Nez Perce Tribal Hatchery Monitoring and Evaluation Project

Fall Chinook Salmon (*Oncorhynchus tshawytscha*)
Supplementation in the Clearwater River Subbasin

Annual Report 2010

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EXECUTIVE SUMMARY

This is year nine of fall Chinook salmon Monitoring and Evaluation (M&E) for the Nez Perce Tribal Hatchery (NPTH) located on the lower Clearwater River in Idaho. Phase I of NPTH is to produce 1.4 million fall Chinook salmon juveniles for supplementation releases in the Clearwater River Subbasin. Full production releases were nearly met with a total of 1,390,328 juveniles released directly from NPTH and associated acclimation facilities.

A total of 538,746 fish were coded wire tagged (CWT), 394,274 received a CWT and adipose (Ad) clip; while 4,889 were ad-only and 452,419 were unmarked. Final CWT retention rates were high on all CWT groups and ranged between 0.988-0.996. All release groups were near the target release size of 50.0 fish/lb except the NLV release group which had the smallest average size of 81.2 fish/lb. The condition factor (K) of all fall Chinook salmon hatchery releases ranged between 1.16 at Luke's Gulch and 1.25 at Cedar Flats, while the condition factor for the natural fish was 1.09.

Using Passive Integrated Transponder (PIT) tag technology we monitored hatchery and naturally produced fall Chinook salmon in the lower Clearwater River and survivals through the hydro-system. We sampled a total of 2,999 natural Chinook salmon subyearlings on the lower Clearwater River of which 2,960 were large enough ($\geq$ 50mm) to PIT tag. Through beach seining and rotary screw trapping we sampled and PIT tagged a total of 221 Chinook salmon subyearlings on the lower Clearwater River which were uploaded as Chinook unknown run and rear type into the PIT Tag Information System (PTAGIS) and also recaptured 18 natural fish. Growth rates for the 441 PIT tagged hatchery fall Chinook recaptured from the lower Clearwater sampling ranged from 0.00 to 1.57 mm/d with an average of 0.68 mm/d. Estimated index survivals of PIT tagged natural subyearling fall Chinook salmon from the Clearwater River to Lower Granite Dam was 19.5%, but could not be calculated beyond Lower Granite Dam due to the low number of detections at downstream dams. Estimated index survival for the NPTH on-station release was 75.5% to Lower Granite Dam and 68.8% to McNary Dam. Estimated index survival for the acclimation releases were 54.0% and 45.5% for Cedar Flats, 72.6% and 59.2% for Luke's Gulch, and 64.1% and 45.6% for NLV to Lower Granite and McNary dams, respectively. As in previous years, the acclimated releases from Cedar Flats and Luke's Gulch migrated at a faster rate (18.3 and 18.1 Rkm/d, respectively) than the other releases, while the natural fall Chinook from the Clearwater River migrated much slower (1.2 Rkm/d) on average to Lower Granite Dam.

Fall Chinook salmon subyearling releases at NPTH on the Clearwater, Luke's Gulch to the S.F. Clearwater, and Cedar Flats to the Selway River were made prior to warm (>16 ^{o}C) summer water temperatures. The release of the NLV acclimated group occurred nearly a month early due to warm water temperatures in Lapwai Creek and at the NLV facility. Temperatures in the upper Clearwater River Subbasin exceeded 20 ^{o}C throughout much of July and early August with the lower Clearwater varying between a more moderate 11-13 ^{o}C during that time period because of cold water releases from Dworshak Reservoir. Most first detections at Lower Granite Dam for all NPTH and associated acclimated releases occurred before temperatures exceed 20 ^{o}C in the Snake River. Cold water releases from Dworshak Reservoir moderated warm Snake River temperatures, keeping water temperatures below 20 ^{o}C at Lower Granite Dam during July and

August. Few detections of natural fall Chinook occurred from mid-July thru late September when temperatures in the Snake River were near or exceeding 20 ^oC. Natural subyearlings detections increased at Lower Granite Dam from early October through December 15th when the detection facility was shut down for the winter. Most hatchery fall Chinook PIT tag detections occurred during the spill period at Lower Granite. The majority of detections of PIT tagged natural fall Chinook occurred later in the fall when spill operations at Lower Granite Dam had ceased.

We collected a random non-lethal subsample from 199 natural subyearling Chinook salmon captured on the Clearwater River during 2010. The DNA analysis is used to separate out spring from fall Chinook salmon and will monitor fall Chinook genetic profiles over time. Also, with NOAA's parentage study beginning with the 2007 NPTH broodstock, and continuing in 2008-2010, we will be able to track juveniles through PIT tags to determine if the reservoir reared life history trait is genetically linked or influenced more by environmental changes within the Snake River Basin. The 2010 genetic analysis will be combined with subsequent year's genetic monitoring data and provided in a later report.

The 2010 aerial spawning ground surveys in the Clearwater River Subbasin resulted in the highest fall Chinook salmon redd count (1,632) since we started surveys in 1988. There were 53 redds observed in the upper mainstem Clearwater above the North Fork confluence. A record high of 281 redds were counted in the Potlatch River which was never supplemented with fall Chinook. Only 2 redds were counted in the S.F. Clearwater River and one redd in the Selway River. We are expecting higher escapement numbers and redds in the upper Clearwater reaches in the future since full production releases were met for the second time this year. The Clearwater River Subbasin fall Chinook salmon redd count represented 36.5% of the Snake River Basin redd count above Lower Granite Dam (n=5,271), which is higher than the average of about 30%. The calculated 7.5 adult-to-redd ratio above Lower Granite Dam was slightly higher than the average (6.2) and would tend to indicate that possibly some redds were missed in the basin during 2010.

The total fall Chinook salmon returning to Lower Granite Dam (LGR) in 2010 was estimated to be 45,335 adults and 7,303 jacks for a total of 52,638 fish. During 2010, the number of fall Chinook salmon trapped and hauled from Lower Granite Dam to NPTH and for broodstock needs was 1,107 fish (545 females and 562 males). The estimate of 2010 fall Chinook salmon escapement above Lower Granite Dam was 39,764 adults and 6,531 jacks for a total of 46,295 fish. Jacks made up only 14.1% of the fall Chinook run over Lower Granite Dam in 2010 compared to 52.7% of the run in 2009. Natural/wild fall Chinook salmon consisted of about 16.2% of the total escapement above LGR in 2010.

A total of 556 fall Chinook salmon carcasses were collected in the Snake River Basin from October 14 through December 13. There were a total of 258 females (46.7%), 295 males (53.3%), and three that could not be identified. Of all female carcasses cut open and examined, 93.0% were 90-100% spawned-out (eggs were spent), 2.7% retained about 40-75% of its eggs, and 4.3% were pre-spawned mortalities and retained 100% of their eggs. Of the 11 pre-spawned female mortalities, 10 of those were collected in the lower Potlatch River with only one found in the Clearwater at Cherry Lane.

Coded wire tag recoveries of fall Chinook salmon processed at NPTH and LFH from 2005-2010 resulted in a 197 NPTH and associated acclimation returns from 2004-2009 releases. A total of 80 NPTH and associated returns were hauled to NPTH from Lower Granite Dam during 2009. Since broodstock needs were met at NPTH, the adult fish ladder was not opened for volunteers. Prior to 2010, returns in 2004-2009 totaled 651 fish from NPTH and associated releases that were hauled to LFH while only 8 fish from those releases volunteered into the LFH fish ladder. This compares with 254 and 336 fish that were hauled and volunteered into NPTH (Table 8).

There are four complete brood returns (5-yr olds) from 2003-2006 release years since NPTH inception. A low smolt-to-adult return (SAR) of 0.025% was estimated for the first release in 2003 from NPTH on-station and a slightly higher 0.034% SAR for the North Lapwai Valley Acclimation Pond. The highest estimated SAR of 1.056% from a complete returns was from the Cedar Flats release in 2006. The lowest SAR of 0.016% was estimated for the 2005 emergency NPTH on-station release caused by a spring flood.

Warm water temperatures delayed trapping during 2010 until August 29 and production staff began hauling fall Chinook from LGR to NPTH on August 30. The last haul date from Lower Granite Dam was September 19. A total of 1,107 fall Chinook were hauled from LGR for broodstock which consisted of 545 females and 562 males. Of the 591 females processed at NPTH, 496 were spawned, 40 died in the pond prior to spawning, 8 were killed and not used for brood, and no excess females were outplanted back to the river to spawn naturally. A total of 562 males were processed with 461 spawned, 56 died in the pond prior to spawning, 34 were killed and not used for brood, and 11 were outplanted back to the river to spawn naturally.

ACKNOWLEDGEMENTS

Nez Perce Tribal Hatchery monitoring and evaluation of fall Chinook salmon supplementation in the Clearwater River Subbasin would not be possible without the dedication of the field technicians and office personnel. The contributions and efforts of Mark Pishl, Charles Axtell, and Richard Johnson to the monitoring and evaluation program have been invaluable. We thank John Sneva and Lance Campbell of the Washington Department of Fish and Wildlife for adult fall Chinook salmon scale reading and analysis. Shawn Narum of the Columbia River Inter-Tribal Fish Commission processed and analyzed the genetic samples collected. We also thank Jonathan McCloud of the Bonneville Power Administration for his assistance and support.

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INTRODUCTION

Chinook salmon (*Oncorhynchus tshawytscha)* and other native fishes have been a crucial part of the diet, culture, economy, and spirituality of the Nez Perce people. Immense declines in salmon populations over the last century have affected the tribe's ability to preserve a principle element of its culture and identity. As a sovereign nation, the Nez Perce Tribe has an implied right to govern the management of natural resources within their traditional territory. The United States is obligated to ensure that treaty rights are perpetuated for the benefit of the tribe (BPA et al. 1997).

The National Marine Fisheries Service (NMFS) listed the Snake River fall Chinook salmon as "threatened" in 1992 in accordance with provisions of the Endangered Species Act (NMFS 1992) and included the Clearwater River Subbasin fall Chinook salmon as part of the evolutionarily significant unit (ESU). As such, the Snake River fall Chinook salmon is considered and managed as one population within the Snake River Basin (Zimmerman et al. 2007 Draft). Fall Chinook salmon within the Clearwater River Subbasin represent an important component of the Snake River ESU fall Chinook salmon population. Maintenance and function of fall Chinook salmon population dynamics within the Clearwater Subbasin itself will play an important role in recovery of the Snake River fall Chinook salmon.

The Nez Perce Tribal Hatchery (NPTH) was approved for construction to rear and release 1.4 million subyearling fall Chinook salmon and 625,000 spring Chinook salmon in the Clearwater River Subbasin starting in 2002. The NPTH produced its first release of subyearling fall Chinook salmon in 2003 (Arnsberg et al. 2007).

Since supplementation may pose some risk to natural populations, the primary purpose of the NPTH Monitoring and Evaluation (M&E) program is to evaluate the performance of hatchery released fall Chinook salmon and the potential risks to the natural fall Chinook salmon population (Hesse and Cramer 2000). The NPTH was constructed based on the NATURES rearing approach as an attempt to produce Chinook salmon more closely mimicking the phenotypic, genetic, and behavioral characteristics of natural origin Chinook salmon populations (Maynard et al., 2001). The NPTH program has the following goals (BPA et al. 1997):

1. Protect, mitigate, and enhance Clearwater Subbasin anadromous fish resources.
2. Develop, reintroduce, and increase natural spawning populations of salmon within the Clearwater Subbasin.
3. Provide long-term harvest opportunities for Tribal and non-Tribal anglers within Nez Perce Treaty lands within four generations (20 years) following project initiation.
4. Sustain long-term fitness and genetic integrity of targeted fish populations.
5. Keep ecological and genetic impacts to non-target populations within acceptable limits.
6. Promote Nez Perce Tribal Management of Nez Perce Tribal Hatchery Facilities and production areas within Nez Perce Treaty lands (BPA et al. 1997).

The NPTH M&E Project is designed to provide information that enables adaptive management of NPTH (Hesse and Cramer 2000). Proper adaptive management will require information from multiple life stages of hatchery and natural spring, fall, and early-fall Chinook salmon.

Supplementation benefits to be evaluated under the proposed M&E program include increases in the distribution, abundance, and harvest of hatchery and natural Chinook salmon populations in the Clearwater River Subbasin. To measure these benefits, changes in the abundance of Chinook salmon in the mainstem Clearwater River and its tributaries will be monitored over the next 15 to 20 years (Hesse and Cramer 2000). In addition to measuring project-related benefits, the M&E Program is designed to provide information on the capacity of the natural environment to support Chinook salmon production, give early warning of adverse effects caused by the project on resident biota, and track trends in environmental quality, management, and policy that may affect project success**.**

The M&E project examines the performance and status of hatchery and natural fish, and effects to non-targeted fish populations, sustainability of harvest, and communicates its findings to enable adaptive management of NPTH. Treatment streams are Lolo, Newsome, and Meadow creeks (Selway River) for spring Chinook salmon, the lower reaches of the South Fork Clearwater and Selway rivers for early-fall Chinook salmon, and the mainstem Clearwater River below Lolo Creek for fall Chinook salmon. Outcomes in these treatment streams will be compared to those in similar non-treatment (reference) streams and other hatchery programs to distinguish treatment effects from the effects of environmental variation.

Summary of NPTH M&E Project Goals and Objectives:

<u>Long Term Goals:</u>

Monitor and evaluate results of the NPTH so that operations can be adaptively managed to optimize hatchery and natural production, sustain harvest, and minimize deleterious ecological effects.

<u>OBJECTIVES:</u>

Objective 1. Determine if program targets for contribution rate of hatchery fish are being achieved and can be improved.

Objective 2. Determine the increase/decrease in natural production that results from supplementation of Chinook salmon in the Clearwater Subbasin, and relate them to limiting factors.

Objective 3. Estimate ecological and genetic effects to fish populations.

Objective 4. Determine how harvest opportunities for spring, early-fall, and fall Chinook salmon can be optimized for tribal and non-tribal anglers within Nez Perce Treaty lands.

Objective 5. Effectively communicate monitoring and evaluation program approach and findings to resource managers.

This 2010 annual report details monitoring and evaluation activities associated with the fall Chinook salmon component of the Nez Perce Tribal Hatchery program from January 1 through December 31, 2010, thus providing data that will be used to analyze the effectiveness of supplementation activities. We also summarize adult returns from all NPTH and associated fall Chinook releases from hatchery releases in 2003 to present. The first eight years of NPTH M&E fall Chinook salmon results can be found in annual reports under primary author Arnsberg on the Columbia Basin Fish and Wildlife Program's website: https://www.cbfish.org/PiscesPublication.mvc/SearchByTitleDescriptionAuthorOrDate. A Supplementation Symposium for the first five-years of NPTH Production and Monitoring & Evaluation was held in January 2009 and other symposiums are scheduled every five years after.

STUDY AREA

The Clearwater River Subbasin, located in north-central Idaho, is the largest tributary to the Snake River in yearly average runoff of about 11 Ma/f. The subbasin extends from its mouth at 200 m elevation on the Idaho-Washington border to its headwaters in the Bitterroot Mountains along the Idaho-Montana border at nearly 2,750 m, encompassing a drainage area of approximately 25,000 km^2. Dworshak Dam, located on the North Fork Clearwater River 3 km upstream of its confluence with the Clearwater, is the only dam in the Clearwater River Subbasin. Contributing about 40% of the Clearwater's annual flow, historical high spring flows in the lower Clearwater have been greatly reduced for flood control and shifted to higher flows during low flow summer periods. Also, with selective water temperature releases, Dworshak Dam moderates cold winter water temperatures and minimizes high summer temperatures in the lower Clearwater River (Arnsberg et al. 1992).

The NPTH M&E study area for fall Chinook salmon supplementation encompasses the lower Clearwater River, North Fork (N.F.) Clearwater River (mouth up to Dworshak Dam), Middle Fork (M.F.) Clearwater River, lower South Fork (S.F.) Clearwater River, lower Selway River, and lower portions of smaller tributaries including Potlatch River and Lapwai Creek (Figure 1).

The NPTH and all facilities associated with rearing, acclimation and release of fall Chinook salmon in the Clearwater River Subbasin are described below. A more detailed description of rearing and acclimation sites can be found in the Nez Perce Tribal Hatchery Program Final Environmental Impact Statement (BPA et al. 1997).

Nez Perce Tribal Hatchery

The NPTH, located on the lower Clearwater River 38 km above its mouth at Tribal Allotment 1705, is the central incubation and rearing facility for spring and fall Chinook salmon (Figure 1). Incubation for all Chinook salmon occurs at NPTH, with early rearing of one million fish in inside troughs and final rearing and acclimation of 500,000 fall Chinook salmon in two earthen and river rock-lined ponds. Fall Chinook salmon can be volitionally released or forced from the ponds.

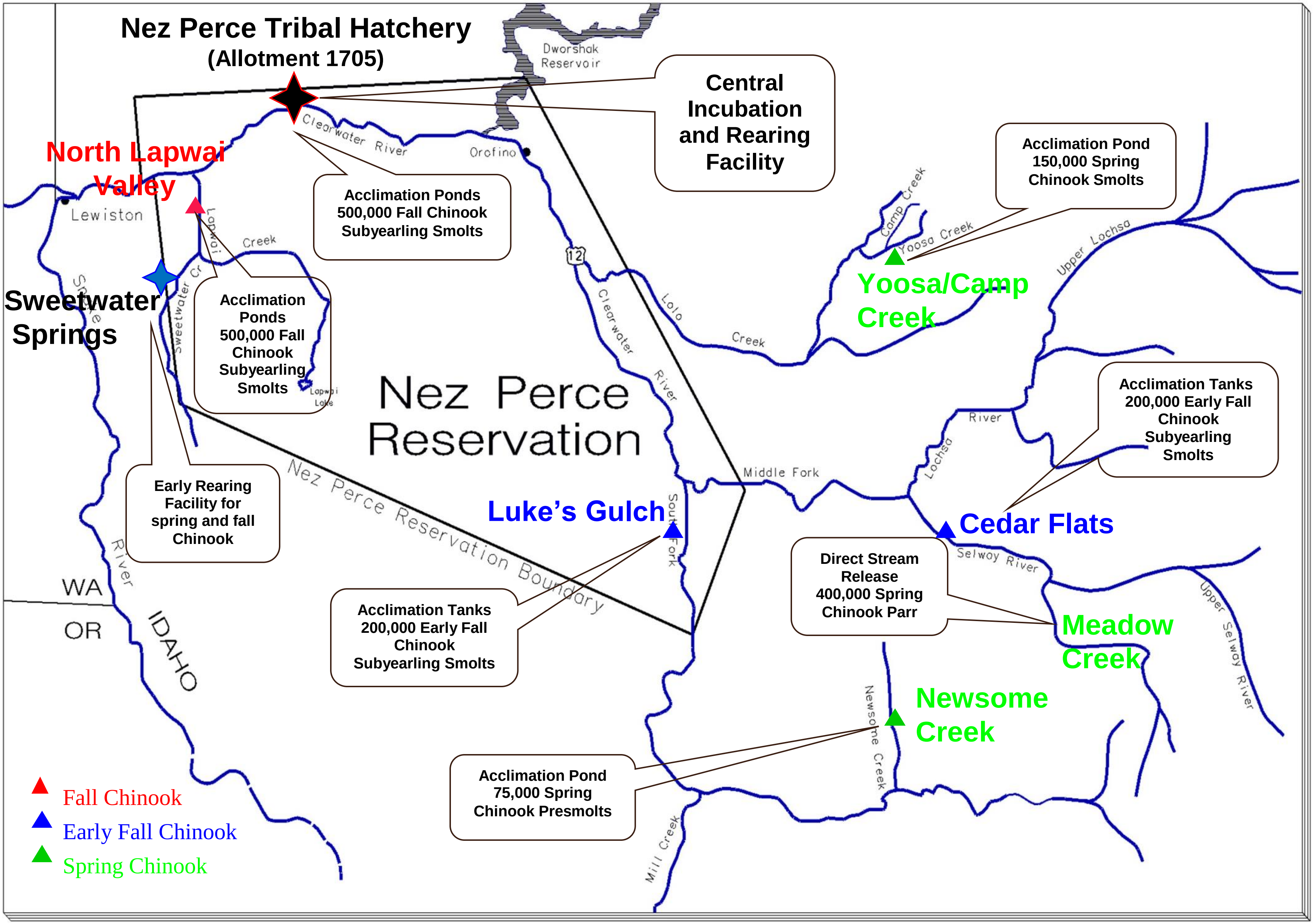

Figure 1. Nez Perce Tribal Hatchery and Chinook salmon acclimation and early rearing facilities within the Clearwater River Subbasin.

Sweetwater Springs

Sweetwater Springs is located approximately 20 km southeast of Lewiston, Idaho and feeds the westernmost fork of Sweetwater Creek which is a tributary to Lapwai Creek (Figure 1). This facility will be used to accommodate up to 400,000 early fall Chinook salmon fry to be grown and transferred to Cedar Flats on the Selway River and Luke's Gulch on the South Fork Clearwater River for final acclimation and release (200,000 subyearling smolts at each facility).

North Lapwai Valley Acclimation Pond

Lapwai Creek drains directly into the mainstem Clearwater River 19 km upstream from its confluence with the Snake River (Figure 1). Approximately 1 km above the mouth of Lapwai Creek, two river rock-lined acclimation ponds were constructed to serve as final rearing and acclimation of 500,000 fall Chinook salmon that will be transferred from NPTH. Fall Chinook salmon can be volitionally released or forced from the North Lapwai Valley (NLV) acclimation ponds into Lapwai Creek. This site was selected so adult returns would home and spawn in the lower Clearwater River where there is an abundance of under-utilized spawning habitat (Arnsberg et al. 1992).

Luke's Gulch Acclimation Facility

Luke's Gulch Acclimation Site is located on the S.F. Clearwater River 13 km upstream of its mouth (Figure 1). Final rearing and acclimation of early fall Chinook salmon at this site will occur in ten 5.8 m diameter circular aluminum tanks and fish will be released directly into the S.F. Clearwater River. The target number of subyearlings for release will be 200,000 which will be transferred as fry from NPTH or Sweetwater Springs if this facility is utilized for early rearing.

Cedar Flats Acclimation Facility

Cedar Flats Acclimation Facility is located on the Selway River 8 km above its mouth and confluence with the Lochsa River which forms the M.F. Clearwater River (Figure 1). Cedar Flats is a developed site just east of the United States Forest Service (USFS) Selway District Ranger Station. Final rearing and acclimation at this site will also occur in ten 5.8 m diameter circular aluminum tanks and fish will be released directly to the Selway River. The target number of subyearlings for release will be 200,000 which will be transferred as fry from NPTH or Sweetwater Springs if this facility is utilized for early rearing.

METHODS

Supplementation

The Nez Perce Tribe's supplementation program for fall Chinook salmon began in 1997 on the Clearwater River with the acclimation and release of Lyons Ferry Hatchery (LFH) fall Chinook salmon yearlings and subyearlings from the Big Canyon Creek Acclimation Facility (Rkm 57). Fall Chinook release numbers, life stages, associated marks, and results from 1998-2005 Fall Chinook Acclimation Project (FCAP) releases can be found in annual reports by primary author Rocklage available on the Columbia Basin Fish and Wildlife Program's website: https://www.cbfish.org/PiscesPublication.mvc/SearchByTitleDescriptionAuthorOrDate.

All releases from NPTH and associated facilities are scheduled to be subyearlings, the historic dominant life history characteristic for "ocean type" emigration and for the "wild" or natural Snake River fall Chinook salmon. NPTH fish will be differentially coded wire tagged to measure adult returns as compared to the FCAP fall Chinook salmon. As part of our aerial redd surveys and carcass collections in the Clearwater River Subbasin, we report all fall Chinook salmon contributions, including FCAP, LFH, and out-of-Snake Basin strays in the carcass recovery section of this report. We also report all fall Chinook salmon contributions in the NPTH spawning summary for 2010. A more detailed summary on NPTH production and hatchery operations during 2010 is provided in the Nez Perce Tribal Hatchery Complex Annual Report (Rodgers et al. 2010).

This year (2010) was the eighth year for fall Chinook salmon subyearling releases from NPTH, six years of releases from NLV, and the fifth year for supplementation of fall Chinook salmon in the upper Clearwater River Subbasin at Luke's Gulch on the S.F. Clearwater River and Cedar Flats on the Selway River. Since the 2010 fall Chinook adult returns were strong, all broodstock were collected at Lower Granite trap and trapping at the NPTH fish ladder was not necessary.

Monitoring and Evaluation

Baseline fall Chinook salmon data collection for adult spawner abundance, spawn timing, and habitat evaluations has been occurring in the Clearwater River since 1988 and in major tributaries including the S.F. Clearwater River since 1992, M.F. Clearwater River and lower Selway River since 1994. The M&E on fish produced from NPTH facilities began in 2003. Standardized performance measures quantified and utilized in program performance evaluations are described in Table 1. In addition, other experiments often occur as part of the M&E program. One example is the U.S. Army Corps of Engineers (Corps) Transportation/Spill study, initiated in 2006, involved passive integrated transponder (PIT) tagging additional production fall Chinook salmon, other than for standard juvenile emigration survivals, at Luke's Gulch and Cedar Flats Acclimation facilities.

