented sound spawning protocols intended to maintain genetic diversity. If adult returns continue to decline, more expensive and labor intensive strategies may become necessary to maintain existing genetic diversity, but runs have not reached that level yet. As feed quality improves and disease issues arise, incremental changes will be implemented at all facilities; however, at this time there are no significant procedural alterations that can be suggested that would materially improve adult return numbers.

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Table 1. Length criteria (fork length in centimeters) used by Lower Snake River Compensation Plan Hatchery Evaluation Studies personnel and by hatchery personnel to age returning adult Chinook salmon.

	AGE (years)		
	3	**4**	**5**
McCall Fish Hatchery	≤67	>66 to <90	>89[a]
Clearwater Fish Hatchery			
Red River	<64	64 to 82	≥83[b]
Crooked River	<64	64 to 82	≥83[b]
Powell	<64	64 to 82	≥83[b]
Dworshak National Fish Hatchery	≤56	57 to 81	>81[c]
Rapid River Fish Hatchery	<62	62 to 83	>83[d]
Sawtooth Fish Hatchery	≤64	64 to 82	>82[e]
Pahsimeroi Fish Hatchery	<62	≥62 to <82	>82[f]
Oxbow Fish Hatchery	≤58	59 to 80	≥81[g]

[a] As noted in 2001 McCall Fish Hatchery Run Year Report.
[b] As noted in 2001 Clearwater Fish Hatchery Run Year Report.
[c] As noted in Annual Report Fiscal Year 2000 Idaho Fishery Resource Office, Ahsahka, Idaho.
[d] As noted in 1999 Rapid River Fish Hatchery Brood Year Report.
[e] As noted in 2000 Sawtooth Fish Hatchery Brood Year Report.
[f] As noted in 2000 Pahsimeroi Fish Hatchery Brood Year Report.
[g] As noted in 2001 Oxbow Fish Hatchery Brood Year Report.

Table 2. Total adult and jack returns, number spawned, and number released of spring and summer Chinook salmon (wild-, natural-, or hatchery-origin) to Idaho hatchery racks.

	Returns					Spawned					Released			
	Female	Male	Jack	Total	Sex Ratio M:F	Female	Male	Jack	Green Egg Take	Fecundity	Female	Male	Jack	Total
McCall Fish Hatchery														
1999	601	617	743	1,961	2.3 :1	427	ND	10	1,892,572	4,432	101	134	576	811
1998	498	400	76	974	1.0 :1	299	ND	15	1,433,237	4,793	150	150	14	314
1997	1,598	2,016	45	3,659	1.3 :1	561	922	15	2,523,059	4,497	968	1,109	11	2,088
1996	181	280	738	1,199	5.6 :1	111	123	4	486,644	4,384	51	89	465	605
1995	99	107	101	307	2.1 :1	57	73	6	268,307	4,707	35	46	35	116
1994	266	191	70	527	1.0 :1	139	80	8	689,203	4,958	104	74	44	222
1993	1,487	1,188	28	2,703	0.8 :1	356	352	4	1,731,515	4,864	919	708	21	1,648
Released Totals include outplants and donations.														
Sawtooth Fish Hatchery														
1999	35	82	79	196	4.6 :1	12	44	11	63,642	5,304	22	54	46	122
1998	77	72	4	153	1.0 :1	27	25	2	139,469	5,166	47	43	2	92
1997	101	144	9	254	1.5 :1	53	63	1	260,480	4,915	43	64	5	112
1996	38	91	27	156	3.1 :1	10	31	1	51,743	5,174	28	58	8	94
1995	4	17	16	37	8.3 :1	2	7	1	7,377	3,689	2	8	10	20
1994	40	50	6	96	1.4 :1	7	17[a]	1	29,933	4,276	33	44	6	83
1993	280	278	29	587	1.1 :1	68	71	22	369,340	5,431	209	207	7	423
[a] 11 males and 1 jack were released after spawning, males and jacks spawned and released in BYR.														
East Fork														
1999	TRAP NOT OPERATED													
1998	TRAP NOT OPERATED													
1997	2	5	0	7	2.5 :1	0	0	0	0	0	2	5	0	7
1996	2	5	3	10	4.0 :1	0	0	0	0	0	2	5	3	10
1995	0	0	0	0	0.0 :1	0	0	0	0	0	0	0	0	0
1994	4	11	0	15	2.8 :1	0	0	0	0	0	4	11	0	15
1993	33	52	5	90	1.7 :1	11	13	0	59,152	5,377	21	39	5	65
Red River Satellite (Clearwater Fish Hatchery)														
1999	ND	ND	ND	31	ND	Fish Combined at South Fork for spawning					ND	ND	ND	24
1998	ND	ND	ND	90	ND	Fish Combined at South Fork for spawning					ND	ND	ND	36
1997	ND	ND	ND	280	ND	Fish Combined at South Fork for spawning					23	34	ND	57
1996	14	39	9	62	3.4 :1	10	31	0	40,156	4,016	1	16	0	17
1995	2	0	2	4	1.0 :1	1	0	6*	4,376	4,376	1	0	1	2
1994	13	18	0	31	1.4 :1	7	8	0	30,634	4,376	5	10	0	15
1993	65	73	1	139	1.1 :1	23	23	0	99,908	4,344	42	48	1	91
*1995 Five Crooked River Jacks and 1 Red River Jack spawned with 1 Red River female.														
Adults returning to Crooked River and Red River weirs were combined into one South Fork stock starting in 1997.														
Crooked River Satellite (Clearwater Fish Hatchery)														
1999	ND	ND	ND	125	ND	Fish Combined at South Fork for spawning					ND	ND	ND	55
1998	ND	ND	ND	277	ND	Fish Combined at South Fork for spawning					ND	ND	ND	79
1997	ND	ND	ND	1,034	ND	Fish Combined at South Fork for spawning					74	52	ND	126
1996	94	113	92	299	2.2 :1	73	158	0	274,332	3,758	20	43	0	63
1995	0	0	6	6	0.0 :1	0	0	5*	0	0	0	0	1	1
1994	18	8	0	26	0.4 :1	10	7	0	44,406	4,441	6	5	0	11
1993	211	185	6	402	0.9 :1	129	129	0	614,789	4,766	75	77	0	152
*1995 Five Crooked River Jacks and 1 Red River Jack spawned with 1 Red River female														
Adults returning to Crooked River and Red River weirs were combined into one South Fork stock starting in 1997														
South Fork Satellite—Red River and Crooked River Combined														
1999	8	8	140	156	18.5 :1	6	21	0	21,739	3,623	2	2	75	79
1998	113	140	2	367	1.3 :1	84	118	0	330,054	3,929	ND	ND	ND	115
1997	708	602	4	1,314	0.9 :1	562	494	ND	1,819,914	3,238	97	86	0	183

Table 2. Continued.

	Returns					Spawned					Released			
	Female	Male	Jack	Total	Sex Ratio M:F	Female	Male	Jack	Green Egg Take	Fecundity	Female	Male	Jack	Total
Powell Satellite (Clearwater Fish Hatchery)														
1999	33	31	124	188	4.7 :1	27	87	0	126,815	4,697	2	1	5	8
1998[a]	248	266	1	541	1.1 :1	226	235	0	897,993	3,973	ND	ND	ND	43
1997	361	355	2	718	1.0 :1	292	238	0	948,387	3,248	55	60	0	115
1996	70	71	45	186	1.7 :1	66	66	45	275,883	4,180	4	0	0	5
1995	1	1	12	14	13.0 :1	1	1	7	5,259	5,259	0	0	0	0
1994	55	30	1	86	0.6 :1	54	29	0	252,045	4,668	0	0	0	0
1993	242	250	8	500	1.1 :1	203	207	0	936,572	4,614	15	25	0	40

[a] totals include 7 unknown sex 4-year-olds and 19 unknown sex 5-year-olds.

Dworshak National Fish Hatchery														
1999	ND	ND	ND	800	ND :1	63	ND	ND	ND	ND	ND	ND	ND	ND
1998	ND	ND	ND	915	ND :1	434	ND	ND	ND	ND	ND	ND	ND	ND
1997	ND	ND	ND	3,150	ND :1	542	ND	ND	ND	ND	ND	ND	ND	ND
1996	ND	ND	ND	963	ND :1	338	ND	ND	ND	ND	ND	ND	ND	ND
1995	ND	ND	ND	125	ND :1	21	ND	ND	ND	ND	ND	ND	ND	ND
1994	ND	ND	ND	74	ND :1	31	ND	ND	ND	ND	ND	ND	ND	ND
1993	ND	ND	ND	823	ND :1	435	ND	ND	ND	ND	ND	ND	ND	ND

Dworshak totals from Appendix A, Adult Spring Chinook Salmon returns to Dworshak and Kooskia National Fish Hatcheries in 2004 and Prognosis for 2005, Table 3.

Rapid River Fish Hatchery														
1999[a]	147	84	640	871	4.9 :1	137	ND	ND	603,678	4,406	1	6	1	583
1998	937	689	7	1,633	0.7 :1	770	ND	ND	3,409,130	4,427	14	28	0	42
1997	ND	ND	ND	10,773	ND :1	766	ND	ND	3,263,573	4,261	ND	ND	ND	7231[b]
1996	310	351	777	1,496	3.6 :1	318	ND	ND	1,132,439	3,561	ND	ND	26	84
1995	29	44	60	133	3.6 :1	22	ND	ND	82,973	3,772	0	4	0	4
1994	128	156	6	290	1.3 :1	103	ND	ND	435,441	4,228	9	14	2	25
1993	2,810	2,331	21	5,162	0.8 :1	1,587	ND	ND	6,491,501	4,090	360	330	4	694

The Hells Canyon trapped fish were combined with Rapid River's broodstock this year. All numbers are a percentage of the total, from Oxbow BYR.

[a] Spawned total includes 22 Oxbow transfers to Rapid River and 575 given to Nez Perce Tribe.

[b] Released total includes 1725 killed, 778 outplants, 101 to SFH, 1501 ponded then outplanted. In addition, 5,510 were marked and returned to the Little Salmon River to re-enter the sport fishery. After the marked fish were released, 2,310 were recaptured, including 312 that returned to the trap more than once. 253 wild Chinook were also released.

Oxbow Fish Hatchery														
1999	4	3	72	79	18.8 :1	1	ND	ND	4,406	4,406	2	1	50	53[a]
1998	33	34	0	74	1.0 :1	19	ND	ND	95,474	5,025	ND	ND	ND	7
1997	506	437	1	944	0.9 :1	372	ND	ND	1,209,000	3,250	ND	ND	ND	ND
1996	13	11	54	78	5.0 :1	11	ND	ND	39,171	3,561	ND	ND	ND	ND
1995	14	21	1	36	1.6 :1	13	ND	ND	49,029	3,771	0	0	0	0
1994	16	12	1	29	0.8 :1	13	ND	ND	54,808	4,216	0	0	0	0
1993	197	232	2	431	1.2 :1	150	ND	ND	611,536	4,077	0	0	0	0

The Hells Canyon trapped fish were combined with Rapid River's broodstock this year. All numbers are a percentage of the total, from Oxbow BYR.

[a] Released total includes 44 jacks given to the Nez Perce Tribe.

Pahsimeroi Fish Hatchery														
1999	156	132	89	377	1.4 :1	79	71	35	371,354	4,701	64	59	54	177
1998	53	56	18	127	1.4 :1	13	23	7	74,105	5,700	36	33	11	80
1997	63	81	3	147	1.3 :1	32	40	0	171,836	5,370	29	40	3	72
1996	31	49	9	89	1.9 :1	18	15	5	85,660	4,759	13	34	4	51
1995	47	26	7	80	0.7 :1	35	15	2	157,938	4,513	11	11	5	27
1994	16	11	9	36	1.3 :1	0	0	0	0	0	16	11	9	36
1993	90	66	13	169	0.9 :1	29	22	4	167,200	5,766	61	62	13	136

Note: spawned males includes those held for spawning, no mention if this is the number actually spawned.
Note: Some releases could include donations.

Table 3. Snake River mean daily flow (kcfs) and spill (kcfs) at Lower Granite Dam during the "peak" and "extended." Chinook salmon smolt migration periods, 1977-2001. The migration periods are as defined by Petrosky (1991).

Year	Peak Flow (4/15 to 5/5)	Extended Flow (4/20 to 5/30)	Peak Spill (4/15 to 5/5)	Extended Spill (4/20 to 5/30)
1999	109.1	111.8	36.8	41.1
1998	81.4	123.9	17.3	37.5
1997	149.1	169.9	43.6	57.0
1996	111.9	124.4	37.1	44.4
1995	72.1	97.2	2.6	14.0
1994	64.1	75.9	0.0	12.0
1993	69.8	114.0	0.0	19.7
1992	54.8	57.3	0.0	0.0
1991	44.0	70.8	0.0	0.3
1990	63.8	66.4	0.0	0.0
1989	94.1	87.2	0.0	0.0
1988	55.0	64.1	0.0	0.0
1987	57.7	62.3	0.0	0.0
1986	93.4	105.7	0.1	4.6
1985	86.9	87.2	0.7	1.5
1984	122.8	146.1	36.2	42.9
1983	85.6	111.3	22.1	19.3
1982	116.7	131.6	24.2	32.4
1981	76.2	86.7	9.4	7.1
1980	89.9	103.1	0.0	0.0
1979	64.9	90.0	0.0	3.4
1978	85.4	95.8	10.3	7.7
1977	39.1	40.2	0.0	0.0

Table 4. Total adult and jack Chinook salmon returning to Idaho hatcheries, 1984-2001. (LSRCP = Lower Snake River Compensation Plan; IPC = Idaho Power Company.) Powell, Red River, and Crooked River are satellite facilities of Clearwater Fish Hatchery.

	LSRCP Spring Chinook							IPC Spring Chinook			Total	LSRCP Summer	IPC Summer	Total
Year	Sawtooth	East Fork	Red River	Crooked River	Powell	Dworshak	Total	Rapid River	Oxbow	Total	Spring Chinook	McCall	Pahsimeroi	Summer Chinook
2001	2,103	0	1,333	2,013	2,344	4,018	11,811	13,169	0	13,169	24,980	10,922	1,097	12,019
2000	986	0	315	1,157	1,602	3,202	7,262	4,905	1,174	6,079	13,341	8,583	459	9,042
1999	196	0	31	125	188	800	1,340	871	79	950	2,290	1,961	377	2,338
1998	153	0	90	277	541	915	1,976	1,633	74	1,707	3,683	974	127	1,101
1997	254	7	280	1,034	718	3,150	5,443	10,773	944	11,717	17,160	3,659	147	3,806
1996	156	10	62	299	186	963	1,676	1,496	78	1,574	3,250	1,199	89	1,288
1995	37	0	4	6	14	125	186	133	36	169	355	307	80	387
1994	96	15	31	26	86	74	328	290	29	319	647	527	36	563
1993	587	90	139	402	500	823	2,541	5,162	431	5,593	8,134	2,703	169	2,872
1992	387	65	228	228	270	370	1,548	2,776	934	3,710	5,258	2,848	131	2,979
1991	566	62	16	20	33	165	862	2,066	62	2,128	2,990	1,212	138	1,350
1990	1,488	145	53	29	179	2,042	3,936	2,744	30	2,774	6,710	969	460	1,429

Dworshak totals from Appendix A Adult Spring Chinook Salmon returns to Dworshak and Kooskia National fish hatcheries in 2004 and prognosis for 2005, Table 3.
East Fork Trap was not in operation from 1997 to 2001.

Table 5. Hatchery-origin only adult and jack Chinook salmon returning to Idaho hatcheries, 1984-2001. (LSRCP = Lower Snake River Compensation Plan; IPC = Idaho Power Company.) Powell, Red River, and Crooked River are satellite facilities of Clearwater Fish Hatchery.

	LSRCP Spring Chinook							IPC Spring Chinook			Total	LSRCP Summer	IPC Summer	Total
Year	Sawtooth	East Fork	Red River	Crooked River	Powell	Dworshak	Total	Rapid River	Oxbow	Total	Spring Chinook	McCall	Pahsimeroi	Summer Chinook
2001	1,427	0	1,080	1,636	2,125	ND	6,268	12,770	0	12,770	19,038	9,144	851	9,995
2000	451	0	282	887	1,340	ND	2,960	4,799	1,159	5,958	8,918	7,864	364	8,228
1999	75	0	7	70	180	ND	332	863	70	933	1,265	1,670	285	1,955
1998	26	0	54	198	498	ND	776	1,591	66	1,657	2,433	822	52	874
1997	99	1	223	908	603	ND	1,834	10,520	912	11,432	13,266	3,402	71	3,473
1996	51	1	45	236	181	ND	514	1,412	60	1,472	1,986	1,102	40	1,142
1995	19	0	2	5	14	ND	40	129	36	165	205	216	65	281
1994	13	0	16	15	86	ND	130	265	29	294	424	375	18	393
1993	164	25	48	200	500	ND	937	4,468	431	4,899	5,836	1,109	55	1,164
1992	245	25	202	22	270	ND	764	2,466	934	3,400	4,164	1,253	88	1,341
1991	328	19	9	14	11	ND	381	1,913	62	1,975	2,356	924	62	986
1990	873	57	38	16	17	ND	1,001	2,606	30	2,606	3,607	654	311	965

1990 to 1994 Oxbow totals unclear of origin.

Table 6. Wild- or natural-origin only adult and jack Chinook salmon returning to Idaho hatcheries, 1984-2001. (LSRCP = Lower Snake River Compensation Plan; IPC = Idaho Power Company.) Powell, Red River, and Crooked River are satellite facilities of Clearwater Fish Hatchery.

	LSRCP Spring Chinook							IPC Spring Chinook			Total	LSRCP Summer	IPC Summer	Total
Year	Sawtooth	East Fork	Red River	Crooked River	Powell	Dworshak	Total	Rapid River	Oxbow	Total	Spring Chinook	McCall	Pahsimeroi	Summer Chinook
2001	676	ND	253	377	219	ND	1,525	399	0	399	1,924	1,778	246	2,024
2000	535	ND	33	270	262	ND	1,100	106	15	121	1,221	719	95	814
1999	121	ND	24	55	8	ND	208	8	9	17	225	291	92	383
1998	127	ND	36	79	43	ND	285	42	8	50	335	152	75	227
1997	155	6	57	126	115	ND	459	253	32	285	744	257	76	333
1996	105	9	17	63	5	ND	199	84	18	102	301	97	49	146
1995	18	0	2	1	0	ND	21	4	0	4	25	91	15	106
1994	83	15	15	11	0	ND	124	25	0	25	149	152	18	170
1993	423	65	91	202	0	ND	781	694	0	694	1,475	1,594	114	1,708
1992	142	40	26	206	0	ND	414	310	0	310	724	1,595	43	1,638
1991	238	43	7	6	22	ND	316	153	0	153	469	288	76	364
1990	615	88	15	13	162	ND	893	138	0	138	1,031	315	149	464

1990 to 1994 Oxbow totals unclear of origin.

Table 7. Age composition of 1993 through 1999 spring and summer Chinook salmon (wild-, natural-, hatchery-origin) returns to Idaho hatchery racks. Summaries are taken from hatchery run reports except where noted.

	Males							Females							Males and Females						
	3		4		5			3		4		5			3		4		5		
Year	No.	%	No.	%	No.	%	TOTAL	No.	%	No.	%	No.	%	TOTAL	No.	%	No.	%	No.	%	TOTAL
McCall Fish Hatchery																					
1999	743	37.9	454	23.2	163	8.3	**1,360**	1	0.1	517	26.4	83	4.2	**601**	744	37.9	971	49.5	246	12.5	**1,961**
1998	76	7.8	124	12.7	276	28.3	**476**	0	0.0	219	22.5	279	28.6	**498**	76	7.8	343	35.2	555	57.0	**974**
1997	45	1.2	1,903	52.0	113	3.1	**2,061**	0	0.0	1,545	42.2	53	1.4	**1,598**	45	1.2	3,448	94.2	166	4.5	**3,659**
1996	737	61.5	266	22.2	18	1.5	**1,021**	0	0.0	160	13.3	18	1.5	**178**	737	61.5	426	35.5	36	3.0	**1,199**
1995	101	32.9	88	28.7	19	6.2	**208**	0	0.0	91	29.6	8	2.6	**99**	101	32.9	179	58.3	27	8.8	**307**
1994	70	13.3	43	8.2	161	30.6	**274**	0	0.0	115	21.8	138	26.2	**253**	70	13.3	158	30.0	299	56.7	**527**
1993	28	1.0	599	22.2	589	21.8	**1,216**	0	0.0	764	28.3	723	26.7	**1,487**	28	1.0	1,363	50.4	1,312	48.5	**2,703**
Sawtooth Fish Hatchery																					
1999	79	40.3	57	29.1	25	12.8	**161**	0	0.0	21	10.7	14	7.1	**35**	79	40.3	78	39.8	39	19.9	**196**
1998	4	2.6	17	11.1	55	35.9	**76**	0	0.0	16	10.5	61	39.9	**77**	4	2.6	33	21.6	116	75.8	**153**
1997	9	3.5	88	34.6	56	22.0	**153**	1	0.4	60	23.6	40	15.7	**101**	10	3.9	148	58.3	96	37.8	**254**
1996	27	17.3	74	47.4	17	10.9	**118**	0	0.0	27	17.3	11	7.1	**38**	27	17.3	101	64.7	28	17.9	**156**
1995	16	43.2	13	35.1	4	10.8	**33**	0	0.0	2	5.4	2	5.4	**4**	16	43.2	15	40.5	6	16.2	**37**
1994	6	6.3	36	37.5	14	14.6	**56**	0	0.0	27	28.1	13	13.5	**40**	6	6.3	63	65.6	27	28.1	**96**
1993	29	4.9	45	7.7	233	39.7	**307**	0	0.0	33	5.6	247	42.1	**280**	29	4.9	78	13.3	480	81.8	**587**
East Fork																					
1999	TRAP NOT OPERATED																				
1998	TRAP NOT OPERATED																				
1997	0	0.0	5	71.4	0	0.0	**5**	0	0.0	2	28.6	0	0.0	**2**	0	0.0	7	100.0	0	0.0	**7**
1996	3	30.0	5	50.0	0	0.0	**8**	0	0.0	2	20.0	0	0.0	**2**	3	30.0	7	70.0	0	0.0	**10**
1995	0	0.0	0	0.0	0	0.0	**0**	0	0.0	0	0.0	0	0.0	**0**	0	0.0	0	0.0	0	0.0	**0**
1994	0	0.0	2	13.3	9	60.0	**11**	0	0.0	0	0.0	4	26.7	**4**	0	0.0	2	13.3	13	86.7	**15**
1993	5	5.6	13	14.4	39	43.3	**57**	1	1.1	6	6.7	26	28.9	**33**	6	6.7	19	21.1	65	72.2	**90**
Red River Satellite (Clearwater Fish Hatchery)																					
1996	9	14.5	39	62.9	0	0.0	**48**	0	0.0	14	22.6	0	0.0	**14**	9	14.5	53	85.5	0	0.0	**62**
1995	2	50.0	0	0.0	0	0.0	**2**	1	25.0	0	0.0	1	25.0	**2**	3	75.0	0	0.0	1	25.0	**4**
1994	0	0.0	9	29.0	9	29.0	**18**	0	0.0	9	29.0	4	12.9	**13**	0	0.0	18	58.1	13	41.9	**31**
1993	1	0.7	48	34.5	25	18.0	**74**	0	0.0	51	36.7	14	10.1	**65**	1	0.7	99	71.2	39	28.1	**139**
Crooked River Satellite (Clearwater Fish Hatchery)																					
1996	92	30.8	112	37.5	1	0.3	**205**	0	0.0	94	31.4	0	0.0	**94**	92	30.8	206	68.9	1	0.3	**299**
1995	6	100.0	0	0.0	0	0.0	**6**	0	0.0	0	0.0	0	0.0	**0**	6	100.0	0	0.0	0	0.0	**6**
1994	0	0.0	2	7.7	6	23.1	**8**	1	3.8	13	50.0	4	15.4	**18**	1	3.8	15	57.7	10	38.5	**26**
1993	6	1.5	50	12.4	135	33.6	**191**	1	0.2	69	17.2	141	35.1	**211**	7	1.7	119	29.6	276	68.7	**402**

Table 7. Continued.

	Males							Females							Males and Females						
	3		4		5			3		4		5			3		4		5		
Year	No.	%	No.	%	No.	%	TOTAL	No.	%	No.	%	No.	%	TOTAL	No.	%	No.	%	No.	%	TOTAL
South Fork Satellite—Red River and Crooked River Combined																					
1999	140	89.7	3	1.9	5	3.2	**148**	0	0.0	6	3.8	2	1.3	**8**	140	89.7	9	5.8	7	4.5	**156**
1998	2	0.5	8	2.2	132	36.0	**142**	0	0.0	29	7.9	84	22.9	**113**	2	0.5	37	10.1	216	58.9	**367**
1997	4	0.3	506	38.5	96	7.3	**606**	2	0.2	684	52.1	22	1.7	**708**	6	0.5	1,190	90.6	118	9.0	**1,314**
1998 total includes 21 unknown sex 4-year-olds and 91 unknown sex 5-year-olds.																					
Powell Satellite (Clearwater Fish Hatchery)																					
1999	124	66.0	3	1.6	28	14.9	**155**	0	0.0	8	4.3	25	13.3	**33**	124	66.0	11	5.9	53	28.2	**188**
1998	1	0.2	75	13.9	191	35.3	**267**	0	0.0	106	19.6	142	26.2	**248**	1	0.2	181	33.5	333	61.6	**541**
1997	2	0.3	207	28.8	98	13.6	**357**	0	0.0	294	40.9	17	2.4	**361**	2	0.3	501	69.8	115	16.0	**718**
1996	45	24.2	71	38.2	0	0.0	**116**	0	0.0	70	37.6	0	0.0	**70**	45	24.2	141	75.8	0	0.0	**186**
1995	12	85.7	1	7.1	0	0.0	**13**	0	0.0	0	0.0	1	7.1	**1**	12	85.7	1	7.1	1	7.1	**14**
1994	1	1.2	10	11.6	20	23.3	**31**	0	0.0	18	20.9	37	43.0	**55**	1	1.2	28	32.6	57	66.3	**86**
1993	8	1.6	82	16.4	168	33.6	**258**	0	0.0	122	24.4	120	24.0	**242**	8	1.6	204	40.8	288	57.6	**500**
1998 total includes 7 unknown sex 4 year olds and 19 unknown sex 5 year olds.																					
1997 total includes 50 unknown age adult females and 50 unknown age adult males.																					
Dworshak National Fish Hatchery																					
1999	ND	ND	ND	ND	ND	ND	**ND**	ND	ND	ND	ND	ND	ND	**ND**	670	83.8	78	9.8	52	6.5	**800**
1998	ND	ND	ND	ND	ND	ND	**ND**	ND	ND	ND	ND	ND	ND	**ND**	11	1.2	176	19.2	728	79.6	915
1997	ND	ND	ND	ND	ND	ND	**ND**	ND	ND	ND	ND	ND	ND	**ND**	12	0.4	2,380	75.6	740	23.5	3,150
1996	ND	ND	ND	ND	ND	ND	**ND**	ND	ND	ND	ND	ND	ND	**ND**	275	28.6	663	68.8	25	2.6	963
1995	ND	ND	ND	ND	ND	ND	**ND**	ND	ND	ND	ND	ND	ND	**ND**	83	66.4	36	28.8	6	4.8	**125**
1994	ND	ND	ND	ND	ND	ND	**ND**	ND	ND	ND	ND	ND	ND	**ND**	3	4.1	30	40.5	41	55.4	**74**
1993	ND	ND	ND	ND	ND	ND	**ND**	ND	ND	ND	ND	ND	ND	**ND**	9	1.1	452	54.9	359	43.6	823
Dworshak totals from Appendix A, Adult Spring Chinook Salmon returns to Dworshak and Kooskia National fish hatcheries in 2004 and prognosis for 2005, Table 3.																					
Rapid River Fish Hatchery																					
1999	ND	ND	ND	ND	ND	ND	**724**	ND	ND	ND	ND	ND	ND	**147**	640	73.5	158	18.1	73	8.4	**871**
1998	ND	ND	ND	ND	ND	ND	**696**	ND	ND	ND	ND	ND	ND	**937**	7	0.4	270	16.5	1,356	83.0	**1,633**
1997	ND	ND	ND	ND	ND	ND	**ND**	ND	ND	ND	ND	ND	ND	**ND**	10	0.1	10,580	98.2	183	1.7	**10,773**
1996	ND	ND	ND	ND	ND	ND	**310**	ND	ND	ND	ND	ND	ND	**1,128**	777	51.9	712	47.6	7	0.5	**1,496**
1995	ND	ND	ND	ND	ND	ND	**104**	ND	ND	ND	ND	ND	ND	**29**	59	44.4	64	48.1	10	7.5	**133**
1994	ND	ND	ND	ND	ND	ND	**ND**	ND	ND	ND	ND	ND	ND	**ND**	6	2.1	148	51.0	136	46.9	**290**
1993	ND	ND	ND	ND	ND	ND	**ND**	ND	ND	ND	ND	ND	ND	**ND**	21	0.4	2,801	54.3	2,340	45.3	**5,162**
Sex determination cannot be made at trapping.																					
Pahsimeroi Fish Hatchery																					
1999	89	23.6	120	31.8	12	3.2	**221**	0	0.0	154	40.8	2	0.5	**156**	89	23.6	274	72.7	14	3.7	**377**
1998	18	14.2	8	6.3	48	37.8	**74**	0	0.0	12	9.4	41	32.3	**53**	18	14.2	20	15.7	89	70.1	**127**
1997	3	2.0	46	31.3	35	23.8	**84**	0	0.0	47	32.0	16	10.9	**63**	3	2.0	93	63.3	51	34.7	**147**
1996	12	13.5	33	37.1	13	14.6	**58**	0	0.0	23	25.8	8	9.0	**31**	12	13.5	56	62.9	21	23.6	**89**
1995	7	8.8	20	25.0	6	7.5	**33**	0	0.0	31	38.8	16	20.0	**47**	7	8.8	51	63.8	22	27.5	**80**
1994	9	25.0	11	30.6	0	0.0	**20**	0	0.0	15	41.7	1	2.8	**16**	9	25.0	26	72.2	1	2.8	**36**
1993	13	7.7	12	7.1	54	32.0	**79**	0	0.0	25	14.8	65	38.5	**90**	13	7.7	37	21.9	119	70.4	**169**

Table 7. Continued.

	Males							Females							Males and Females						
	3		4		5			3		4		5			3		4		5		
Year	No.	%	No.	%	No.	%	TOTAL	No.	%	No.	%	No.	%	TOTAL	No.	%	No.	%	No.	%	TOTAL
Oxbow Fish Hatchery																					
1999	ND	ND	ND	ND	ND	ND	**ND**	ND	ND	ND	ND	ND	ND	**ND**	72	91.1	2	2.5	5	6.3	**79**
1998	ND	ND	ND	ND	ND	ND	**ND**	ND	ND	ND	ND	ND	ND	**ND**	0	0.0	13	17.6	61	82.4	**74**
1997	ND	ND	ND	ND	ND	ND	**438**	ND	ND	ND	ND	ND	ND	**506**	1	0.1	942	99.8	1	0.1	**944**
1996	ND	ND	ND	ND	ND	ND	**65**	ND	ND	ND	ND	ND	ND	**13**	54	69.2	19	24.4	5	6.4	**78**
1995	ND	ND	ND	ND	ND	ND	**22**	ND	ND	ND	ND	ND	ND	**14**	1	2.8	20	55.6	15	41.7	**36**
1994	ND	ND	ND	ND	ND	ND	**13**	ND	ND	ND	ND	ND	ND	**16**	1	3.4	9	31.0	19	65.5	**29**
1993	ND	ND	ND	ND	ND	ND	**234**	ND	ND	ND	ND	ND	ND	**197**	2	0.5	195	45.2	234	54.3	**431**

Sex determination cannot be made at trapping.

