Lyons Ferry Hatchery Evaluation
Fall Chinook Salmon
Annual Report: 2012

by

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Abstract

This report summarizes activities by the Washington Department of Fish and Wildlife's (WDFW) Lower Snake River Hatchery Evaluation Program for the period 16 April 2012 through 15 April 2013.

During 2012, WDFW collected 5,225 fish at Lyons Ferry Hatchery (LFH) and Lower Granite Dam (LGR) for broodstock, monitoring and evaluation of our hatchery releases, and to estimate the run composition at LGR. At the end of the season, 491 LGR males were returned to the river near LFH to spawn naturally. Accuracy of identification of origins (hatchery/wild) occurred at three levels: highly accurate, moderately accurate, and relatively unknown. Fish with coded wire tags (CWT), Visual Implant Elastomer (VIE) or Passive Integrated Transponder (PIT) tags contributed to a highly accurate count of hatchery or natural fish in broodstock. Fish with Adipose clips were highly accurate for determination that they were hatchery origin but not accurate about the release location. Fish PIT tagged as juveniles during outmigration past LGR Dam were accurate at determining basin of origin but not hatchery/wild designation. Unmarked/untagged fish were the least accurate group because scale analysis is unable to determine origins. For complete broodstock analysis, males used multiple times are counted multiple times. Highly accurate assignments occurred with 59.0% of the broodstock being identified as Snake River hatchery fish based on CWT, VIE, and PIT tags, 0.5% of the broodstock were identified as Snake River natural origin based on PIT tags from seined juveniles in the Snake River, and less than 0.1% of the broodstock were identified as strays based on CWTs or PIT tags. Moderate accuracy was determined for 3.9% of the broodstock that were AD clipped or had lost/unreadable CWT hatchery fish, and 2.5% of the broodstock that were PIT tagged as Snake River outmigrants (hatchery or natural). Low level accuracy was determined for 34.0% of the broodstock that were unmarked and untagged which could be hatchery or wild. This high rate of uncertainty is not considered acceptable for run reconstruction, stock status monitoring, or for ESA recovery purposes.

Of the 571 males spawned, 348 fish were used multiple times to minimize the use of jacks. Overall, minijacks (zero salt) contributed 0% of the matings, jacks contributed 0.1% of the matings, and jills contributed to 0.7% of the matings.

PIT tagged fish (males and females) trapped at LGR Dam were evaluated to determine if there was a relationship between trapping date and spawning date. Run timing was not a predictor of spawn timing.

A total of 4,526,108 green eggs were taken at LFH in 2012; numerically less than full production goals listed in the *United States v. Oregon Management Agreement,* but well within precision levels expected from large production hatcheries. Green egg to eye-up survival was 96.9%. Based on hatchery records, overall average fecundity of LGR and LFH trapped females combined was 3,823 eggs/female.

Hatchery staff released BY11 subyearlings into the Snake River on site on 29-30 May 2012 (200,900 fish at 50.0 fish/lb (fpp)). Two additional groups were released: one group into the

Snake River near Couse Creek (199,300 fish at 54.0 fpp) on 29 May 2012, and a second group into the Grande Ronde River near Cougar Creek (384,000 fish at 48.0 fpp) on 24 May 2012.

Hatchery staff released BY11 yearlings into the Snake River at LFH from 10-12 April 2013 (489,500 fish) with peak emigration occurring 10 and 11 April. All release groups were represented by a unique coded wire tag (CWT) group and additionally may have received a passive integrated transponder (PIT) tag as identified in the US *v.* OR production tables. Approximately 50% of the release was AD+CWT tagged and 50% were CWT tagged at release. Visual examinations showed slender bodies and was verified by low K-factors of 1.03 and 1.04. There were no signs of precocity during visual examinations at release. PIT tags in 29,890 of the released onstation yearlings (BY11) and 19,943 of the released subyearlings (BY11) will be used to monitor adult returns in-season. Migration timing of PIT tagged fish was calculated from release site to detection facility. Subyearling juvenile salmon averaged 2.4 km/day to Lower Monumental (LMO) Dam, 4.4 km/day to Ice Harbor (ICH) Dam, 5.9 km/day to McNary (MCN) Dam, 8.7 km/day to John Day (JDD) Dam and 12.7 km/day to Bonneville (BON) Dam. Yearling juvenile salmon averaged 5.6 km/day to LMO Dam, 7.2 km/day to IHR Dam, 10.5 km/day to MCN Dam, 15.9 km/day to John Day Dam, and 21.2 km/day to Bonneville Dam.

Upon return, fish from yearling production were consistently larger than subyearlings at the same salt water age. Yearling females returned at larger sizes than yearling males of the same salt water age until age 3-salt when males were larger than the females. Subyearling females consistently returned at larger sizes than subyearling males of the same salt water age. Minijacks (0-salt) returned from yearling releases but not from subyearling releases. Yearlings returned 1-salt jacks and jills, whereas subyearlings returned no jills. Fork lengths were highly variable and there is considerable overlap between each of the salt water ages.