Table 1. Standardized performance measures and definitions quantified for evaluation of Nez Perce Tribal Hatchery fall Chinook production.

Performance Measure		Definition
Abundance	Adult Escapement (to Snake Basin upstream of Lower Granite Dam)	Number of adult fish, including jacks that have "escaped" past fisheries to Lower Granite Dam. Partitioned by origin, age, and release group. Based on run-reconstruction.
	Index of Spawner Abundance - redd counts	Counts of redds in spawning areas via multiple pass extensive area aerial counts.
	Hatchery Fraction	1) Percent of fish on spawning ground that originated from a hatchery. Determined from carcass sampling for individual spawning aggregates. 2) Also reported for total spawner abundance upstream of Lower Granite Dam. From run-reconstruction. 3) Percentage of fish used in broodstock of Snake Basin hatchery origin.
	Ocean/Mainstem Harvest	Raw measure (primary). Number of fish caught in ocean, mainstem or tributary fisheries (commercial, tribal, or recreational). Determined from CWT commercial landings, creel surveys, etc.
	Hatchery Production Abundance	Raw measure (primary). Number of parr, presmolts, or smolts released from a hatchery per year.
	Run Prediction	Derived measure. Short-term forecast of expected adult returns to some point (e.g., mouth of Columbia, or Snake River) based on current data (e.g., # smolts out, prior years adult returns, etc.).
Survival – Productivity	Smolt-to-Adult Return Rate	Raw measure (secondary): Number of adults from a given brood year returning to a point (e.g. LGR dam) divided by the number of smolts that left this point 1-3 years prior, integrated over all return years.
	Juvenile Survival to Lower Granite Dam	Raw measure (secondary): Survival rate measure estimated from detection of PIT tagged smolts at first mainstem dam, or model derived survival rates based on detections at first and second mainstem dams (e.g. using SURPH). Smolts or parr are tagged in the tributary rearing areas.
	Juvenile Survival to all Mainstem Dams	Raw measure (secondary): Survival from first dam where stock enters mainstem Columbia or Snake River to Bonneville. Derived from PIT tag detections.
	Post-release Survival	Raw measure (secondary): Survival from release (e.g., parr, presmolt, or smolt) to further sampling points (e.g., rotary screw traps at outlet of tributary, first mainstem dam encountered by smolts, dam encountered on return).
Distribution	Adult Spawner Spatial Distribution	Raw measure: Tributary spawner distribution – extensive estimates of where spawners are found within a tributary. Subbasin spawner distribution - presence/absence surveys across multiple tributaries within a subbasin.
	Stray Rate	1) Percentage of non-Snake Basin hatchery origin adults in the spawner abundance estimate based on run-reconstruction. 2) Percentage of non-Snake Basin hatchery origin fish included in hatchery broodstock (based on known mark type and scale-pattern origin determination).
Life History	Age Class Structure	Derived measure: The proportion of escapement composed of individuals of different brood years, typically assessed via length measurements and length at age relationships, from analysis of calcified structures, using scales, and recovering marks.
	Age–at–Return	Raw measure (primary): Age distribution of spawners on spawning ground determined from length at age relationships, scale analysis, calcified structure analysis, or mark recovery from carcass surveys.
	Age–at-Emigration	Raw measure (primary): Age distribution of emigrants (e.g., proportion of emigrants as subyearling vs holdover or reservoired reared) from tributaries, estimate determined from PIT tag detections at mainstem Snake and Columbia River dams.
	Size-at-Emigration/Release	1) Size distribution and average (length, weight) of emigrants (e.g., proportion of emigrants at fry, parr, presmolt, and smolt stages) from tributaries determined from seine, fyke nets, or rotary screw trap. 2) Length frequency, average length, and fish/lb estimates for each release group within 3 days of release (start of volitional).
	Condition of Juveniles at Emigration	Derived measure: A species-specific length to weight relationship used as an index of growth (W/L^3). Comparative length/weight data are determined from in-hatchery evaluations, tributaries and beach seining, fyke nets and rotary screw trap operation.
	Adult Spawner Sex Ratio	Raw measure (primary): Carcass or weir counts.
	Juvenile Emigration Timing	Raw measure (primary): Distribution of emigration dates within major tributaries. Peak, range and 10^{th}-90^{th} percentiles.
	Water Temperature	Raw Measure: Water temperatures of all supplementation study streams.

Chinook salmon abundance and population trends can be assessed by monitoring juvenile densities, juvenile emigration numbers, adult escapement and indexes of spawner abundance through redd counts (Steward 1996, Hesse and Cramer 2000, Johnson et al. 2007). Accurate estimates of abundance and escapement are needed to determine the success of supplementation efforts. For the lower Clearwater River, emigration timing and survival are assessed by PIT tagging a subsample of all hatchery subyearling release groups prior to release and beach seining and PIT tagging naturally produced fall Chinook salmon. During 2010, through the CORPS Transportation/Spill study, we installed two 8’ rotary “screw” traps in the lower Clearwater River at the railroad bridge near Spalding, Idaho (Rkm 20) to collect additional naturally produced fall Chinook for PIT tagging. Additionally, we employed a larger 45.72 m x 3.66 m seine in open water in the lower 3-4 km impounded section of the Clearwater to capture fall Chinook salmon rearing in the “reservoir type” environment.

Fall Chinook salmon adult escapement was estimated through aerial redd surveys and counts/releases over Lower Granite Dam (the last dam in a series of eight on the Columbia and Snake rivers). We estimated adult natural and hatchery fall Chinook salmon spawning contributions to the lower Clearwater River through carcass collections and identification of hatchery marks or tags and through scale sample analysis. We also monitored and evaluated NPTH spawning composition of hatchery and natural fall Chinook salmon spawned for the 2010 broodyear.

Performance Measures

Fish population performance measures (Table 1) address how the fish populations are meeting NPTH management objectives. Performance measures are derived from data collected during juvenile and adult monitoring and evaluation activities. We report on most performance measures listed in this table while others will take several years of data collection before analysis can be performed. For example, ocean/mainstem harvest estimates are often not reported by various agencies until the following year and sometimes longer after the harvest has occurred. In the following methods, we describe performance measures that were evaluated during 2010 along with constrains that may limit complete evaluation.

<u>Juvenile Monitoring</u>

Life History, Emigration Timing, and Survival Estimates

During 2010, we beach seined along the lower Clearwater River shoreline areas below the North Fork Clearwater River where most fall Chinook salmon spawning occurred in 2009. We targeted naturally produced fall Chinook salmon subyearlings and hatchery subyearlings released on-station from NPTH and associated acclimation facilities. Fall Chinook salmon hatchery subyearlings from FCAP are released earlier in the spring, emigrate immediately, and usually have emigrated downstream of the lower Clearwater River when annual beach seining begins.

Evaluation parameters for natural and hatchery fall Chinook captured included fish size, growth rates if already PIT tagged, emigration timing and survival to the Snake River dams. We used experimental 30.5 m x 1.8 m and 15.2 m x 1.2 m beach seines (0.48 cm mesh) with weighted multi-stranded mudlines with center bags of the same mesh size. The larger seine was pulled from the back of a jet boat deck in a large arc until approximately half the net was deployed, then the boat was directed to shore in which all crew members assisted in pulling the seine to shore. The less accessible beach seining sites required the smaller seine pulled from the shoreline utilizing personnel in the water wearing neoprene waders. Later in the season, we employed a larger seine (45.72 m x 3.66 m with a 3.66 m deep bag). All salmonids captured were placed in 18.9 L buckets and then placed in larger aerated 114 L plastic holding bins. Salmonids were anesthetized in a 3 ml tricaine methanesulfonate (MS-222) stock solution (100 g/L) per 19 L of water buffered with a sodium bicarbonate solution. All Chinook salmon subyearlings were measured to the nearest 1 mm fork length and weighed to the nearest 0.1 gm with a digital Ohaus portable advanced balance.

All natural fall Chinook salmon captured and PIT tagged by seining and rotary screw trapping are included in the emigration timing and survival analysis. We PIT tagged Chinook salmon subyearlings following methods developed by Prentice et al. (1990a, 1990b) and protocols established by the PIT Tag Steering Committee (1992). All subyearling Chinook salmon ($\geq$ 60 mm) fork length that were not hatchery marked or had the appearance of being an unmarked hatchery fish were PIT tagged with standard length 12 mm tags. As part of the CORPS study we used 8.5 mm PIT tags for fall Chinook that measured 50-59 mm fork length. We checked all Chinook salmon for the presence of an adipose fin clip and/or a coded wire tag that would signify a hatchery fish using a Northwest Marine Technologies Field Sampling Detector model FSD-I. Our tagging goal was a minimum of 1,000 and up to a maximum of 8,000 natural subyearling fall Chinook salmon for our M&E study and another 10,000 natural fish for the COPRS study. After at least a fifteen minute recovery period, we released all Chinook salmon juveniles back to the river where captured. Records of all new PIT tagged fish and PIT tag recaptures were submitted to the PIT Tag Information System (PTAGIS). All PIT tag files were uploaded under the Project Leader's BDA coordinator ID and natural fish identified as 13W (1 = Chinook salmon, 3 = fall run, and W = wild rearing type).

Detections and travel times of PIT tagged fish at the Lower Snake River and Columbia River dams were obtained from PTAGIS. The combined probability of survival and emigration as a subyearling of PIT tagged subyearlings from point of release to the Lower Snake River dams were estimated by the Cormack, Jolly, and Seber (1964, 1965, and 1965, respectively, as cited in Smith et al. 1994) methodology using the Survival Using Proportional Hazards (SURPH) computer modeling program (Lady et al. 2002). However, this model assumes that all fish arriving at Lower Granite Dam have an equal probability of detection. Because a proportion of the Snake River fall Chinook salmon subyearlings emigrate later in the fall/winter and early spring after detection facilities are shut down, this basic assumption is violated. Since we are unable to determine the proportion of fish that migrate when detection facilities are shut down, the model results are an underestimate (or index) of fall Chinook salmon survival to Lower Granite, depending on the proportion that hold over for a given year and emigrate as yearlings.

The NPTH M&E staff coded wire tagged and ad-clipped fish with the Auto-Fish Tagging Trailer designed by Northwest Marine Technology and purchased through the Bonneville Power Administration (BPA). Tagging goals for 2010 were to tag each subyearling fall Chinook salmon release group from NPTH and NLV with a unique CWT code (200,000 each site) for adult return evaluations and have a 100,000 CWT/ad-clip group for fishery evaluations (Rocklage and Hesse, 2004). The goal for Cedar Flats and Lukes's Gulch was to release 100,000 CWT only and 100,000 CWT/ad-clip each. Final tagging and marking release numbers are reported in the results section. The CWT retention rates were measured initially during tagging and final retention rates were measured at least three weeks after tagging on 500 fish per release group.

To investigate emigration timing and survival through the mainstem hydro-system, our PIT tagging goals for all hatchery fall Chinook salmon subyearling releases were approximately 3,000 fish for 2010 at all four sites. As part of the CORPS study, we PIT tagged 13,409 and 11,219 additional fish at each of the up-river acclimation sites at Luke's Gulch and Cedar Flats, respectively.

Length and weight data from PIT tagging were used to calculate a release condition factor (K) (Tesch 1971) using the following equation:

$$\hat{K} = \frac{W}{L^3} \times 100{,}000$$

Where:
W = weight in grams,
L = length in millimeters,
and 100,000 is a constant used as a scalar.

Condition factor (Tesch 1971) can be a useful indicator of fish health, since individuals with a low condition factor might be considered light for their length, a potential indication of malnutrition or disease (Wootton 1990).

Flow and Temperature

Flow data for the Clearwater River were obtained from the U.S. Geological Survey (USGS) Spalding, Idaho gauging station online at *http://waterdata.usgs.gov/id/nwis/current/?type=flow*. We placed Onset temperature loggers in lower Lapwai Creek at NLV, the lower South Fork Clearwater, Selway, and Middle Fork Clearwater rivers. Flow, temperature, and spill data for the Snake River at Lower Granite Dam were provided by the CORPS and obtained online at *http://www.cbr.washington.edu/dart/river.html*. We compare flow and temperature data to hatchery release timing along with hatchery and natural juvenile emigration timing based on PIT tag detection data at mainstem dams.

Genetic Monitoring

The target goal for genetic analysis was 100 non-lethal upper caudal fin clips from natural subyearling Chinook salmon captured by seining on the lower Clearwater River. An additional 100 natural fall Chinook salmon subyearlings were targeted for genetic monitoring through the Corps study. Tissue samples were placed in vials of alcohol and sent to the Hagerman Laboratory in Idaho for deoxyribonucleic acid (DNA) analysis by the Columbia River Inter-Tribal Fish Commission (CRITFC) staff. Analyses determine percent composition of spring/summer or fall Chinook salmon and will build upon baseline fall Chinook salmon genetic profiles. The 2010 genetic analysis will be combined with future genetic monitoring data and reported in a later NPTH M&E report.

Adult Monitoring

Spawning Ground Surveys

We used aerial (by helicopter) spawning ground surveys as an index of spawner abundance and distribution. We scheduled surveys from the end of September to first part of December along the entire Clearwater River (120 km), lower N.F. Clearwater River (2 km), entire M.F. Clearwater River (37 km), S.F. Clearwater River from the mouth to the town of Harpster (22.5 km), and on the Selway River (31 km) from the mouth to Selway Falls (Figure 2). On each survey, we mapped, took weekly photographs, documented spawn timing, and recorded the number and distribution of fall Chinook salmon redds. Redd surveys were conducted from mid-morning to mid-day to take advantage of the best lighting conditions. For each survey we noted general weather conditions and water discharges at USGS gauging stations on the Clearwater River (Spalding and Orofino, Idaho), S.F. Clearwater River (Harpster, Idaho), and lower Selway River (Lowell, Idaho). We also noted general water transparencies (poor to excellent) on each survey, with excellent being $\geq$ 5 m, good being 3-4 m, and poor < 3 m. We report Clearwater River Subbasin redd survey results since 1988, the year surveys began (Arnsberg et al. 1992). Total fall Chinook salmon redds in the Snake River Basin above Lower Granite Dam (LGR) are reported for 2010. We also report the estimated adult escapement above LGR (Young et al. 2013) and calculate the adult/redd number comparing that to the average adult/redd ratio since 1987. Finally, we regressed fall Chinook salmon redds counted in the Snake River Basin above Lower Granite Dam from 1987-2010 with adult (not including jacks) escapement over Lower Granite Dam from past years' run estimates (*US v Oregon* Technical Advisory Committee unpublished data; Washington Department of Fish and Wildlife unpublished data; Sands 2003; Steinhorst et al. 2006, 2007; Young et al. 2013) to obtain a correlation coefficient.

Escapement and Carcass Recoveries

Adult fall Chinook salmon escapement to the Clearwater River Subbasin was estimated from redd counts in the Snake River Basin and the number of fish estimated over Lower Granite Dam through the fall Chinook salmon run reconstruction process (Young et al. 2013). This process takes into account the number of natural and hatchery fish returning to Lower Granite and subtracts the number hauled to LFH and NPTH for broodstock and the number of fallbacks through the dam. Also, when NPTH opens the adult fish ladder to obtain additional broodstock, that number of hatchery and natural fish is subtracted from the total escapement estimate to the Clearwater River from the natural spawning population.

During redd surveys, Chinook salmon carcasses seen from the air were mapped and retrieved the same or following day. Biological information collected included fork length, sex composition, percent egg retention, identification of hatchery marks, and scale samples to determine natural or hatchery origin, total age, subyearling or yearling ("reservoir reared") emigration life history, and years spent in the ocean. Snouts were collected from any carcass with an adipose fin clip or CWT and wire extracted later in the lab, read, and location and date of release identified. After processing, tails were removed from carcasses to ensure fish were not re-sampled and returned to the general area where found. Scale samples were sent to the Washington Department of Fish and Wildlife (WDFW) Olympia Lab for analysis.

Smolt-to-Adult Return Estimates

Smolt-to-adult return (SAR's) estimates were calculated from a run reconstruction to Lower Granite Dam (Young et al. 2013). This was the seventh year for returning adults from the first NPTH and NLV releases in 2003 and is the third complete brood return for NPTH releases, however, we do see a few age six returning fall Chinook which may not be included. Age six individuals, however, tend to be mostly from naturally produced fish and only change SAR estimates insignificantly. We present total CWT returns processed at NPTH and at LFH for each NPTH release group for the last six years (2004-2009). We include NPTH released fish processed from LFH because they receive a larger proportion of fish for broodstock than NPTH (about 70/30 split) through random trapping at Lower Granite Dam. Adult returns are summarized from 2004-2010, expanded for trapping rates at Lower Granite Dam, and a total SAR is given for each release group. We also include NPTH and associated release groups adult contributions to ocean and freshwater fisheries as reported to the Regional Mark Processing Center (RMPC). The reported SAR represents the survival of adults returning back to the Snake River and the inclusion of adult contributions to all fisheries are reported as smolt-to-adult survivals (SAS).

Hatchery Spawning

Before the 2010 fall Chinook salmon run began, the Lower Granite Dam trapping rate was set at a 12% sampling rate of the entire run. Because the fall Chinook run was strong along with the steelhead run, the trapping rate was reduced to 10% during the run in order to handle all the fish at Lower Granite Dam. The NPTH began hauling fall Chinook adults from Lower Granite on August 30. The NPTH did not have to open the adult fish ladder to the mainstem Clearwater River to collect additional broodstock in 2010 as brood was met with fish hauled from LGD. Spawning at NPTH occurred weekly from October 19 to November 30 at NPTH for a total of seven spawn weeks. Monitoring and evaluation staff collected biological information on all fish spawned that included: fork length, identification of hatchery marks (ad-clips, visible implant elastomer (VIE) tags, etc.) and removing snouts containing a CWT. The CWTs were read immediately after spawning to determine origin so that known "strays" could be excluded from the broodstock. Scales were taken and read later to determine origin (hatchery or natural), total age, emigration strategy (i.e. either subyearling or "reservoir reared" life history), and years

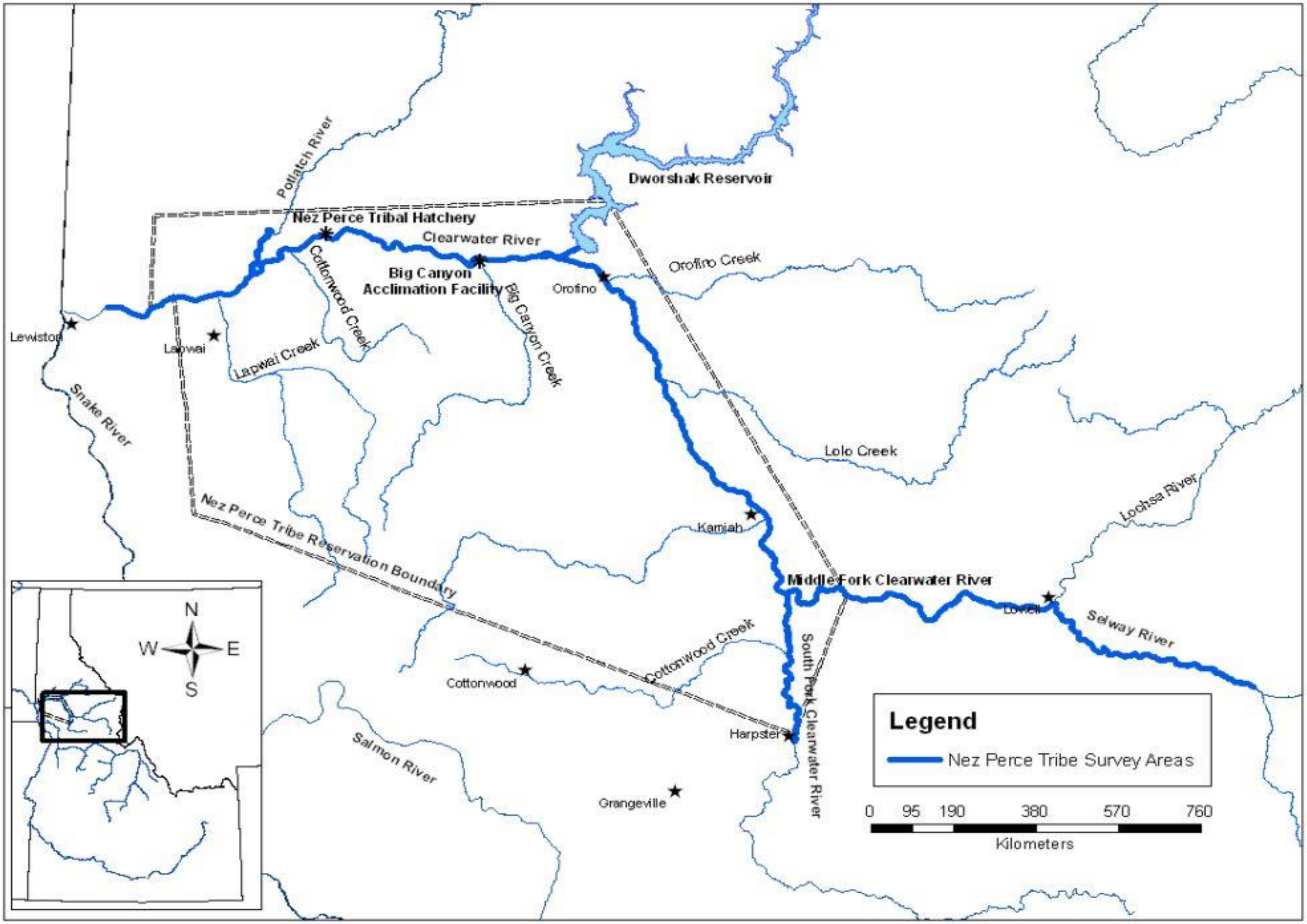

Figure 2. Fall Chinook salmon aerial redd survey areas within the Clearwater River Subbasin conducted by the Nez Perce Tribe.

spent in the ocean. A fin clip was also taken from all spawned fish for DNA analysis as collaboration on a parentage study with the National Oceanic and Atmospheric Administration (NOAA). The main emphasis of this study is to examine if the "holdover" or yearling life history trait is genetically linked to parents that exhibited the same trait.

Genetic Monitoring

We collected tissue samples from all fall Chinook salmon adult carcasses collected from the spawning grounds that were in fair to good condition and all fall Chinook salmon spawned at NPTH for DNA analysis. A representative subsample of at least 200 carcasses would be analyzed. Samples consisted of opercle punches from each individual stored in separate vials of alcohol labeled with the fish ID number, date, and where it was taken. All samples were sent to the Hagerman Laboratory and analyzed by CRITFC staff to build upon baseline fall Chinook salmon genetic profiles and examine genetic differentiation between Snake River Basin and known "stray" fall Chinook salmon. However, as mentioned above, all NPTH spawned fish were sampled for DNA in 2010 as part of NOAA's parentage study. Results for the 2010 carcass samples will be in a later comprehensive genetic analysis report.

RESULTS

Supplementation

During the 2009 fall Chinook salmon run, gametes were taken from fish hauled from Lower Granite Dam and adult volunteers to the NPTH fish ladder for 2010 subyearling releases. All subyearlings were coded wire tagged and adipose fin clipped prior to release as planned, meeting target goals, except for the NLV and Cedar Flats releases which were less than the target release number (Table 2). There were a total of 1,390,328 fish released with a total of 538,746 CWT only, 394,274 CWT/Ad-clip, and 452,419 unmarked (Table 2). Final CWT retention rates were high on all CWT groups and ranged between 0.988-0.996 (Table 2). The fish released at NPTH and Cedar Flats were close to the target release size of 50.0 fish/lb, while Luke's Gulch exceeding the target and were the largest group released at 44.4 fish/lb. The NLV release group, which was released almost a month earlier than the other groups, had the smallest average size of 81.2 fish/lb (Table 2). The condition factors (K-factors) on all release groups ranged between 1.16 and 1.25 (Table 2).

Monitoring and Evaluation

Juvenile Monitoring

Life History, Emigration Timing, and Survival Estimates

We sampled a total of 3,017 natural Chinook salmon subyearlings on the lower Clearwater River of which 2,960 were large enough to PIT tag (Table 3). Flows in the lower Clearwater River peaked on June 5, measuring approximately 1,841 cubic meters per second (cms). Sampling for natural fall Chinook on the lower Clearwater began the week of June 21 as flows were steadily

Table 2. Fall Chinook salmon released, number coded wire tag (CWT), final CWT retentions, number adipose fin clipped (Ad-clip), number unmarked/untagged, number passive integrated transponder (PIT) tagged, fish per pound, and condition factor (K-factor) at release from Nez Perce Tribal Hatchery (NPTH) on-station and associated acclimation facilities, 2010.