Table 8.1. Return vs. release numbers for adult McCall Hatchery Chinook salmon returns, 1990 to 1999. All numbers are taken from raw trapping data.

Release Year	Smolts Released[a]	3-year-old (% return)	4-year-old (% return)	5-year-old (% return)	Total (% return)
1999	1,182,610	2,988 0.25	7,353 0.62	1,442 0.12	11,783 1.00
1998	393,872	693 0.18	2,919 0.74	798 0.20	4,410 1.12
1997	238,647	64 0.03	650 0.27	186 0.08	900 0.38
1996	585,654	41 0.01	203 0.03	327 0.06	571 0.10
1995	1,074,598	694 0.06	2,864 0.27	555 0.05	4,113 0.38
1994	1,198,649	101 0.01	300 0.03	466 0.04	867 0.07
1993	605,800	70 0.01	179 0.03	48 0.01	297 0.05
1992	901,500	28 0.00	158 0.02	27 0.00	213 0.02
1991	708,600	206 0.03	1,363 0.19	299 0.04	1,868 0.26
1990	1,032,500	821 0.08	2,617 0.25	1,312 0.13	4,750 0.46

[a] Releases at hatchery only and does not include off-site releases.

Table 8.2.a. Return vs. release numbers for adult Sawtooth Hatchery Chinook salmon returns, 1990 to 1999.

Release Year	Smolts Released[a]	3-year-old (% return)	4-year-old (% return)	5-year-old (% return)	Total (% return)
1999	223,240	279	1,219 0.55	327 0.15	1,825 0.82
1998	43,161	60 0.14	135 0.31	32 0.07	227 0.53
1997	4,756	0 0.00	12 0.25	37 0.78	49 1.03
1996	25,006	0 0.00	3 0.01	3 0.01	6 0.02
1995	334,313	20 0.01	73 0.02	23 0.01	116 0.03
1994	213,830	8 0.00	24 0.01	26 0.01	58 0.03
1993	774,583	6 0.00	7 0.00	7 0.00	20 0.00
1992	1,273,400	29 0.00	63 0.00	4 0.00	96 0.01
1991	652,600	45 0.01	78 0.01	27 0.00	150 0.02
1990	1,895,600	68 0.00	496 0.03	480 0.03	1,044 0.06

[a] Releases at hatchery only and does not include off-site releases. Brood Year reports do not separate wild from hatchery fish. All numbers are taken from Brood Year reports.

Table 8.2.b. Return vs. release numbers for adult East Fork Hatchery Chinook salmon returns, 1990 to 1999. Hatchery and natural origin fish are combined for all years.

Release Year	Smolts Released[a]	3-year-old (% return)	4-year-old (% return)	5-year-old (% return)	Total (% return)	
1999	ND	0 0.00	0 0.00	0 0.00	0 0.00	Trap not operated
1998	ND	0 0.00	0 0.00	0 0.00	0 0.00	Trap not operated
1997	ND	0 0.00	0 0.00	0 0.00	0 0.00	Trap not operated
1996	ND	0 0.00	6 0.00	0 0.00	6 0.00	
1995	48,845	3 0.01	7 0.01	0 0.00	10 0.02	
1994	12,368	0 0.00	7 0.06	0 0.00	7 0.06	
1993	35,172	0 0.00	0 0.00	0 0.00	0 0.00	
1992	79,300	6 0.01	2 0.00	0 0.00	8 0.01	
1991	98,300	15 0.02	18 0.02	13 0.01	46 0.05	
1990	514,600	7 0.00	27 0.01	65 0.01	99 0.02	

[a] Releases at hatchery only and does not include off-site releases.

Table 8.3.a. Return vs. release numbers for adult Crooked River and Red River satellites Chinook salmon returns, 1990 to 1999. All adult recovery data for 1999-1994 are from George et al. (2006). Adult recovery data prior to that are taken from individual hatchery brood year reports, and likely include both hatchery and natural-origin adults. Release numbers only include full-term smolt releases.

Release Year	Smolts Released[a]	3-year-old (% return)	4-year-old (% return)	5-year-old (% return)	Total (% return)
1999	961,964	477 0.05	2,372 0.25	498 0.05	3,347 0.35
1998	257,114	137 0.05	718 0.28	167 0.06	1,022 0.40
1997	2,970	1 0.03	6 0.20	22 0.74	29 0.98
1996	61,073	4 0.01	47 0.08	5 0.01	56 0.09
1995	537,908	94 0.02	935 0.17	213 0.04	1,242 0.23
1994	273,766	6 0.00	241 0.09	59 0.02	306 0.11
1993	579,048	1 0.00	0 0.00	7 0.00	8 0.00
1992	296,012	8 0.00	33 0.01	1 0.00	42 0.01
1991	6,000	26 0.43	218 3.63	23 0.38	267 4.45
1990	574,207	3 0.00	416 0.07	315 0.05	734 0.13

[a] Releases at hatchery only and does not include off-site releases.

Table 8.3.b. Return vs. release numbers for adult Powell Satellite Chinook salmon returns, 1990 to 1999.

Release Year	Smolts Released[a]	3-year-old (% return)	4-year-old (% return)	5-year-old (% return)	Total (% return)
1999	334,482	305 0.09	1,749 0.52	202 0.06	2,256 0.67
1998	244,847	124 0.05	888 0.36	44 0.02	1,056 0.43
1997	3,513	1 0.03	11 0.31	92 2.62	104 2.96
1996	232,731	2 0.00	181 0.08	53 0.02	236 0.10
1995	290,417	45 0.02	501 0.17	333 0.11	879 0.30
1994	200,568	12 0.01	141 0.07	115 0.06	268 0.13
1993	602,107	1 0.00	1 0.00	0 0.00	2 0.00
1992	261,628	8 0.00	28 0.01	1 0.00	37 0.01
1991	7,800	6 0.08	204 2.62	57 0.73	267 3.42
1990	358,540	7 0.00	249 0.07	288 0.08	544 0.15

[a] Releases at hatchery only and does not include off-site releases. Brood Year reports do not separate wild from hatchery fish. All numbers are taken from Brood Year reports.

Table 8.4. Return vs. release numbers for adult Dworshak Hatchery Chinook salmon returns, 1990 to 1999.

Release Year	Smolts Released [a]	3-year-old (% return)	4-year-old (% return)	5-year-old (% return)	Total (% return)
1999	1,044,511	496 0.05	10,622 1.02	1,851 0.18	12,969 1.24
1998	973,400	670 0.07	7,443 0.76	2,452 0.25	10,565 1.09
1997	53,078	11 0.02	78 0.15	344 0.65	433 0.82
1996	102,903	12 0.01	176 0.17	52 0.05	240 0.23
1995	1,311,445	275 0.02	2,380 0.18	728 0.06	3,383 0.26
1994	1,278,273	83 0.01	663 0.05	740 0.06	1,486 0.12
1993	467,222	3 0.00	36 0.01	25 0.01	64 0.01
1992	959,369	9 0.00	30 0.00	6 0.00	45 0.00
1991	1,094,884	23 0.00	452 0.04	41 0.00	516 0.05
1990	1,251,247	16 0.00	286 0.02	359 0.03	661 0.05

[a] Releases at hatchery only and does not include off-site releases. All numbers taken from Dworshak report.

Table 8.5. Return vs. release numbers for adult Rapid River Hatchery Chinook salmon returns, 1990 to 1999.

Release Year	Smolts Released[a]	3-year-old (% return)	4-year-old (% return)	5-year-old (% return)	Total (% return)
1999	2,847,284	1,701 0.06	12,546 0.44	157 0.01	14,404 0.51
1998	896,170	639 0.07	3,086 0.34	96 0.01	3,821 0.43
1997	85,838	7 0.01	152 0.18	12 0.01	171 0.20
1996	379,167	10 0.00	263 0.07	72 0.02	345 0.09
1995	2,786,919	751 0.03	10,333 0.37	1,321 0.05	12,405 0.45
1994	2,547,642	59 0.00	659 0.03	177 0.01	895 0.04
1993	1,801,246	6 0.00	64 0.00	2 0.00	72 0.00
1992	2,615,500	21 0.00	148 0.01	10 0.00	179 0.01
1991	2,564,900	96 0.00	2,801 0.11	136 0.01	3,033 0.12
1990	2,770,400	238 0.01	2,209 0.08	2,340 0.08	4,787 0.17

[a] Releases at hatchery only and does not include off-site releases. 1990 Brood Year Report does not separate marked by age. All numbers taken from the Brood Year Reports.

Table 8.6. Return vs. release numbers for adult Pahsimeroi Hatchery Chinook salmon returns, 1990 to 1999. Data for 1999-1997 are taken from raw trapping data, while previous years are taken from hatchery brood year reports that include hatchery- and natural-origin adults.

Release Year	Smolts Released [a]	3-year-old (% return)	4-year-old (% return)	5-year-old (% return)	Total (% return)
1999	135,669	79 0.06	511 0.38	256 0.19	846 0.62
1998	65,648	85 0.13	253 0.39	308 0.47	646 0.98
1997	122,017	18 0.01	200 0.16	32 0.03	250 0.20
1996	0	0 0.00	0 0.00	0 0.00	0 0.00
1995	147,429	12 0.01	38 0.03	34 0.02	84 0.06
1994	130,510	7 0.01	56 0.04	32 0.02	95 0.07
1993	375,000	9 0.00	51 0.01	21 0.01	81 0.02
1992	605,900	13 0.00	26 0.00	22 0.00	61 0.00
1991	227,500	6 0.00	37 0.02	1 0.00	44 0.02
1990	1,058,000	20 0.00	98 0.01	119 0.01	237 0.02

[a] Releases at hatchery only and does not include off-site releases.

Table 8.7. Return vs. release numbers for adult Oxbow Hatchery Chinook salmon returns, 1990 to 1999.

Release Year	Smolts Released [a]	3-year-old (% return)	4-year-old (% return)	5-year-old (% return)	Total (% return)
1999	300,000	205 0.07	0 0.00	0 0.00	205 0.07
1998	304,096	72 0.02	930 0.31	0 0.00	1,002 0.33
1997	13,470	0 0.00	2 0.01	24 0.18	26 0.19
1996	67,818	1 0.00	13 0.02	5 0.01	19 0.03
1995	499,536	54 0.01	942 0.19	61 0.01	1,057 0.21
1994	380,504	1 0.00	19 0.00	1 0.00	21 0.01
1993	200,250	1 0.00	20 0.01	5 0.00	26 0.01
1992	500,500	2 0.00	9 0.00	15 0.00	26 0.01
1991	500,500	22 0.00	195 0.04	19 0.00	236 0.05
1990	551,200	40 0.01	894 0.16	234 0.04	1,168 0.21

[a] Releases at hatchery only and does not include off-site releases. Brood Year Reports from 1990 through 1995 are not broken down by hatchery vs. wild. All numbers are taken from Brood Year Reports.

Table 9. Smolt-to-adult rates for OTC and coded-wire-tagged Chinook salmon released from McCall Fish Hatchery for three brood years.

Brood Year	Group	Number Released	SAR
1988			
	OTC	523,250	0.50
	CWT	313,325	0.35
1989			
	OTC	353,771	0.18
	CWT	319,800	0.20
1990			
	OTC	450,750	0.004
	CWT	322,093	0.003

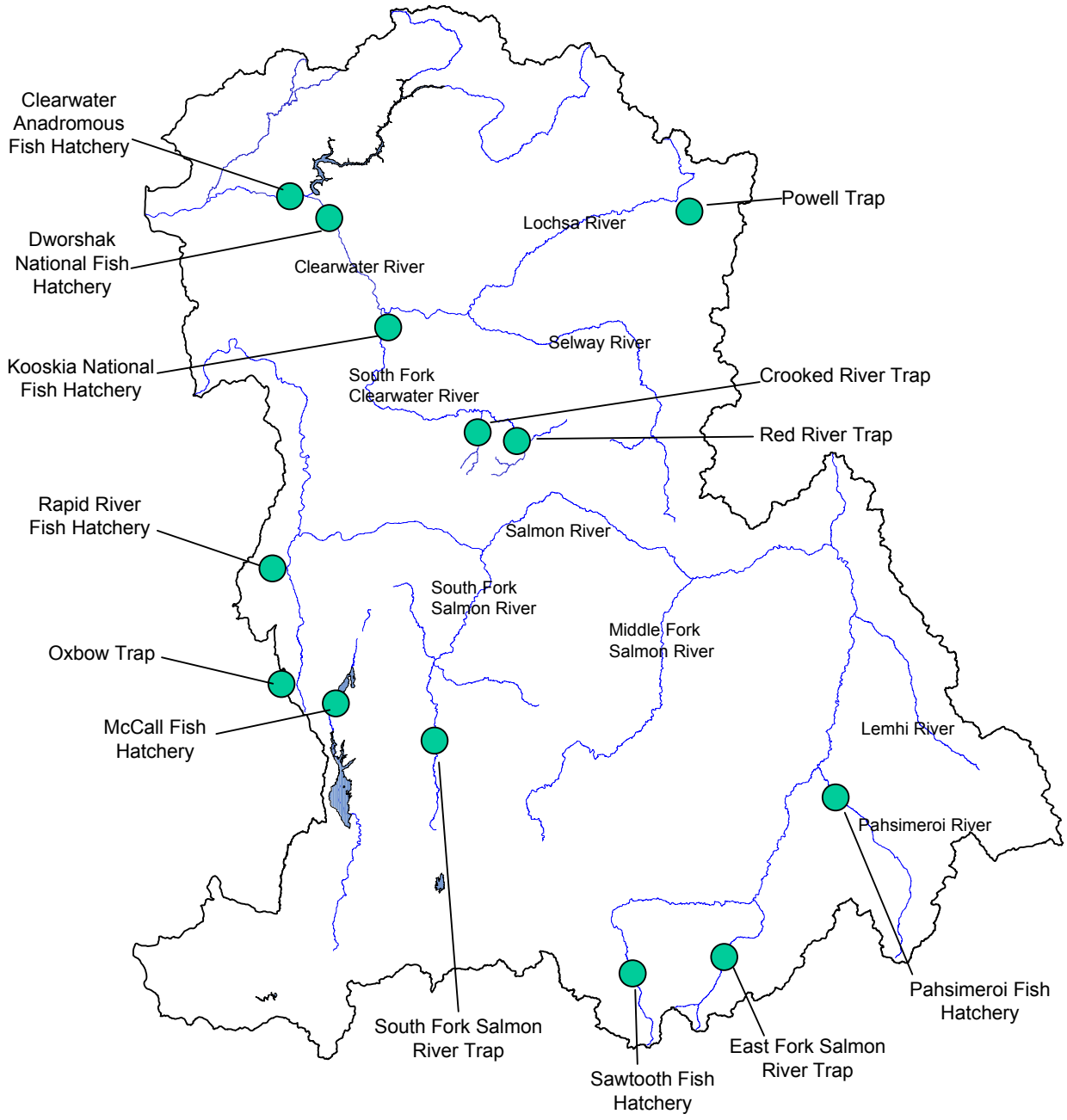

Figure 1. Locations of Chinook salmon hatcheries and trapping facilities in Idaho.

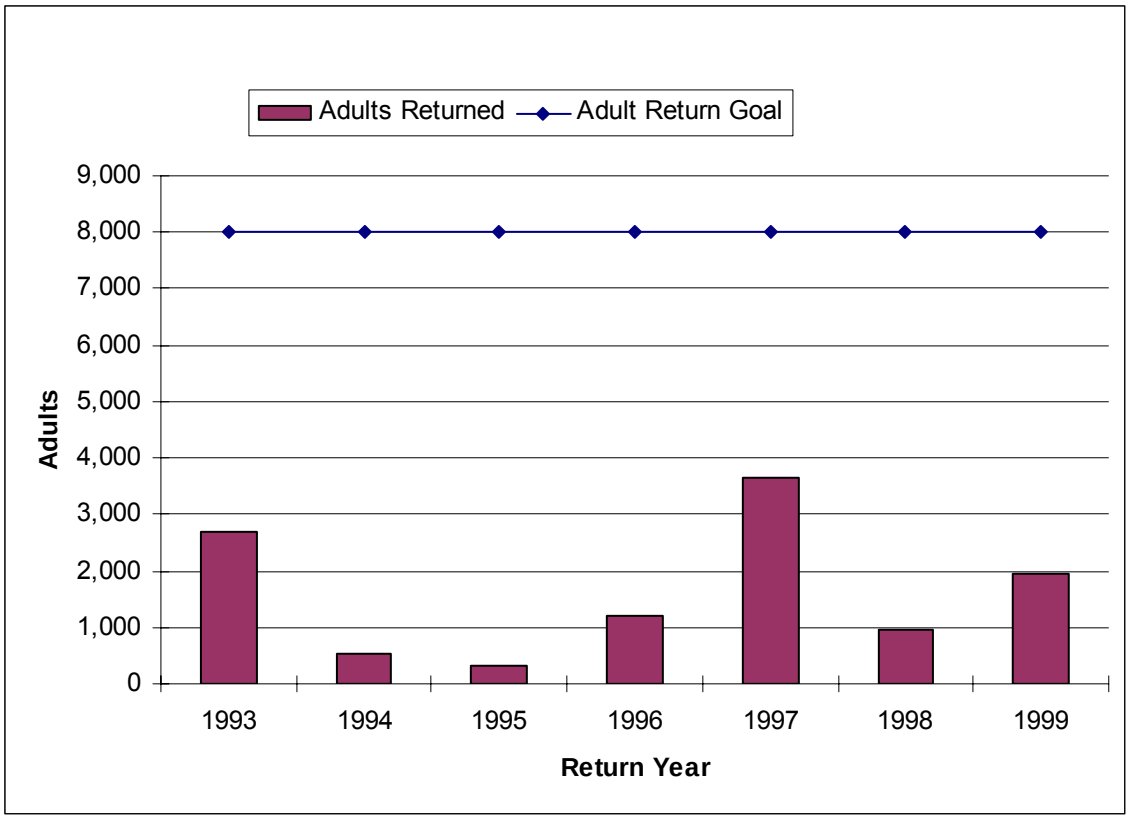

Figure 2. Total returns to McCall Fish Hatchery relative to the design target of 8,000 adult Chinook for releases in the period 1993-1999.

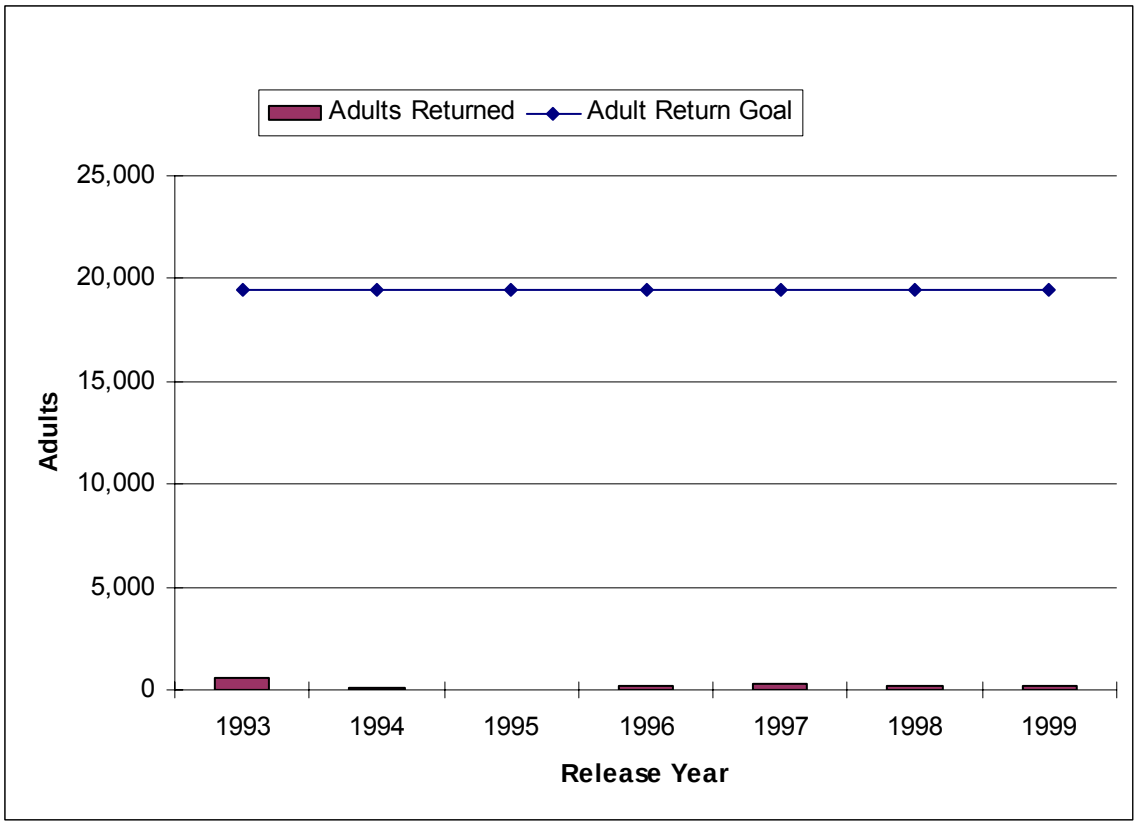

Figure 3. Total returns to Sawtooth Fish Hatchery relative to the design target of 19,445 adult Chinook for releases in the period 1993-1999.

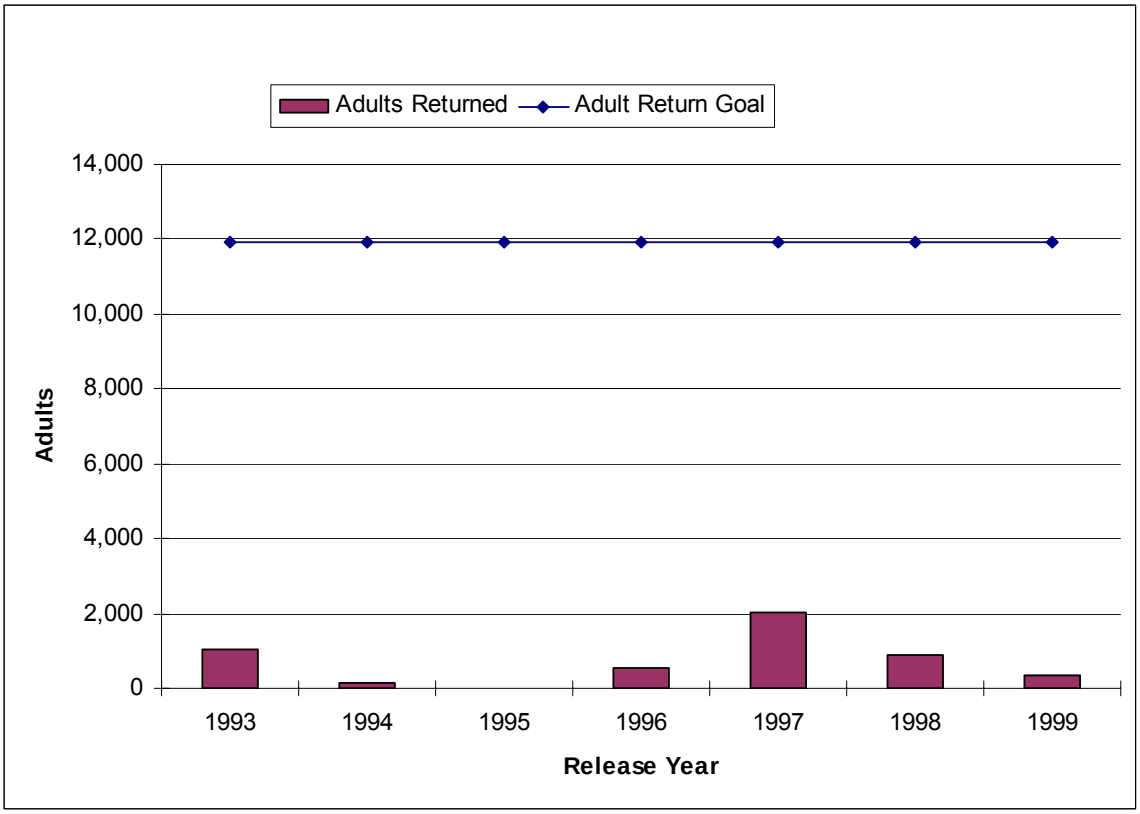

Figure 4. Total returns to Clearwater Fish Hatchery relative to the design target of 11,915 adult Chinook for releases in the period 1993-1999.

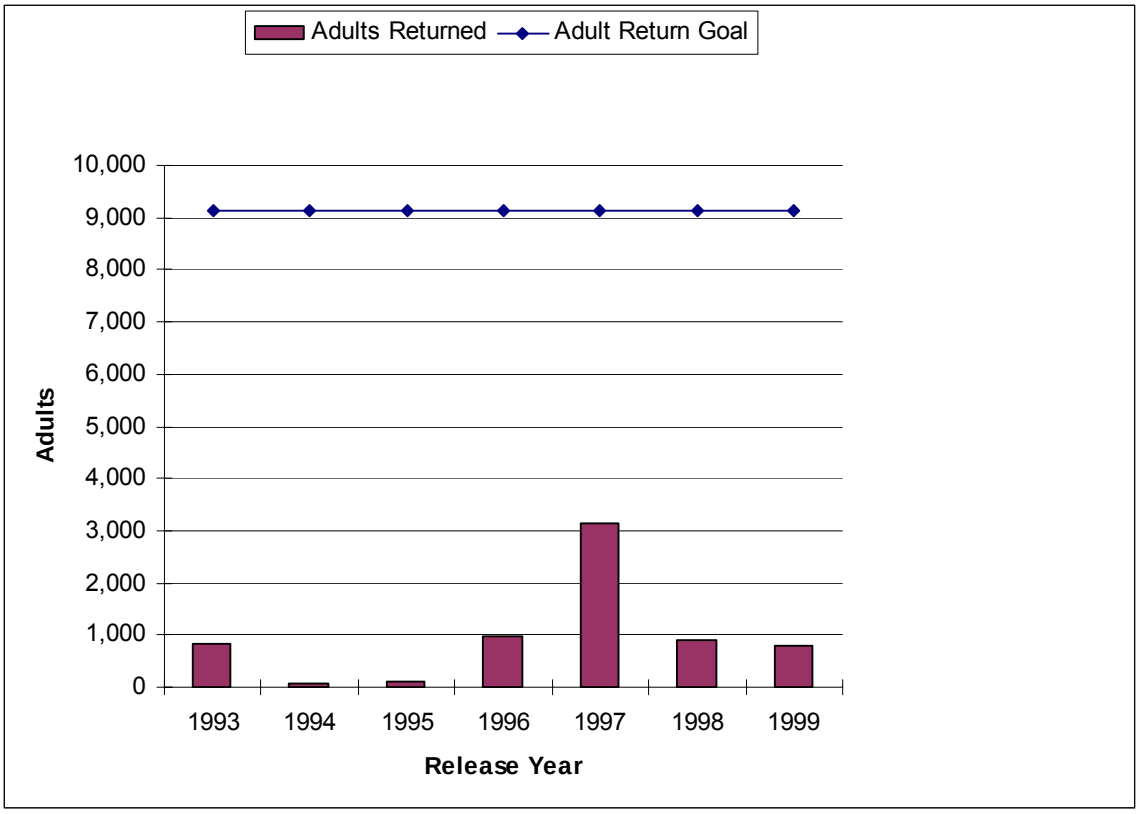

Figure 5. Total returns to Dworshak National Fish Hatchery relative to the design target of 9,135 adult Chinook for releases in the period 1993-1999.

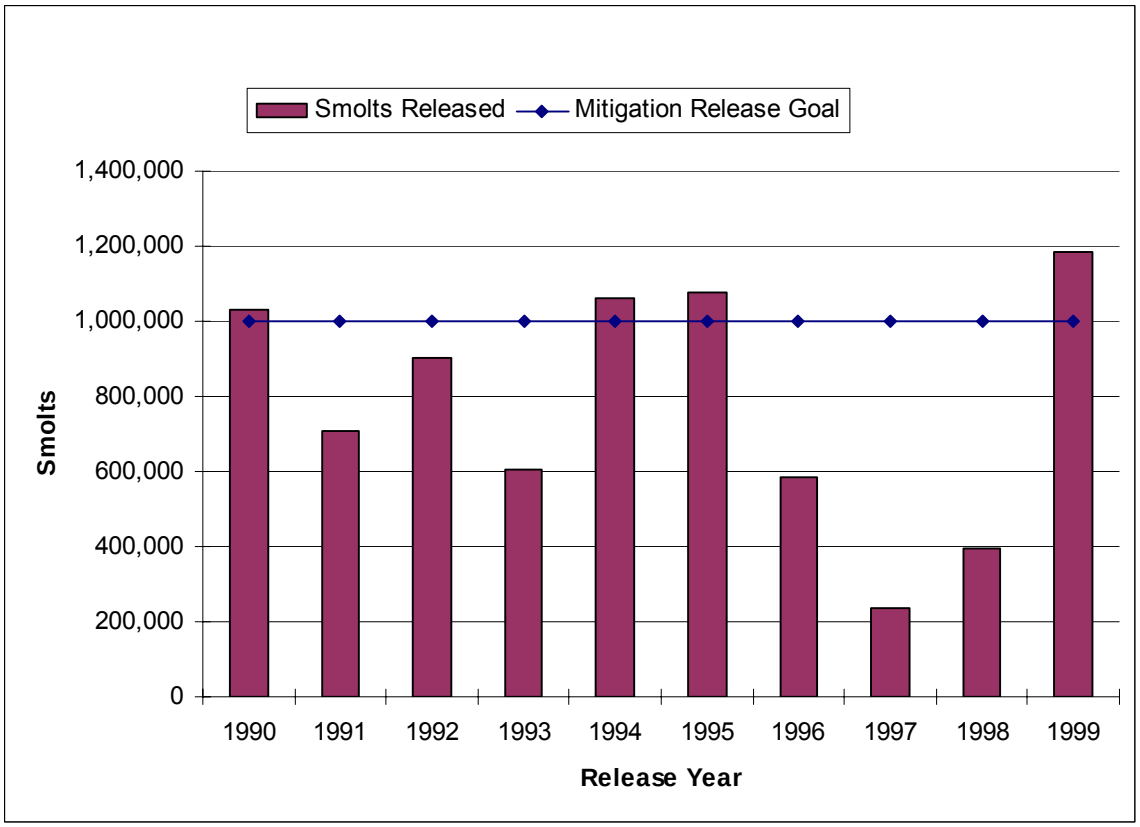

Figure 6. Number of smolts released by year versus the release target for McCall Fish Hatchery from 1990-1999.