The Tucannon River was surveyed by foot, covering 92.3% of the historical spawning area of fall Chinook. After expanding for areas not surveyed, an estimated 541 fall Chinook redds were constructed in the river during fall 2012, resulting in an estimated spawning escapement of 1,623 Chinook. The return to the Tucannon River consisted of 72.9% in-basin hatchery fish based on CWT or VIE tags, 4.9% stray salmon based on wire (CWT or Agency wire tag) recoveries. Presumed to be from inbasin releases, non-tagged AD clipped hatchery fish represented 3.4% and adult returns from hatchery yearling releases by scale pattern analysis represented 6.3%. The remaining 12.5% of the run were unclipped and untagged, therefore are of unknown origin.

Juvenile production in the Tucannon River was estimated at 20,331 naturally produced fall Chinook from the 2011 spawners. Juvenile fall Chinook were observed at the Tucannon smolt trap from 7 February through 23 July 2012. Median passage date for fall Chinook passing the trap was 7 June 2012. We calculated 67 smolts/redd were produced from the 2011 spawn. Juvenile coho salmon were trapped from 6 December through 19 July with a median passage date of 11 June. Naturally produced coho parr and smolts were estimated at 2,495 from the 2010 and 2011 spawners.

Characteristics of fall Chinook reaching LGR Dam showed that males and females tended to arrive at approximately the same rate. The return consisted of 78.1% males, including jacks. The sex ratio of the return was calculated at 3.6 males/female. After removal of broodstock and

adjustments for fish passing the dam, falling back, and remaining below the dam, the fish estimated passing LGR Dam was 80.0% males resulting in a sex ratio of 4.0 males/female. The majority of the run consisted of small males 54 cm or less. The median fork length of males was 55 cm and the median fork length of females was 73 cm.

We calculated that a minimum of 40.6% of the total LSRCP mitigation goal (91,500 fish) was met in 2012. Mitigation numbers presented in this report should be considered minimum estimates. A total of 37,121 LSRCP adult fall Chinook were estimated to have returned to the Columbia basin, including; returns to the Snake River (WDFW and FCAP), fully expanded (CWT tagged and untagged) harvest recoveries of WDFW releases outside of the Snake River, and unexpanded harvest recoveries of FCAP releases with CWTs outside of the Snake River. Returns to the Snake River include 15 fish harvested in sport fisheries (from WDFW releases) below LGR Dam, and an unreported number of fish harvested in tribal fisheries. Harvest reported by IDFG was not included because only observed, non-expanded, harvest was reported to RMIS.

The escapement goal (18,300 hatchery fish) to the Snake River Basin was exceeded in 2012 (WDFW and FCAP). An estimated 11,227 true jacks and jills (1-salt) and 13,517 adults (2-5 salt) contributed to the goal. An additional 4,063 minijacks (0-salt) were also estimated to have returned to the Snake River, but do not count toward the mitigation goal. Mitigation fisheries may not be maintained if the naturally produced portion of the population is not maintained at a yet to be determined minimum abundance threshold (critical threshold under ESA permitting) that would be able to sustain the incidental catch and release mortality from tribal and non-tribal fisheries. It is possible that the hatchery return component could be exceeded and fisheries may not be granted because natural origin Chinook abundance is insufficient to sustain incidental fishery impacts.

The run size of natural origin fish estimated to reach LGR Dam was 12,797 fish $\geq$ 53 cm fork length and 4,143 fish <53 cm fork length. The remaining run consisted of 23,541 fish $\geq$ 53 cm fork length and 14,800 fish < 53 cm fork length, all likely hatchery origin. The stray rate of out of basin fall Chinook was estimated at 0.2% for fish $\geq$ 53 cm fork length and 0.4% for fish <53 cm fork length.

Fall Chinook WDFW released into the Snake River at LFH, the Snake River near Couse Creek, and into the Grande Ronde River, resulted in harvest of 2,759 fish in sport fisheries and 4,977 in commercial fisheries, representing 36 and 64 % of the total harvest recoveries outside of the Snake River Basin in 2012. WDFW released fish were also recovered at hatcheries (12 salmon recovered at Priest Rapids, Ringold Springs, and Umatilla hatcheries, < 0.2% of all out of basin recoveries) and on spawning grounds (59 salmon on the Hanford reach, 0.8% of all out of basin recoveries) outside of the Snake River basin.

In the ocean, both yearlings and subyearlings were primarily intercepted off the coasts of Washington and British Columbia. A higher percentage of yearlings were intercepted off of Oregon and California than subyearlings. A higher percentage of subyearlings were recovered in British Columbia and Alaska than yearlings. In freshwater, a higher percentage of subyearlings were harvested than yearlings.

Total survival estimates of yearlings released at LFH was compared by using CWT and PIT tag estimates. PIT tag detections result in an average 3.4 times greater 0-salt survival estimate than occurred by using CWT estimation methods. However, as fish returned at older ages the differences between methods reversed and the CWT estimation method resulted in 1.6 and 1.7 and 1.5 times greater survival estimate of 1-salt, 2-salt, and 3-salt fish than estimated by using PIT tags. Although returns are not complete for the brood years evaluated, it appears that CWT estimation methods result in accounting for more jack and adults than PIT tag detections, but PIT tags are useful for estimating the abundance of minijacks.