Release Site	Release Dates	Total Release Number	Number CWT only	Number CWT/ Ad-clip	Number Ad-clip only	Number Unmarked/ Untagged	CWT Codes	Final CWT Retention	Fish/ lb	K-Factor	Number PIT Tagged
NPTH On-station	6/7-6/11	536,999	199,710	99,100	1,229	236,960	CWT=612772 AD/CWT= 220200	0.996 0.988	54.2	1.20	3,086
N. Lapwai Valley	5/14	465,949	164,981	99,024	1,228	200,716	CWT=220201 AD/CWT= 220202	0.996 0.988	81.2	1.21	3,089
Cedar Flats[1]	6/14	188,411	74,939	97,930	1,214	14,328	CWT=612765 AD/CWT= 612764	0.996 0.988	48.3	1.25	14,219
Luke's Gulch[1]	6/9	198,969	99,116	98,220	1,218	415	CWT=612747 AD/CWT= 612748	0.996 0.988	44.4	1.16	16,409
	Subtotals	1,390,328	538,746	394,274	4,889	452,419					36,803

[1]Additional PIT tags in collaboration with the CORPS transportation study

Table 3. Weekly number, average fork length, and number passive integrated transponder (PIT) tagged natural subyearling fall Chinook salmon sampled on the lower Clearwater River, and percent of total Dworshak Dam spill in relation to total discharge, 2010.

Week of	Clearwater River Avg. Weekly Temps.[1] (^{0}C)	Clearwater River Avg. Weekly Flows[1] (cms)	Dworshak Dam Spill %	Total Number Captured	Number PIT Tagged (13W)	Weekly Average Fork Lth. (mm)
June 21	12.6	853.4	9.9	10	0	70.5
June 28	14.6	567.1	1.6	1340	1329	66.2
July 5	13.9	452.7	0	906	870	69.1
July 12	13.2	444.6	6.9	290	290	71.8
July 19	12.1	455.3	22.3	337	337	74.9
July 26	12.3	437.7	20.5	134	134	78.3
Aug 2	12.5	408.1	15.5	0	0	NA
Totals				3,017	2,960	

[1]Obtained from the USGS gauging station at Spalding, Idaho.

declining. Fall Chinook subyearlings averaged 66.2 mm fork length during the second week of sampling and 1,328 out of 1,340 fish captured were large enough to PIT tag. Only 447 juveniles were tagged with the smaller 8.5 mm tags during the entire sampling season. Flows steadily decreased until Dworshak Dam releases began the second week in July which kept flows relatively steady until early August when fall Chinook sampling catch rates in the flowing portions of the Clearwater River decreased. The last sampling day was August 3 with only one Chinook captured and PIT tagged. August 3 represents the only sampling date in the impounded section of the Clearwater River in 2010.

We recaptured 18 natural PIT tagged Chinook salmon and measured growth rates between 0.0 to 2.0 mm/d with an average of 0.80 mm/d. Average condition factor (K) for the natural fish was 1.08. Growth rates for the 445 PIT tagged recaptured hatchery fish ranged from 0.00 to 1.57 mm/d with an average of 0.66 mm/d. Average condition factor (K) for the hatchery fish at time of release was 1.25, 1.20, 1.16, and 1.21 for the Cedar Flats, NPTH, Luke's Gulch, and NLV releases, respectively (Table 2).

Length frequencies for the natural subyearling fall Chinook sampled in the lower Clearwater River during the months of June and July are provided in Figure 3. We sampled 11 subyearlings during June that were 49 mm or less and too small to be PIT tagged with the 8.5 mm tags, while no fish sampled were too small to tag in July (Figure 3).

Consistent with previous years, the Cedar Flats 2010 release had the highest number of fish that were detected in 2011 as yearlings with a total of 19 (0.5%) (Table 4). The natural fish from the Clearwater River had 95 detections in 2011 as yearlings, which represented 18.9% of the total number of unique PIT tag detections for this group (Table 4).

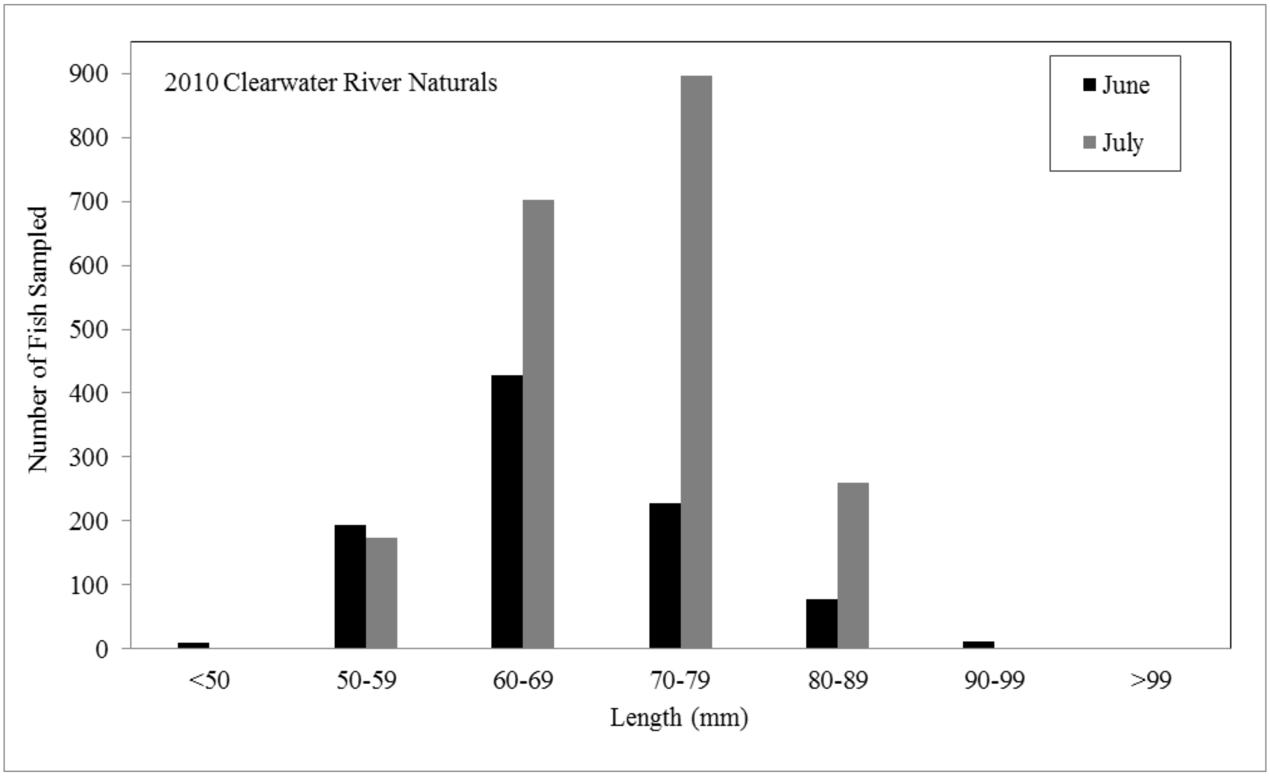

Figure 3. Length frequencies of natural fall Chinook salmon sampled in the lower Clearwater River, 2010.

Table 4. Unique PIT tag detections at all hydrosytem juvenile detection facilities from releases of fall Chinook salmon subyearlings in the lower Clearwater River, Nez Perce Tribal Hatchery (NPTH) and associated acclimation facilities, 2010.

Release Site	Unique PIT Tag Detections	Detected as Subyearlings In 2010	Detected as Yearlings In 2011
Clearwater Naturals	503	408 (81.1%)	95 (18.9%)
NPTH On-Station	1,244	1,241 (99.8%)	3 (0.2%)
Cedar Flats	3,972	3,953 (99.5%)	19 (0.5%)
Luke’s Gulch	6,990	6,980 (99.9%)	10 (0.1%)
N. Lapwai Valley	1,332	1,332 (100%)	0 (0%)

Estimated index survival of PIT tagged natural subyearling fall Chinook salmon from the Clearwater River to Lower Granite Dam was 20%, but could not be calculated to McNary Dam due to inadequate detections at juvenile facilities (Table 5). Index survival does not include "holdovers" or those fish that overwintered (reservoir reared) and migrated as yearlings. Estimated index survival for the NPTH on-station release was 75% to Lower Granite Dam and 69% to McNary Dam. Estimated index survival for the acclimation releases were 54% and 46% for Cedar Flats, 73% and 59% for Luke's Gulch, and 64% and 46% for NLV to Lower Granite and McNary dams, respectively (Table 5).

Table 5. Estimated index survivals (using SURPH) with 95% confidence intervals (CI's) from passive integrated transponder **(**PIT) tagged releases of natural fall Chinook salmon subyearlings in the lower Clearwater River and Nez Perce Tribal Hatchery (NPTH) releases to Lower Granite and McNary dams, 2010 (LGR = Lower Granite Dam, MCN = McNary Dam, CI = confidence interval at the 95% level).

Release Site	Release PIT Tag Number	Index Survival to LGR (95% CI's)	Index Survival to MCN (95% CI's)
Clearwater Naturals	2,960	0.20 [0.18 - 0.22]	-----[a]
NPTH On-Station	3,086	0.75 [0.68 - 0.85]	0.69 [0.60 - 0.83]
Cedar Flats	14,219	0.54 [0.50 - 0.58]	0.46 [0.40– 0.54]
Luke's Gulch	16,409	0.73 [0.69 - 0.76]	0.59 [0.54 - 0.64]
N. Lapwai Valley	3,089	0.64 [0.59 - 0.70]	0.46 [0.39 - 0.48]

[a] Insufficient detections to calculate survival.

The juvenile detection facilities with most detections, similar to previous years, were Lower Granite, Little Goose, and McNary dams. A total of 18,711 project PIT tagged fall Chinook juveniles were detected at all lower Snake and Columbia River juvenile facilities in 2010, of which 68.9% were detected at Lower Granite, Little Goose, and McNary dams. PIT tag detections were also used to establish mean migration rates to these three detection points for natural and hatchery subyearling fall Chinook salmon tagged in 2010 (Figure 4). As in previous years, the acclimated releases from Cedar Flats and Luke's Gulch migrated at a faster rate (18.3 and 18.1 Rkm/d, respectively) than the other releases to Lower Granite Dam, while the natural fall Chinook from the Clearwater River migrated much slower (1.2 Rkm/d) on average (Figure 4). All of the hatchery and natural PIT tagged releases migrated at an increasingly faster rate to all three major juvenile detection facilities. All PIT tag release groups had adequate detections during 2010 to derive an index of the 10th, 50th, and 90th percentile arrival dates to Lower Granite Dam (Table 6). The 50% arrival timing for the Clearwater naturals was October 31 at Lower Granite. The 50% arrival timing at Lower Granite Dam was June 19 for the Luke's Gulch release, June 27 for Cedar Flats, June 22 for the NPTH release group, and June 1 for the NLV group (Table 6). Cumulative arrival timing for all PIT tagged releases to Lower Granit Dam are shown in Figure 5.

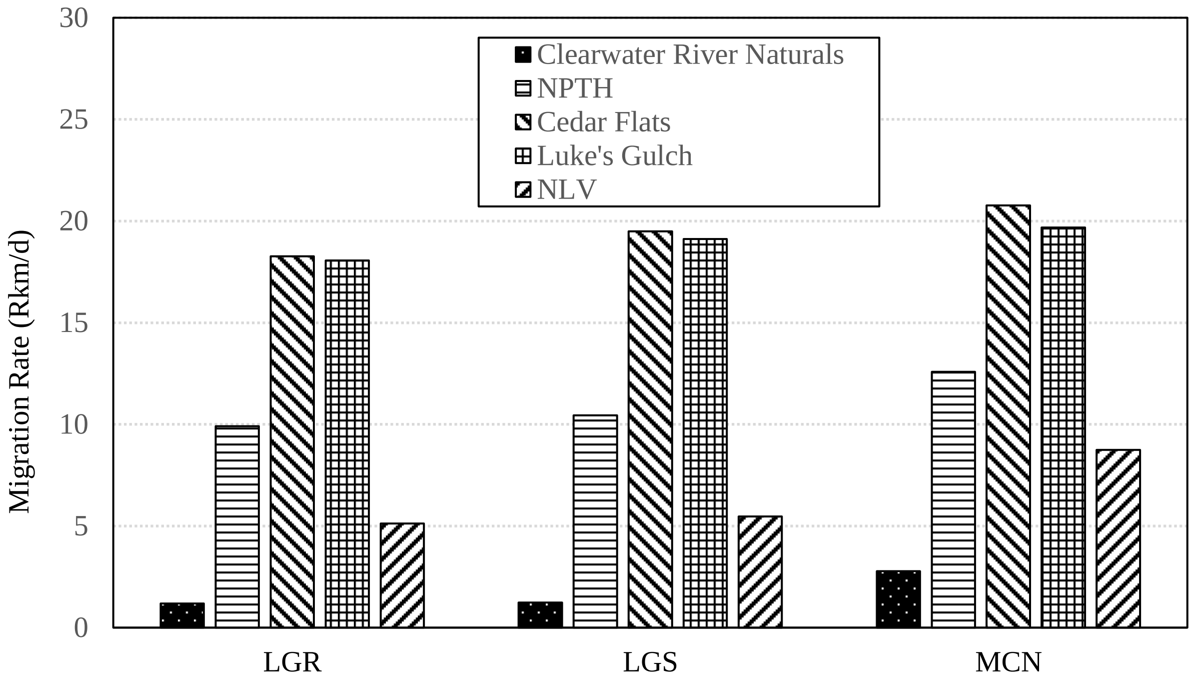

Figure 4. Total detection mean migration rate to selected Snake and Columbia River dams of passive integrated transponder (PIT) tagged Clearwater River natural fall Chinook salmon subyearlings, Nez Perce Tribal Hatchery (NPTH) on-station releases, and acclimated releases at Cedar Flats, Luke's Gulch, and North Lapwai Valley (NLV) 2010 (LGR = Lower Granite Dam, LGS = Little Goose Dam, MCN = McNary Dam).

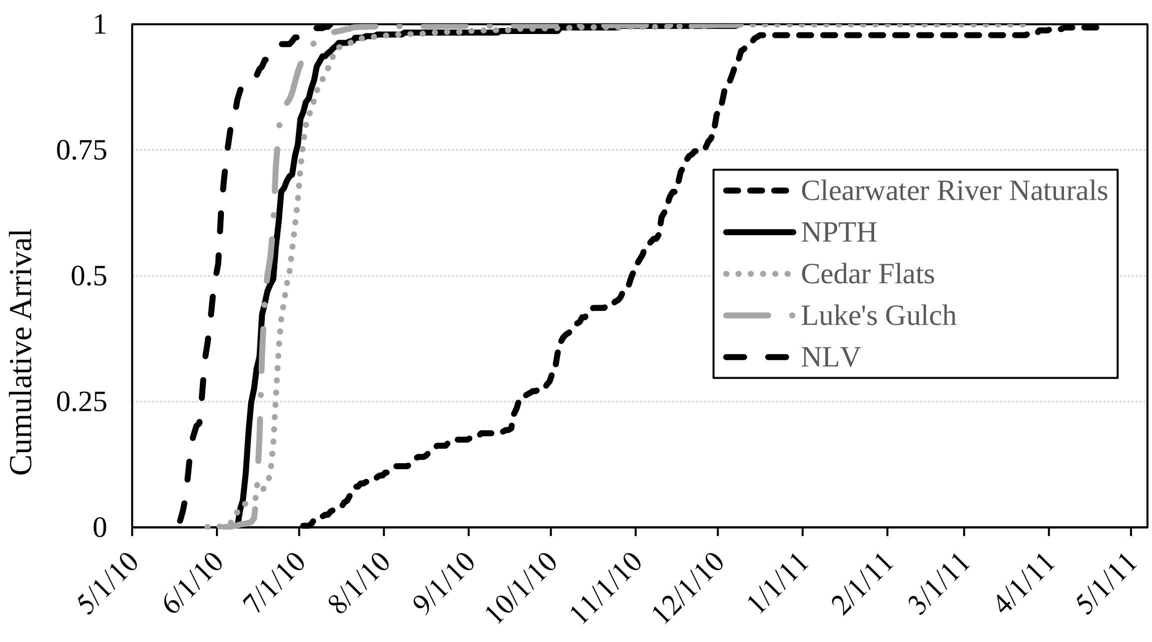

Figure 5. Cumulative arrival timing to Lower Granite Dam of passive integrated transponder (PIT) tagged Clearwater River natural fall Chinook salmon subyearlings, Nez Perce Tribal Hatchery (NPTH) on-station releases, and acclimated releases at Cedar Flats, Luke's Gulch, and North Lapwai Valley (NLV).

Table 6. Detections for the 10th, 50th, and 90th percentile arrival timing at Lower Granite Dam (LGR) of natural fall Chinook salmon passive integrated transponder (PIT) tagged on the lower Clearwater River, Nez Perce Tribal Hatchery (NPTH) on-station releases, and acclimated releases at Cedar Flats, Luke's Gulch, and North Lapwai Valley in 2010.

Release Group	Release Date	Lower Granite Dam (LGR) PIT Tag Detections	% Arrival Timing to LGR		
		n	10%	50%	90%
Clearwater River Naturals	6/28 – 8/17	321	7/29	10/31	12/6
NPTH On-Station	6/7	298	6/11	6/22	7/7
Cedar Flats	6/14	1,310	6/20	6/27	7/11
Luke's Gulch	6/9	2,245	6/16	6/19	6/30
North Lapwai Valley (NLV)	5/14	382	5/21	6/1	6/16

Temperature and Flow

Fall Chinook salmon subyearling releases at NPTH on the Clearwater, Luke's Gulch on the S.F. Clearwater, and Cedar Flats on the Selway River were made prior to warm (>15 ^{o}C) summer water temperatures on the lower Clearwater River (Figure 6) and before cold water releases from Dworshak Dam in early July. The release of the NLV acclimated group was a few weeks earlier because of warming water temperatures at the NLV facility. Temperatures in the upper Clearwater River Subbasin exceeded 20 ^{o}C throughout much of July and early August with the lower Clearwater moderating between 11-13 ^{o}C during that time period because of cold water releases from Dworshak Reservoir. This is the time period that most of the natural fall Chinook sampling occurred on the lower Clearwater River (Figure 6).

Most PIT tag detections at Lower Granite Dam for all NPTH and associated acclimated releases occurred before temperatures exceed 20 ^{o}C in the Snake River (Figure 7). Cold water releases from Dworshak Reservoir moderated warm Snake River temperatures by 2-3 ^{o}C keeping water temperatures below 20 ^{o}C at Lower Granite Dam during July, August and September. Some detections of Clearwater River natural fall Chinook occurred from July thru mid-September when temperatures in the Snake River were near or exceeding 20 ^{o}C (Figure 7). There were more natural subyearlings first detected at Lower Granite Dam starting in late September thru early December when temperatures on the Snake River and at Lower Granite Dam dropped to approximately 18 ^{o}C and below (Figure 7). While the subyearling release from NLV occurred prior to peak spring flows on the lower Clearwater River, the releases at NPTH on the Clearwater, Luke's Gulch on the S.F. Clearwater, and Cedar Flats on the Selway River were

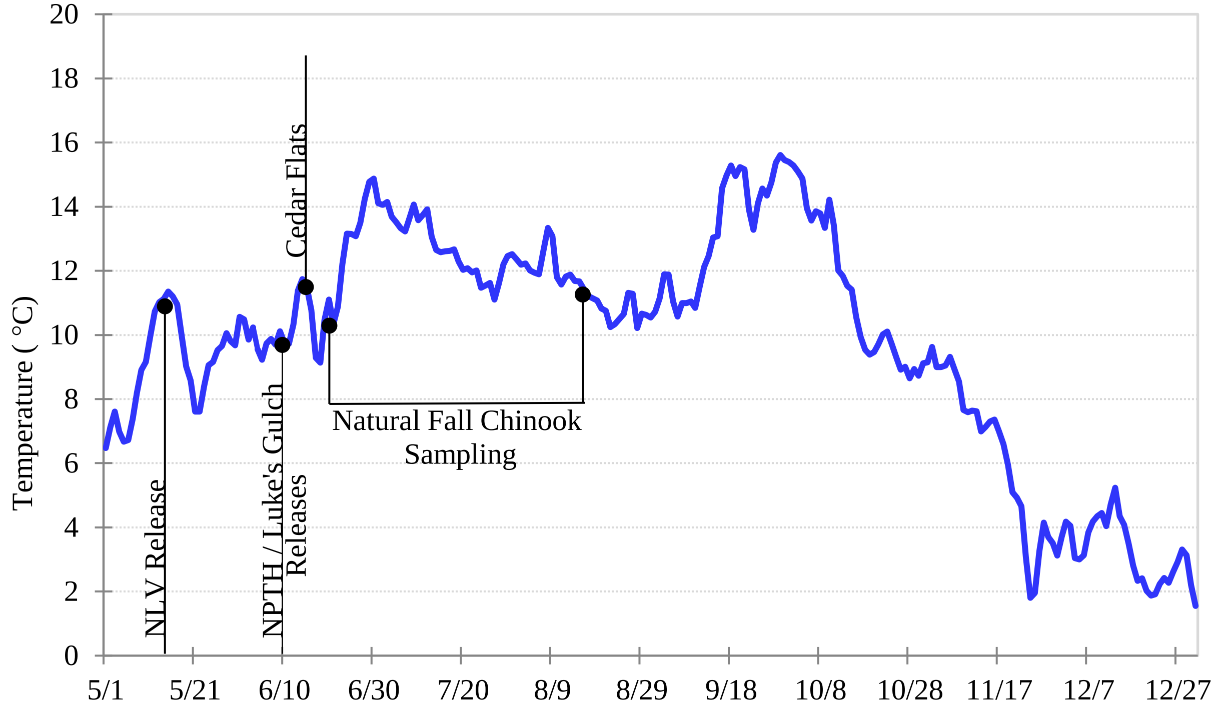

Figure 6. Mean daily temperatures recorded in the Lower Clearwater River (USGS Spalding gauge), timing of natural fall Chinook sampling on the Clearwater River and hatchery releases from Nez Perce Tribal Hatchery (NPTH), Cedar Flats, Luke’s Gulch, and North Lapwai Valley (NLV), 2010.

made after peak spring flows (Figure 8). While these releases were made on the descending limbs of their respective hydrographs, sampling Clearwater natural fall Chinook could not begin until the Clearwater flows were below 850 cubic meters per second (cms) and descending (Figure 8). PIT tag detections at Lower Granite Dam (LGR) in relation to mean daily flows and spill of the Clearwater naturals along with the combined hatchery fall Chinook releases from NPTH and associated acclimation facilities are shown in Figure 9. Most hatchery detections occurred during the spill period at Lower Granite (Figure 9). In contrast, very few of the PIT tagged natural fish experienced summer spill as most detections occurred later in the fall (Figure 9).

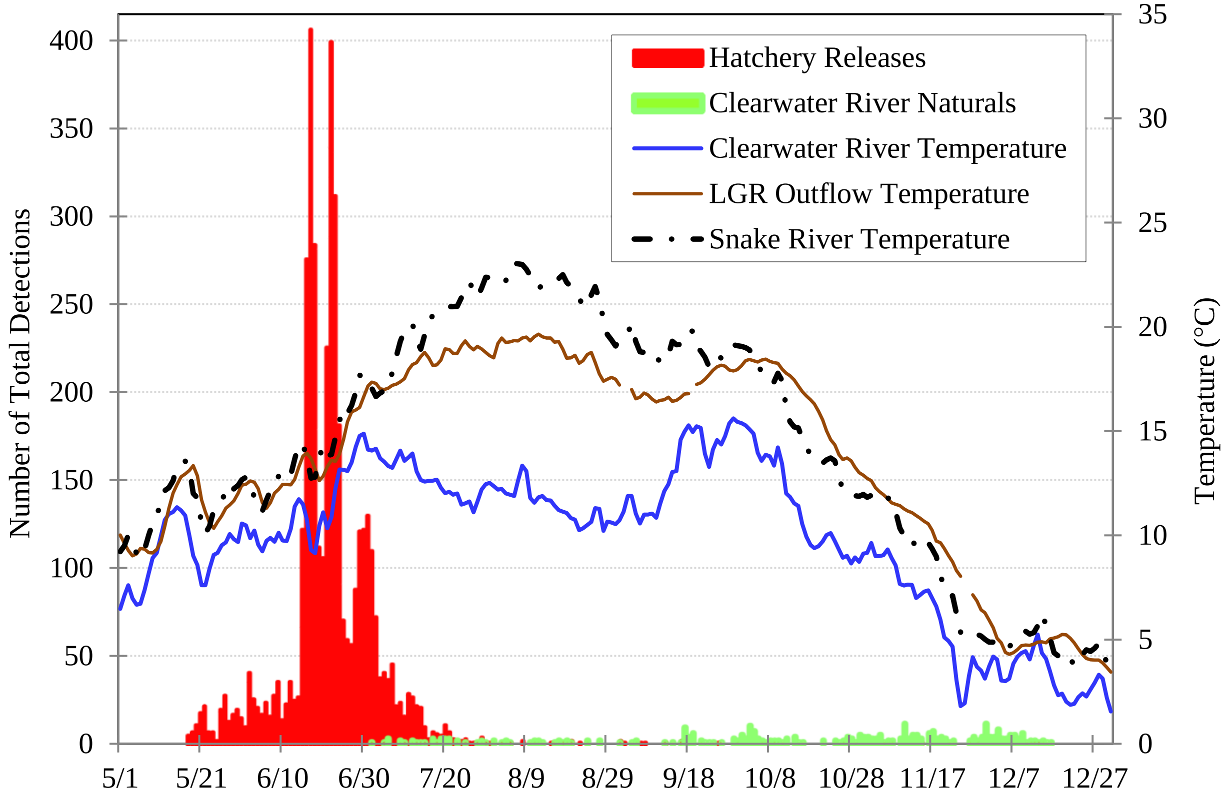

Figure 7. Passive integrated transponder (PIT) tag detections of Clearwater River natural and combined hatchery releases from Nez Perce Tribal Hatchery, Cedar Flats, Luke's Gulch, and North Lapwai Valley fall Chinook salmon at Lower Granite Dam in relation to mean daily temperatures recorded in the Clearwater River (USGS Spalding gauge), Snake River (USGS Anatone gauge) and at Lower Granite Dam (LGR), 2010.

