# Nez Perce Tribal Hatchery Monitoring and Evaluation Project

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

**Annual Report 2011**

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# EXECUTIVE SUMMARY

For this 2011 report we have incorporated the Nez Perce Tribal Hatchery (NPTH) M&E Project and the Fall Chinook Acclimation Project (FCAP) M&E. This is year ten 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 625,000 spring and 1.4 million fall Chinook salmon for supplementation releases in the Clearwater River Subbasin. The fall Chinook salmon subyearling release goal of 1.4 million was met and exceeded by 335,906 fish for 2011. The Nez Perce Tribe (NPT) also operates the Fall Chinook Acclimation Project (FCAP), which consists of three juvenile acclimation facilities along the Snake and Clearwater rivers with the intent of effectively enhancing population size and distributing natural Fall Chinook salmon spawning throughout existing habitat areas above Lower Granite Dam. This is year sixteen of this long-term project to monitor and evaluate the success of these efforts. For the FCAP subyearlings, total releases were close to the goal of 1.4 million with a total of 1,438,910 fish reported released. The FCAP total release goal of 450,000 yearlings was exceeded by 33,340 fish. A grand total of 3,658,156 fall Chinook salmon were released by the Nez Perce Tribe in 2011. Coded wire tagging (CWT) and marking (adipose fin clipping) goals were met for all fall Chinook releases in 2011. Final CWT retention rates were high on all CWT groups and ranged between 0.993-1.0. The average condition factors (K-factors) ranged between 0.97 and 1.12.

All fall Chinook salmon yearling and subyearling releases from FCAP and NPTH facilities were made prior to warm (>16 $^{o}$C) summer water temperatures. The releases for the FCAP yearlings occurred in April while the FCAP subyearlings were released in May. The Captain John yearling release was made two weeks earlier than the Big Canyon and Pittsburg Landing yearling releases due to an earlier acclimation timing. The subyearlings releases from NPTH facilities occurred in mid-June, except for the North Lapwai Valley acclimated group which was released a month earlier because water temperatures were warming in Lapwai Creek and at the facility. This year 286,587 extra subyearling fall Chinook were released at NPTH on July 6 at a smaller size and after peak flows in the Clearwater and Snake rivers. 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 the same period because of cold water releases from Dworshak Reservoir. Most first detections at Lower Granite Dam for all FCAP, 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 by 2-3 $^{o}$C keeping water temperatures below or near 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 exceeded 20 $^{o}$C. Natural subyearling detections increased at Lower Granite Dam in October, with most detections occurring at the facility from the middle of October to the middle of November when temperatures at Lower Granite Dam dropped to approximately 10 $^{o}$C and below on average. Most hatchery fall Chinook detections from FCAP and NPTH releases occurred during the spill period at Lower Granite Dam. In contrast, very few PIT tagged natural fall Chinook experienced summer spill as most detections occurred later in the fall. For genetic monitoring, we collected a random non-lethal subsample (upper caudal fin clips) from 200 natural subyearling Chinook salmon captured on the Clearwater River during 2011.

Using Passive Integrated Transponder (PIT) tag technology we monitored hatchery and naturally produced fall Chinook salmon in the lower Clearwater and Snake rivers. Through beach seining we sampled a total of 632 natural Chinook salmon subyearlings on the lower Clearwater River of which 631 were large enough ($\geq$ 50 mm) to PIT tag. We also recaptured 10 natural fish that averaged 0.54 mm of growth per day. Average K-factor for natural fish was 1.10 at the time of tagging. Estimated index survivals of PIT tagged natural subyearling fall Chinook salmon from the Clearwater River to Lower Granite Dam was 14.0%, but could not be calculated to McNary Dam. The natural fish from the Clearwater River had 37 detections in 2012 as holdover yearlings, representing 41.6% of the total number of unique PIT tags detected. Only 40 (0.00%) hatchery fall Chinook released in 2011 from the NPTH and FCAP facilities were detected in 2012 as holdovers. Estimated index survival for the NPTH on-station release was 81.0% to Lower Granite Dam and 79.0% to McNary Dam. The estimated index survivals for the NPTH acclimation releases were 88.0% and 75.0% for Cedar Flats, 88.0% and 78.0% for Luke's Gulch, and 84.0% and 60.0% for NLV to Lower Granite and McNary dams, respectively. The estimated index survivals for the NPTH second release to Lower Granite and McNary dams was 41.0% and 24.0%, respectively. The estimated index survival to Lower Granite Dam for subyearling releases from FCAP facilities ranged between 86.0% from Big Canyon to 92.0% from the Pittsburg Acclimation Site. Estimated index survival to Lower Granite Dam for the FCAP yearling acclimated releases ranged between 92.0% from the Big Canyon Acclimation Site to 93.0% from both the Pittsburg Landing and Captain John acclimation sites. As in previous years, the NPTH acclimated releases from Luke's Gulch and Cedar Flats migrated at a faster rate (41.9 and 40.9 Rkm/d, respectively) than the other NPTH releases to Lower Granite Dam, while the natural fall Chinook from the Clearwater River migrated much slower (0.89 Rkm/d) on average to Lower Granite Dam. The yearling and subyearling releases from the PLAP facility migrated at a faster rate (21.3 and 35.5 Rkm/d, respectively) to Lower Granite Dam than the other FCAP releases.

We observed a total of 1,574 fall Chinook salmon redds in the Clearwater River and three redds in the N.F. Clearwater River during four surveys in 2011. We observed two redds on the Potlatch River. Spawning was near completion by 28 November on the Clearwater River with few live fish observed. A total of 31 redds were observed in the S.F. Clearwater, 3 redds in the M.F. Clearwater River, and 8 redds in the Selway River. This was the highest redd count in all three upper Clearwater tributaries since we began surveys in the S.F. Clearwater during 1992 in the M.F. Clearwater and Selway during 1994. There were a total of 1,621 redds observed in the entire Clearwater River Subbasin. A total of 154 redds were observed in the Grande Ronde River, 24 redds in the Imnaha River, and 60 redds observed in the Salmon River. An additional survey was conducted on the Salmon River from French Creek up to the S.F. Salmon River and on the S.F. Salmon from the mouth up to the Reed Ranch, however, no additional redds were observed.

The lowest smolt-to-adult returns (SAR) back to the Snake River from NPTH and FCAP releases from 2006-2008, and subsequent ocean and freshwater harvest rates were for all 2007 release groups. The highest estimated SARs and smolt-to-adult survivals (SASs) were for the 2008 release groups with NLV having the highest return rate back to the Snake River (1.46%) and the highest harvest rate (0.61%) for a total SAS of 2.07%. A similar trend resulted in the FCAP subyearling releases in terms of SARs and SASs. The lowest SARs and SASs occurred for the 2007 releases while the highest SARs back to the Snake River for all release groups occurred for the 2008 releases with Big Canyon subyearling release having the highest SAR of 1.67%. All release groups had similar harvest rates for the 2008 releases which ranged from 0.63% to 0.69%. The FCAP yearling releases also show similar SARs and SASs for the 2006-2008 releases with 2007 having the lowest returns back to the Snake River and the lowest contributions to harvest. The highest average SAR and SAS was also for the 2008 release groups with Captain John having the highest SAR of 3.1% back to the Snake River and also the highest harvest rate of 1.1%, for a total SAS of 4.2%.

During 2011, the number of fall Chinook salmon trapped and hauled from Lower Granite Dam to NPTH and LFH for broodstock needs and run reconstruction purposes was 588 and 2,281 fish, respectively. After subtracting hauled fish from the Lower Granite estimate and volunteers to the NPTH, the preliminary fall Chinook salmon escapement estimate to the spawning grounds was 23,580 adults and 14,175 jacks for a total of 37,755 fish. It was estimated that the natural adult escapement above Lower Granite was 8,072 (34.2%) and 4,153 (29.3%) natural jacks. Natural and hatchery jacks together made up 37.5% of the fall Chinook escapement above Lower Granite Dam in 2011.

A total of 442 fall Chinook salmon carcasses were collected in the Clearwater River during 2011. There were a total of 275 females (62.2%) and 167 males (37.8%) among the carcasses collected. Of all female carcasses cut open and examined, about 98.2% were 100% spawned-out or eggs were spent. Only 2 females examined had retained most all of their eggs (pre-spawn mortalities).

Analysis of the composition of fall Chinook salmon carcasses collected in the Clearwater River Subbasin using coded wire tags, adipose fin clips, and scale readings resulted in identifying 173 hatchery origin fish (41.2%) and 193 unmarked/untagged fish (46.0%). A total of 54 (12.9%) carcasses were identified as natural "reservoir reared" fish. The two known (from wire) out-of-Snake Basin hatchery "strays" made up 0.5% of the carcasses sampled in the Clearwater River during 2011. The greatest number of carcasses collected in the Clearwater River Subbasin were unknown (unmarked/untagged) subyearlings that emigrated as subyearlings (46.0%), followed by known hatchery subyearlings that emigrated as subyearlings (26.9%), then by naturally produced subyearlings that held over or possibly reservoir reared and emigrated as yearlings (12.9%), then by hatchery released yearlings (11.0%), and lastly by hatchery subyearling releases that reservoir reared (2.9%). Most carcasses collected returned at total age-4 (65.7%), followed by age-3 fish (24.5%), age-2 or jacks (6.2%), and lastly age-5 (3.6%) (Table 10). There were no age-6 carcasses collected.

A total of 588 fall Chinook were hauled from Lower Granite Dam for NPTH broodstock which consisted of 437 females and 151 males. A total of 192 fall Chinook volunteered into the NPTH fish ladder which consisted of 73 females and 119 males. A grand total of 780 fall Chinook salmon were processed at NPTH during 2011. For both NPTH and LFH, fall Chinook salmon broodstock needs were met in 2011. There were a total of 437 females used for broodstock, 75 died in the pond prior to spawning, and 8 were green or the eggs not viable. A total of 215 males were used for broodstock, 27 died in the pond prior to spawning, 25 were killed outright and not used for brood, and 3 were released back to the river to spawn naturally. Most of the KO males were hauled from Lower Granite Dam, were small and sacrificed in order to extract and read coded wire tags for run reconstruction purposes. The highest contribution of females (n=141 or 32.3%) to the broodstock was unmarked/untagged fish with a subyearling emigration life history scale pattern. The second highest contribution of females (n=41 or 9.4%) was from all NPTH and associated acclimation releases that emigrated as subyearlings. Yearling releases from on-station LFH contributed 8.9% to the total female broodstock. Out-of-Snake River Basin strays (n=7) made up 1.6% of the female broodstock. The highest male contribution (n=82 or 38.1%) to the broodstock was also unmarked/untagged subyearlings showing a subyearling emigration life history by scales. The second highest contribution of males (n=38 or 17.7%) were from NPTH and associated acclimation releases that emigrated as subyearlings, followed by Big Canyon subyearling releases (n=20 or 9.3%). Out-of-Snake River Basin strays (n=1) made up 0.4% of the male broodstock composition. Total age composition of all fall Chinook salmon females processed at NPTH resulted in 81.4% age-4, 11.2% age-3, and 6.7% age-5 of fish that could be identified. Total age composition of all fall Chinook salmon males processed at NPTH resulted in 67.0% age-4, 30.7% age-3, and 2.2% age-5. Of all age-3 females spawned, ten (2.3% of all brood) were 1-ocean fish (jills) from yearling releases in 2008, and one female was identified as a reservoir reared natural fish. Of all males spawned, only 5 fish (2.3%) were from hatchery yearling releases or true 1-ocean jacks, and three (1.4%) were subyearling jacks that reservoir reared.

Beginning in 2011, parental based tagging (PBT) was initiated at both LFH and NPTH for all broodstock. The results of PBT will be a better tracking of parents to returning offspring and monitoring and evaluation of different rearing and release strategies. We also subsampled 100% (n=443) of fall Chinook salmon carcasses collected on the spawning grounds for DNA analysis, although only a subsample will be analyzed. A comprehensive genetic analysis report on NPTH broodstock and carcass recovery will be forthcoming in a later publication.

## 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 biologists, technicians and office personnel. The contributions and efforts of Mark Pishl, Charles Axtell, Carol Reuben, and Richard Johnson to the monitoring and evaluation program have been invaluable. We thank John Sneva 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 patience, 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 and Snake rivers above Lower Granite Dam (LGR) represent an important component of the Snake River ESU fall Chinook salmon population. Maintenance and function of fall Chinook salmon population dynamics within these systems and their tributaries will play an important role in recovery of the Snake River fall Chinook salmon.

In 1994, through *U.S. v. Oregon*, the Nez Perce Tribe (NPT) reached an agreement with States and Federal agencies to release yearling fall Chinook salmon beginning in 1996 as replacement of lost production from adults trapped at LGR and hauled to Lyons Ferry Hatchery (LFH) for broodstock needs and to cull non-Snake River Basin strays. The agreement stipulated the release of 450,000 yearlings annually on-station from LFH and outplanting an additional 450,000 to acclimation facilities upstream of LGR to supplement natural fall Chinook salmon production. The NPT operates the Fall Chinook Acclimation Project (FCAP), which consists of two juvenile acclimation facilities along the Snake River and one along the Clearwater River with the intent of effectively enhancing population size and distributing natural fall Chinook salmon spawning throughout the existing habitat areas above LGR. The FCAP facilities began operation at Pittsburg Landing on the Snake River in 1996, Big Canyon Creek on the Clearwater River in 1997 and at Captain John Rapids on the Snake River in 1998. In addition, due to sufficient broodstock levels at LFH, subyearling fall Chinook salmon have been available for release from the FCAP facilities since 1997.

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 and FCAP 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 both the Clearwater and Snake river Subbasins. To measure these benefits, changes in the abundance of Chinook salmon in these systems and their tributaries will be monitored over the next 15 to 20 years (Hesse and Cramer 2000). In addition to measuring project-related benefits, the NPTH and FCAP M&E Program are 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.

These combined M&E projects examine 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 and FCAP. Treatment streams in the Clearwater River include the lower reaches of the South Fork Clearwater, Middle Fork Clearwater and Selway rivers for early-fall Chinook salmon, and the mainstem Clearwater River for fall Chinook salmon. Treatment streams in the Snake River basin include the free flowing mainstem Snake River above Asotin, Washington and the Grande Ronde, Imnaha and Salmon rivers.

Summary of NPTH and FCAP M&E Project Goals and Objectives:

<u>Long Term Goals:</u>

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

The NPTH M&E Project is designed to provide information that enables adaptive management of the 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.

OBJECTIVES:

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 River, Snake River, associated tributaries, and treatment streams.

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 2011 annual report details monitoring and evaluation activities associated with the fall Chinook salmon component of the Nez Perce Tribal Hatchery and FCAP programs from January 1 through December 31, 2011, thus providing data that will be used to analyze the effectiveness of supplementation activities. We also summarize adult returns from NPTH, FCAP and associated acclimated fall Chinook releases from 2006 to 2008 (complete adult returns) along with contributions to ocean and freshwater fisheries. The fall Chinook Acclimation Monitoring and Evaluation Project (FCAP M&E; BPA Project 1998-010-04) was incorporated into the NPTH M&E Project and we include 2011 release numbers, juvenile survivals, emigration timing statistics, adult returns from the most recent three years of complete returns, and contributions to ocean and freshwater fisheries. Also reported as part of the FCAP M&E are 2011 fall Chinook salmon aerial redd counts on the lower Grande Ronde, Imnaha, and Salmon rivers. The first decade 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. Earlier FCAP M&E results can be found in annual reports by primary author Rocklage under the same above website.

## STUDY AREA

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).

The FCAP M&E study area for fall Chinook salmon supplementation encompasses all treatment streams and tributaries of the lower Clearwater River and free flowing Snake River above Asotin, Washington (Figure 2). The Fall Chinook Acclimation Project (FCAP) release facility location and descriptions are also described below.

**Nez Perce Tribal Hatchery (NPTH) Facilities**

The NPTH, located on the lower Clearwater River 38 km above its mouth at Tribal Allotment 1705, and 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.

*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.

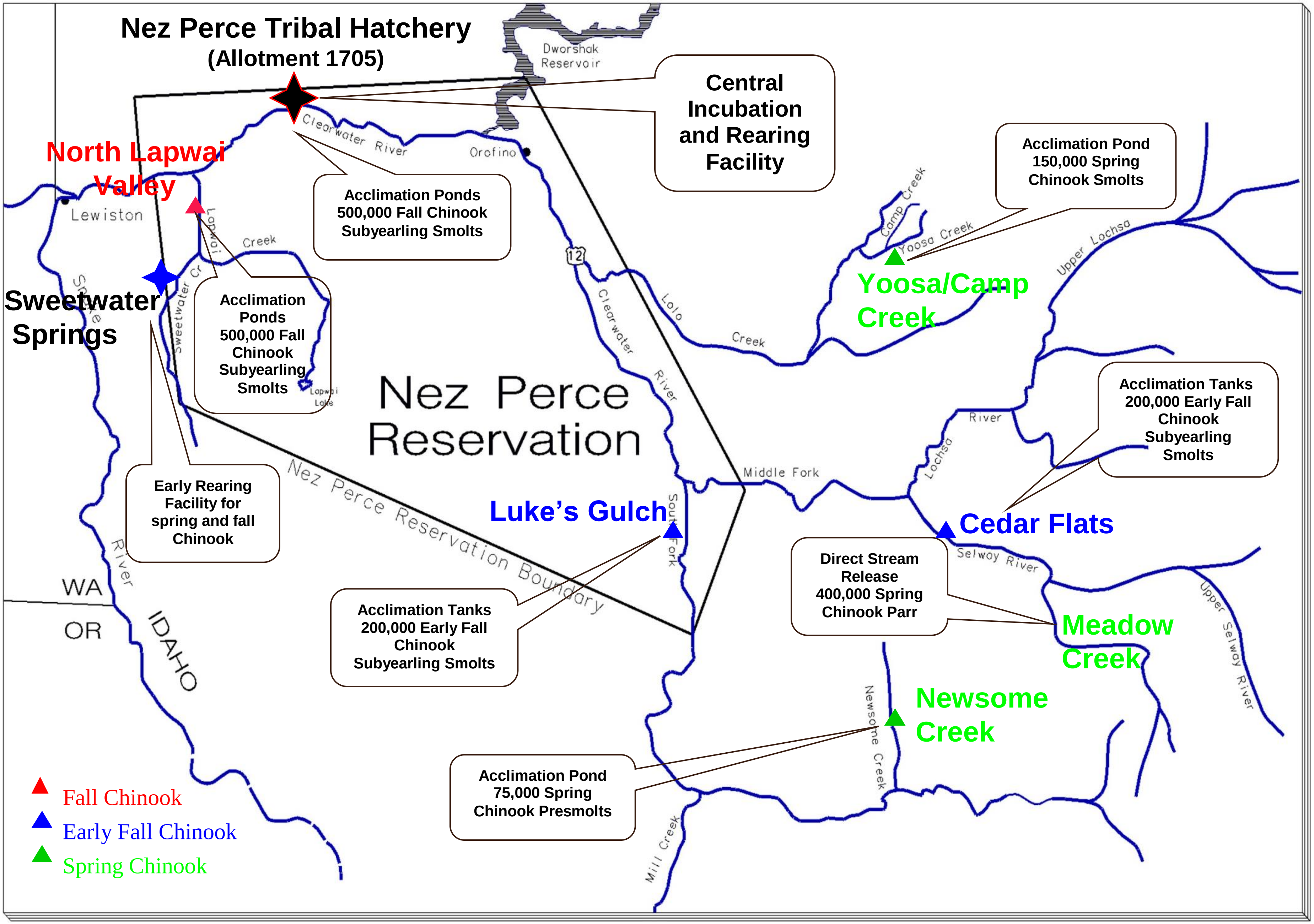


Figure 1. Nez Perce Tribal Hatchery and Chinook salmon acclimation and early rearing facilities within the Clearwater River Subbasin.

*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.

**Fall Chinook Acclimation Project (FCAP) Facilities**

*Big Canyon Creek Acclimation Facility*

Located on the Clearwater River at Big Canyon Creek (Rkm 57) (Figure 2) this facility is the final rearing and acclimation site for 150,000 yearling and 500,000 subyearling fall Chinook salmon. Juveniles are held in sixteen 5.8 m diameter circular aluminum tanks and fish released directly to the Clearwater River.

*Pittsburg Landing Acclimation Facility*

Located on the Snake River at Pittsburg Landing (Rkm 346) (Figure 2) this facility is the final rearing and acclimation site for 150,000 yearling and 400,000 subyearling fall Chinook salmon. Juveniles are held in sixteen 5.8 m diameter circular aluminum tanks and fish released directly to the Snake River.

*Captain John Rapids Acclimation Facility*

Located on the Snake River at Pittsburg Landing (Rkm 263) (Figure 2) this facility is the final rearing and acclimation site for 150,000 yearling and 500,000 subyearling fall Chinook salmon. Juveniles are acclimated in a single in-ground 150’X 50’ acclimation pond and released volitionally with any fish remaining by the final release date forced out by draining the pond.

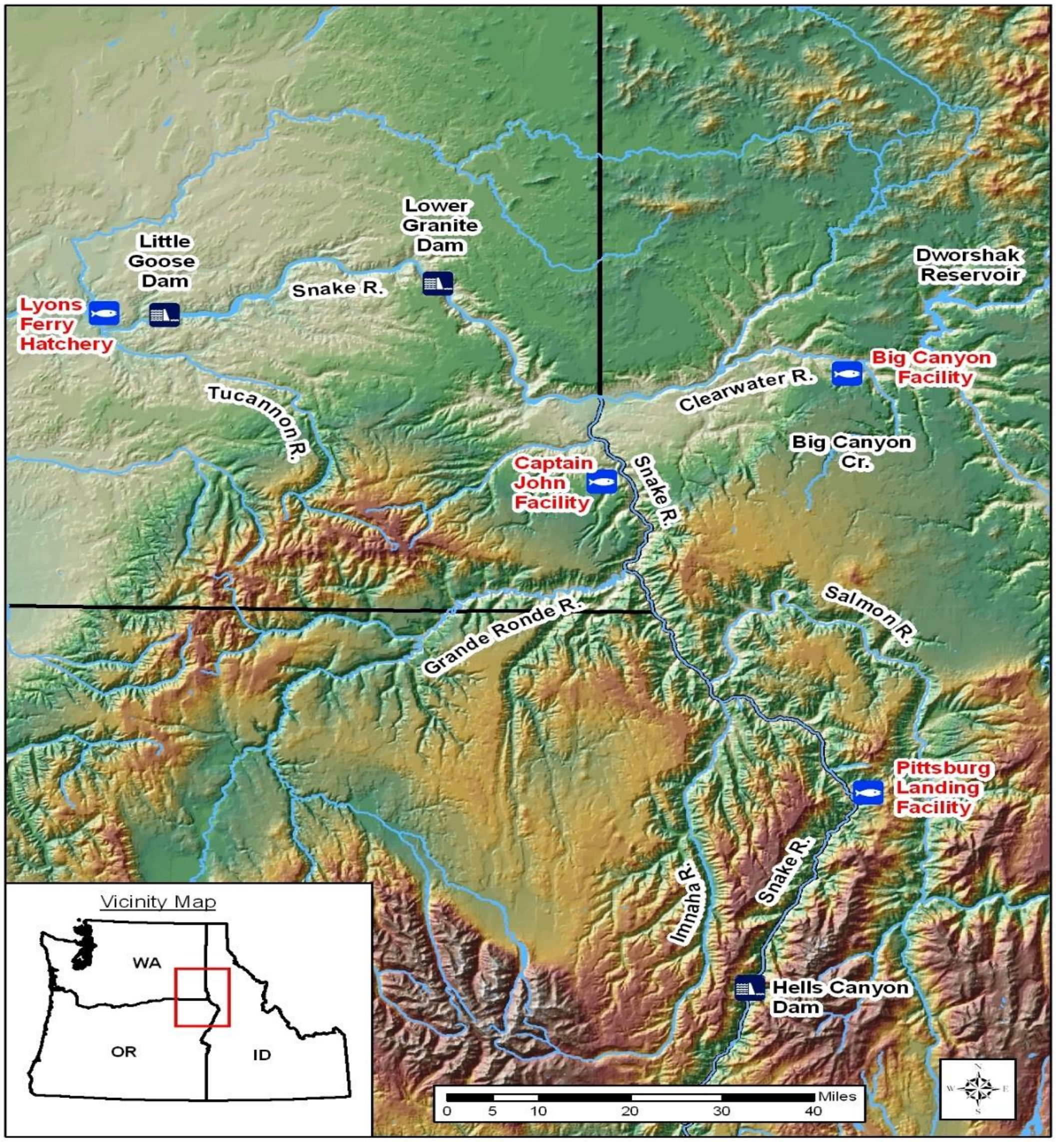


Figure 2. Lyons Ferry Hatchery and Fall Chinook Acclimation Project (FCAP) facilities including Pittsburg Landing and Captain John on the Snake River and Big Canyon on the Clearwater River.

# METHODS

## Supplementation

The Nez Perce Tribe's supplementation program for fall Chinook salmon began in 1996 on the Snake River at Pittsburg Landing and in 1997 on the Clearwater River at Big Canyon Creek with the acclimation and release of Lyons Ferry Hatchery (LFH) fall Chinook salmon yearlings and subyearlings when available. A second acclimation site on the Snake River at Captain John Rapids began releasing fall Chinook in 1998. Fall Chinook release numbers, life stages, associated marks, and results from earlier 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. The first release of subyearlings occurred in 2003 from NPTH. The NPTH fish are differentially coded wire tagged to measure adult returns as compared to the FCAP fall Chinook salmon and to measure adult contributions in ocean and freshwater fisheries. 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 hatchery strays in the carcass recovery section of this report. We also report all fall Chinook salmon contributions in the NPTH spawning summary for 2011.

This was the 15th year for FCAP yearling and subyearling production releases of fall Chinook from FCAP facilities in the Snake River Subbasin. It is also the 8th year for fall Chinook salmon subyearling releases from NPTH into the Clearwater River Subbasin. However, after working out new facility issues, 2009 was the first year where full production of 1.4 million subyearlings was accomplished and slightly exceeded at NPTH and associated acclimation facilities. Release numbers were only slightly less than the goal of 1.4 million in 2010 but release numbers exceeded the release goal in 2011 by 335,906 fish.