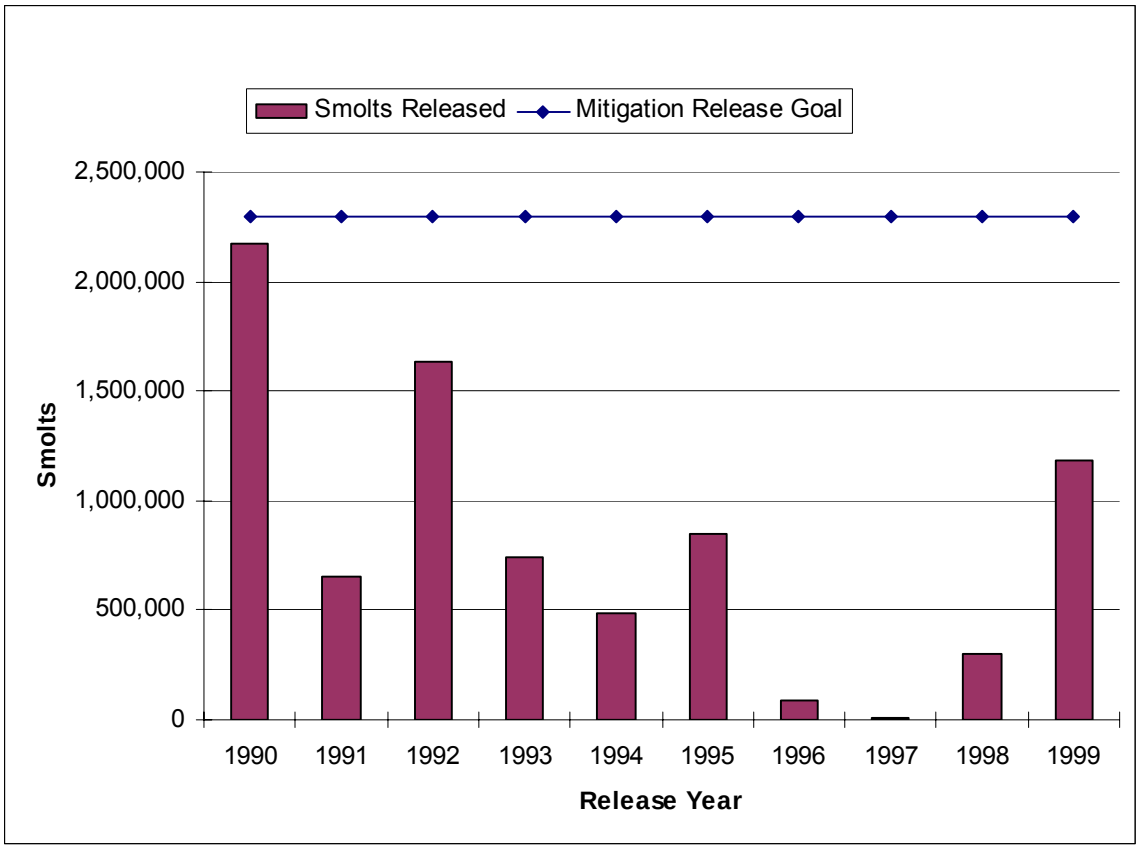

Figure 7. Number of smolts released by year versus the release target for Sawtooth Fish Hatchery from 1990-1999.

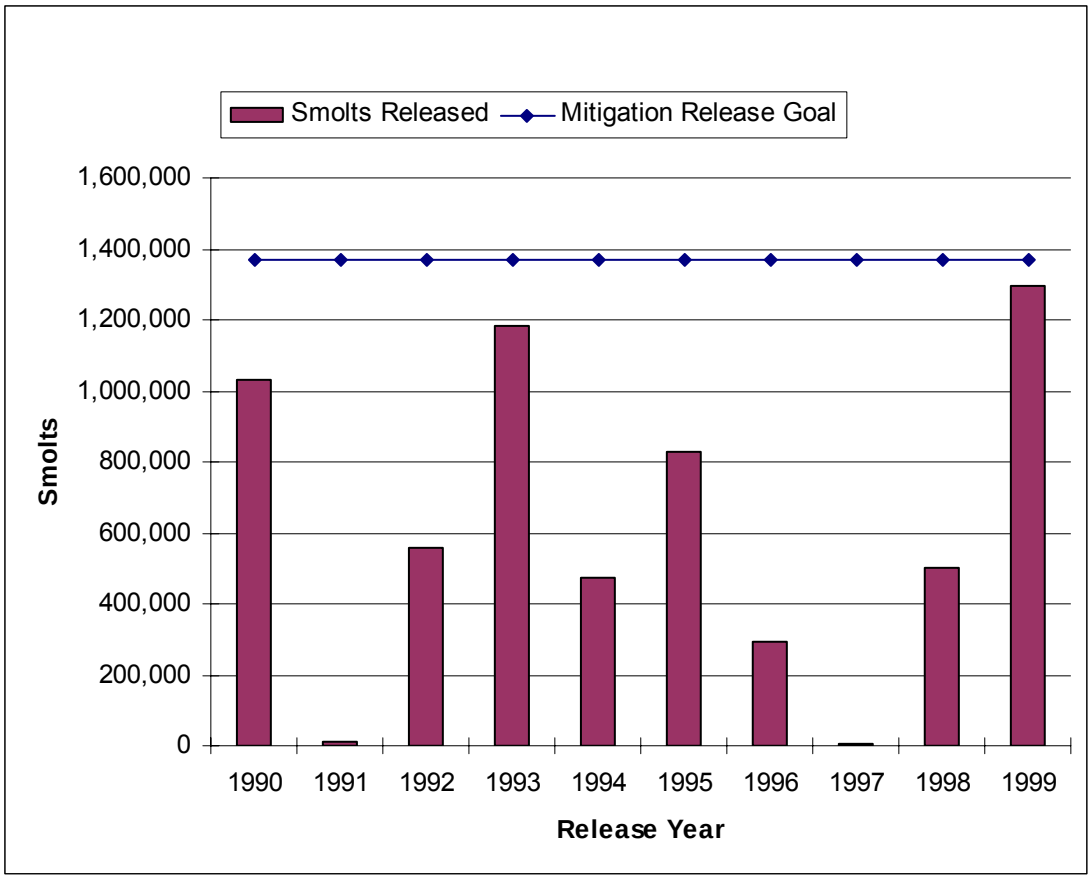

Figure 8. Number of smolts released by year versus the release target for Clearwater Fish Hatchery from 1990-1999.

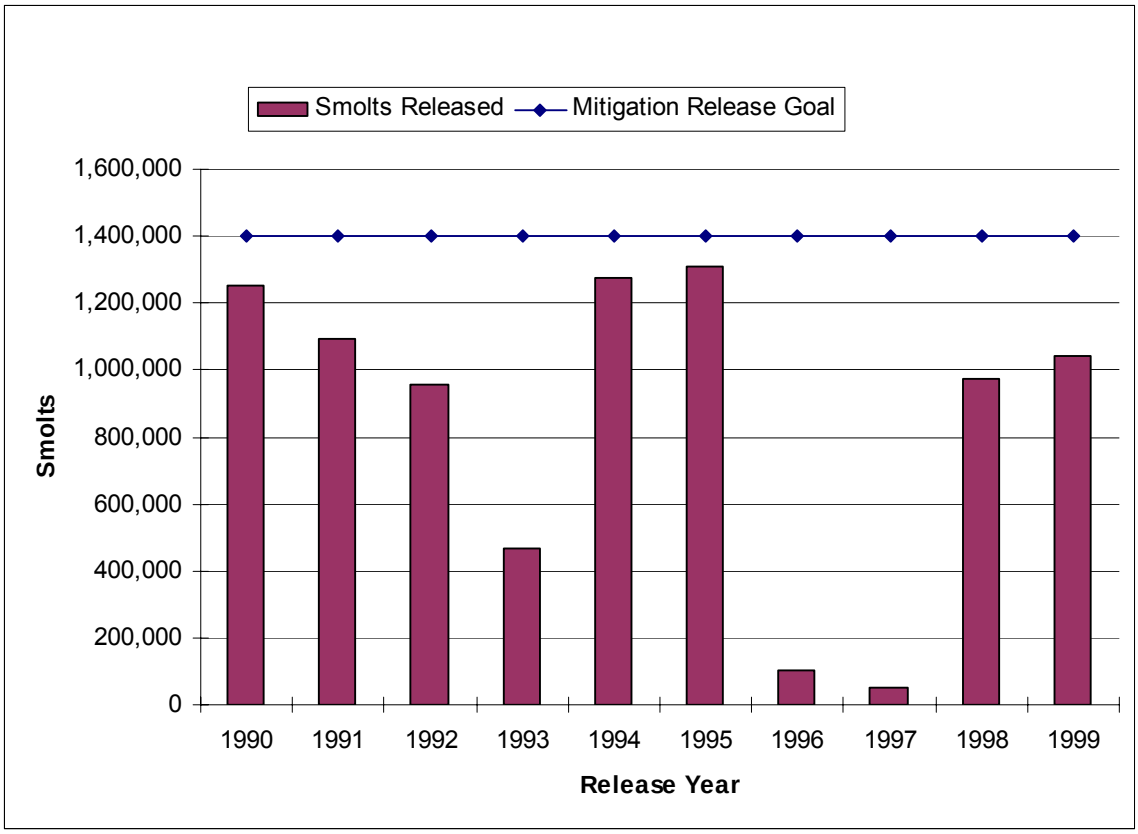

Figure 9. Number of smolts released by year versus the release target for Dworshak National Fish Hatchery from 1990-1999.

APPENDICES

Appendix A. Table 1a. Release data for McCall Fish Hatchery reared spring Chinook salmon released in year 1993. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
S Fk Salmon R@ Knox Bridge 4/21/1993-4/22/1993	S Fk Salmon	CWT,AD	103225	52,392	Supplementation, Mag Off
		CWT,AD	103226	52,965	
		CWT,AD	103227	54,451	
		AD	Shed Tags	4,942	
			Untagged	0	Supplementation, Mag Off
		PIT		None	
		Total:		**164,750**	
S Fk Salmon R@ Knox Bridge 4/3/1993-4/4/1993	S Fk Salmon	CWT,AD	103602	301,100	U.S. Canada
		AD	Shed Tags	3,700	
			Untagged	0	U.S. Canada
		PIT		3,500	
		Total:		**308,300**	
S Fk Salmon R@ Knox Bridge 4/21/1993-4/22/1993	S Fk Salmon	RV	Untagged	132,750	Supplementation
		PIT		None	
		Total:		**132,750**	
S Fk Salmon R@ Knox Bridge 4/9/1993	S Fk Salmon	PIT		504	Time Release Study
S Fk Salmon R@ Knox Bridge 4/22/1993	S Fk Salmon	PIT		500	Time Release Study
S Fk Salmon R@ Knox Bridge 5/5/1993	S Fk Salmon	PIT		509	Time Release Study
Total release for McCall in 1993			**607,313**		

Appendix A. Table 1b. Release data for McCall Fish Hatchery reared spring Chinook salmon released in year 1994. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
S Fork Salmon R@ Knox Bridge 4/9/1994-4/13/1994	S Fk Salmon	CWT,AD AD PIT **Total:**	104902 Shed Tags Untagged	327,603 0 0 3,000 **327,603**	U.S. Canada
S Fork Salmon R@ Knox Bridge 4/9/1994-4/13/1994	S Fk Salmon	AD PIT **Total:**	Untagged	496,621 None **496,621**	Identification
S Fork Salmon R@ Knox Bridge 4/9/1994-4/13/1994	S Fk Salmon	LV PIT **Total:**	Untagged	235,441 498 **235,939**	Supplementation
Buckhorn Creek: S Fork Salmon 7/21/1994—8/12/1994	S Fk Salmon	LV PIT **Total:**	Untagged	44,999 None **44,999**	Supplementation
S Fork Salmon R@ Knox Bridge 10/3/1994—10/3/1994	S Fk Salmon	LV PIT **Total:**	Untagged	140,172 None **140,172**	Supplementation
Cabin Creek: S Fork Salmon R 8/12/1994—8/12/1994	S Fk Salmon	LV PIT **Total:**	Untagged	51,163 None **51,163**	Supplementation
S Fork Salmon R@ Knox Bridge 4/12/1994	S Fk Salmon	PIT, AD, CWT		400	Time Release Study Treatment
S Fork Salmon R@ Knox Bridge 4/14/1994	S Fk Salmon	PIT, AD, CWT		400	Time Release Study Control
S Fork Salmon R@ Knox Bridge 4/24/1994	S Fk Salmon	PIT, AD, CWT		400	Time Release Study Control
S Fork Salmon R@ Knox Bridge 4/28/1994	S Fk Salmon	PIT, AD, CWT		400	Time Release Study Control
Total release for McCall in 1994			**1,298,097**		

Appendix A. Table 1c. Release data for McCall Fish Hatchery reared spring Chinook salmon released in year 1995. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
S Fork Salmon R@ Knox Bridge 4/6/1995—4/8/1995	S Fk Salmon	CWT,AD	103043	61,389	U.S. Canada Contribution
		CWT,AD	104918	55,146	
		CWT,AD	104919	53,362	
		CWT,AD	103042	61,907	
		CWT,AD	103041	63,812	
		CWT,AD	103040	62,633	
		CWT,AD	103039	60,567	
		AD	Untagged	339,489	U.S. Canada Contribution
		PIT		5,400	
		Total:		**763,705**	
S Fork Salmon R@ Knox Bridge 4/6/1995—4/8/1995	S Fk Salmon	RV	Untagged	310,394	Supplementation—ISS
		PIT		499	
		Total:		**310,893**	
S Fork Salmon R@ Knox Bridge 4/7/1995	S Fk Salmon	PIT,AD,CWT		400	Time Release Study
S Fork Salmon R@ Knox Bridge 4/12/1995	S Fk Salmon	PIT,AD,CWT		400	Time Release Study
S Fork Salmon R@ Knox Bridge 4/19/1995	S Fk Salmon	PIT,AD,CWT		400	Time Release Study
S Fork Salmon R@ Knox Bridge 4/24/1995	S Fk Salmon	PIT,AD,CWT		400	Time Release Study
S Fork Salmon R Buckhorn Creek 7/21/1994	S Fk Salmon	PIT,LV		1,001	Indian Treaty Harvest
S Fork Salmon R Buckhorn Creek 7/22/1994	S Fk Salmon	PIT,LV		1,001	Indian Treaty Harvest
S Fork Salmon R@ Knox Bridge 10/3/1994	S Fk Salmon	PIT,LV		1,001	Indian Treaty Harvest
Total release for McCall in 1995			**1,079,201**		

Appendix A. Table 1d. Release data for McCall Fish Hatchery reared spring Chinook salmon released in year 1996. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
S Fork Salmon R@	S Fk Salmon	CWT,AD	102028	33,717	US Canada
Knox Bridge		AD	Untagged	278,147	US Canada
4/11/1996—4/14/1996		PIT		29,607	
		Total:		**341,471**	
S Fork Salmon R@	S Fk Salmon	AD	Untagged	9,869	High BKD Contribution
Knox Bridge		PIT		None	
4/11/1996—4/14/1996		**Total:**		**9,869**	
S Fork Salmon R@	S Fk Salmon	LV	Untagged	9,356	High BKD Supplementation
Knox Bridge		PIT		None	
4/11/1996—4/14/1996		**Total:**		**9,356**	
S Fork Salmon R@	S Fk Salmon	LV	Untagged	224,958	Supplementation
Knox Bridge		PIT		None	
4/11/1996—4/14/1996		**Total:**		**224,958**	
Total release for McCall in 1996			**585,654**		

Appendix A. Table 1e. Release data for McCall Fish Hatchery reared spring Chinook salmon released in year 1997. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
S Fork Salmon R@	S Fk Salmon	CWT,AD	105144	9,534	US Canada Contribution
Knox Bridge		AD	Untagged	113,057	US Canada Contribution
3/19/1997—3/21/1997		PIT		52,701	
		Total:		**175,292**	
S Fork Salmon R@	S Fk Salmon	Elas	Untagged	63,355	Supplementation, Elastomer study
Knox Bridge		PIT		None	
3/19/1997—3/21/1997		**Total:**		**63,355**	
S Fork Salmon R@	S Fk Salmon	AD	Untagged	52,526	Supplementation
Knox Bridge		PIT		None	
3/19/1997—3/21/1997		**Total:**		**52,526**	
Total release for McCall in 1997			**291,173**		

Appendix A. Table 1f. Release data for McCall Fish Hatchery reared spring Chinook salmon released in year 1998. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
S Fork Salmon R@	S Fk Salmon	CWT,AD	105126	4,432	U.S. Canada Release
Knox Bridge		CWT,AD	105127	52,383	
3/29/1998—4/6/1998		CWT,AD	105111	25,796	
		AD	Untagged	240,780	U.S. Canada Release
		PIT		47,499	
		Total:		**370,890**	
S Fork Salmon R @	S Fk Salmon	RV	Untagged	24,990	Supplementation
Stolle Meadows		PIT		None	
7/7/1998—7/10/1998		**Total:**		**24,990**	
S Fork Salmon R@	S Fk Salmon	Elas	Untagged	22,982	Supplementation
Knox Bridge		PIT		None	
3/29/1998—4/6/1998		**Total:**		**22,982**	
Buckhorn Creek:	S Fk Salmon	CWT	105143	51,467	NPT Fall release SFSR
S Fork Salmon		CWT	105124	35,489	
10/7/1998—10/8/1998		CWT	105123	38,793	
		CWT	105230	18,561	
			Untagged	4,524	NPT Fall release SFSR
		PIT		1,991	
		Total:		**150,825**	
S Fork Salmon R @	S Fk Salmon	CWT	104617	6,388	Research release @ Stolle Meadows
Stolle Meadows		CWT	105121	41,988	
8/3/1998—8/19/1998			Untagged	1,496	Research release @ Stolle Meadows
		PIT		None	
		Total:		**49,872**	
S Fork Salmon R@	S Fk Salmon	CWT	105108	0	NPT release intended for Dollar Crk
Knox Bridge			Untagged	0	NPT release intended for Dollar Crk
		PIT		None	
		Total:		**0**	
Buckhorn Creek:	S Fk Salmon	CWT	105114	22,520	NPT summer release @ Buckhorn Crk
S Fork Salmon		CWT	105231	21,086	
8/5/1998—8/5/1998			Untagged	1,349	NPT summer release @ Buckhorn Crk
		PIT		None	
		Total:		**44,955**	
Total release for McCall in 1998			**664,514**		

Appendix A. Table 1g. Release data for McCall Fish Hatchery reared spring Chinook salmon released in year 1999. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
S Fork Salmon R@	S Fk Salmon	CWT,AD	105130	2,434	Contribution
Knox Bridge		CWT,AD	104944	53,744	
4/5/1999—4/8/1999		CWT,AD	104945	54,863	
		CWT,AD	105119	42,440	
		CWT,AD	105128	53,374	
		CWT,AD	105129	34,952	
		AD	Untagged	725,746	Contribution
		PIT		48,593	
		Total:		**1,016,146**	
S Fork Salmon R@	S Fk Salmon	CWT	105122	38,341	NPT Release
Knox Bridge			Untagged	1,186	NPT Release
		PIT		None	
		Total:		**39,527**	
S Fk Salmon R@	S Fk Salmon	LV	Untagged	126,937	Supplementation
Knox Bridge		PIT		None	
4/5/1999—4/8/1999		**Total:**		**126,937**	
Total release for McCall in 1999			**1,182,610**		

Appendix A. Table 2a. Release data for Sawtooth Fish Hatchery reared spring Chinook salmon released in year 1993. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Buster Back	Salmon R	CWT,RV	105003	15,597	Supplementation/Med. Density
		CWT,RV	105002	20,386	
10/2/1992—10/7/1992		CWT,RV	105001	22,553	
		RV	Shed Tags	1,809	
			Untagged	0	Supplementation/Med. Density
		PIT		None	
		Total:		**60,345**	
Sawtooth Weir	Salmon R	CWT,AD	104219	13,571	U.S. Canada/ Low Density
		CWT,AD	104220	15,739	
10/2/1992—10/8/1992		CWT,AD	105023	14,970	
		CWT,AD	105024	16,865	
		AD	Shed Tags	1,950	
			Untagged	0	U.S. Canada/ Low Density
		PIT		1,893	
		Total:		**64,988**	
Buster Back	Salmon R	CWT,RV	104943	10,004	Supplementation/Low Density
		CWT,RV	104313	21,816	
10/2/1992—10/7/1992		RV	Shed Tags	984	
			Untagged	0	Supplementation/Low Density
		PIT		None	
		Total:		**32,804**	
Sawtooth Hatchery	Salmon R	CWT,AD	105033	23,277	U.S. Canada High BKD
		CWT,AD	105035	21,278	
4/5/1993—4/8/1993		CWT,AD	105036	19,885	
		CWT,AD	105031	21,094	
		CWT,AD	105032	21,248	
		AD	Shed Tags	2,971	
			Untagged	0	U.S. Canada High BKD
		PIT		None	
		Total:		**109,753**	
E Fork Salmon R	Salmon R	LV	Untagged	34,373	East Fork Release
Trap		PIT		799	
4/20/1993—4/20/1993		**Total:**		**35,172**	
U Salmon R@	Salmon R	RV	Untagged	51,469	Supplementation
Blaine County Bridge		PIT		350	
4/20/1993—4/20/1993		**Total:**		**51,819**	
Sawtooth Weir	Salmon R	CWT,AD	105025	9,850	U.S. Canada/High Density
		CWT,AD	105026	21,308	
10/2/1992—10/8/1992		CWT,AD	105027	21,578	
		CWT,AD	104311	14,080	
		CWT,AD	104913	109,685	
		CWT,AD	104914	98,190	
		AD	Shed Tags	8,658	
			Untagged	0	U.S. Canada/High Density
		PIT		5,247	
		Total:		**288,596**	

Appendix A. Table 2a. Continued.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Buster Back	Salmon R	CWT,RV	104912	101,743	Supplementation/High Density
		RV	Shed Tags	3,147	
10/2/1992—10/7/1992			Untagged	0	Supplementation/High Density
		PIT		None	
		Total:		**104,890**	
Sawtooth Weir	Salmon R	CWT,AD	105028	21,661	U.S. Canada/Med. Density
		CWT,AD	105029	20,950	
10/2/1992—10/8/1992		CWT,AD	105030	16,936	
		AD	Shed Tags	1,841	
			Untagged	0	U.S. Canada/Med. Density
		PIT		None	
		Total:		**61,388**	
Total release for Sawtooth in 1993			**809,755**		

Appendix A. Table 2b. Release data for Sawtooth Fish Hatchery reared spring Chinook salmon released in year 1994. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Sawtooth Hatchery	Salmon R	CWT,AD	104605	5,256	Natural Rearing
		CWT,AD	104611	2,845	
4/9/1994—4/13/1994		CWT,AD	104928	15,877	
		CWT,AD	104930	23,863	
		AD	Untagged	5,984	Natural Rearing
		PIT		571	
		Total:		**54,396**	
Sawtooth Hatchery	Salmon R	CWT,AD	104927	18,720	Natural Rearing, Control
		CWT,AD	104929	20,559	
4/9/1994—4/13/1994		CWT,AD	104604	11,238	
		CWT,AD	104612	5,535	
		AD	Untagged	8,499	Natural Rearing, Control
		PIT		719	
		Total:		**65,270**	
Sawtooth Hatchery	Salmon R	AD	Untagged	21,864	BKD Study
		PIT		None	
4/13/1994—4/13/1994		**Total:**		**21,864**	
U Salmon R@	Salmon R	LV	Untagged	72,300	Supplementation
Blaine County Bridge		PIT		None	
4/9/1994—4/9/1994		**Total:**		**72,300**	
E Fork Salmon R@	Salmon R	RV	Untagged	10,493	East Fork Release
Bowery Creek		PIT		1,875	
4/8/1994—4/8/1994		**Total:**		**12,368**	
Total release for Sawtooth in 1994			**226,198**		

Appendix A. Table 2c. Release data for Sawtooth Fish Hatchery reared spring Chinook salmon released in year 1995. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Sawtooth Hatchery	Salmon R	AD,LV	Untagged	26,778	Supplementation
		PIT		1,000	
4/7/1995—4/7/1995		**Total:**		**27,778**	
Sawtooth Hatchery	Salmon R	AD	Untagged	75,417	Contribution
		PIT		500	
4/5/1995—4/5/1995		**Total:**		**75,917**	
E Fork Salmon R Trap	E Fk. Salmon	LV	Untagged	17,595	East Fork Release
		PIT		None	
4/3/1995—4/3/1995		**Total:**		**17,595**	
7 Mi Above East Fork Weir	E Fk Salmon	LV	Untagged	30,750	Upper East Fork Release
		PIT		500	
3/28/1995—3/30/1995		**Total:**		**31,250**	
Blaine Bridge	Salmon R	RV	Untagged	204,803	Supplementation, ISS
		PIT		790	
10/24/1994—3/31/1995		**Total:**		**205,593**	
West Fork Yankee Fork	Salmon R	AD	Untagged	25,025	Production
		PIT		None	
10/19/1994—10/20/1994		**Total:**		**25,025**	
Total release for Sawtooth in 1995			**383,158**		

Appendix A. Table 2d. Release data for Sawtooth Fish Hatchery reared spring Chinook salmon released in year 1996. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
U Salmon R@	Salmon R	AD	Untagged	23,056	Supplementation
Blaine County Bridge		PIT		1,263	
3/26/1996—3/26/1996		**Total:**		**24,319**	
Total release for Sawtooth in 1996			**24,319**		

Appendix A. Table 2e. Release data for Sawtooth Fish Hatchery reared spring Chinook salmon released in year 1997. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Sawtooth Hatchery	Salmon R	AD	Untagged	1,626	Contribution
		PIT		750	
4/17/1997—4/17/1997		**Total:**		**2,376**	
U Salmon R@	Salmon R	AD	Untagged	1,524	Contribution
Blaine County Bridge		Pit		750	
4/17/1997—4/17/1997		**Total:**		**2,274**	
Pahsimeroi Hatchery	Pah Ch-2	AD	Untagged	5,145	Pahsimeroi Contribution
		PIT		None	
4/15/1997—4/15/1997		**Total:**		**5,145**	
Total release for Sawtooth in 1997			**9,795**		

Appendix A. Table 2f. Release data for Sawtooth Fish Hatchery reared spring Chinook salmon released in year 1998. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Sawtooth Hatchery	Salmon R	AD	Untagged	42,662	Sawtooth Contribution
		PIT		499	
4/21/1998—4/21/1998		**Total:**		**43,161**	
Total release for Sawtooth in 1998			**43,161**		

Appendix A. Table 2g. Release data for Sawtooth Fish Hatchery reared spring Chinook salmon released in year 1999. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Sawtooth Hatchery	Salmon R	CWT	104618	9,916	Supplementation
		CWT	104620	6,938	
4/16/1999—4/16/1999		CWT	104631	10,336	
		CWT	104632	7,885	
		CWT	104633	4,518	
		CWT	105238	21,133	
		CWT	105240	21,964	
		CWT	105262	21,193	
			Untagged	1,129	Supplementation
		PIT		991	
		Total:		**106,003**	
Sawtooth Hatchery	Salmon R	CWT,AD	102021	39,779	Reserve
		CWT,AD	104619	8,905	
4/16/1999—4/16/1999		CWT,AD	105125	40,727	
		CWT,AD	105239	21,128	
		AD	Untagged	4,928	Reserve
		PIT		1,975	
		Total:		**117,442**	
Total release for Sawtooth in 1999			**223,445**		

Appendix A. Table 3a. Release data for Clearwater Fish Hatchery reared spring Chinook salmon released in year 1993. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Upper Meadow Creek 7/20/1993—7/20/1993	Rapid River	CWT,AD AD PIT **Total:**	103525 Shed Tags Untagged	52,477 1,623 0 None **54,100**	NPT Meadow Creek NPT Meadow Creek
Meadow Creek: Selway R 7/22/1993—7/22/1993	Rapid River	CWT,AD AD PIT **Total:**	103526 Shed Tags Untagged	57,812 1,788 0 None **59,600**	NPT Meadow Creek NPT Meadow Creek
Lochsa R @ Pete King Creek 8/5/1993—8/6/1993	Powell	LV PIT **Total:**	Untagged	12,000 None **12,000**	Supplementation
Colt Killed Cr: Tributary To Lochsa 8/4/1993—8/5/1993	Powell	LV PIT **Total:**	Untagged	79,998 None **79,998**	Supplementation
Big Flat Creek: Lochsa R 8/5/1993—8/6/1993	Powell	LV PIT **Total:**	Untagged	39,879 996 **40,875**	Supplementation
Lochsa R @ Squaw Creek 8/5/1993—8/6/1993	Powell	LV PIT **Total:**	Untagged	11,000 1,000 **12,000**	Supplementation
Red River Rearing Ponds 10/12/1993—10/12/1993	Red River	RV PIT **Total:**	Untagged	21,146 1,000 **22,146**	BKD Release
Total release for Clearwater in 1993			**280,719**		

Appendix A. Table 3b. Release data for Clearwater Fish Hatchery reared spring Chinook salmon released in year 1994. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Red River Rearing	Rapid River	CWT,AD	103506	55,392	Red River Release
Ponds		AD	Shed Tags	1,713	
9/23/1994—9/23/1994		LV,AD	Untagged	261,650	Red River Release
		PIT		2,000	
		Total:		**320,755**	
Powell Rearing	Powell	CWT,AD	104656	33,177	Natural Rearing, Test
Ponds		CWT,AD	104657	36,310	
4/8/1994—4/14/1994		CWT,AD	104658	33,463	
		CWT,AD	104659	36,027	
		AD	Untagged	59,591	Natural Rearing, Test
		PIT		2,000	
		Total:		**200,568**	
Crooked R Ponds	Clearwater	CWT,AD	102023	62,920	Production
9/23/1994		AD	Untagged	153,360	Production
		PIT		None	
		Total:		**216,280**	
Lochsa R @	Powell	RV	Untagged	13,972	Supplementation
Squaw Creek		PIT		1,005	
7/5/1994—7/5/1994		**Total:**		**14,977**	
Big Flat Creek:	Powell	RV	Untagged	48,954	Supplementation
Lochsa R		PIT		1,000	
7/6/1994—7/8/1994		**Total:**		**49,954**	
Colt Killed Cr:	Powell	RV	Untagged	99,808	Supplementation
Tributary To Lochsa		PIT		None	
7/6/1994—7/8/1994		**Total:**		**99,808**	
Meadow Creek:	Rapid River	RV	Untagged	414,991	Supplementation
Selway R		PIT		2,009	
7/12/1994—7/29/1994		**Total:**		**417,000**	
Crooked R Ponds	Crooked R	RV	Untagged	199,255	Supplementation
		PIT		None	
9/19/1994—9/19/1994		**Total:**		**199,255**	
Crooked R Ponds	Rapid River	AD	Untagged	273,766	INAD Study, low BKD
		PIT		None	
4/8/1994—4/14/1994		**Total:**		**273,766**	
Papoose Creek:	Powell	CWT,AD	104655	59,506	Natural Rearing Control
Lochsa R		AD	Shed Tags	916	
4/13/1994—4/15/1994			Untagged	0	Natural Rearing Control
		PIT		None	
		Total:		**60,422**	
Papoose Creek:	Powell	CWT,AD	104654	29,631	Natural Rearing Test
Lochsa R		AD	Shed Tags	917	
4/13/1994—4/15/1994			Untagged	0	Natural Rearing Test
		PIT		None	
		Total:		**30,548**	