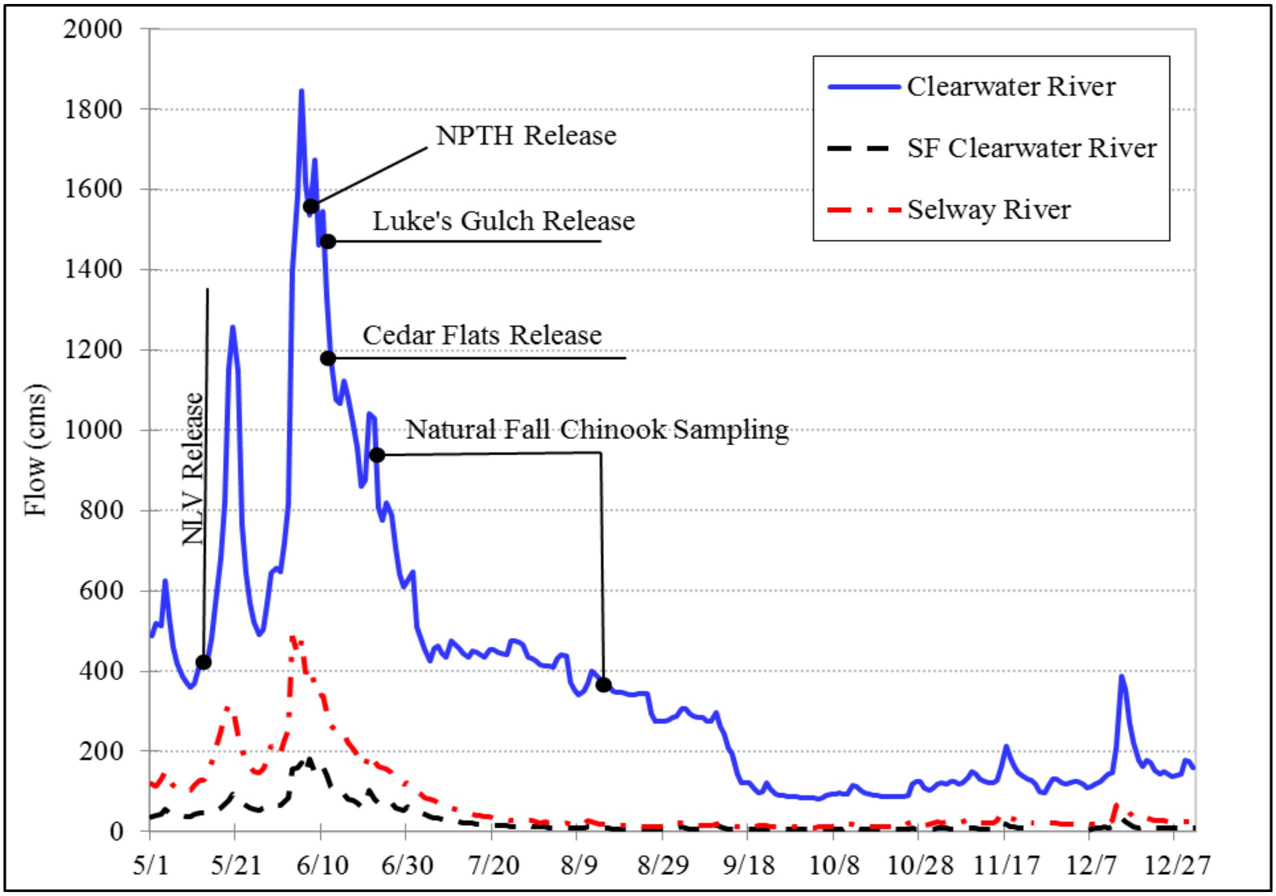

Figure 8. Mean daily flows recorded in the Clearwater River Subbasin, timing of natural fall Chinook sampling on the Clearwater River and hatchery releases from Nez Perce Tribal Hatchery (NPTH), Cedar Flats, Luke's Gulch, and North Lapwai Valley (NLV), 2010.

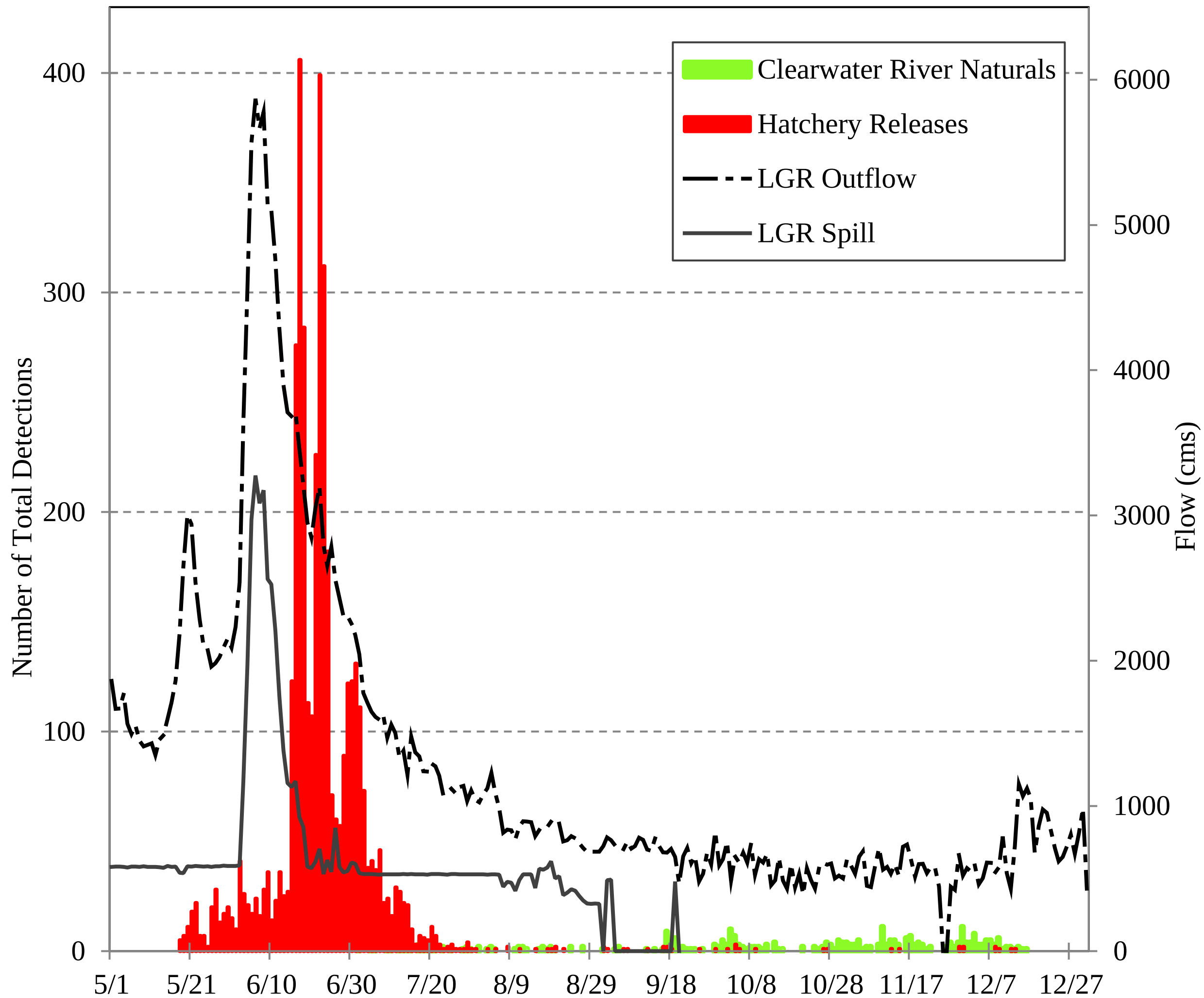

Figure 9. Passive integrated transponder (PIT) fall Chinook detections of Clearwater River naturals and combined hatchery releases from Nez Perce Tribal Hatchery, Cedar Flats, Luke's Gulch, and North Lapwai Valley at Lower Granite Dam (LGR) in relation to mean daily flows and spill recorded at the dam, 2010.

Genetic Monitoring

We collected a random non-lethal subsample (upper caudal fin clips) from 199 natural subyearling Chinook salmon captured on the Clearwater River during 2010. All genetic samples were sent to the Hagerman Laboratory in Idaho and analyzed by the CRITFC staff to determine percent composition of spring/summer or fall Chinook salmon and to build upon baseline fall Chinook salmon genetic profiles. The 2010 genetic analysis will be combined with subsequent year's genetic monitoring data and provided in a later report.

Adult Monitoring

Spawning Ground Surveys

We observed a total of 1,632 fall Chinook salmon redds in the Clearwater River in 2010 (Appendix A). Included in the Clearwater redd count, 53 redds were observed in the mainstem above the confluence of the N.F. Clearwater River. Surveys were conducted on the Potlatch and N.F. Clearwater rivers on the same dates as the lower Clearwater River. A total of 281 redds were observed on the Potlatch and 8 redds observed on the N.F. Clearwater. A total of 2 redds were observed in the lower S.F. Clearwater River, one redd observed in the lower Selway River, and no redds observed in the M.F. Clearwater River. A total of 1,924 redds were observed in the Clearwater River Subbasin which was the highest count since surveys began in 1988 (Figure 10).

Aerial redd surveys began on the Clearwater River October 18 with 390 redds observed, so the initiation of spawning began much earlier (Appendix A). A peak of 802 redds were observed on November 1 and survey conditions were good. Water transparencies began with excellent conditions and then degraded to only fair on the last survey on November 29 when 420 new redds were observed. The lowest water flows (3,080 cfs at Spalding) occurred on the first survey with rains increasing flows to 4,610 cfs on the last survey (Appendix A).

There were a total of 5,302 fall Chinook salmon redds counted in the Snake River Basin above Lower Granite Dam in 2010 and 324 redds estimated below Granite in the Tucannon River (Arnsberg et al. 2011; Figure 10). The 2010 fall Chinook redd count represents the highest count in the Snake River Basin since surveys began in 1988 (Figure 10). The adult escapement above Lower Granite Dam was estimated to be 39,764 adults during 2010 (Young et al. 2013). The adult-to-redd ratio above Lower Granite Dam was calculated to be 7.5 adults/redd in 2010 with an average of 6.2 adults/redd averaged across all years since 1987 (Figure 12). Redd counts showed a high correlation ($R^2 = 0.93$) with yearly escapement estimates over Lower Granite Dam (Figure 11). Using the adult/redd number of 7.5 in 2010, the estimated adult escapement to the Clearwater River Subbasin was approximately 14,430 adults (1-ocean fish or jacks/jills not included).

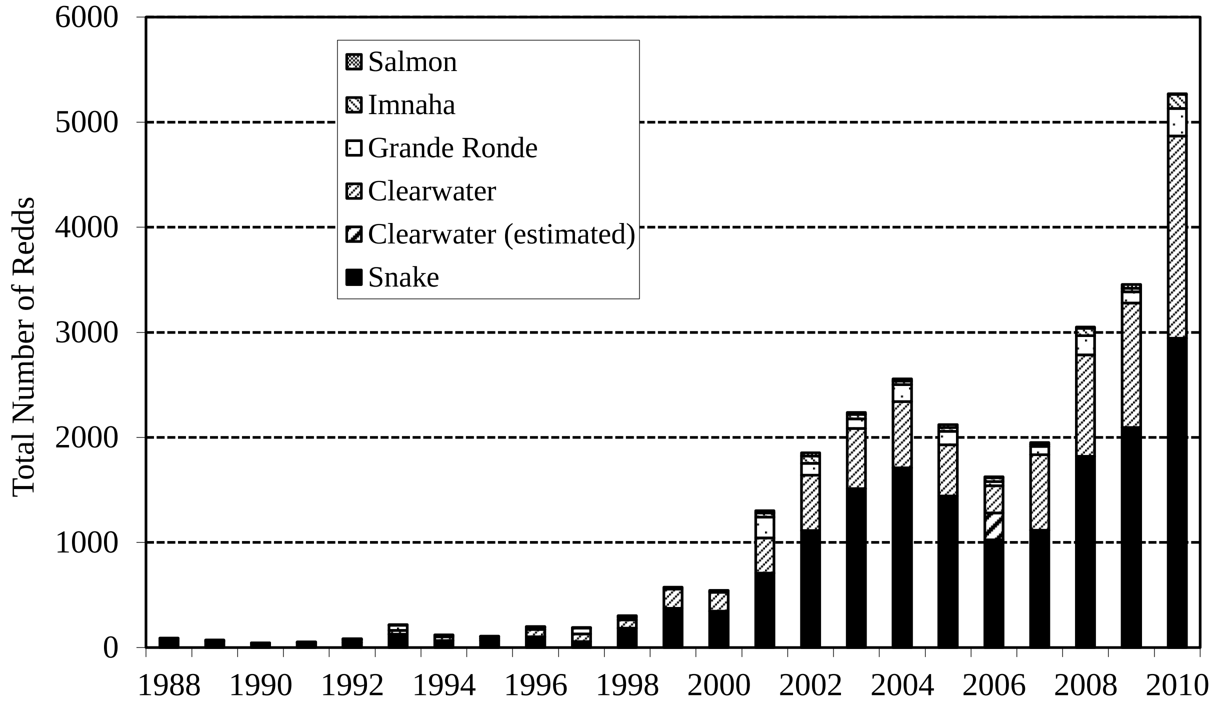

Figure 10. Fall Chinook salmon redds counted in the Snake River Basin above Lower Granite Dam, 1988-2010 (Clearwater River estimated number missed for 2006 only).

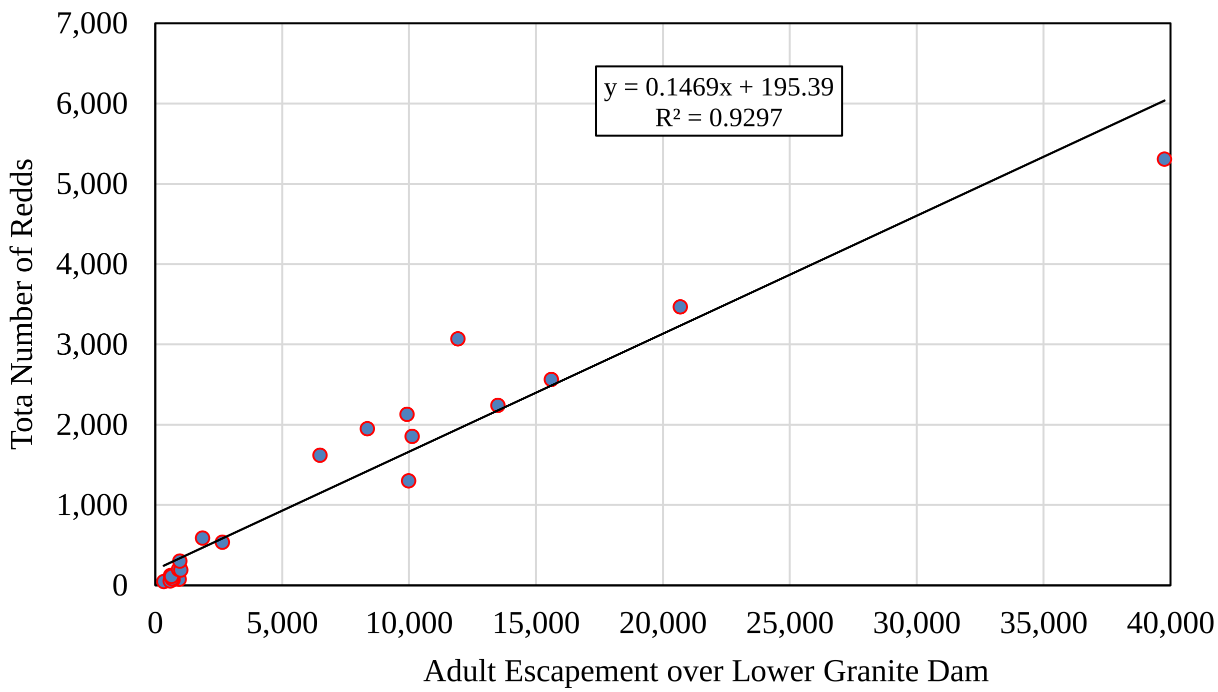

Figure 11. Fall Chinook salmon redds counted in the Snake River Basin above Lower Granite Dam and estimated adult (not including jacks) escapement regression over Lower Granite Dam from run reconstructions, 1987-2010.

Escapement and Carcass Recoveries

The preliminary total fall Chinook salmon returning to Lower Granite Dam (LGR) in 2010 was estimated to be 45,335 adults and 7,303 jacks for a total of 52,638 fish (Young et al. 2013). During 2010, the number of fall Chinook salmon trapped and hauled from Lower Granite Dam to NPTH for broodstock was 1,107 fish (545 females and 562 males). The estimate of 2010 fall Chinook salmon escapement above Lower Granite Dam was 39,764 adults and 6,531 jacks for a total of 46,295 fish (Young et al. 2013). Jacks made up only 14.1% of the fall Chinook run over Lower Granite Dam in 2010 compared to 52.7% of the run in 2009. Natural/wild fall Chinook salmon consisted of about 16.2% of the total escapement above LGR in 2010 (Young et al. 2013).

A total of 556 fall Chinook salmon carcasses were collected in the Snake River Basin from October 14 through December 13 (Appendix B). There were a total of 258 females (46.7%), 295 males (53.3%), and three that could not be identified. Of all female carcasses cut open and examined, 93.0% were 90-100% spawned-out (eggs were spent), 2.7% retained about 40-75% of its eggs, and 4.3% were pre-spawned mortalities and retained 100% of their eggs. Of the 11 pre-spawned female mortalities, 10 of those were collected in the lower Potlatch River with only one found in the Clearwater at Cherry Lane (Appendix B).

Analysis of the composition of fall Chinook salmon carcasses collected in the Clearwater River (n=289) using coded wire tags, PIT tags, adipose fin clips, and scale readings resulted in identifying 149 hatchery origin fish (51.6%), 28 natural origin fish (9.7%), and 105 (36.3%) unmarked/untagged fish that were not identified as natural or hatchery, and 7 (2.4%) fish in which scales were regenerated or could not be read (Appendix B).

Analysis of the composition of fall Chinook salmon carcasses collected in the Potlatch River (n=248) using coded wire tags, PIT tags, adipose fin clips, and scale readings resulted in identifying 183 hatchery origin fish (73.8%), no natural origin fish (0.0%), and 62 (25.0%) unmarked/untagged fish that were not identified as natural or hatchery, and 3 (1.2%) fish in which scales were regenerated or could not be read. One carcass was identified as a coho by scales (Appendix B).

The breakdown of fall Chinook salmon carcasses of subyearling versus yearling hatchery released fall Chinook salmon, number of natural fish, out-of-Snake Basin strays, and fish that reservoir reared and emigrated as yearlings are summarized in Table 7. The greatest number of carcasses collected in the Clearwater River Subbasin were hatchery subyearlings that emigrated as subyearlings (37.9%), followed by unmarked/untagged subyearlings that emigrated as subyearlings (31.1%), and thirdly by hatchery yearling releases (16.5%). The majority of carcasses collected returned at total age-3 (70.0%) followed by age-4 fish (22.2%), age-2 or jacks (5.2%), and lastly age-5 (2.6%). There were no age six carcasses collected. All age-2 fish collected were males. The 34 out-of-Snake Basin hatchery “strays” made up 6.3% of the carcasses sampled in the Snake River Basin (Table 7), however, 27 (79.4%) of those were collected in the Potlatch River with 4 (11.8%) collected in Alpowa Creek and 4 (11.8%) in the lower Clearwater (Appendix B).

Table 7. Number of each age class, percent of total return identified by emigration life history type from coded wire tags, visible implant elastomer tags, adipose fin clip, and scale analysis; fork length (cm) range and average fork length in parenthesis of adult fall Chinook salmon carcasses (n = 541) collected in the Clearwater River Subbasin, 2010 (14 unknown origins and/or life history types not included in percentages).

Emigration Life History type	No. Age 2 Fk Lth Range (avg.)	No. Age 3 Fk lth Range (avg.)	No. Age 4 Fk lth Range (avg.)	No. Age 5 Fk lth Range (avg.)	Total of Life History type (% of total)
Subyearling Hat release/Subyearling Emigration	17 (3.1%) 48-59 (53)	183 (33.8%) 55-83 (69)	0 (0.0%)	5 (0.9%) 79-95 (87)	205 (37.9%)
Subyearling Hat release/ Reservoir Reared	0 (0.0%)	5 (0.9%) 61-75 (68)	11 (2.0%) 70-85 (79)	1 (0.2%) 89 (89)	17 (3.1%)
Yearling Hat Release	0 (0.0%)	28 (5.2%) 50-74 (60)	59 (10.9%) 63-90 (76)	2 (0.4%) 78-96 (87)	89 (16.5%)
Natural Reservoir Reared	0 (0.0%)	4 (0.7%) 61-74 (67)	22 (4.1%) 75-100 (85)	2 (0.4%) 92-95 (94)	28 (5.2%)
Subyearling Out-of-Snake Basin Hatchery Strays	0 (0.0%)	10 (1.8%) 59-73 (69)	0 (0.0%)	0 (0.0%)	10 (1.8%)
Yearling Out-of-Snake Basin Hatchery Strays	1 (0.2%) 58 (58)	6 (1.1%) 67-74 (71)	16 (3.0%) 71-92 (79)	1 (0.2%) 96 (96)	24 (4.4%)
Unmarked/Untagged Subyearling emigration	10 (1.8%) 41-60 (53)	143 (26.4%) 58-83 (70)	12 (2.2%) 73-95 (83)	3 (0.6%) 92-97 (95)	168 (31.1%)
Total Collected by Age	28 (5.2%)	379 (70.0%)	120 (22.2%)	14 (2.6%)	541

Smolt-to-Adult Return Estimates

Total coded wire tag recoveries of fall Chinook salmon processed at NPTH and LFH from 2005-2010 for NPTH and associated subyearling acclimation releases from 2004-2009 releases are given in Table 8. A total of 197 NPTH and associated returns were hauled from Lower Granite Dam to LFH for brood and none volunteered into the LFH fish ladder during 2009. A total of 80 NPTH and associated returns were hauled to NPTH from Lower Granite Dam during 2009. Since broodstock needs were met at NPTH, the adult fish ladder was not opened for volunteers. Prior to 2010, returns in 2004-2009 totaled 651 fish from NPTH and associated releases that were hauled to LFH while only 8 fish from those releases volunteered into the LFH fish ladder. This compares with 254 and 336 fish that were hauled and volunteered into NPTH (Table 8).

The fall Chinook salmon run reconstruction estimates from 2004-2009 (expanded for trapping rates at Lower Granite Dam) and estimated contributions in the ocean and Columbia River fisheries are provided in Table 9. Since NPTH inception, there are four complete brood returns (5-yr olds) from 2003-2006 release years. A low smolt-to-adult return (SAR) of 0.025% was estimated for the first release in 2003 from NPTH on-station and a slightly higher 0.034% for the North Lapwai Valley Acclimation Pond. The highest estimated SAR of 1.056% form complete returns was from the Cedar Flats release in 2006. The lowest SAR of 0.016% was estimated for the 2005 emergency NPTH on-station release during the spring flood that occurred (Table 9).

Generally there were more coded wire tag recoveries reported in ocean fisheries than in freshwater fisheries which occurs mostly in the Columbia River (Table 9). Higher smolt-to-adult survival (SAS) estimates, which include ocean and freshwater fishery contributions, usually correspond to higher SARs (fish returning to the Snake River). The highest SAS of 1.189% has been for the Cedar Flats release group in 2006 while the lowest fisheries contribution was for the NPTH 2005 emergency release group (Table 9).

Table 8. Total coded wire tag recoveries (2005-2010) at Nez Perce Tribal Hatchery (NPTH) and Lyons Ferry Hatchery (LFH) from NPTH and associated acclimation releases from 2004-2009 (includes hauled fish from Lower Granite Dam and volunteers (VOL) into each hatchery (not expanded for trapping rates at Lower Granite Dam).