## 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 (Arnsberg and Statler 1995). The M&E on fish produced from NPTH facilities began in 2003 (Arnsberg et al. 2007). Fall Chinook salmon spawning surveys began in the mainstem Snake River in 1986. The M&E program on fish produced from FCAP facilities began in 1997. 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. Funding was not available for

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. |

2007 production fish but was for the 2008-2011 releases and results will be included in a separate report forthcoming through the Corps.

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 beach seining and PIT tagging naturally produced fall Chinook salmon and a subsample of all hatchery subyearling release groups. Additionally, we employed a larger seine 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 the fall Chinook run reconstruction analysis. We also monitored and evaluated NPTH spawning composition of hatchery and natural fall Chinook salmon spawned for the 2011 broodyear.

**Performance Measures**

Fish population performance measures (Table 1) address how fish populations are meeting NPTH and FCAP 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 and mainstem freshwater 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 2011 along with constraints that may limit complete evaluation.

**Juvenile Monitoring**

*Life History, Emigration Timing, and Survival Estimates*

During 2011, we beach seined along the lower Clearwater River shoreline areas below the North Fork Clearwater River where most fall Chinook salmon spawning occurred in 2010. We primarily target naturally produced fall Chinook salmon subyearlings in the lower Clearwater River, while secondarily collect any PIT tag recapture information from the FCAP, NPTH and associated acclimation facility hatchery releases. Fall Chinook salmon hatchery yearlings and subyearlings from the 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. 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 are included in the emigration timing and survival analysis, along with the PIT tagged fish that were released from the FCAP, NPTH, and associated acclimation facilities. We PIT tagged fall Chinook salmon juveniles following methods developed by Prentice et al. (1990a, 1990b) and protocols established by the PIT Tag Steering Committee (1992). Subyearling Chinook salmon $\geq$ 60 mm fork length that were not hatchery origin based on an adipose fin clip, coded wire tag, or had the appearance of being an unmarked hatchery fish were PIT tagged with standard length 12 mm tags. These fish were considered natural. Natural fish were generally much smaller at the time of seining with slightly different coloration and more prominent parr marks than hatchery fish. We used 8.5 mm PIT tags for natural 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. After a minimum 10 minute recovery period, we released all Chinook salmon juveniles back to the river where captured.

All FCAP yearling and subyearling releases were PIT tagged at Lyons Ferry Hatchery prior to transfer to associated acclimation sites, while all NPTH subyearlings were PIT tagged at each acclimation site after transfer. PIT tagging was completed using a Wells Cargo gooseneck trailer converted for use with five fresh-flow stainless steel PIT tagging stations. Standard sterile 12 mm PIT tags using BIOMARK's HPT-12 pre-loaded trays and MK-25 rapid implant guns were used on all hatchery PIT tag samples. 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), hatchery fish as 13H (1 = Chinook salmon, 3 = fall run, and H = hatchery rearing type), and recaptures as 15U (1 = Chinook salmon, 5 = unknown run, and U = unknown rearing type).

To investigate emigration timing and survival through the mainstem hydro-system, 2011 project PIT tagging goals for all hatchery fall Chinook salmon subyearling releases from NPTH and FCAP facilities was approximately 3,000 fish at all sites. Additional Juveniles were PIT tagged in 2011 from Luke's Gulch, Cedar Flats and all FCAP acclimation facilities for the large scale

U.S. Army Corps of Engineers (Corps) transportation/spill study. 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 subyearling emigration 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 from NPTH releases with the Auto-Fish Tagging Trailer designed by Northwest Marine Technology and purchased through the Bonneville Power Administration (BPA). Tagging goals for 2011 were to tag each subyearling fall Chinook salmon release group with a unique CWT code (200,000) for adult return evaluations and have a 100,000 CWT/ad-clip group for fishery evaluations (Rocklage and Hesse, 2004). Washington Department of Fish and Wildlife (WDFW) staff coded wire tagged and ad-clipped fish at Lyons Ferry Hatchery prior to transfer for all FCAP yearling and subyearling releases. Tagging goals were accomplished in 2011 for NPTH and FCAP releases. 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.

Length and weight data from PIT tagging were used to calculate condition factor (K) at the time of tagging and from pre-release samples done one day prior to releases (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, and upstream in 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*.

*Genetic Monitoring*

The target goal for genetic analysis was a random 200 non-lethal upper caudal fin clips from natural subyearling Chinook salmon captured by seining on the lower Clearwater River. 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) genetics staff. Analyses determine percent composition of spring/summer or fall Chinook salmon and will build upon baseline fall Chinook salmon genetic profiles.

## Adult Monitoring

*Spawning Ground Surveys*

We used aerial (by helicopter) spawning ground surveys as an index of fall Chinook salmon spawner abundance and distribution. We scheduled 3-4 surveys from the first part of October to the end of November 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 3). As part of the FCAP M&E, we conducted aerial redd surveys on the Grande Ronde River from the mouth up to the highway bridge above Troy, OR (RKm 84.8), on the Imnaha River from the mouth up to the town of Imnaha (19.5 km) (Figure 4), and on the Salmon River from the mouth up to the S.F. Salmon River (RKm 214) (Figure 5). On each survey, we mapped, took photos, documented spawn timing, and recorded the number and distribution of fall Chinook salmon redds. Surveys were conducted from mid-morning to mid-day to take advantage of the best lighting conditions. We also noted general weather conditions, water discharges at USGS gauging stations on the Clearwater River (Spalding and Orofino, ID), S.F. Clearwater River (Harpster, ID), lower Selway River (Lowell, ID), Grande Ronde River (Troy, OR), Imnaha River (Imnaha, OR), and Salmon River (Whitebird, ID). We recorded 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 a summary of Snake River Basin fall Chinook survey results since 1988, the year surveys began in the Clearwater River.

Total fall Chinook salmon redds in the Snake River Basin above Lower Granite Dam (LGD) are reported for 2011 (Arnsberg et al. 2012). We also report the estimated adult escapement above LGD (Young et al. 2013) and calculate the adult/redd number for 2011 and average adults/redd since 1988. Finally, we regressed fall Chinook salmon redds counted in the Snake River Basin above Lower Granite Dam from 1987-2011 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.

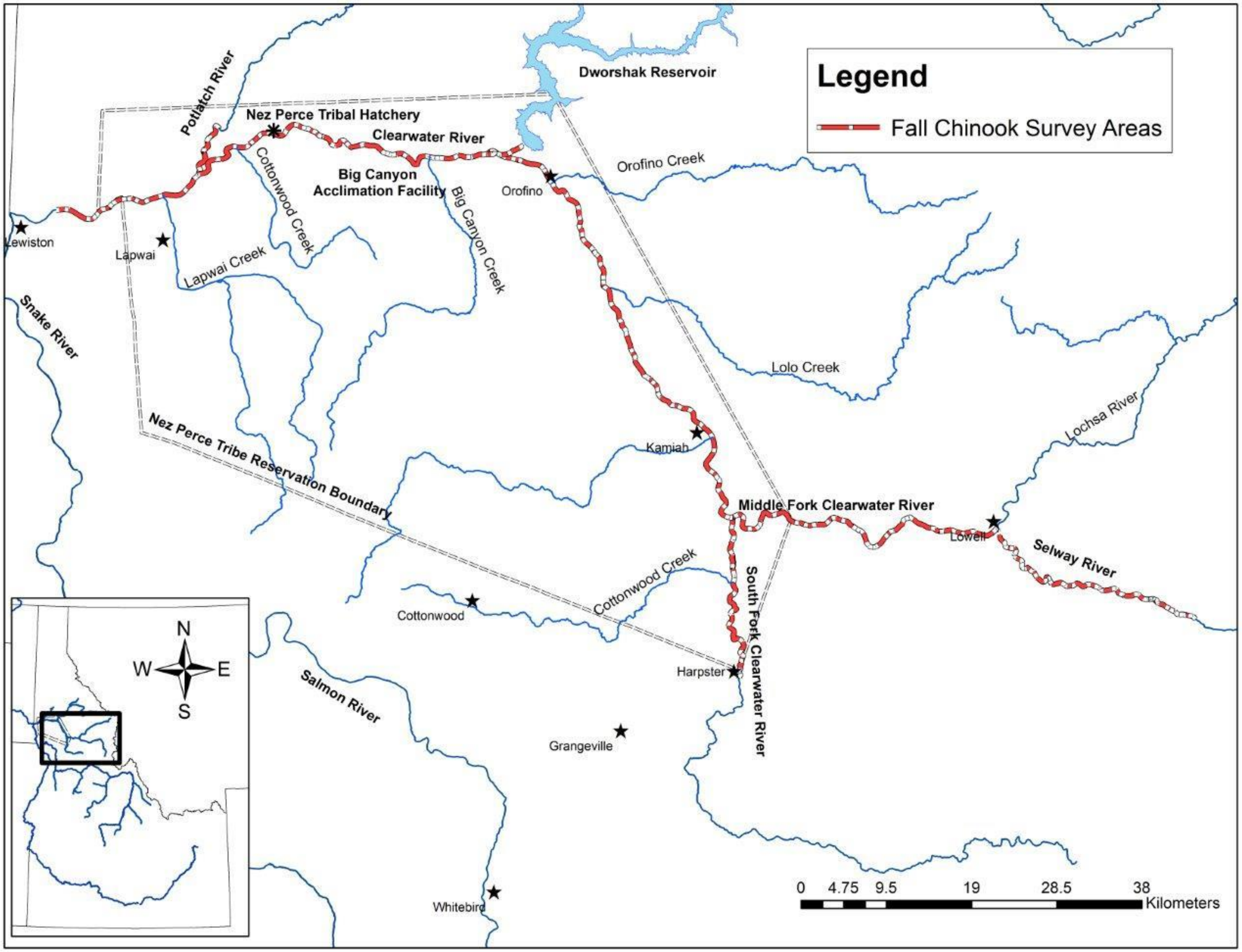


Figure 3. Fall Chinook salmon aerial redd survey areas within the Clearwater River Subbasin conducted by the Nez Perce Tribe.

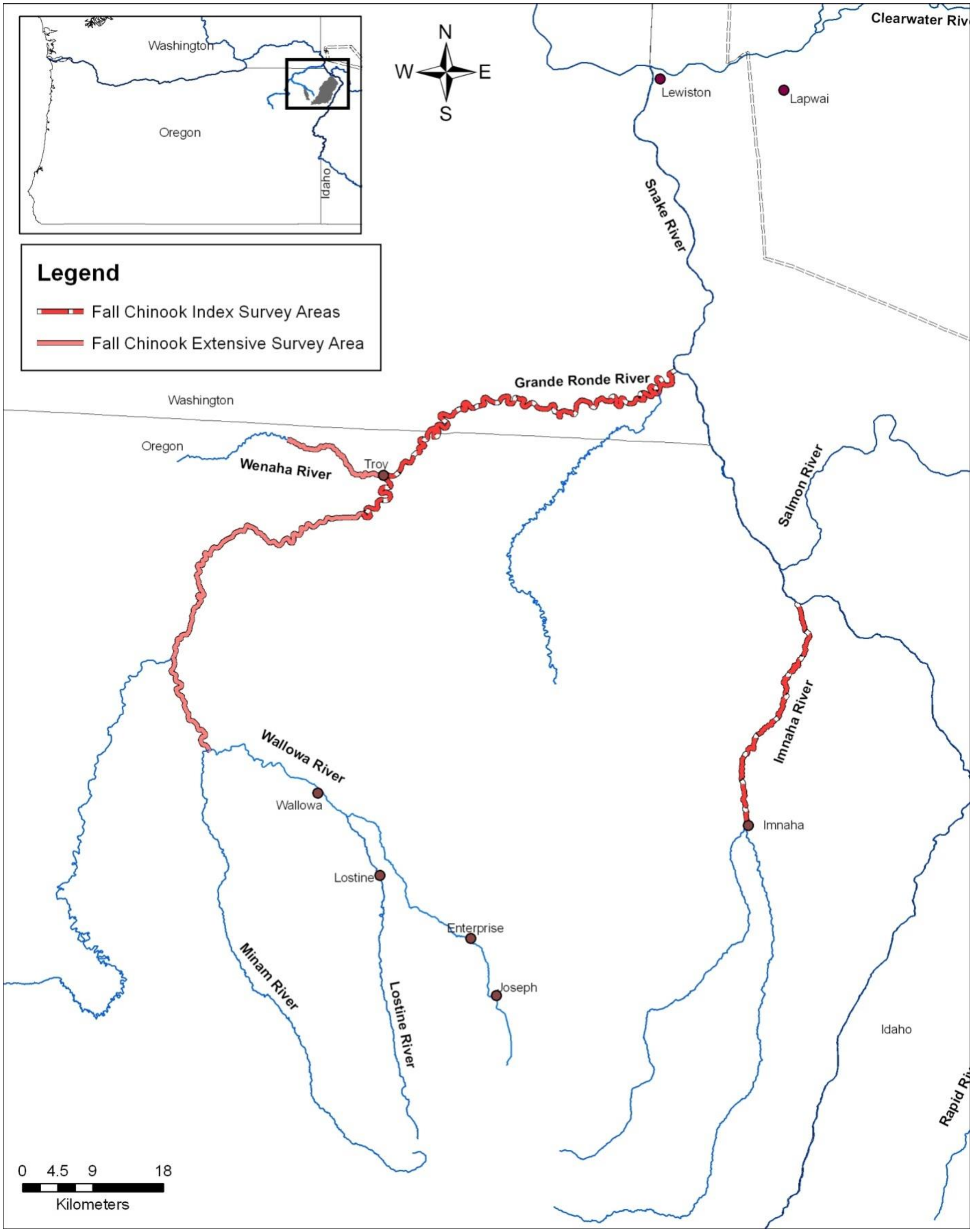


Figure 4. Fall Chinook salmon aerial redd survey areas within the Grande Ronde and Imnaha River subbasins conducted by the Nez Perce Tribe.

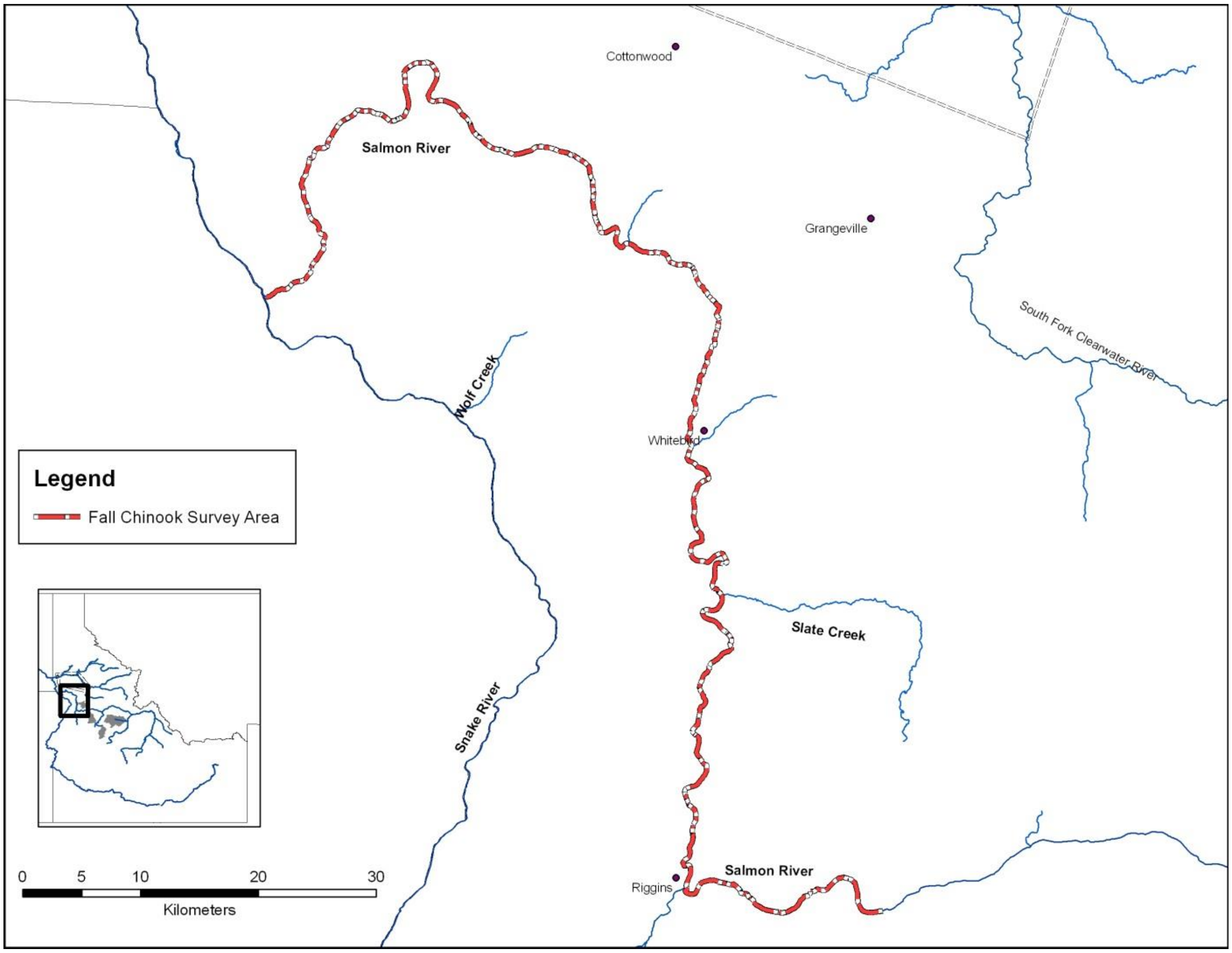


Figure 5. Fall Chinook salmon aerial redd survey areas within the Salmon River conducted by the Nez Perce Tribe.

*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 included members from the *US v Oregon* Technical Advisory Committee (TAC), LFH and NPTH monitoring and evaluation, and NOAA Fisheries. Total 2011 fall Chinook salmon escapement estimates have been completed for natural and hatchery fish to Lower Granite Dam (Young et al. 2013) and are included in this report.

During 2011, fall Chinook salmon carcasses in the Clearwater River were numerous just a few weeks after spawning commenced and were collected below major spawning reaches as time permitted. Biological information collected included fork length, sex composition, percent egg retention, identification of hatchery marks, coded wire tags, PIT tags, and scale samples to determine total age, subyearling or reservoir reared emigration life history, and years spent in the ocean. Scale analysis is no longer a reliable tool to determine hatchery from natural or wild fish and has not been used for that purpose in recent years. Percent natural spawners above Lower Granite Dam is now determined by a hatchery subtraction method through the fall Chinook run reconstruction process (Young et al. 2013).

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 river for nutrient enhancement. 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 returns (SARs) estimates were calculated through yearly fall Chinook run reconstructions to Lower Granite Dam (Young et al. 2013). The most recent years of complete returns of fall Chinook salmon from releases at NPTH, associated acclimation sites, and FCAP sites are summarized. This would include up to age-5 returning adults for the 2006 subyearling and yearling release years. Adult returns are summarized, expanded for trapping rates at Lower Granite Dam, and a total SAR given for each release group. We also include fall Chinook salmon contributions in ocean and freshwater fisheries as reported to the Regional Mark Processing Center (RMPC) and calculate a smolt-to-adult survival (SAS) for each release group.

*Hatchery Spawning*

Before the 2011 fall Chinook salmon run began, the Lower Granite Dam (LGR) trapping rate was set at a 10% sampling rate of the entire run. Water temperatures were favorable for trapping fall Chinook on August 18. NPTH staff began hauling fall Chinook adults from LGR on August 29. Since the trap rate was low, the NPTH opened the adult fish ladder to the mainstem Clearwater River beginning September 27 to insure full broodstock needs were met. The adult fish ladder stayed opened continually until November 2 when enough brood were collected. During 2011, enough fall Chinook salmon adults were collected at NPTH and LFH to meet full production for 2012 releases.

Spawning of volunteer and hauled fall Chinook salmon from Lower Granite Dam occurred weekly from October 18 to November 29 at NPTH for a total of seven spawn days. 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” may be excluded from the broodstock. Scales were taken to determine total age, emigration strategy (i.e. either subyearling, hatchery yearling, or “reservoir reared” life history), and years 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 2011 as part of NOAA's parentage study. Results for the 2011 carcass samples will be in a later comprehensive genetic analysis report.

# RESULTS

## Supplementation

During the 2011 fall Chinook salmon run, gametes were taken from fish hauled from Lower Granite Dam and adult volunteers to the NPTH fish ladder for 2012 subyearling releases. All fall chinook releases were coded wire tagged and adipose fin clipped prior to release as planned, meeting target goals (Table 2). There were a total of 483,340 yearling fall Chinook (from LFH broodyear 2009) released at the three FCAP sites exceeding the release goal by 33,340 fish. Subyearlings released at FCAP facilities also exceeded the release goal of 1.4 million fish by 38,910 fish. At NPTH and associated acclimation sites releases exceeded the goal of 1.4 million by 49,323 fish, plus another 286,587 fish that became a second later release at NPTH. Final CWT retention rates were high on all CWT groups and ranged between 0.993-1.0. The average condition factors (K-factors) were good on all release groups and ranged between 0.97 and 1.12. A grand total of 3,658,156 fall Chinook salmon were released by the Nez Perce Tribe in 2011 (Table 2).

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 Fall Chinook Acclimation Facilities (FCAP) and at Nez Perce Tribal Hatchery (NPTH) on-station and associated acclimation facilities, 2011 (ND = no data).

| Release Site/ Life Stage | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| FCAP Captain Johns Yearlings | 4/1 | 154,586 | 80,830 | 71,407 | 867 | 1,482 | CWT=220314<br>AD/CWT= 220315 | 0.982<br>0.988 | 10.3 | ND | 18,954 |
| FCAP Pittsburg Landing Yearlings | 4/13 | 166,410 | 93,103 | 69,415 | 2,766 | 1,126 | CWT=220313<br>AD/CWT= 220316 | 0.988<br>0.962 | 9.5 | ND | 18,947 |
| FCAP Big Canyon Yearlings | 4/14 | 162,344 | 89,325 | 71,096 | 286 | 1,637 | CWT=220312<br>AD/CWT= 220317 | 0.982<br>0.996 | 9.9 | ND | 18,877 |
| FCAP Captain Johns Subyearlings | 5/22 | 516,480 | 100,986 | 100,967 | 200 | 314,327 | CWT=220120<br>AD/CWT= 220119 | 0.998<br>1.000 | 45.3 | ND | 41,029 |
| FCAP Pittsburg Landing Subyearlings | 5/23 | 413,284 | 100,999 | 100,987 | 201 | 211,097 | CWT=220122<br>AD/CWT= 220121 | 0.998<br>1.000 | 49.0 | ND | 32,855 |
| FCAP Big Canyon Subyearlings | 5/25 | 509,146 | 100,784 | 100,622 | 200 | 307,576 | CWT=220115<br>AD/CWT= 220117 | 0.998<br>1.000 | 51.0 | 1.10 | 40,958 |
| NPTH On-station First Release Subyearlings | 6/7 | 526,761 | 201,980 | 94,893 | 5,523 | 224,365 | CWT=220210<br>AD/CWT= 220209 | 0.992<br>0.945 | 52.5 | 1.01 | 2,980 |
| NPTH Cedar Flats Subyearlings | 6/15 | 205,560 | 103,007 | 96,604 | 5,622 | 323 | CWT=220205<br>AD/CWT= 220206 | 0.997<br>0.945 | 54.5 | 1.07 | 16,400 |
| NPTH Luke's Gulch Subyearlings | 6/14 | 207,482 | 99,115 | 101,688 | 1,315 | 5,364 | CWT=220207<br>AD/CWT= 220208 | 0.949<br>0.987 | 50.2 | 1.12 | 16,449 |
| NPTH North Lapwai Valley Subyearlings | 5/14 | 509,520 | 202,265 | 99,174 | 1,282 | 206,799 | CWT=220203<br>AD/CWT= 220204 | 0.992<br>0.987 | 75.0 | 1.03 | 2,980 |
| NPTH On-station Second Release Subyearlings | 7/6 | 286,587 | 194,586 | 0 | 0 | 92,007 | CWT=220211<br>AD/CWT= 220212 | 0.997<br>0.945 | 93.0 | 0.97 | 2,969 |

## Monitoring and Evaluation

### Juvenile Monitoring

*Life History, Emigration Timing, and Survival Estimates*

We sampled a total of 632 natural fall Chinook salmon subyearlings on the lower Clearwater River of which 631 were large enough to PIT tag (Table 3). Sampling did not start until the week of July 11 due to higher and more prolonged spring flows than observed in previous years. Due to these high flows, only four fall Chinook subyearlings were captured and PIT tagged the week of July 11 (Table 3). Fall Chinook subyearlings averaged 66.6 mm fork length during the second week of sampling and 186 out of 186 fish captured were large enough to PIT tag. During the entire sampling season, 80 (12.7%) juveniles were tagged with the smaller 8.5 mm PIT tags. Flows decreased sharply until Dworshak Dam releases began the first week in July which kept flows relatively on a slow decline until late August and early September when fall Chinook salmon sampling ceased in the Clearwater River. Sampling in the impounded portion of the lower Clearwater River occurred on three separate occasions, resulting in 203 natural fall Chinook salmon subyearlings PIT tagged. The last sampling day was August 25 with two Chinook salmon captured and PIT tagged.

We recaptured 10 natural PIT tagged Chinook salmon and measured growth rates between 0 to 1.0 mm/d with an average of 0.54 mm/d. Average condition factor (K) for the natural fish was 1.10. Average condition factor (K) for the hatchery fish at time of tagging was 1.01, 1.07, 1.12, 1.03 and 0.97 for the NPTH first release, Cedar Flats, Luke's Gulch, NLV and NPTH second release, respectively (Table 2).

Length frequencies for the natural subyearling fall Chinook sampled in the lower Clearwater River during the months of July and August are provided in Figure 6. We did not sampled any subyearlings during July that were 49 mm or less and too small to be PIT tagged with the 8.5 mm tags (Figure 6).

For NPTH and associated releases, the Luke's Gulch and Cedar Flats releases showed the highest number of unique detections at all juvenile detection points below Lower Granite (Table 4), a direct result of an approximately five fold increase in PIT tagged juveniles released from these two sites as compared to the other NPTH releases (Table 6). The Clearwater River natural PIT tag group was detected at 14.1% at all juvenile detection sites below Lower Granite Dam. As in 2010, the CJRAP yearling and subyearling groups showed a higher number of unique detections than the other releases from BCCAP and PLAP (Table 5). Very few NPTH and FCAP PIT tagged fish were first detected as yearlings in 2014, in contrast to 37 (41.6%) Clearwater River naturals (Table 4, Table 5). The NPTH on-station second group, released much later and at a smaller size (Table 2), exhibited the highest number of yearling detections of all the hatchery releases at 32 (4.71%) (Table 4).