Direct take of listed Snake River fall Chinook was calculated for adult returns in 2012 and juvenile releases in 2013. We were generally within allowances except for juvenile take associated with marking/tagging/release. Trapping and handling of juvenile fall Chinook on the Tucannon River were also exceeded during 2013. We have begun talks with NOAA about revising juvenile take calculations and allowances.

Acknowledgments

The Lyons Ferry Fall Chinook Salmon Hatchery Evaluation Program is the result of work by many individuals within the Washington Department of Fish and Wildlife Fish Program. We want to thank all those who contributed to this program.

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Table of Contents

List of Tables

List of Figures

List of Appendices

Introduction

Program Objectives

This report summarizes activities by the Washington Department of Fish and Wildlife's (WDFW) Lower Snake River Hatchery Fall Chinook Evaluation Program from 16 April 2012 to 15 April 2013. WDFW's Snake River Lab (SRL) staff completed this work with Federal fiscal year 2012/2013 funds provided through the U.S. Fish and Wildlife Service (USFWS), under the Lower Snake River Compensation Plan (LSRCP).

This hatchery program began in 1984 after construction of Lyons Ferry Hatchery (LFH, Figure 1) and is part of the LSRCP program authorized by Congress in 1976. The purpose of the LSRCP is to replace adult salmon, steelhead and rainbow trout lost by construction and operation of four hydroelectric dams on the Lower Snake River in Washington. Specifically, the stated purpose of the plan was:

> *"…[to]….. provide the number of salmon and steelhead trout needed in the Snake River system to help maintain commercial and sport fisheries for anadromous species on a sustaining basis in the Columbia River system and Pacific Ocean" (NMFS & USFWS 1972 pg 14.)*

Subsequently in 1994, additional authorization was provided to construct juvenile acclimation facilities for fall Chinook salmon that would

> " … protect, maintain or enhance biological diversity of existing wild stocks."

Numeric mitigation goals for the LSRCP were established in a three step process (COE 1974). First, the adult escapement that occurred prior to construction of the four dams was estimated. Second, an estimate was made of the reduction in adult escapement (loss) caused by construction and operation of the dams (e.g. direct mortality of smolts resulting in reduced adult abundance and loss to mainstem spawning habitat). Last, a catch to escapement ratio was used to estimate the future production that was forgone in commercial and recreational fisheries as result of the reduced spawning escapement and natural production. Assuming that the fisheries below the project area would continue to be prosecuted into the future as they had in the past, LSRCP adult return goals were expressed in terms of the adult escapement back to, or above the project area.

For fall Chinook salmon, the escapement to the Snake River below Hells Canyon Dam prior to construction of four lower Snake River dams was estimated to be 34,400. Construction and operation of the dams was expected to cause a reduction in the spawning escapement in two ways: 1) the slack water reservoirs created behind the dams was expected to eliminate spawning grounds for 5,000 adults, and 2) 15% of the smolts migrating past each dam were expected to die (48% cumulative mortality).

These factors were expected to reduce the adult escapement by 18,300[1]. This number established the LSRCP escapement mitigation goal back to the project area (Snake River). This reduction in natural spawning escapement was estimated to result in a reduction in the coast-wide commercial/tribal harvest of 54,900 adults, and a reduction in the recreational fishery harvest of 18,300 adults below the project area. In summary the expected total number of adults (excludes minijacks but includes jacks) that would be produced as part of the LSRCP mitigation program was 91,500 (Table 1).

Table 1. Fall Chinook goals as stated in the LSRCP Mitigation document.

Component	Number of Adults
Escapement to Project Area	18,300
Commercial Harvest	54,900
Recreational Harvest	18,300
Total hatchery fish	91,500
Maintain Natural origin population	14,363

Since 1976 when the LSRCP was authorized, many of the parameters and assumptions used to size the hatchery program and estimate the magnitude of benefits have changed.

- The survival rate required to deliver a 4:1 catch to escapement ratio has been less than expected and this has resulted in fewer adults being produced.

- The listing of Snake River fall Chinook and Snake River Steelhead under the Endangered Species Act has resulted in significant curtailment of commercial, recreational and tribal fisheries throughout the ocean and mainstem Columbia River. This has resulted in a higher percentage of the annual hatchery run returning to the project area than was expected.