Fall Chinook Release Data				2005-2009 Returns		2010 Returns		Total CWTs Recovered
Release Location	First Release Date	Total Release Number	Fish/ lb	# LFH Hauled/ VOL	# NPTH Hauled/ VOL	# LFH Hauled/ VOL	# NPTH Hauled	
NPTH*	6/4/04	169,596	55.2	9/2	3/27	0/0	0	41
NPTH (emerg. release-flood)*	6/7/05	869,300	110-120	11/3	3/21	0/0	0	38
North Lapwai Valley*	5/17/06	199,746	72.3	97/1	34/82	2/0	1	217
Cedar Flats*	6/13/06	25,774	32.9	36/0	17/3	1/0	0	57
Lukes Gulch*	6/13/06	25,391	36.6	26/0	8/4	0	0	38
NPTH*	6/8/06	432,097	59.0	220/2	70/173	2/0	5	472
North Lapwai Valley	5/22/07	163,431	50.9	7/0	3/3	1/0	21	35
Cedar Flats	6/11/07	24,988	47.3	3/0	1/0	1/0	9	14
Lukes Gulch	6/4/07	24,955	37.2	1/0	1/0	0/0	21	23
NPTH	6/11/07	491,424	37.9	52/0	22/21	7/0	22	124
North Lapwai Valley	5/15/08	168,624	73.4	64/0	32/0	59/0	0	155
Cedar Flats	6/12/08	100,294	59.3	31/0	15/0	20/0	1	67
Lukes Gulch	6/12/08	100,368	46.0	41/0	22/2	35/0	0	100
NPTH	6/10-6/15/08	495,936	50.7	53/0	23/0	47/0	0	123
North Lapwai Valley	5/15/09	495,569	85.3	0/0	0/0	3/0	0	3
Cedar Flats	6/9/09	200,098	57.9	0/0	0/0	5/0	0	5
Lukes Gulch	6/10/09	209,878	51.6	0/0	0/0	9/0	0	9
NPTH	6/8-6/12/09	628,815	51.5	0/0	0/0	5/0	0	5
			Totals	651/8	254/336	197/0	80	1,526

*Complete return years.

Table 9. Estimated fall Chinook Salmon smolt-to-adult returns (SARs) and smolt-to-adult survivals (SASs) for Nez Perce Tribal Hatchery (NPTH) on-station and associated subyearling releases from 2003-2007 (coded wire tag recoveries as reported to the Regional Mark Processing Center (RMPC) using estimated numbers i.e. expanded, and expanded numbers at Lower Granite Dam (Snake River recoveries) through run reconstructions (includes 1-ocean returns).

Release Location	Release Year	Total # coded wire tags	Total Ocean Fisheries recoveries	Total Freshwater Fisheries recoveries	Total Snake River recoveries	Grand Total recoveries	SAR's (%) to Snake	Total SAS's %
North Lapwai Valley*	2003	167,967	16	3	57	76	0.034	0.045
NPTH 1st release*	2003	193,643	8	0	49	57	0.025	0.029
NPTH 2nd release*	2003	97,932	37	0	261	298	0.267	0.304
NPTH*	2004	163,830	7	0	86	93	0.052	0.057
NPTH Emerg. Release*	2005	542,164	5	6	88	99	0.016	0.018
North Lapwai Valley*	2006	198,108	170	79	764	1,013	0.386	0.511
Cedar Flats*	2006	25,478	34	0	269	303	1.056	1.189
Lukes Gulch*	2006	25,099	18	0	172	190	0.685	0.757
NPTH*	2006	296,606	302	57	1650	2,009	0.556	0.677
North Lapwai Valley	2007	144,841	16	32	101	149	0.070	0.103
Cedar Flats	2007	24,890	0	4	49	53	0.197	0.213
Lukes Gulch	2007	24,906	1	1	19	21	0.076	0.084
NPTH	2007	293,935	66	76	625	767	0.213	0.261

*Complete returns and recoveries.

Hatchery Spawning

Fall Chinook adults were first counted on August 18 at Lower Granite Dam (LGR), although there is some overlap on either side of that date with summer Chinook salmon. Warm water temperatures delayed trapping during 2010 until August 29 and production staff began hauling fall Chinook from LGR to NPTH on August 30. The last haul date from Lower Granite Dam was September 19. A total of 1,107 fall Chinook were hauled from LGR for broodstock which consisted of 545 females (Appendix C) and 562 males (Appendix D). All brood were collected at LGR in 2010, therefore the NPTH adult fish ladder was not opened for volunteers.

Of the 545 females processed at NPTH, 496 were spawned, 41 died in the pond prior to spawning, 8 were killed and not used for brood, and no excess females were outplanted back to the river to spawn naturally (Appendix C). A total of 562 males were processed with 461 spawned, 56 died in the pond prior to spawning, 34 were killed and not used for brood, and 11 were outplanted back to the river to spawn naturally (Appendix D). Most males killed and not used were mostly 1-ocean jacks and were sacrificed to read coded wire tags for run reconstruction purposes. In order to possibly decrease the number of returning jacks in the future, spawning was intentionally limited to older and larger males and some were spawned with more than one female.

This was the fourth year for a full adult return (5-year old fish) back to the Clearwater River Subbasin from subyearling releases at the NPTH and the NLV acclimation site in 2003-2006. A total of 29 females and 51 males were processed that were from prior years NPTH and associated acclimated releases. Of the 29 females, 26 were spawned and incorporated into the broodstock which represented 5.2% of the total broodstock. Of the 51 males, 46 were spawned which represented 10.0% of the brood.

The highest contribution of females to the broodstock was 17.9% unmarked/untagged hatchery subyearlings, followed by LFH on-station yearlings (14.9%), and thirdly by Hells Canyon Dam direct releases (11.7) (Appendix C). There were 10 known out-of-Snake Basin hatchery female strays that represented 2.0% of all females hauled from LGR and 1.6% was used in the brood.

The highest composition of all fall Chinook males used for brood was unmarked/untagged fish (24.7%) with a subyearling emigration history, followed by Hells Canyon subyearling (12.1%), and thirdly by unknown hatchery ad-clip subyearling (6.7%) (Appendix D). There were 16 known out-of-Snake Basin hatchery male strays that represented 2.8% of all males hauled from LGR, however, only one was used representing 0.2% of all broodstock.

Total age composition of all fall Chinook salmon females processed (and not necessarily used for brood) at NPTH resulted in 53.2% age-3, 39.8% age-4, and 2.9% age-5 of fish that could be identified (Appendix C). There were two age-3 one ocean "jills" used for brood from yearling releases. Percentages of females incorporated into the brood were similar to those processed as few (8.8%) females were sacrificed and not used in the egg take (Appendix C).

Total age composition of all fall Chinook salmon males processed (not necessarily used for brood) at NPTH resulted in 1.1% age-2, 82.9% age-3, 13.9% age-4, 1.2% age 5, 0.5% age-5, and one (0.2%) age-6 fish that could be identified (Appendix D). The incorporation of true 1-ocean "jacks" into the NPTH broodstock was 4.8% of all males used, however, this is skewed high because larger males were used to spawn more than once with multiple females.

Genetic Monitoring

A total of 957 or 100% of the adult fall Chinook salmon incorporated into the NPTH broodstock in 2010 were tissue sampled for DNA analysis as part of NOAA's parentage study. The results of this work will be published after another year of data collection. We also subsampled 553 (out of 556) fall Chinook salmon carcasses collected on the spawning grounds for DNA analysis (Appendix B). A comprehensive genetic analysis report on NPTH broodstock and carcass recovery will be forthcoming in a later publication.

DISCUSSION

Supplementation

The NPTH was close to the 1.4 million release goal for 2010. The release group at NLV was released earlier than scheduled because of warm water temperatures at that site. The NLV release group was slightly smaller at release than all other groups but the condition factor (1.21) was one of the second highest along with Cedar Flats release group (Table 2). All other groups were released near the scheduled time of release.

Monitoring and Evaluation

<u>Juvenile Monitoring</u>

Life History, Emigration Timing, and Survival Estimates

The NLV release experienced a higher percentage (43.12%) of unique PIT tag detections than the other acclimated hatchery releases and the Clearwater River natural fall Chinook (16.99%). As in previous years it appears that the NLV group experienced a longer duration of spill and higher flows at Lower Granite Dam due to an earlier release. Sufficient detections for the Clearwater River natural releases allowed for survival to be estimated to Lower Granite. This is a direct result of the Lower Granite Dam PIT tag detectors operating into the middle of December. As in previous years, there are not yet enough detections at Lower Granite and subsequent facilities to estimate survival below Lower Granite Dam. Given the extended operation of the Lower Granite Dam PIT tag detectors, the 90% arrival date for the natural group to Lower Granite Dam was December 6, over a month after the juvenile detection system is normally de-watered for the winter months on October 31. To accurately study the Clearwater River natural fall Chinook population and their life history using PIT tag technology, it is essential that detectors at all juvenile facilities are in operation for as long as possible. Migration rates increased for all the acclimated hatchery and natural releases to each successive observation point in 2010. This may contribute to these fish reaching advanced stages of smoltification as they emigrate to farther reaches of the Snake and Columbia rivers. The NLV group were released earlier and 60.31% smaller than the other hatchery releases, they experienced the highest flows from the Clearwater River and at Lower Granite Dam but migrated at the slowest rate. These fish could have possibly migrated slower than the other hatchery releases, spending more time feeding through the reservoirs to attain growth and smoltify.

Flow and Temperature

Flow and subsequent spill at Lower Granite Dam was lower from March to June in 2010, but peaked higher from June to July compared to 2009. Water temperature extremes between the lower Clearwater River and the Snake River during natural fall Chinook emigration conditions show a difference of about 10 ^{o}C during mid-July through August, similar to recent years. Water temperatures on the Clearwater River were a cool 11-13 ^{o}C while at the same time the Snake River temperatures were 20-23 ^{o}C. This temperature difference may be a thermal barrier that may contribute, along with smaller size at emigration, to delayed Clearwater River natural fall Chinook salmon subyearling emigration resulting in significantly more holdovers or reservoir reared fish. The percentage of holdovers from 2010 releases that were detected in 2011 as yearlings from unique PIT tag detections was 18.89% for the natural fall Chinook and 0.24% for the combined hatchery releases from NPTH and associated acclimation facilities.

Genetic Monitoring

We continued to collect genetic information on natural juvenile Chinook salmon subyearlings collected on the lower Clearwater River. We have reached our target level of at least 100 samples throughout each sampling season. The DNA analysis is used to separate out spring from fall Chinook salmon and will monitor fall Chinook genetic profiles over time. Also, with NOAA's parentage study beginning with the 2007 NPTH broodstock, and continuing in 2008-2010, we will be able to track juveniles through PIT tags to determine if the reservoir reared life history trait is genetically linked or influenced more by environmental changes within the Snake River Basin. The 2010 genetic analysis will be combined with the future years of genetic monitoring and analysis and reported in a later report along with a separate NOAA report.

<u>Adult Monitoring</u>

Spawning Ground Surveys

The 2010 aerial spawning ground surveys in the Clearwater River Subbasin resulted in the highest fall Chinook salmon redd count (1,632) since we started surveys in 1988. There were 53 redds observed in the upper mainstem Clearwater above the North Fork confluence. A record high of 281 redds were counted in the Potlatch River which was never supplemented with fall Chinook. Only 2 redds were counted in the S.F. Clearwater River and one redd in the Selway River. We are expecting higher escapement numbers and redds in the upper Clearwater reaches in the future since full production releases were met for the second time this year.

The Clearwater River Subbasin fall Chinook salmon redd count represented 36.5% of the Snake River Basin redd count above Lower Granite Dam (n=5,271), which is higher than the average of about 30%. The calculated 7.5 adult-to-redd ratio above Lower Granite Dam was slightly higher than the average (6.2) and would tend to indicate that possibly some redds were missed in the basin during 2010. Fall Chinook redds were located in unusual spawning locations such as in Potlatch River and Alpowa Creek and could have spawned elsewhere where counts were not conducted.

Escapement and Carcass Recoveries

The total fall Chinook salmon returning to Lower Granite Dam in 2010 was the highest estimate since before this last lower Snake River dam was completed in 1975. The estimated total fall Chinook salmon returning to LGR in 2010 was estimated to be 45,335 adults and 7,303 jacks for a total of 52,638 fish. The estimate of 2010 fall Chinook salmon escapement above Lower Granite Dam was 39,764 adults and 6,531 jacks for a total of 46,295 fish. Jacks consisted of about 16.2% of the total escapement above LGR in 2010.

A total of 556 fall Chinook salmon carcasses were collected in the Snake River Basin which represented the highest number collected since we began carcass collection in the Clearwater River Subbasin in 1988. There was fairly low female pre-spawn that represented 4.3% of all carcasses collected. Of the 11 pre-spawned female mortalities, 10 of those were collected in the lower Potlatch River with only one found in the Clearwater River.

Smolt-to-Adult Return Estimates

This was the seventh year for fall Chinook salmon returns from NPTH and NLV releases that began in 2003 and the third year for a full age-class return up to 5-yr olds. The first full returns from NPTH on-station and NLV releases were low as was the return from the 2005 on-station emergency flood event release. However, the 2003 NPTH second release SAR of 0.27% was right on the target goal of returning 3,750 adults from a full production release of 1,400,000. Since 2010 was the second year in a row of reaching a full 1.4 million production release, higher returns are expected and already look promising for earlier age class returns.

Hatchery Spawning

A large return of fall Chinook salmon during 2010 was sufficient to capture enough broodstock for full production at both LFH and NPTH. Similar to the increased abundance at LGR, there were more fish than expected, hauling broodstock from LGR was met early, and the adult ladder at NPTH was not opened for volunteer fish. Getting all broodstock from LGR gives us more natural fish that we can incorporate into the brood which is a target goal of 30%. As was the practice beginning in 2008 and to possibly decrease the number of returning jacks in the future, spawning was intentionally limited to older and larger males with some spawning with up to five females.

Genetic Monitoring

As mentioned before, 2007 was the first year in which we analyzed 100% of the adult fall Chinook salmon incorporated into the NPTH broodstock in cooperation with NOAA's parentage study. Through this study, we may be able to determine if the holdover or "reservoir reared" life history trait is genetically-based or driven by environmental changes occurring in the basin. As this study is in its fourth and final year, it will take possibly another year or so before analysis and a report or publication is completed.

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LIST OF APPENDICES

Appendix A. Fall Chinook salmon aerial redd surveys with new redds observed during given flight date on the Clearwater River, 2010.

RM	RKM	LANDMARK	New Redds Counted by Flight Date					
			10/18	10/20	11/1	11/29	12/6	Totals
6.8	12.5	Below Casino				11		11
14.0	22.5	Catholic Creek			2			2
18.0	29.0	Lower Myrtle	24		44	12		80
19.1	30.7	Lower Cottonwood	14		20	2		36
19.3	31.1	Mid Cottonwood-Channel	3		24	16		43
21.0	33.8	Below Cherrylane Bridge	1		17	17		35
21.7	35.0	Fir Island (Hwy 12 Side Channel)	2		4	3		9
22.0	35.4	Fir Island (Cherrylane-1705)	97		194	44		335
22.2	35.7	NPTH (1705) Ladder	2		103	86		191
23.3	37.5	Pine Creek	8		2			10
23.9	38.5	Below Thunderbird Market	2		18	27		47
26.5	42.7	Above Bedrock Creek	16		2	19		37
27.5	44.3	Below Rest Area			8	4		12
28.4	45.7	Rest Area	7		38	23		68
31.5	50.7	Below Tomahawk-Tree Farm	29		9			38
32.5	52.3	Below Tomahawk	40		87	32		159
32.8	52.8	Camp Tomahawk			2	11		13
34.0	54.7	Leaning Pine Hole	18		9			27
35.4	60.0	Below Old Peck Bridge	36		57	21		114
35.7	57.5	Above Old Peck Bridge			6	10		16
36.2	58.3	Above Old Peck Bridge	6			2		8
37.9	61.0	Snells Island	1					1
39.1	62.9	Below Pink House Boatramp	3		28	11		42
39.6	63.7	Above Pink House Boatramp	19					19
40.3	64.9	Ahsahka Islands	61		99	66		226
0.2	0.3	N.F. Clearwater			8			8
43.2	69.5	Hwy. Dept. Garage	1			3		4
45.5	73.8	Above Tunnel Pond		2				2
51.2	82.5	Below Greer Bridge					4	4
52.5	84.5	Above Greer Bridge					5	5
52.8	85.0	Greer Grain Elevators		1	4			5
53.8	86.6	Above Greer Power Lines			2			2
58.2	93.7	Clearwater River-Canyon Area		4				4
62.3	100.4	Long Camp Boat Ramp			5			5
63.0	101.4	Above long Camp Boat Ramp		4	9			13
66.0	106.9	Below Kamiah Train Bridge			1			1
73.0	118.2	Above Button Beach					8	8
		Totals	390	11	802	420	17	1640

Appendix A. (continued).

			10/18	10/20	11/1	11/29	12/6	
		River Mile Start	4	45	4	4	45	
		River Mile End	45	75	75	45	75	
		Flow at Spalding Gauge (cfs)	3,080	3,080	4,090	4,610	3,930	
		Avg. Temp at Spalding Gauge	8.4	8.5	8.8	3.9	3.2	
		Flow from Dworshak (cfs)	1,600	1,600	1,700	1,600	1,600	
		Flow at Orofino Gauge (cfs)	1,400	1,380	2,460	2,540	1,740	
		Avg. Temp at Orofino Gauge	8.8	8.5	7.5	0.0	0.0	
		General Observation Conditions	Excel	Excel	Good	Fair	Fair	

Appendix B. Fall Chinook salmon carcasses collected in the Snake River Basin by the Nez Perce Tribe, 2010 (N = no, Y = yes, U = Unknown; Collection site, Origin, and Age keys are at end of table).

Date	Fish ID #	Collection Site	Fork Lth	Sex	% Spawned	CWT	Ad-Clip	VIE	Opercle Punch	Scales taken	DNA taken	CWT Code	CWT Origin	Pit Tag #	Comments	Origin	Eur Age	Sub Rel	Reservoir overwinter
10/14	10-001	Lower Clearwater R.	86	F	100	N	N	N	N	Y	Y					W	1.2	Y	Y
10/14	10-002	Lower Clearwater R.	70	M		N	N	N	N	Y	Y					H	1.2	Y	Y
10/14	10-003	Lower Clearwater R.	75	F	100	N	N	N	N	Y	Y					H	1.2	Y	Y
10/14	10-004	Lower Clearwater R.	76	M		N	N	N	N	Y	Y					U	0.3	Y	N
10/14	10-005	Lower Clearwater R.	98	M		N	N	N	N	Y	Y					W	1.2	Y	Y
10/14	10-006	Lower Clearwater R.	78	M		N	N	N	N	Y	Y					U	0.2	Y	N
10/19	10-007	Lower Clearwater R.	53	M		Y	N	N	N	Y	Y	612763	NPTH08SLGA			H	0.1	Y	N
10/19	10-008	Lower Clearwater R.	77	F	100	N	N	N	N	Y	Y					W	1.2	Y	Y
10/19	10-009	Lower Clearwater R.	81	F	100	N	N	N	N	Y	Y					U	0.3	Y	N
10/19	10-010	Lower Clearwater R.	82	F	100	N	N	N	N	Y	Y					W	1.2	Y	Y
10/19	10-011	Lower Clearwater R.	95	F	100	N	N	N	N	Y	Y					W	1.3	Y	Y
10/19	10-012	Lower Clearwater R.	85	F	100	N	N	N	N	Y	Y					W	1.2	Y	Y
10/19	10-013	Lower Clearwater R.	73	M		N	N	N	N	Y	Y					U	0.2	Y	N
10/19	10-014	Lower Clearwater R.	81	F	100	N	N	N	N	Y	Y					U	0.3	Y	N
10/19	10-015	Lower Clearwater R.	79	F	100	N	N	N	N	Y	Y					W	1.2	Y	Y
10/28	10-016	Lower Clearwater R.	64	M		N	N	N	N	Y	Y			3D9.1C2C6163AF	LF07SSNSUR	H	0.2	Y	N
10/28	10-017	Lower Clearwater R.	85	F	100	N	N	N	N	Y	Y			3D9.1C2D58589C	LGRADULT	H	1.2	Y	Y
10/28	10-018	Lower Clearwater R.	57	M		N	N	N	N	Y	Y					U	0.1	Y	N
10/28	10-019	Lower Clearwater R.	72	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
10/28	10-020	Lower Clearwater R.	82	F	100	N	N	N	N	Y	Y					R	R	R	R
10/28	10-021	Lower Clearwater R.	88	M		N	N	N	N	Y	Y					W	1.2	Y	Y
10/28	10-022	Lower Clearwater R.	85	M		N	N	N	N	Y	Y					H	1.2	Y	Y
10/28	10-023	Lower Clearwater R.	85	M		N	N	N	N	Y	Y					H	1.2	Y	Y
10/28	10-024	Lower Clearwater R.	91	M		N	N	N	N	Y	Y					R	R	R	R
10/28	10-025	Lower Clearwater R.	93	M		N	N	N	N	Y	Y					U	0.3	Y	N
10/28	10-026	Lower Clearwater R.	61	M		N	N	N	N	Y	Y					W	1.1	Y	Y
10/28	10-027	Lower Clearwater R.	72	M		N	N	N	N	Y	Y					U	0.2	Y	N

Appendix B. (continued).

Date	Fish ID #	Collection Site	Fork Lth	Sex	% Spawned	CWT	Ad-Clip	VIE	Opercle Punch	Scales taken	DNA taken	CWT Code	CWT Origin	Pit Tag #	Comments	Origin	Eur Age	Sub Rel	Reservoir overwinter
10/28	10-028	Lower Clearwater R.	63	M		Y	N	N	N	Y	Y	612737	NPTH07SLGA			H	0.2	Y	N
10/28	10-029	Lower Clearwater R.	69	M		N	N	N	N	Y	Y					H	1.1	Y	Y
10/28	10-030	Lower Clearwater R.	67	F	100	Y	Y	N	N	Y	Y	612716	NPTH07SO			H	0.2	Y	N
10/28	10-031	Lower Clearwater R.	69	M		N	N	N	N	Y	Y					W	1.1	Y	Y
10/28	10-032	Lower Clearwater R.	76	F	100	Y	N	N	N	Y	Y	612516	LF06YBCA			H	1.2	N	N
10/28	10-033	Lower Clearwater R.	95	F	100	N	N	N	N	Y	Y					U	0.4	Y	N
10/28	10-034	Lower Clearwater R.	74	M		N	N	N	N	Y	Y					U	0.2	Y	N
10/28	10-035	Lower Clearwater R.	77	M		N	N	N	N	Y	Y					U	0.2	Y	N
10/28	10-036	Lower Clearwater R.	92	M		N	N	N	N	Y	Y					W	1.2	Y	Y
10/28	10-037	Lower Clearwater R.	78	M		N	N	N	N	Y	Y					R	R	R	R
10/28	10-038	Lower Clearwater R.	100	M		N	N	N	N	Y	Y					W	1.2	Y	Y
10/28	10-039	Lower Clearwater R.	70	M		Y	N	N	N	Y	Y	612521	LF07SCJA			H	0.2	Y	N
10/28	10-040	Lower Clearwater R.	85	F	100	N	N	N	N	Y	Y					W	1.2	Y	Y
10/28	10-041	Lower Clearwater R.	90	F	100	N	N	N	N	Y	Y					W	1.2	Y	Y
10/28	10-042	Lower Clearwater R.	64	M		N	N	N	N	Y	Y					U	0.2	Y	N
10/28	10-043	Lower Clearwater R.	91	F	100	N	N	N	N	Y	Y					R	R	R	R
10/28	10-044	Lower Clearwater R.	71	M		N	N	N	N	Y	Y					U	0.2	Y	N
10/28	10-045	Lower Clearwater R.	76	F	100	N	N	N	N	Y	Y					U	0.3	Y	N
10/28	10-046	Lower Clearwater R.	67	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
10/28	10-047	Lower Clearwater R.	83	F	100	N	N	N	N	Y	Y					R	R	R	R
10/28	10-048	Lower Clearwater R.	80	F	100	N	N	N	N	Y	Y					W	1.2	Y	Y
10/28	10-049	Lower Clearwater R.	77	F	100	N	N	N	N	Y	Y					W	1.2	Y	Y
10/28	10-050	Lower Clearwater R.	95	F	100	N	N	N	N	Y	Y					U	0.3	Y	N
11/1	10-051	Big Canyon Creek	61	M		Y	N	N	N	Y	Y	612520	LF07SBCA	3D9.1C2CCB1E6E		H	0.2	Y	N
11/1	10-052	Big Canyon Creek	70	M		Y	N	N	N	Y	Y	612520	LF07SBCA			H	0.2	Y	N
11/1	10-053	Big Canyon Creek	66	M		Y	Y	N	N	Y	Y	612694	NPTH07SNLVA			H	0.2	Y	N
11/1	10-054	Big Canyon Creek	74	M		N	N	N	N	Y	Y					W	1.1	Y	Y
11/1	10-055	Big Canyon Creek	79	M		N	N	N	N	Y	Y					U	0.2	Y	N

Appendix B. (continued).