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, 2011.

| Week of | Clearwater River Avg. Weekly Temps.[1] (⁰C) | Clearwater River Avg. Weekly Flows[1] (cms) | Dworshak Dam Spill (%) | Total Number Captured | Number PIT Tagged | Weekly Average Fork Lth. (mm) | Weekly Average Condition Factor (K) |
|---|---|---|---|---|---|---|---|
| July 11 | 12.6 | 882.0 | 23.6 | 4 | 4 | 75.0 | 1.06 |
| July 18 | 13.5 | 728.9 | 31.9 | 186 | 186 | 66.6 | 1.14 |
| July 25 | 13.5 | 584.4 | 31.2 | 229 | 228 | 70.1 | 1.11 |
| August 1 | 13.5 | 521.9 | 30.2 | 89 | 89 | 68.6 | 1.11 |
| August 8 | 11.9 | 473.2 | 25.5 | 47 | 47 | 75.8 | 1.11 |
| August 15 | 12.0 | 452.0 | 27.1 | 61 | 61 | 76.3 | 1.12 |
| August 22 | 12.1 | 450.2 | 28.0 | 16 | 16 | 78.8 | 1.08 |
| Totals | | | | 632 | 631 | | |

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

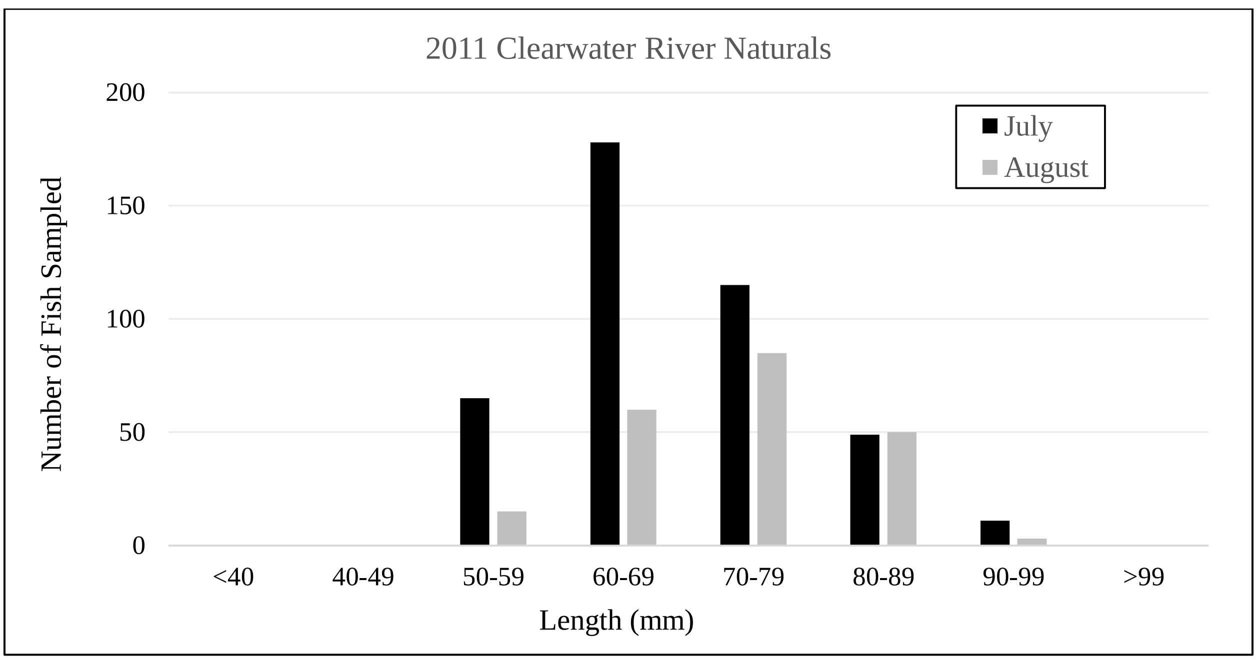


Figure 6. Length frequencies of natural fall Chinook salmon sampled in the lower Clearwater River, 2011.

Table 4. Unique PIT tag detections at all hydrosytem juvenile detection facilities from passive integrated transponder (PIT) tagged releases of fall Chinook salmon subyearlings (0+) in the lower Clearwater River, Nez Perce Tribal Hatchery (NPTH) and associated acclimation facilities, 2011.

| Release Site | Brood Year | Release Strategy | Unique PIT Tag Detections | Detected in Migratory Year 2011 | Detected as Holdovers In 2012 |
|---|---|---|---|---|---|
| Clearwater Naturals | 2010 | 0+ | 89 | 52 (58.4%) | 37 (41.6%) |
| NPTH On-Station First release | 2010 | 0+ | 1,494 | 1,494 (100%) | 0 (0.00%) |
| Cedar Flats | 2010 | 0+ | 9,675 | 9,671 (100%) | 4 (0.00%) |
| Luke's Gulch | 2010 | 0+ | 9,735 | 9,733 (100%) | 2 (0.00%) |
| North Lapwai Valley | 2010 | 0+ | 1,416 | 1,416 (100%) | 0 (0%) |
| NPTH On-Station Second Release | 2010 | 0+ | 680 | 648 (95.3%) | 32 (4.71%) |

Table 5. Unique PIT tag detections at all hydrosytem juvenile detection facilities from passive integrated transponder (PIT) tagged releases of hatchery fall Chinook salmon yearlings (1+) and subyearlings (0+) from the Fall Chinook Acclimation Project (FCAP) in the lower Clearwater River at the Big Canyon Acclimation facility (BCCAP) and on the Snake River at the Pittsburg Landing (PLAP) and Captain John Rapids (CJRAP) acclimation facilities, 2011.

| Release Site | Brood Year | Release Strategy | Unique PIT Tag Detections | Detected in Migratory Year 2011 | Detected as Holdovers In 2012 |
|---|---|---|---|---|---|
| BCCAP | 2009 | 1+ | 12,787 | 12,786 (100%) | 1 (0.00%) |
| | 2010 | 0+ | 21,822 | 21,821 (100%) | 1 (0.00%) |
| PLAP | 2009 | 1+ | 13,742 | 13,742 (100%) | 0 (0.00%) |
| | 2010 | 0+ | 18,709 | 18,709 (100%) | 0 (0.00%) |
| CJRAP | 2009 | 1+ | 14,188 | 14,188 (100%) | 0 (0.00%) |
| | 2010 | 0+ | 23,877 | 23,877 (100%) | 0 (0.00%) |

Table 6. 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, 2011 (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 | 631 | 0.14 [0.10 - 0.19] | -----[a] |
| NPTH On-Station First release | 2,980 | 0.81 [0.75 - 0.88] | 0.79 [0.65 - 0.93] |
| Cedar Flats | 16,400 | 0.88 [0.86 - 0.91] | 0.75 [0.67– 0.83] |
| Luke's Gulch | 16,444 | 0.88 [0.85 - 0.91] | 0.78 [0.70 - 0.86] |
| North Lapwai Valley (NLV) | 2,980 | 0.84 [0.77 - 0.92] | 0.60 [0.47 - 0.62] |
| NPTH On-Station Second Release | 2,969 | 0.41 [0.36 - 0.48] | 0.24 [0.17 - 0.24] |

[a]Insufficient downstream detections to calculate survival.

Estimated index survival of PIT tagged natural subyearling fall Chinook salmon from the Clearwater River to Lower Granite Dam was 14%, but could not be calculate to McNary Dam (Table 6). Index survival includes subyearlings that were detected up until December 15, or when the detection facility at Lower Granite was shut down, and does not include "holdovers" or those fish that overwintered and migrated as yearlings. Estimated index survival for hatchery production releases from NPTH and FCAP releases are shown in Table 6 and Table 7, respectively. Survivals from all release sites to Lower Granite Dam were high for all subyearlings groups except the second NPTH on-station release at 41% (Table 6).

Total detections represents the total number of PIT tags detected at each dam and not necessarily unique detections. The juvenile detection facilities with the most detections continue to be Lower Granite, Little Goose, and McNary dams. Total detections were also used to establish mean migration rates to these three detection points for natural subyearlings from the lower Clearwater River and hatchery releases from the NPTH and FCAP acclimation facilities in 2011 (Figure 7, Figure 8, Figure 9). As in previous years, the acclimated releases from Luke's Gulch and Cedar Flats migrated at a faster rate than the other NPTH releases, while the natural fall Chinook from the Clearwater River migrated much slower on average to Lower Granite Dam (Figure 7). The yearling and subyearling releases from the PLAP facility migrated at a faster rate to Lower Granite Dam than the other FCAP releases (Figure 8, Figure 9). Most PIT tag release groups had adequate detections during 2011 to derive an index of the 10th, 50th, and 90th percentile arrival dates to Lower Granite Dam (Table 8, Table 9). The 90$^{th}$ Percentile arrival date to Lower Granite Dam for the 2011 natural fall Chinook released in the Clearwater River did not occur until the following spring on April 4, 2012 (Table 8). Cumulative arrival timing for all natural and hatchery releases are shown in Figure 10.

Table 7. Estimated index survivals (using SURPH) with 95% confidence intervals (CI's) from passive integrated transponder (PIT) tagged releases of hatchery fall Chinook salmon yearlings (1+) and subyearlings (0+) from the Fall Chinook Acclimation Project (FCAP) in the lower Clearwater River at the Big Canyon Acclimation facility (BCCAP) and on the Snake River at the Pittsburg Landing (PLAP) and Captain John Rapids (CJRAP) acclimation facilities to Lower Granite and McNary dams, 2011 (LGR = Lower Granite Dam, MCN = McNary Dam, CI = confidence interval at the 95% level).

| Release Site | Release Strategy | Release Pit Tag Number | Index Survival to LGR (95% CI's) | Index Survival to MCN (95% CI's) |
|---|---|---|---|---|
| BCCAP | 1+ | 18,877 | 0.92 [0.90 - 0.94] | 0.69 [0.65 - 0.72] |
| | 0+ | 40,958 | 0.86 [0.84 - 0.89] | 0.72 [0.66 - 0.77] |
| PLAP | 1+ | 18,947 | 0.93 [0.91 - 0.94] | 0.78 [0.73– 0.83] |
| | 0+ | 32,855 | 0.92 [0.90 - 0.95] | 0.82 [0.78 - 0.88] |
| CJRAP | 1+ | 18,954 | 0.93 [0.92 - 0.95] | 0.73 [0.69 - 0.75] |
| | 0+ | 41,029 | 0.91 [0.89 - 0.93] | 0.83 [0.76 - 0.84] |

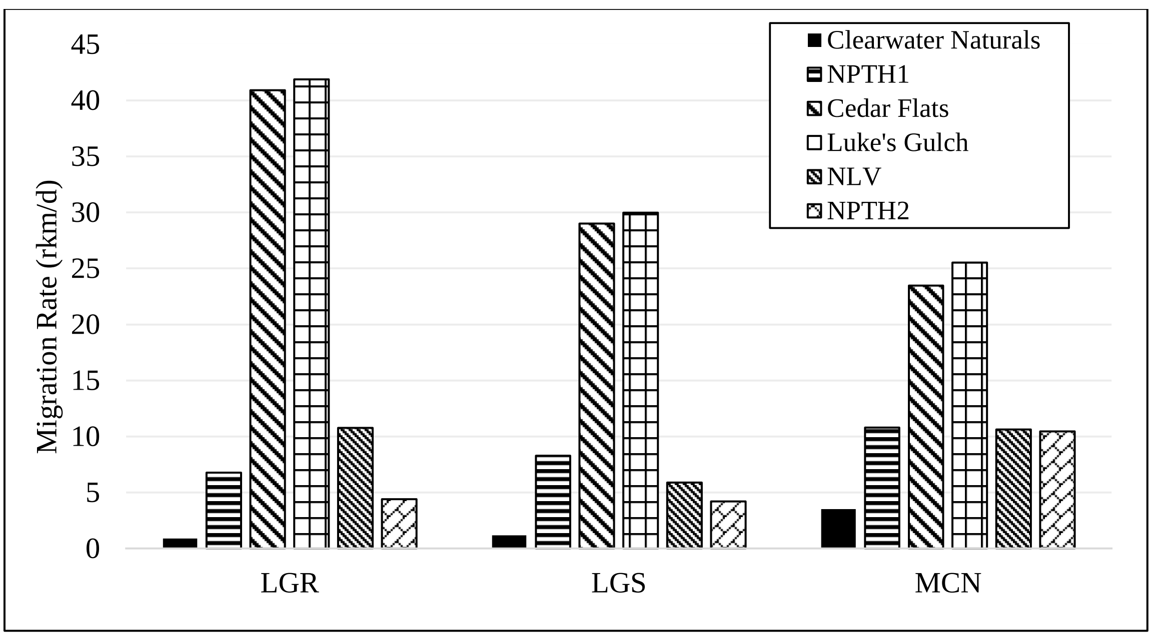


Figure 7. Total detection mean migration rate to selected Snake and Columbia River dams of passive integrated transponder (PIT) tagged Clearwater River natural fall Chinook salmon subyearlings, Nez Perce Tribal Hatchery (NPTH) on-station releases, and acclimated releases at Cedar Flats, Luke's Gulch, and North Lapwai Valley (NLV) 2011 (LGR = Lower Granite Dam, LGS = Little Goose Dam, MCN = McNary Dam.

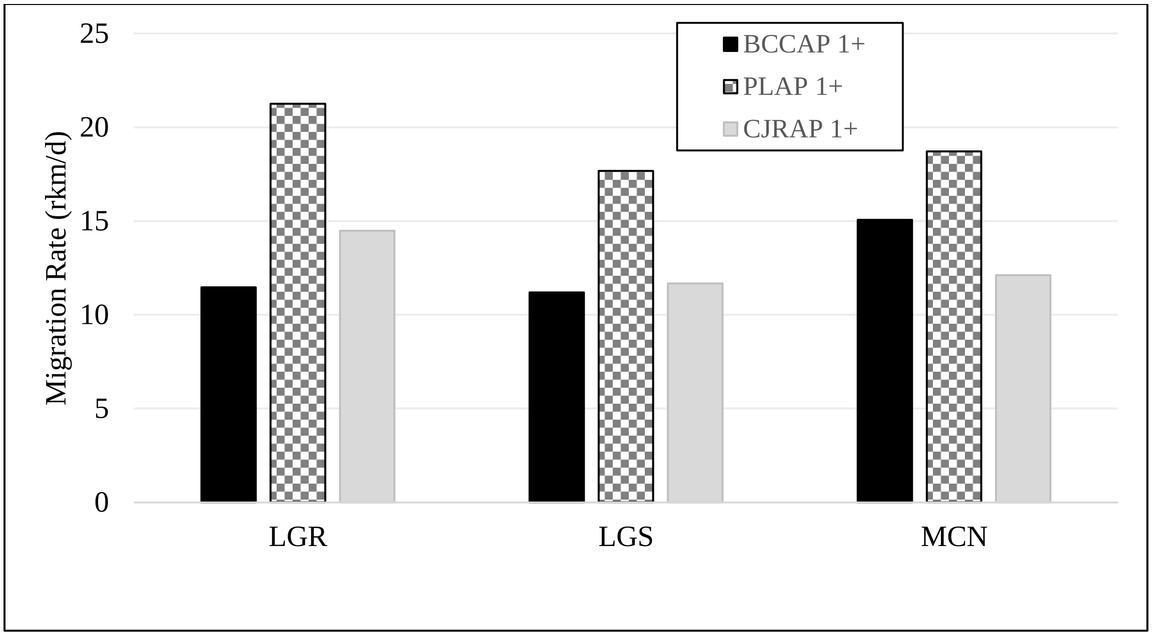


Figure 8. Total detection mean migration rate to selected Snake and Columbia River dams of passive integrated transponder (PIT) tagged releases of hatchery fall Chinook salmon yearlings (1+) from the Fall Chinook Acclimation Project (FCAP) in the lower Clearwater River at the Big Canyon Acclimation facility (BCCAP) and on the Snake River at the Captain John Rapid (CJRAP) and Pittsburg Landing (PLAP) acclimation facilities, 2011 (LGR = Lower Granite Dam, LGS = Little Goose Dam, MCN = McNary Dam).

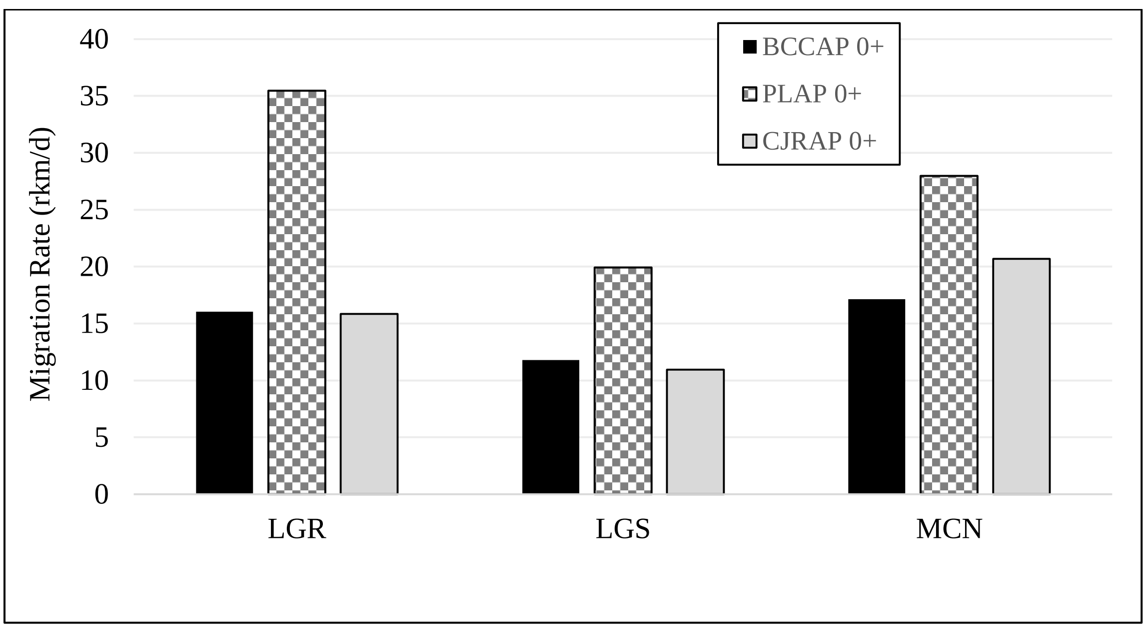


Figure 9. Total detection mean migration rate to selected Snake and Columbia River dams of passive integrated transponder (PIT) tagged releases of hatchery fall Chinook salmon subyearlings (0+) from the Fall Chinook Acclimation Project (FCAP) in the lower Clearwater River at the Big Canyon Acclimation facility (BCCAP) and on the Snake River at the Captain John Rapid (CJRAP) and Pittsburg Landing (PLAP) acclimation facilities, 2011 (LGR = Lower Granite Dam, LGS = Little Goose Dam, MCN = McNary Dam).

Table 8. Total detections for the 10th, 50th, and 90th percentile arrival timing to Lower Granite Dam 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 2011.

| Release Group | Release Strategy | Release Date | Lower Granite Dam (LGR) PIT Tag Detections | % Arrival Timing to LGR | | |
|---|---|---|---|---|---|---|
| | | | *n* | 10% | 50% | 90% |
| Clearwater River Naturals | 0+ | 7/13 – 8/25 | 55 | 9/14 | 11/11 | 4/4/12 |
| NPTH On-Station First Release | 0+ | 6/7 | 515 | 6/15 | 6/21 | 7/12 |
| Cedar Flats | 0+ | 6/15 | 3,648 | 6/18 | 6/21 | 7/5 |
| Luke's Gulch | 0+ | 6/14 | 3,511 | 6/17 | 6/19 | 6/26 |
| North Lapwai Valley (NLV) | 0+ | 5/14 | 462 | 5/17 | 5/24 | 6/15 |
| NPTH On-Station Second Release | 0+ | 7/6 | 246 | 7/15 | 7/31 | 10/18 |

Table 9. Total detections for the 10th, 50th, and 90th percentile arrival timing from passive integrated transponder (PIT) tagged releases of hatchery fall Chinook salmon yearlings (1+) and subyearlings (0+) from the Fall Chinook Acclimation Project (FCAP) in the lower Clearwater River at the Big Canyon Acclimation facility (BCCAP) and on the Snake River at the Pittsburg Landing (PLAP) and Captain John Rapid (CJRAP) acclimation facilities to Lower Granite Dam 2011.

| Release Group | Release Strategy | Release Date | Lower Granite Dam (LGR) PIT Tag Detections | % Arrival Timing to LGR | | |
|---|---|---|---|---|---|---|
| | | | *n* | 10% | 50% | 90% |
| CJRAP | 1+ | 4/1 | 6,414 | 4/4 | 4/10 | 4/29 |
| PLAP | 1+ | 4/13 | 6,541 | 4/17 | 4/23 | 5/3 |
| BCCAP | 1+ | 4/14 | 5,598 | 4/19 | 4/27 | 5/8 |
| | | | | | | |
| CJRAP | 0+ | 5/22 | 7,352 | 5/25 | 5/29 | 6/6 |
| PLAP | 0+ | 5/23 | 5,268 | 5/26 | 5/29 | 6/3 |
| BCCAP | 0+ | 5/25 | 6,270 | 5/28 | 6/3 | 6/17 |

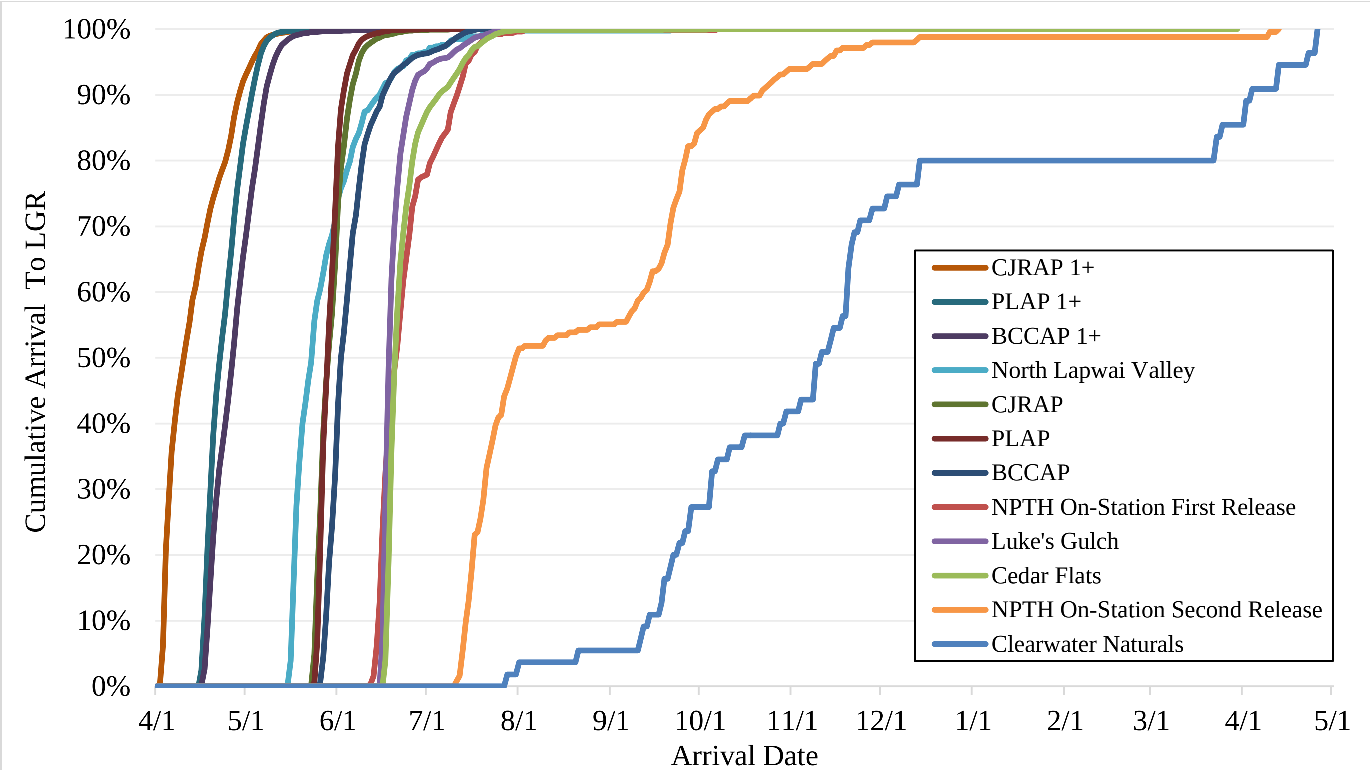


Figure 10. Cumulative arrival timing of Clearwater River natural and hatchery releases from the NPTH and FCAP acclimation facilities to Lower Granite Dam 2011.

*Temperature and Flow*

All fall Chinook subyearling releases from NPTH facilities were made prior to warm (>16 °C) summer water temperatures. The releases of FCAP yearlings occurred in April and the FCAP subyearlings were released in May while temperature were still cool in the Clearwater and Snake rivers. The CJRAP yearling release was made two weeks earlier than the BCCAP and PLAP yearling releases due to an earlier acclimation schedule. The subyearling releases from NPTH facilities occurred approximately mid-June, except for the NLV acclimated group which was released a month earlier on May 14 and the second NPTH on-station release which occurred later on July 6. Temperatures in the upper Clearwater River Subbasin exceeded 20 °C throughout much of July and early August with the lower Clearwater varying between a much cooler 11-13 °C during the period of cold water releases from Dworshak Reservoir. Most detections at Lower Granite Dam for all FCAP, NPTH and associated acclimated releases occurred before temperatures exceeded 20 °C in the Snake River (Figure 11). Cold water releases from Dworshak Reservoir moderated warm Snake River temperatures by 2-3 °C keeping water temperatures near 20 °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 and at Lower Granite Dam were near or exceeded 20 °C (Figure 11).