  Three hatchery programs artificially propagate endemic Snake River fall Chinook. Two of the programs (LSRCP [includes LFH and Fall Chinook Acclimation Project – FCAP)]), and Nez Perce Tribal Hatchery [NPTH]) are integrated programs aimed at increasing harvest and natural-origin abundance via supplementation and harvest mitigation releases. Information about the NPTH is presented in NPT annual reports and is not presented here. The third program (Idaho Power Company [IPC]) is primarily mitigation for lost production due to construction of the Hells Canyon Complex (HCC). Fish are released at two different life stages (sub-yearling and yearling smolts) throughout the basin. Releases occur at 10 release locations. The three programs are highly coordinated in their operations, including broodstock collection at Lower Granite Dam and fish transfers among facilities. Several out of basin hatchery facilities are

[1] The LSRCP Special Report has language referring to adult recoveries. That language was intended to differentiate adults from juveniles in the document (Dan Herrig, USFW, personal communication). The LSCRP mitigation goal was based upon 97,500 fall Chinook counted at Mc Nary Dam in 1958 and expected 14,363 fall Chinook to persist in the Snake River through natural production. At that time adult and jack counts were combined to give a total count. Therefore the mitigation goal consists of jacks and adults, not just adults. Since minijacks (fish < 30 cm total length) are not counted at the dams, they were excluded from the calculations that determined the mitigation goal.

utilized (Irrigon and Umatilla) in addition to the in basin facilities and acclimation sites. Marking of hatchery-origin fish is guided by a Snake River Basin Fall Chinook Salmon Production Program Marking Justification white paper (Rocklage 2004). Mark types and quantities have been adopted under the 2008 - 2017 *United States v. Oregon* Management Agreement (*United States v. Oregon* 2008). At full production levels, 76% of the hatchery-produced fish are marked in some manner, 47% are marked with an adipose fin clip.

In summary, the LSRCP (LFH and FCAP) and IPC overall program purposes are as follows:

- The goal of the LSRCP program is to mitigate for decreased numbers of fall Chinook harvested and returning to the Snake River due to the construction of the lower Snake River Dams with the presumption that the natural population will remain at 14,363. The first order of business for the LSRCP fall Chinook mitigation program was the egg bank effort to keep this population from becoming extirpated. The conservation of this stock including both demographics and genetic integrity is paramount under the LSRCP. The Snake River fall Chinook program has been a conservation effort from the beginning. Production goals of LSRCP are consistent with *United States v. Oregon* Agreements.

- The goal of the IPC program is to replace adult fall Chinook salmon lost to the construction and ongoing operation of the HCC by releasing 1,000,000 smolts annually.

- The immediate goal of the FCAP is a concerted effort to ensure that the Snake River fall Chinook salmon above Lower Granite Dam are not extirpated. FCAP is part of the LSRCP mentioned in item 1 above, but accounting for adults is done separately by NPT. Long-term goals of the project are

    1. Increase the natural population of Snake River fall Chinook spawning above Lower Granite Dam.
    2. Sustain long-term preservation and genetic integrity of this population.
    3. Keep the ecological and genetic impacts of non-target fish populations within acceptable limits.
    4. Assist with the recovery of Snake River fall Chinook.
    5. Provide harvest opportunities for both tribal and non-tribal anglers.

- There has been substantial effort made to maintain the population's genetic structure and diversity as well as rebuild adult returns of both hatchery and natural origin salmon through supplementation efforts by WDFW. The LSRCP program at LFH has been guided by the following objectives:

    1. Maintain and enhance natural populations of native salmonids
    2. Establish broodstock(s) capable of meeting eggtake needs,
    3. Return adults to the LSRCP area which meet designated goals

4. Improve or re-establish sport and tribal fisheries.

While recognizing the overarching purpose and goals established for the LSRCP and realities regarding changes since the program was authorized, the following objectives for the beneficial uses of adult returns have been established for the period through 2017 (United States v. Oregon 2008):

1. Contribute to coast-wide ocean fisheries in accordance with the Pacific Salmon Treaty.

2. Contribute to the recreational, commercial and/or tribal fisheries in the mainstem Columbia River consistent with agreed to abundance-based harvest rate schedules established in the 2008 – 2017 *US vs. Oregon* Management Agreement.

3. Spawn enough fish to retain 4.75 million eggs (Lyons Ferry AOP 2009-2010) to assure that production goals as stated in *US vs. Oregon* are met. Fecundities vary depending upon return age classes and run composition, but generally 1,400-2,000 females would need to be spawned to make production goals. In order to produce enough fish to meet the original LSRCP harvest goals, many more fish would need to be trapped, spawned, and reared, or smolt to adult survivals would need to be increased dramatically. Major infrastructure additions would need to occur at LFH for additional production and changes to the *United States v. Oregon* production tables would need to occur in order to meet the original LSRCP harvest mitigation goals.

4. Estimate the numbers of returns of LSRCP, FCAP, NPTH and IPC program hatchery fish to the Snake River basin (below and above LGR Dam), and estimate the numbers of natural origin fish escaping to spawn above Lower Granite Dam. For these tasks, an additional 1,300-2,000 fish must be recovered so coded wire tag information can be decoded.

5. To provide tribal and non-tribal fisheries in the Snake River consistent with co-manager goals, ESA constraints and permits, and the Columbia River Management Plan.

6. To contribute to hatchery and natural-origin return goals identified in the draft Snake River Fall Chinook Management Plan.

Hatchery-Origin Return Goals

- Interim total return target based on current production levels and survival is 15,484 hatchery-origin fish above Lower Monumental Dam, which is comprised of 9,988 from LSRCP, 3,206 from Nez Perce Tribal Hatchery (NPTH), and 2,290 from IPC. Returns are estimated in-season to Lower Monumental Dam and not to Ice Harbor Dam (located closer to the mouth of the Snake River) because Columbia River salmon dip into the Snake River, cross the dam, then fall back below the dam causing an overestimate of fall Chinook to the Snake River.