Date	Fish ID #	Collection Site	Fork Lth	Sex	% Spawned	CWT	Ad-Clip	VIE	Opercle Punch	Scales taken	DNA taken	CWT Code	CWT Origin	Pit Tag #	Comments	Origin	Eur Age	Sub Rel	Reservoir overwinter
11/1	10-056	Big Canyon Creek	74	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/1	10-057	Big Canyon Creek	88	M		N	N	N	N	Y	Y					W	1.2	Y	Y
11/1	10-058	Big Canyon Creek	41	M		N	N	N	N	Y	Y					U	0.1	Y	N
11/1	10-059	Big Canyon Creek	62	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/1	10-060	Lower Clearwater R.	65	M		N	N	N	N	Y	Y			3D9.1C2C5EB5C7	LF07SSNSUR	H	0.2	Y	N
11/1	10-061	Lower Clearwater R.	68	M		Y	Y	N	N	Y	Y	612694	NPTH07SNLVA			H	0.2	Y	N
11/1	10-062	Lower Clearwater R.	75	M		Y	Y	N	N	Y	Y	612517	LF07SBCA			H	0.2	Y	N
11/1	10-063	Lower Clearwater R.	76	M		Y	Y	N	N	Y	Y	612694	NPTH07SNLVA			H	0.2	Y	N
11/1	10-064	Lower Clearwater R.	71	M		Y	N	N	N	Y	Y	612716	NPTH07SO			H	0.2	Y	N
11/1	10-065	Lower Clearwater R.	67	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/1	10-066	Lower Clearwater R.	62	M		Y	Y	N	N	Y	Y	612517	LF07SBCA			H	0.2	Y	N
11/1	10-067	Lower Clearwater R.	79	F	100	N	N	N	N	Y	Y					U	0.3	Y	N
11/1	10-068	Lower Clearwater R.	63	M		Y	N	N	N	Y	Y	612737	NPTH07SLGA			H	0.2	Y	N
11/1	10-069	Lower Clearwater R.	58	M		N	N	N	N	Y	Y					H	1.1	N	N
11/1	10-070	Lower Clearwater R.	67	M		Y	N	N	N	Y	Y	612737	NPTH07SLGA			H	0.2	Y	N
11/1	10-071	Lower Clearwater R.	61	M		Y	N	N	N	Y	Y	612520	LF07SBCA			H	1.1	Y	Y
11/1	10-072	Lower Clearwater R.	71	M		Y	N	N	N	Y	Y	612716	NPTH07SO			H	0.2	Y	N
11/1	10-073	Lower Clearwater R.	61	F	100	Y	N	N	N	Y	Y	612753	LF07YBCA			H	1.1	N	N
11/1	10-074	Lower Clearwater R.	66	M		Y	Y	N	N	Y	Y	612517	LF07SBCA			H	0.2	Y	N
11/1	10-075	Lower Clearwater R.	80	M		Y	Y	N	N	Y	Y	612517	LF07SBCA			H	0.2	Y	N
11/1	10-076	Lower Clearwater R.	69	M		Y	Y	N	N	Y	Y	612517	LF07SBCA			H	0.2	Y	N
11/1	10-077	Lower Clearwater R.	73	M		N	N	N	N	Y	Y					U	0.3	Y	N
11/1	10-078	Lower Clearwater R.	68	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/1	10-079	Lower Clearwater R.	69	M		Y	N	N	N	Y	Y	612736	NPTH07SCFA			H	0.2	Y	N
11/1	10-080	Lower Clearwater R.	69	M		Y	Y	N	N	Y	Y	612716	NPTH07SO			H	0.2	Y	N
11/3	10-081	Lower Clearwater R.	59	M		N	N	N	2LOP	Y	Y			3D9.1C2C653D53	LF07SCRSUR	H	0.2	Y	N
11/3	10-082	Lower Clearwater R.	80	F	100	N	N	N	N	Y	Y			3D9.1BF2451853	SN06SLGRTR	W	1.2	Y	Y
11/3	10-083	Lower Clearwater R.	90	M		Y	N	N	N	Y	Y	612516	LF06YBCA			H	1.2	N	N

Appendix B. (continued).

Date	Fish ID #	Collection Site	Fork Lth	Sex	% Spawned	CWT	Ad-Clip	VIE	Opercle Punch	Scales taken	DNA taken	CWT Code	CWT Origin	Pit Tag #	Comments	Origin	Eur Age	Sub Rel	Reservoir overwinter
11/3	10-084	Lower Clearwater R.	78	F	100	Y	Y	N	N	Y	Y	612507	LF05YBCA			H	1.3	N	N
11/3	10-085	Lower Clearwater R.	55	M		Y	Y	N	N	Y	Y	612694	NPTH07SNLVA			H	0.2	Y	N
11/3	10-086	Lower Clearwater R.	63	M		Y	Y	N	N	Y	Y	612517	LF07SBCA			H	0.2	Y	N
11/3	10-087	Lower Clearwater R.	73	F	100	Y	N	N	N	Y	Y	612696	NPTH06SO			H	1.2	Y	Y
11/3	10-088	Lower Clearwater R.	55	M		Y	N	N	N	Y	Y	612753	LF07YBCA			H	1.1	N	N
11/3	10-089	Lower Clearwater R.	61	M		Y	Y	N	N	Y	Y	612694	NPTH07SNLVA			H	0.2	Y	N
11/3	10-090	Lower Clearwater R.	66	M		Y	N	N	N	Y	Y	612736	NPTH07SCFA			H	0.2	Y	N
11/3	10-091	Lower Clearwater R.	79	F	100	Y	Y	N	N	Y	Y	612513	LF06YBCA			H	1.2	N	N
11/3	10-092	Lower Clearwater R.	97	F	100	N	N	N	N	Y	Y					U	0.4	Y	N
11/3	10-093	Lower Clearwater R.	88	F	100	N	N	N	N	Y	Y					W	1.2	Y	Y
11/3	10-094	Lower Clearwater R.	84	F	100	N	N	N	N	Y	Y					W	1.2	Y	Y
11/3	10-095	Lower Clearwater R.	77	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/3	10-096	Lower Clearwater R.	76	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
11/3	10-097	Lower Clearwater R.	64	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/3	10-098	Lower Clearwater R.	70	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/3	10-099	Lower Clearwater R.	80	F	100	N	N	N	N	Y	Y					W	1.2	Y	Y
11/3	10-100	Lower Clearwater R.	68	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/3	10-101	Lower Clearwater R.	83	F	100	N	N	N	N	Y	Y					U	0.3	Y	N
11/3	10-102	Lower Clearwater R.	69	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/3	10-103	Lower Clearwater R.	77	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/3	10-104	Lower Clearwater R.	69	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/3	10-105	Lower Clearwater R.	89	F	100	N	N	N	N	Y	Y					W	1.2	Y	Y
11/3	10-106	Lower Clearwater R.	79	F	100	N	N	N	N	Y	Y					H	1.2	Y	Y
11/3	10-107	Lower Clearwater R.	92	F	100	N	N	N	N	Y	Y					W	1.3	Y	Y
11/3	10-108	Lower Clearwater R.	67	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/3	10-109	Lower Clearwater R.	75	M		N	N	N	N	Y	Y					R	R	R	R
11/3	10-110	Lower Clearwater R.	67	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/3	10-111	Lower Clearwater R.	83	F	100	N	N	N	N	Y	Y					H	1.2	Y	Y

Appendix B. (continued).

Date	Fish ID #	Collection Site	Fork Lth	Sex	% Spawned	CWT	Ad-Clip	VIE	Opercle Punch	Scales taken	DNA taken	CWT Code	CWT Origin	Pit Tag #	Comments	Origin	Eur Age	Sub Rel	Reservoir overwinter
11/3	10-112	Lower Clearwater R.	82	F	100	N	N	N	N	Y	Y					W	1.2	Y	Y
11/3	10-113	Lower Clearwater R.	66	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/3	10-114	Lower Clearwater R.	67	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/4	10-115	Lower Clearwater R.	70	M		Y	Y	N	N	Y	Y	612694	NPTH07SNLVA			H	0.2	Y	N
11/4	10-116	Lower Clearwater R.	86	M		Y	N	N	N	Y	Y	612707	NPTH05SNLVA			H	0.4	Y	N
11/4	10-117	Lower Clearwater R.	64	M		Y	N	N	N	Y	Y	612736	NPTH07SCFA			H	0.2	Y	N
11/4	10-118	Lower Clearwater R.	71	F	100	Y	Y	N	N	Y	Y	634671	LF07SCCD			H	0.2	Y	N
11/4	10-119	Lower Clearwater R.	65	M		Y	Y	N	N	Y	Y	612716	NPTH07SO			H	0.2	Y	N
11/4	10-120	Lower Clearwater R.	65	M		Y	Y	N	N	Y	Y	612517	LF07SBCA			H	0.2	Y	N
11/4	10-121	Lower Clearwater R.	65	M		Y	Y	N	N	Y	Y	612694	NPTH07SNLVA			H	0.2	Y	N
11/4	10-122	Lower Clearwater R.	75	F	100	Y	Y	N	N	Y	Y	612716	NPTH07SO			H	0.2	Y	N
11/4	10-123	Lower Clearwater R.	69	F	100	Y	N	N	N	Y	Y	612520	LF07SBCA			H	0.2	Y	N
11/4	10-124	Lower Clearwater R.	77	F	100	Y	N	N	N	Y	Y	612737	NPTH07SLGA			H	0.2	Y	N
11/4	10-125	Lower Clearwater R.	78	F	100	Y	N	N	N	Y	Y	612696	NPTH06SO			H	1.2	Y	Y
11/4	10-126	Lower Clearwater R.	84	F	100	Y	Y	N	N	Y	Y	612513	LF06YBCA			H	1.2	N	N
11/4	10-127	Lower Clearwater R.	71	M		Y	N	N	N	Y	Y	612520	LF07SBCA			H	0.2	Y	N
11/4	10-128	Lower Clearwater R.	58	M		Y	Y	N	N	Y	Y	634680	LF07YO			H	1.1	N	N
11/4	10-129	Lower Clearwater R.	81	M		Y	N	N	N	Y	Y	612737	NPTH07SLGA			H	0.2	Y	N
11/4	10-130	Lower Clearwater R.	68	M		Y	Y	N	N	Y	Y	612716	NPTH07SO			H	1.1	Y	Y
11/4	10-131	Lower Clearwater R.	63	M		Y	Y	N	N	Y	Y	612517	LF07SBCA			H	0.2	Y	N
11/4	10-132	Lower Clearwater R.	74	F	100	Y	Y	N	N	Y	Y	612513	LF06YBCA			H	1.2	N	N
11/4	10-133	Lower Clearwater R.	75	M		Y	N	N	N	Y	Y	612514	LF06YCJA			H	1.2	N	N
11/4	10-134	Lower Clearwater R.	79	M		Y	Y	N	N	Y	Y	612716	NPTH07SO			H	0.2	Y	N
11/4	10-135	Lower Clearwater R.	63	M		Y	Y	N	N	Y	Y	612517	LF07SBCA			H	0.2	Y	N
11/4	10-136	Lower Clearwater R.	80	M		Y	N	N	N	Y	Y	612694	NPTH07SNLVA			H	0.2	Y	N
11/4	10-137	Lower Clearwater R.	79	M		Y	Y	N	N	Y	Y	612716	NPTH07SO			H	0.2	Y	N
11/4	10-138	Lower Clearwater R.	68	M		Y	N	N	N	Y	Y	612520	LF07SBCA			H	0.2	Y	N
11/4	10-139	Lower Clearwater R.	69	M		Y	Y	N	N	Y	Y	612716	NPTH07SO			H	0.2	Y	N

Appendix B. (continued).

Date	Fish ID #	Collection Site	Fork Lth	Sex	% Spawned	CWT	Ad-Clip	VIE	Opercle Punch	Scales taken	DNA taken	CWT Code	CWT Origin	Pit Tag #	Comments	Origin	Eur Age	Sub Rel	Reservoir overwinter
11/4	10-140	Lower Clearwater R.	81	M		Y	Y	N	N	Y	Y	612694	NPTH07SNLVA			H	0.2	Y	N
11/4	10-141	Lower Clearwater R.	68	M		Y	N	N	N	Y	Y	612694	NPTH07SNLVA			H	0.2	Y	N
11/4	10-142	Lower Clearwater R.	73	M		Y	N	N	N	Y	Y	612520	LF07SBCA			H	0.2	Y	N
11/4	10-143	Lower Clearwater R.	48	M		N	N	N	N	Y	Y					U	0.1	Y	N
11/4	10-144	Lower Clearwater R.	75	M		Y	Y	N	N	Y	Y	612729	NPTH07SO			H	1.1	Y	Y
11/4	10-145	Lower Clearwater R.	63	M		Y	Y	N	N	Y	Y	612716	NPTH07SO			H	0.2	Y	N
11/4	10-146	Lower Clearwater R.	65	F	100	Y	N	N	N	Y	Y	612520	LF07SBCA			H	0.2	Y	N
11/4	10-147	Lower Clearwater R.	75	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/4	10-148	Lower Clearwater R.	71	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/4	10-149	Lower Clearwater R.	73	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/4	10-150	Lower Clearwater R.	73	M		N	N	N	1LOP	Y	Y					U	0.2	Y	N
11/4	10-151	Lower Clearwater R.	52	M		N	N	N	N	Y	Y					R	R	R	R
11/4	10-152	Lower Clearwater R.	61	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/4	10-153	Lower Clearwater R.	71	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/4	10-154	Lower Clearwater R.	78	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/4	10-155	Lower Clearwater R.	66	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
11/8	10-156	Lower Clearwater R.	73	M		Y	Y	N	1LOP	Y	Y	612517	LF07SBCA	3D9.1C2CC702C9		H	0.2	Y	N
11/8	10-157	Lower Clearwater R.	75	M		Y	N	N	1LOP	Y	Y	NO SNOUT	LOST	3D9.1C2CD8BBA9	LF07SCRSUR	H	0.2	Y	N
11/8	10-158	Lower Clearwater R.	73	M		Y	Y	N	N	Y	Y	612716	NPTH07SO			H	0.2	Y	N
11/8	10-159	Lower Clearwater R.	65	M		Y	Y	N	N	Y	Y	612716	NPTH07SO			H	0.2	Y	N
11/8	10-160	Lower Clearwater R.	72	M		Y	Y	N	N	Y	Y	612517	LF07SBCA			H	0.2	Y	N
11/8	10-161	Lower Clearwater R.	54	M		Y	Y	N	N	Y	Y	610179	LF08SBCA			H	0.1	Y	N
11/8	10-162	Lower Clearwater R.	79	M		Y	Y	N	N	Y	Y	612694	NPTH07SNLVA			H	0.2	Y	N
11/8	10-163	Lower Clearwater R.	56	M		Y	N	N	N	Y	Y	612766	NPTH08SNLA			H	0.1	Y	N
11/8	10-164	Lower Clearwater R.	58	M		Y	Y	N	1LOP	Y	Y	634996	LF08SCCD			H	0.1	Y	N
11/8	10-165	Lower Clearwater R.	58	M		Y	Y	N	N	Y	Y	612750	LF07YBCA			H	1.1	N	N
11/8	10-166	Lower Clearwater R.	64	M		Y	Y	N	N	Y	Y	612694	NPTH07SNLVA			H	0.2	Y	N
11/8	10-167	Lower Clearwater R.	58	M		Y	N	N	N	Y	Y	612736	NPTH07SCFA			H	0.2	Y	N

Appendix B. (continued).

Date	Fish ID #	Collection Site	Fork Lth	Sex	% Spawned	CWT	Ad-Clip	VIE	Opercle Punch	Scales taken	DNA taken	CWT Code	CWT Origin	Pit Tag #	Comments	Origin	Eur Age	Sub Rel	Reservoir overwinter
11/8	10-168	Lower Clearwater R.	52	M		Y	Y	N	N	Y	Y	612750	LF07YBCA			H	1.1	N	N
11/8	10-169	Lower Clearwater R.	75	F	100	Y	Y	N	N	Y	Y	612716	NPTH07SO			H	0.2	Y	N
11/8	10-170	Lower Clearwater R.	64	M		Y	N	N	N	Y	Y	612736	NPTH07SCFA			H	0.2	Y	N
11/8	10-171	Lower Clearwater R.	38	M		N	Y	N	N	Y	Y					H	R	R	R
11/8	10-172	Lower Clearwater R.	73	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
11/8	10-173	Lower Clearwater R.	89	F	100	N	N	N	N	Y	Y					H	1.3	Y	Y
11/8	10-174	Lower Clearwater R.	70	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/8	10-175	Lower Clearwater R.	78	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
11/8	10-176	Lower Clearwater R.	70	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/8	10-177	Lower Clearwater R.	60	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/8	10-178	Lower Clearwater R.	70	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/8	10-179	Lower Clearwater R.	68	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/8	10-180	Lower Clearwater R.	66	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/8	10-181	Lower Clearwater R.	84	F	100	N	N	N	N	Y	Y					H	1.2	Y	Y
11/8	10-182	Lower Clearwater R.	67	F	100	N	N	N	1LOP	Y	Y					U	0.2	Y	N
11/8	10-183	Lower Clearwater R.	69	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/8	10-184	Lower Clearwater R.	89	F	100	N	N	N	N	Y	Y					U	0.3	Y	N
11/8	10-185	Lower Clearwater R.	53	M		N	Y	N	N	Y	Y					H	0.1	Y	N
11/8	10-186	Lower Clearwater R.	81	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/8	10-187	Lower Clearwater R.	56	M		N	N	N	N	Y	Y					U	0.1	Y	N
11/10	10-188	Lower Clearwater R.	80	M		N	N	N	N	Y	Y					W	1.2	Y	Y
11/10	10-189	Lower Clearwater R.	64	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/10	10-190	Lower Clearwater R.	75	M		Y	N	N	N	Y	Y	612736	NPTH07SCFA			H	0.2	Y	N
11/10	10-191	Lower Clearwater R.	68	M		Y	N	N	1LOP	Y	Y	612520	LF07SBCA	3D9.1C2C5C7032		H	0.2	Y	N
11/10	10-192	Lower Clearwater R.	62	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/10	10-193	Lower Clearwater R.	71	M		N	N	N	N	Y	Y			3D9.1C2C3D61C5	SN07SLGRTR	U	0.2	Y	N
11/10	10-194	Lower Clearwater R.	64	U		Y	N	N	N	Y	Y	612694	NPTH07SNLVA			H	0.2	Y	N
11/10	10-195	Lower Clearwater R.	73	M		Y	Y	N	N	Y	Y	634680	LF07YO			H	1.1	N	N

Appendix B. (continued).

Date	Fish ID #	Collection Site	Fork Lth	Sex	% Spawned	CWT	Ad-Clip	VIE	Opercle Punch	Scales taken	DNA taken	CWT Code	CWT Origin	Pit Tag #	Comments	Origin	Eur Age	Sub Rel	Reservoir overwinter
11/10	10-196	Lower Clearwater R.	71	F	100	Y	Y	N	N	Y	Y	612716	NPTH07SO			H	0.2	Y	N
11/10	10-197	Lower Clearwater R.	76	F	100	Y	Y	N	1LOP	Y	Y	612517	LF07SBCA			H	0.2	Y	N
11/10	10-198	Lower Clearwater R.	68	M		Y	Y	N	1LOP	Y	Y	612694	NPTH07SNLVA			H	0.2	Y	N
11/10	10-199	Lower Clearwater R.	64	F	100	Y	N	N	N	Y	Y	612694	NPTH07SNLVA			H	0.2	Y	N
11/10	10-200	Lower Clearwater R.	69	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/10	10-201	Lower Clearwater R.	70	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/10	10-202	Lower Clearwater R.	68	M		N	Y	N	N	Y	Y					H	0.2	Y	N
11/10	10-203	Lower Clearwater R.	63	M		N	N	N	N	Y	Y					W	1.1	Y	Y
11/10	10-204	Lower Clearwater R.	75	F	100	N	N	N	N	Y	Y					W	1.2	Y	Y
11/10	10-205	Lower Clearwater R.	88	M		N	N	N	N	Y	Y					U	0.3	Y	N
11/10	10-206	Lower Clearwater R.	74	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/10	10-207	Lower Clearwater R.	65	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
11/10	10-208	Lower Clearwater R.	71	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
11/15	10-209	Potlatch River	56	M		Y	N	N	N	Y	Y	612755	LF07YCJA			H	1.1	N	N
11/15	10-210	Potlatch River	62	M		Y	Y	N	1LOP	Y	Y	612518	LF07SCJA	3D9.1C2D3C9481		H	0.2	Y	N
11/15	10-211	Potlatch River	67	M		Y	N	N	N	Y	Y	090909	09BLANK			H	R	R	R
11/15	10-212	Potlatch River	53	M		Y	N	N	N	Y	Y	610183	LF08SCJA			H	0.1	Y	N
11/15	10-213	Potlatch River	57	M		Y	Y	N	N	Y	Y	610180	LF08SCJA			H	0.1	Y	N
11/15	10-214	Potlatch River	75	M		Y	N	N	N	Y	Y	612736	NPTH07SCFA			H	0.2	Y	N
11/15	10-215	Potlatch River	49	M		N	N	N	N	Y	Y					U	0.1	Y	N
11/15	10-216	Potlatch River	68	F	0	N	Y	N	N	Y	Y					U	0.2	Y	N
11/15	10-217	Potlatch River	62	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/15	10-218	Potlatch River	50	M		Y	N	N	N	Y	Y	610182	LF08SBCA			H	0.1	Y	N
11/15	10-219	Potlatch River	73	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
11/15	10-220	Potlatch River	70	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/15	10-221	Potlatch River	76	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/15	10-222	Potlatch River	67	M		N	N	N	1LOP	Y	Y					U	0.2	Y	N
11/15	10-223	Potlatch River	74	M		N	N	N	N	Y	Y					U	0.2	Y	N

Appendix B. (continued).

Date	Fish ID #	Collection Site	Fork Lth	Sex	% Spawned	CWT	Ad-Clip	VIE	Opercle Punch	Scales taken	DNA taken	CWT Code	CWT Origin	Pit Tag #	Comments	Origin	Eur Age	Sub Rel	Reservoir overwinter
11/18	10-224	Alpowa Creek	87	F	100	Y	N	N	N	Y	Y	633597	LF05YO			H	1.3	N	N
11/18	10-225	Alpowa Creek	74	F	100	Y	Y	LR	N	Y	Y	634092	LF06YO			H	1.2	N	N
11/18	10-226	Alpowa Creek	57	M		Y	N	LR	1LOP	Y	Y	634681	LF07YO			H	1.1	N	N
11/18	10-227	Alpowa Creek	69	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/18	10-228	Alpowa Creek	68	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/18	10-229	Potlatch River	66	M		Y	N	N	1LOP	Y	Y	612755	LF07YCJA	3D9.1C2C5CE18E		H	1.1	N	N
11/18	10-230	Potlatch River	62	M		Y	Y	N	N	Y	Y	612517	LF07SBCA			H	0.2	Y	N
11/18	10-231	Potlatch River	72	F	100	Y	N	N	N	Y	Y	634092	LF06YO			H	1.2	N	N
11/18	10-232	Potlatch River	60	M		Y	N	N	N	Y	Y	612755	LF07YCJA			H	1.1	N	N
11/18	10-233	Potlatch River	72	F	100	Y	N	N	N	Y	Y	612514	LF06YCJA			H	1.2	N	N
11/18	10-234	Potlatch River	74	M		Y	N	N	N	Y	Y	090909	09BLANK			H	1.1	N	N
11/18	10-235	Potlatch River	64	M		Y	N	N	N	Y	Y	634670	LF07GRRD			H	0.2	Y	N
11/18	10-236	Potlatch River	73	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
11/18	10-237	Potlatch River	69	F	100	Y	N	N	N	Y	Y	612514	LF06YCJA			H	1.2	N	N
11/18	10-238	Potlatch River	67	M		Y	Y	N	N	Y	Y	612694	NPTH07SNLVA			H	0.2	Y	N
11/18	10-239	Potlatch River	52	M		Y	Y	N	N	Y	Y	634996	LF08SCCD			H	0.1	Y	N
11/18	10-240	Potlatch River	61	M		Y	Y	N	N	Y	Y	634680	LF07YO			H	1.1	N	N
11/18	10-241	Potlatch River	80	F	70	Y	Y	LR	N	Y	Y	633987	LF06YO			H	1.2	N	N
11/18	10-242	Potlatch River	79	M		N	Y	N	N	Y	Y					U	0.2	Y	N
11/18	10-243	Potlatch River	61	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/18	10-244	Potlatch River	57	M		N	N	N	N	Y	Y					U	0.1	Y	N
11/18	10-245	Potlatch River	74	M		N	Y	N	N	Y	Y					U	0.2	Y	N
11/29	10-246	Potlatch River	61	M		Y	Y	N	N	Y	Y	634671	LF07SCCD	3D9.1C2CC79108		H	0.2	Y	N
11/29	10-247	Potlatch River	60	M		Y	Y	N	1LOP	Y	Y	612517	LF07SBCA			H	0.2	Y	N
11/29	10-248	Potlatch River	49	M		Y	N	N	N	Y	Y	610182	LF08SBCA			H	0.1	Y	N
11/29	10-249	Potlatch River	81	F	100	Y	Y	N	N	Y	Y	612513	LF06YBCA			H	1.2	N	N
11/29	10-250	Potlatch River	91	F	100	Y	N	N	N	Y	Y	090909	09BLANK			H	1.2	N	N
11/29	10-251	Potlatch River	69	F	100	Y	Y	LR	N	Y	Y	633987	LF06YO			H	1.2	N	N

Appendix B. (continued).