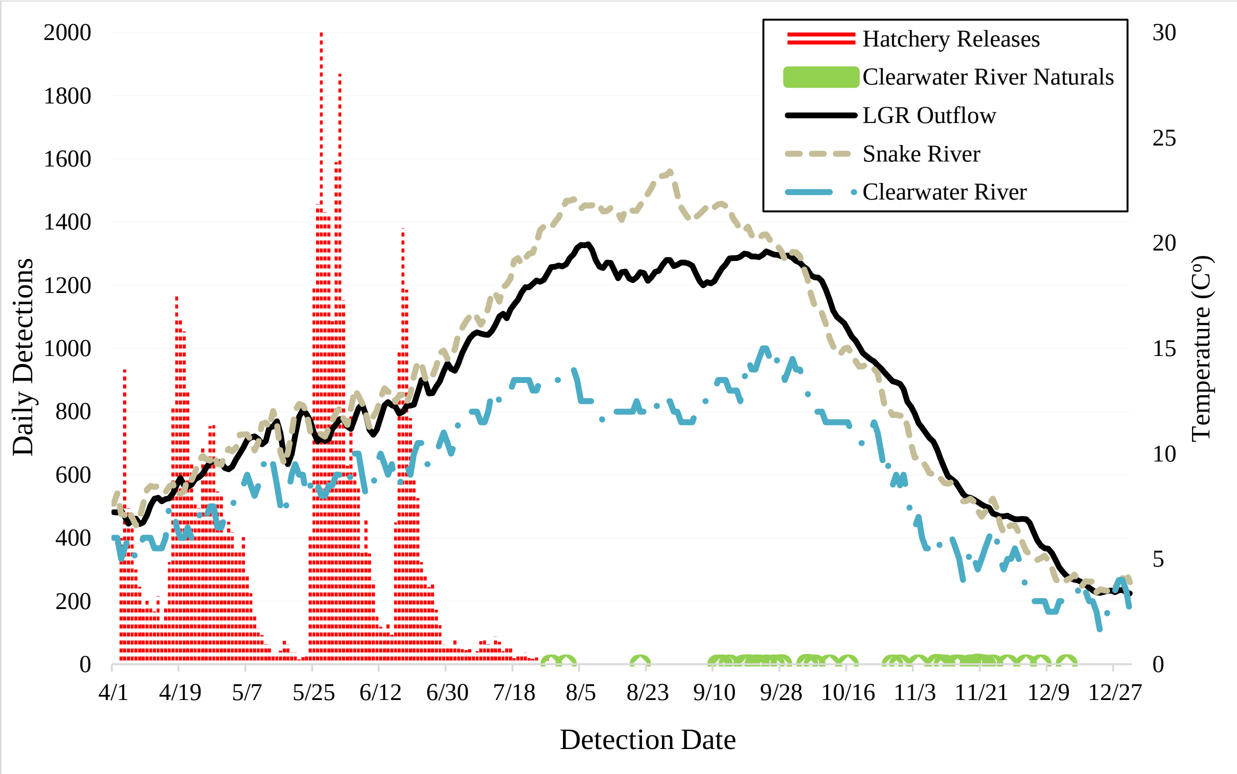


Figure 11. Passive integrated transponder (PIT) fall Chinook detections of Clearwater River naturals and combined detections from the Nez Perce Tribal Hatchery, Cedar Flats, Luke's Gulch, North Lapwai Valley, and FCAP facilities at Lower Granite Dam in relation to mean daily temperatures recorded in the Clearwater River (USGS Spalding gauge), Snake River (USGS Anatone gauge) and at Lower Granite Dam (LGR), 2011.

Natural subyearling detections increased at Lower Granite Dam during the second week of September, with the most detections occurring at the facility from mid-October to mid-November when temperatures at Lower Granite Dam dropped to approximately 15 °C and below (Figure 11). While the subyearling release from NLV occurred prior to peak spring flows on the lower Clearwater River, the first on-station release from NPTH occurred at peak flow (Figure 12). The releases from Luke's Gulch, Cedar Flats, the second on-station NPTH group and the natural fall Chinook groups were made after peak spring flows (Figure 12). All FCAP yearling and subyearling releases were made prior to the peak spring flows on the Clearwater and Snake rivers (Figure 13). While these releases were made during higher spring flows, sampling Clearwater natural fall Chinook could not begin until the Clearwater flows were below 800 cubic meters per second (cms) and dropping (Figure 12). First PIT tag detections at Lower Granite Dam (LGR) in relation to mean daily flows and spill recorded at LGR of the Clearwater naturals and all combined hatchery fall Chinook releases from NPTH and associated acclimation facilities are shown in Figure 14. Most hatchery detections occurred during the spill period at Lower Granite (Figure 14). In contrast, very few of the PIT tagged natural fish experienced summer spill as most detections occurred later in the fall (Figure 14).

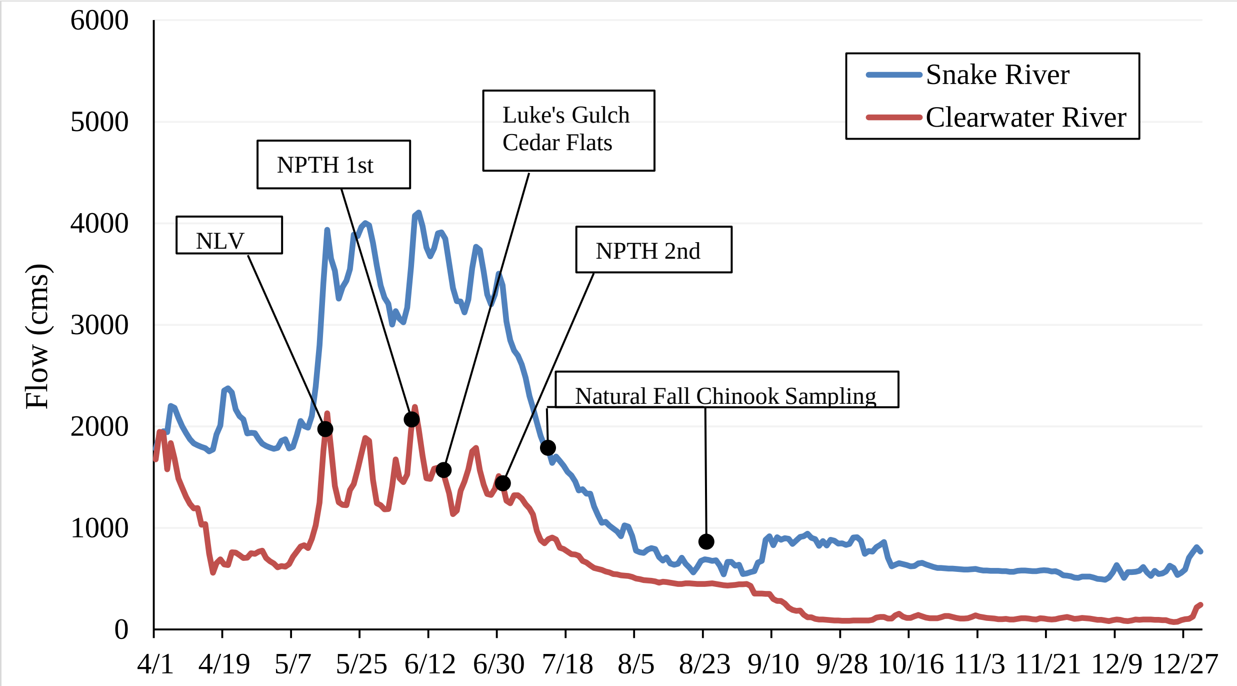


Figure 12. Mean daily flows recorded in the Clearwater River Subbasin, timing of natural fall Chinook sampling on the Clearwater River and hatchery releases from Nez Perce Tribal Hatchery (NPTH), Cedar Flats, Luke's Gulch, and North Lapwai Valley (NLV), 2011.

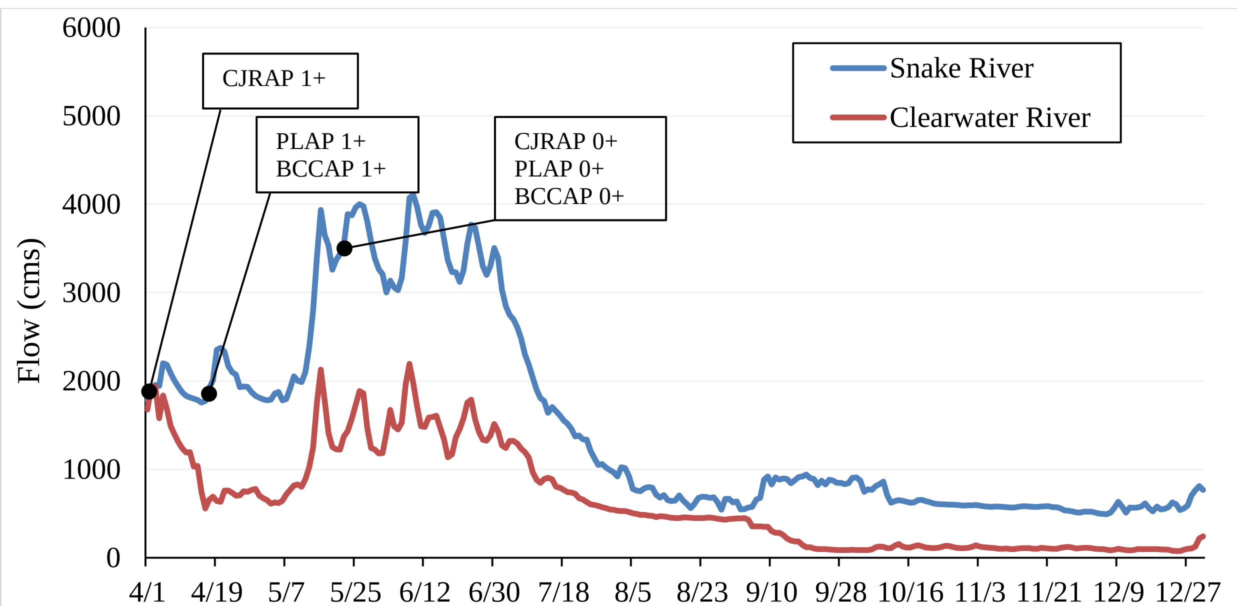


Figure 13. Release timing of hatchery fall Chinook salmon yearlings (1+) and subyearlings (0+) from the Fall Chinook Acclimation Project (FCAP) in the lower Clearwater River at the Big Canyon Acclimation facility (BCCAP) and on the Snake River at the Pittsburg Landing (PLAP) and Captain John Rapid (CJRAP) acclimation facilities in relation to mean daily flows recorded in the Clearwater River (USGS Spalding gauge) and the Snake River (USGS Anatone gauge), 2011.

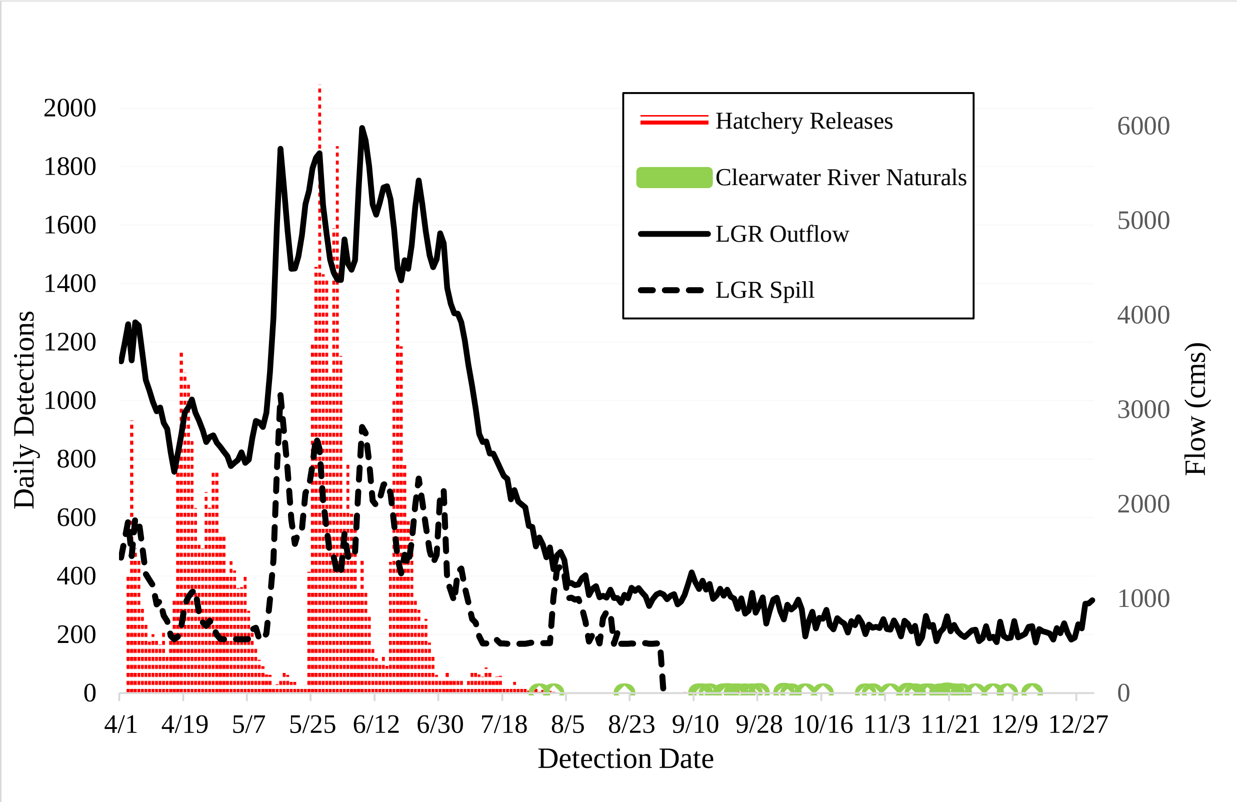


Figure 14. Passive integrated transponder (PIT) fall Chinook detections of Clearwater River naturals and combined detections from the Nez Perce Tribal Hatchery, Cedar Flats, Luke's Gulch, North Lapwai Valley, and FCAP facilities at Lower Granite Dam (LGR) in relation to mean daily flows and spill recorded at the dam, 2011.

### *Genetic Monitoring*

We collected a random non-lethal subsample (upper caudal fin clips) from 119 natural subyearling Chinook salmon captured on the Clearwater River during 2011. 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 2011 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 1,574 fall Chinook salmon redds in the Clearwater River and three redds in the N.F. Clearwater River during four surveys in 2011 (Arnsberg et al. 2012; Appendix A). There were 533 redds observed during the first survey on October 17 in the lower Clearwater, 427 new redds observed on October 31, 434 new redds on November 21, and 163 new redds observed on November 28. Potlatch River was surveyed on the same dates as the lower Clearwater from the mouth upstream about five miles with two redds observed on the third survey and none observed on the first, second and last surveys. Spawning was near completion by 28 November on the Clearwater with only a few live fish observed. Survey conditions were only fair on the first and second lower Clearwater survey because of higher than normal winds on the first survey and low light conditions on the second survey. Survey conditions were good on the last lower Clearwater survey with some deep water areas not clearly visible for counting redds, so a few redds were likely missed. During the spawning period, discharges from Dworshak Reservoir remained relatively stable at 1,500-1,600 cfs during surveys. Flows on the lower Clearwater (USGS Gauging Station at Spalding, ID) remained relatively low during surveys and dropped to 3,740 cfs on last survey after the peak survey flow of only 5,020 on 2 November.

Three surveys were conducted on the S.F. Clearwater, M.F. Clearwater and Selway rivers on October 19, November 2 and November 28. A count of 12, 16, and 3 redds were observed on those dates, respectively, in the S.F. Clearwater for a total of 31 redds. A total of 3 redds were observed in the M.F. Clearwater River and a total of 8 redds observed in the Selway River. This is the highest redd count in all three upper Clearwater tributaries since we began surveys in the S.F. Clearwater during 1992 and in the M.F. Clearwater and Selway during 1994. Good to excellent conditions prevailed on all surveys upstream of the N.F. Clearwater confluence and also in the M.F. Clearwater, S.F. Clearwater and Selway rivers. There were a total of 1,621 redds observed in the entire Clearwater River Subbasin (Figure 10).

A total of three aerial surveys conducted by NPT staff on the Grande Ronde River resulted in a total of 154 redds observed (Figure 16). Surveys on October 18, November 9, and November 29 resulted in 13, 109, and 32 new redds counted, respectively. Redds were seen in 41 distinct spawning locations. Survey conditions were good to excellent on the first two surveys and fair during the last survey, therefore a few deep water redds may have been missed. Flows fluctuated only slightly between 790 and 939 cfs (USGS Gauging station at Troy, OR). Since 2004, the mean number of redds occurring in the Grande Ronde River Subbasin has been 140, ranging from 41 to 263. The lowest redd count for the Grande Ronde River, since intensive surveys began, was zero in 1989 and 1991, while the highest count was 263 in 2010.

A total of three aerial surveys conducted by NPT staff on the Imnaha River resulted in a total of 24 redds observed (Figure 16). Surveys on October 18 and November 22 resulted in 11 and 13 new redds counted, respectively. A scheduled survey on 9 November was not conducted because of helicopter mechanical problems after surveying the Grande Ronde that day. Flows during surveys were stable from 176 to 182 cfs. Survey conditions were excellent on the first survey and only fair on the last survey, so a few redds may have been missed. Since 2004, the mean number of redds occurring in the Imnaha River has been 48, ranging from 17 to 132. The lowest redd count for the Imnaha River, since intensive surveys began was zero redds in 1994, while the highest count was 132 in 2010.

Two aerial surveys conducted by NPT staff on the Salmon River resulted in a total of 60 redds observed (Figure 11). A survey on November 2 resulted in 38 redds counted with another 22 new redds counted on November 29. An additional survey was conducted on the Salmon River from French Creek up to the S.F. Salmon River (Rm 134) and on the S.F. Salmon from the mouth up to the Reed Ranch (Rm 49). No additional redds were observed in this extended area search. Flows were moderate during surveys beginning at 5,440 cfs on the first survey and declining to 4,680 cfs on the last survey. Survey conditions were excellent on both surveys

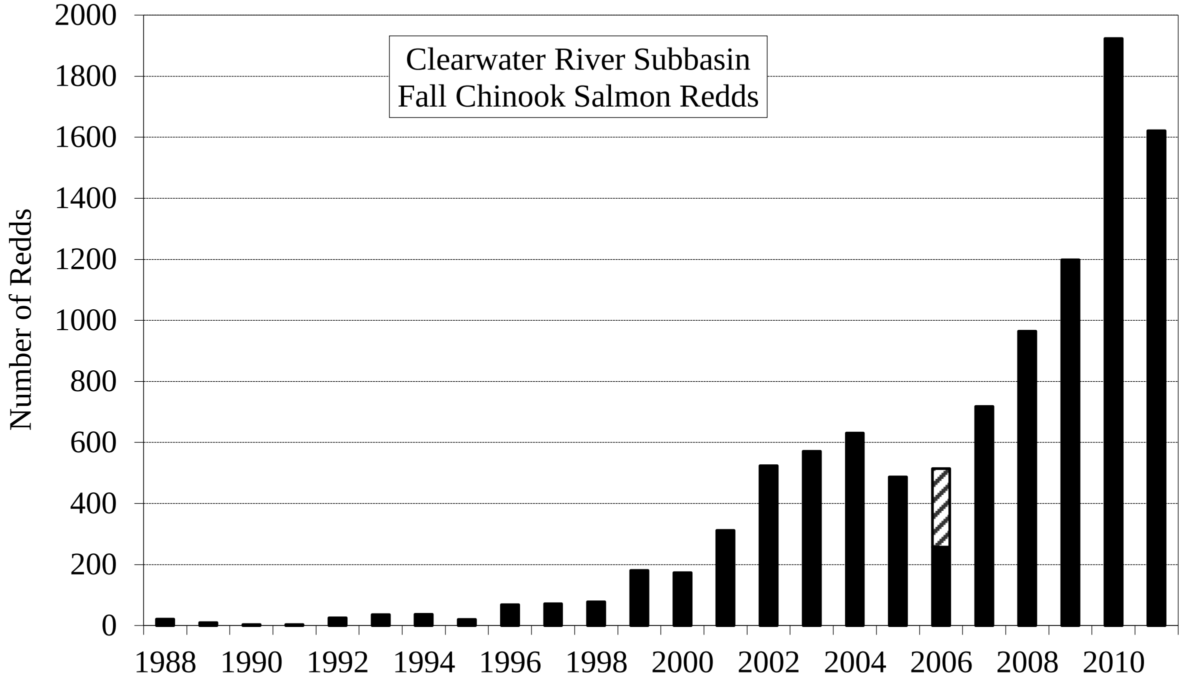


Figure 10. Fall Chinook salmon redds counted in the Clearwater River Subbasin, 1988-2011 (cross hatch in 2006 indicates an estimated redd number missed due to turbid water conditions and incomplete surveys).

resulting in deeper spawning habitat being visible for counting redds. Since 2004, the mean number of redds occurring in the Salmon River has been 24, ranging between 8 and 60. The lowest redd count for the Salmon River, since intensive surveys began in 1992, was zero redds in both 1999 and 2000, while the highest count was 60 in 2011.

There were a total of 4,708 fall Chinook salmon redds counted in the Snake River Basin above Lower Granite Dam, 302 redds estimated below Little Goose Dam in the Tucannon River, and 10 redds counted just below Lower Monumental Dam tailrace for a grand total of 5,010 fall Chinook redds in the Snake River Basin during 2011 (Arnsberg et al. 2012). The 2011 fall Chinook redd count represents the second highest count in the Snake River Basin since surveys began in 1988 (Figure 11). The preliminary adult escapement above Lower Granite Dam in 2011 was estimated to be 27,714 adults (Young et al. 2013). The adult-to-redd ratio above Lower Granite Dam was calculated to be 5.0 adults/redd in 2011 with an average of 5.9 adults/redd averaged across all years since 1988 (Figure 12). Redd counts continue to show a high correlation ($R^2$ = 0.928) with yearly escapement estimates over Lower Granite Dam (Figure 17). Using the adult/redd number of 5.0 in 2011, the estimated adult escapement to the Clearwater River Subbasin was approximately 8,105 adults (1-ocean fish or jacks not included).

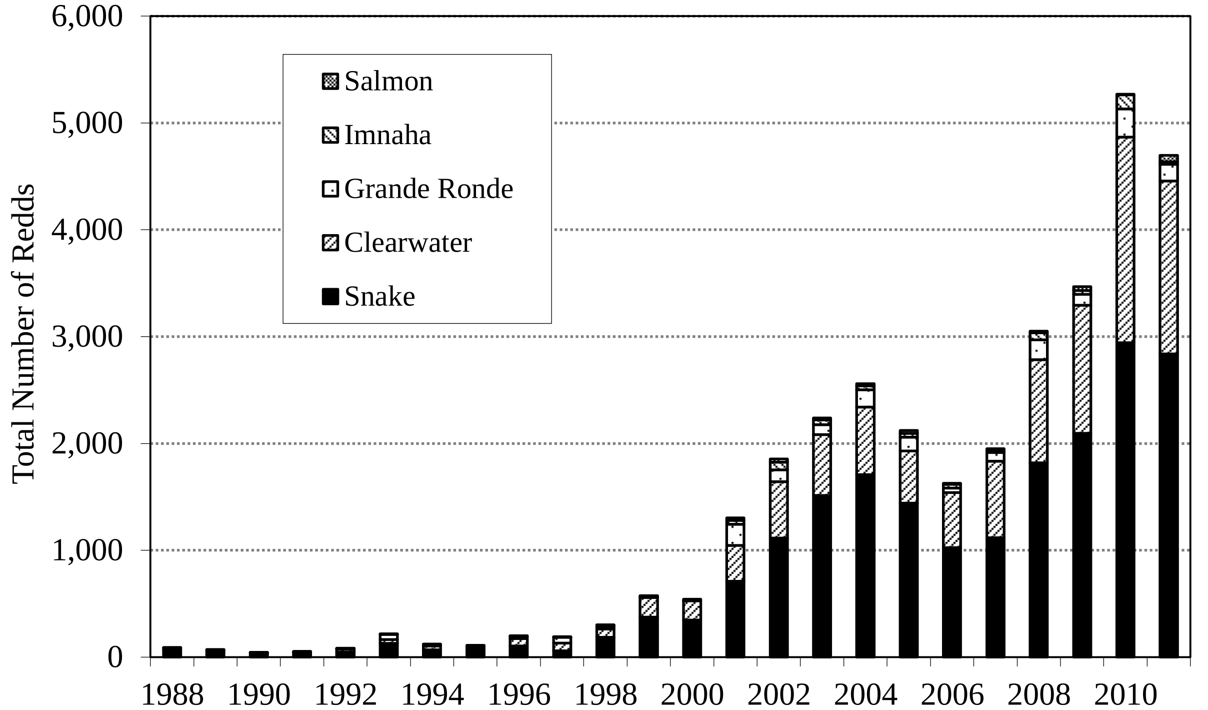


Figure 11. Fall Chinook salmon redds counted in the Snake River Basin above Lower Granite Dam, 1988-2011.

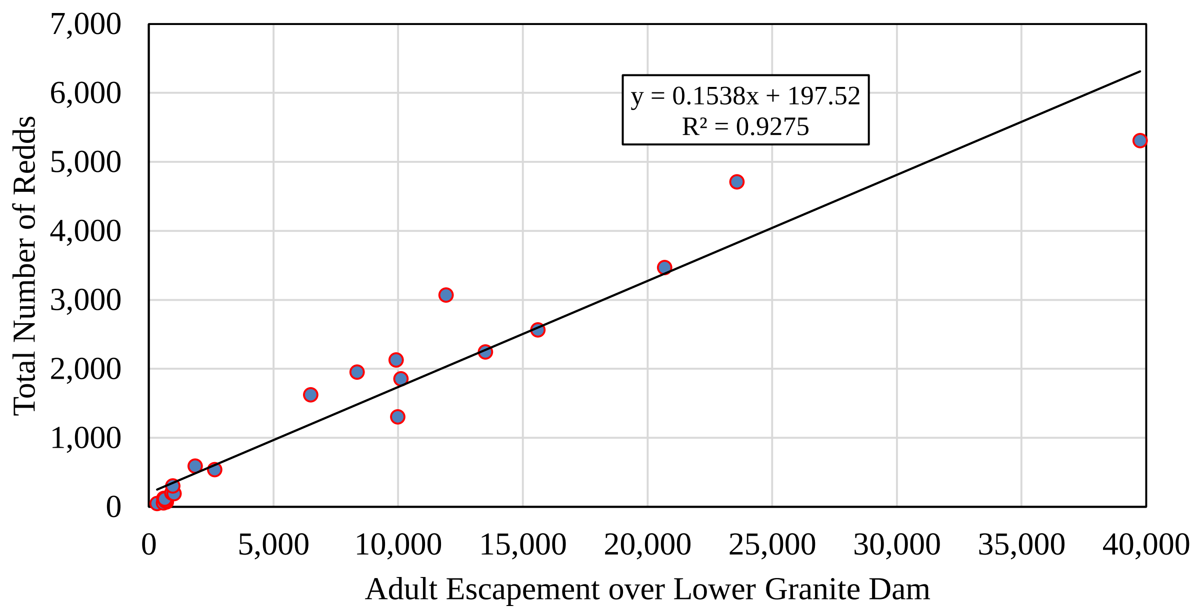


Figure 12. Fall Chinook salmon redds counted in the Snake River Basin above Lower Granite Dam and adult (not including jacks) escapement regression over Lower Granite Dam from run reconstructions, 1988-2011.