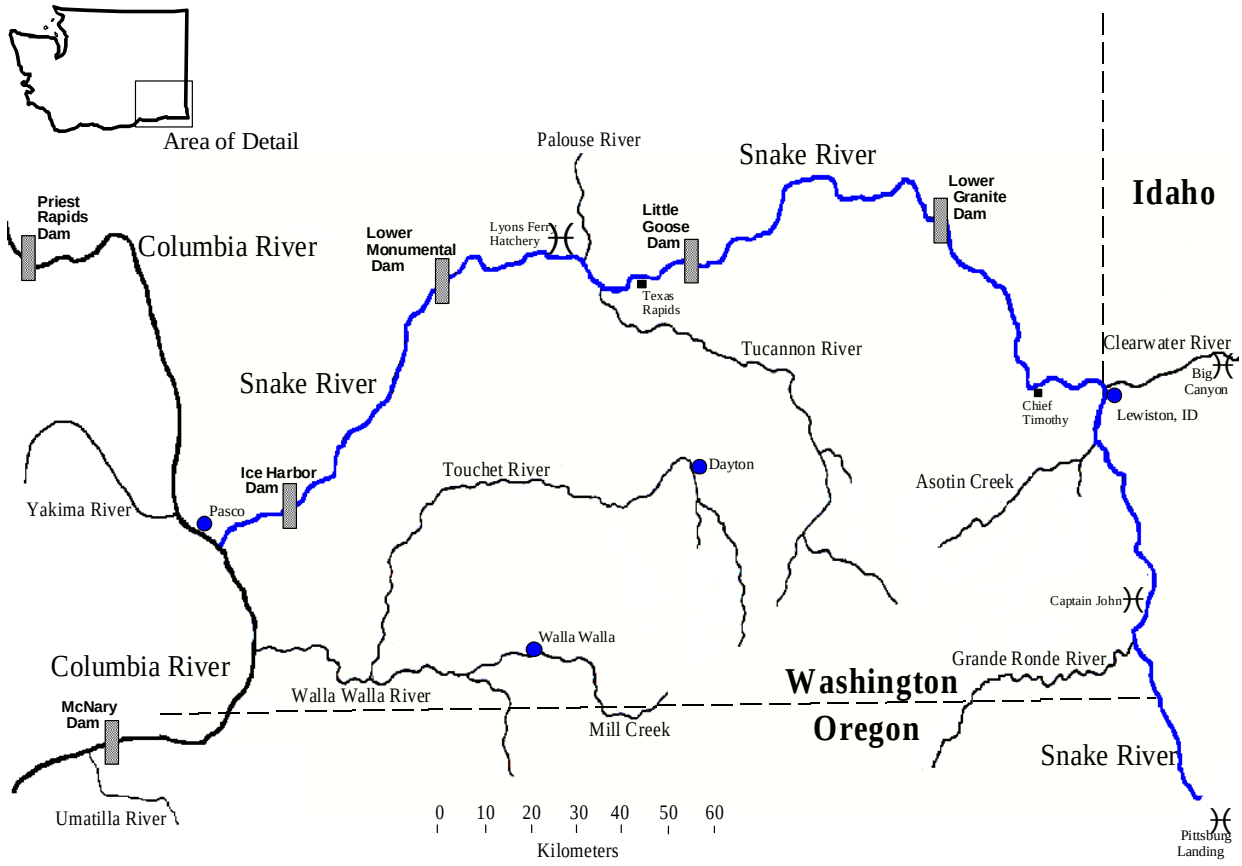
- The long-term goal is for a total return 24,750 hatchery-origin fish above Lower Monumental Dam, which is comprised of 18,300 from LSRCP, 3,750 from NPTH, and 2,700 for IPC.

Natural-Origin Return Goals

- Achieve ESA delisting by attaining interim population abundance in the Snake River ESU of at least 3,000 natural-origin spawners, with no fewer than 2,500 distributed in the mainstem Snake River (as recommended by the Interior Columbia Technical Recovery Team).

- Interim goal is to achieve a population of 7,500 natural-origin fall Chinook (adults and jacks) above Lower Monumental Dam.

- Long term goal is to achieve a population of 14,363 natural-origin fall Chinook (adults and jacks) above Lower Monumental Dam.



Rkm	Location
0.0	Snake River mouth
16.1	Ice Harbor Dam
66.9	Lower Monumental Dam
95.1	Lyons Ferry Hatchery
95.7	Lyons Ferry Park
105.2	Texas Rapids Boat Launch
113.1	Little Goose Dam
115.0	Bryan's Landing Boat Launch
132.3	Central Ferry Park
173.0	Lower Granite Dam
210.3	Chief Timothy Park
253.7	Couse Creek Boat Launch
263.0	Captain John Acclimation Site
346.0	Pittsburg Landing Acclimation Site
397.4	Hells Canyon Dam (not shown)
0.0	Clearwater River mouth
57.0	Big Canyon Acclimation Site
0.0	Grande Ronde River mouth
49.4	Cougar Creek

Figure 1. The Lower Snake RiverBasin showing locations of Lyons Ferry Hatchery, acclimation sites, and major tributaries in the area.