Date	Fish ID #	Collection Site	Fork Lth	Sex	% Spawned	CWT	Ad-Clip	VIE	Opercle Punch	Scales taken	DNA taken	CWT Code	CWT Origin	Pit Tag #	Comments	Origin	Eur Age	Sub Rel	Reservoir overwinter
11/29	10-252	Potlatch River	76	F	100	Y	N	N	N	Y	Y	612694	NPTH07SNLVA			H	0.2	Y	N
11/29	10-253	Potlatch River	67	M		Y	N	N	N	Y	Y	612695	NPTH07SO			H	0.2	Y	N
11/29	10-254	Potlatch River	75	M		Y	N	N	N	Y	Y	612694	NPTH07SNLVA			H	0.2	Y	N
11/29	10-255	Potlatch River	80	F	100	Y	N	N	N	Y	Y	090909	09BLANK			H	1.2	N	N
11/29	10-256	Potlatch River	82	M		Y	N	N	N	Y	Y	612514	LF06YCJA			H	1.2	N	N
11/29	10-257	Potlatch River	77	F	100	Y	Y	N	N	Y	Y	634672	LF07SO			H	0.2	Y	N
11/29	10-258	Potlatch River	71	F	100	Y	Y	N	N	Y	Y	612694	NPTH07SNLVA			H	0.2	Y	N
11/29	10-259	Potlatch River	68	M		Y	Y	N	N	Y	Y	612518	LF07SCJA			H	0.2	Y	N
11/29	10-260	Potlatch River	73	M		Y	Y	N	N	Y	Y	612694	NPTH07SNLVA			H	0.2	Y	N
11/29	10-261	Potlatch River	75	F	100	Y	N	LR	N	Y	Y	634092	LF06YO			H	1.2	N	N
11/29	10-262	Potlatch River	79	F	100	Y	N	N	N	Y	Y	612514	LF06YCJA			H	1.2	N	N
11/29	10-263	Potlatch River	68	F	100	Y	Y	N	N	Y	Y	612517	LF07SBCA			H	0.2	Y	N
11/29	10-264	Potlatch River	79	F	100	Y	Y	N	1LOP	Y	Y	633583	LF05SCCD1			H	R	R	R
11/29	10-265	Potlatch River	73	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
11/29	10-266	Potlatch River	62	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
11/29	10-267	Potlatch River	69	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
11/29	10-268	Potlatch River	64	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/29	10-269	Potlatch River	52	M		N	N	N	N	Y	Y					U	0.1	Y	N
11/29	10-270	Potlatch River	71	F	100	N	Y	N	N	Y	Y					U	0.2	Y	N
11/29	10-271	Potlatch River	68	M		N	Y	N	N	Y	Y					U	0.2	Y	N
11/29	10-272	Potlatch River	68	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
11/29	10-273	Potlatch River	61	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/29	10-274	Potlatch River	63	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
11/29	10-275	Potlatch River	66	M		N	N	N	N	Y	Y					U	0.2	Y	N
11/29	10-276	Potlatch River	73	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
11/29	10-277	Potlatch River	74	F	100	N	N	N	1LOP	Y	Y					U	0.2	Y	N
11/29	10-278	Potlatch River	67	M		N	N	N	N	Y	Y					U	0.2	Y	N
12/1	10-279	Potlatch River	53	M		Y	Y	N	N	Y	Y	634680	LF07YO			H	1.1	N	N

Appendix B. (continued).

Date	Fish ID #	Collection Site	Fork Lth	Sex	% Spawned	CWT	Ad-Clip	VIE	Opercle Punch	Scales taken	DNA taken	CWT Code	CWT Origin	Pit Tag #	Comments	Origin	Eur Age	Sub Rel	Reservoir overwinter
12/1	10-280	Potlatch River	74	F	100	Y	Y	N	N	Y	Y	612511	LF06YCJA			H	1.2	N	N
12/1	10-281	Potlatch River	70	F	100	Y	Y	N	N	Y	Y	634671	LF07SCCD			H	0.2	Y	N
12/2	10-282	Potlatch River	71	F	0	N	N	N	N	Y	Y				Coho by scales	Coho			
12/1	10-283	Potlatch River	61	F	100	Y	Y	N	N	Y	Y	612750	LF07YBCA			H	1.1	N	N
12/1	10-284	Potlatch River	55	M		Y	Y	N	N	Y	Y	612750	LF07YBCA			H	1.1	N	N
12/1	10-285	Potlatch River	65	M		N	N	N	N	Y	Y					U	0.2	Y	N
12/1	10-286	Potlatch River	75	F	100	N	Y	N	N	Y	Y					U	0.2	Y	N
12/1	10-287	Potlatch River	53	M		Y	Y	N	N	Y	Y	634680	LF07YO			H	1.1	N	N
12/1	10-288	Potlatch River	68	M		Y	Y	N	N	Y	Y	634671	LF07SCCD			H	0.2	Y	N
12/1	10-289	Potlatch River	71	F	100	N	Y	N	N	Y	Y					U	0.2	Y	N
12/1	10-290	Potlatch River	77	F	90	Y	Y	N	N	Y	Y	633987	LF06YO			H	1.2	N	N
12/1	10-291	Potlatch River	64	M		N	N	N	N	Y	Y					U	0.2	Y	N
12/1	10-292	Potlatch River	69	F	100	Y	Y	N	N	Y	Y	090136	LF07SIPCHC			H	0.2	Y	N
12/1	10-293	Potlatch River	76	F	100	Y	Y	N	N	Y	Y	090136	LF07SIPCHC			H	0.2	Y	N
12/1	10-294	Potlatch River	71	M		Y	N	N	N	Y	Y	090909	09BLANK			H	R	R	R
12/1	10-295	Potlatch River	73	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
12/1	10-296	Potlatch River	95	F	100	Y	N	N	N	Y	Y	612709	NPTH05SO			H	0.4	Y	N
12/1	10-297	Potlatch River	71	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
12/1	10-298	Potlatch River	72	F	100	Y	Y	N	N	Y	Y	612517	LF07SBCA			H	0.2	Y	N
12/1	10-299	Potlatch River	81	F	100	Y	N	N	N	Y	Y	612516	LF06YBCA			H	1.2	N	N
12/1	10-300	Potlatch River	72	F	100	Y	N	LR	N	Y	Y	634092	LF06YO			H	1.2	N	N
12/1	10-301	Potlatch River	70	M		Y	N	N	N	Y	Y	612520	LF07SBCA			H	0.2	Y	N
12/1	10-302	Potlatch River	63	M		Y	N	N	N	Y	Y	634672	LF07SO			H	0.2	Y	N
12/1	10-303	Potlatch River	69	F	100	Y	Y	N	N	Y	Y	612694	NPTH07SNLVA			H	0.2	Y	N
12/1	10-304	Potlatch River	74	M		Y	N	N	N	Y	Y	612522	LF07SPLA			H	0.2	Y	N
12/1	10-305	Potlatch River	72	M		Y	Y	N	N	Y	Y	090133	UMA07SUMA			H	0.2	Y	N
12/1	10-306	Potlatch River	79	F	100	Y	N	N	N	Y	Y	090909	09BLANK			H	1.2	N	N
12/1	10-307	Potlatch River	74	F	100	N	N	N	N	Y	Y					U	0.2	Y	N

Appendix B. (continued).

Date	Fish ID #	Collection Site	Fork Lth	Sex	% Spawned	CWT	Ad-Clip	VIE	Opercle Punch	Scales taken	DNA taken	CWT Code	CWT Origin	Pit Tag #	Comments	Origin	Eur Age	Sub Rel	Reservoir overwinter
12/1	10-308	Potlatch River	83	F	100	Y	Y	N	N	Y	Y	633987	LF06YO			H	1.2	N	N
12/1	10-309	Potlatch River	66	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
12/1	10-310	Potlatch River	77	F	100	Y	N	N	N	Y	Y	612516	LF06YBCA			H	1.2	N	N
12/1	10-311	Potlatch River	59	M		Y	Y	N	N	Y	Y	634671	LF07SCCD			H	0.2	Y	N
12/1	10-312	Potlatch River	73	F	100	N	Y	N	N	Y	Y					U	0.2	Y	N
12/1	10-313	Potlatch River	81	F	40	Y	Y	N	N	Y	Y	633987	LF06YO			H	1.2	N	N
12/1	10-314	Potlatch River	69	M		Y	Y	N	N	Y	Y	NO SNOUT	LOST			H	0.2	Y	N
12/2	10-315	Potlatch River	74	F	100	Y	N	N	1LOP	Y	Y	090909	09BLANK			H	1.2	N	N
12/2	10-316	Potlatch River	64	M		N	N	N	N	Y	Y					R	R	R	R
12/2	10-317	Potlatch River	63	M		Y	Y	N	N	Y	Y	634672	LF07SO			H	0.2	Y	N
12/2	10-318	Potlatch River	56	M		Y	Y	N	N	Y	Y	610179	LF08SBCA			H	0.1	Y	N
12/2	10-319	Potlatch River	67	F	100	N	Y	N	1LOP	Y	Y					U	0.2	Y	N
12/2	10-320	Potlatch River	74	M		N	N	N	N	Y	Y					U	0.2	Y	N
12/2	10-321	Potlatch River	68	F	100	N	Y	N	N	Y	Y					U	0.2	Y	N
12/2	10-322	Potlatch River	58	M		Y	N	N	N	Y	Y	090909	09BLANK			H	0.1	Y	N
12/2	10-323	Potlatch River	73	F	100	Y	N	N	N	Y	Y	634092	LF06YO			H	1.2	N	N
12/2	10-324	Potlatch River	70	F	100	Y	Y	N	N	Y	Y	090134	UMA07SUMA			H	0.2	Y	N
12/2	10-325	Potlatch River	61	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
12/2	10-326	Potlatch River	69	F	100	N	Y	N	N	Y	Y					U	0.2	Y	N
12/2	10-327	Potlatch River	70	M		Y	N	N	N	Y	Y	612737	NPTH07SLGA			H	0.2	Y	N
12/2	10-328	Potlatch River	58	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
12/2	10-329	Potlatch River	49	M		N	N	N	N	Y	Y					U	0.1	Y	N
12/2	10-330	Potlatch River	74	F	100	Y	N	N	N	Y	Y	612516	LF06YBCA			H	1.2	N	N
12/2	10-331	Potlatch River	49	M		Y	Y	N	N	Y	Y	634996	LF08SCCD			H	0.1	Y	N
12/2	10-332	Potlatch River	72	F	100	Y	N	N	N	Y	Y	090909	09BLANK			H	1.1	N	N
12/2	10-333	Potlatch River	68	M		Y	Y	N	N	Y	Y	634672	LF07SO			H	0.2	Y	N
12/2	10-334	Potlatch River	74	F	100	Y	N	N	1ROP	Y	Y	612514	LF06YCJA			H	1.2	N	N
12/2	10-335	Potlatch River	65	F	100	Y	N	N	N	Y	Y	612520	LF07SBCA			H	0.2	Y	N

Appendix B. (continued).

Date	Fish ID #	Collection Site	Fork Lth	Sex	% Spawned	CWT	Ad-Clip	VIE	Opercle Punch	Scales taken	DNA taken	CWT Code	CWT Origin	Pit Tag #	Comments	Origin	Eur Age	Sub Rel	Reservoir overwinter
12/2	10-336	Potlatch River	67	F	100	Y	N	N	N	Y	Y	612516	LF06YBCA			H	1.2	N	N
12/2	10-337	Potlatch River	52	M		N	N	N	N	Y	Y					H	1.1	N	N
12/2	10-338	Potlatch River	92	F	100	Y	N	N	N	Y	Y	090909	09BLANK			H	1.2	N	N
12/2	10-339	Potlatch River	62	M		Y	N	N	N	Y	Y	612521	LF07SCJA			H	0.2	Y	N
12/2	10-340	Potlatch River	61	F	100	Y	Y	N	N	Y	Y	634672	LF07SO			H	0.2	Y	N
12/2	10-341	Potlatch River	62	M		N	N	N	2LOP	Y	Y					U	0.2	Y	N
12/2	10-342	Potlatch River	69	F	100	Y	Y	N	N	Y	Y	634671	LF07SCCD			H	0.2	Y	N
12/2	10-343	Potlatch River	72	F	100	Y	Y	N	N	Y	Y	634672	LF07SO			H	0.2	Y	N
12/2	10-344	Potlatch River	76	F	100	N	N	N	N	Y	Y					H	1.2	Y	Y
12/2	10-345	Potlatch River	65	F	100	Y	N	N	N	Y	Y	612521	LF07SCJA			H	0.2	Y	N
12/2	10-346	Potlatch River	63	M		N	N	N	N	Y	Y					U	0.2	Y	N
12/2	10-347	Potlatch River	74	F	100	N	Y	N	N	Y	Y					U	0.2	Y	N
12/2	10-348	Potlatch River	77	M		Y	Y	N	N	Y	Y	612518	LF07SCJA			H	0.2	Y	N
12/2	10-349	Potlatch River	65	F	100	Y	Y	N	N	Y	Y	634672	LF07SO			H	0.2	Y	N
12/2	10-350	Potlatch River	65	M		Y	Y	N	1LOP	Y	Y	634672	LF07SO			H	0.2	Y	N
12/2	10-351	Potlatch River	73	M		Y	Y	N	N	Y	Y	090134	UMA07SUMA			H	0.2	Y	N
12/2	10-352	Potlatch River	68	F	100	Y	N	N	N	Y	Y	634092	LF06YO			H	1.2	N	N
12/2	10-353	Potlatch River	69	F	100	Y	N	N	N	Y	Y	612514	LF06YCJA			H	1.2	N	N
12/2	10-354	Potlatch River	71	M		Y	N	N	1LOP	Y	Y	612694	NPTH07SNLVA			H	0.2	Y	N
12/2	10-355	Potlatch River	66	M		N	N	N	N	Y	Y					U	0.2	Y	N
12/2	10-356	Potlatch River	55	M		Y	N	N	N	Y	Y	612755	LF07YCJA			H	1.1	N	N
12/2	10-357	Potlatch River	71	F	100	Y	Y	N	N	Y	Y	612517	LF07SBCA			H	0.2	Y	N
12/2	10-358	Potlatch River	72	M		Y	Y	N	N	Y	Y	090134	UMA07SUMA			H	0.2	Y	N
12/2	10-359	Potlatch River	69	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
12/2	10-360	Potlatch River	75	F	100	Y	Y	N	N	Y	Y	094505	UMA06YUMA			H	1.2	N	N
12/2	10-361	Potlatch River	61	M		Y	N	N	N	Y	Y	612736	NPTH07SCFA			H	0.2	Y	N
12/2	10-362	Potlatch River	62	M		Y	Y	N	N	Y	Y	634672	LF07SO			H	0.2	Y	N
12/6	10-363	Alpowa Creek	69	F	100	Y	Y	N	N	Y	Y	633987	LF06YO			H	1.2	N	N

Appendix B. (continued).

Date	Fish ID #	Collection Site	Fork Lth	Sex	% Spawned	CWT	Ad-Clip	VIE	Opercle Punch	Scales taken	DNA taken	CWT Code	CWT Origin	Pit Tag #	Comments	Origin	Eur Age	Sub Rel	Reservoir overwinter
12/6	10-364	Alpowa Creek	68	F	100	Y	Y	N	N	Y	Y	612517	LF07SBCA			H	0.2	Y	N
12/6	10-365	Alpowa Creek	66	F	100	Y	Y	N	N	Y	Y	634681	LF07YO			H	1.1	N	N
12/6	10-366	Alpowa Creek	69	F	100	N	Y	N	N	Y	Y					U	0.2	Y	N
12/6	10-367	Alpowa Creek	70	F	100	Y	Y	N	N	Y	Y	090135	UMA07SUMA			H	0.2	Y	N
12/6	10-368	Alpowa Creek	83	F	100	Y	Y	N	N	Y	Y	094505	UMA06YUMA			H	1.2	N	N
12/6	10-369	Alpowa Creek	74	F	100	Y	Y	N	N	Y	Y	634672	LF07SO			H	0.2	Y	N
12/6	10-370	Alpowa Creek	69	F	100	Y	Y	N	N	Y	Y	634672	LF07SO			H	0.2	Y	N
12/6	10-371	Alpowa Creek	75	F	100	Y	Y	N	N	Y	Y	633987	LF06YO			H	1.2	N	N
12/6	10-372	Alpowa Creek	82	M		Y	N	N	N	Y	Y	090909	09BLANK			H	1.2	N	N
12/6	10-373	Alpowa Creek	86	M		Y	N	N	N	Y	Y	634092	LF06YO			H	1.2	N	N
12/6	10-374	Alpowa Creek		U		Y				N	N	090909	09BLANK		HEAD ONLY	H	U	U	U
12/6	10-375	Alpowa Creek		U		Y				N	N	634680	LF07YO		HEAD ONLY	H	1.1	N	N
12/8	10-376	Cherry Lane	66	F	100	Y	Y	LR	N	Y	Y	633987	LF06YO			H	1.2	N	N
12/8	10-377	Cherry Lane	74	M		N	N	N	N	Y	Y					H	1.1	N	N
12/8	10-378	Cherry Lane	82	F	100	Y	Y	N	N	Y	Y	612694	NPTH07SNLVA			H	0.2	Y	N
12/8	10-379	Cherry Lane	70	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
12/8	10-380	Cherry Lane	65	M		Y	N	N	N	Y	Y	612695	NPTH07SO			H	1.1	Y	Y
12/8	10-381	Cherry Lane	74	F	100	N	N	N	1LOP	Y	Y					U	0.2	Y	N
12/8	10-382	Cherry Lane	74	M		Y	N	N	1LOP	Y	Y	612520	LF07SBCA	3D9.1C2CD3782F		H	0.2	Y	N
12/8	10-383	Cherry Lane	65	F	100	N	N	N	1LOP	Y	Y					U	0.2	Y	N
12/8	10-384	Cherry Lane	72	M		Y	N	LR	N	Y	Y	634092	LF06YO			H	1.2	N	N
12/8	10-385	Cherry Lane	68	F	100	N	N	N	1LOP	Y	Y					U	0.2	Y	N
12/8	10-386	Cherry Lane	71	M		Y	Y	N	N	Y	Y	612716	NPTH07SO			H	0.2	Y	N
12/8	10-387	Cherry Lane	66	F	100	Y	Y	N	N	Y	Y	634671	LF07SCCD			H	0.2	Y	N
12/8	10-388	Cherry Lane	96	F	100	Y	N	N	N	Y	Y	090909	09BLANK			H	1.3	N	N
12/8	10-389	Cherry Lane	69	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
12/8	10-390	Cherry Lane	70	M		N	N	N	N	Y	Y					U	0.2	Y	N
12/8	10-391	Cherry Lane	67	M		N	N	N	N	Y	Y					U	0.2	Y	N

Appendix B. (continued).

Date	Fish ID #	Collection Site	Fork Lth	Sex	% Spawned	CWT	Ad-Clip	VIE	Opercle Punch	Scales taken	DNA taken	CWT Code	CWT Origin	Pit Tag #	Comments	Origin	Eur Age	Sub Rel	Reservoir overwinter
12/8	10-392	Cherry Lane	89	F	100	Y	Y	N	N	Y	Y	612671	NPTH05SNLVA			H	0.4	Y	N
12/8	10-393	Cherry Lane	83	M		Y	N	LR	N	Y	Y	634092	LF06YO			H	1.2	N	N
12/8	10-394	Cherry Lane	75	M		Y	N	N	N	Y	Y	612737	NPTH07SLGA			H	0.2	Y	N
12/8	10-395	Cherry Lane	70	F	100	Y	Y	N	N	Y	Y	612517	LF07SBCA			H	0.2	Y	N
12/8	10-396	Cherry Lane	53	M		Y	Y	N	2LOP	Y	Y	634995	LF08SO			H	0.1	Y	N
12/8	10-397	Cherry Lane	74	F	100	Y	Y	N	N	Y	Y	612513	LF06YBCA			H	1.2	N	N
12/8	10-398	Cherry Lane	72	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
12/8	10-399	Cherry Lane	74	M		N	N	N	N	Y	Y					U	0.2	Y	N
12/8	10-400	Cherry Lane	72	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
12/8	10-401	Cherry Lane	65	M		Y	Y	N	N	Y	Y	612716	NPTH07SO			H	0.2	Y	N
12/8	10-402	Cherry Lane	63	M		Y	Y	N	N	Y	Y	612750	LF07YBCA			H	1.1	N	N
12/8	10-403	Cherry Lane	73	M		N	N	N	N	Y	Y					U	0.2	Y	N
12/8	10-404	Cherry Lane	77	F	100	Y	N	N	N	Y	Y	612694	NPTH07SNLVA			H	0.2	Y	N
12/8	10-405	Cherry Lane	74	M		Y	N	N	N	Y	Y	612520	LF07SBCA			H	0.2	Y	N
12/8	10-406	Cherry Lane	75	M		N	N	N	N	Y	Y					U	0.2	Y	N
12/8	10-407	Cherry Lane	73	M		Y	Y	N	N	Y	Y	634671	LF07SCCD			H	0.2	Y	N
12/8	10-408	Cherry Lane	74	F	100	Y	N	N	N	Y	Y	612514	LF06YCJA			H	1.2	N	N
12/8	10-409	Cherry Lane	71	F	100	Y	Y	N	N	Y	Y	612716	NPTH07SO			H	0.2	Y	N
12/8	10-410	Cherry Lane	83	M		N	N	N	N	Y	Y					U	0.2	Y	N
12/8	10-411	Cherry Lane	73	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
12/8	10-412	Cherry Lane	65	M		Y	N	N	N	Y	Y	612517	LF07SBCA			H	0.2	Y	N
12/8	10-413	Cherry Lane	65	M		N	N	N	N	Y	Y					U	0.2	Y	N
12/8	10-414	Cherry Lane	71	F	100	Y	N	N	N	Y	Y	090135	UMA07SUMA			H	0.2	Y	N
12/8	10-415	Cherry Lane	75	F	100	Y	N	N	N	Y	Y	612514	LF06YCJA			H	1.2	N	N
12/8	10-416	Cherry Lane	75	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
12/8	10-417	Cherry Lane	71	F	100	N	Y	N	N	Y	Y					H	0.2	Y	N
12/8	10-418	Cherry Lane	74	F	100	Y	N	N	N	Y	Y	612516	LF06YBCA			H	1.2	N	N
12/8	10-419	Cherry Lane	73	M		N	N	N	N	Y	Y					U	0.2	Y	N

Appendix B. (continued).

Date	Fish ID #	Collection Site	Fork Lth	Sex	% Spawned	CWT	Ad-Clip	VIE	Opercle Punch	Scales taken	DNA taken	CWT Code	CWT Origin	Pit Tag #	Comments	Origin	Eur Age	Sub Rel	Reservoir overwinter
12/8	10-420	Cherry Lane	68	M		Y	Y	N	N	Y	Y	612517	LF07SBCA			H	0.2	Y	N
12/8	10-421	Cherry Lane	79	M		Y	N	N	N	Y	Y	612520	LF07SBCA			H	0.2	Y	N
12/8	10-422	Cherry Lane	69	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
12/8	10-423	Cherry Lane	76	F	100	N	Y	N	N	Y	Y					H	1.2	N	N
12/8	10-424	Cherry Lane	80	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
12/8	10-425	Cherry Lane	67	F	100	Y	N	N	N	Y	Y	612737	NPTH07SLGA			H	0.2	Y	N
12/8	10-426	Cherry Lane	69	M		Y	Y	N	N	Y	Y	634671	LF07SCCD			H	0.2	Y	N
12/8	10-427	Cherry Lane	50	M		Y	Y	N	2LOP	Y	Y	612739	NPTH08SO			H	0.1	Y	N
12/8	10-428	Cherry Lane	85	M		Y	N	N	N	Y	Y	612514	LF06YCJA			H	1.2	N	N
12/8	10-429	Cherry Lane	60	M		Y	N	N	N	Y	Y	612737	NPTH07SLGA			H	0.2	Y	N
12/8	10-430	Cherry Lane	75	F	100	Y	Y	N	N	Y	Y	612517	LF07SBCA			H	0.2	Y	N
12/8	10-431	Cherry Lane	78	F	100	Y	Y	N	N	Y	Y	612716	NPTH07SO			H	0.2	Y	N
12/8	10-432	Cherry Lane	77	M		Y	N	N	N	Y	Y	612694	NPTH07SNLVA			H	0.2	Y	N
12/8	10-433	Cherry Lane	79	M		Y	N	N	1LOP	Y	Y	612716	NPTH07SO			H	0.2	Y	N
12/8	10-434	Cherry Lane	50	M		Y	N	N	N	Y	Y	612755	LF07YCJA			H	1.1	N	N
12/8	10-435	Cherry Lane	70	F	100	Y	Y	N	N	Y	Y	612517	LF07SBCA			H	0.2	Y	N
12/8	10-436	Cherry Lane	59	M		Y	Y	N	1LOP	Y	Y	610180	LF08SCJA			H	0.1	Y	N
12/8	10-437	Cherry Lane	71	F	0	Y	N	N	N	Y	Y	090909	09BLANK			H	1.2	N	N
12/8	10-438	Cherry Lane	86	F	100	Y	N	N	N	Y	Y	090909	09BLANK			H	1.2	N	N
12/8	10-439	Cherry Lane	71	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
12/8	10-440	Cherry Lane	87	M		N	N	N	N	Y	Y					U	0.3	Y	N
12/8	10-441	Cherry Lane	72	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
12/8	10-442	Cherry Lane	72	M		N	N	N	1LOP	Y	Y					U	0.2	Y	N
12/8	10-443	Cherry Lane	66	M		N	N	N	N	Y	Y					U	0.2	Y	N
12/8	10-444	Cherry Lane	92	F	100	N	N	N	N	Y	Y					U	0.4	Y	N
12/8	10-445	Cherry Lane	67	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
12/8	10-446	Cherry Lane	75	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
12/8	10-447	Cherry Lane	77	M		N	N	N	N	Y	Y					U	0.2	Y	N

Appendix B. (continued).