*Escapement and Carcass Recoveries*

The preliminary total fall Chinook salmon returning to Lower Granite Dam in 2011 was estimated to be 27,714 adults and 15,437 jacks for a total of 43,151 fish (Young et al. 2013). During 2011, the number of fall Chinook salmon trapped and hauled from Lower Granite Dam to NPTH and LFH for broodstock needs and run reconstruction purposes was 588 and 2,281 fish, respectively. After subtracting hauled fish from the Lower Granite estimate and volunteers to the NPTH, the preliminary fall Chinook salmon escapement estimate to the spawning grounds was 23,580 adults and 14,175 jacks for a total of 37,755 fish (Young et al. 2013). It was estimated that the natural adult escapement above Lower Granite was 8,072 (34.2%) and 4,153 (29.3%) natural jacks. Natural and hatchery jacks together made up 37.5% of the fall Chinook escapement above Lower Granite Dam in 2011.

A total of 442 fall Chinook salmon carcasses were collected in the Clearwater River during 2011 (Appendix B). One additional carcass was identified as a Coho salmon by scales. There were a total of 275 females (62.2%) and 167 males (37.8%) among the carcasses collected. Of all female carcasses cut open and examined, about 98.2% were 100% spawned-out or eggs were spent (Appendix B). Only 2 females examined had retained most all of their eggs (pre-spawn mortalities).

Analysis of the composition of fall Chinook salmon carcasses collected in the Clearwater River Subbasin using coded wire tags, adipose fin clips, and scale readings resulted in identifying 173 hatchery origin fish (41.2%) and 193 unmarked/untagged fish (46.0%) (Table 10, Appendix B). The unmarked/untagged fish group, however, contains a proportion of NPTH released fish as about 30% of the subyearlings released are not coded wire tagged or adipose fin clipped. A total of 54 (12.9%) carcasses were identified as natural "reservoir reared" fish. The two known (from wire) out-of-Snake Basin hatchery "strays" made up 0.5% of the carcasses sampled in the Clearwater River during 2011 (Table 10; Appendix B).

The breakdown of fall Chinook salmon carcasses of subyearling versus yearling hatchery released fall Chinook salmon, number of unknown fish (scale analysis could not determine for certain if hatchery or natural), natural fish that reservoir reared by scale analysis, and out-of-Snake Basin hatchery strays are summarized in Table 10. The greatest number of carcasses collected in the Clearwater River Subbasin were unknown (unmarked/untagged) subyearlings that emigrated as subyearlings (46.0%), followed by known hatchery subyearlings that emigrated as subyearlings (26.9%), then by naturally produced subyearlings that held over or possibly reservoir reared and emigrated as yearlings (12.9%), then by hatchery released yearlings (11.0%), and lastly by hatchery subyearling releases that reservoir reared (2.9%). Most carcasses collected returned at total age-4 (65.7%), followed by age-3 fish (24.5%), age-2 or jacks (6.2%), and lastly age-5 (3.6%) (Table 10). There were no age-6 carcasses collected.

Table 10. Number of each age class, percent of the total sample identified by emigration life history type from coded wire tags, adipose fin clips, and scale analysis; fork length (cm) range and average fork length in parenthesis of total age 2-5 fall Chinook salmon carcasses (n=420) collected in the Clearwater River Subbasin during 2011.

| Release Strategy/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 | 12 (2.9%) 44-55 (49) | 15 (3.6%) 61-75 (68) | 85 (20.2%) 68-94 (82) | 1 (0.2%) 79 (79) | 113 (26.9%) |
| Subyearling Hat Release/ Reservoir Reared | 1 (0.2%) 39 (39) | 9 (2.1%) 51-71 (59) | 1 (0.2%) 70 (70) | 1 (0.2%) 85 (85) | 12 (2.9%) |
| Yearling Hat Release | 0 | 26 (6.2%) 51-71 (60) | 18 (4.3%) 63-80 (72) | 2 (0.5%) 75-92 (84) | 46 (11.0%) |
| Unknown with Subyearling Emigration | 12 (2.9%) 37-55 (48) | 48 (11.4%) 60-96 (74) | 133 (31.7%) 66-102 (83) | 0 | 193 (46.0%) |
| Natural Reservoir Reared | 1 (0.2%) 37 (37) | 5 (1.2%) 62-68 (65) | 38 (9.0%) 57-93 (80) | 10 (2.4%) 81-103 (91) | 54 (12.9%) |
| Out-of-Snake Basin Hatchery Strays | 0 | 0 | 1 (0.2%) 78 (78) | 1 (0.2%) 88 (88) | 2 (0.5%) |
| Total Collected by Age | 26 (6.2%) | 103 (24.5%) | 276 (65.7%) | 15 (3.6%) | 420 |

### *Smolt-to-Adult Return Estimates*

The fall Chinook salmon run reconstruction estimates from 2007-2011 (Young et al. 2013), expanded for trapping rates at Lower Granite Dam and estimated contributions in the ocean and Columbia River fisheries from NPTH and associated releases are provided in Table 11 and Figure 13. The lowest smolt-to-adult returns (SAR) back to the Snake River and subsequent ocean and freshwater harvest rates were for the 2007 release groups. The highest estimated SARs and smolt-to-adult survivals (SASs) were for the 2008 release groups with NLV having the highest return rate back to the Snake River (1.46%) and the highest harvest rate (0.61%) for a total SAS of 2.07% (Table 11; Figure 13).

A similar trend resulted in the FCAP subyearling releases from 2006-2008 in terms of SARs and SASs (Table 12; Figure 14). The lowest SARs and SASs occurred for the 2007 releases while the highest SARs back to the Snake River for all release groups occurred for the 2008 releases with Big Canyon release having the highest SAR of 1.67%. All release groups had similar harvest rates for the 2008 releases which ranged from 0.63% to 0.69% (Table 12, Figure 14).

Table 11. 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 2006-2008 (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 | 2006 | 198,108 | 170 | 79 | 799 | 1,048 | 0.40 | 0.53 |
| Cedar Flats | 2006 | 25,478 | 28 | 0 | 281 | 309 | 1.10 | 1.21 |
| Lukes Gulch | 2006 | 25,099 | 18 | 0 | 172 | 190 | 0.69 | 0.76 |
| NPTH | 2006 | 296,606 | 302 | 57 | 1,662 | 2,021 | 0.56 | 0.68 |
| North Lapwai Valley | 2007 | 144,841 | 20 | 24 | 101 | 145 | 0.07 | 0.10 |
| Cedar Flats | 2007 | 24,890 | 0 | 4 | 49 | 53 | 0.20 | 0.21 |
| Lukes Gulch | 2007 | 24,906 | 1 | 0 | 19 | 20 | 0.08 | 0.08 |
| NPTH | 2007 | 293,935 | 66 | 15 | 625 | 706 | 0.21 | 0.24 |
| North Lapwai Valley | 2008 | 167,976 | 590 | 441 | 2,451 | 3,482 | 1.46 | 2.07 |
| Cedar Flats | 2008 | 99,641 | 309 | 13 | 1,027 | 1,349 | 1.03 | 1.35 |
| Lukes Gulch | 2008 | 99,456 | 213 | 7 | 1,383 | 1,603 | 1.39 | 1.61 |
| NPTH | 2008 | 249,827 | 558 | 393 | 2,186 | 3,137 | 0.88 | 1.26 |

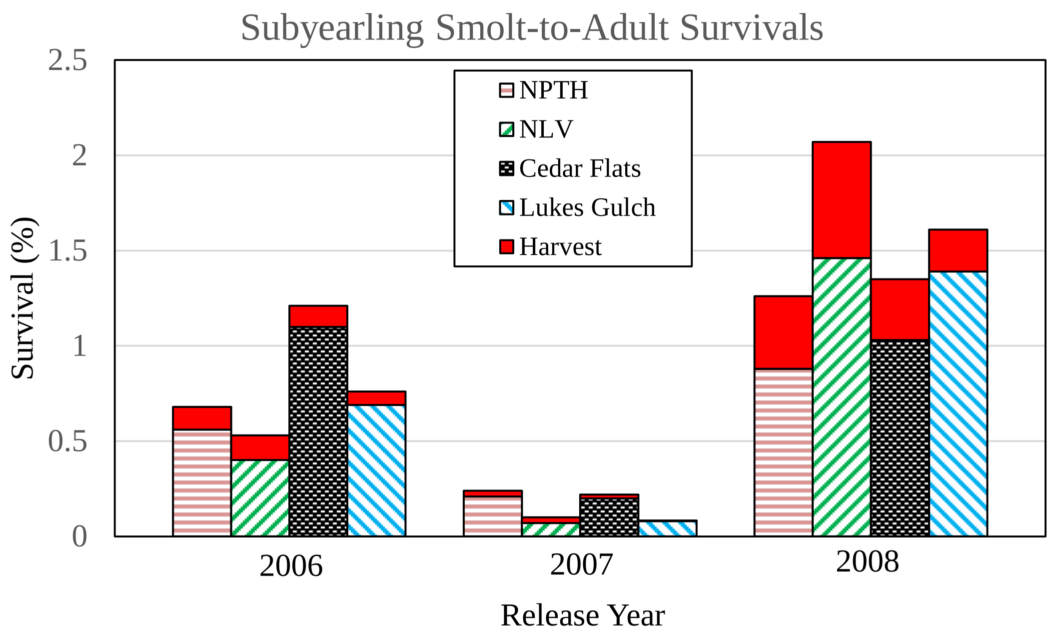


Figure 13. Fall Chinook salmon smolt-to-adult returns (SARs) to the Snake River plus ocean and freshwater harvest estimates (in red) for total smolt-to-adult survivals (SASs) from juvenile subyearling releases at Nez Perce Tribal Hatchery (NPTH) and associated acclimation sites at North Lapwai Valley (NLV), Cedar Flats, and Lukes Gulch (includes 1-ocean fish).

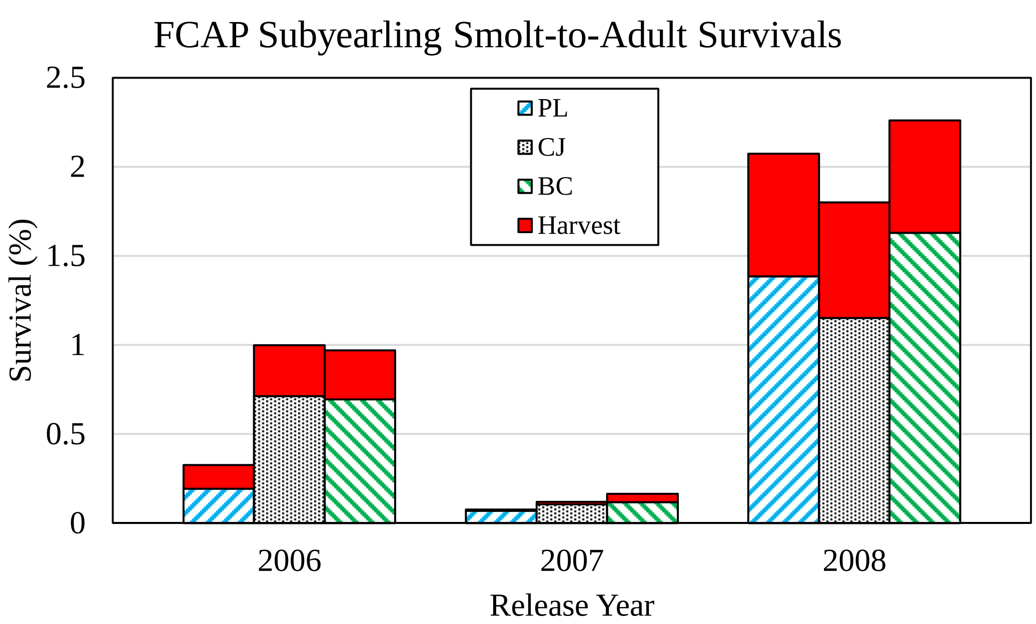


Figure 14**.** Fall Chinook salmon smolt-to-adult returns (SARs) to the Snake River plus ocean and freshwater harvest estimates (in red) for total smolt-to-adult survivals (SASs) from juvenile subyearling releases from the Fall Chinook Acclimation Project (FCAP) at Pittsburg Landing (PL), Captain John Rapids (CJ), and at Big Canyon Creek (BC) acclimation sites (includes 1-ocean fish) .

Table 12. Estimated fall Chinook Salmon smolt-to-adult survivals (SASs) for the Fall Chinook Acclimation Project (FCAP) subyearling acclimated releases from 2006-2008 (coded wire tag recoveries from ocean and freshwater fisheries reported to the Regional Mark Processing Center using estimated numbers i.e. expanded, and expanded smolt-to-adult returns (SARs) to Lower Granite Dam-Snake recoveries through yearly run reconstructions).

| Release Location/strategy | Release year | Total # coded wire tags | Total # coded wire tags + ad-clipped | CWT code | Total Ocean Fisheries recoveries | Total Freshwater Fisheries recoveries | Total Snake R. recoveries | Grand Total recoveries | SARs (%) to Snake | Total SASs (%) |
|---|---|---|---|---|---|---|---|---|---|---|
| Pittsburg Landing | 2006 | - | 185,413 | 094419 | 113 | 131 | 360 | 604 | 0.19 | 0.33 |
| Captain Johns | 2006 | 99,366 | - | 610177 | 130 | 3 | 631 | 764 | 0.64 | 0.77 |
| Captain Johns | 2006 | - | 98,699 | 610176 | 238 | 194 | 782 | 1214 | 0.79 | 1.23 |
| Big Canyon | 2006 | 98,994 | - | 610175 | 144 | 0 | 660 | 804 | 0.67 | 0.81 |
| Big Canyon | 2006 | - | 97,763 | 610174 | 205 | 193 | 707 | 1105 | 0.72 | 1.13 |
| Pittsburg Landing | 2007 | 98,046 | - | 612731 | 0 | 0 | 67 | 67 | 0.07 | 0.07 |
| Pittsburg Landing | 2007 | - | 97,668 | 612732 | 12 | 4 | 69 | 85 | 0.07 | 0.09 |
| Captain Johns | 2007 | 99,212 | - | 612728 | 6 | 0 | 89 | 95 | 0.09 | 0.10 |
| Captain Johns | 2007 | - | 99,107 | 612727 | 4 | 18 | 119 | 141 | 0.12 | 0.14 |
| Big Canyon | 2007 | 100,103 | - | 612730 | 20 | 0 | 112 | 132 | 0.11 | 0.13 |
| Big Canyon | 2007 | - | 98,546 | 612729 | 48 | 28 | 121 | 197 | 0.12 | 0.20 |

Table 12. Continued.

| Release Location/strategy | Release year | Total # coded wire tags | Total # coded wire tags + ad-clipped | CWT code | Total Ocean Fisheries recoveries | Total Freshwater Fisheries recoveries | Total Snake R. recoveries | Grand Total recoveries | SARs (%) to Snake | Total SASs (%) |
|---|---|---|---|---|---|---|---|---|---|---|
| Pittsburg Landing | 2008 | 99,802 | - | 612522 | 270 | 12 | 1,206 | 1,488 | 1.21 | 1.49 |
| Pittsburg Landing | 2008 | - | 99,371 | 612519 | 507 | 586 | 1,550 | 2,643 | 1.56 | 2.66 |
| Captain Johns | 2008 | 98,734 | - | 612521 | 183 | 0 | 778 | 961 | 0.79 | 0.97 |
| Captain Johns | 2008 | - | 98,282 | 612518 | 507 | 586 | 1,492 | 2,585 | 1.52 | 2.63 |
| Big Canyon | 2008 | 99,367 | - | 612520 | 270 | 10 | 1,416 | 1,696 | 1.43 | 1.71 |
| Big Canyon | 2008 | - | 98,903 | 612517 | 581 | 389 | 1,902 | 2,872 | 1.92 | 2.90 |

The FCAP yearling releases also show similar higher SARs and SASs for the 2006-2008 releases with all 2007 having the lowest returns back to the Snake River and the lowest contributions to harvest (Table 13, Figure 15). The highest average SAR and SAS was also for the 2008 release groups with Captain John having the highest SAR of 3.1% back to the Snake River and also the highest harvest rate of 1.1%, for a total SAS of 4.2% (Table 13; Figure 15).

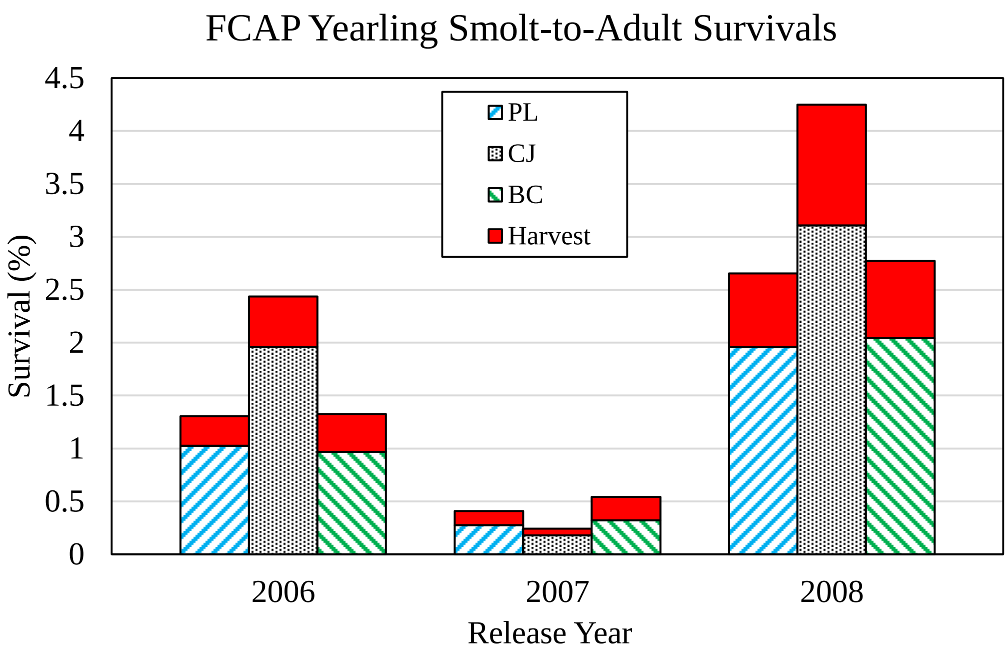


Figure 15. Fall Chinook salmon smolt-to-adult returns (SARs) to the Snake River plus ocean and freshwater harvest estimates (in red) for total smolt-to-adult survivals (SASs) from juvenile yearling releases from the Fall Chinook Acclimation Project (FCAP) at Pittsburg Landing (PL), Captain John Rapids (CJ), and at Big Canyon Creek (BC) acclimation sites (includes 1-ocean fish).

Table 13. Estimated fall Chinook Salmon smolt-to-adult survivals (SASs) for the Fall Chinook Acclimation Project (FCAP) yearling acclimated releases from 2006-2008 (coded wire tag recoveries from ocean and freshwater fisheries reported to the Regional Mark Processing Center using estimated numbers i.e. expanded, and expanded smolt-to-adult returns (SARs) to Lower Granite Dam-Snake recoveries through yearly run reconstructions).

| Release Location | Release year | Total # coded wire tags | Total # coded wire tags + ad-clipped | CWT code | Total Ocean Fisheries recoveries | Total Freshwater Fisheries recoveries | Total Snake R. recoveries | Grand Total recoveries | SARs (%) to Snake | Total SASs (%) |
|---|---|---|---|---|---|---|---|---|---|---|
| Pittsburg Landing | 2006 | 77,644 | - | 610153 | 129 | 0 | 799 | 928 | 1.03 | 1.20 |
| Pittsburg Landing | 2006 | - | 66,987 | 610150 | 132 | 140 | 687 | 959 | 1.03 | 1.43 |
| Captain Johns | 2006 | 78,156 | - | 610152 | 157 | 4 | 1,573 | 1734 | 2.01 | 2.22 |
| Captain Johns | 2006 | - | 70,185 | 610151 | 243 | 301 | 1,338 | 1882 | 1.91 | 2.68 |
| Big Canyon | 2006 | 59,465 | - | 610144 | 93 | 3 | 591 | 687 | 0.99 | 1.16 |
| Big Canyon | 2006 | - | 66,732 | 610148 | 169 | 185 | 631 | 985 | 0.95 | 1.48 |
| Pittsburg Landing | 2007 | 72,805 | - | 612510 | 62 | 0 | 217 | 279 | 0.30 | 0.38 |
| Pittsburg Landing | 2007 | - | 70,969 | 612505<br>612661 | 46 | 80 | 181 | 307 | 0.26 | 0.43 |
| Captain Johns | 2007 | 78,588 | - | 612509 | 40 | 0 | 148 | 188 | 0.19 | 0.24 |
| Captain Johns | 2007 | - | 69,180 | 612506 | 35 | 23 | 115 | 173 | 0.17 | 0.25 |
| Big Canyon | 2007 | 77,220 | - | 612508 | 102 | 7 | 168 | 277 | 0.22 | 0.36 |
| Big Canyon | 2007 | - | 67,891 | 612507 | 102 | 110 | 296 | 508 | 0.44 | 0.75 |

Table 13. Continued.

| Release Location | Release year | Total # coded wire tags | Total # coded wire tags + ad-clipped | CWT code | Total Ocean Fisheries recoveries | Total Freshwater Fisheries recoveries | Total Snake R. recoveries | Grand Total recoveries | SARs (%) to Snake | Total SASs (%) |
|---|---|---|---|---|---|---|---|---|---|---|
| Pittsburg Landing | 2008 | 81,476 | - | 612515 | 331 | 0 | 1,676 | 2,007 | 2.06 | 2.46 |
| Pittsburg Landing | 2008 | - | 68,129 | 612512 | 401 | 311 | 1,254 | 1,966 | 1.84 | 2.89 |
| Captain Johns | 2008 | 82,934 | - | 612514 | 489 | 5 | 2,442 | 2,936 | 2.94 | 3.54 |
| Captain Johns | 2008 | - | 69,056 | 612511 | 721 | 519 | 2,283 | 3,523 | 3.31 | 5.10 |
| Big Canyon | 2008 | 77,749 | - | 612516 | 304 | 14 | 1,894 | 2,212 | 2.44 | 2.85 |
| Big Canyon | 2008 | - | 68,199 | 612513 | 474 | 269 | 1,089 | 1,832 | 1.60 | 2.69 |

*Hatchery Spawning*

Fall Chinook adults are 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. Water temperatures were favorable and trapping began on August 18, however, NPTH did not start hauling fall Chinook until August 29. The last haul date from LGR was October 3. The NPTH also opened the fish ladder to trap additional fish to make broodstock goals, especially since male returns were low in 2011.

A total of 588 fall Chinook were hauled from Lower Granite Dam for NPTH broodstock which consisted of 437 females (Appendix C) and 151 males (Appendix D). A total of 192 fall Chinook volunteered into the NPTH fish ladder which consisted of 73 females and 119 males. A grand total of 780 fall Chinook salmon were processed at NPTH during 2011. For both NPTH and LFH, fall Chinook salmon broodstock needs were met in 2011.

There were a total of 437 females used for broodstock, 75 died in the pond prior to spawning, and 8 were green or the eggs not viable (labeled as KO or killed outright in Appendix C). A total of 215 males were used for broodstock, 27 died in the pond prior to spawning, 25 were killed outright and not used for brood, and 3 were released back to the river to spawn naturally (Appendix D). Most of the KO males were hauled from Lower Granite Dam, were small and sacrificed in order to extract and read coded wire tags for run reconstruction purposes.

The highest contribution of females (n=141 or 32.3%) to the broodstock was unmarked/untagged fish with a subyearling emigration life history scale pattern (Appendix C). The unmarked/untagged unknown origin fish contains natural or wild fish and a proportion of NPTH and NLV fish as well since not all hatchery fish are marked/tagged. The second highest contribution of females (n=41 or 9.4%) was from all NPTH and associated acclimation releases that emigrated as subyearlings. Yearling releases from on-station LFH contributed 8.9% to the total female broodstock. Out-of-Snake River Basin strays (n=7) made up 1.6% of the female broodstock (Appendix C).

The highest male contribution (n=82 or 38.1%) to the broodstock was also unmarked/untagged subyearlings showing a subyearling emigration life history by scales (Appendix D). The second highest contribution of males (n=38 or 17.7%) were from NPTH and associated acclimation releases that emigrated as subyearlings, followed by Big Canyon subyearling releases (n=20 or 9.3%). Out-of-Snake River Basin strays (n=1) made up 0.4% of the male broodstock composition (Appendix D).

Total age composition of all fall Chinook salmon females processed at NPTH resulted in 81.4% age-4, 11.2% age-3, and 6.7% age-5 of fish that could be identified (Appendix C). Total age composition of all fall Chinook salmon males processed at NPTH resulted in 67.0% age-4, 30.7% age-3, and 2.2% age-5 (Appendix D). There were no age-6 fish processed during 2011. Of all age-3 females spawned, ten (2.3% of all brood) were 1-ocean fish (jills) from yearling releases in 2008, and one female was identified as a reservoir reared natural fish (Appendix C). Of all males spawned, only 5 fish (2.3%) were from hatchery yearling releases or true 1-ocean jacks, and three (1.4%) were subyearling jacks that reservoir reared (Appendix D).

*Genetic Monitoring*

Beginning in 2011, parental based tagging (PBT) was initiated at both LFH and NPTH for all broodstock. Since we were short on males to spawn on a one-to-one ratio, we used the larger males multiple times in the spawning. The results of PBT will be a better tracking of parents to returning offspring and monitoring and evaluation of different rearing and release strategies. We also subsampled 100% (n=443) fall Chinook salmon carcasses collected on the spawning grounds for DNA analysis, although only a subsample will be analyzed. A comprehensive genetic analysis report on NPTH broodstock and carcass recovery will be forthcoming in a later publication.