Broodstock Collection and Management 2012

Fall Chinook are collected at LFH and LGR Dam for broodstock (Appendix A). Each year there is a discrepancy between estimated numbers of fish collected and the numbers of fish processed/killed (Table 2). The in-season estimate of numbers of fish diverted into the hatchery at LFH is a minimum estimate of the run to LFH. Some of the fish that are trapped at LFH are shunted back to the river and never used for broodstock. The trap is closed much of the fall and opened for limited periods during which times fish recycle through the trap if they are not diverted into the brood ponds (see LFH Trapping Operations below). The discrepancies between the numbers of fish recorded as collected at LGR trap and the number of fish processed were likely data errors in the numbers of fish trapped at LGR trap.

Table 2. Numbers of Chinook initially collected at LFH and LGR for broodstock, evaluation, and run construction needs in 2012.

Year	Trap Location	Number Collected/Hauled for Broodstock	Processed (killed)	Returned to Snake River	Difference from Number Collected/Hauled
2012	LFH	199	199	0	0
	LGR	5,056	4,535	491	30

Lower Granite Dam Trapping Operations

Fall Chinook were trapped by systematically opening the trap 15% of each hour from 28 August through 19 November. Fish were trapped and hauled to LFH across the run (Figure 2). Trapping protocols are presented in Appendix B. Historical trapping rates and operation dates of systematic sampling at LGR are presented in Appendix C. In general, NOAA Fisheries staff anesthetized the salmon, gathered length and sex data, and indicated if the fish had a fin clip, wire tag or a PIT tag. The fish were then marked with a hole in the operculum prior to release upstream or transport. Approximately 84% of the salmon collected for broodstock were shipped to LFH and 16% were hauled to NPTH. Fish slated for LFH were hauled in a 5,678 L aerated tank truck by WDFW personnel.

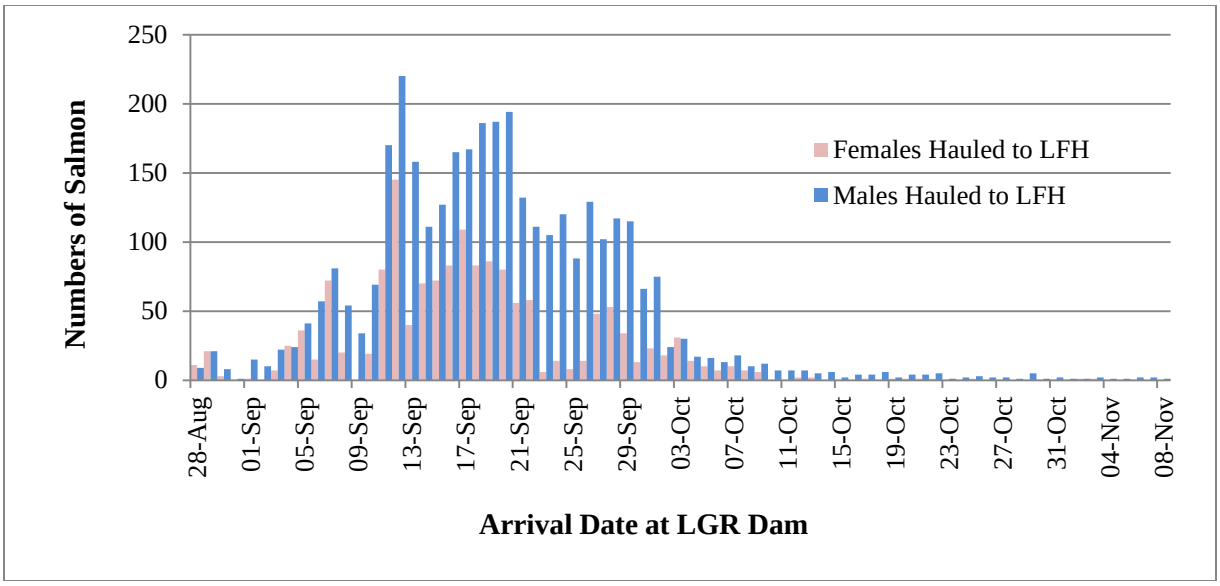


Figure 2. Arrival timing of fall Chinook trapped at LGR Dam that were hauled to LFH in 2012.

LFH Trapping Operations

Broodstock are collected at LFH to fulfill needs not met by trapping at LGR Dam. The trap at LFH was operated periodically from 16 September through 19 September to target additional larger sized fish as noted in trapping and sorting protocols provided in Appendix D.