Appendix A. Table 3b. Continued.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Papoose Creek:	Powell	LV	Untagged	16,110	Supplementation
Lochsa R		PIT		None	
4/13/1994—4/15/1994		**Total:**		**16,110**	
Powell Rearing	Powell	CWT,AD	101531	66,273	Supplementation
Ponds		AD	Untagged	83,334	Supplementation
		PIT		None	
		Total:		**149,607**	
Powell Rearing	Rapid River	CWT,AD	104662	32,228	Supplementation
Ponds		CWT,AD	103044	67,559	
10/3/1994—10/3/1994		CWT,AD	103045	55,434	
		AD	Shed Tags	4,862	
			Untagged	0	Supplementation
		PIT		2,000	
		Total:		**162,083**	
Lochsa R @	Powell	RV	Untagged	14,080	Supplementation
Pete King Creek		PIT		1,000	
7/5/1994—7/5/1994		**Total:**		**15,080**	
Total release for Clearwater in 1994			**2,226,213**		

Appendix A. Table 3c. Release data for Clearwater Fish Hatchery reared spring Chinook salmon released in year 1995. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Crooked R Ponds	Clearwater	CWT,AD	103527	48,299	Natural Rearing Control
		CWT,AD	103530	50,537	
4/10/1995—4/14/1995		CWT,AD	103531	51,964	
		AD	Shed Tags	1,360	
			Untagged	0	Natural Rearing Control
		PIT		400	
		Total:		**152,560**	
Walton Creek Tributary	Clearwater	CWT,AD	103517	49,016	Natural Rearing Control
To Lochsa		CWT,AD	103518	53,108	
4/12/1995—4/13/1995		CWT,AD	103521	54,251	
		AD	Shed Tags	3,964	
			Untagged	0	Natural Rearing Control
		PIT		800	
		Total:		**161,139**	
Walton Creek Tributary	Clearwater	CWT,AD	103516	51,288	Natural Rearing Treatment
To Lochsa		CWT,AD	103519	34,699	
4/12/1995—4/13/1995		CWT,AD	103520	39,439	
		AD	Shed Tags	1,454	
			Untagged	0	Natural Rearing Treatment
		PIT		2,400	
		Total:		**129,280**	

Appendix A. Table 3c. Continued.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Crooked R Ponds	Rapid River	CWT,AD	104563	18,676	Crooked R direct release
		CWT,AD	104561	19,563	
4/12/1995—4/12/1995		CWT,AD	104562	20,922	
		AD	Untagged	165,461	Crooked R direct release
		PIT		1,600	
		Total:		**226,222**	
Papoose Creek:	Rapid River	RV	Untagged	54,800	Supplementation
Lochsa R		PIT		500	
4/5/1995—4/6/1995		**Total:**		**55,300**	
American R:	Rapid River	RV	Untagged	220,249	Supplementation
S Fork Clearwater R.		PIT		1,200	
4/5/1995—4/10/1995		**Total:**		**221,449**	
Newsome Creek:	Rapid River	RV	Untagged	188,412	Supplementation
S Fork Clearwater R.		PIT		1,200	
4/10/1995—4/11/1995		**Total:**		**189,612**	
Crooked R Ponds	Clearwater	CWT,AD	103528	51,534	Natural Rearing Treatment
		CWT,AD	103529	52,739	
4/10/1995—4/14/1995		AD	Shed Tags	1,060	
			Untagged	0	Natural Rearing Treatment
		PIT		400	
		Total:		**105,733**	
Crooked R Ponds	Rapid River	CWT,AD	103532	51,881	Natural Rearing Treatment
		AD	Shed Tags	712	
4/10/1995—4/14/1995			Untagged	0	Natural Rearing Treatment
		PIT		800	
		Total:		**53,393**	
Total release for Clearwater in 1995			**1,294,688**		

Appendix A. Table 3d. Release data for Clearwater Fish Hatchery reared spring Chinook salmon released in year 1996. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Powell Rearing	Clearwater	CWT,AD	104546	16,416	Natural Rearing Control
Ponds		CWT,AD	104541	22,555	
4/11/1996		CWT,AD	104545	21,071	
		PIT		5,716	
		AD		47,334	
		Total:		**113,092**	
Powell Rearing	Clearwater	CWT,AD	104544	14,691	Natural Rearing Control
Ponds		CWT,AD	104542	22,293	
4/11/1996		CWT,AD	104543	215,268	
		AD		44,761	
		PIT		5,716	
		Total:		**302,729**	

Appendix A. Table 3d. Continued.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Snake River At Hells Canyon Dam 4/9/1996	Clearwater	AD **Total:**		67,818 **67,818**	BKD Parents
Walton Creek Tributary To Lochsa 4/15/1996	Clearwater	AD **Total:**		11,540 **11,540**	Production
Red River Rearing Ponds 4/10/1996	Clearwater	RV PIT **Total:**		24,002 1,214 **25,216**	Production
Crooked River Ponds 4/10/1996	Clearwater	AD PIT **Total:**		37,071 2,100 **39,171**	Production
Crooked River 8/25/1995	Clearwater	PIT **Total:**		506 **506**	
Total release for Clearwater in 1996			**560,072**		

Appendix A. Table 3e. Release data for Clearwater Fish Hatchery reared spring Chinook salmon released in year 1997. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Powell Rearing Ponds 4/15/1997—4/15/1997	Powell	AD PIT **Total:**	Untagged	3,013 500 **3,513**	Contribution
Red River: S. Fork Clearwater R. 4/14/1997—4/14/1997	Red River	AD PIT **Total:**	Untagged	2,970 None **2,970**	Contribution
Magruder Corridor 4/11/1997—4/11/1997	Selway	PIT/AD **Total:**	Untagged	1,428 **1,428**	Contribution
Rapid River Hatchery 4/15/1997—4/15/1997	Rapid River	AD PIT **Total:**	Untagged	12,447 None **12,447**	Contribution, Isolation Group.
Clearwater At Big Canyon Creek 4/14/1997—6/12/1997	Snake Riv	PIT **Total**		12,981 **12,981**	NPT
Total release for Clearwater in 1997			**33,339**		

Appendix A. Table 3f. Release data for Clearwater Fish Hatchery reared spring Chinook salmon released in year 1998. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Lt Salmon R @	Powell	CWT	105229	19,252	NPTH Parr Release
Warm Springs Br			Untagged	595	NPTH Parr Release
		PIT		None	
		Total:		**19,847**	
Lochsa R @	Powell	CWT	104616	9,628	ISS Parr Release
Squaw Creek			Untagged	298	ISS Parr Release
		PIT		None	
		Total:		**9,926**	
Powell Rearing	Powell	CWT,AD	104626	52,000	Powell Contribution Normal Size
Ponds		CWT,AD	104627	55,064	
4/6/1998—4/8/1998		AD	Untagged	12,152	Powell Contribution Normal Size
		PIT		2,010	
		Total:		**121,226**	
Powell Rearing	Powell	CWT,AD	104624	53,420	Powell Contribution Large Size
Ponds		CWT,AD	104625	54,094	
4/6/1998—4/8/1998		AD	Untagged	10,178	Powell Contribution Large Size
		PIT		None	
		Total:		**117,692**	
Crooked R:	Crooked R	AD	Untagged	205,407	Contribution
S. Fork Clearwater R.		PIT		499	
4/7/1998—4/9/1998		**Total:**		**205,906**	
Colt Killed Cr:	Powell	AD	Untagged	297,173	Contribution
Tributary To Lochsa R		PIT		1,906	
7/15/1998—8/5/1998		**Total:**		**299,079**	
Snake R @	Rapid River	AD	Untagged	304,100	Contribution
Hells Canyon Dam		PIT		None	
3/16/1998—3/18/1998		**Total:**		**304,100**	
Red River Rearing	Red River	LV	Untagged	21,123	Red River LVs
Ponds		PIT		500	
4/7/1998—4/9/1998		**Total:**		**21,623**	
Red River Rearing	S Fk Clearwater	RV	Untagged	29,085	Red River RVs
Ponds		PIT		500	
4/13/1998—4/13/1998		**Total:**		**29,585**	
Lochsa R @	Powell	AD	Untagged	83,748	Parr Release
Boulder Creek		PIT		None	
7/7/1998—7/8/1998		**Total:**		**83,748**	
Walton Creek Tributary	Powell	CWT,AD	105135	51,404	Contribution
To Lochsa		CWT,AD	105136	51,397	
9/23/1998—9/23/1998		AD	Untagged	227,038	Contribution
		PIT		716	
		Total:		**330,555**	

Appendix A. Table 3f. Continued.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Magruder Corridor	Selway	NONE	Untagged	5,116	Parr Release
		PIT		596	
9/29/1998—9/29/1998		**Total:**		**5,712**	
Red River Rearing Ponds	S Fk Clearwater	LV	Untagged	65,140	Parr Release
		PIT		704	
10/5/1998—10/5/1998		**Total:**		**65,844**	
Crooked R: S Fk Clwtr	S Fk Clearwater	RV	Untagged	161,422	Parr Release
		PIT		697	
9/24/1998—9/24/1998		**Total:**		**162,119**	
Magruder Corridor	Selway	AD	Untagged	8,592	NPT Helicopter Smolt Plant
		PIT		300	
4/21/1998—4/22/1998		**Total:**		**8,892**	
Walton Creek, Tributary To Lochsa	Powell	AD	Untagged	5,919	Walton Crk. Smolt Release
		PIT		None	
4/6/1998—4/9/1998		**Total:**		**5,919**	
Lochsa R @ Pete King Creek	Powell	BWT	Untagged	12,889	Pete King Release
		PIT		None	
7/20/1998—7/20/1998		**Total:**		**12,889**	
Selway		PIT		2,028	
7/21/1998		**Total:**		**2,028**	
Total release for Clearwater in 1998			**1,806,690**		

Appendix A. Table 3g. Release data for Clearwater Fish Hatchery reared spring Chinook salmon released in year 1999. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
S Fork Clearwater R@ Mill Creek	S Fk Clearwater	CWT	105116	38,451	NPTH Mill Crk Release
			Untagged	1,189	NPTH Mill Crk Release
		PIT		None	
		Total:		**39,640**	
Lolo Creek	S Fk Clearwater	CWT	105134	52,469	NPTH Lolo Crk Release
		CWT	105112	25,664	
3/31/1999—4/2/1999		CWT	105131	53,487	
		CWT	105303	10,910	
			Untagged	4,438	NPTH Lolo Crk Release
		PIT		1,007	
		Total:		**147,975**	

Appendix A. Table 3g. Continued.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Walton Creek Tributary	Rapid River	CWT,AD	105137	52,245	LSRCP Powell Pond
To Lochsa		CWT,AD	105138	52,637	
4/12/1999—4/15/1999		CWT,AD	105139	52,873	
		CWT,AD	105140	52,736	
		CWT,AD	105141	52,883	
		CWT,AD	105142	53,276	
		AD	Untagged	17,827	LSRCP Powell Pond
		PIT		None	
		Total:		**334,477**	
Papoose Creek:	Powell	CWT	103210	44,558	ISS Papoose Crk.
Lochsa R		AD	Untagged	1,894	ISS Papoose Crk.
		PIT		1,498	
		Total:		**47,950**	
Newsome Creek:	Rapid River	CWT	105132	51,918	NPTH Newsome Crk Release
S Fork Clearwater R		CWT	105304	18,968	
3/19/1999—3/19/1999			Untagged	2,224	NPTH Newsome Crk Release
		PIT		999	
		Total:		**74,109**	
Meadow Creek:	Rapid River	AD	Untagged	284,574	NPTH Meadow Crk Release
Selway R		PIT		999	
3/22/1999—3/29/1999		**Total:**		**285,573**	
Crooked R:	Rapid River	AD	Untagged	246,478	Contribution
S Fork Clearwater		PIT		500	
4/12/1999—4/15/1999		**Total:**		**246,978**	
Red River:	S Fk Clearwater	AD	Untagged	360,483	Contribution
S Fork Clearwater		PIT		500	
4/12/1999—4/15/1999		**Total:**		**360,983**	
Crooked R:	S Fk Clearwater	AD	Untagged	354,003	Contribution
S Fork Clearwater		PIT		None	
4/12/1999—4/15/1999		**Total:**		**354,003**	
Red River Rearing	Powell	RV	Untagged	74,981	LV Parr Release
Ponds		PIT		None	
9/27/1999—9/27/1999		**Total:**		**74,981**	
Crooked R Ponds	Powell	LV	Untagged	89,299	RV Parr Release
		PIT		None	
9/28/1999—9/28/1999		**Total:**		**89,299**	
Lochsa R @	Powell	CWT	105118	35,373	Nez Perce Tribal release.
Boulder Creek		CWT	105149	18,837	
4/5/1999—4/7/1999		CWT	105117	38,536	
			Untagged	2,869	Nez Perce Tribal release.
		PIT		None	
		Total:		**95,615**	
Total release for Clearwater in 1999			**2,151,583**		

Appendix A. Table 4a. Release data for Dworshak Fish Hatchery reared spring Chinook salmon released in year 1993. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Dworshak National Fish Hatchery 4/8/1993	Dworshak	AD/CWT	52934	59,043	
		AD/CWT	52935	61,421	
		AD		7,428	
		PIT		1,474	
		TOTAL		**129,366**	
Dworshak National Fish Hatchery 4/15/1993	Dworshak	AD/CWT	52229	7,723	
		AD/CWT	52718	24,400	
		AD/CWT	52740	39,734	
		AD		10,058	
		TOTAL		**81,915**	
Dworshak National Fish Hatchery 4/22/1993	Dworshak	AD/CWT	52933	56,371	
		AD/CWT	52936	61,464	
		AD		10,033	
		PIT		1,462	
		TOTAL		**129,330**	
Dworshak National Fish Hatchery 5/6/1993	Dworshak	AD/CWT	52932	53,910	
		AD/CWT	52931	50,877	
		AD		20,623	
		PIT		1,201	
		TOTAL		**126,611**	
Total release for Dworshak in 1993			**467,222**		

Appendix A. Table 4b. Release data for Dworshak Fish Hatchery reared spring Chinook salmon released in year 1994. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Dworshak National Fish Hatchery 4/8/1994	Dworshak	AD/CWT	53156	60,014	
		AD	UNK	1,586	
		AD		2,042	
		PIT		6,000	
		TOTAL		**69,642**	
Dworshak National Fish Hatchery 4/14/1994	Dworshak	AD/CWT	53159	56,254	
		AD/CWT	53219	58,974	
		AD/CWT	53205	59,281	
		AD/CWT	53218	60,008	
		AD	UNK	502,096	
		AD		14,286	
		PIT		1,198	
		TOTAL		**752,097**	
Dworshak National Fish Hatchery 4/15/1994	Rapid River	AD/CWT	53152	53,668	
		AD/CWT	53159	55,455	
		AD/CWT	53155	57,407	
		AD/CWT	53153	56,216	
		AD	UNK	61,878	
		AD		11,556	
		PIT		1,200	
		TOTAL		**297,380**	
Dworshak National Fish Hatchery 5/6/1994	Dworshak	AD/CWT	53158	62,211	
		AD	UNK	4,179	
		AD		2,110	
		PIT		6,000	
		TOTAL		**74,500**	
Dworshak National Fish Hatchery 4/22/1994		PIT		6,000	
		TOTAL		**6,000**	
Total release for Dworshak in 1994			**1,199,619**		

Appendix A. Table 4c. Release data for Dworshak Fish Hatchery reared spring Chinook salmon released in year 1995. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Dworshak National Fish Hatchery 4/13/1995—4/14/1995	Dworshak	AD/CWT	53534	60,409	
		AD/CWT	53535	59,352	
		AD	UNK	162,034	
		AD		10,888	
		TOTAL		**292,683**	
Dworshak National Fish Hatchery 4/13/1995—4/14/1995	Kooskia	AD	UNK	451,407	
Dworshak National Fish Hatchery 4/14/1995	Dworshak	AD/CWT	53206	66,674	
		AD/CWT	53207	69,115	
		AD/CWT	53208	60,879	
		AD/CWT	53209	62,950	
		AD/CWT	53210	67,497	
		AD/CWT	53532	67,729	
		AD/CWT	53533	67,951	
		AD	UNK	11,810	
		AD		26,412	
		PIT		4,000	
		TOTAL		**505,017**	
Lower Granite Dam 4/3/1995	Dworshak	PIT		1,004	
Total release for Dworshak in 1995			**1,250,111**		

Appendix A. Table 4d. Release data for Dworshak Fish Hatchery reared spring Chinook salmon released in year 1996. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Dworshak National Fish Hatchery 4/11/1996	Dworshak	AD/CWT	52958	15,557	
		AD/CWT	52959	4,127	
		AD/CWT	52960	15,361	
		AD/CWT	52963	15,630	
		AD/CWT	53006	13,557	
		AD/CWT	53007	15,829	
		AD/CWT	53721	16,647	
		AD		2,128	
		PIT		4,067	
		TOTAL		**102,903**	
North Fork Clearwater 4/11/1996	Dworshak	PIT		1,003	
Total release for Dworshak in 1996			**103,906**		

Appendix A. Table 4e. Release data for Dworshak Fish Hatchery reared spring Chinook salmon released in year 1997. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Dworshak National Fish Hatchery 4/7/1997—4/11/1997	Dworshak	AD/CWT	52962	15,656	
		AD		211	
		TOTAL		**15,867**	
Dworshak National Fish Hatchery 4/7/1997	Dworshak	AD/CWT	53008	19,683	
		AD/CWT	54213	3,076	
		AD		371	
		PIT		14,080	
		TOTAL		**37,210**	
Total release for Dworshak in 1997			**53,077**		

Appendix A. Table 4f. Release data for Dworshak Fish Hatchery reared spring Chinook salmon released in year 1998. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Dworshak National Fish Hatchery 3/25/1998	Dworshak	AD/CWT	53716	43,142	
		AD/CWT	53214	69,246	
		AD		652,431	
		PIT		28,060	
		TOTAL		**792,879**	
Dworshak National Fish Hatchery 3/26/1998	Dworshak	AD/CWT	53213	49,564	
		AD/CWT	53517	28,960	
		AD		82,353	
		PIT		19,644	
		TOTAL		**180,521**	
Total release for Dworshak in 1998			**973,400**		

Appendix A. Table 4g. Release data for Dworshak Fish Hatchery reared spring Chinook salmon released in year 1999. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Dworshak National Fish Hatchery 4/7/1999	Dworshak	AD/CWT	54211	45,150	
		AD		32,823	
		PIT		24,510	
		TOTAL		**102,483**	
Dworshak National Fish Hatchery 4/8/1999	Dworshak	AD/CWT	54212	47,381	
		AD		71,312	
		PIT		23,335	
		TOTAL		**142,028**	
Total release for Dworshak in 1999			**244,511**		

Appendix A. Table 5a. Release data for Rapid River Fish Hatchery reared spring Chinook salmon released in year 1993. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Rapid River Hatchery	Rapid River	CWT,LV,AD	104906	110,086	Contribution Mag Off
		CWT,LV,AD	104907	110,382	
4/14/1993—4/19/1993		CWT,LV,AD	104917	215,026	
		CWT,LV,AD	104920	54,637	
		CWT,LV,AD	104921	53,941	
		LV,AD	Shed Tags	16,826	
			Untagged	0	Contribution Mag Off
		PIT		None	
		Total:		**560,898**	
Rapid River Hatchery	Rapid River	CWT,LV	104901	311,398	Evaluation, Mag Off
		LV	Shed Tags	9,641	
4/14/1993—4/19/1993			Untagged	0	Evaluation, Mag Off
		PIT		301	
		Total:		**321,340**	
Rapid River Hatchery	Rapid River	CWT,AD	103601	330,641	U.S. Canada Mag On
		AD	Shed Tags	10,319	
4/14/1993—4/19/1993			Untagged	0	U.S. Canada Mag On
		PIT		3,001	
		Total:		**343,961**	
Rapid River Hatchery	Rapid River	AD	Untagged	259,004	ID. Mag Off
		PIT		None	Blank Wire
4/14/1993—4/19/1993		**Total:**		**259,004**	
Rapid River Hatchery	Rapid River	CWT,AD,LV	104908	113,452	Contribution
		CWT,AD,LV	104909	108,964	
4/14/1993—4/19/1993		CWT,AD,LV	104910	111,720	
		CWT,AD,LV	104911	112,006	
		CWT,AD,LV	104922	54,886	
		CWT,AD,LV	104923	56,767	
		AD,LV	Shed Tags	17,252	
			Untagged	0	Contribution
		PIT		None	
		Total:		**575,047**	
Snake R @	Rapid River	AD	Untagged	200,150	Contribution
Hells Canyon Dam		Pit		100	
4/16/1993—4/16/1993		**Total:**		**200,250**	
Squaw Creek		Pit		698	
7/9/1992					
Colt Killed Creek		Pit		698	
7/9/1992					
Colt Killed Creek		Pit		700	
7/23/1992					
Total release for Rapid River in 1993			**2,262,596**		

Appendix A. Table 5b. Release data for Rapid River Fish Hatchery reared spring Chinook salmon released in year 1994. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Rapid River Hatchery	Rapid River	CWT,AD	104903	303,743	U.S. Canada
		AD	Shed Tags	9,472	
4/8/1994—4/25/1994			Untagged	0	U.S. Canada
		PIT		1,501	
		Total:		**314,716**	
Rapid River Hatchery	Rapid River	AD	Untagged	2,149,826	Hatchery/Wild
		PIT		1,500	
4/8/1994—4/25/1994		**Total:**		**2,151,326**	
Rapid River Hatchery	Rapid River	AD	Untagged	80,600	Hatchery/Wild
		PIT		None	
4/21/1994—4/25/1994		**Total:**		**80,600**	
Snake R @	Rapid River	AD	Untagged	380,504	Hells Canyon Release
Hells Canyon Dam		Pit		None	
4/20/1994—4/21/1994		**Total:**		**380,504**	
Total release for Rapid River in 1994			**2,927,146**		

Appendix A. Table 5c. Release data for Rapid River Fish Hatchery reared spring Chinook salmon released in year 1995. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Snake R @	Rapid River	CWT,AD	104915	97,772	Some of 104915 went to Rapid River
Hells Canyon Dam		AD	Untagged	401,263	Some of 104915 went to Rapid River
		PIT		501	
		Total:		**499,536**	
Rapid River Hatchery	Rapid River	CWT,AD,LV	104904	296,415	U.S. Canada Contribution
		CWT,AD,LV	104916	101,368	
3/16/1995—4/12/1995		AD,LV	Shed Tags	12,364	
		AD	Untagged	2,374,783	U.S. Canada Contribution
		PIT		1,989	
		Total:		**2,786,919**	
Total release for Rapid River in 1995			**3,286,455**		

Appendix A. Table 5d. Release data for Rapid River Fish Hatchery reared spring Chinook salmon released in year 1996. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Rapid River Hatchery	Rapid River	CWT,AD	102020	22,803	US Canada
		CWT,AD	104501	21,569	
3/19/1996—4/16/1996		AD	Untagged	315,620	US Canada
		PIT		19,175	
		Total:		**379,167**	
Total release for Rapid River in 1996			**379,167**		

Appendix A. Table 5e. Release data for Rapid River Fish Hatchery reared spring Chinook salmon released in year 1997. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Rapid River Hatchery	Rapid River	AD	Untagged	45,321	Contribution
		PIT		40,517	
3/17/1997—4/10/1997		**Total:**		**85,838**	
Total release for Rapid River in 1997			**85,838**		

Appendix A. Table 5f. Release data for Rapid River Fish Hatchery reared spring Chinook salmon released in year 1998. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Rapid River Hatchery	Rapid River	CWT,AD	104905	277,799	US-Canada Contribution.
		AD	Untagged	570,014	US-Canada Contribution.
		PIT		48,357	
		Total:		**896,170**	
Total release for Rapid River in 1998			**896,170**		

Appendix A. Table 5g. Release data for Rapid River Fish Hatchery reared spring Chinook salmon released in year 1999. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Rapid River Hatchery	Rapid River	CWT,AD	103522	4,770	Contribution
		CWT,AD	103523	55,139	
3/18/1999—4/26/1999		CWT,AD	103524	53,916	
		CWT,AD	103219	52,751	
		CWT,AD	103533	55,020	
		CWT,AD	105133	52,439	
		AD	Untagged	2,523,952	Contribution
		PIT		49,297	
		Total:		**2,847,284**	
Snake R @	Rapid River	AD	Untagged	300,000	Contribution
Hells Canyon Dam		Pit		None	
3/18/1999—3/19/1999		**Total:**		**300,000**	
Lt Salmon R @	Rapid River	AD	Untagged	200,000	Contribution
Stinky Springs		Pit		None	
3/17/1999—3/17/1999		**Total:**		**200,000**	
Total release for Rapid River in 1999			**3,347,284**		

Appendix A. Table 6a. Release data for Pahsimeroi Fish Hatchery reared spring Chinook salmon released in year 1993. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Pahsimeroi Ponds	Pah Ch-2	CWT,AD	104931	20,426	whirling disease/wild hatchery
		CWT,AD	104932	20,344	
4/14/1993—4/19/1993		CWT,AD	104940	9,684	
		CWT,AD	104939	9,904	
		CWT,AD	104935	20,651	
		CWT,AD	104936	21,491	
		CWT,AD	104933	21,333	
		CWT,AD	104934	21,422	
		CWT,AD	104941	10,500	
		CWT,AD	104942	9,156	
		AD	Untagged	126,136	whirling disease/wild hatchery
		PIT		None	
		Total:		**291,047**	
Pahsimeroi Ponds	Pah Ch-2	LV	Untagged	83,953	supplementation
		PIT		None	
4/14/1993—4/19/1993		**Total:**		**83,953**	
Total release for Pahsimeroi in 1993			**375,000**		

Appendix A. Table 6b. Release data for Pahsimeroi Fish hatchery reared spring Chinook salmon released in year 1994. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Pahsimeroi Ponds	Pah Ch-1	AD	Untagged	40,567	Hatchery Eval. Supplementation
		PIT		None	
4/8/1994—4/12/1994			**Total:**	**40,567**	
Pahsimeroi Ponds	Pah Ch-1	AD	Untagged	39,803	Supplementation
		PIT		997	
4/8/1994—4/12/1994			**Total:**	**40,800**	
Pahsimeroi Ponds	Pah Ch-1	LV	Untagged	22,696	Supplementation
		PIT		None	
4/8/1994—4/12/1994			**Total:**	**22,696**	
Pahsimeroi Ponds	Pah Ch-1	LV	Untagged	22,727	Supplementation
		PIT		None	
4/8/1994—4/12/1994			**Total:**	**22,727**	
Pahsimeroi Ponds	Pah Ch-1	AD	Untagged	2,591	Positive Female BKD
		PIT		None	
4/8/1994—4/12/1994			**Total:**	**2,591**	
Pahsimeroi Ponds	Pah Ch-1	LV	Untagged	1,129	Positive Female BKD
		PIT		None	
4/8/1994—4/12/1994			**Total:**	**1,129**	
Total release for Pahsimeroi in 1994			**130,510**		

Appendix A. Table 6c. Release data for Pahsimeroi Fish Hatchery reared spring Chinook salmon released in 1995. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Pahsimeroi Ponds	Pah Ch-1	RV	Untagged	64,746	Supplementation
		PIT		None	
4/11/1995—4/14/1995		**Total:**		**64,746**	
Pahsimeroi Ponds	Pah Ch-1	AD	Untagged	82,189	Production
		PIT		494	
4/11/1995—4/14/1995		**Total:**		**82,683**	
Total release for Pahsimeroi in 1995			**147,429**		

Appendix A. Table 6d. Release data for Pahsimeroi Fish Hatchery reared spring Chinook salmon released in 1996. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
NO FISH WERE RELEASED FROM PAHSIMEROI FISH HATCHERY IN 1996					
Total release for Pahsimeroi in 1996			**0**		

Appendix A. Table 6e. Release data for Pahsimeroi Fish Hatchery reared spring Chinook salmon released in 1997. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Pahsimeroi Ponds	Pah Ch-2	AD	Untagged	92,383	Contribution
		PIT		29,634	
4/18/1997—4/18/1997		**Total:**		**122,017**	
Total release for Pahsimeroi in 1997			**122,017**		

Appendix A. Table 6f. Release data for Pahsimeroi Fish Hatchery reared spring Chinook salmon released in 1998. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Pahsimeroi Ponds	Pah Ch-2	AD	Untagged	65,648	Pahsimeroi Contribution
		PIT		None	
4/15/1998—4/18/1998		**Total:**		**65,648**	
4/4/1998		PIT		993	
Total release for Pahsimeroi in 1998			**66,641**		

Appendix A. Table 6g. Release data for Pahsimeroi Fish Hatchery reared spring Chinook salmon released in 1999. Release data in appendices is reported from IDFG fish marking database. Numbers based on estimates made at time of marking and may not match numbers reported in the text.