# DISCUSSION

## Supplementation

During the 2011 fall Chinook salmon run, gametes were taken from fish hauled from Lower Granite Dam and adult volunteers to the NPTH fish ladder for 2012 subyearling releases. Fall chinook releases were coded wire tagged and adipose fin clipped prior to release as planned, meeting target tagging and marking goals. There were a total of 483,340 yearling fall released at the three FCAP sites exceeding the release goal by 33,340 fish. Subyearlings released at FCAP facilities also exceeded the release goal of 1.4 million fish by 38,910 fish. At NPTH and associated acclimated releases exceeded the release goal of 1.4 million by 49,323 fish, plus another 286,587 fish that became a second later release at NPTH.

## Monitoring and Evaluation

### <u>Juvenile Monitoring</u>

*Life History, Emigration Timing, and Survival Estimates*

All of the FCAP and NPTH hatchery fall Chinook releases migrated at a significantly faster rate than the natural subyearling fall Chinook from the Clearwater River. Hatchery fall Chinook migration rate from release to each detection point seems to be impacted by the release location and the distance each location is from the beginning of Lower Granite Dam pool near Lewiston, Idaho. The second subyearling group from NPTH was released much later and at a smaller size on July 6. This group migrated slower than the other hatchery releases to Lower Granite Dam and had a similar trend when compared graphically with the cumulative arrival timing of the Clearwater River natural fall Chinook in 2011. This second release also exhibited more holdovers that were detected in 2012 as yearlings than the other hatchery releases. The emigration timing and life history strategies may be directly correlated with size at release, release date, and smoltification timing. PIT tag detections were sufficient for survival to be estimated to Lower Granite Dam. The Lower Granite Dam juvenile bypass and PIT tag detectors are usually operational from late March thru the end of October, but continued operation in 2011 into mid-December. This especially enhances the emigration timing and survival estimates for the Clearwater River natural subyearling fall Chinook, providing more time and detections at Lower Granite Dam. In previous years when the PIT tag detectors are shut down on October 31, there were not yet enough detections at Lower Granite and subsequent facilities to estimate survival below Lower Granite for the natural Clearwater River releases. Even with the extended operation of the Lower Granite Dam PIT tag detectors, the 90% arrival date for the 2011 natural fall Chinook groups to Lower Granite Dam was April 4, 2012. 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.

*Flow and Temperature*

There was more inflow and subsequent spill at Lower Granite Dam in 2011 compared to the ten year average (2001-2010). Over 90% of the hatchery FCAP and NPTH releases had reached Lower Granite Dam during periods of high inflow and subsequent spill, while the majority of PIT tag detections of natural fall Chinook at the dam occurred during periods of low flow and lack of spill. 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 causing delayed Clearwater River natural fall Chinook salmon subyearling emigration resulting in significantly more holdovers or reservoir reared fish. The colder water in the Clearwater River as compared to the Snake River during egg incubation also delays emergence from the spawning beds and subsequent growth and smoltification, further delaying emigration.

*Genetic Monitoring*

Beginning in 2011, parental based tagging (PBT) was initiated at both LFH and NPTH for all broodstock. The results of PBT will be a better tracking of parents to returning offspring and monitoring and evaluation of different rearing and release strategies. A comprehensive genetic analysis report on NPTH broodstock and carcass recovery will be forthcoming in a later publication.

## Adult Monitoring

*Spawning Ground Surveys*

We continue to observe fall Chinook redds within the Snake River Basin where no redds were observed in previous surveys. The 2011 redd count was the second highest redd count in the basin with the highest count in 2010. There were a total of 1,621 redds observed in the entire Clearwater River Subbasin, again second to the 2010 redd count. With supplementation at full production levels, we anticipate higher redd counts within the basin in future years.

*Escapement and Carcass Recoveries*

The total fall Chinook salmon returning to Lower Granite Dam in 2011 was the second highest estimate since before this last lower Snake River dam was completed in 1975. The preliminary total fall Chinook salmon returning to Lower Granite Dam in 2011 was estimated to be 27,714 adults and 15,437 jacks for a total of 43,151 fish. During 2011, the number of fall Chinook salmon trapped and hauled from Lower Granite Dam to NPTH and LFH for broodstock needs and run reconstruction purposes was 588 and 2,281 fish, respectively. After subtracting hauled fish from the Lower Granite estimate and volunteers to the NPTH, the preliminary fall Chinook salmon escapement estimate to the spawning grounds was 23,580 adults and 14,175 jacks for a total of 37,755 fish.

A total of 442 fall Chinook salmon carcasses were collected in the Snake River Basin which represented the second highest number collected since we began carcass collection in the Clearwater River Subbasin in 1988.

*Smolt-to-Adult Return Estimates*

This was the eight year for fall Chinook salmon returns from NPTH and NLV releases that began in 2003 and the fourth year for a full age-class return up to 5-yr olds. The lowest SARs and SASs were estimated for the 2007 NPTH and FCAP releases, however, they were much higher for all 2008 release groups. Higher survivals can be seen when juvenile survivals are high and ocean conditions are favorable. High harvest rates are also seen when juvenile survivals are high.

*Hatchery Spawning*

The preseason fall Chinook salmon forecast to Lower Granite Dam was somewhat lower than the actual return estimate, however, since trapping at Lower Granite Dam began on the scheduled date, all fall Chinook broodstock needs were met. During 2011, it was apparent that males were less numerous than females which triggered both NPTH and LFH to open their fish ladders to collect more brood. Opening fish ladders results in less natural fall Chinook incorporated into the broodstock, since most all volunteers are of hatchery origin.

*Genetic Monitoring*

As mentioned earlier, parental based tagging (PBT) was initiated at both LFH and NPTH for all broodstock. The results of PBT will be a better tracking of parents to returning offspring and monitoring and evaluation of different rearing and release strategies. A comprehensive genetic analysis report on NPTH broodstock and carcass recovery will be forthcoming in a later publication.

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Appendix A. Fall Chinook salmon aerial redd surveys with new redds observed during given flight date on the Clearwater River, 2011.

| RM | RKM | LANDMARK | New Redds Counted by Flight Date | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 10/17 | 10/19 | 10/31 | 11/2 | 11/21 | 11/28 | Totals |
| 4.5 | 7.2 | Island at Potlatch Mill | | | | | | | 0 |
| 6.8 | 10.9 | Below Casino | | | 2 | | | | 2 |
| 9.0 | 14.5 | Hog Islands | | | | | | 2 | 2 |
| 11.0 | 17.7 | Above Hwy 95 bridge | | | 7 | | 5 | 2 | 14 |
| 11.9 | 19.2 | Below Train Bridge | | | 4 | | | | 4 |
| 14.0 | 22.5 | Catholic Creek | | | 5 | | 18 | | 23 |
| 15.0 | 24.1 | Below Arrow Bridge | | | | | | | 0 |
| 17.3 | 27.9 | Island Above Gibbs Eddy | 6 | | 2 | | 3 | | 11 |
| 18.0 | 29.0 | Lower Myrtle | 71 | | 10 | | 13 | | 94 |
| 19.1 | 30.7 | Lower Cottonwood | 12 | | 16 | | | | 28 |
| 19.3 | 31.1 | Mid Cottonwood-Channel | 7 | | 5 | | 11 | | 23 |
| 20.0 | 32.2 | Below Cherrylane Bridge | | | 3 | | | | 3 |
| 21.0 | 33.8 | Below Cherrylane Bridge | 29 | | 30 | | 15 | | 74 |
| 21.5 | 34.6 | Fir Island (North Side) | | | 4 | | | | 4 |
| 21.7 | 35.0 | Fir Island (Hwy 12 Side Channel) | 11 | | 7 | | | | 18 |
| 22.0 | 35.4 | Fir Island (Cherrylane-1705) | 124 | | 63 | | 54 | 22 | 263 |
| 22.2 | 35.7 | NPTH (1705) Ladder | 66 | | 24 | | 56 | 45 | 191 |
| 23.3 | 37.5 | Pine Creek | 22 | | | | 25 | | 47 |
| 23.9 | 38.5 | Below Thunderbird Market | 1 | | 1 | | 4 | | 6 |
| 25.1 | 40.4 | Above Thunderbird Market | | | | | | | 0 |
| 26.5 | 42.7 | Above Bedrock Creek | 13 | | 75 | | 8 | 16 | 112 |
| 27.5 | 44.3 | Below Rest Area | 14 | | 26 | | 7 | | 47 |
| 28.4 | 45.7 | Rest Area | 32 | | 12 | | 35 | 10 | 89 |
| 29.2 | 47.0 | Above Lenore Boat Ramp | | | | | | | 0 |
| 30.1 | 48.4 | House on Cliff | 12 | | | | 25 | | 37 |
| 31.5 | 50.7 | Below Tomahawk-Tree Farm | 7 | | 6 | | 1 | | 14 |
| 32.5 | 52.3 | Below Tomahawk | 7 | | | | 11 | | 18 |
| 32.8 | 52.8 | Camp Tomahawk | | | | | 2 | 5 | 7 |
| 34.0 | 54.7 | Leaning Pine Hole | 6 | | | | 27 | | 33 |
| 35.4 | 57.0 | Below Old Peck Bridge | 12 | | 16 | | 3 | 8 | 39 |
| 35.7 | 57.5 | Above Old Peck Bridge | 7 | | | | | 24 | 31 |
| 36.2 | 58.3 | Above Old Peck Bridge | | | 7 | | | | 7 |
| 37.9 | 61.0 | Snells Island | | | | | 31 | | 31 |
| 39.1 | 62.9 | Below Pink House Boatramp | 7 | | 7 | | | 1 | 15 |
| 39.6 | 63.7 | Above Pink House Boatramp | 17 | | 4 | | 4 | | 25 |
| 40.3 | 64.9 | Ahsahka Islands | 50 | | 91 | | 76 | 28 | 245 |
| 0.2 | 0.3 | N.F. Clearwater | | | 2 | | | 1 | 3 |
| 43.2 | 69.5 | Hwy. Dept. Garage | | | | | | | 0 |
| 45.5 | 73.2 | Above Mouth of Orofino Creek | | | | | | 3 | 3 |
| 45.8 | 73.8 | Above Tunnel Pond | | | | | | | 0 |
| 49.2 | 79.3 | Above Fords Creek | | | | | | | 0 |
| 50.5 | 81.3 | Above Fords Creek | | | | | | | 0 |
| 51.0 | 82.1 | Above B&B Gift Shop | | | | | | | 0 |
| 51.2 | 82.5 | Below Greer Bridge | | | | | | 2 | 2 |
| 52.3 | 84.2 | Below Greer Bridge | | | | | | | 0 |
| 52.8 | 85.0 | Greer Grain Elevators | | | | | | | 0 |

Appendix A. (continued).

| RM | RKM | LANDMARK | New Redds Counted by Flight Date | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 10/17 | 10/19 | 10/31 | 11/2 | 11/21 | 11/28 | Totals |
| 53.8 | 86.6 | Above Greer Power Lines | | 6 | | | | 3 | 9 |
| 58.2 | 93.7 | Clearwater River-Canyon Area | | | | | | | 0 |
| 62.3 | 100.4 | Long Camp Boat Ramp | | | | | | | 0 |
| 63.0 | 101.4 | Above long Camp Boat Ramp | | | | | | | 0 |
| 63.4 | 102.0 | About 3 m below Kamiah | | | | 1 | | 1 | 2 |
| 66.0 | 106.2 | Just above Kamiah Train Bridge | | | | 1 | | | 1 |
| 66.8 | 107.6 | Above Kamiah Hwy 12 Bridge | | | | | | | 0 |
| 67.1 | 108.0 | Below Lawyer's Creek | | | | | | | 0 |
| 69.6 | 112.0 | Above freeze-core site | | | | | | | 0 |
| 73.0 | 117.5 | Above Button Beach | | | | | | | 0 |
| | | Totals | 533 | 6 | 429 | 2 | 434 | 173 | 1,577 |
| | | River Mile Start | 4 | 45 | 4 | 45 | 4 | 4 | |
| | | River Mile End | 45 | 75 | 45 | 75 | 45 | 75 | |
| | | Flow at Spalding Gauge (cfs) | 4,500 | 4,550 | 3,970 | 5,020 | 3,650 | 3,740 | |
| | | Avg. Temp at Spalding Gauge | 11.0 | 10.5 | 8.7 | 6.5 | 5.0 | 5.4 | |
| | | Flow from Dworshak Dam | 1,600 | 1,600 | 1,500 | 1,500 | 1,500 | 1,500 | |
| | | Flow at Orofino Gauge (cfs) | 3,170 | 2,510 | 2,310 | 3,090 | 1,940 | 2,000 | |
| | | Avg. Temp at Orofino Gauge | 10.9 | 10.2 | 7.7 | 5.9 | 1.8 | 1.7 | |
| | | General Observation Conditions | Fair | Good | Fair | Excel | Good | Good | |

Appendix B. Fall Chinook salmon carcasses collected in the Clearwater River by the Nez Perce Tribe, 2011 (N = no, Y = yes, U = Unknown; CWT Origin and Age keys are at end of table).

| Fish ID # | Date | Fork Length | Sex | % Spawned | CWT | Ad-Clip | VIE | Opercle Punch | Scales taken | DNA taken | CWT Code | CWT Origin | Pit Tag # | Pit Tag Origin | SITE | Origin | European Age | Total Age | Reservoir Reared |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11001 | 10/20 | 67 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11002 | 10/20 | 96 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11003 | 10/20 | 85 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | W | 1.3 | 5 | Y |
| 11004 | 10/20 | 90 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11005 | 10/20 | 83 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11006 | 10/20 | 85 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | R | | |
| 11007 | 10/24 | 37 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | W | 1.0 | 2 | Y |
| 11008 | 10/24 | 73 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11009 | 10/24 | 77 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11010 | 10/24 | 91 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | W | 1.2 | 4 | Y |
| 11011 | 10/24 | 79 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | W | 1.2 | 4 | Y |
| 11012 | 10/24 | 83 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11013 | 10/24 | 82 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | W | 1.2 | 4 | Y |
| 11014 | 10/24 | 82 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | W | 1.2 | 4 | Y |
| 11015 | 10/24 | 94 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11016 | 10/24 | 79 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11017 | 10/24 | 89 | F | 100 | N | N | N | N | Y | 1 | | | 3D9.1C2D55057C | LGRADULT | Cherrylane | U | 0.3 | 4 | |
| 11018 | 10/24 | 59 | M | 100 | N | N | N | N | Y | 3 | | | | | Cherrylane | U | R | | |
| 11019 | 10/24 | 82 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11020 | 10/24 | 82 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11021 | 10/24 | 99 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11022 | 10/24 | 75 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11023 | 10/24 | 82 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11024 | 10/24 | 80 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | W | 1.2 | 4 | Y |
| 11025 | 10/24 | 93 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | W | 1.2 | 4 | |
| 11026 | 10/24 | 65 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | H | 1.1 | 3 | |
| 11027 | 10/24 | 83 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | W | 1.2 | 4 | Y |
| 11028 | 10/24 | 80 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11029 | 10/25 | 82 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |

Appendix B (continued).

| Fish ID # | Date | Fork Length | Sex | % Spawned | CWT | Ad-Clip | VIE | Opercle Punch | Scales taken | DNA taken | CWT Code | CWT Origin | Pit Tag # | Pit Tag Origin | SITE | Origin | European Age | Total Age | Reservoir Reared |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11030 | 10/25 | 98 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11031 | 10/25 | 86 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11032 | 10/25 | 83 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11033 | 10/25 | 75 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11034 | 10/25 | 78 | F | 75 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11035 | 10/25 | 78 | M | 100 | N | N | N | N | Y | 2 | | | 3D9.1C2D555A0C | LGRADULT | Cherrylane | U | 0.3 | 4 | |
| 11036 | 10/25 | 81 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11037 | 10/25 | 82 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11038 | 10/25 | 81 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11039 | 10/25 | 87 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11040 | 10/25 | 94 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11041 | 10/25 | 75 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | W | 1.2 | 4 | Y |
| 11042 | 10/25 | 79 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | W | 1.2 | 4 | Y |
| 11043 | 10/25 | 83 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11044 | 10/25 | 68 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | W | 1.1 | 3 | Y |
| 11045 | 10/25 | 91 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11046 | 10/25 | 44 | M | 100 | Y | N | N | N | Y | 2 | 612772 | NPTH09SO | | | Cherrylane | H | 0.1 | 2 | |
| 11047 | 10/25 | 63 | M | 100 | Y | N | N | 1L | Y | 2 | 220302 | LF08YBCA | 3D9.1C2D1DF6F1 | LF08YBCA | Cherrylane | H | 1.1 | 3 | |
| 11048 | 10/25 | 61 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | W | 1.2 | 4 | Y |
| 11049 | 10/25 | 80 | F | 100 | Y | Y | N | N | Y | 2 | 612694 | NPTH07SNLVA | | | Cherrylane | H | 0.3 | 4 | |
| 11050 | 10/25 | 83 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11051 | 10/25 | 85 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11052 | 10/25 | 89 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | R | | |
| 11053 | 10/26 | 82 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11054 | 10/26 | 81 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | W | 1.3 | 5 | Y |
| 11055 | 10/26 | 77 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11056 | 10/26 | 94 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11057 | 10/26 | 83 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11058 | 10/26 | 87 | M | 100 | N | N | N | N | Y | 2 | | | 3D9.1C2C551321 | SR07LGRTAILR | Cherrylane | W | 1.2 | 4 | Y |
| 11059 | 10/26 | 98 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |

Appendix B (continued).

| Fish ID # | Date | Fork Length | Sex | % Spawned | CWT | Ad-Clip | VIE | Opercle Punch | Scales taken | DNA taken | CWT Code | CWT Origin | Pit Tag # | Pit Tag Origin | SITE | Origin | European Age | Total Age | Reservoir Reared |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11060 | 10/26 | 68 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11061 | 10/26 | 82 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11062 | 10/26 | 82 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11063 | 10/26 | 84 | F | 100 | Y | N | N | N | Y | 2 | 612736 | NPTH07SCFA | | | Cherrylane | H | 0.3 | 4 | |
| 11064 | 10/26 | 75 | M | 100 | Y | Y | N | N | Y | 1 | 610179 | LF08SBCA | | | Cherrylane | H | 0.2 | 3 | |
| 11065 | 10/26 | 90 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | W | 1.2 | 4 | Y |
| 11066 | 10/26 | 89 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 1.2 | 4 | |
| 11067 | 10/26 | 80 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11068 | 10/26 | 90 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | W | 1.2 | 4 | Y |
| 11069 | 10/26 | 76 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11070 | 10/26 | 80 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11071 | 10/26 | 82 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11072 | 10/26 | 81 | F | 100 | Y | N | N | N | Y | 2 | 612695 | NPTH07SO | | | Cherrylane | H | 0.3 | 4 | |
| 11073 | 10/26 | 77 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | R | | |
| 11074 | 10/26 | 99 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | W | 1.3 | 5 | Y |
| 11075 | 10/26 | 82 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11076 | 10/26 | 103 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | W | 1.3 | 5 | Y |
| 11077 | 10/26 | 66 | F | 100 | Y | N | N | N | Y | 2 | 612753 | LF07YBCA | | | Cherrylane | H | R | 4 | |
| 11078 | 10/26 | 74 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | W | 1.2 | 4 | Y |
| 11079 | 10/26 | 79 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11080 | 10/26 | 75 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 1.2 | 4 | |
| 11081 | 10/26 | 80 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | R | | |
| 11082 | 10/26 | 80 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11083 | 10/26 | 76 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11084 | 10/26 | 70 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | W | 1.2 | 4 | Y |
| 11085 | 10/26 | 67 | F | 100 | Y | N | N | N | Y | 2 | 612697 | NPTH08SO | | | Cherrylane | H | 0.2 | 3 | |
| 11086 | 10/26 | 37 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.1 | 2 | |
| 11087 | 10/26 | 41 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.1 | 2 | |
| 11088 | 10/26 | 79 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11089 | 10/26 | 62 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | W | 1.1 | 3 | Y |

Appendix B (continued).

| Fish ID # | Date | Fork Length | Sex | % Spawned | CWT | Ad-Clip | VIE | Opercle Punch | Scales taken | DNA taken | CWT Code | CWT Origin | Pit Tag # | Pit Tag Origin | SITE | Origin | European Age | Total Age | Reservoir Reared |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11090 | 10/26 | 82 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11091 | 10/26 | 86 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | W | 1.3 | 5 | Y |
| 11092 | 10/26 | 66 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11093 | 10/26 | 85 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | W | 1.2 | 4 | Y |
| 11094 | 10/26 | 76 | F | 100 | N | N | N | N | Y | 3 | | | 3D9.1C2D580E6E | LGRADULT | Cherrylane | U | 0.3 | 4 | |
| 11095 | 10/26 | 66 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11096 | 10/26 | 89 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | W | 1.2 | 4 | Y |
| 11097 | 10/26 | 79 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | W | 1.2 | 4 | Y |
| 11098 | 10/26 | 84 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11099 | 10/27 | 78 | F | 100 | N | N | N | N | Y | 1 | | | | | Pink House | U | 0.3 | 4 | |
| 11100 | 10/27 | 79 | M | 100 | N | N | N | N | Y | 1 | | | | | Pink House | U | 0.3 | 4 | |
| 11101 | 10/27 | 95 | M | 100 | N | N | N | N | Y | 2 | | | | | Pink House | U | 0.3 | 4 | |
| 11102 | 11/2 | 82 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11103 | 11/2 | 70 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11104 | 11/2 | 101 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | W | 1.3 | 5 | Y |
| 11105 | 11/2 | 85 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | W | 1.2 | 4 | Y |
| 11106 | 11/2 | 94 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | R | | |
| 11107 | 11/2 | 82 | F | 100 | Y | N | N | N | Y | 2 | 612694 | NPTH07SNLVA | | | Cherrylane | H | 0.3 | 4 | |
| 11108 | 11/2 | 53 | M | 100 | Y | N | N | 1LOP | Y | 2 | 220306 | LF09SBCA | | | Cherrylane | H | 0.1 | 2 | |
| 11109 | 11/2 | 73 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11110 | 11/2 | 92 | F | 100 | N | Y | N | N | Y | 2 | | | | | Cherrylane | H | R | | |
| 11111 | 11/2 | 72 | F | 100 | N | N | N | N | Y | 3 | | | | | Cherrylane | W | 1.2 | 4 | Y |
| 11112 | 11/2 | 90 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11113 | 11/2 | 83 | F | 100 | Y | N | N | N | Y | 2 | 612694 | NPTH07SNLVA | | | Cherrylane | H | 0.3 | 4 | |
| 11114 | 11/2 | 54 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.1 | 2 | |
| 11115 | 11/2 | 82 | F | 100 | Y | N | N | N | Y | 2 | 612716 | NPTH07SO | | | Cherrylane | H | 0.3 | 4 | |
| 11116 | 11/2 | 80 | F | 100 | Y | N | N | N | Y | 2 | 612695 | NPTH07SO | | | Cherrylane | H | 0.3 | 4 | |
| 11117 | 11/2 | 80 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11118 | 11/2 | 102 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | W | 1.3 | 5 | Y |
| 11119 | 11/2 | 76 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 1.2 | 4 | Y |

Appendix B (continued).

| Fish ID # | Date | Fork Length | Sex | % Spawned | CWT | Ad-Clip | VIE | Opercle Punch | Scales taken | DNA taken | CWT Code | CWT Origin | Pit Tag # | Pit Tag Origin | SITE | Origin | European Age | Total Age | Reservoir Reared |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11120 | 11/2 | 83 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | W | 1.3 | 5 | Y |
| 11121 | 11/2 | 48 | M | 100 | N | N | N | 1LOP | Y | 1 | | | 3D9.1C2D52D779 | LF09SBCA | Cherrylane | H | 0.1 | 2 | |
| 11122 | 11/2 | 78 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | W | 1.2 | 4 | Y |
| 11123 | 11/2 | 77 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | R | | |
| 11124 | 11/2 | 52 | M | 100 | Y | Y | N | N | Y | 2 | 220307 | LF09SBCA | | | Cherrylane | H | 0.1 | 2 | |
| 11125 | 11/2 | 84 | M | 100 | N | N | N | N | Y | 3 | | | | | Cherrylane | U | R | | |
| 11126 | 11/2 | 74 | F | 100 | N | Y | N | N | Y | 1 | | | | | Cherrylane | H | 1.2 | 4 | |
| 11127 | 11/2 | 82 | F | 100 | Y | N | N | N | Y | 1 | 612520 | LF07SBCA | | | Cherrylane | H | 0.3 | 4 | |
| 11128 | 11/2 | 83 | F | 100 | Y | Y | N | N | Y | 1 | 612716 | NPTH07SO | | | Cherrylane | H | 0.3 | 4 | |
| 11129 | 11/2 | 83 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11130 | 11/2 | 81 | F | 80 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11131 | 11/2 | 84 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11132 | 11/2 | 72 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11133 | 11/3 | 61 | F | 100 | Y | N | N | N | Y | 2 | 612762 | NPTH08SLGA | | | South Fork Clwr | H | 1.1 | 3 | Y |
| 11134 | 11/3 | 80 | F | 100 | Y | N | N | 1LOP | Y | 2 | 612737 | NPTH07SLGA | | | South Fork Clwr | H | 0.3 | 4 | |
| 11135 | 11/3 | 70 | M | 100 | Y | N | N | N | Y | 2 | 612737 | NPTH07SLGA | | | South Fork Clwr | H | 0.3 | 4 | |
| 11136 | 11/3 | 70 | F | 100 | Y | N | N | N | Y | 2 | 612520 | LF07SBCA | | | Cherrylane | H | 1.2 | 4 | ? |
| 11137 | 11/3 | 70 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11138 | 11/3 | 84 | M | 100 | N | Y | N | N | Y | 1 | | | | | Cherrylane | H | 0.3 | 4 | |
| 11139 | 11/3 | 66 | M | 100 | Y | Y | N | N | Y | 1 | 220303 | LF08YBCA | | | Cherrylane | H | 1.1 | 3 | |
| 11140 | 11/3 | 76 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | W | 1.2 | 4 | Y |
| 11141 | 11/3 | 63 | F | 100 | Y | N | N | N | Y | 1 | 612753 | LF07YBCA | | | Cherrylane | H | R | 4 | |
| 11142 | 11/3 | 85 | F | 100 | Y | N | N | N | Y | 1 | 612694 | NPTH07SNLVA | | | Cherrylane | H | 0.3 | 4 | |
| 11143 | 11/3 | 85 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11144 | 11/3 | 79 | M | 100 | N | N | N | N | Y | 3 | | | 3D9.1C2D551F23 | LGRADULT | Cherrylane | U | R | | |
| 11145 | 11/3 | 74 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | W | 1.2 | 4 | Y |
| 11146 | 11/3 | 45 | M | 100 | Y | N | N | N | Y | 2 | 612747 | NPTH09SLGA | | | Cherrylane | H | 0.1 | 2 | |
| 11147 | 11/3 | 37 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 1.0 | 2 | |
| 11148 | 11/3 | 39 | M | 100 | N | N | N | 1LOP | Y | 2 | | | 3D9.1C2D5F408C | LF09SDWORCRSUR | Cherrylane | H | 1.0 | 2 | Y |
| 11149 | 11/3 | 48 | M | 100 | Y | Y | N | N | Y | 1 | 220307 | LF09SBCA | | | Cherrylane | H | 0.1 | 2 | |