Hatchery Operations 2012

Spawning Operations

Spawning and Egg Take

Sorting of broodstock prior to spawning is an essential task for determining the sex composition and lengths of fish on hand. Both of these enumerations are used to modify trapping and spawning protocols in-season. The ponds of LGR trapped fish had approximately 0.38:1 sex ratio (males/females) in the adults (75 cm or greater), and 3.8:1 sex ratio (males/females) for fish less than 75 cm. Mate selection and spawning protocols changed weekly to allow for maximum use of unmarked/untagged fish from LGR, older aged males ($\geq$ 2-salt), and subyearlings.

The duration, peak of spawning, eggtake, and percent egg mortality (Table 3), numbers of fish spawned (Table 4), and the number killed outright and that died in the LFH and LGR trapped ponds (Table 5) are provided. Natural origin fish were identified based on PIT tags recovered from fish seined and tagged as juveniles and likely underestimate the numbers of natural origin fish processed. Semen from some males was held overnight for use on the LFH trapped fish. Semen from untagged males held overnight was used in matings first thing the following morning. The goal is to maximize the use of untagged fish during spawning as a way to maximize the proportion of natural origin fish in matings. In 2012 eggtake was within 5% of the 4.75 million goal and therefore was considered attained.

Table 3. Duration and peak of spawning, egg take, and percent egg mortality at LFH, 1984-2012.

Year	Spawn Duration Begin	End	Peak of Spawning	Total Egg Take	Egg take fully covered through *US v. Oregon* priority number[a]	Egg take partially covered *US v. Oregon* priority number	Egg mortality to eye-up (%)[b]
1984	8 Nov	5 Dec	21 Nov	1,567,823	-	-	21.6
1985	2 Nov	14 Dec	7 Nov	1,414,342	-	-	4.0
1986	22 Oct	17 Dec	19 Nov	592,061	-	-	4.0
1987	20 Oct	14 Dec	17 Nov	5,957,976	-	-	3.8
1988	18 Oct	6 Dec	12 Nov	2,926,748	-	-	3.4
1989	21 Oct	16 Dec	11 Nov	3,518,107	-	-	5.8
1990	20 Oct	8 Dec	6 Nov	3,512,571	-	-	8.3
1991	15 Oct	10 Dec	12 Nov	2,994,676[c]	-	-	8.3
1992	20 Oct	8 Dec	21 Nov	2,265,557[c]	-	-	6.0
1993	19 Oct	7 Dec	2 Nov	2,181,879	-	-	6.7
1994	18 Oct	6 Dec	8 Nov	1,532,404	-	-	5.1
1995	25 Oct	5 Dec	14 Nov	1,461,500	-	-	5.6[d]
1996	22 Oct	3 Dec	5 Nov	1,698,309	-	-	4.6
1997	21 Oct	2 Dec	4 Nov	1,451,823[e]	-	-	5.2
1998	20 Oct	8 Dec	3 Nov	2,521,135	-	-	5.1
1999	19 Oct	14 Dec	9 & 10 Nov	4,668,267	-	-	9.4
2000	24 Oct	5 Dec	7 & 8 Nov	4,190,338	-	-	5.9
2001	23 Oct	27 Nov	13 & 14 Nov	4,734,234	-	-	6.4
2002	22 Oct	25 Nov	12 & 13 Nov	4,910,467	-	-	3.6
2003	21 Oct	2 Dec	10 & 12 Nov	2,812,751	8	9	3.1
2004	19 Oct	22 Nov	9 & 10 Nov	4,625,638	16	17	3.3
2005	18 Oct	29 Nov	15 & 16 Nov	4,929,630	16	17	3.5
2006	24 Oct	5 Dec	7 & 8 Nov	2,819,004	8	9	3.2
2007	23 Oct	3 Dec	13 & 14 Nov	5,143,459	17	-	3.3
2008	21 Oct	25 Nov	4 & 5 Nov	5,010,224	17	-	3.7
2009	20 Oct	18 Nov	9 & 10 Nov	4,574,182	17	12,14 [f]	4.7
2010	19 Oct	30 Nov	16 Nov	4,619,533	16	17	2.7
2011	18 Oct	21 Nov	7 & 8 Nov	4,723,501	10&15&17[g]	11-14,16	3.5
2012[h]	16 Oct	13 Nov	6 Nov	4,526,108	5,7-9,11,13,15,16	6,10,17	3.1

[a] Priority levels as listed in the *US v. Oregon fall agreement* production tables (Appendix).

[b] Egg mortality includes eggs destroyed due to positive ELISA values.

[c] An additional 9,000 eggs from stray females were given to Washington State University.

[d] Does not include loss from 10,000 stray eggs given to University of Idaho. The egg loss from strays was 8.63% excluding eggs used in fertilization experiments.

[e] Total egg take includes eggs from one Coho female crossed with a fall Chinook.

[f] Priority levels 12 and 14 did not meet production goal. However, overall production in the subyearling group was more than required.

[g] Fully covered through priority 10 and priorities 15 and 17 were also fully covered.

[h] Priorities 12 and 14 are not included this year forward as the Transportation Study has ended.

Table 4. Spawn dates, numbers of fall Chinook, and weekly egg take of fish spawned at LFH in 2012. (LFH and LGR trapped fish are combined and jacks are included with males).