Release Site/Date	Stock Name	Mark Type	CWT Code	Release Number	Marking Purpose
Pahsimeroi Ponds	Pah Ch-2	AD	Untagged	135,169	Pahsimeroi IPC.
		PIT		500	
4/14/1999—4/19/1999		**Total:**		**135,669**	
Total release for Pahsimeroi in 1999			**135,669**		

Appendix B. Table 1a. Interrogations of PIT-tagged juvenile Chinook salmon tagged at McCall Fish Hatchery and emigrating in 1993.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
DAC92280.MC2	KNOXB	04/03/93	500	113	22.60	46	9.20	33	6.60	19	3.80	211	42.20	46.27
LRB93060.MAF	SALRSF	04/03/93	889	193	21.71	85	9.56	33	3.71	31	3.49	342	38.47	41.74
LRB93060.MHF	SALRSF	04/03/93	1,462	332	22.71	115	7.87	64	4.38	46	3.15	557	38.10	40.66
LRB93061.MAF	SALRSF	04/03/93	611	155	25.37	51	8.35	21	3.44	19	3.11	246	40.26	40.98
LRB93061.MHF	SALRSF	04/03/93	38	9	23.68	3	7.89	3	7.89	2	5.26	17	44.74	43.03
TOTALS	**SALRSF**	**04/03/93**	**3,000**	**689**	**22.97**	**254**	**8.47**	**121**	**4.03**	**98**	**3.27**	**1,162**	**38.73**	**40.96**
DAC93061.TR1	KNOXB	04/09/93	504	104	20.63	44	8.73	32	6.35	16	3.17	196	38.89	38.28
DAC93061.TR2	KNOXB	04/22/93	500	124	24.80	57	11.40	19	3.80	18	3.60	218	43.60	27.63
DAC93061.TR3	KNOXB	05/05/93	509	113	22.20	64	12.57	32	6.29	13	2.55	222	43.61	22.77

Appendix B. Table 1b. Interrogations of PIT-tagged juvenile Chinook salmon released from McCall Fish Hatchery and emigrating in 1994.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
DAC94070.SPM	KNOXB	04/09/94	498	84	16.9	36	7.2	18	3.6	40	8.0	178	35.7	31.16
LRB94068.FMH	KNOXB	04/11/94	1,500	207	13.8	83	5.5	63	4.2	88	5.9	441	29.4	30.39
LRB94069.FAM	KNOXB	04/11/94	1,500	258	17.2	124	8.3	85	5.7	136	9.1	603	40.2	29.37
TOTALS	**KNOXB**	**04/11/94**	**3,000**	**465**	**15.5**	**207**	**6.9**	**148**	**4.9**	**224**	**7.5**	**1,044**	**34.8**	**29.98**
DAC94069.T1T	KNOXB	04/12/94	400	73	18.3	34	8.5	21	5.3	28	7.0	156	39.0	28.76
DAC94070.T1C	KNOXB	04/14/94	400	53	13.3	36	9.0	14	3.5	31	7.8	134	33.5	28.89
DAC94070.T2T	KNOXB	04/22/94	400	38	9.5	26	6.5	13	3.3	23	5.8	100	25.0	27.20
DAC94070.T2C	KNOXB	04/28/94	400	46	11.5	30	7.5	17	4.3	12	3.0	105	26.3	24.04

Appendix B. Table 1c. Interrogations of PIT-tagged juvenile Chinook salmon tagged at McCall Fish Hatchery and emigrating in 1995.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
DAC94200.2IT	SALRSF	07/21/94	1,001	27	2.7	9	0.9	6	0.6	1	0.1	43	4.3	290.13
DAC94200.1IT	SALRSF	07/22/94	1,000	19	1.9	8	0.8	2	0.2	0	0.0	29	2.9	301.36
DAC94262.FTR	KNOXB	10/03/94	1,000	22	2.2	10	1.0	3	0.3	1	0.1	36	3.6	249.16
DAC95047.AE1	KNOXB	04/06/95	524	109	20.8	73	13.9	35	6.7	14	2.7	231	44.1	35.22
DAC95048.AE2	KNOXB	04/06/95	2,194	431	19.6	247	11.3	181	8.2	51	2.3	910	41.5	36.94
DAC95049.AE3	KNOXB	04/06/95	83	15	18.1	7	8.4	6	7.2	4	4.8	32	38.6	38.14
TOTALS	**KNOXB**	**04/06/95**	**2,801**	**555**	**19.8**	**327**	**11.7**	**222**	**7.9**	**69**	**2.5**	**1,173**	**41.9**	**36.68**
DAC95048.MC1	KNOXB	04/07/95	400	85	21.3	41	10.3	33	8.3	13	3.3	172	43.0	37.25
DAC95049.ISS	KNOXB	04/07/95	499	92	18.4	53	10.6	45	9.0	7	1.4	197	39.5	37.55
DAC95060.AE4	KNOXB	04/07/95	271	58	21.4	28	10.3	21	7.7	2	0.7	109	40.2	38.71
DAC95060.AE5	KNOXB	04/07/95	100	19	19.0	13	13.0	8	8.0	1	1.0	41	41.0	50.43
DAC95060.AE6	KNOXB	04/07/95	176	35	19.9	19	10.8	15	8.5	3	1.7	72	40.9	35.33
DAC95060.AE7	KNOXB	04/07/95	52	14	26.9	5	9.6	4	7.7	0	0.0	23	44.2	46.50
LRB95047.MCA	KNOXB	04/07/95	585	102	17.4	59	10.1	37	6.3	13	2.2	211	36.1	33.20
LRB95047.MCH	KNOXB	04/07/95	1,000	194	19.4	111	11.1	63	6.3	17	1.7	385	38.5	35.76
LRB95048.MCA	KNOXB	04/07/95	415	85	20.5	54	13.0	34	8.2	12	2.9	185	44.6	34.51
TOTALS	**KNOXB**	**04/07/95**	**3,498**	**684**	**19.6**	**383**	**10.9**	**260**	**7.4**	**68**	**1.9**	**1,395**	**39.9**	**36.30**
DAC95048.MC2	KNOXB	04/12/95	400	71	17.8	50	12.5	33	8.3	4	1.0	158	39.5	38.54
DAC95048.MC3	KNOXB	04/19/95	400	58	14.5	35	8.8	33	8.3	5	1.3	131	32.8	27.80
DAC95049.MC4	KNOXB	04/24/95	400	75	18.8	44	11.0	27	6.8	4	1.0	150	37.5	29.29

Appendix B. Table 1d. Interrogations of PIT-tagged juvenile Chinook salmon released from McCall Fish Hatchery and emigrating in 1996.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
DAC96078.M11	KNOXB	04/11/96	2,089	362	17.3	164	7.9	173	8.3	37	1.8	736	35.2	34.41
DAC96078.M12	KNOXB	04/11/96	1,900	330	17.4	182	9.6	147	7.7	29	1.5	688	36.2	34.39
DAC96078.M13	KNOXB	04/11/96	878	166	18.9	69	7.9	64	7.3	12	1.4	311	35.4	33.70
DAC96078.M14	KNOXB	04/11/96	2,602	458	17.6	206	7.9	200	7.7	42	1.6	906	34.8	34.34
DAC96078.M15	KNOXB	04/11/96	250	46	18.4	20	8.0	22	8.8	5	2.0	93	37.2	33.91
DAC96078.M21	KNOXB	04/11/96	1,421	231	16.3	118	8.3	108	7.6	21	1.5	478	33.6	34.33
DAC96078.M22	KNOXB	04/11/96	1,949	378	19.4	153	7.9	124	6.4	35	1.8	690	35.4	34.21
DAC96078.M23	KNOXB	04/11/96	1,814	319	17.6	156	8.6	127	7.0	27	1.5	629	34.7	34.39
DAC96078.M31	KNOXB	04/11/96	188	36	19.1	14	7.4	18	9.6	3	1.6	71	37.8	35.25
DAC96078.M32	KNOXB	04/11/96	842	143	17.0	68	8.1	52	6.2	9	1.1	272	32.3	34.34
DAC96078.M33	KNOXB	04/11/96	1,098	181	16.5	94	8.6	78	7.1	11	1.0	364	33.2	34.57
DAC96078.M34	KNOXB	04/11/96	2,732	506	18.5	251	9.2	196	7.2	40	1.5	993	36.3	34.22
DAC96078.M41	KNOXB	04/11/96	1,515	274	18.1	131	8.6	116	7.7	20	1.3	541	35.7	34.38
DAC96078.M42	KNOXB	04/11/96	1,259	223	17.7	111	8.8	99	7.9	23	1.8	456	36.2	34.52
DAC96078.M43	KNOXB	04/11/96	3,093	543	17.6	253	8.2	242	7.8	47	1.5	1,085	35.1	34.41
DAC96079.M24	KNOXB	04/11/96	1,998	353	17.7	174	8.7	156	7.8	29	1.5	712	35.6	33.84
DAC96079.M35	KNOXB	04/11/96	780	146	18.7	51	6.5	52	6.7	10	1.3	259	33.2	33.88
DAC96079.M44	KNOXB	04/11/96	1,199	198	16.5	100	8.3	87	7.3	17	1.4	402	33.5	33.70
TOTALS	**KNOXB**	**04/11/96**	**27,607**	**4,893**	**17.7**	**2,315**	**8.4**	**2,061**	**7.5**	**417**	**1.5**	**9,686**	**35.1**	**34.32**
LRB96079.M11	KNOXB	04/13/96	2,000	354	17.7	177	8.9	146	7.3	30	1.5	707	35.4	32.33

Appendix B. Table 1e. Interrogations of PIT-tagged juvenile Chinook salmon released from McCall Fish Hatchery and emigrating in 1997.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
LRB97063.M11	KNOXB	03/20/97	1,000	140	14.00	90	9.00	40	4.00	17	1.70	287	28.70	49.74
LRB97063.M12	KNOXB	03/20/97	1,000	128	12.80	93	9.30	50	5.00	9	0.90	280	28.00	49.33
LRB97063.M13	KNOXB	03/20/97	345	54	15.65	27	7.83	16	4.64	0	0.00	97	28.12	48.05
LRB97063.M22	KNOXB	03/20/97	490	70	14.29	50	10.20	18	3.67	3	0.61	141	28.78	47.82
LRB97063.M31	KNOXB	03/20/97	998	124	12.42	93	9.32	46	4.61	10	1.00	273	27.35	48.57
LRB97063.M32	KNOXB	03/20/97	498	70	14.06	49	9.84	25	5.02	8	1.61	152	30.52	47.60
LRB97063.M41	KNOXB	03/20/97	47	8	17.02	3	6.38	4	8.51	0	0.00	15	31.91	47.21
LRB97063.M42	KNOXB	03/20/97	1	0	0.00	1	100.00	0	0.00	0	0.00	1	100.00	0.00
LRB97063.M43	KNOXB	03/20/97	1,057	159	15.04	106	10.03	59	5.58	7	0.66	331	31.32	52.29
LRB97063.M44	KNOXB	03/20/97	628	78	12.42	64	10.19	36	5.73	5	0.80	183	29.14	48.59
LRB97064.M11	KNOXB	03/20/97	1,082	148	13.68	119	11.00	49	4.53	7	0.65	323	29.85	50.90
LRB97064.M12	KNOXB	03/20/97	1,003	153	15.25	95	9.47	40	3.99	10	1.00	298	29.71	49.37
LRB97064.M13	KNOXB	03/20/97	913	142	15.55	87	9.53	31	3.40	9	0.99	269	29.46	49.61
LRB97064.M14	KNOXB	03/20/97	314	40	12.74	29	9.24	14	4.46	5	1.59	88	28.03	49.99
LRB97064.M21	KNOXB	03/20/97	823	114	13.85	69	8.38	37	4.50	5	0.61	225	27.34	48.50
LRB97064.M22	KNOXB	03/20/97	1,000	140	14.00	71	7.10	41	4.10	12	1.20	264	26.40	49.68
LRB97064.M23	KNOXB	03/20/97	1,000	132	13.20	92	9.20	31	3.10	10	1.00	265	26.50	50.71
LRB97064.M24	KNOXB	03/20/97	4	0	0.00	1	25.00	0	0.00	0	0.00	1	25.00	0.00
LRB97064.M25	KNOXB	03/20/97	263	40	15.21	25	9.51	14	5.32	2	0.76	81	30.80	47.13
LRB97064.M31	KNOXB	03/20/97	1,021	140	13.71	77	7.54	48	4.70	9	0.88	274	26.84	47.91
LRB97064.M32	KNOXB	03/20/97	999	118	11.81	98	9.81	39	3.90	11	1.10	266	26.63	50.04
LRB97064.M33	KNOXB	03/20/97	1,000	130	13.00	113	11.30	62	6.20	5	0.50	310	31.00	51.51
LRB97064.M34	KNOXB	03/20/97	105	14	13.33	9	8.57	5	4.76	0	0.00	28	26.67	49.09
LRB97064.M41	KNOXB	03/20/97	1,083	157	14.50	118	10.90	45	4.16	6	0.55	326	30.10	48.74
LRB97064.M42	KNOXB	03/20/97	1,000	133	13.30	91	9.10	36	3.60	2	0.20	262	26.20	51.18

Appendix B. Table 1e. Continued.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
LRB97064.M43	KNOXB	03/20/97	280	45	16.07	21	7.50	12	4.29	3	1.07	81	28.93	52.14
LRB97065.M11	KNOXB	03/20/97	1,000	131	13.10	87	8.70	39	3.90	19	1.90	276	27.60	51.72
LRB97065.M12	KNOXB	03/20/97	1,000	139	13.90	90	9.00	42	4.20	12	1.20	283	28.30	48.80
LRB97065.M13	KNOXB	03/20/97	1,015	140	13.79	79	7.78	31	3.05	11	1.08	261	25.71	49.39
LRB97065.M14	KNOXB	03/20/97	436	69	15.83	51	11.70	18	4.13	6	1.38	144	33.03	51.44
LRB97065.M21	KNOXB	03/20/97	1,000	138	13.80	99	9.90	46	4.60	10	1.00	293	29.30	49.67
LRB97065.M22	KNOXB	03/20/97	1,000	141	14.10	110	11.00	37	3.70	7	0.70	295	29.50	47.61
LRB97065.M23	KNOXB	03/20/97	1,009	142	14.07	109	10.80	38	3.77	6	0.59	295	29.24	47.90
LRB97065.M24	KNOXB	03/20/97	661	100	15.13	53	8.02	17	2.57	3	0.45	173	26.17	48.51
LRB97065.M31	KNOXB	03/20/97	1,098	145	13.21	109	9.93	41	3.73	14	1.28	309	28.14	50.47
LRB97065.M32	KNOXB	03/20/97	505	58	11.49	56	11.09	21	4.16	6	1.19	141	27.92	52.58
LRB97065.M33	KNOXB	03/20/97	996	155	15.56	87	8.73	36	3.61	8	0.80	286	28.71	51.48
LRB97065.M34	KNOXB	03/20/97	714	133	18.63	62	8.68	39	5.46	3	0.42	237	33.19	48.02
LRB97065.M35	KNOXB	03/20/97	437	78	17.85	47	10.76	17	3.89	7	1.60	149	34.10	50.32
LRB97065.M41	KNOXB	03/20/97	1,003	158	15.75	88	8.77	53	5.28	5	0.50	304	30.31	48.17
LRB97065.M42	KNOXB	03/20/97	1,003	123	12.26	114	11.37	35	3.49	12	1.20	284	28.32	48.68
LRB97065.M43	KNOXB	03/20/97	1,001	145	14.49	95	9.49	42	4.20	10	1.00	292	29.17	50.41
LRB97065.M44	KNOXB	03/20/97	271	40	14.76	33	12.18	10	3.69	4	1.48	87	32.10	49.40
LRB97066.M11	KNOXB	03/20/97	1,000	147	14.70	98	9.80	37	3.70	7	0.70	289	28.90	47.37
LRB97066.M12	KNOXB	03/20/97	1,000	155	15.50	77	7.70	30	3.00	8	0.80	270	27.00	48.78
LRB97066.M13	KNOXB	03/20/97	352	43	12.22	34	9.66	20	5.68	2	0.57	99	28.13	51.11
LRB97066.M14	KNOXB	03/20/97	999	149	14.91	90	9.01	38	3.80	9	0.90	286	28.63	49.40
LRB97066.M16	KNOXB	03/20/97	138	23	16.67	13	9.42	6	4.35	2	1.45	44	31.88	47.33
LRB97066.M21	KNOXB	03/20/97	1,000	144	14.40	93	9.30	38	3.80	8	0.80	283	28.30	48.09
LRB97066.M22	KNOXB	03/20/97	1,001	162	16.18	86	8.59	39	3.90	11	1.10	298	29.77	48.91
LRB97066.M23	KNOXB	03/20/97	1,000	166	16.60	82	8.20	43	4.30	8	0.80	299	29.90	49.41
LRB97066.M24	KNOXB	03/20/97	1,000	138	13.80	88	8.80	40	4.00	6	0.60	272	27.20	51.41
LRB97066.M25	KNOXB	03/20/97	150	24	16.00	15	10.00	4	2.67	2	1.33	45	30.00	47.63
LRB97066.M31	KNOXB	03/20/97	1,000	152	15.20	97	9.70	43	4.30	5	0.50	297	29.70	49.99
LRB97066.M32	KNOXB	03/20/97	1,061	162	15.27	101	9.52	48	4.52	4	0.38	315	29.69	51.48
LRB97066.M33	KNOXB	03/20/97	1,000	139	13.90	83	8.30	41	4.10	9	0.90	272	27.20	48.46
LRB97066.M34	KNOXB	03/20/97	1,000	161	16.10	118	11.80	41	4.10	11	1.10	331	33.10	47.08
LRB97066.M35	KNOXB	03/20/97	595	74	12.44	61	10.25	24	4.03	5	0.84	164	27.56	51.66
LRB97066.M41	KNOXB	03/20/97	1,000	139	13.90	107	10.70	55	5.50	9	0.90	310	31.00	50.12
LRB97066.M42	KNOXB	03/20/97	1,010	136	13.47	110	10.89	58	5.74	9	0.89	313	30.99	51.89
LRB97066.M43	KNOXB	03/20/97	1,013	139	13.72	96	9.48	56	5.53	11	1.09	302	29.81	47.74
LRB97067.M11	KNOXB	03/20/97	1,000	148	14.80	86	8.60	39	3.90	8	0.80	281	28.10	51.41
LRB97067.M12	KNOXB	03/20/97	500	79	15.80	60	12.00	13	2.60	2	0.40	154	30.80	50.36
LRB97067.M21	KNOXB	03/20/97	1,000	136	13.60	92	9.20	34	3.40	9	0.90	271	27.10	49.11
LRB97067.M22	KNOXB	03/20/97	502	84	16.73	44	8.76	33	6.57	4	0.80	165	32.87	51.81
LRB97067.M31	KNOXB	03/20/97	1,000	148	14.80	87	8.70	37	3.70	11	1.10	283	28.30	47.28
LRB97067.M32	KNOXB	03/20/97	400	51	12.75	40	10.00	11	2.75	5	1.25	107	26.75	48.76
LRB97067.M41	KNOXB	03/20/97	877	132	15.05	105	11.97	47	5.36	11	1.25	295	33.64	48.37
TOTALS	**KNOXB**	**03/20/97**	**52,701**	**7,543**	**14.31**	**5,023**	**9.53**	**2,235**	**4.24**	**474**	**0.90**	**15,275**	**28.98**	**49.36**

Appendix B. Table 1f. Interrogations of PIT-tagged juvenile Chinook salmon released from McCall Fish Hatchery and emigrating in 1998.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
LRB98048.M11	KNOXB	03/30/98	1,000	274	27.4	148	14.8	71	7.1	11	1.1	504	50.4	36.54
LRB98048.M12	KNOXB	03/30/98	1,000	261	26.1	153	15.3	59	5.9	17	1.7	490	49.0	36.33
LRB98048.M13	KNOXB	03/30/98	1,000	271	27.1	149	14.9	64	6.4	12	1.2	496	49.6	36.57
LRB98048.M14	KNOXB	03/30/98	671	171	25.5	138	20.6	47	7.0	6	0.9	362	53.9	36.79
LRB98048.M21	KNOXB	03/30/98	1,000	299	29.9	141	14.1	86	8.6	21	2.1	547	54.7	36.52
LRB98048.M22	KNOXB	03/30/98	1,000	264	26.4	132	13.2	70	7.0	10	1.0	476	47.6	36.58
LRB98048.M23	KNOXB	03/30/98	756	187	24.7	128	16.9	39	5.2	10	1.3	364	48.1	36.25
LRB98048.M31	KNOXB	03/30/98	1,003	303	30.2	134	13.4	56	5.6	18	1.8	511	50.9	36.06
LRB98048.M32	KNOXB	03/30/98	1,048	303	28.9	165	15.7	58	5.5	17	1.6	543	51.8	35.72
LRB98048.M33	KNOXB	03/30/98	1,045	278	26.6	169	16.2	67	6.4	15	1.4	529	50.6	35.49
LRB98048.M41	KNOXB	03/30/98	1,000	263	26.3	147	14.7	71	7.1	17	1.7	498	49.8	36.54
LRB98048.M42	KNOXB	03/30/98	999	315	31.5	137	13.7	56	5.6	23	2.3	531	53.2	36.44
LRB98048.M43	KNOXB	03/30/98	999	293	29.3	148	14.8	69	6.9	17	1.7	527	52.8	36.35
LRB98048.M44	KNOXB	03/30/98	953	264	27.7	131	13.7	65	6.8	14	1.5	474	49.7	36.44
LRB98049.M11	KNOXB	03/30/98	999	275	27.5	147	14.7	70	7.0	14	1.4	506	50.7	37.79
LRB98049.M12	KNOXB	03/30/98	998	275	27.6	169	16.9	73	7.3	15	1.5	532	53.3	36.21
LRB98049.M13	KNOXB	03/30/98	1,000	256	25.6	151	15.1	63	6.3	9	0.9	479	47.9	37.29
LRB98049.M14	KNOXB	03/30/98	1,065	299	28.1	161	15.1	62	5.8	17	1.6	539	50.6	36.38
LRB98049.M21	KNOXB	03/30/98	999	284	28.4	137	13.7	63	6.3	12	1.2	496	49.6	36.44
LRB98049.M22	KNOXB	03/30/98	998	306	30.7	136	13.6	72	7.2	13	1.3	527	52.8	36.45
LRB98049.M23	KNOXB	03/30/98	1,000	282	28.2	133	13.3	61	6.1	8	0.8	484	48.4	36.31
LRB98049.M24	KNOXB	03/30/98	240	71	29.6	22	9.2	23	9.6	4	1.7	120	50.0	35.61
LRB98049.M31	KNOXB	03/30/98	1,000	259	25.9	133	13.3	49	4.9	14	1.4	455	45.5	36.46
LRB98049.M32	KNOXB	03/30/98	1,017	283	27.8	145	14.3	68	6.7	8	0.8	504	49.6	36.43
LRB98049.M33	KNOXB	03/30/98	1,006	280	27.8	145	14.4	69	6.9	13	1.3	507	50.4	36.64
LRB98049.M34	KNOXB	03/30/98	999	293	29.3	153	15.3	72	7.2	12	1.2	530	53.1	36.47
LRB98049.M41	KNOXB	03/30/98	1,000	247	24.7	156	15.6	71	7.1	11	1.1	485	48.5	36.35
LRB98049.M42	KNOXB	03/30/98	999	268	26.8	138	13.8	69	6.9	13	1.3	488	48.8	36.34
LRB98049.M43	KNOXB	03/30/98	999	294	29.4	156	15.6	62	6.2	10	1.0	522	52.3	36.75
LRB98049.M44	KNOXB	03/30/98	1,000	259	25.9	157	15.7	80	8.0	17	1.7	513	51.3	36.47
LRB98049.M45	KNOXB	03/30/98	1,000	256	25.6	159	15.9	58	5.8	14	1.4	487	48.7	36.64
LRB98050.M11	KNOXB	03/30/98	1,000	284	28.4	159	15.9	67	6.7	21	2.1	531	53.1	36.26
LRB98050.M12	KNOXB	03/30/98	1,000	286	28.6	172	17.2	66	6.6	15	1.5	539	53.9	36.53
LRB98050.M13	KNOXB	03/30/98	1,000	280	28.0	144	14.4	60	6.0	14	1.4	498	49.8	36.77
LRB98050.M14	KNOXB	03/30/98	1,000	265	26.5	144	14.4	60	6.0	16	1.6	485	48.5	36.61
LRB98050.M15	KNOXB	03/30/98	243	68	28.0	26	10.7	18	7.4	2	0.8	114	46.9	37.36
LRB98050.M21	KNOXB	03/30/98	999	272	27.2	139	13.9	46	4.6	12	1.2	469	46.9	36.49
LRB98050.M22	KNOXB	03/30/98	1,000	255	25.5	142	14.2	60	6.0	16	1.6	473	47.3	36.42
LRB98050.M23	KNOXB	03/30/98	1,000	274	27.4	161	16.1	66	6.6	12	1.2	513	51.3	36.63
LRB98050.M24	KNOXB	03/30/98	1,000	258	25.8	163	16.3	65	6.5	14	1.4	500	50.0	36.30
LRB98050.M25	KNOXB	03/30/98	708	206	29.1	107	15.1	53	7.5	12	1.7	378	53.4	35.50
LRB98050.M32	KNOXB	03/30/98	1,000	259	25.9	163	16.3	74	7.4	11	1.1	507	50.7	37.25
LRB98050.M33	KNOXB	03/30/98	1,019	288	28.3	143	14.0	66	6.5	8	0.8	505	49.6	36.61
LRB98050.M34	KNOXB	03/30/98	791	201	25.4	123	15.5	50	6.3	9	1.1	383	48.4	36.47
LRB98050.M3B	KNOXB	03/30/98	1,017	268	26.4	149	14.7	73	7.2	11	1.1	501	49.3	37.37
LRB98050.M41	KNOXB	03/30/98	1,000	296	29.6	131	13.1	59	5.9	12	1.2	498	49.8	36.49
LRB98050.M42	KNOXB	03/30/98	1,000	265	26.5	140	14.0	68	6.8	12	1.2	485	48.5	37.40
LRB98050.M43	KNOXB	03/30/98	1,011	287	28.4	133	13.2	66	6.5	12	1.2	498	49.3	36.38
LRB98050.M44	KNOXB	03/30/98	1,000	286	28.6	146	14.6	69	6.9	15	1.5	516	51.6	36.44
LRB98050.M45	KNOXB	03/30/98	918	252	27.5	133	14.5	57	6.2	13	1.4	455	49.6	36.11
TOTALS	**KNOXB**	**03/30/98**	**47,499**	**13,083**	**27.5**	**7,036**	**14.8**	**3,106**	**6.5**	**649**	**1.4**	**23,874**	**50.3**	**36.47**

Appendix B. Table 1g. Interrogations of PIT-tagged juvenile Chinook salmon tagged at McCall Fish Hatchery and emigrating in 1999.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
PAK98265.M8A	SALRSF	10/07/98	205	5	2.44	6	2.93	1	0.49	4	1.95	16	7.80	215.29
PAK98265.M9A	SALRSF	10/07/98	286	4	1.40	16	5.59	5	1.75	1	0.35	26	9.09	205.70
PAK98265.MB8	SALRSF	10/07/98	464	6	1.29	13	2.80	6	1.29	1	0.22	26	5.60	220.60
PAK98265.MB9	SALRSF	10/07/98	392	5	1.28	22	5.61	6	1.53	3	0.77	36	9.18	201.55
PAK98266.10A	SALRSF	10/07/98	293	9	3.07	16	5.46	4	1.37	0	0.00	29	9.90	229.56
PAK98266.10B	SALRSF	10/07/98	351	10	2.85	18	5.13	5	1.42	2	0.57	35	9.97	207.32
TOTALS	**SALRSF**	**10/07/98**	**1,991**	**39**	**1.96**	**91**	**4.57**	**27**	**1.36**	**11**	**0.55**	**168**	**8.44**	**211.31**
JLC99048.M22	KNOXB	04/06/99	999	143	14.31	216	21.62	87	8.71	44	4.40	490	49.05	37.97
JLC99048.M23	KNOXB	04/06/99	998	154	15.43	211	21.14	80	8.02	36	3.61	481	48.20	39.82
JLC99048.M24	KNOXB	04/06/99	1,004	139	13.84	192	19.12	81	8.07	41	4.08	453	45.12	41.05
LRB99047.M11	KNOXB	04/06/99	999	135	13.51	224	22.42	76	7.61	35	3.50	470	47.05	39.80
LRB99047.M12	KNOXB	04/06/99	1,000	142	14.20	239	23.90	71	7.10	42	4.20	494	49.40	38.37
LRB99047.M13	KNOXB	04/06/99	1,000	131	13.10	242	24.20	76	7.60	24	2.40	473	47.30	39.88
LRB99047.M14	KNOXB	04/06/99	805	95	11.80	182	22.61	54	6.71	34	4.22	365	45.34	36.77
LRB99047.M21	KNOXB	04/06/99	999	149	14.91	216	21.62	89	8.91	34	3.40	488	48.85	38.87
LRB99047.M22	KNOXB	04/06/99	1,000	154	15.40	235	23.50	72	7.20	34	3.40	495	49.50	39.73
LRB99047.M23	KNOXB	04/06/99	998	134	13.43	227	22.75	87	8.72	55	5.51	503	50.40	37.97
LRB99047.M24	KNOXB	04/06/99	377	59	15.65	93	24.67	43	11.41	17	4.51	212	56.23	42.94
LRB99047.M31	KNOXB	04/06/99	4,312	617	14.31	961	22.29	356	8.26	180	4.17	2,114	49.03	40.07
LRB99047.M41	KNOXB	04/06/99	4,336	590	13.61	996	22.97	349	8.05	175	4.04	2,110	48.66	38.72
LRB99048.M11	KNOXB	04/06/99	1,001	129	12.89	228	22.78	81	8.09	37	3.70	475	47.45	38.53
LRB99048.M12	KNOXB	04/06/99	996	149	14.96	224	22.49	72	7.23	35	3.51	480	48.19	39.95
LRB99048.M13	KNOXB	04/06/99	1,000	134	13.40	255	25.50	77	7.70	45	4.50	511	51.10	39.35
LRB99048.M14	KNOXB	04/06/99	999	128	12.81	203	20.32	93	9.31	43	4.30	467	46.75	41.79
LRB99048.M21	KNOXB	04/06/99	1,000	145	14.50	197	19.70	67	6.70	37	3.70	446	44.60	41.75
LRB99048.M31	KNOXB	04/06/99	5,649	819	14.50	1,274	22.55	439	7.77	184	3.26	2,716	48.08	39.87
LRB99048.M41	KNOXB	04/06/99	5,664	782	13.81	1,206	21.29	458	8.09	221	3.90	2,667	47.09	40.77
LRB99049.M11	KNOXB	04/06/99	999	153	15.32	244	24.42	65	6.51	42	4.20	504	50.45	38.93
LRB99049.M12	KNOXB	04/06/99	826	111	13.44	193	23.37	61	7.38	31	3.75	396	47.94	39.97
LRB99049.M21	KNOXB	04/06/99	1,000	144	14.40	213	21.30	74	7.40	38	3.80	469	46.90	41.66
LRB99049.M22	KNOXB	04/06/99	1,000	143	14.30	242	24.20	83	8.30	31	3.10	499	49.90	38.89
LRB99049.M23	KNOXB	04/06/99	726	93	12.81	174	23.97	53	7.30	31	4.27	351	48.35	38.82
LRB99049.M31	KNOXB	04/06/99	4,020	575	14.30	887	22.06	335	8.33	148	3.68	1,945	48.38	39.64
LRB99049.M41	KNOXB	04/06/99	4,293	607	14.14	940	21.90	385	8.97	178	4.15	2,110	49.15	39.24
TOTALS	**KNOXB**	**04/06/99**	**48,000**	**6,754**	**14.07**	**10,714**	**22.32**	**3,864**	**8.05**	**1,852**	**3.86**	**23,184**	**48.30**	**39.73**
KAA98265.MCC	KNOXB	04/07/99	593	93	15.68	112	18.89	39	6.58	21	3.54	265	44.69	48.14