Appendix B (continued).

| Fish ID # | Date | Fork Length | Sex | % Spawned | CWT | Ad-Clip | VIE | Opercle Punch | Scales taken | DNA taken | CWT Code | CWT Origin | Pit Tag # | Pit Tag Origin | SITE | Origin | European Age | Total Age | Reservoir Reared |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11150 | 11/3 | 57 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | W | 1.2 | 4 | Y |
| 11151 | 11/3 | 82 | M | 100 | N | N | N | N | Y | 1 | | | 3D9.1C2CF96836 | CR07WILD | Cherrylane | W | 1.2 | 4 | Y |
| 11152 | 11/3 | 80 | F | 100 | Y | N | N | N | Y | 1 | 612694 | NPTH07SNLVA | | | Cherrylane | H | 0.3 | 4 | |
| 11153 | 11/3 | 92 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11154 | 11/3 | 85 | F | 100 | Y | N | N | N | Y | 2 | 612736 | NPTH07SCFA | | | Cherrylane | H | 0.3 | 4 | |
| 11155 | 11/3 | 75 | F | 100 | Y | N | N | N | Y | 1 | 612753 | LF07YBCA | | | Cherrylane | H | 1.2 | 4 | |
| 11156 | 11/3 | 62 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11157 | 11/3 | 85 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 1.2 | 4 | |
| 11158 | 11/3 | 85 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11159 | 11/3 | 85 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11160 | 11/3 | 81 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | W | 1.2 | 4 | Y |
| 11161 | 11/3 | 77 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | W | 1.2 | 4 | Y |
| 11162 | 11/3 | 85 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | W | 1.2 | 4 | Y |
| 11163 | 11/3 | 77 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11164 | 11/3 | 45 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.1 | 2 | |
| 11165 | 11/3 | 74 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | W | 1.2 | 4 | Y |
| 11166 | 11/3 | 74 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | W | 1.2 | 4 | Y |
| 11167 | 11/3 | 81 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | W | 1.3 | 5 | Y |
| 11168 | 11/3 | 67 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | W | 1.1 | 3 | Y |
| 11169 | 11/3 | 84 | F | 100 | Y | N | N | N | Y | 1 | 612694 | NPTH07SNLVA | | | Cherrylane | H | 0.3 | 4 | |
| 11170 | 11/3 | 84 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | W | 1.2 | 4 | Y |
| 11171 | 11/3 | 72 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11172 | 11/3 | 85 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11173 | 11/3 | 78 | F | 100 | N | N | N | 1LOP | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11174 | 11/3 | 73 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11175 | 11/3 | 86 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11176 | 11/3 | 82 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11177 | 11/3 | 56 | M | 100 | Y | N | N | N | Y | 2 | 220302 | LF08YBCA | | | Cherrylane | H | 1.1 | 3 | |
| 11178 | 11/3 | 81 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | R | | |
| 11179 | 11/3 | 77 | F | 100 | Y | N | N | N | Y | 1 | 612736 | NPTH07SCFA | | | Cherrylane | H | 0.3 | 4 | |

Appendix B (continued).

| Fish ID # | Date | Fork Length | Sex | % Spawned | CWT | Ad-Clip | VIE | Opercle Punch | Scales taken | DNA taken | CWT Code | CWT Origin | Pit Tag # | Pit Tag Origin | SITE | Origin | European Age | Total Age | Reservoir Reared |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11180 | 11/3 | 82 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11181 | 11/3 | 75 | F | 100 | Y | N | N | N | Y | 2 | 612695 | NPTH07SO | | | Cherrylane | H | 0.3 | 4 | |
| 11182 | 11/3 | 83 | F | 100 | Y | Y | N | N | Y | 2 | 612694 | NPTH07SNLVA | | | Cherrylane | H | 0.3 | 4 | |
| 11183 | 11/3 | 66 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11184 | 11/3 | 79 | F | 100 | Y | N | N | N | Y | 2 | 612696 | NPTH06SO | | | Cherrylane | H | 0.4 | 5 | |
| 11185 | 11/3 | 57 | M | 100 | Y | N | N | N | Y | 1 | 220303 | LF08YBCA | | | Cherrylane | H | 1.1 | 3 | |
| 11186 | 11/3 | 82 | M | 100 | Y | N | N | N | Y | 1 | 612694 | NPTH07SNLVA | | | Cherrylane | H | 0.3 | 4 | |
| 11187 | 11/3 | 74 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11188 | 11/7 | 57 | M | 100 | N | N | N | 1LOP | Y | 1 | | | 3D9.1C2D0367CA | LF08SDWORCRSUR | Cherrylane | H | 1.1 | 3 | Y |
| 11189 | 11/7 | 71 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11190 | 11/7 | 70 | F | 100 | Y | N | N | 1LOP | Y | 2 | 612753 | LF07YBCA | | | Cherrylane | H | 1.2 | 4 | |
| 11191 | 11/7 | 87 | F | 100 | Y | Y | N | N | Y | 2 | 612694 | NPTH07SNLVA | | | Cherrylane | H | 0.3 | 4 | |
| 11192 | 11/7 | 83 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | W | 1.2 | 4 | Y |
| 11193 | 11/7 | 78 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11194 | 11/7 | 105 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | R | | |
| 11195 | 11/7 | 86 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | W | 1.3 | 5 | Y |
| 11196 | 11/7 | 79 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | W | 1.2 | 4 | Y |
| 11197 | 11/7 | 87 | F | 100 | Y | N | N | N | Y | 2 | 612737 | NPTH07SLGA | | | Cherrylane | H | 0.3 | 4 | |
| 11198 | 11/7 | 83 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11199 | 11/7 | 83 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11200 | 11/7 | 90 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11201 | 11/7 | 82 | F | 100 | Y | N | N | N | Y | 2 | 612694 | NPTH07SNLVA | | | Cherrylane | H | 0.3 | 4 | |
| 11202 | 11/7 | 82 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11203 | 11/7 | 96 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11204 | 11/7 | 85 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11205 | 11/7 | 47 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.1 | 2 | |
| 11206 | 11/7 | 69 | M | 100 | Y | N | N | N | Y | 2 | 612753 | LF07YBCA | | | Cherrylane | H | 1.2 | 4 | |
| 11207 | 11/7 | 70 | M | 100 | Y | N | N | N | Y | 2 | 612737 | NPTH07SLGA | | | Cherrylane | H | 0.3 | 4 | |
| 11208 | 11/7 | 82 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 1.1 | 3 | |
| 11209 | 11/7 | 85 | F | 100 | Y | N | N | N | Y | 2 | 612694 | NPTH07SNLVA | | | Cherrylane | H | 0.3 | 4 | |

Appendix B (continued).

| Fish ID # | Date | Fork Length | Sex | % Spawned | CWT | Ad-Clip | VIE | Opercle Punch | Scales taken | DNA taken | CWT Code | CWT Origin | Pit Tag # | Pit Tag Origin | SITE | Origin | European Age | Total Age | Reservoir Reared |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11210 | 11/7 | 85 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11211 | 11/7 | 49 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.1 | 2 | |
| 11212 | 11/7 | 85 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11213 | 11/7 | 65 | M | 100 | Y | N | N | N | Y | 1 | 220302 | LF08YBCA | | | Cherrylane | H | 1.1 | 3 | |
| 11214 | 11/7 | 77 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11215 | 11/7 | 87 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | NS | | |
| 11216 | 11/7 | 84 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11217 | 11/7 | 84 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11218 | 11/7 | 48 | M | 100 | Y | N | N | N | Y | 2 | LOST | | | | Cherrylane | H | 0.1 | 2 | |
| 11219 | 11/7 | 70 | M | 100 | Y | Y | N | N | Y | 2 | 634996 | LFH08SCCD | | | Cherrylane | H | 0.2 | 3 | |
| 11220 | 11/7 | 69 | F | 100 | Y | Y | N | N | Y | 2 | 610179 | LF08SBCA | | | Cherrylane | H | 0.2 | 3 | |
| 11221 | 11/7 | 86 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11222 | 11/7 | 74 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11223 | 11/7 | 81 | F | 100 | Y | Y | N | N | Y | 2 | 612517 | LF07SBCA | | | Cherrylane | H | 0.3 | 4 | |
| 11224 | 11/7 | 75 | F | 100 | Y | N | N | N | Y | 2 | 612516 | LF06YBCA | | | Cherrylane | H | R | 5 | |
| 11225 | 11/7 | 78 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11226 | 11/7 | 80 | F | 100 | Y | N | N | N | Y | 2 | 612716 | NPTH07SO | | | Cherrylane | H | R | 4 | |
| 11227 | 11/7 | 82 | M | 100 | Y | N | N | N | Y | 2 | 612737 | NPTH07SLGA | | | Cherrylane | H | 0.3 | 4 | |
| 11228 | 11/7 | 65 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11229 | 11/7 | 82 | F | 100 | Y | N | N | N | Y | 1 | 612694 | NPTH07NLVA | | | Cherrylane | H | 0.3 | 4 | |
| 11230 | 11/7 | 66 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11231 | 11/7 | 50 | M | 100 | Y | Y | N | N | Y | 2 | 220200 | NPTH09SO | | | Cherrylane | H | 0.1 | 2 | |
| 11232 | 11/7 | 80 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11233 | 11/7 | 68 | F | 100 | Y | N | N | N | Y | 2 | 612520 | LF07SBCA | | | Cherrylane | H | 0.3 | 4 | |
| 11234 | 11/7 | 64 | M | 100 | N | N | N | N | Y | 2 | | | 3D9.1C2D00A5EB | LF08SDWORCRSUR | Cherrylane | H | 1.1 | 3 | Y |
| 11235 | 11/7 | 80 | F | 100 | Y | N | N | N | Y | 1 | 612737 | NPTH07SLGA | | | Cherrylane | H | 0.3 | 4 | |
| 11236 | 11/7 | 74 | F | 100 | Y | N | N | N | Y | 1 | 612736 | NPTH07SCFA | | | Cherrylane | H | 0.3 | 4 | |
| 11237 | 11/7 | 49 | M | 100 | Y | Y | N | N | Y | 2 | 635181 | LF09SCCD | | | Cherrylane | H | 0.1 | 2 | |
| 11238 | 11/7 | 73 | F | 100 | Y | Y | N | N | Y | 1 | 634671 | LF07SCCD | | | Cherrylane | H | 0.3 | 4 | |
| 11239 | 11/7 | 69 | M | 100 | Y | N | N | N | Y | 2 | 610182 | LF08SBCA | | | Cherrylane | H | 0.2 | 3 | |

Appendix B (continued).

| Fish ID # | Date | Fork Length | Sex | % Spawned | CWT | Ad-Clip | VIE | Opercle Punch | Scales taken | DNA taken | CWT Code | CWT Origin | Pit Tag # | Pit Tag Origin | SITE | Origin | European Age | Total Age | Reservoir Reared |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11240 | 11/7 | 88 | F | 100 | Y | Y | N | N | Y | 1 | 612716 | NPTH07SO | | | Cherrylane | H | 0.3 | 4 | |
| 11241 | 11/16 | 64 | F | 100 | Y | Y | N | 1LOP | Y | 2 | 220303 | LF08YBCA | 3D9.1C2D48DBEA | LF08YBCA | Cherrylane | H | 1.1 | 3 | |
| 11242 | 11/16 | 78 | M | 100 | Y | N | N | N | Y | 2 | 612736 | NPTH07SCFA | | | Cherrylane | H | R | 4 | |
| 11243 | 11/16 | 82 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11244 | 11/16 | 76 | F | 100 | Y | N | N | N | Y | 1 | 612736 | NPTH07SCFA | | | Cherrylane | H | 0.3 | 4 | |
| 11245 | 11/16 | 76 | F | 100 | Y | N | N | N | Y | 2 | 612737 | NPTH07SLGA | | | Cherrylane | H | 0.3 | 4 | |
| 11246 | 11/16 | 85 | F | 100 | Y | Y | N | N | Y | 1 | 612716 | NPTH07SO | | | Cherrylane | H | 0.3 | 4 | |
| 11247 | 11/16 | 86 | F | 100 | Y | Y | N | N | Y | 1 | 612694 | NPTH07SNLVA | | | Cherrylane | H | 0.3 | 4 | |
| 11248 | 11/16 | 75 | F | 100 | Y | N | N | 1LOP | Y | 2 | 612753 | LF07YBCA | | | Cherrylane | H | 1.2 | 4 | |
| 11249 | 11/16 | 76 | F | 100 | Y | N | N | N | Y | 1 | 612737 | NPTH07SLGA | | | Cherrylane | H | 0.3 | 4 | |
| 11250 | 11/16 | 72 | F | 100 | Y | N | N | 1LOP | Y | 1 | 612753 | LF07YBCA | | | Cherrylane | H | 1.2 | 4 | |
| 11251 | 11/16 | 78 | F | 100 | Y | Y | N | N | Y | 2 | 090135 | UMA07SUMA | | | Cherrylane | H | 0.3 | 4 | |
| 11252 | 11/16 | 74 | F | 100 | Y | N | N | N | Y | 2 | 612766 | NPTH08SNLVA | | | Cherrylane | H | 1.1 | 3 | Y |
| 11253 | 11/16 | 82 | F | 100 | Y | Y | N | N | Y | 2 | 634671 | LF07SCCD | | | Cherrylane | H | 0.3 | 4 | |
| 11254 | 11/16 | 79 | F | 100 | Y | N | N | N | Y | 1 | 612695 | NPTH07SO | | | Cherrylane | H | 0.3 | 4 | |
| 11255 | 11/16 | 61 | F | 100 | Y | Y | N | N | Y | 2 | 220303 | LF08YBCA | | | Cherrylane | H | 1.1 | 3 | |
| 11256 | 11/16 | 77 | F | 100 | Y | N | N | N | Y | 1 | 612520 | LF07SBCA | | | Cherrylane | H | 0.3 | 4 | |
| 11257 | 11/16 | 80 | F | 100 | Y | Y | N | N | Y | 1 | 612694 | NPTH07SNLVA | | | Cherrylane | H | 0.3 | 4 | |
| 11258 | 11/16 | 51 | M | 100 | Y | N | N | N | Y | 2 | 220302 | LF08YBCA | | | Cherrylane | H | 1.1 | 3 | |
| 11259 | 11/16 | 78 | F | 100 | Y | N | N | N | Y | 1 | 612520 | LF07SBCA | | | Cherrylane | H | 0.3 | 4 | |
| 11260 | 11/16 | 83 | M | 100 | Y | N | N | N | Y | 2 | 612737 | NPTH07SLGA | | | Cherrylane | H | 0.3 | 4 | |
| 11261 | 11/16 | 87 | F | 100 | Y | Y | N | N | Y | 1 | 612694 | NPTH07SNLVA | | | Cherrylane | H | 0.3 | 4 | |
| 11262 | 11/16 | 65 | F | 100 | Y | N | N | N | Y | 1 | 220302 | LF08YBCA | | | Cherrylane | H | 1.1 | 3 | |
| 11263 | 11/16 | 84 | F | 100 | Y | Y | N | N | Y | 1 | 612517 | LF07SBCA | | | Cherrylane | H | 0.3 | 4 | |
| 11264 | 11/16 | 70 | M | 100 | Y | N | N | N | Y | 2 | 612766 | NPTH08SNLVA | | | Cherrylane | H | 0.2 | 3 | |
| 11265 | 11/16 | 87 | F | 100 | Y | N | N | N | Y | 2 | 612716 | NPTH07SO | | | Cherrylane | H | 0.3 | 4 | |
| 11266 | 11/16 | 67 | M | 100 | Y | N | N | N | Y | 2 | 612755 | LF07YCJA | | | Cherrylane | H | 1.2 | 4 | |
| 11267 | 11/16 | 84 | M | 100 | Y | N | N | N | Y | 2 | 612694 | NPTH07SNLVA | | | Cherrylane | H | 0.3 | 4 | |
| 11268 | 11/16 | 88 | M | 100 | Y | Y | N | N | Y | 1 | 612716 | NPTH07SO | | | Cherrylane | H | 0.3 | 4 | |
| 11269 | 11/16 | 69 | F | 100 | Y | Y | N | 1LOP | Y | 2 | 612738 | NPTH08SNLVA | | | Cherrylane | H | 1.1 | 3 | |

Appendix B (continued).

| Fish ID # | Date | Fork Length | Sex | % Spawned | CWT | Ad-Clip | VIE | Opercle Punch | Scales taken | DNA taken | CWT Code | CWT Origin | Pit Tag # | Pit Tag Origin | SITE | Origin | European Age | Total Age | Reservoir Reared |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11270 | 11/16 | 90 | M | 100 | Y | N | N | N | Y | 1 | 612737 | NPTH07SLGA | | | Cherrylane | H | 0.3 | 4 | |
| 11271 | 11/16 | 84 | F | 100 | Y | N | N | N | Y | 2 | 612694 | NPTH07SNLVA | | | Cherrylane | H | 0.3 | 4 | |
| 11272 | 11/16 | 61 | F | 100 | N | Y | N | 1LOP | Y | 2 | | | | | Cherrylane | H | 0.2 | 3 | |
| 11273 | 11/16 | 62 | F | 100 | Y | N | N | N | Y | 1 | 220300 | LF08YCJA | | | Cherrylane | H | 1.1 | 3 | |
| 11274 | 11/16 | 52 | F | 100 | Y | N | N | N | Y | 2 | 220300 | LF08YCJA | | | Cherrylane | H | 1.1 | 3 | |
| 11275 | 11/16 | 68 | F | 100 | Y | Y | N | N | Y | 2 | 612739 | NPTH08SO | | | Cherrylane | H | 1.1 | 3 | Y |
| 11276 | 11/16 | 78 | F | 100 | Y | N | N | N | Y | 2 | 612716 | NPTH07SO | | | Cherrylane | H | 0.3 | 4 | |
| 11277 | 11/16 | 83 | F | 100 | Y | N | N | N | Y | 1 | 612736 | NPTH07SCFA | | | Cherrylane | H | 0.3 | 4 | |
| 11278 | 11/16 | 83 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11279 | 11/16 | 96 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11280 | 11/16 | 77 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11281 | 11/16 | 85 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11282 | 11/16 | 79 | M | 100 | N | N | N | 1LOP | Y | 2 | | | | | Cherrylane | U | R | | |
| 11283 | 11/16 | 82 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 1.3 | 5 | |
| 11284 | 11/16 | 80 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11285 | 11/16 | 65 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11286 | 11/16 | 72 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11287 | 11/16 | 76 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11288 | 11/16 | 71 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11289 | 11/16 | 90 | F | 100 | N | Y | N | N | Y | 2 | | | | | Cherrylane | H | 0.3 | 4 | |
| 11290 | 11/16 | 77 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11291 | 11/16 | 49 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.1 | 2 | |
| 11292 | 11/16 | 93 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11293 | 11/16 | 80 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11294 | 11/16 | 81 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11295 | 11/16 | 53 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.1 | 2 | |
| 11296 | 11/16 | 92 | F | 100 | N | N | N | N | Y | 3 | | | | | Cherrylane | W | 1.2 | 4 | Y |
| 11297 | 11/16 | 83 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11298 | 11/16 | 89 | F | 0 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11299 | 11/16 | 81 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | W | 1.2 | 4 | Y |

Appendix B (continued).

| Fish ID # | Date | Fork Length | Sex | % Spawned | CWT | Ad-Clip | VIE | Opercle Punch | Scales taken | DNA taken | CWT Code | CWT Origin | Pit Tag # | Pit Tag Origin | SITE | Origin | European Age | Total Age | Reservoir Reared |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11300 | 11/16 | 85 | F | 100 | N | Y | N | N | Y | 2 | | | | | Cherrylane | H | 0.3 | 4 | |
| 11301 | 11/16 | 72 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11302 | 11/16 | 87 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11303 | 11/16 | 82 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11304 | 11/16 | 82 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11305 | 11/16 | 77 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11306 | 11/16 | 90 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11307 | 11/16 | 84 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11308 | 11/16 | 102 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11309 | 11/17 | 71 | F | 100 | Y | N | N | N | Y | 2 | 612753 | LF07YBCA | 3D9.1C2D6EFF3B | ORPHAN | Cherrylane | H | 1.2 | 4 | |
| 11310 | 11/17 | 47 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.1 | 2 | |
| 11311 | 11/17 | 55 | F | 100 | Y | N | N | N | Y | 2 | 220201 | NPTH09SNLVA | | | Cherrylane | H | 0.1 | 2 | |
| 11312 | 11/17 | 76 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11313 | 11/17 | 83 | F | 100 | Y | Y | N | N | Y | 1 | 612716 | NPTH07SO | | | Cherrylane | H | 0.3 | 4 | |
| 11314 | 11/17 | 76 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11315 | 11/17 | 74 | M | 100 | Y | Y | N | N | Y | 2 | 612752 | LF07YCJA | | | Cherrylane | H | 1.2 | 4 | |
| 11316 | 11/17 | 64 | F | 100 | Y | N | N | N | Y | 1 | 220302 | LF08YBCA | | | Cherrylane | H | 1.1 | 3 | |
| 11317 | 11/17 | 78 | F | 100 | Y | N | N | N | Y | 2 | 612694 | NPTH07SNLVA | | | Cherrylane | H | 0.3 | 4 | |
| 11318 | 11/17 | 75 | F | 100 | Y | Y | N | N | Y | 2 | 612517 | LF07SBCA | | | Cherrylane | H | 0.3 | 4 | |
| 11319 | 11/17 | 80 | F | 100 | Y | N | N | N | Y | 2 | 612694 | NPTH07SNLVA | | | Cherrylane | H | 0.3 | 4 | |
| 11320 | 11/17 | 85 | F | 100 | Y | N | N | N | Y | 2 | 612696 | NPTH06SO | | | Cherrylane | H | 1.3 | 5 | ? |
| 11321 | 11/17 | 85 | F | 100 | Y | N | N | N | Y | 2 | 612520 | LF07SBCA | | | Cherrylane | H | 0.3 | 4 | |
| 11322 | 11/17 | 87 | F | 100 | Y | Y | N | N | Y | 2 | 612694 | NPTH07SNLVA | | | Cherrylane | H | 0.3 | 4 | |
| 11323 | 11/17 | 61 | M | 100 | Y | N | N | N | Y | 2 | 220302 | LF08YBCA | | | Cherrylane | H | 1.1 | 3 | |
| 11324 | 11/17 | 56 | M | 100 | Y | Y | N | 1LOP | Y | 2 | 220303 | LF08YBCA | | | Cherrylane | H | 1.1 | 3 | |
| 11325 | 11/17 | 55 | M | 100 | Y | Y | N | N | Y | 1 | 220305 | LF08YCJA | | | Cherrylane | H | 1.1 | 3 | |
| 11326 | 11/17 | 65 | F | 100 | Y | N | N | N | Y | 2 | 612753 | LF07YBCA | | | Cherrylane | H | 1.2 | 4 | |
| 11327 | 11/17 | 49 | M | 100 | Y | N | N | N | Y | 2 | 220307 | LF09SBCA | | | Cherrylane | H | 0.1 | 2 | |
| 11328 | 11/17 | 53 | M | 100 | Y | N | N | N | Y | 1 | 635165 | LF08YO | | | Cherrylane | H | 1.1 | 3 | |
| 11329 | 11/17 | 79 | F | 100 | Y | N | N | N | Y | 1 | 612736 | NPTH07SCFA | | | Cherrylane | H | 0.3 | 4 | |

Appendix B (continued).

| Fish ID # | Date | Fork Length | Sex | % Spawned | CWT | Ad-Clip | VIE | Opercle Punch | Scales taken | DNA taken | CWT Code | CWT Origin | Pit Tag # | Pit Tag Origin | SITE | Origin | European Age | Total Age | Reservoir Reared |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11330 | 11/17 | 79 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11331 | 11/17 | 51 | M | 100 | Y | N | N | N | Y | 2 | 220201 | NPTH09SNLVA | | | Cherrylane | H | 0.1 | 2 | |
| 11332 | 11/17 | 76 | F | 100 | Y | N | N | N | Y | 2 | 612753 | LF07YBCA | | | Cherrylane | H | 1.2 | 4 | |
| 11333 | 11/17 | 67 | F | 100 | Y | N | N | N | Y | 2 | 612753 | LF07YBCA | | | Cherrylane | H | 1.2 | 4 | |
| 11334 | 11/17 | 54 | M | 100 | Y | N | N | N | Y | 1 | 220302 | LF08YBCA | | | Cherrylane | H | 1.1 | 3 | |
| 11335 | 11/17 | 82 | F | 100 | Y | N | N | N | Y | 2 | 612694 | NPTH07SNLVA | | | Cherrylane | H | 0.3 | 4 | |
| 11336 | 11/17 | 86 | F | 100 | Y | Y | N | N | Y | 3 | 612694 | NPTH07SNLVA | | | Cherrylane | H | 0.3 | 4 | |
| 11337 | 11/17 | 84 | F | 100 | Y | Y | N | N | Y | 2 | 612694 | NPTH07SNLVA | | | Cherrylane | H | 0.3 | 4 | |
| 11338 | 11/17 | 68 | F | 100 | Y | Y | N | N | Y | 2 | 610179 | LF08SBCA | | | Cherrylane | H | 0.2 | 3 | |
| 11339 | 11/17 | 83 | F | 100 | Y | Y | N | N | Y | 2 | 612694 | NPTH07SNLVA | | | Cherrylane | H | 0.3 | 4 | |
| 11340 | 11/17 | 74 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11341 | 11/17 | 101 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11342 | 11/17 | 83 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11343 | 11/17 | 52 | M | 100 | N | N | N | N | Y | 3 | | | | | Cherrylane | U | 0.1 | 2 | |
| 11344 | 11/17 | 77 | F | 100 | N | N | N | N | Y | 3 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11345 | 11/17 | 76 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | W | 1.2 | 4 | Y |
| 11346 | 11/17 | 85 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11347 | 11/17 | 72 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11348 | 11/17 | 81 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11349 | 11/17 | 69 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11350 | 11/17 | 87 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11351 | 11/17 | 79 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | W | 1.2 | 4 | Y |
| 11352 | 11/17 | 88 | F | 0 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11353 | 11/17 | 82 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11354 | 11/17 | 76 | F | 100 | N | N | N | 1LOP | Y | 2 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11355 | 11/17 | 76 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11356 | 11/17 | 77 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11357 | 11/17 | 67 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11358 | 11/17 | 78 | M | 100 | N | N | N | N | Y | 3 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11359 | 11/17 | 70 | M | 100 | N | N | N | N | Y | 2 | | | 3D9.1C2D1A02C3 | LF08SDWORSRSUR | Cherrylane | H | 1.1 | 3 | |