Date	Fish ID #	Collection Site	Fork Lth	Sex	% Spawned	CWT	Ad-Clip	VIE	Opercle Punch	Scales taken	DNA taken	CWT Code	CWT Origin	Pit Tag #	Comments	Origin	Eur Age	Sub Rel	Reservoir overwinter
12/8	10-448	Cherry Lane	73	M		N	N	N	N	Y	Y					U	0.2	Y	N
12/8	10-449	Cherry Lane	65	M		N	N	N	N	Y	Y			3D9.1C2C5C22B2	LF07SSNSUR	H	0.2	Y	N
12/8	10-450	Cherry Lane	71	M		N	Y	N	1LOP	Y	Y					H	0.2	Y	N
12/8	10-451	Cherry Lane	74	M		N	N	N	N	Y	Y					U	0.2	Y	N
12/8	10-452	Cherry Lane	74	F		N	N	N	N	Y	Y					U	0.2	Y	N
12/8	10-453	Cherry Lane	67	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
12/8	10-454	Cherry Lane	72	M		N	N	N	1LOP	Y	Y					U	0.2	Y	N
12/8	10-455	Cherry Lane	70	M		N	N	N	N	Y	Y					U	0.2	Y	N
12/8	10-456	Cherry Lane	79	M		N	N	N	N	Y	Y					U	0.2	Y	N
12/9	10-457	Potlatch River	83	F	0	N	Y	N	N	Y	Y					U	0.2	Y	N
12/9	10-458	Potlatch River	71	F	100	Y	Y	LR	N	Y	Y	633987	LF06YO			H	1.2	N	N
12/9	10-459	Potlatch River	81	M		N	N	N	N	Y	Y					U	0.2	Y	N
12/9	10-460	Potlatch River	68	F	50	Y	Y	N	N	Y	Y	634672	LF07SO			H	0.2	Y	N
12/9	10-461	Potlatch River	75	F	0	Y	N	LR	N	Y	Y	634092	LF06YO			H	1.2	N	N
12/9	10-462	Potlatch River	64	F	100	Y	N	N	N	Y	Y	612755	LF07YCJA			H	1.1	N	N
12/9	10-463	Potlatch River	70	M		N	N	N	N	Y	Y					U	0.2	Y	N
12/9	10-464	Potlatch River	58	M		N	N	N	1LOP	Y	Y			3D9.1C2C5979D5	LF07SSNSUR	H	0.2	Y	N
12/9	10-465	Potlatch River	55	M		Y	N	N	N	Y	Y	612695	NPTH07SO			H	0.2	Y	N
12/9	10-466	Potlatch River	71	F	50	Y	Y	N	N	Y	Y	634671	LF07SCCD			H	0.2	Y	N
12/9	10-467	Potlatch River	72	F	100	Y	N	N	N	Y	Y	612514	LF06YCJA			H	1.2	N	N
12/9	10-468	Potlatch River	74	F	0	Y	Y	N	N	Y	Y	633987	LF06YO			H	1.2	N	N
12/9	10-469	Potlatch River	48	M		Y	Y	N	N	Y	Y	612761	NPTH08SCFA			H	0.1	Y	N
12/9	10-470	Potlatch River	61	M		Y	Y	N	1LOP	Y	Y	612750	LF07YBCA			H	1.1	N	N
12/9	10-471	Potlatch River	79	F	100	Y	Y	N	N	Y	Y	094505	UMA06YUMA			H	1.2	N	N
12/9	10-472	Potlatch River	68	F	100	Y	N	N	N	Y	Y	612521	LF07SCJA			H	0.2	Y	N
12/9	10-473	Potlatch River	78	F	75	N	N	N	N	Y	Y					H	1.2	N	N
12/9	10-474	Potlatch River	69	F	100	Y	N	N	N	Y	Y	612522	LF07SPLA			H	0.2	Y	N
12/9	10-475	Potlatch River	83	F	0	Y	Y	N	N	Y	Y	633987	LF06YO			H	1.2	N	N

Appendix B. (continued).

Date	Fish ID #	Collection Site	Fork Lth	Sex	% Spawned	CWT	Ad-Clip	VIE	Opercle Punch	Scales taken	DNA taken	CWT Code	CWT Origin	Pit Tag #	Comments	Origin	Eur Age	Sub Rel	Reservoir overwinter
12/9	10-476	Potlatch River	68	F	0	N	N	N	N	Y	Y					R	R	R	R
12/9	10-477	Potlatch River	88	F	0	Y	Y	N	N	Y	Y	633582	LF05SO			H	0.4	Y	N
12/9	10-478	Potlatch River	67	M		Y	Y	N	N	Y	Y	612750	LF07YBCA			H	1.1	N	N
12/9	10-479	Potlatch River	66	F	100	Y	Y	N	N	Y	Y	612518	LF07SCJA			H	0.2	Y	N
12/9	10-480	Potlatch River	78	F	100	Y	Y	N	N	Y	Y	612517	LF07SBCA			H	0.2	Y	N
12/9	10-481	Potlatch River	61	F	100	Y	N	N	N	Y	Y	612755	LF07YCJA			H	1.1	N	N
12/9	10-482	Potlatch River	70	F	100	Y	Y	N	N	Y	Y	634671	LF07SCCD			H	0.2	Y	N
12/9	10-483	Potlatch River	81	F	0	Y	Y	N	N	Y	Y	634092	LF06YO			H	1.2	N	N
12/9	10-484	Potlatch River	71	F	0	Y	Y	N	N	Y	Y	612511	LF06YCJA			H	1.2	N	N
12/9	10-485	Potlatch River	72	F	100	Y	Y	N	N	Y	Y	612517	LF07SBCA			H	0.2	Y	N
12/9	10-486	Potlatch River	71	M		Y	Y	N	N	Y	Y	612694	NPTH07SNLVA			H	0.2	Y	N
12/9	10-487	Potlatch River	77	F	100	Y	Y	N	N	Y	Y	612517	LF07SBCA			H	0.2	Y	N
12/9	10-488	Potlatch River	75	F	75	N	N	N	N	Y	Y					U	0.2	Y	N
12/9	10-489	Potlatch River	75	F	75	Y	N	N	N	Y	Y	634092	LF06YO			H	1.2	N	N
12/9	10-490	Potlatch River	69	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
12/13	10-491	Potlatch River	61	F	100	Y	Y	N	N	Y	Y	634672	LF07SO			H	0.2	Y	N
12/13	10-492	Potlatch River	66	F	100	Y	Y	N	N	Y	Y	612517	LF07SBCA			H	0.2	Y	N
12/13	10-493	Potlatch River	66	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
12/13	10-494	Potlatch River	83	F	100	Y	N	N	N	Y	Y	612512	LF06YPLA			H	1.2	N	N
12/13	10-495	Potlatch River	60	M		N	N	N	N	Y	Y					U	0.1	Y	N
12/13	10-496	Potlatch River	76	F	100	Y	Y	N	N	Y	Y	634672	LF07SO			H	0.2	Y	N
12/13	10-497	Potlatch River	79	F	100	N	Y	N	N	Y	Y					U	0.2	Y	N
12/13	10-498	Potlatch River	70	M		N	N	N	1LOP	Y	Y					U	0.2	Y	N
12/13	10-499	Potlatch River	73	F	100	Y	Y	N	N	Y	Y	090134	UMA07SUMA			H	0.2	Y	N
12/13	10-500	Potlatch River	73	M		Y	Y	N	N	Y	Y	634672	LF07SO			H	0.2	Y	N
12/13	10-501	Potlatch River	69	M		N	N	N	N	Y	Y					U	0.2	Y	N
12/13	10-502	Potlatch River	80	F	100	Y	N	N	N	Y	Y	612514	LF06YCJA			H	1.2	N	N
12/13	10-503	Potlatch River	72	F	100	Y	Y	N	N	Y	Y	612514	LF06YCJA			H	1.2	N	N

Appendix B. (continued).

Date	Fish ID #	Collection Site	Fork Lth	Sex	% Spawned	CWT	Ad-Clip	VIE	Opercle Punch	Scales taken	DNA taken	CWT Code	CWT Origin	Pit Tag #	Comments	Origin	Eur Age	Sub Rel	Reservoir overwinter
12/13	10-504	Potlatch River	71	F	100	Y	N	N	N	Y	Y	090909	09BLANK			H	1.1	N	N
12/13	10-505	Potlatch River	67	F	100	N	N	N	1LOP	Y	Y					R	R	R	R
12/13	10-506	Potlatch River	73	M		N	N	N	N	Y	Y					U	0.2	Y	N
12/13	10-507	Potlatch River	73	F	100	Y	Y	N	N	Y	Y	612517	LF07SBCA			H	0.2	Y	N
12/13	10-508	Potlatch River	68	F	100	Y	Y	N	N	Y	Y	634672	LF07SO			H	0.2	Y	N
12/13	10-509	Potlatch River	59	M		Y	Y	N	1LOP	Y	Y	090135	UMA07SUMA			H	0.2	Y	N
12/13	10-510	Potlatch River	67	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
12/13	10-511	Potlatch River	64	F	100	N	N	N	N	Y	Y					H	1.1	N	N
12/13	10-512	Potlatch River	65	M		N	N	N	N	Y	Y					U	0.2	Y	N
12/13	10-513	Potlatch River	72	F	100	Y	N	N	N	Y	Y	090909	09BLANK			H	1.2	N	N
12/13	10-514	Potlatch River	75	F	100	Y	N	N	N	Y	Y	612514	LF06YCJA			H	1.2	N	N
12/13	10-515	Potlatch River	64	M		N	N	N	N	Y	Y					U	0.2	Y	N
12/13	10-516	Potlatch River	63	F	100	Y	N	N	N	Y	Y	612521	LF07SCJA			H	0.2	Y	N
12/13	10-517	Potlatch River	72	M		N	N	N	N	Y	Y					U	0.2	Y	N
12/13	10-518	Potlatch River	69	F	100	Y	Y	N	N	Y	Y	090135	UMA07SUMA			H	0.2	Y	N
12/13	10-519	Potlatch River	63	F	100	Y	N	N	N	Y	Y	633987	LF06YO			H	1.2	N	N
12/13	10-520	Potlatch River	56	M		Y	N	N	N	Y	Y	612520	LF07SBCA			H	R	Y	R
12/13	10-521	Potlatch River	75	F	100	Y	Y	N	N	Y	Y	634671	LF07SCCD			H	0.2	Y	N
12/13	10-522	Potlatch River	79	F	100	Y	N	N	N	Y	Y	612516	LF06YBCA			H	1.2	N	N
12/13	10-523	Potlatch River	68	F	100	Y	N	N	N	Y	Y	612521	LF07SCJA			H	0.2	Y	N
12/13	10-524	Potlatch River	69	F	100	N	N	N	1LOP	Y	Y					U	0.2	Y	N
12/13	10-525	Potlatch River	78	M		N	Y	N	N	Y	Y					U	0.2	Y	N
12/13	10-526	Potlatch River	77	M		N	Y	N	N	Y	Y					U	0.2	Y	N
12/13	10-527	Potlatch River	67	F	100	N	Y	N	N	Y	Y					U	0.2	Y	N
12/13	10-528	Potlatch River	67	F	100	N	Y	N	N	Y	Y					U	0.2	Y	N
12/13	10-529	Potlatch River	71	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
12/13	10-530	Potlatch River	75	F	100	Y	N	N	1LOP	Y	Y	090909	09BLANK			H	0.2	Y	N
12/13	10-531	Potlatch River	64	M		Y	N	N	N	Y	Y	612694	NPTH07SNLVA			H	0.2	Y	N

Appendix B. (continued).

Date	Fish ID #	Collection Site	Fork Lth	Sex	% Spawned	CWT	Ad-Clip	VIE	Opercle Punch	Scales taken	DNA taken	CWT Code	CWT Origin	Pit Tag #	Comments	Origin	Eur Age	Sub Rel	Reservoir overwinter
12/13	10-532	Potlatch River	71	F	100	Y	Y	N	N	Y	Y	633987	LF06YO			H	1.2	N	N
12/13	10-533	Potlatch River	75	M		Y	N	N	N	Y	Y	090909	09BLANK			H	1.2	N	N
12/13	10-534	Potlatch River	48	M		Y	Y	N	N	Y	Y	610179	LF08SBCA			H	0.1	Y	N
12/13	10-535	Potlatch River	69	F	100	Y	N	N	N	Y	Y	612521	LF07SCJA			H	0.2	Y	N
12/13	10-536	Potlatch River	65	F	100	Y	N	N	N	Y	Y	090134	UMA07SUMA			H	0.2	Y	N
12/13	10-537	Potlatch River	79	F	100	N	N	N	N	Y	Y					H	1.2	N	N
12/13	10-538	Potlatch River	73	M		N	N	N	N	Y	Y					U	0.2	Y	N
12/13	10-539	Potlatch River	76	F	100	Y	N	N	N	Y	Y	090909	09BLANK			H	R	R	R
12/13	10-540	Potlatch River	80	F	100	Y	N	N	N	Y	Y	090909	09BLANK			H	0.2	Y	N
12/13	10-541	Potlatch River	71	F	100	Y	N	N	1LOP	Y	Y	612736	NPTH07SCFA			H	0.2	Y	N
12/13	10-542	Potlatch River	77	F	100	Y	N	LR	1LOP	Y	Y	634092	LF06YO			H	1.2	N	N
12/13	10-543	Potlatch River	70	M		Y	N	N	N	Y		090909	09BLANK			H	1.1	Y	N
12/13	10-544	Potlatch River	68	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
12/13	10-545	Potlatch River	75	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
12/13	10-546	Potlatch River	67	M		N	N	N	N	Y	Y					U	0.2	Y	N
12/13	10-547	Potlatch River	65	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
12/13	10-548	Potlatch River	70	F	100	N	N	N	1LOP	Y	Y					U	0.2	Y	N
12/13	10-549	Potlatch River	56	M		N	N	N	1LOP	Y	Y					U	0.1	Y	N
12/13	10-550	Potlatch River	66	M		N	N	N	1LOP	Y	Y					U	0.2	Y	N
12/13	10-551	Potlatch River	67	M		N	N	N	N	Y	Y					U	0.2	Y	N
12/13	10-552	Potlatch River	69	F	100	N	N	N	N	Y	Y					U	0.2	Y	N
12/13	10-553	Potlatch River	63	F	100	N	Y	N	N	Y	Y					U	0.2	Y	N
12/13	10-554	Potlatch River	71	M		N	N	N	N	Y	Y					U	0.2	Y	N
12/13	10-555	Potlatch River	62	F	100	N	Y	N	N	Y	Y					U	0.2	Y	N
12/13	10-556	Potlatch River		F		Y				N	Y	612521	LF07SCJA		Head Only	H	U	Y	U

***Collection Site:** Cherry Lane = Clearwater River at Cherrylane. ***Age key:** examples: 0.1 = 2-year old that had a subyearling emigration and spent 1-year in salt water, 1.3 = 5-yr old that had a yearling emigration and spent 3-years in salt water. By scale analysis: W = wild or natural, H = hatchery release; Y = yes, N = no, R = regenerated scales that could not be read; Reservoir Overwinter = Subyearling that reservoir reared and emigrated as a yearling. ***Origin key** (from CWT or PIT tag): LF = Lyons Ferry Hatchery, 05 = 2005 Broodyear, Y = yearling release, S = subyearling release, O = on-station release, BCA = Big Canyon Acclimation release, CJA = Captain John Acclimation release, PLA = Pittsburg Landing Acclimation release, NPTH = Nez Perce Tribal Hatchery, NLV = North Lapwai Valley acclimated release, LGA = Lukes Gulch Acclimation release, CFA = Cedar Flats Acclimation release, DWOR = Dworshak subyearling surrogate releases, CCD = Couse Cr. direct release, GRRD = Grande Ronde direct release, IPC = Idaho Power Company direct release at Hells Canyon Dam, SN = Snake River, LGR Adult = tagged as adult at Lower Granite Dam, LGRTR = tagged as juvenile at Lower Granite Tailrace, UMA = Umatilla River stray, BLANK = Umatilla R. yearling stray.

Appendix C. Fall Chinook salmon female origin and life history summary of fish hauled from Lower Granite Dam (LGR) and volunteers to Nez Perce Tribal Hatchery (NPTH) fish ladder that were processed at NPTH with total of each origin spawned for 2010 broodstock (origins from coded wire tags, visible implant elastomer tags, passive integrated transponder (PIT) tags, adipose fin clips, and scale readings; SP = spawned, DIP = died in pond, KO = killed outright and not used for broodstock i.e. green eggs, OUT = Outplanted to spawn naturally).

Origins of Females (N = 545 processed)	Brood Yr	Hauled from Lower Granite Dam Females (n = 545) SP	DIP	KO	OUT	Total Spawned/ Total (496/545)
NPTH (on-station release) subyearling emigration	06	1	1			
	07	12				13/14
NPTH (on-station release) reservoir reared	06	2				
	07		1			2/3
NPTH-North Lapwai Valley release subyearling emigration	05	1				
	07	1				2/2
NPTH-Lukes Gulch release subyearling emigration	06					
	07	7	1			7/8
NPTH-Cedar Flats release subyearling emigration						
	07	2				2/2
Big Canyon subyearlings subyearling emigration	05					
	07	20	1			20/21
Big Canyon subyearlings reservoir reared						
	06	1				1/1
Captain John subyearlings subyearling emigration	05	1				
	06	1				
	07	12	1			14/15
Pittsburg Landing subyearlings subyearling emigration	05	1				
	07	17	1			18/19
LFH-Hells Canyon (IPC) direct subyearling emigration	05					
	07	58	3			58/61
LFH on-station subyearlings subyearling emigration	06	2				
	07	8	3			10/13
Snake R. Couse Creek direct subyearling emigration	05	3				
	07	6				9/9
Grande Ronde direct subyearling emigration						
	07	3				3/3
Snake R (Pit tag-LGR) subyearling emigration	05					
	06	3				3/3
Snake R (Pit tag-LGR) Hatchery subyearling reservoir reared	05					
	06	3				3/3
Snake R (Pit tag-LGR) natural suby reservoir reared (by scales)	04					
	06	6				6/6
Snake R (Pit tag-LGR) subyearling unknown/unknown emigration						
	06	1	1			1/2

LFH subs-Snake R surrogates (Corps study) sub emigration	05	1				
	07	7	1	1		8/10
Clearwater River Wild/Natural PIT tag Reservoir Reared						
	06		1			0/1
Clearwater River Wild/Natural PIT tag Unknown emigration						
	06	1				1/1
LFH subs-Clearwater R surrogates (Corps study) sub emigration	05	1				
	06	1				
	07	1				3/3
Wild/Natural Snake PIT tag subyearling emigration						
	07	1				1/1
Unmarked/untagged subyearlings (by scales) subyearling emigration	05	10	1	1		
	06	13				
	07	66	7			89/98
Wild/Natural reservoir reared (by scales)	05	3	1			
	06	21	1			
	07	1				25/27
Big Canyon yearlings						
	06	18	3			18/21
Captain John yearlings	05	1				
	06	24	5			25/30
Pittsburg Landing yearlings	05	1				
	06	18	1			
	07	1				20/21
LFH on-station yearlings	05	2				
	06	71	6	4		
	07	1				74/84
Umatilla R stray subyearlings						
	07	5		1		5/6
Umatilla R stray yearlings	06	3				
	07			1		3/4
Unknown hatchery yearling (by scales)	05	1				
	06	3				4/4
Unknown hatchery (ad-clip) subyearling emigration (lost wire)						
	07	3				3/3
Unknown hatchery subyearling emigration (ad-clip only)	05	1				
	07	33				34/34
Unknown hatchery (ad-clip) emigration unknown						
	?	2				2/2
Unknown hatchery subyearling emigration (lost wire)						
	07	3				3/3
Unknown subyearling (by scales) subyearling emigration						
	07	1				1/1

Origin	Brood Yr	SP	DIP	KO	OUT	Total
Unknown subyearling (by scales) reservoir reared emigration	06		1			0/1
Unknown origin (unknown broodyear and emigration)						
	?	5				5/5
Female Totals (by broodyear)	05	27	2	1	0	27/30
	06	193	19	4	0	193/216
	07	269	20	3	0	269/292
	?	7	0	0	0	7/7
Females Grand Total		496	41	8	0	496/545

Appendix D. Fall Chinook salmon male origin and life history summary of fish hauled from Lower Granite Dam (LGR) and volunteers to Nez Perce Tribal Hatchery (NPTH) fish ladder that were processed at NPTH with total of each origin spawned for 2010 broodstock (origins from coded wire tags, visible implant elastomer tags, passive integrated transponder (PIT) tags, adipose fin clips, and scale readings; SP = spawned, DIP = died in pond, KO = killed outright and not used for broodstock, OUT = Outplanted to spawn naturally).

Origins of Males (N = 562 processed)	Brood Yr	Hauled from Lower Granite Dam Males (n = 562)				Total Spawned/ Total (461/562)
		SP	DIP	KO	OUT	
NPTH (on-station) subyearling emigration	06	1				
	07	8		1		9/10
NPTH-North Lapwai Valley subyearling emigration						
	07	16	2	1		16/19
NPTH-North Lapwai Valley unknown emigration						
	07	1				1/1
NPTH-Lukes Gulch subyearling emigration						
	07	12		1		12/13
NPTH-Cedar Flats subyearling emigration	07	7				
	08	1				8/8
Big Canyon subyearlings subyearling emigration						
	07	20	3	2		20/25
Captain John subyearlings subyearling emigration						
	07	15	3	1		15/19
Pittsburg L. subyearlings subyearling emigration						
	07	24	2			24/26
LFH-Hells Canyon Dam (IPC) direct subyearling emigration						
	07	56	5	3	5	56/69
LFH on-station subyearlings subyearling emigration						
	07	18	3			18/21
Snake R. Couse Creek direct subyearling emigration						
	07	11	1	1		11/13

Snake R. Couse Creek direct unknown emigration	07	1				1/1
Grande Ronde direct subyearling emigration	07	4	1		1	4/6
Snake R (Pit tag-LGR) unknown subyearling emigration (by scales)	06		2			0/2
Snake R (Pit tag-LGR) hatchery subyearling reservoir reared	06	1				1/1
Snake R (Pit tag-LGR) natural suby subyearling emigration (by scales)	07	2	1			2/3
Snake R (Pit tag-LGR) natural suby reservoir reared (by scales)	04	1				
	06	3				
	07	1		1		5/6
Snake R (Pit tag-LGR) subyearling unknown/unknown emigration	06	1				1/1
LFH subs-Snake R surrogates (Corps study) sub emigration	07	29	1	1		29/31
LFH subs-Snake R surrogates (Corps study) emigration unknown	07	1				1/1
LFH subs-Clearwater R surrogates (Corps study) sub emigration	07	4	1			4/5
LFH subs-Clearwater R surrogates (Corps study) reservoir reared	05	1				
	07	6	1			7/8
LFH subs-Clearwater R surrogates (Corps study) emigration unknown	07	1				1/1
Wild/Natural Clearwater R PIT tag reservoir reared	06		1			0/1
Wild/Natural Snake R PIT tag subyearling reservoir reared	06	1				
	07	2				3/3
Wild/Natural Snake R PIT tag subyearling emigration	07	2	1			2/3
Unmarked hatchery subyearlings reservoir reared (by scales)	05	1	1			
	06	12	3	2		
	07	3				16/22
Wild/Natural subyearling emigration (by scales)	05	4				
	06	8			1	
	07	101	10	4	3	
	08	1				114/132
Big Canyon yearlings	06	3	3			3/6
Captain John yearlings	06	5				
	07	2				
	08		3			7/10
Pittsburg Landing yearlings	06	10				
	07	7	1			17/18

LFH on-station yearlings	06	10	2	1		10/13
Umatilla R stray yearlings	06			3		0/3
Umatilla R stray subyearlings subyearling emigration	07	1	1	11		1/13
Unknown hatchery yearling (by scales, lost wire)	06	1				1/1
Unknown hatchery yearling (by scales, no wire)	06	1				1/1
Unknown hatchery yearling (by scales, ad-clip, no wire)	06	1				1/1
Unknown hatchery subyearling (ad-clip, lost wire) sub emigration	07	2				
	08	1				3/3
Unknown hatchery subyearling (by scales) reservoir reared	06	1				1/1
Unknown hatchery subyearling (ad-clip) subyearling emigration	06	1				
	07	30	4	1	1	31/37
Unknown origin (no marks/tags) emigration unknown	?	4				10/17
Male Totals (by broodyear)	04	1	0	0	0	1/1
	05	6	1	0	0	6/7
	06	60	11	6	1	60/78
	07	387	41	28	10	387/466
	08	3	3	0	0	3/6
	?	4	0	0	0	4/4
Males Grand Total		461	56	34	11	461/562