Appendix B. Table 2a. Interrogations of PIT-tagged juvenile Chinook salmon tagged at Sawtooth Fish hatchery and emigrating in 1993.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
DAC92260.05A	SALR	10/02/92	380	20	5.26	7	1.84	10	2.63	4	1.05	41	10.79	239.53
DAC92260.A05	SALR	10/02/92	416	24	5.77	18	4.33	6	1.44	2	0.48	50	12.02	244.49
DAC92262.A08	SALR	10/02/92	299	5	1.67	2	0.67	0	0.00	1	0.33	8	2.68	241.47
DAC92263.11A	SALR	10/02/92	398	3	0.75	2	0.50	1	0.25	0	0.00	6	1.51	212.94
DAC92263.A11	SALR	10/02/92	400	5	1.25	2	0.50	0	0.00	0	0.00	7	1.75	220.62
TOTALS	**SALR**	**10/02/92**	**1,893**	**57**	**3.01**	**31**	**1.64**	**17**	**0.90**	**7**	**0.37**	**112**	**5.92**	**241.47**
DAC92260.06A	SAWT	10/02/92	371	6	1.62	2	0.54	3	0.81	1	0.27	12	3.23	213.42
DAC92260.A06	SAWT	10/02/92	424	9	2.12	2	0.47	3	0.71	1	0.24	15	3.54	212.05
DAC92261.12A	SAWT	10/02/92	365	4	1.10	4	1.10	1	0.27	1	0.27	10	2.74	209.02
DAC92261.13A	SAWT	10/02/92	360	2	0.56	0	0.00	0	0.00	1	0.28	3	0.83	206.70
DAC92261.A12	SAWT	10/02/92	435	9	2.07	1	0.23	2	0.46	2	0.46	14	3.22	215.24
DAC92261.A13	SAWT	10/02/92	420	5	1.19	2	0.48	1	0.24	0	0.00	8	1.90	215.72
DAC92262.07A	SAWT	10/02/92	299	6	2.01	2	0.67	1	0.33	0	0.00	9	3.01	213.54
DAC92262.08A	SAWT	10/02/92	498	6	1.20	1	0.20	0	0.00	1	0.20	8	1.61	244.91
DAC92262.A07	SAWT	10/02/92	482	10	2.07	0	0.00	1	0.21	1	0.21	12	2.49	214.72
DAC92263.09A	SAWT	10/02/92	549	6	1.09	2	0.36	0	0.00	0	0.00	8	1.46	211.38
DAC92263.A09	SAWT	10/02/92	249	2	0.80	1	0.40	2	0.80	0	0.00	5	2.01	207.75
DAC92264.10A	SAWT	10/02/92	340	6	1.76	4	1.18	1	0.29	0	0.00	11	3.24	206.19
DAC92265.A10	SAWT	10/02/92	455	13	2.86	1	0.22	1	0.22	0	0.00	15	3.30	206.08
TOTALS	**SAWT**	**10/02/92**	**5,247**	**84**	**1.60**	**22**	**0.42**	**16**	**0.30**	**8**	**0.15**	**130**	**2.48**	**210.64**
DAC92259.04A	SALR	04/20/93	476	53	11.13	22	4.62	15	3.15	10	2.10	100	21.01	34.13
DAC92259.A04	SALR	04/20/93	323	40	12.38	11	3.41	12	3.72	8	2.48	71	21.98	34.05
TOTALS	**SALR**	**04/20/93**	**799**	**93**	**11.64**	**33**	**4.13**	**27**	**3.38**	**18**	**2.25**	**171**	**21.40**	**34.13**
DAC92264.01A	SALREF	04/20/93	163	10	6.13	1	0.61	0	0.00	3	1.84	14	8.59	23.95
DAC92264.A01	SALREF	04/20/93	141	8	5.67	2	1.42	0	0.00	4	2.84	14	9.93	19.57
DAC92264.A1T	SALREF	04/20/93	46	2	4.35	2	4.35	1	2.17	1	2.17	6	13.04	21.45
TOTALS	**SALREF**	**04/20/93**	**350**	**20**	**5.71**	**5**	**1.43**	**1**	**0.29**	**8**	**2.29**	**34**	**9.71**	**21.65**

Appendix B. Table 2b. Interrogations of PIT-tagged juvenile Chinook salmon tagged at Sawtooth Fish hatchery and emigrating in 1994.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
DAC93273.S03	SALREF	04/08/94	380	26	6.84	3	0.79	9	2.37	10	2.63	48	12.63	27.80
DAC93271.S13	SAWT	04/08/94	381	40	10.50	4	1.05	10	2.62	12	3.15	66	17.32	25.59
DAC93272.S10	SAWT	04/08/94	333	23	6.91	6	1.80	10	3.00	5	1.50	44	13.21	25.82
DAC93272.S11	SAWT	04/08/94	364	31	8.52	7	1.92	6	1.65	6	1.65	50	13.74	25.33
DAC93272.S12	SAWT	04/08/94	258	23	8.91	3	1.16	7	2.71	6	2.33	39	15.12	26.30
DAC93272.S14	SAWT	04/08/94	159	13	8.18	4	2.52	3	1.89	3	1.89	23	14.47	24.58
TOTALS	**SAWT**	**04/08/94**	**1,495**	**130**	**8.70**	**24**	**1.61**	**36**	**2.41**	**32**	**2.14**	**222**	**14.85**	**25.69**
DAC93272.S06	SALR	04/09/94	303	25	8.25	3	0.99	6	1.98	8	2.64	42	13.86	26.01
DAC93273.S05	SALR	04/09/94	268	16	5.97	3	1.12	5	1.87	7	2.61	31	11.57	27.31
TOTALS	**SALR**	**04/09/94**	**571**	**41**	**7.18**	**6**	**1.05**	**11**	**1.93**	**15**	**2.63**	**73**	**12.78**	**26.19**
DAC93272.S08	SAWT	04/11/94	373	35	9.38	1	0.27	6	1.61	13	3.49	55	14.75	20.58
DAC93273.S01	SAWT	04/11/94	346	35	10.12	5	1.45	6	1.73	7	2.02	53	15.32	22.99
TOTALS	**SAWT**	**04/11/94**	**719**	**70**	**9.74**	**6**	**0.83**	**12**	**1.67**	**20**	**2.78**	**108**	**15.02**	**22.66**

Appendix B. Table 2c. Interrogations of PIT-tagged juvenile Chinook salmon tagged at Sawtooth Fish hatchery and emigrating in 1995.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
DAC94263.07B	SALR	03/27/95	230	5	2.17	4	1.74	3	1.30	0	0.00	12	5.22	38.12
DAC94263.08B	SALR	03/27/95	327	10	3.06	5	1.53	5	1.53	3	0.92	23	7.03	39.97
DAC94263.09B	SALR	03/27/95	122	4	3.28	5	4.10	2	1.64	2	1.64	13	10.66	43.87
DAC94263.10B	SALR	03/27/95	111	0	0.00	1	0.90	1	0.90	0	0.00	2	1.80	0.00
TOTALS	**SALR**	**03/27/95**	**790**	**19**	**2.41**	**15**	**1.90**	**11**	**1.39**	**5**	**0.63**	**50**	**6.33**	**42.48**
DAC94263.S11	SALREF	03/28/95	500	17	3.40	5	1.00	7	1.40	3	0.60	32	6.40	38.90
DAC94264.S5A	SAWT	04/05/95	500	47	9.40	22	4.40	23	4.60	1	0.20	93	18.60	34.07
DAC94263.S6A	SAWT	04/07/95	500	52	10.40	19	3.80	23	4.60	7	1.40	101	20.20	30.66
DAC94264.S2A	SAWT	04/07/95	500	37	7.40	22	4.40	26	5.20	7	1.40	92	18.40	31.10
TOTALS	**SAWT**	**04/07/95**	**1,000**	**89**	**8.90**	**41**	**4.10**	**49**	**4.90**	**14**	**1.40**	**193**	**19.30**	**31.05**

Appendix B. Table 2d. Interrogations of PIT-tagged juvenile Chinook salmon tagged at Sawtooth hatchery and emigrating in 1996.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
DAC96080.SWT	SALR	03/26/96	763	24	3.15	18	2.36	14	1.83	4	0.52	60	7.86	36.05
DJN96038.S51	SALR	03/26/96	125	6	4.80	1	0.80	5	4.00	1	0.80	13	10.40	29.43
DJN96038.S52	SALR	03/26/96	125	7	5.60	4	3.20	1	0.80	1	0.80	13	10.40	36.84
DJN96038.S61	SALR	03/26/96	125	6	4.80	3	2.40	0	0.00	1	0.80	10	8.00	32.22
DJN96038.S62	SALR	03/26/96	125	6	4.80	0	0.00	1	0.80	0	0.00	7	5.60	39.42
TOTALS	**SALR**	**03/26/96**	**1,263**	**49**	**3.88**	**26**	**2.06**	**21**	**1.66**	**7**	**0.55**	**103**	**8.16**	**35.33**

Appendix B. Table 2e. Interrogations of PIT-tagged juvenile Chinook salmon tagged at Sawtooth hatchery and emigrating in 1997.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
KEP96274.S11	SAWT	04/17/97	375	62	16.53	30	8.00	16	4.27	3	0.80	111	29.60	29.95
KEP96274.S21	SAWT	04/17/97	375	57	15.20	35	9.33	10	2.67	3	0.80	105	28.00	29.03
TOTALS	**SAWT**	**04/17/97**	**750**	**119**	**15.87**	**65**	**8.67**	**26**	**3.47**	**6**	**0.80**	**216**	**28.80**	**29.85**
KEP96274.S12	SALR	04/17/97	376	59	15.69	41	10.90	19	5.05	5	1.33	124	32.98	31.04
KEP96274.S22	SALR	04/17/97	374	67	17.91	26	6.95	19	5.08	2	0.53	114	30.48	28.26
TOTALS	**SALR**	**04/17/97**	**750**	**126**	**16.80**	**67**	**8.93**	**38**	**5.07**	**7**	**0.93**	**238**	**31.73**	**29.73**

Appendix B. Table 2f. Interrogations of PIT-tagged juvenile Chinook salmon tagged at Sawtooth hatchery and emigrating in 1998.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
KEP98063.SA1	SAWT	04/21/98	237	74	31.22	20	8.44	22	9.28	5	2.11	121	51.05	18.67
KEP98063.SA2	SAWT	04/21/98	262	65	24.81	42	16.03	15	5.73	5	1.91	127	48.47	18.15
TOTALS			**499**	**139**	**27.86**	**62**	**12.42**	**37**	**7.41**	**10**	**2.00**	**248**	**49.70**	**18.65**

Appendix B. Table 2g. Interrogations of PIT-tagged juvenile Chinook salmon tagged at Sawtooth Hatchery and emigrating in 1999.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
CONTROL														
KEP99066.01S	SAWTRP	04/16/99	983	107	10.89	175	17.80	67	6.82	23	2.34	372	37.84	28.56
KEP99067.05S	SAWTRP	04/16/99	497	41	8.25	96	19.32	25	5.03	22	4.43	184	37.02	28.22
TREATMENT														
KEP99066.02S	SAWTRP	04/16/99	492	42	8.54	49	9.96	30	6.10	20	4.07	141	28.66	33.48
KEP99066.04S	SAWTRP	04/16/99	495	44	8.89	86	17.37	25	5.05	10	2.02	165	33.33	31.76
KEP99067.06S	SAWTRP	04/16/99	499	29	5.81	57	11.42	21	4.21	12	2.40	119	23.85	28.99
TOTALS	**SAWTRP**	**04/16/99**	**2,966**	**263**	**8.87**	**463**	**15.61**	**168**	**5.66**	**87**	**2.93**	**981**	**33.07**	**29.65**

Appendix B. Table 3a. Interrogations of PIT-tagged juvenile Chinook salmon released from Clearwater Fish Hatchery and released in 1993.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
DAC93215.BF1	BIGFLC	8/5/93	575	19	3.3	5	0.9	3	0.5	4	0.7	31	5.4	262.74
DAC93215.BF2	BIGFLC	8/5/93	421	13	3.1	3	0.7	5	1.2	4	1.0	25	5.9	268.38
TOTALS	**BIGFLC**	**8/5/93**	**996**	**32**	**3.2**	**8**	**0.8**	**8**	**0.8**	**8**	**0.8**	**56**	**5.6**	**265.56**
DAC93215.SQ1	SQUAWC	8/5/93	500	6	1.2	1	0.2	0	0.0	1	0.2	8	1.6	277.88
DAC93215.SQ2	SQUAWC	8/5/93	500	8	1.6	4	0.8	2	0.4	3	0.6	17	3.4	287.48
TOTALS	**SQUAWC**	**8/5/93**	**1,000**	**14**	**1.4**	**5**	**0.5**	**2**	**0.2**	**4**	**0.4**	**25**	**2.5**	**282.68**
DAC93279.RR1	REDP	10/12/93	700	20	2.9	12	1.7	7	1.0	5	0.7	44	6.3	223.22
DAC93279.RR2	REDP	10/12/93	300	10	3.3	8	2.7	4	1.3	2	0.7	24	8.0	195.72
TOTALS	**REDP**	**10/12/93**	**1,000**	**30**	**3.0**	**20**	**2.0**	**11**	**1.1**	**7**	**0.7**	**68**	**6.8**	**209.47**

Appendix B. Table 3b. Interrogations of PIT-tagged juvenile Chinook salmon released from Clearwater Fish Hatchery and released in 1994.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
DAC94062.C3A	POWP	04/13/94	250	75	30.0	16	6.4	16	6.4	31	12.4	138	55.2	25.99
DAC94062.C4A	POWP	04/13/94	250	70	28.0	16	6.4	24	9.6	42	16.8	152	60.8	24.68
DAC94063.C1B	POWP	04/13/94	250	64	25.6	17	6.8	13	5.2	32	12.8	126	50.4	21.34
DAC94063.C2B	POWP	04/13/94	250	70	28.0	19	7.6	18	7.2	23	9.2	130	52.0	20.95
DAC94063.C5A	POWP	04/13/94	250	50	20.0	23	9.2	17	6.8	28	11.2	118	47.2	25.98
DAC94063.C6A	POWP	04/13/94	250	62	24.8	18	7.2	12	4.8	25	10.0	117	46.8	25.91
DAC94063.C9A	POWP	04/14/94	500	99	19.8	19	3.8	23	4.6	50	10.0	191	38.2	24.49
TOTALS	**POWP**	**04/14/94**	**2,000**	**490**	**24.5**	**128**	**6.4**	**123**	**6.2**	**231**	**11.6**	**972**	**48.6**	**24.68**
DAC94180.PTK	PETEKC	07/05/94	1,000	42	4.2	14	1.4	15	1.5	4	0.4	75	7.5	308.36
DAC94179.SQW	SQUAWC	07/05/94	1,005	31	3.1	9	0.9	5	0.5	1	0.1	46	4.6	310.96
DAC94180.BGF	BIGFLC	07/07/94	1,000	43	4.3	17	1.7	8	0.8	6	0.6	74	7.4	295.68
DBJ94180.M21	MEADOC	07/10/94	509	7	1.4	3	0.6	3	0.6	0	0.0	13	2.6	333.31
DBJ94181.M31	MEADOC	07/10/94	269	11	4.1	2	0.7	4	1.5	0	0.0	17	6.3	288.56
DBJ94180.M31	MEADOC	07/11/94	243	4	1.6	3	1.2	1	0.4	1	0.4	9	3.7	298.91
DBJ94181.M41	MEADOC	07/12/94	511	11	2.2	3	0.6	3	0.6	1	0.2	18	3.5	299.66
DBJ94179.M11	MEADOC	07/14/94	218	1	0.5	0	0.0	1	0.5	1	0.5	3	1.4	355.55
DBJ94180.M12	MEADOC	07/14/94	259	1	0.4	1	0.4	0	0.0	0	0.0	2	0.8	355.55
TOTALS	**MEADOC**	**7/10-7/14/94**	**2,009**	**35**	**1.7**	**12**	**0.6**	**12**	**0.6**	**3**	**0.1**	**62**	**3.1**	**316.48**
DAC94264.RV1	CROOKP	09/22/94	1,000	92	9.2	41	4.1	19	1.9	7	0.7	159	15.9	236.34
DAC94264.AD1	CROOKP	09/23/94	500	42	8.4	28	5.6	14	2.8	7	1.4	91	18.2	232.64
DAC94264.CWT	CROOKP	09/23/94	500	57	11.4	31	6.2	10	2.0	9	1.8	107	21.4	241.59
TOTALS	**CROOKP**	**9/22-9/23/94**	**2,000**	**191**	**9.6**	**100**	**5.0**	**43**	**2.2**	**23**	**1.2**	**357**	**17.9**	**236.34**
DAC94173.PO1	POWP	10/03/94	1,000	61	6.1	24	2.4	20	2.0	9	0.9	114	11.4	206.23
DAC94174.POW	POWP	10/03/94	1,000	81	8.1	51	5.1	27	2.7	8	0.8	167	16.7	211.16
TOTALS	**POWP**	**10/03/94**	**2,000**	**142**	**7.1**	**75**	**3.8**	**47**	**2.4**	**17**	**0.9**	**281**	**14.1**	**208.70**

Appendix B. Table 3c. Interrogations of PIT-tagged juvenile Chinook salmon released from Clearwater Fish Hatchery and released in 1995.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
DAC95052.C7B	AMERR	04/05/95	400	109	27.3	44	11.0	29	7.3	9	2.3	191	47.8	24.50
DAC95052.C8B	AMERR	04/07/95	400	83	20.8	32	8.0	16	4.0	0	0.0	131	32.8	23.74
DAC95053.C9B	AMERR	04/08/95	400	105	26.3	55	13.8	25	6.3	11	2.8	196	49.0	22.38
TOTALS	**AMERR**	**4/5-4/8/95**	**1,200**	**297**	**24.8**	**131**	**10.9**	**70**	**5.8**	**20**	**1.7**	**518**	**43.2**	**23.74**
DAC95046.4AC	CROOKP	04/10/95	400	99	24.8	64	16.0	47	11.8	8	2.0	218	54.5	29.57
DAC95046.C4B	CROOKP	04/10/95	400	107	26.8	59	14.8	52	13.0	11	2.8	229	57.3	29.61
DAC95048.C5A	CROOKP	04/10/95	400	96	24.0	60	15.0	39	9.8	8	2.0	203	50.8	32.73
DAC95048.C5B	CROOKP	04/10/95	400	90	22.5	62	15.5	39	9.8	8	2.0	199	49.8	23.45
DAC95048.C6A	CROOKP	04/10/95	400	115	28.8	62	15.5	37	9.3	11	2.8	225	56.3	22.38
DAC95048.C6B	CROOKP	04/10/95	400	118	29.5	61	15.3	42	10.5	10	2.5	231	57.8	27.61
DAC95052.C8A	CROOKP	04/12/95	400	64	16.0	47	11.8	19	4.8	10	2.5	140	35.0	23.56
DAC95053.C9A	CROOKP	04/12/95	400	41	10.3	32	8.0	11	2.8	9	2.3	93	23.3	21.82
DAC95054.11E	CROOKP	04/12/95	400	128	32.0	41	10.3	25	6.3	14	3.5	208	52.0	19.64
DAC95054.12E	CROOKP	04/12/95	400	118	29.5	64	16.0	32	8.0	15	3.8	229	57.3	19.37
TOTALS	**CROOKP**	**4/10-4/12/95**	**4,000**	**976**	**24.4**	**552**	**13.8**	**343**	**8.6**	**104**	**2.6**	**1,975**	**49.4**	**23.50**
DAC95053.10W	NEWSOC	04/10/95	400	136	34.0	57	14.3	28	7.0	15	3.8	236	59.0	20.61
DAC95053.11W	NEWSOC	04/11/95	400	162	40.5	35	8.8	28	7.0	14	3.5	239	59.8	18.48
DAC95054.12W	NEWSOC	04/11/95	400	125	31.3	67	16.8	38	9.5	4	1.0	234	58.5	17.81
TOTALS	**NEWSOC**	**4/10-4/11/95**	**1,200**	**423**	**35.3**	**159**	**13.3**	**94**	**7.8**	**33**	**2.8**	**709**	**59.1**	**18.48**
DAC95052.C7A	PAPOOC	04/05/95	500	130	26.0	48	9.6	27	5.4	11	2.2	216	43.2	24.13

Appendix B. Table 3d. Interrogations of PIT-tagged juvenile Chinook salmon tagged at Clearwater Fish Hatchery and emigrating in 1996.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
RBK95236.CR1	CROOKR	08/25/95	289	32	11.1	11	3.8	1	0.3	2	0.7	46	15.9	282.93
RBK95237.CR1	CROOKR	08/25/95	76	2	2.6	0	0.0	0	0.0	0	0.0	2	2.6	302.22
RBK95237.CR2	CROOKR	08/25/95	141	7	5.0	1	0.7	0	0.0	1	0.7	9	6.4	292.17
TOTALS	**CROOKR**	**08/25/95**	**506**	**41**	**8.1**	**12**	**2.4**	**1**	**0.2**	**3**	**0.6**	**57**	**11.3**	**288.00**
DAC96064.C07	CROOKP	04/10/96	500	39	7.8	20	4.0	21	4.2	5	1.0	85	17.0	31.39
DAC96067.45U	CROOKP	04/10/96	100	15	15.0	5	5.0	2	2.0	2	2.0	24	24.0	31.60
DAC96067.46U	CROOKP	04/10/96	100	16	16.0	7	7.0	6	6.0	0	0.0	29	29.0	34.35
DAC96067.47L	CROOKP	04/10/96	100	9	9.0	6	6.0	6	6.0	3	3.0	24	24.0	35.24
DAC96067.47U	CROOKP	04/10/96	100	11	11.0	3	3.0	7	7.0	1	1.0	22	22.0	37.33
DAC96067.48L	CROOKP	04/10/96	100	9	9.0	4	4.0	4	4.0	0	0.0	17	17.0	33.02
DAC96067.48U	CROOKP	04/10/96	100	17	17.0	8	8.0	5	5.0	3	3.0	33	33.0	36.32
DAC96067.49L	CROOKP	04/10/96	100	9	9.0	4	4.0	5	5.0	3	3.0	21	21.0	34.98
DAC96067.49U	CROOKP	04/10/96	100	12	12.0	6	6.0	10	10.0	2	2.0	30	30.0	31.69
DAC96067.50L	CROOKP	04/10/96	100	12	12.0	6	6.0	4	4.0	1	1.0	23	23.0	35.43
DAC96067.50U	CROOKP	04/10/96	100	10	10.0	4	4.0	5	5.0	3	3.0	22	22.0	35.84
DAC96067.51L	CROOKP	04/10/96	100	13	13.0	3	3.0	11	11.0	0	0.0	27	27.0	32.01
DAC96067.51U	CROOKP	04/10/96	100	19	19.0	8	8.0	4	4.0	3	3.0	34	34.0	33.29
DAC96067.52L	CROOKP	04/10/96	100	12	12.0	2	2.0	4	4.0	1	1.0	19	19.0	39.52
DAC96067.52U	CROOKP	04/10/96	100	12	12.0	4	4.0	5	5.0	2	2.0	23	23.0	30.93
DAC96067.L45	CROOKP	04/10/96	100	6	6.0	8	8.0	3	3.0	1	1.0	18	18.0	36.35
DAC96067.L46	CROOKP	04/10/96	100	5	5.0	3	3.0	3	3.0	2	2.0	13	13.0	33.53
TOTALS	**CROOKP**	**04/10/96**	**2,100**	**226**	**10.8**	**101**	**4.8**	**105**	**5.0**	**32**	**1.5**	**464**	**22.1**	**34.35**
DAC96065.5A	POWP	04/11/96	330	72	21.8	31	9.4	22	6.7	5	1.5	130	39.4	32.60
DAC96065.6A	POWP	04/11/96	338	64	18.9	35	10.4	29	8.6	5	1.5	133	39.3	32.03
DAC96065.6AC	POWP	04/11/96	260	50	19.2	23	8.8	21	8.1	4	1.5	98	37.7	32.70
DAC96065.C5A	POWP	04/11/96	270	48	17.8	18	6.7	17	6.3	4	1.5	87	32.2	31.93
DAC96066.1A	POWP	04/11/96	300	47	15.7	23	7.7	24	8.0	6	2.0	100	33.3	31.50
DAC96066.1AC	POWP	04/11/96	300	42	14.0	27	9.0	20	6.7	5	1.7	94	31.3	30.90
DAC96066.2A	POWP	04/11/96	300	44	14.7	24	8.0	27	9.0	2	0.7	97	32.3	33.71
DAC96066.3A	POWP	04/11/96	275	29	10.5	26	9.5	21	7.6	4	1.5	80	29.1	31.50
DAC96066.3AC	POWP	04/11/96	325	53	16.3	38	11.7	22	6.8	7	2.2	120	36.9	33.37
DAC96066.4A	POWP	04/11/96	250	38	15.2	32	12.8	22	8.8	1	0.4	93	37.2	30.76
DAC96066.4AC	POWP	04/11/96	350	56	16.0	29	8.3	28	8.0	4	1.1	117	33.4	32.62
DAC96066.C2A	POWP	04/11/96	300	55	18.3	30	10.0	24	8.0	6	2.0	115	38.3	32.42
DAC96071.1A1	POWP	04/11/96	1,025	178	17.4	101	9.9	83	8.1	23	2.2	385	37.6	32.16
DAC96071.1A2	POWP	04/11/96	1,367	242	17.7	115	8.4	103	7.5	37	2.7	497	36.4	32.03
DAC96071.1A3	POWP	04/11/96	465	84	18.1	41	8.8	35	7.5	9	1.9	169	36.3	32.39
DAC96071.C1A	POWP	04/11/96	1,057	172	16.3	100	9.5	77	7.3	27	2.6	376	35.6	31.42
DAC96072.C31	POWP	04/11/96	1,473	237	16.1	138	9.4	118	8.0	23	1.6	516	35.0	31.41
DAC96072.C32	POWP	04/11/96	656	146	22.3	56	8.5	36	5.5	11	1.7	249	38.0	32.40
DAC96072.C41	POWP	04/11/96	1,218	175	14.4	114	9.4	75	6.2	32	2.6	396	32.5	32.82
DAC96072.C42	POWP	04/11/96	573	77	13.4	51	8.9	42	7.3	8	1.4	178	31.1	32.13
TOTALS	**POWP**	**04/11/96**	**11,432**	**1,909**	**16.7**	**1,052**	**9.2**	**846**	**7.4**	**223**	**2.0**	**4,030**	**35.3**	**32.15**
DAC96064.C08	REDP	04/10/96	500	51	10.2	16	3.2	19	3.8	5	1.0	91	18.2	36.48
DAC96071.8A1	REDP	04/10/96	423	47	11.1	17	4.0	25	5.9	7	1.7	96	22.7	35.60
DAC96071.8A2	REDP	04/10/96	291	23	7.9	13	4.5	9	3.1	1	0.3	46	15.8	34.58
TOTALS	**REDP**	**04/10/96**	**1,214**	**121**	**10.0**	**46**	**3.8**	**53**	**4.4**	**13**	**1.1**	**233**	**19.2**	**35.60**

Appendix B. Table 3e. Interrogations of PIT-tagged juvenile Chinook salmon released from Clearwater Fish Hatchery and emigrating in 1997.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
BDA97097.013	CLWR	04/14/97	2,514	660	26.3	511	20.3	333	13.2	65	2.6	1,569	62.4	11.27
BDA97098.012	CLWR	04/15/97	2,516	662	26.3	541	21.5	321	12.8	53	2.1	1,577	62.7	13.29
BDA97099.005	CLWR	04/16/97	2,509	608	24.2	561	22.4	363	14.5	74	2.9	1,606	64.0	12.44
BDA97100.003	CLWR	04/17/97	2,512	776	30.9	519	20.7	271	10.8	58	2.3	1,624	64.6	5.58
BDA97128.003	CLWR	05/14/97	997	254	25.5	171	17.2	117	11.7	16	1.6	558	56.0	3.60
BDA97128.005	CLWR	05/15/97	1,021	251	24.6	162	15.9	115	11.3	11	1.1	539	52.8	6.63
BDA97155.011	CLWR	06/11/97	2,495	743	29.8	435	17.4	133	5.3	67	2.7	1,378	55.2	35.71
BDA97155.012	CLWR	06/10/97	2,464	682	27.7	375	15.2	131	5.3	49	2.0	1,237	50.2	36.37
BDA97156.003	CLWR	06/13/97	2,483	721	29.0	402	16.2	110	4.4	31	1.2	1,264	50.9	33.73
BDA97156.005	CLWR	06/12/97	2,470	649	26.3	394	16.0	111	4.5	36	1.5	1,190	48.2	35.61
TOTALS	**CLWR**	**4/14-6/12/97**	**21,981**	**6,006**	**27.3**	**4,071**	**18.5**	**2,005**	**9.1**	**460**	**2.1**	**12,542**	**57.1**	**12.86**
(NOTE: These fish were releases at Big Canyon Creek—stock is Snake River by the NPT.)														
KEP96325.PW1	POWP	04/15/97	300	43	14.3	34	11.3	18	6.0	0	0.0	95	31.7	49.51
KEP96325.PW2	POWP	04/15/97	200	22	11.0	20	10.0	8	4.0	1	0.5	51	25.5	58.20
TOTALS	**POWP**	**04/15/97**	**500**	**65**	**13.0**	**54**	**10.8**	**26**	**5.2**	**1**	**0.2**	**146**	**29.2**	**53.86**
KEP96325.SL1	SELWYR	04/11/97	747	119	15.9	68	9.1	32	4.3	1	0.1	220	29.5	79.79
KEP96325.SL2	SELWYR	04/11/97	681	96	14.1	71	10.4	42	6.2	2	0.3	211	31.0	79.38
TOTALS	**SELWYR**	**04/11/97**	**1,428**	**215**	**15.1**	**139**	**9.7**	**74**	**5.2**	**3**	**0.2**	**431**	**30.2**	**79.59**

Appendix B. Table 3f. Interrogations of PIT-tagged juvenile Chinook salmon released from Clearwater Fish Hatchery and emigrating in 1998.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
BDA98097.BC1	CLWR	04/13/98	2,459	866	35.2	338	13.7	192	7.8	61	2.5	1,457	59.3	14.04
BDA98097.BC7	CLWR	04/13/98	1,283	322	25.1	195	15.2	57	4.4	24	1.9	598	46.6	21.34
BDA98098.BC4	CLWR	04/16/98	2,467	945	38.3	385	15.6	191	7.7	64	2.6	1,585	64.2	11.58
BDA98098.BC8	CLWR	04/16/98	1,249	288	23.1	168	13.5	65	5.2	11	0.9	532	42.6	19.68
TOTALS	**CLWR**	**4/13-4/16/98**	**7,458**	**2,421**	**32.5**	**1,086**	**14.6**	**505**	**6.8**	**160**	**2.1**	**4,172**	**55.9**	**16.86**
(NOTE: These fish were releases at Big Canyon Creek—stock is Snake River by the NPT.)														
JPW98194.1CK	COLTKC	07/15/98	621	2	0.3	12	1.9	3	0.5	2	0.3	19	3.1	329.28
JPW98204.CCC	COLTKC	07/27/98	634	4	0.6	13	2.1	2	0.3	0	0.0	19	3.0	304.20
JPW98204.CC2	COLTKC	08/04/98	651	8	1.2	5	0.8	5	0.8	0	0.0	18	2.8	312.62
TOTALS	**COLTKC**	**7/15-8/4/98**	**1,906**	**14**	**0.7**	**30**	**1.6**	**10**	**0.5**	**2**	**0.1**	**56**	**2.9**	**312.62**
KEP98062.CR1	CROOKP	04/08/98	499	135	27.1	74	14.8	33	6.6	7	1.4	249	49.9	26.61
JKB98262.CRP	CROOKP	09/21/98	697	9	1.3	8	1.1	5	0.7	5	0.7	27	3.9	246.01
KEP98062.3AP	POWP	04/08/98	335	104	31.0	42	12.5	20	6.0	5	1.5	171	51.0	24.59
KEP98062.P1B	POWP	04/08/98	335	103	30.7	60	17.9	24	7.2	10	3.0	197	58.8	25.53
KEP98062.P2A	POWP	04/08/98	335	110	32.8	62	18.5	24	7.2	8	2.4	204	60.9	26.48
KEP98062.P2B	POWP	04/08/98	335	125	37.3	51	15.2	20	6.0	7	2.1	203	60.6	25.20
KEP98062.P3B	POWP	04/08/98	335	123	36.7	47	14.0	25	7.5	8	2.4	203	60.6	24.84
KEP98062.PW1	POWP	04/08/98	335	110	32.8	52	15.5	27	8.1	8	2.4	197	58.8	26.39
TOTALS	**POWP**	**04/08/98**	**2,010**	**675**	**33.6**	**314**	**15.6**	**140**	**7.0**	**46**	**2.3**	**1,175**	**58.5**	**25.37**
KEP98264.PP1	POWP	09/23/98	716	16	2.2	19	2.7	11	1.5	13	1.8	59	8.2	222.36
KEP98062.RRL	REDP	04/08/98	500	197	39.4	82	16.4	28	5.6	16	3.2	323	64.6	25.56
KEP98063.RRH	REDP	04/13/98	500	161	32.2	89	17.8	33	6.6	12	2.4	295	59.0	20.62
TOTALS	**REDP**	**4/8-4/13/98**	**1,000**	**358**	**35.8**	**171**	**17.1**	**61**	**6.1**	**28**	**2.8**	**618**	**61.8**	**23.09**
JKB98272.RRP	REDP	10/05/98	343	3	0.9	1	0.3	2	0.6	0	0.0	6	1.7	256.98
JKB98273.RRP	REDP	10/05/98	361	2	0.6	2	0.6	4	1.1	1	0.3	9	2.5	205.10
TOTALS	**REDP**	**10/05/98**	**704**	**5**	**0.7**	**3**	**0.4**	**6**	**0.9**	**1**	**0.1**	**15**	**2.1**	**231.04**
KEP98063.SEL	SELWYR	04/22/98	300	80	26.7	67	22.3	29	9.7	5	1.7	181	60.3	18.17
SCS98194.US1	SELWYR	07/21/98	2,028	6	0.3	16	0.8	4	0.2	4	0.2	30	1.5	299.95
JKB98266.SEL	SELWYR	09/29/98	596	7	1.2	6	1.0	3	0.5	2	0.3	18	3.0	264.74