Appendix B (continued).

| Fish ID # | Date | Fork Length | Sex | % Spawned | CWT | Ad-Clip | VIE | Opercle Punch | Scales taken | DNA taken | CWT Code | CWT Origin | Pit Tag # | Pit Tag Origin | SITE | Origin | European Age | Total Age | Reservoir Reared |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11360 | 11/17 | 60 | M | 100 | N | N | N | 1LOP | Y | 2 | | | 3D9.1C2D1ED6D4 | LF08SDWORCRSUR | Cherrylane | H | 1.1 | 3 | |
| 11361 | 11/21 | 72 | F | 100 | Y | N | N | N | Y | 2 | 612753 | LF07YBCA | | | Cherrylane | H | 1.2 | 4 | |
| 11362 | 11/21 | 57 | M | 100 | Y | N | N | 1LOP | Y | 2 | 220304 | LF08YPLA | 3D9.1C2C8526CE | LF08YPLA | Cherrylane | H | 1.1 | 3 | |
| 11363 | 11/21 | 57 | F | 100 | Y | N | N | 1LOP | Y | 2 | 220302 | LF08YBCA | 3D9.1C2D019953 | LF08YBCA | Cherrylane | H | 1.1 | 3 | |
| 11364 | 11/21 | 71 | M | 100 | N | N | N | 1LOP | Y | 1 | | | 3D9.1C2D137888 | LF08SDWORSRSUR | Cherrylane | H | 0.2 | 3 | |
| 11365 | 11/21 | 58 | M | 100 | N | N | N | 1LOP | Y | 1 | | | 3D9.1C2D14BE81 | LF08SDWORCRSUR | Cherrylane | H | 1.1 | 3 | Y |
| 11366 | 11/21 | 67 | M | 100 | N | N | N | 1LOP | Y | 2 | | | 3D9.1C2D19DFDC | LF08SDWORSRSUR | Cherrylane | H | 0.2 | 3 | |
| 11367 | 11/21 | 76 | F | 100 | Y | N | N | N | Y | 2 | 612520 | LF07SBCA | | | Cherrylane | H | 0.3 | 4 | |
| 11368 | 11/21 | 94 | M | 100 | Y | N | N | N | Y | 1 | 612694 | NPTH07SNLVA | | | Cherrylane | H | 0.3 | 4 | |
| 11369 | 11/21 | 84 | F | 100 | Y | N | N | N | Y | 2 | 612736 | NPTH07SCFA | | | Cherrylane | H | 0.3 | 4 | |
| 11370 | 11/21 | 78 | F | 100 | Y | N | N | N | Y | 2 | 612716 | NPTH07SO | | | Cherrylane | H | 0.3 | 4 | |
| 11371 | 11/21 | 67 | F | 100 | Y | N | N | 1LOP | Y | 1 | 612762 | NPTH08SLGA | | | Cherrylane | H | 0.2 | 3 | |
| 11372 | 11/21 | 77 | F | 100 | Y | Y | N | N | Y | 2 | 612716 | NPTH07SO | | | Cherrylane | H | 0.3 | 4 | |
| 11373 | 11/21 | 82 | F | 100 | Y | N | N | N | Y | 2 | 612736 | NPTH07SCFA | | | Cherrylane | H | 0.3 | 4 | |
| 11374 | 11/21 | 79 | F | 100 | Y | Y | N | N | Y | 2 | 612694 | NPTH07SNLVA | | | Cherrylane | H | 0.3 | 4 | |
| 11375 | 11/21 | 56 | M | 100 | Y | Y | N | N | Y | 2 | 220304 | LF08YPLA | | | Cherrylane | H | 1.1 | 3 | |
| 11376 | 11/21 | 71 | M | 100 | Y | N | N | N | Y | 2 | 220300 | LF08YCJA | | | Cherrylane | H | 1.1 | 3 | |
| 11377 | 11/21 | 78 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11378 | 11/21 | 76 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11379 | 11/21 | 91 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11380 | 11/21 | 73 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11381 | 11/21 | 68 | M | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11382 | 11/21 | 88 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11383 | 11/21 | 78 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11384 | 11/21 | 87 | F | 100 | N | N | N | N | Y | 3 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11385 | 11/21 | 90 | F | 100 | N | Y | N | N | Y | 1 | | | | | Cherrylane | H | 0.3 | 4 | |
| 11386 | 11/21 | 70 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11387 | 11/21 | 83 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11388 | 11/21 | 91 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11389 | 11/21 | 72 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.2 | 3 | |

Appendix B (continued).

| Fish ID # | Date | Fork Length | Sex | % Spawned | CWT | Ad-Clip | VIE | Opercle Punch | Scales taken | DNA taken | CWT Code | CWT Origin | Pit Tag # | Pit Tag Origin | SITE | Origin | European Age | Total Age | Reservoir Reared |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11390 | 11/21 | 79 | F | 100 | N | N | N | N | Y | 3 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11391 | 11/21 | 72 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11392 | 11/21 | 42 | M | 100 | N | N | N | N | Y | 3 | | | | | Cherrylane | U | 1.0 | 2 | |
| 11393 | 11/21 | 82 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11394 | 11/21 | 86 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11395 | 11/21 | 77 | F | 100 | N | N | N | N | Y | 3 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11396 | 11/21 | 80 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11397 | 11/21 | 79 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | W | 1.2 | 4 | Y |
| 11398 | 11/21 | 80 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11399 | 11/21 | 86 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11400 | 11/21 | 71 | M | 100 | N | N | N | N | Y | 3 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11401 | 11/21 | 49 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.1 | 2 | |
| 11402 | 11/21 | 80 | F | 100 | N | N | N | N | Y | 3 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11403 | 11/21 | 65 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11404 | 11/21 | 78 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 1.2 | 4 | |
| 11405 | 11/21 | 69 | F | 100 | N | N | N | N | Y | 1 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11406 | 11/21 | 74 | F | 100 | N | N | N | N | Y | 3 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11407 | 11/21 | 62 | M | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | W | 1.1 | 3 | Y |
| 11408 | 11/21 | 60 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11409 | 11/21 | 80 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11410 | 11/29 | 67 | F | 100 | N | N | N | 1LOP | Y | 3 | | | 3D9.1C2C93FA32 | LF08SDWORSRSUR | Cherrylane | H | 0.2 | 3 | |
| 11411 | 11/29 | 83 | F | 100 | Y | N | N | N | Y | 3 | 612520 | LF07SBCA | | | Cherrylane | H | 0.3 | 4 | |
| 11412 | 11/29 | 81 | F | 100 | Y | Y | N | N | Y | 2 | 612694 | NPTH07SNLVA | | | Cherrylane | H | 0.3 | 4 | |
| 11413 | 11/29 | 86 | F | 100 | Y | N | N | N | Y | 3 | 612737 | NPTH07SLGA | | | Cherrylane | H | 0.3 | 4 | |
| 11414 | 11/29 | 75 | F | 100 | Y | N | N | N | Y | 2 | 634681 | LF07YO | | | Cherrylane | H | 1.2 | 4 | |
| 11415 | 11/29 | 83 | F | 100 | Y | Y | N | N | Y | 2 | 634671 | LF07SCCD | | | Cherrylane | H | 0.3 | 4 | |
| 11416 | 11/29 | 56 | M | 100 | Y | N | N | N | Y | 3 | 220302 | LF08YBCA | | | Cherrylane | H | 1.1 | 3 | |
| 11417 | 11/29 | 55 | M | 100 | Y | N | N | 1LOP | Y | 2 | 220300 | LF08YCJA | | | Cherrylane | H | 1.1 | 3 | |
| 11418 | 11/29 | 61 | M | 100 | Y | Y | N | N | Y | 3 | 610179 | LF08SBCA | | | Cherrylane | H | R | 3 | |
| 11419 | 11/29 | 83 | F | 100 | Y | Y | N | N | Y | 3 | 612716 | NPTH07SO | | | Cherrylane | H | 0.3 | 4 | |

Appendix B (continued).

| Fish ID # | Date | Fork Length | Sex | % Spawned | CWT | Ad-Clip | VIE | Opercle Punch | Scales taken | DNA taken | CWT Code | CWT Origin | Pit Tag # | Pit Tag Origin | SITE | Origin | European Age | Total Age | Reservoir Reared |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11420 | 11/29 | 88 | F | 100 | Y | N | N | N | Y | 3 | 090909 | 09BLANK | | | Cherrylane | H | 1.3 | 5 | |
| 11421 | 11/29 | 76 | F | 100 | Y | Y | N | N | Y | 3 | 634671 | LF07SCCD | | | Cherrylane | H | 0.3 | 4 | |
| 11422 | 11/29 | 80 | F | 100 | Y | N | N | N | Y | 3 | 612520 | LF07SBCA | | | Cherrylane | H | 0.3 | 4 | |
| 11423 | 11/29 | 66 | F | 100 | Y | N | N | N | Y | 3 | 612697 | NPTH08SO | | | Cherrylane | H | 0.2 | 3 | |
| 11424 | 11/29 | 82 | F | 100 | Y | N | N | N | Y | 3 | 612716 | NPTH07SO | | | Cherrylane | H | 0.3 | 4 | |
| 11425 | 11/29 | 84 | M | 100 | Y | N | N | N | Y | 3 | 612737 | NPTH07SLGA | | | Cherrylane | H | 0.3 | 4 | |
| 11426 | 11/29 | 68 | M | 100 | Y | N | N | N | Y | 3 | 612697 | NPTH08SO | | | Cherrylane | H | 0.2 | 3 | |
| 11427 | 11/29 | 65 | F | 100 | Y | Y | N | N | Y | 2 | 220303 | LF08YBCA | | | Cherrylane | H | 1.1 | 3 | |
| 11428 | 11/29 | 76 | F | 100 | N | N | N | 1LOP | Y | 3 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11429 | 11/29 | 55 | M | 100 | N | N | N | N | Y | 3 | | | | | Cherrylane | U | 0.1 | 2 | |
| 11430 | 11/29 | 62 | M | 100 | N | N | N | N | Y | 3 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11431 | 11/29 | 68 | F | 100 | N | Y | N | N | Y | 3 | | | | | Cherrylane | H | 1.2 | 4 | |
| 11432 | 11/29 | 76 | F | 100 | N | N | N | N | Y | 2 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11433 | 11/29 | 84 | F | 100 | N | N | N | N | Y | 3 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11434 | 11/29 | 75 | F | 100 | N | N | N | N | Y | 3 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11435 | 11/29 | 75 | F | 100 | N | N | N | 1LOP | Y | 3 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11436 | 11/29 | 92 | M | 100 | N | N | N | N | Y | 3 | | | | | Cherrylane | U | 1.2 | 4 | |
| 11437 | 11/29 | 91 | F | 100 | N | N | N | N | Y | 3 | | | | | Cherrylane | U | 0.3 | 4 | |
| 11438 | 11/29 | 70 | F | 100 | N | N | N | N | Y | 3 | | | | | Cherrylane | U | 0.2 | 3 | |
| 11439 | 12/7 | 68 | F | 100 | Y | N | N | N | Y | 2 | 612697 | NPTH08SO | | | | H | 0.2 | 3 | |
| 11440 | 12/7 | 80 | F | 100 | Y | Y | Y | N | Y | 2 | 634680 | LF07YO | | | | H | 1.2 | 4 | |
| 11441 | 12/7 | 65 | F | 100 | N | N | N | N | Y | 2 | | | | | | W | 1.1 | 3 | Y |
| 11442 | 12/7 | 69 | F | 100 | N | N | N | N | Y | 2 | | | | | | U | 0.2 | 3 | |
| 11443 | 12/7 | 86 | F | 60 | N | N | N | N | Y | 1 | | | | | | U | 0.3 | 4 | |

***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, R = regenerated scales that could not be read.
***Origin key** (from CWT or PIT tag): LF = Lyons Ferry Hatchery, NPTH = Nez Perce Tribal Hatchery, UMA = Umatilla Hatchery, 07 = 2007 broodyear, 08 = 2008 broodyear, Y = yearling release, S = subyearling release, O = on-station release, BCA = Big Canyon Acclimation release, CJA = Captain John Acclimation release, PA = Pittsburg Landing Acclimation release, 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, BONN = tagged at Bonneville Dam as an adult, LGRTR = Lower Granite Dam tailrace tagged as a juvenile emigrant, BLANK = Umatilla R. yearling release.

Appendix C. Fall Chinook salmon female origin, broodyear, and life history summary of fish hauled from Lower Granite Dam and volunteers to Nez Perce Tribal Hatchery (NPTH) fish ladder that were processed at NPTH with total of each origin spawned for 2011 broodstock (origins from coded wire tags, passive integrated transponder (PIT) tags, adipose fin clips, and scale readings; SP = spawned, DIP = died in pond prior to spawning, KO = killed outright and not used for broodstock i.e. non-viable or green eggs).

| Origins of Females (N = 510 processed) | Brood Yr | Hauled from Lower Granite Dam Females (n = 437) | | | Volunteers to NPTH Females (n = 73) | | | Total Spawned/ Total (437/510) |
|---|---|---|---|---|---|---|---|---|
| | | SP | DIP | KO | SP | DIP | KO | |
| NPTH (on-station release) subyearling emigration | 07 | 11 | 1 | | 5 | 4 | | |
| | 08 | 2 | | | | | | 17/22 |
| NPTH-North Lapwai Valley release subyearling emigration | 07 | 5 | | | 1 | | | |
| | 08 | | | | | | | 6/6 |
| NPTH-Lukes Gulch release subyearling emigration | 07 | 3 | | | 4 | | | |
| | 08 | | | | | | | 7/7 |
| NPTH-Cedar Flats release subyearling emigration | 07 | 6 | | | 2 | 1 | | |
| | 08 | 2 | | | | | | 10/11 |
| NPTH-Cedar Flats release reservoir reared | | | | | | | | |
| | 07 | 1 | | | | | | 1/1 |
| Big Canyon subyearlings subyearling emigration | 07 | 26 | | | 3 | 7 | | |
| | 08 | 1 | 1 | | 1 | | | 31/39 |
| Captain John subyearlings subyearling emigration | 07 | 13 | | | | | | |
| | 08 | 4 | | 1 | | | | 17/18 |
| Pittsburg L. subyearlings subyearling emigration | | | | | | | | |
| | 07 | 13 | | | 1 | | | 14/14 |
| Hells Canyon Dam (IPC) direct subyearling emigration | 07 | 15 | 3 | 1 | | | | |
| | 08 | 2 | | | | | | 17/21 |
| LFH on-station subyearlings subyearling emigration | 07 | 4 | | | | | | |
| | 08 | 1 | | 1 | | | | 5/6 |
| Snake R. Couse Creek direct subyearling emigration | | | | | | | | |
| | 07 | 1 | | | | | | 1/1 |
| Grande Ronde direct subyearling emigration | 07 | 2 | | | | | | |
| | 08 | 2 | | 1 | | | | 4/5 |
| Snake R (Pit tag-LGR) unknown subyearling emigration (by scales) | 06 | 1 | | | | | | |
| | 07 | 5 | 1 | | | | | 6/7 |
| Snake R (Pit tag-LGR) unknown unknown emigration (scales reg.) | | | | | | | | |
| | 06 | 1 | | | | | | 1/1 |
| Snake R (Pit tag-LGR) natural suby reservoir reared (by scales) | 06 | 6 | 1 | | | | | |
| | 07 | 1 | | | | | | |
| | 08 | 1 | 1 | | | | | 8/9 |
| LFH subs-Snake R surrogates (Corps study) suby emigration | | | | | | | | |
| | 07 | 23 | 2 | | | | | 23/25 |
| LFH subs-Snake R surrogates (Corps study) reservoir reared | | | | | | | | |
| | 07 | 1 | | | | | | 1/1 |
| LFH subs-Clearwater R surrogates (Corps study) suby emigration | 07 | 3 | | | | | | |
| | 08 | 1 | | | | | | 4/4 |

Appendix C (continued).

| Origins of Females (N = 510 processed) | Brood Yr | Hauled from Lower Granite Dam Females (n = 437) SP | DIP | KO | Volunteers to NPTH Females (n = 73) SP | DIP | KO | Total Spawned/ Total (437/510) |
|---|---|---|---|---|---|---|---|---|
| LFH subs-Clearwater R surrogates (Corps study) reservoir reared | 07 | 4 | 3 | | | | | |
| | 08 | 3 | | | | | | 7/10 |
| Unmarked/untagged subyearlings subyearling emigration | 07 | 110 | 12 | 1 | 17 | 11 | | |
| | 08 | 12 | 1 | | 2 | 2 | | 141/168 |
| Snake River Natural (PIT tag) subyearling emigration | | | | | | | | |
| | 07 | 2 | 1 | | | | | 2/3 |
| Wild/Natural reservoir reared (by scales) | 06 | 7 | 5 | | | 1 | | |
| | 07 | 14 | | | 1 | | | 22/28 |
| Big Canyon yearlings | 06 | 1 | | | | 1 | | |
| | 07 | 4 | | | 5 | 1 | | 10/12 |
| Captain John yearlings | 07 | 3 | | | | 1 | | |
| | 08 | 4 | | | | | | 7/8 |
| Pittsburg Landing yearlings | 06 | 3 | | | | | | |
| | 07 | 1 | | | | | | |
| | 08 | 3 | | | | | | 7/7 |
| LFH on-station yearlings | 06 | 2 | | | | | | |
| | 07 | 34 | | 2 | | | | |
| | 08 | 3 | | 1 | | | | 39/42 |
| Umatilla R stray subyearlings | | | | | | | | |
| | 07 | 4 | | | | | | 4/4 |
| Umatilla R stray yearlings | | | | | | | | |
| | 06 | 3 | | | | | | 3/3 |
| Unknown hatchery ad-clipped subyearling emigration (no wire) | 06 | 1 | | | | | | |
| | 07 | 7 | 2 | | 1 | 1 | | |
| | 08 | 1 | | | | | | 10/13 |
| Unknown hatchery ad-clip yearling (lost wire) | | | | | | | | |
| | 07 | 1 | | | | | | 1/1 |
| Unknown hatchery ad-clip subyearling (lost wire) | 07 | 1 | | | | | | |
| | 08 | 1 | | | | | | 2/2 |
| Unknown hatchery yearling (by scales) | 06 | 1 | | | | | | |
| | 07 | 1 | | | | | | |
| | 08 | 1 | 1 | | | | | 3/4 |
| Unknown origin (no marks, tagged at Bonneville Dam as adult) | | | | | | | | |
| | 07 | 1 | | | | | | 1/1 |
| Unknown origin (no marks, clips) emigration unknown | | | | | | | | |
| | ? | 4 | | | | | | 4/4 |
| Female Totals (by broodyear) | 06 | 26 | 6 | 0 | 0 | 2 | 0 | 26/34 |
| | 07 | 320 | 25 | 4 | 40 | 26 | 0 | 360/415 |
| | 08 | 44 | 4 | 4 | 3 | 2 | 0 | 47/57 |
| | ? | 4 | | | | | | 4/4 |
| Females Grand Total | | 394 | 35 | 8 | 43 | 30 | 0 | 437/510 |

Appendix D. Fall Chinook salmon male origin, broodyear, and life history summary of fish hauled from Lower Granite Dam and volunteers to Nez Perce Tribal Hatchery (NPTH) fish ladder that were processed at NPTH with total of each origin spawned for 2011 broodstock (origins from coded wire tags, passive integrated transponder (PIT) tags, adipose fin clips, and scale readings; SP = spawned, DIP = died in pond prior to spawning, KO = killed outright and not used for broodstock, OUT = outplanted to river to spawn naturally).

| Origins of Males (N = 270 processed) | Brood Yr | Hauled from Lower Granite Dam Males (n = 151) | | | | Volunteers to NPTH Males (n = 119) | | | | Total Spawned/ Total (215/270) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | SP | DIP | KO | OUT | SP | DIP | KO | OUT | |
| NPTH (on-station release) subyearling emigration | 07 | 1 | | | | 4 | 3 | | | |
| | 08 | 3 | | | | 4 | 2 | | | 8/13 |
| NPTH-North Lapwai Valley release subyearling emigration | 07 | 4 | | 1 | | 3 | 2 | | | |
| | 08 | 2 | | | | 6 | 1 | | | 15/19 |
| NPTH-Lukes Gulch release subyearling emigration | 07 | | | | | 4 | | | | |
| | 08 | 1 | | | | 2 | | | | 7/7 |
| NPTH-Cedar Flats release subyearling emigration | 07 | | | | | 3 | 1 | | | |
| | 08 | | | | | 2 | | | | 5/6 |
| NPTH-Cedar Flats release reservoir reared | 07 | | | | | 1 | | | | |
| | 08 | | | | | 1 | | | | 2/2 |
| Big Canyon subyearlings subyearling emigration | 07 | 5 | | | | 9 | 3 | | | |
| | 08 | 2 | | | | 4 | 1 | 1 | | 20/25 |
| Pittsburg L. subyearlings subyearling emigration | 07 | 1 | | 1 | | | | | | |
| | 08 | 4 | | | | | | | | 5/6 |
| Hells Canyon Dam (IPC) direct subyearling emigration | 07 | 4 | | 1 | | | | | | |
| | 08 | 1 | | | | | | | | 5/6 |
| LFH on-station subyearlings subyearling emigration | 07 | 2 | | | | 1 | | | | |
| | 08 | | | 1 | | | | | | 3/4 |
| Snake R. Couse Creek direct subyearling emigration | 09 | | | | | | | | | |
| | 08 | 1 | | 2 | | | | | | 1/3 |
| Grande Ronde direct subyearling emigration | 07 | | | | | | | | | |
| | 08 | 4 | | | | | | | | 4/4 |
| Snake R Wild/Natural (PIT tag) subyearling emigration | | | | | | | | | | |
| | 07 | 1 | | | | | | | | 1/1 |
| Snake R (Pit tag-LGR) subyearling emigration | | | | | | | | | | |
| | 07 | 3 | | | | 1 | | | | 1/1 |
| Snake R (Pit tag-LGR) subyearling unknown emigration | 06 | | 1 | | | | | | | |
| | 07 | 1 | | | | | | | | 1/2 |
| Snake R (Pit tag-LGR) natural suby reservoir reared (by scales) | | | | | | | | | | |
| | 07 | 2 | 1 | | | | | | | 2/3 |
| LFH subs-Snake R surrogates (Corps study) sub emigration | 07 | 7 | | | | | | | | |
| | 08 | 2 | | | | | | | | 9/9 |
| LFH subs-Snake R surrogates (Corps study) reservoir reared | 07 | 2 | | | 1 | | | | | |
| | 08 | 1 | | 1 | | | | | | 3/5 |

Appendix D (continued).

| Origins of Males (N = 270 processed) | Brood Yr | Hauled from Lower Granite Dam Males (n = 151) | | | | Volunteers to NPTH Males (n = 119) | | | | Total Spawned/ Total (215/270) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | SP | DIP | KO | OUT | SP | DIP | KO | OUT | |
| Unmarked/untagged subyearlings subyearling emigration | 07 | 43 | 3 | 2 | | 20 | 4 | | | |
| | 08 | 3 | | 2 | 2 | 16 | 2 | 1 | | 82/98 |
| Wild/Natural reservoir reared (by scales) | 06 | 1 | 1 | | | | | | | |
| | 07 | 3 | | 1 | | | | | | |
| | 08 | 1 | | | | | | | | 5/7 |
| Big Canyon yearlings | 06 | | | | | 2 | | 1 | | |
| | 07 | 2 | | | | 7 | 1 | | | |
| | 08 | | | | | 2 | | | | 13/15 |
| Captain John yearlings | | | | | | | | | | |
| | 07 | | | | | 1 | | | | 1/1 |
| Pittsburg Landing yearlings | 07 | 2 | | | | | | | | |
| | 08 | 1 | | | | | | | | 3/3 |
| LFH on-station yearlings | 07 | 6 | | 5 | | | | | | |
| | 08 | 2 | | | | | | | | 8/13 |
| Umatilla R stray subyearlings | 07 | 1 | | 1 | | | | | | |
| | 08 | | | 1 | | | | | | 1/3 |
| Umatilla R stray yearlings | | | | | | | | | | |
| | 07 | | | 1 | | | | | | 0/1 |
| Unknown hatchery (ad-clip, no wire) subyearling emigration | | | | | | | | | | |
| | 07 | 2 | | 1 | | | | | | 2/3 |
| Unknown hatchery subyearling (no ad-clip, lost wire) | | | | | | | | | | |
| | 08 | | | | | 1 | | | | 1/1 |
| Unknown hatchery yearlings (by scales) | | | | | | | | | | |
| | 07 | | | | | | 1 | 1 | | 0/2 |
| Male Totals (by broodyear) | 06 | 1 | 2 | 0 | 0 | 2 | 0 | 1 | 0 | 3/6 |
| | 07 | 92 | 4 | 14 | 1 | 54 | 15 | 1 | 0 | 146/181 |
| | 08 | 28 | 0 | 7 | 2 | 38 | 6 | 2 | 0 | 66/83 |
| Males Grand Total | | 121 | 6 | 21 | 3 | 94 | 21 | 4 | 0 | 215/270 |