Appendix B. Table 3g. Interrogations of PIT-tagged juvenile Chinook salmon released from Clearwater Fish Hatchery and emigrating in 1999.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
KEP99035.CRK	CROOKP	04/13/99	500	84	16.8	122	24.4	49	9.8	23	4.6	278	55.6	26.01
SCS98071.LL1	LOLOC	04/02/99	1,007	180	17.9	259	25.7	97	9.6	26	2.6	562	55.8	28.02
SCS99071.MC1	MEADOC	03/30/99	999	146	14.6	273	27.3	102	10.2	26	2.6	547	54.8	25.23
SCS99070.NC1	NEWSOC	03/19/99	999	157	15.7	205	20.5	73	7.3	29	2.9	464	46.4	41.22
JMH99035.PS1	PAPOOC	04/07/99	749	98	13.1	164	21.9	56	7.5	21	2.8	339	45.3	27.83
JMH99035.PS2	PAPOOC	04/07/99	749	104	13.9	183	24.4	54	7.2	34	4.5	375	50.1	31.20
TOTALS	**PAPOOC**	**04/07/99**	**1,498**	**202**	**13.5**	**347**	**23.2**	**110**	**7.3**	**55**	**3.7**	**714**	**47.7**	**29.52**
KEP99035.RED	REDP	04/13/99	500	66	13.2	110	22.0	46	9.2	26	5.2	248	49.6	25.83

Appendix B. Table 4a. Interrogations of PIT-tagged juvenile Chinook salmon released from Dworshak Fish hatchery and emigrating in 1993.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
HLB93061.16A	DWOR	04/08/93	124	32	25.81	13	10.48	9	7.26	3	2.42	57	45.97	26.83
HLB93061.16B	DWOR	04/08/93	124	35	28.23	17	13.71	8	6.45	3	2.42	63	50.81	24.62
HLB93061.19A	DWOR	04/08/93	132	41	31.06	17	12.88	5	3.79	1	0.76	64	48.48	23.83
HLB93061.19B	DWOR	04/08/93	111	36	32.43	15	13.51	10	9.01	3	2.70	64	57.66	23.19
HLB93061.1A	DWOR	04/08/93	138	29	21.01	15	10.87	5	3.62	3	2.17	52	37.68	28.86
HLB93061.1B	DWOR	04/08/93	103	25	24.27	10	9.71	4	3.88	3	2.91	42	40.78	28.04
HLB93061.2A	DWOR	04/08/93	174	58	33.33	30	17.24	6	3.45	5	2.87	99	56.90	25.27
HLB93061.2B	DWOR	04/08/93	73	25	34.25	13	17.81	4	5.48	3	4.11	45	61.64	22.42
HLB93061.3A	DWOR	04/08/93	127	43	33.86	24	18.90	6	4.72	10	7.87	83	65.35	23.01
HLB93061.3B	DWOR	04/08/93	118	28	23.73	18	15.25	13	11.02	3	2.54	62	52.54	22.61
HLB93062.4A	DWOR	04/08/93	107	26	24.30	16	14.95	6	5.61	5	4.67	53	49.53	25.35
HLB93062.4B	DWOR	04/08/93	143	42	29.37	13	9.09	8	5.59	6	4.20	69	48.25	23.53
TOTALS	**DWOR**	**04/08/93**	**1,474**	**420**	**28.49**	**201**	**13.64**	**84**	**5.70**	**48**	**3.26**	**753**	**51.09**	**26.63**
HLB93060.25A	DWOR	04/22/93	136	47	34.56	9	6.62	13	9.56	4	2.94	73	53.68	15.01
HLB93060.25B	DWOR	04/22/93	104	42	40.38	8	7.69	7	6.73	4	3.85	61	58.65	13.39
HLB93063.10A	DWOR	04/22/93	114	38	33.33	16	14.04	5	4.39	8	7.02	67	58.77	11.41
HLB93063.10B	DWOR	04/22/93	129	48	37.21	12	9.30	7	5.43	3	2.33	70	54.26	11.56
HLB93063.11A	DWOR	04/22/93	112	43	38.39	16	14.29	8	7.14	3	2.68	70	62.50	12.29
HLB93063.11B	DWOR	04/22/93	132	55	41.67	17	12.88	8	6.06	5	3.79	85	64.39	12.61
HLB93063.12A	DWOR	04/22/93	122	43	35.25	13	10.66	12	9.84	4	3.28	72	59.02	12.56
HLB93063.12B	DWOR	04/22/93	123	42	34.15	14	11.38	8	6.50	4	3.25	68	55.28	13.72
HLB93063.13A	DWOR	04/22/93	108	34	31.48	10	9.26	3	2.78	5	4.63	52	48.15	13.48
HLB93063.13B	DWOR	04/22/93	137	38	27.74	17	12.41	8	5.84	7	5.11	70	51.09	13.76
HLB93063.15A	DWOR	04/22/93	117	38	32.48	8	6.84	7	5.98	5	4.27	58	49.57	14.98
HLB93063.15B	DWOR	04/22/93	128	45	35.16	14	10.94	7	5.47	6	4.69	72	56.25	14.45
TOTALS	**DWOR**	**04/22/93**	**1,462**	**513**	**35.09**	**154**	**10.53**	**93**	**6.36**	**58**	**3.97**	**818**	**55.95**	**18.34**
HLB93060.20A	DWOR	05/06/93	125	31	24.80	14	11.20	3	2.40	10	8.00	58	46.40	10.39
HLB93060.20B	DWOR	05/06/93	98	34	34.69	5	5.10	4	4.08	7	7.14	50	51.02	10.29
HLB93060.23A	DWOR	05/06/93	137	50	36.50	18	13.14	5	3.65	5	3.65	78	56.93	9.77
HLB93060.23B	DWOR	05/06/93	105	29	27.62	7	6.67	6	5.71	12	11.43	54	51.43	9.53
HLB93062.5A	DWOR	05/06/93	118	32	27.12	15	12.71	5	4.24	5	4.24	57	48.31	8.69
HLB93062.5B	DWOR	05/06/93	129	38	29.46	14	10.85	5	3.88	8	6.20	65	50.39	9.89
HLB93062.6A	DWOR	05/06/93	119	33	27.73	6	5.04	8	6.72	8	6.72	55	46.22	7.48
HLB93062.6B	DWOR	05/06/93	125	28	22.40	10	8.00	7	5.60	11	8.80	56	44.80	7.78
HLB93062.8A	DWOR	05/06/93	120	30	25.00	12	10.00	7	5.83	10	8.33	59	49.17	10.51
HLB93062.8B	DWOR	05/06/93	125	32	25.60	12	9.60	4	3.20	8	6.40	56	44.80	9.81
TOTALS	**DWOR**	**05/06/93**	**1,201**	**337**	**28.06**	**113**	**9.41**	**54**	**4.50**	**84**	**6.99**	**588**	**48.96**	**20.54**

Appendix B. Table 4b. Interrogations of PIT-tagged juvenile Chinook salmon released from Dworshak Fish hatchery and emigrating in 1994.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
CSM94054.A1A	DWOR	04/08/94	2,000	393	19.65	171	8.55	145	7.25	226	11.30	935	46.75	28.94
CSM94054.A2A	DWOR	04/08/94	218	57	26.15	23	10.55	15	6.88	18	8.26	113	51.83	22.54
CSM94054.A2B	DWOR	04/08/94	219	46	21.00	15	6.85	17	7.76	20	9.13	98	44.75	28.45
CSM94055.A2A	DWOR	04/08/94	850	217	25.53	77	9.06	68	8.00	86	10.12	448	52.71	22.88
CSM94055.A2B	DWOR	04/08/94	713	176	24.68	60	8.42	68	9.54	82	11.50	386	54.14	23.03
CSM94055.A3A	DWOR	04/08/94	1,000	220	22.00	97	9.70	79	7.90	101	10.10	497	49.70	22.64
CSM94055.A3B	DWOR	04/08/94	1,000	217	21.70	88	8.80	93	9.30	84	8.40	482	48.20	21.33
TOTALS	**DWOR**	**04/08/94**	**6,000**	**1,326**	**22.10**	**531**	**8.85**	**485**	**8.08**	**617**	**10.28**	**2,959**	**49.32**	**24.55**
HLB94059.B28	DWOR	04/14/94	150	49	32.67	12	8.00	21	14.00	11	7.33	93	62.00	12.30
HLB94059.B23	DWORNF	04/14/94	150	47	31.33	12	8.00	20	13.33	13	8.67	92	61.33	16.65
HLB94059.B24	DWORNF	04/14/94	150	47	31.33	15	10.00	25	16.67	6	4.00	93	62.00	18.70
HLB94059.B25	DWORNF	04/14/94	150	48	32.00	14	9.33	24	16.00	13	8.67	99	66.00	15.51
HLB94059.B26	DWORNF	04/14/94	148	49	33.11	23	15.54	17	11.49	5	3.38	94	63.51	12.84
HLB94059.B27	DWORNF	04/14/94	150	54	36.00	13	8.67	18	12.00	13	8.67	98	65.33	17.19
HLB94059.B29	DWORNF	04/14/94	150	41	27.33	12	8.00	17	11.33	15	10.00	85	56.67	19.63
HLB94059.B30	DWORNF	04/14/94	150	54	36.00	10	6.67	16	10.67	16	10.67	96	64.00	15.82
TOTALS	**DWORNF**	**04/14/94**	**1,048**	**340**	**32.44**	**99**	**9.45**	**137**	**13.07**	**81**	**7.73**	**657**	**62.69**	**16.33**
HLB94060.C10	DWORNF	04/15/94	150	50	33.33	12	8.00	8	5.33	10	6.67	80	53.33	15.11
HLB94060.C3A	DWORNF	04/15/94	150	58	38.67	9	6.00	17	11.33	11	7.33	95	63.33	17.65
HLB94060.C4A	DWORNF	04/15/94	150	45	30.00	7	4.67	20	13.33	12	8.00	84	56.00	17.72
HLB94060.C5A	DWORNF	04/15/94	150	51	34.00	8	5.33	14	9.33	21	14.00	94	62.67	17.40
HLB94060.C6A	DWORNF	04/15/94	150	55	36.67	8	5.33	14	9.33	19	12.67	96	64.00	20.50
HLB94060.C7A	DWORNF	04/15/94	150	48	32.00	12	8.00	21	14.00	13	8.67	94	62.67	12.41
HLB94060.C8A	DWORNF	04/15/94	150	55	36.67	12	8.00	19	12.67	11	7.33	97	64.67	16.98
HLB94060.C9A	DWORNF	04/15/94	150	40	26.67	8	5.33	18	12.00	12	8.00	78	52.00	17.79
TOTALS	**DWORNF**	**04/15/94**	**1,200**	**402**	**33.50**	**76**	**6.33**	**131**	**10.92**	**109**	**9.08**	**718**	**59.83**	**16.17**
CSM94056.A4A	DWOR	04/22/94	1,000	210	21.00	104	10.40	67	6.70	126	12.60	507	50.70	18.40
CSM94056.A4B	DWOR	04/22/94	1,000	205	20.50	92	9.20	79	7.90	127	12.70	503	50.30	18.27
CSM94056.A5A	DWOR	04/22/94	1,000	271	27.10	80	8.00	69	6.90	109	10.90	529	52.90	17.39
CSM94056.A5B	DWOR	04/22/94	1,000	268	26.80	67	6.70	74	7.40	149	14.90	558	55.80	16.99
CSM94057.A6A	DWOR	04/22/94	1,000	244	24.40	68	6.80	68	6.80	152	15.20	532	53.20	17.50
CSM94057.A6B	DWOR	04/22/94	1,000	238	23.80	85	8.50	76	7.60	153	15.30	552	55.20	17.68
TOTALS	**DWOR**	**04/22/94**	**6,000**	**1,436**	**23.93**	**496**	**8.27**	**433**	**7.22**	**816**	**13.60**	**3,181**	**53.02**	**17.59**
CSM94057.A7A	DWOR	05/06/94	1,000	141	14.10	132	13.20	72	7.20	130	13.00	475	47.50	10.53
CSM94057.A7B	DWOR	05/06/94	1,000	128	12.80	131	13.10	69	6.90	132	13.20	460	46.00	8.57
CSM94058.A8A	DWOR	05/06/94	1,000	139	13.90	135	13.50	82	8.20	131	13.10	487	48.70	9.98
CSM94058.A8B	DWOR	05/06/94	1,000	161	16.10	109	10.90	72	7.20	158	15.80	500	50.00	9.69
CSM94058.A9A	DWOR	05/06/94	1,000	128	12.80	120	12.00	94	9.40	146	14.60	488	48.80	11.71
CSM94058.A9B	DWOR	05/06/94	1,000	124	12.40	137	13.70	74	7.40	147	14.70	482	48.20	10.23
TOTALS	**DWOR**	**05/06/94**	**6,000**	**821**	**13.68**	**764**	**12.73**	**463**	**7.72**	**844**	**14.07**	**2,892**	**48.20**	**10.22**

Appendix B. Table 4c. Interrogations of PIT-tagged juvenile Chinook salmon tagged at Dworshak Fish hatchery and emigrating in 1995.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
EFP95089.SBC	LGR	04/03/95	1,004	485	48.31	1	0.10	0	0.00	0	0.00	486	48.41	2.12
HLB95033.A01	DWORNF	04/14/95	200	57	28.50	36	18.00	23	11.50	6	3.00	122	61.00	29.19
HLB95033.A02	DWORNF	04/14/95	200	60	30.00	24	12.00	26	13.00	8	4.00	118	59.00	25.30
HLB95033.A03	DWORNF	04/14/95	200	51	25.50	29	14.50	27	13.50	15	7.50	122	61.00	18.02
HLB95033.A04	DWORNF	04/14/95	200	61	30.50	31	15.50	19	9.50	11	5.50	122	61.00	24.63
HLB95033.A07	DWORNF	04/14/95	200	73	36.50	32	16.00	22	11.00	7	3.50	134	67.00	22.54
HLB95033.A08	DWORNF	04/14/95	200	54	27.00	30	15.00	30	15.00	0	0.00	114	57.00	21.24
HLB95034.A05	DWORNF	04/14/95	200	69	34.50	32	16.00	23	11.50	4	2.00	128	64.00	18.48
HLB95034.A06	DWORNF	04/14/95	200	72	36.00	28	14.00	32	16.00	1	0.50	133	66.50	18.23
HLB95034.A09	DWORNF	04/14/95	200	64	32.00	34	17.00	23	11.50	8	4.00	129	64.50	22.46
HLB95034.A10	DWORNF	04/14/95	200	75	37.50	32	16.00	27	13.50	7	3.50	141	70.50	19.50
HLB95034.B16	DWORNF	04/14/95	200	61	30.50	25	12.50	36	18.00	3	1.50	125	62.50	19.37
HLB95034.B17	DWORNF	04/14/95	200	62	31.00	24	12.00	27	13.50	9	4.50	122	61.00	22.91
HLB95034.B18	DWORNF	04/14/95	200	71	35.50	35	17.50	29	14.50	7	3.50	142	71.00	23.26
HLB95034.B19	DWORNF	04/14/95	200	60	30.00	38	19.00	22	11.00	8	4.00	128	64.00	18.28
HLB95035.B20	DWORNF	04/14/95	200	62	31.00	28	14.00	32	16.00	8	4.00	130	65.00	18.33
HLB95035.B21	DWORNF	04/14/95	200	64	32.00	35	17.50	27	13.50	7	3.50	133	66.50	17.90
HLB95035.B22	DWORNF	04/14/95	200	72	36.00	29	14.50	29	14.50	5	2.50	135	67.50	23.71
HLB95035.B23	DWORNF	04/14/95	200	61	30.50	26	13.00	32	16.00	4	2.00	123	61.50	24.24
HLB95035.B24	DWORNF	04/14/95	200	54	27.00	41	20.50	24	12.00	10	5.00	129	64.50	23.03
HLB95035.B25	DWORNF	04/14/95	200	74	37.00	24	12.00	30	15.00	5	2.50	133	66.50	24.44
TOTALS	**DWORNF**	**04/14/95**	**4,000**	**1,277**	**31.93**	**613**	**15.33**	**540**	**13.50**	**133**	**3.33**	**2,563**	**64.08**	**21.82**

Appendix B. Table 4d. Interrogations of PIT-tagged juvenile Chinook salmon tagged at Dworshak Fish hatchery and emigrating in 1996.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
HLB96045.RW6	DWORNF	04/11/96	201	51	25.37	20	9.95	27	13.43	3	1.49	101	50.25	30.10
HLB96073.RW6	DWORNF	04/11/96	3,866	1,092	28.25	572	14.80	442	11.43	92	2.38	2,198	56.85	27.31
TOTALS	**DWORNF**	**04/11/96**	**4,067**	**1,143**	**28.10**	**592**	**14.56**	**469**	**11.53**	**95**	**2.34**	**2,299**	**56.53**	**28.07**
LRB96045.RW1	CLWRNF	04/11/96	200	31	15.50	32	16.00	22	11.00	2	1.00	87	43.50	31.81
LRB96045.RW2	CLWRNF	04/11/96	200	29	14.50	15	7.50	24	12.00	3	1.50	71	35.50	35.86
LRB96045.RW3	CLWRNF	04/11/96	201	44	21.89	12	5.97	17	8.46	1	0.50	74	36.82	33.63
LRB96045.RW4	CLWRNF	04/11/96	201	47	23.38	36	17.91	16	7.96	4	1.99	103	51.24	20.20
LRB96045.RW5	CLWRNF	04/11/96	201	44	21.89	24	11.94	21	10.45	5	2.49	94	46.77	31.45
TOTALS	**CLWRNF**	**04/11/96**	**1,003**	**195**	**19.44**	**119**	**11.86**	**100**	**9.97**	**15**	**1.50**	**429**	**42.77**	**31.10**

Appendix B. Table 4e. Interrogations of PIT-tagged juvenile Chinook salmon tagged at Dworshak hatchery and emigrating in 1997.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
HLB97036.R10	DWORNF	04/07/97	4,343	741	17.06	685	15.77	300	6.91	58	1.34	1,784	41.08	31.96
HLB97037.R10	DWORNF	04/07/97	2,675	468	17.50	415	15.51	198	7.40	45	1.68	1,126	42.09	32.08
HLB97043.R10	DWORNF	04/07/97	4,577	765	16.71	703	15.36	341	7.45	73	1.59	1,882	41.12	31.39
HLB97044.R10	DWORNF	04/07/97	2,485	414	16.66	370	14.89	163	6.56	35	1.41	982	39.52	32.00
TOTALS	**DWORNF**	**04/07/97**	**14,080**	**2,388**	**16.96**	**2,173**	**15.43**	**1,002**	**7.12**	**211**	**1.50**	**5,774**	**41.01**	**31.83**

Appendix B. Table 4f. Interrogations of PIT-tagged juvenile Chinook salmon tagged at Dworshak hatchery and emigrating in 1998.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
HLB98040.R05	DWORNF	3/25/98	3,989	1,223	30.66	873	21.89	330	8.27	166	4.16	2,592	64.98	30.63
HLB98042.R07	DWORNF	3/25/98	4,017	1,296	32.26	840	20.91	324	8.07	232	5.78	2,692	67.02	30.32
HLB98043.R08	DWORNF	3/25/98	4,023	1,285	31.94	856	21.28	318	7.90	222	5.52	2,681	66.64	29.39
HLB98049.R09	DWORNF	3/25/98	4,009	1,342	33.47	798	19.91	315	7.86	216	5.39	2,671	66.63	29.40
HLB98050.R10	DWORNF	3/25/98	4,005	1,352	33.76	788	19.68	287	7.17	223	5.57	2,650	66.17	29.10
HLB98054.R11	DWORNF	3/25/98	4,009	1,376	34.32	786	19.61	312	7.78	237	5.91	2,711	67.62	29.12
HLB98056.R12	DWORNF	3/25/98	4,008	1,382	34.48	785	19.59	299	7.46	273	6.81	2,739	68.34	28.28
TOTALS	**DWORNF**	**03/25/98**	**28,060**	**9,256**	**32.99**	**5,726**	**20.41**	**2,185**	**7.79**	**1,569**	**5.59**	**18,736**	**66.77**	**29.39**
HLB98057.R16	DWORNF	3/26/98	4,005	1,289	32.18	741	18.50	338	8.44	323	8.06	2,691	67.19	25.26
HLB98061.R17	DWORNF	3/26/98	3,996	1,200	30.03	806	20.17	351	8.78	344	8.61	2,701	67.59	25.16
HLB98063.R18	DWORNF	3/26/98	3,995	1,276	31.94	745	18.65	360	9.01	363	9.09	2,744	68.69	25.18
HLB98064.R19	DWORNF	3/26/98	3,993	1,201	30.08	739	18.51	382	9.57	335	8.39	2,657	66.54	25.03
HLB98068.C20	DWORNF	3/26/98	2,998	980	32.69	565	18.85	254	8.47	282	9.41	2,081	69.41	25.19
HLB98068.R20	DWORNF	3/26/98	657	213	32.42	127	19.33	61	9.28	48	7.31	449	68.34	25.09
TOTALS	**DWORNF**	**03/26/98**	**19,644**	**6,159**	**31.35**	**3,723**	**18.95**	**1,746**	**8.89**	**1,695**	**8.63**	**13,323**	**67.82**	**25.17**

Appendix B. Table 4g. Interrogations of PIT-tagged juvenile Chinook salmon tagged at Dworshak hatchery and emigrating in 1999.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
HLB99041.R03	DWORNF	4/7/99	2,797	370	13.23	822	29.39	324	11.58	187	6.69	1,703	60.89	31.30
HLB99042.R04	DWORNF	4/7/99	5,256	732	13.93	1,364	25.95	568	10.81	307	5.84	2,971	56.53	33.07
HLB99043.R05	DWORNF	4/7/99	4,181	628	15.02	1,243	29.73	534	12.77	256	6.12	2,661	63.65	29.43
HLB99048.R06	DWORNF	4/7/99	4,096	534	13.04	1,297	31.67	503	12.28	295	7.20	2,629	64.18	27.92
HLB99049.R07	DWORNF	4/7/99	4,024	574	14.26	1,240	30.82	492	12.23	236	5.86	2,542	63.17	27.16
HLB99053.R08	DWORNF	4/7/99	4,156	631	15.18	1,389	33.42	543	13.07	206	4.96	2,769	66.63	25.56
TOTALS	**DWORNF**	4/7/99	**24,510**	**3,469**	**14.15**	**7,355**	**30.01**	**2,964**	**12.09**	**1,487**	**6.07**	**15,275**	**62.32**	**28.68**
HLB99055.R18	DWORNF	4/8/99	4,122	583	14.14	1,413	34.28	480	11.64	233	5.65	2,709	65.72	22.97
HLB99056.R19	DWORNF	4/8/99	4,108	544	13.24	1,343	32.69	473	11.51	272	6.62	2,632	64.07	26.30
HLB99060.R20	DWORNF	4/8/99	3,920	517	13.19	1,224	31.22	506	12.91	223	5.69	2,470	63.01	27.47
HLB99062.R21	DWORNF	4/8/99	4,046	538	13.30	1,281	31.66	540	13.35	294	7.27	2,653	65.57	26.19
HLB99063.R22	DWORNF	4/8/99	3,699	532	14.38	1,085	29.33	440	11.90	246	6.65	2,303	62.26	28.92
HLB99067.R23	DWORNF	4/8/99	3,440	544	15.81	1,080	31.40	427	12.41	188	5.47	2,239	65.09	28.55
TOTALS	**DWORNF**	4/8/99	**23,335**	**3,258**	**13.96**	**7,426**	**31.82**	**2,866**	**12.28**	**1,456**	**6.24**	**15,006**	**64.31**	**26.89**

Appendix B. Table 5a. Interrogations of PIT-tagged juvenile Chinook salmon tagged at Rapid River Fish hatchery and emigrating in 1993.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
EJL92191.SQC	SQUAWC	07/09/92	698	24	3.44	16	2.29	4	0.57	2	0.29	46	6.59	310.15
EJL92191.WSC	WHITSC	07/09/92	698	12	1.72	4	0.57	0	0.00	0	0.00	16	2.29	318.17
EJL92191.BFC	WHITSC	07/23/92	700	10	1.43	18	2.57	8	1.14	0	0.00	36	5.14	295.57
DAC93062.1BA	RAPH	04/14/93	50	17	34.00	3	6.00	6	12.00	3	6.00	29	58.00	20.63
DAC93062.1BL	RAPH	04/14/93	51	16	31.37	4	7.84	6	11.76	0	0.00	26	50.98	18.18
DAC93063.1AA	RAPH	04/14/93	50	14	28.00	4	8.00	4	8.00	0	0.00	22	44.00	21.86
DAC93063.1AL	RAPH	04/14/93	50	12	24.00	5	10.00	2	4.00	3	6.00	22	44.00	19.95
DAC93063.2AA	RAPH	04/14/93	50	15	30.00	7	14.00	2	4.00	1	2.00	25	50.00	21.42
DAC93063.2AL	RAPH	04/14/93	50	21	42.00	6	12.00	2	4.00	0	0.00	29	58.00	19.60
TOTALS	**RAPH**	**04/14/93**	**301**	**95**	**31.56**	**29**	**9.63**	**22**	**7.31**	**7**	**2.33**	**153**	**50.83**	**22.04**
DAC93063.HEA	HCD	04/16/93	50	13	26.00	2	4.00	4	8.00	4	8.00	23	46.00	17.22
DAC93063.HEL	HCD	04/16/93	50	14	28.00	9	18.00	4	8.00	1	2.00	28	56.00	15.21
TOTALS	**HCD**	**04/16/93**	**100**	**27**	**27.00**	**11**	**11.00**	**8**	**8.00**	**5**	**5.00**	**51**	**51.00**	**17.22**
LRB93062.RAF	RAPH	04/17/93	1,486	494	33.24	153	10.30	129	8.68	36	2.42	812	54.64	16.66
LRB93062.RHF	RAPH	04/17/93	1,515	504	33.27	167	11.02	120	7.92	48	3.17	839	55.38	16.65
TOTALS	**RAPH**	**04/17/93**	**3,001**	**998**	**33.26**	**320**	**10.66**	**249**	**8.30**	**84**	**2.80**	**1,651**	**55.01**	**17.88**

Appendix B. Table 5b. Interrogations of PIT-tagged juvenile Chinook salmon released from Rapid River hatchery and emigrating in 1994.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
LRB94066.RRH	RAPH	04/12/94	1,501	364	24.25	74	4.93	63	4.20	57	3.80	558	37.18	21.18
LRB94067.RRA	RAPH	04/21/94	1,500	283	18.87	67	4.47	58	3.87	56	3.73	464	30.93	17.82

Appendix B. Table 5c. Interrogations of PIT-tagged juvenile Chinook salmon tagged at Rapid River hatchery and emigrating in 1995.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
DAC95046.RHC	HCD	03/30/95	501	182	36.33	41	8.18	18	3.59	17	3.39	258	51.50	29.12
LRB95045.RA1	RAPH	03/31/95	492	187	38.01	67	13.62	42	8.54	15	3.05	311	63.21	31.33
LRB95045.RA2	RAPH	03/31/95	498	182	36.55	67	13.45	35	7.03	14	2.81	298	59.84	30.88
LRB95046.R3A	RAPH	03/31/95	499	182	36.47	47	9.42	45	9.02	21	4.21	295	59.12	30.34
LRB95046.R4A	RAPH	03/31/95	500	155	31.00	84	16.80	46	9.20	13	2.60	298	59.60	31.26
TOTALS	**RAPH**	**03/31/95**	**1,989**	**706**	**35.50**	**265**	**13.32**	**168**	**8.45**	**63**	**3.17**	**1,202**	**60.43**	**31.03**

Appendix B. Table 5d. Interrogations of PIT-tagged juvenile Chinook salmon tagged at Rapid River hatchery and emigrating in 1996.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
DAC96074.R11	RAPH	03/19/96	1,698	375	22.08	210	12.37	121	7.13	43	2.53	749	44.11	44.24
DAC96074.R12	RAPH	03/19/96	1,698	366	21.55	201	11.84	130	7.66	43	2.53	740	43.58	45.12
DAC96074.R13	RAPH	03/19/96	382	81	21.20	44	11.52	22	5.76	6	1.57	153	40.05	46.27
DAC96074.R14	RAPH	03/19/96	2,223	508	22.85	250	11.25	150	6.75	52	2.34	960	43.18	44.34
DAC96074.R21	RAPH	03/19/96	1,698	399	23.50	192	11.31	114	6.71	37	2.18	742	43.70	44.14
DAC96074.R22	RAPH	03/19/96	788	184	23.35	80	10.15	55	6.98	19	2.41	338	42.89	44.60
DAC96074.R23	RAPH	03/19/96	1,641	366	22.30	183	11.15	140	8.53	37	2.25	726	44.24	45.36
DAC96074.R31	RAPH	03/19/96	735	168	22.86	71	9.66	66	8.98	11	1.50	316	42.99	44.31
DAC96074.R32	RAPH	03/19/96	2,351	549	23.35	238	10.12	165	7.02	70	2.98	1,022	43.47	45.26
DAC96074.R41	RAPH	03/19/96	805	190	23.60	98	12.17	44	5.47	19	2.36	351	43.60	43.66
DAC96074.R42	RAPH	03/19/96	2,553	599	23.46	269	10.54	201	7.87	58	2.27	1,127	44.14	44.07
DAC96075.R15	RAPH	03/19/96	398	96	24.12	37	9.30	36	9.05	8	2.01	177	44.47	44.46
DAC96075.R24	RAPH	03/19/96	199	46	23.12	20	10.05	13	6.53	7	3.52	86	43.22	47.45
TOTALS	**RAPH**	**03/19/96**	**17,169**	**3,927**	**22.87**	**1,893**	**11.03**	**1,257**	**7.32**	**410**	**2.39**	**7,487**	**43.61**	**44.48**
LRB96060.RR1	RAPH	04/02/96	500	101	20.20	52	10.40	44	8.80	19	3.80	216	43.20	30.75
LRB96061.RR2	RAPH	04/03/96	500	101	20.20	56	11.20	28	5.60	8	1.60	193	38.60	30.48
LRB96061.RR3	RAPH	04/04/96	500	102	20.40	49	9.80	28	5.60	10	2.00	189	37.80	29.46
LRB96061.RR4	RAPH	04/05/96	506	111	21.94	66	13.04	39	7.71	3	0.59	219	43.28	28.52

Appendix B. Table 5e. Interrogations of PIT-tagged juvenile Chinook salmon tagged at Rapid River hatchery and emigrating in 1997.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
LRB96269.R11	RAPH	04/01/97	750	98	13.07	64	8.53	37	4.93	7	0.93	206	27.47	33.89
LRB96269.R21	RAPH	04/01/97	752	103	13.70	74	9.84	28	3.72	8	1.06	213	28.32	33.14
LRB96269.R31	RAPH	04/01/97	575	107	18.61	48	8.35	28	4.87	7	1.22	190	33.04	34.77
LRB96269.R4	RAPH	04/01/97	925	126	13.62	82	8.86	47	5.08	7	0.76	262	28.32	35.12
LRB96270.R11	RAPH	04/01/97	1,027	142	13.83	87	8.47	35	3.41	17	1.66	281	27.36	34.21
LRB96270.R12	RAPH	04/01/97	1,124	160	14.23	117	10.41	59	5.25	9	0.80	345	30.69	35.36
LRB96270.R13	RAPH	04/01/97	1,000	167	16.70	87	8.70	49	4.90	6	0.60	309	30.90	33.98
LRB96270.R14	RAPH	04/01/97	1,068	146	13.67	104	9.74	52	4.87	12	1.12	314	29.40	34.10
LRB96270.R15	RAPH	04/01/97	487	57	11.70	36	7.39	23	4.72	5	1.03	121	24.85	35.02
LRB96270.R21	RAPH	04/01/97	1,001	136	13.59	98	9.79	41	4.10	13	1.30	288	28.77	34.04
LRB96270.R22	RAPH	04/01/97	1,001	136	13.59	89	8.89	45	4.50	6	0.60	276	27.57	32.68
LRB96270.R23	RAPH	04/01/97	1,015	130	12.81	102	10.05	44	4.33	9	0.89	285	28.08	32.89
LRB96270.R24	RAPH	04/01/97	1,037	124	11.96	104	10.03	41	3.95	9	0.87	278	26.81	34.00
LRB96270.R25	RAPH	04/01/97	1,143	171	14.96	108	9.45	41	3.59	6	0.52	326	28.52	35.93
LRB96270.R32	RAPH	04/01/97	1,067	161	15.09	105	9.84	38	3.56	6	0.56	310	29.05	35.29
LRB96270.R33	RAPH	04/01/97	1,053	156	14.81	96	9.12	58	5.51	12	1.14	322	30.58	32.98
LRB96270.R34	RAPH	04/01/97	1,200	181	15.08	111	9.25	57	4.75	13	1.08	362	30.17	32.94
LRB96270.R35	RAPH	04/01/97	1,085	160	14.75	117	10.78	45	4.15	10	0.92	332	30.60	34.01
LRB96270.R36	RAPH	04/01/97	696	94	13.51	62	8.91	33	4.74	5	0.72	194	27.87	34.30
LRB96270.R42	RAPH	04/01/97	1,721	265	15.40	159	9.24	88	5.11	17	0.99	529	30.74	33.90
LRB96270.R43	RAPH	04/01/97	1,000	143	14.30	95	9.50	50	5.00	6	0.60	294	29.40	34.84
LRB96270.R44	RAPH	04/01/97	1,000	149	14.90	86	8.60	46	4.60	14	1.40	295	29.50	34.57
LRB96270.R45	RAPH	04/01/97	1,015	132	13.00	103	10.15	37	3.65	10	0.99	282	27.78	40.69
LRB96270.R46	RAPH	04/01/97	650	111	17.08	61	9.38	32	4.92	2	0.31	206	31.69	33.95
LRB96271.R11	RAPH	04/01/97	1,000	150	15.00	108	10.80	63	6.30	6	0.60	327	32.70	33.92
LRB96271.R12	RAPH	04/01/97	1,020	163	15.98	96	9.41	49	4.80	9	0.88	317	31.08	35.29
LRB96271.R14	RAPH	04/01/97	1,007	64	6.36	44	4.37	36	3.57	7	0.70	151	15.00	59.08
LRB96271.R21	RAPH	04/01/97	1,034	159	15.38	112	10.83	49	4.74	10	0.97	330	31.91	33.81
LRB96271.R22	RAPH	04/01/97	637	88	13.81	55	8.63	33	5.18	8	1.26	184	28.89	33.15
LRB96271.R23	RAPH	04/01/97	1,001	157	15.68	91	9.09	51	5.09	7	0.70	306	30.57	33.09
LRB96271.R25	RAPH	04/01/97	1,002	63	6.29	55	5.49	32	3.19	4	0.40	154	15.37	50.02
LRB96271.R26	RAPH	04/01/97	660	59	8.94	28	4.24	31	4.70	4	0.61	122	18.48	50.32
LRB96271.R31	RAPH	04/01/97	1,000	150	15.00	109	10.90	56	5.60	8	0.80	323	32.30	34.12
LRB96271.R32	RAPH	04/01/97	1,071	140	13.07	107	9.99	54	5.04	12	1.12	313	29.23	32.98
LRB96271.R33	RAPH	04/01/97	397	68	17.13	30	7.56	13	3.27	3	0.76	114	28.72	34.06
LRB96271.R34	RAPH	04/01/97	1,011	73	7.22	58	5.74	37	3.66	7	0.69	175	17.31	50.22
LRB96271.R35	RAPH	04/01/97	599	38	6.34	36	6.01	23	3.84	5	0.83	102	17.03	49.00
LRB96271.R41	RAPH	04/01/97	1,000	151	15.10	102	10.20	43	4.30	7	0.70	303	30.30	32.95
LRB96271.R42	RAPH	04/01/97	1,000	142	14.20	100	10.00	45	4.50	11	1.10	298	29.80	34.12
LRB96271.R43	RAPH	04/01/97	519	96	18.50	38	7.32	24	4.62	6	1.16	164	31.60	33.95
LRB96271.R44	RAPH	04/01/97	1,219	100	8.20	90	7.38	53	4.35	8	0.66	251	20.59	50.33
LRB96272.R13	RAPH	04/01/97	985	132	13.40	103	10.46	40	4.06	10	1.02	285	28.93	33.43
LRB96272.R15	RAPH	04/01/97	464	35	7.54	23	4.96	20	4.31	2	0.43	80	17.24	61.25
LRB96272.R24	RAPH	04/01/97	499	66	13.23	49	9.82	33	6.61	2	0.40	150	30.06	33.65
TOTALS	**RAPH**	**04/01/97**	**40,517**	**5,449**	**13.45**	**3,629**	**8.96**	**1,839**	**4.54**	**352**	**0.87**	**11,269**	**27.81**	**38.83**

Appendix B. Table 5f. Interrogations of PIT-tagged juvenile Chinook salmon tagged at Rapid River hatchery and emigrating in 1998.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
LRB98040.R11	RAPH	04/13/98	999	337	33.73	146	14.61	73	7.31	19	1.90	575	57.56	19.55
LRB98040.R12	RAPH	04/13/98	1,000	343	34.30	156	15.60	50	5.00	22	2.20	571	57.10	19.65
LRB98040.R13	RAPH	04/13/98	806	263	32.63	137	17.00	57	7.07	13	1.61	470	58.31	19.64
LRB98040.R21	RAPH	04/13/98	1,019	366	35.92	132	12.95	67	6.58	16	1.57	581	57.02	20.21
LRB98040.R22	RAPH	04/13/98	1,000	326	32.60	164	16.40	60	6.00	17	1.70	567	56.70	19.58
LRB98040.R23	RAPH	04/13/98	1,025	358	34.93	173	16.88	70	6.83	33	3.22	634	61.85	20.21
LRB98040.R32	RAPH	04/13/98	1,027	354	34.47	157	15.29	66	6.43	17	1.66	594	57.84	19.42
LRB98040.R33	RAPH	04/13/98	1,002	364	36.33	161	16.07	59	5.89	25	2.50	609	60.78	19.51
LRB98040.R34	RAPH	04/13/98	371	126	33.96	63	16.98	22	5.93	6	1.62	217	58.49	19.59
LRB98040.R3B	RAPH	04/13/98	1,000	353	35.30	143	14.30	57	5.70	21	2.10	574	57.40	19.71
LRB98040.R41	RAPH	04/13/98	998	339	33.97	167	16.73	62	6.21	18	1.80	586	58.72	20.37
LRB98040.R42	RAPH	04/13/98	1,000	335	33.50	155	15.50	70	7.00	22	2.20	582	58.20	19.44
LRB98040.R43	RAPH	04/13/98	998	340	34.07	156	15.63	56	5.61	24	2.40	576	57.72	19.41
LRB98040.R44	RAPH	04/13/98	173	65	37.57	28	16.18	6	3.47	3	1.73	102	58.96	19.41
LRB98041.R11	RAPH	04/13/98	1,000	358	35.80	159	15.90	54	5.40	16	1.60	587	58.70	19.55
LRB98041.R12	RAPH	04/13/98	1,000	335	33.50	160	16.00	84	8.40	22	2.20	601	60.10	19.85
LRB98041.R13	RAPH	04/13/98	884	300	33.94	132	14.93	71	8.03	13	1.47	516	58.37	18.59
LRB98041.R14	RAPH	04/13/98	999	324	32.43	166	16.62	65	6.51	19	1.90	574	57.46	18.91
LRB98041.R22	RAPH	04/13/98	1,000	347	34.70	159	15.90	63	6.30	22	2.20	591	59.10	18.61
LRB98041.R23	RAPH	04/13/98	1,000	347	34.70	149	14.90	55	5.50	19	1.90	570	57.00	19.39
LRB98041.R24	RAPH	04/13/98	543	204	37.57	81	14.92	22	4.05	9	1.66	316	58.20	18.47
LRB98041.R2A	RAPH	04/13/98	1,000	329	32.90	171	17.10	47	4.70	26	2.60	573	57.30	19.62
LRB98041.R31	RAPH	04/13/98	1,000	336	33.60	165	16.50	73	7.30	12	1.20	586	58.60	19.53
LRB98041.R32	RAPH	04/13/98	1,001	328	32.77	158	15.78	65	6.49	16	1.60	567	56.64	20.52
LRB98041.R33	RAPH	04/13/98	408	144	35.29	68	16.67	31	7.60	9	2.21	252	61.76	20.40
LRB98041.R34	RAPH	04/13/98	999	307	30.73	194	19.42	53	5.31	20	2.00	574	57.46	19.17
LRB98041.R35	RAPH	04/13/98	998	360	36.07	181	18.14	68	6.81	22	2.20	631	63.23	18.73
LRB98041.R41	RAPH	04/13/98	1,000	359	35.90	142	14.20	70	7.00	23	2.30	594	59.40	19.49
LRB98041.R42	RAPH	04/13/98	1,000	342	34.20	168	16.80	71	7.10	12	1.20	593	59.30	20.14
LRB98041.R43	RAPH	04/13/98	678	249	36.73	103	15.19	47	6.93	10	1.47	409	60.32	19.38
LRB98041.R44	RAPH	04/13/98	1,000	327	32.70	161	16.10	66	6.60	23	2.30	577	57.70	18.41
LRB98041.R45	RAPH	04/13/98	1,000	332	33.20	158	15.80	73	7.30	19	1.90	582	58.20	19.39
LRB98042.R11	RAPH	04/13/98	1,006	341	33.90	155	15.41	61	6.06	20	1.99	577	57.36	19.54
LRB98042.R12	RAPH	04/13/98	999	350	35.04	143	14.31	54	5.41	17	1.70	564	56.46	18.58
LRB98042.R13	RAPH	04/13/98	1,000	314	31.40	156	15.60	72	7.20	28	2.80	570	57.00	19.50
LRB98042.R14	RAPH	04/13/98	1,000	312	31.20	158	15.80	92	9.20	19	1.90	581	58.10	20.29
LRB98042.R15	RAPH	04/13/98	942	323	34.29	160	16.99	57	6.05	23	2.44	563	59.77	19.83
LRB98042.R21	RAPH	04/13/98	1,000	330	33.00	156	15.60	57	5.70	16	1.60	559	55.90	19.48
LRB98042.R22	RAPH	04/13/98	1,000	339	33.90	154	15.40	62	6.20	17	1.70	572	57.20	18.61
LRB98042.R23	RAPH	04/13/98	1,000	352	35.20	160	16.00	66	6.60	21	2.10	599	59.90	19.33
LRB98042.R24	RAPH	04/13/98	1,000	329	32.90	170	17.00	71	7.10	24	2.40	594	59.40	19.41
LRB98042.R25	RAPH	04/13/98	477	181	37.95	66	13.84	27	5.66	12	2.52	286	59.96	20.19
LRB98042.R31	RAPH	04/13/98	1,000	316	31.60	160	16.00	65	6.50	22	2.20	563	56.30	18.94
LRB98042.R32	RAPH	04/13/98	997	364	36.51	160	16.05	73	7.32	15	1.50	612	61.38	19.32
LRB98042.R33	RAPH	04/13/98	1,013	332	32.77	161	15.89	60	5.92	18	1.78	571	56.37	19.58
LRB98042.R34	RAPH	04/13/98	1,000	340	34.00	153	15.30	67	6.70	20	2.00	580	58.00	19.47
LRB98042.R35	RAPH	04/13/98	998	339	33.97	149	14.93	66	6.61	28	2.81	582	58.32	19.38
LRB98042.R41	RAPH	04/13/98	1,000	349	34.90	151	15.10	68	6.80	21	2.10	589	58.90	19.52
LRB98042.R42	RAPH	04/13/98	999	313	31.33	153	15.32	66	6.61	19	1.90	551	55.16	19.23
LRB98042.R43	RAPH	04/13/98	999	317	31.73	159	15.92	70	7.01	24	2.40	570	57.06	20.48
LRB98042.R44	RAPH	04/13/98	999	337	33.73	169	16.92	54	5.41	20	2.00	580	58.06	19.47
LRB98042.R45	RAPH	04/13/98	1,000	334	33.40	166	16.60	73	7.30	14	1.40	587	58.70	19.32
TOTALS	**RAPH**	**04/13/98**	**48,357**	**16,409**	**33.93**	**7,672**	**15.87**	**3,134**	**6.48**	**966**	**2.00**	**28,181**	**58.28**	**19.49**

Appendix B. Table 5g. Interrogations of PIT-tagged juvenile Chinook salmon tagged at Rapid River hatchery and emigrating in 1999.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
JLC99041.R43	RAPH	04/02/99	1,000	219	21.90	271	27.10	86	8.60	29	2.90	605	60.50	38.73
JLC99041.R44	RAPH	04/02/99	1,000	191	19.10	281	28.10	83	8.30	22	2.20	577	57.70	36.79
JLC99041.R45	RAPH	04/02/99	1,000	198	19.80	282	28.20	74	7.40	27	2.70	581	58.10	38.02
LRB99040.R11	RAPH	04/02/99	858	195	22.73	225	26.22	71	8.28	30	3.50	521	60.72	37.54
LRB99040.R21	RAPH	04/02/99	590	124	21.02	167	28.31	58	9.83	16	2.71	365	61.86	36.47
LRB99040.R31	RAPH	04/02/99	2,909	596	20.49	806	27.71	281	9.66	103	3.54	1,786	61.40	36.07
LRB99040.R41	RAPH	04/02/99	999	221	22.12	296	29.63	81	8.11	27	2.70	625	62.56	36.69
LRB99040.R42	RAPH	04/02/99	998	199	19.94	271	27.15	94	9.42	32	3.21	596	59.72	35.11
LRB99040.R43	RAPH	04/02/99	1,000	209	20.90	269	26.90	98	9.80	40	4.00	616	61.60	36.44
LRB99040.R44	RAPH	04/02/99	1,000	209	20.90	266	26.60	87	8.70	39	3.90	601	60.10	36.19
LRB99040.R45	RAPH	04/02/99	867	197	22.72	229	26.41	85	9.80	31	3.58	542	62.51	37.60
LRB99041.R11	RAPH	04/02/99	997	218	21.87	264	26.48	96	9.63	39	3.91	617	61.89	37.81
LRB99041.R12	RAPH	04/02/99	999	225	22.52	265	26.53	94	9.41	40	4.00	624	62.46	37.06
LRB99041.R13	RAPH	04/02/99	1,000	218	21.80	271	27.10	88	8.80	38	3.80	615	61.50	40.99
LRB99041.R14	RAPH	04/02/99	998	214	21.44	263	26.35	76	7.62	38	3.81	591	59.22	37.12
LRB99041.R15	RAPH	04/02/99	803	169	21.05	216	26.90	74	9.22	25	3.11	484	60.27	39.17
LRB99041.R21	RAPH	04/02/99	372	81	21.77	103	27.69	35	9.41	21	5.65	240	64.52	37.23
LRB99041.R22	RAPH	04/02/99	1,000	215	21.50	267	26.70	88	8.80	33	3.30	603	60.30	37.99
LRB99041.R23	RAPH	04/02/99	1,000	223	22.30	256	25.60	81	8.10	34	3.40	594	59.40	37.11
LRB99041.R24	RAPH	04/02/99	295	68	23.05	73	24.75	33	11.19	7	2.37	181	61.36	35.90
LRB99041.R31	RAPH	04/02/99	5,314	1,136	21.38	1,463	27.53	499	9.39	206	3.88	3,304	62.18	36.96
LRB99041.R41	RAPH	04/02/99	1,000	219	21.90	283	28.30	86	8.60	31	3.10	619	61.90	36.67
LRB99041.R42	RAPH	04/02/99	999	200	20.02	255	25.53	86	8.61	35	3.50	576	57.66	36.91
LRB99041.R46	RAPH	04/02/99	929	188	20.24	228	24.54	89	9.58	36	3.88	541	58.23	36.02
LRB99042.R11	RAPH	04/02/99	999	211	21.12	282	28.23	80	8.01	41	4.10	614	61.46	35.89
LRB99042.R12	RAPH	04/02/99	995	194	19.50	284	28.54	92	9.25	39	3.92	609	61.21	36.06
LRB99042.R13	RAPH	04/02/99	996	192	19.28	269	27.01	82	8.23	46	4.62	589	59.14	37.80
LRB99042.R14	RAPH	04/02/99	1,000	215	21.50	256	25.60	78	7.80	40	4.00	589	58.90	37.09
LRB99042.R15	RAPH	04/02/99	624	126	20.19	168	26.92	59	9.46	30	4.81	383	61.38	38.77
LRB99042.R21	RAPH	04/02/99	1,000	224	22.40	248	24.80	90	9.00	40	4.00	602	60.20	37.11
LRB99042.R22	RAPH	04/02/99	1,000	196	19.60	294	29.40	79	7.90	44	4.40	613	61.30	36.79
LRB99042.R23	RAPH	04/02/99	1,000	219	21.90	271	27.10	85	8.50	36	3.60	611	61.10	37.13
LRB99042.R24	RAPH	04/02/99	999	217	21.72	267	26.73	86	8.61	31	3.10	601	60.16	36.59
LRB99042.R25	RAPH	04/02/99	449	90	20.04	122	27.17	29	6.46	19	4.23	260	57.91	38.01
LRB99042.R31	RAPH	04/02/99	5,337	1,085	20.33	1,402	26.27	459	8.60	201	3.77	3,147	58.97	36.95
LRB99042.R41	RAPH	04/02/99	1,000	218	21.80	274	27.40	82	8.20	37	3.70	611	61.10	35.84
LRB99042.R42	RAPH	04/02/99	1,000	208	20.80	284	28.40	79	7.90	40	4.00	611	61.10	39.85
LRB99042.R43	RAPH	04/02/99	1,000	207	20.70	249	24.90	84	8.40	41	4.10	581	58.10	36.71
LRB99042.R44	RAPH	04/02/99	1,000	220	22.00	278	27.80	95	9.50	43	4.30	636	63.60	35.32
LRB99042.R45	RAPH	04/02/99	1,000	204	20.40	269	26.90	72	7.20	42	4.20	587	58.70	36.89
LRB99042.R46	RAPH	04/02/99	496	92	18.55	119	23.99	45	9.07	19	3.83	275	55.44	33.82
TOTALS	**RAPH**	**04/02/99**	**47,822**	**10,050**	**21.02**	**12,906**	**26.99**	**4,199**	**8.78**	**1,768**	**3.70**	**28,923**	**60.48**	**36.95**
LRB99089.RR1	RAPH	04/20/99	975	0	0.00	0	0.00	0	0.00	51	5.23	51	5.23	0.00
LRB99089.RR2	RAPH	04/20/99	500	0	0.00	0	0.00	0	0.00	26	5.20	26	5.20	0.00
TOTALS	**RAPH**	**04/20/99**	**1,475**	**0**	**0.00**	**0**	**0.00**	**0**	**0.00**	**77**	**5.22**	**77**	**5.22**	**0.00**

Appendix B. Table 6a. Interrogations of PIT-tagged juvenile Chinook salmon released from Pahsimeroi Fish hatchery and emigrating in 1993.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
DAC93062.PA1	PAHP	04/14/93	300	77	25.67	22	7.33	15	5.00	7	2.33	121	40.33	19.17
DAC93062.PA2	PAHP	04/14/93	300	58	19.33	26	8.67	18	6.00	5	1.67	107	35.67	19.53
TOTAL	**PAHP**	**04/14/93**	**600**	**135**	**22.50**	**48**	**8.00**	**33**	**5.50**	**12**	**2.00**	**228**	**38.00**	**19.35**
EJL93333.PRT	PAHSIR	11/29/93	114	9	7.89	0	0.00	2	1.75	1	0.88	12	10.53	153.63
EJL93334.PRT	PAHSIR	11/30/93	79	8	10.13	1	1.27	2	2.53	2	2.53	13	16.46	154.96
TOTAL	**PAHSIR**	**11/29-11/30/93**	**193**	**17**	**8.81**	**1**	**0.52**	**4**	**2.07**	**3**	**1.55**	**25**	**12.95**	**154.29**

Appendix B. Table 6b. Interrogations of PIT-tagged juvenile Chinook salmon released from Pahsimeroi Fish hatchery and emigrating in 1994.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
DAC93274.PP1	PAHP	04/12/94	499	82	16.43	10	2.00	8	1.60	18	3.61	118	23.65	18.23
DAC93274.PP2	PAHP	04/12/94	498	61	12.25	11	2.21	11	2.21	25	5.02	108	21.69	15.41
TOTALS	**PAHP**	**04/12/94**	**997**	**143**	**14.34**	**21**	**2.11**	**19**	**1.91**	**43**	**4.31**	**226**	**22.67**	**16.79**

Appendix B. Table 6c. Interrogations of PIT-tagged juvenile Chinook salmon released from Pahsimeroi Fish hatchery and emigrating in 1995.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
TSC95055.PPT	PAHP	02/24/95	494	66	13.36	30	6.07	21	4.25	6	1.21	123	24.90	70.20

Appendix B. Table 6d. Interrogations of PIT-tagged juvenile Chinook salmon released from Pahsimeroi Fish hatchery and emigrating in 1996.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
No Fish Were Released in 1996														

Appendix B. Table 6e. Interrogations of PIT-tagged juvenile Chinook salmon released from Pahsimeroi Fish hatchery and emigrating in 1997.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
LRB96274.P32	PAHP	04/07/97	1,000	144	14.40	104	10.40	39	3.90	10	1.00	297	29.70	38.29
LRB96274.P33	PAHP	04/07/97	1,139	207	18.17	125	10.97	43	3.78	11	0.97	386	33.89	37.43
LRB96274.P41	PAHP	04/07/97	1,002	141	14.07	111	11.08	50	4.99	11	1.10	313	31.24	37.70
LRB96274.P42	PAHP	04/07/97	1,000	158	15.80	104	10.40	44	4.40	12	1.20	318	31.80	37.41
LRB96274.P43	PAHP	04/07/97	1,001	133	13.29	84	8.39	62	6.19	9	0.90	288	28.77	38.48
LRB96274.P44	PAHP	04/07/97	329	52	15.81	44	13.37	11	3.34	3	0.91	110	33.43	31.17
LRB96275.P11	PAHP	04/07/97	1,000	148	14.80	119	11.90	49	4.90	9	0.90	325	32.50	37.18
LRB96275.P12	PAHP	04/07/97	500	80	16.00	70	14.00	29	5.80	4	0.80	183	36.60	37.38
LRB96275.P21	PAHP	04/07/97	1,021	166	16.26	127	12.44	42	4.11	16	1.57	351	34.38	36.55
LRB96275.P22	PAHP	04/07/97	623	93	14.93	69	11.08	26	4.17	5	0.80	193	30.98	38.21
LRB96275.P31	PAHP	04/07/97	1,000	140	14.00	112	11.20	56	5.60	13	1.30	321	32.10	38.32
LRB96275.P32	PAHP	04/07/97	250	48	19.20	23	9.20	14	5.60	4	1.60	89	35.60	38.04
LRB96275.P33	PAHP	04/07/97	1,000	245	24.50	118	11.80	47	4.70	9	0.90	419	41.90	31.45
LRB96275.P34	PAHP	04/07/97	317	63	19.87	44	13.88	25	7.89	5	1.58	137	43.22	29.96
LRB96275.P41	PAHP	04/07/97	1,000	160	16.00	106	10.60	39	3.90	15	1.50	320	32.00	37.05
LRB96275.P42	PAHP	04/07/97	750	119	15.87	87	11.60	26	3.47	7	0.93	239	31.87	38.37
LRB96275.P43	PAHP	04/07/97	74	14	18.92	11	14.86	2	2.70	0	0.00	27	36.49	36.08
LRB96275.P44	PAHP	04/07/97	1,015	244	24.04	126	12.41	52	5.12	19	1.87	441	43.45	32.43
LRB96275.P45	PAHP	04/07/97	1,085	228	21.01	130	11.98	64	5.90	16	1.47	438	40.37	31.62
LRB96276.P11	PAHP	04/07/97	1,000	240	24.00	126	12.60	56	5.60	14	1.40	436	43.60	30.42
LRB96276.P12	PAHP	04/07/97	1,000	239	23.90	129	12.90	55	5.50	17	1.70	440	44.00	31.74
LRB96276.P13	PAHP	04/07/97	1,000	225	22.50	120	12.00	57	5.70	13	1.30	415	41.50	31.08
LRB96276.P21	PAHP	04/07/97	1,000	237	23.70	116	11.60	53	5.30	17	1.70	423	42.30	30.42
LRB96276.P22	PAHP	04/07/97	1,000	226	22.60	114	11.40	64	6.40	13	1.30	417	41.70	32.80
LRB96276.P23	PAHP	04/07/97	1,000	244	24.40	115	11.50	47	4.70	14	1.40	420	42.00	29.68
LRB96276.P24	PAHP	04/07/97	528	126	23.86	59	11.17	23	4.36	10	1.89	218	41.29	30.17
LRB96276.P31	PAHP	04/07/97	1,000	220	22.00	132	13.20	62	6.20	18	1.80	432	43.20	32.01
LRB96276.P32	PAHP	04/07/97	1,000	216	21.60	128	12.80	42	4.20	17	1.70	403	40.30	29.39
LRB96276.P33	PAHP	04/07/97	1,000	237	23.70	128	12.80	58	5.80	19	1.90	442	44.20	32.84
LRB96276.P34	PAHP	04/07/97	600	130	21.67	83	13.83	35	5.83	9	1.50	257	42.83	31.11
LRB96276.P41	PAHP	04/07/97	1,000	241	24.10	103	10.30	45	4.50	14	1.40	403	40.30	31.07
LRB96276.P42	PAHP	04/07/97	1,000	246	24.60	118	11.80	58	5.80	24	2.40	446	44.60	29.65
LRB96276.P43	PAHP	04/07/97	1,000	224	22.40	102	10.20	53	5.30	22	2.20	401	40.10	33.37
LRB96276.P44	PAHP	04/07/97	1,000	232	23.20	118	11.80	46	4.60	21	2.10	417	41.70	30.55
LRB96276.P45	PAHP	04/07/97	400	102	25.50	42	10.50	21	5.25	8	2.00	173	43.25	29.94
TOTALS	**PAHP**	**04/07/97**	**29,634**	**5,968**	**20.14**	**3,447**	**11.63**	**1,495**	**5.04**	**428**	**1.44**	**11,338**	**38.26**	**34.35**

Appendix B. Table 6f. Interrogations of PIT-tagged juvenile Chinook salmon tagged at Pahsimeroi hatchery and emigrating in 1998.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
KEP98064.PA1	PAHP	04/04/98	499	105	21.04	59	11.82	18	3.61	9	1.80	191	38.28	32.92
KEP98064.PAH	PAHP	04/04/98	494	81	16.40	62	12.55	24	4.86	4	0.81	171	34.62	31.78
TOTALS	**PAHP**	**04/04/98**	**993**	**186**	**18.73**	**121**	**12.19**	**42**	**4.23**	**13**	**1.31**	**362**	**36.46**	**32.40**

Appendix B. Table 6g. Interrogations of PIT-tagged juvenile Chinook salmon tagged at Pahsimeroi hatchery and emigrating in 1999.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
KEP99068.PAH	PAHP	04/16/99	500	108	21.60	93	18.60	25	5.00	15	3.00	241	48.20	25.98

Appendix B. Table 7a. Interrogations of PIT-tagged juvenile Chinook salmon released from Oxbow Fish hatchery and emigrating in 1993.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
DAC93063.HEL	HCD	3/4/1993	50	14	28.00	9	18.00	4	8.00	1	2.00	28	56.00	15.21
DAC93063.HEA	HCD	3/4/1993	50	13	26.00	2	4.00	4	8.00	4	8.00	23	46.00	17.22
Totals:			**100**	**27**	**27.00**	**11**	**22.00**	**8**	**8.00**	**5**	**5.00**	**51**	**51.00**	**16.29**

Appendix B. Table 7b. Interrogations of PIT-tagged juvenile Chinook salmon released from Oxbow Fish hatchery and emigrating in 1995.

File Name	Rel. Site	Rel. Date	No. Rel.	LGR		LGO		LMN		MCN		TOTAL		Median travel time (days)
				No.	%	No.	%	No.	%	No.	%	No.	%	
DAC95046.RHC	HCD	02/15/95	501	182	36.33	41	8.18	18	3.59	17	3.39	258	51.5	29.12
Totals:			**501**	**182**	**36.33**	**41**	**8.18**	**18**	**3.59**	**17**	**3.39**	**258**	**51.5**	**29.12**

Prepared by:

Chris Harrington
Sr. Fisheries Research Biologist

Brian Leth
Sr. Fisheries Research Biologist

Tracy Petering
Technical Records Specialist

Paul Kline
Principal Fisheries Research Biologist

Approved by:

IDAHO DEPARTMENT OF FISH AND GAME

Steve Yundt, Chief
Bureau of Fisheries

Daniel J. Schill
Fisheries Research Manager