Spawn Dates	Hatchery and Unk Origin Males[a]	Natural Origin Males	Hatchery and Unk Origin Females[a]	Natural Origin Females	Non-Viable [b]	Egg Take
16 Oct	8	0	16	1	1	71,983
23 Oct	42	0	77	1	0	313,297
30 Oct	169	1	353	1	3	1,358,553
6 Nov	279	2	625	0	6	2,331,025
13 Nov	70	0	109	1	0	451,250
Totals	**568**	**3**	**1180**	**4**	**10**	**4,526,108**

[a] Numbers of fish presented include spawned fish whose progeny were later destroyed.
[b] Non-viable females—not ripe when killed.

Table 5. Weekly summary and origins of mortality and surplus fall Chinook processed at LFH in 2012. (LFH and LGR trapped fish are combined; jacks are included with males).

Week Ending	Mortality						Killed Outright					
	LF/Snake R.[a]		Natural		Other/Unk[b]		LF/Snake R.		Natural		Other/Unk	
	M	F	M	F	M	F	M	F	M	F	M	F
2 Sep	0	0	0	0	0	0	13	0	0	0	2	0
9 Sep	0	0	0	0	0	0	74	0	0	0	1	0
16 Sep	0	1	0	0	0	0	257	0	0	0	14	0
23 Sep	1	1	0	0	0	1	367	0	0	0	9	0
30 Sep	0	0	0	0	0	0	0	0	0	0	0	0
7 Oct	5	4	0	0	0	6	623	67	0	0	22	1
14 Oct	0	0	0	0	0	1	0	0	0	0	0	0
21 Oct	1	2	0	0	0	0	15	2	0	0	2	0
28 Oct	8	1	0	0	1	3	0	0	0	0	0	0
4 Nov	24	5	0	0	4	1	7	2	0	0	0	2
11 Nov	77	5	0	0	14	2	389	39	0	0	15	3
18 Nov	71	1	0	0	25	2	272	265	0	2	29	206
Totals	**187**	**20**	**0**	**0**	**44**	**16**	**2017**	**375**	**0**	**2**	**94**	**212**

[a] Includes known LFH or NPTH origin (from CWT and/or VIE), and PIT tagged fish of Snake River hatchery origin.
[b] Includes undetermined hatchery yearlings by scales, hatchery strays by scales or wire, regenerated scales, and Lost and No tags.

Fish Returned to River

Untagged fish from LGR Dam that were not needed for broodstock were returned to the Snake River near LFH on 13 November. A total of 491 males were released (Table 6). Co-managers agreed in-season that these fish could be returned to the Snake near LFH instead of above LGR due to the size of the release and that it would not affect run reconstruction estimates as the trap at LGR had already closed for the season. We estimate that all of these fish remained in the reservoir below LMO and LGR Dams since none were detected in the Tucannon River.

Table 6. Fall Chinook hauled to the Snake River and released in 2012.

Release site	Trap site	Release date	Origin Determination Method / Age	Grand Total
LFH	LGR	13-Nov	Snake R Hatchery by PIT	
			subyearling reservoir reared 2 salt (age4)	1
			subyearling 2 salt (age3)	120
			subyearling 3 salt (age4)	12
			yearling 1 salt (age 3)	1
			yearling 2 salt (age4)	2
			Snake R Natural by PIT	
			subyearling 3 salt (age4)	3
			Snake R Unknown by PIT	
			unknown age	13
			Unknown Hatchery by Clip, WIR or Yearling Scales	
			subyearling 2 salt (age3)	4
			yearling 2 salt (age4)	1
			unknown age	62
			Unknown Origin	
			reservoir reared 2 salt (age4)	4
			reservoir reared 3 salt (age5)	1
			subyearling 2 salt (age3)	30
			subyearling 3 salt (age4)	15
			subyearling 4 salt (age5)	3
			unknown age	219
Grand Total				**491**

Broodstock Profile

This was the second year fin tissues were taken from all fish contributing to broodstock, including those that were spawned but not used (Appendix F). This was the first year scales were taken on all fish processed in order to determine salt age and rearing type (subyearling, yearling, or reservoir reared subyearlings). Otoliths were taken from all unmarked/untagged fish (spawned as well as unspawned) from LGR by staff from the University of Idaho. The otoliths were used in a microchemistry study to determine where fall Chinook are rearing in the Snake River basin based on strontium levels found in the otoliths (Hegg 2012). These otoliths will be archived at the University of Idaho.

In more recent years, a more concerted effort has been given to spawning larger sized males because of the large number of jacks that had been used in the past and possible heritability of that trait. While not a completely accurate representation of the overall genetic contribution of those fish to the broodstock, it provides a relative representation that can be used in future years when examining changes in age composition. The composition and length frequencies of broodstock at LFH are presented in Figure 3 and Figure 4, respectively. Males used multiple times are counted multiple times in both figures. Unknown origin fish could be either hatchery or natural origin. An estimated 10.9% of the males and 35.5% of the females that contributed gametes for production were returns from yearling releases. Of the broodstock contributing to production, 9.7% were collected at the LFH trap.

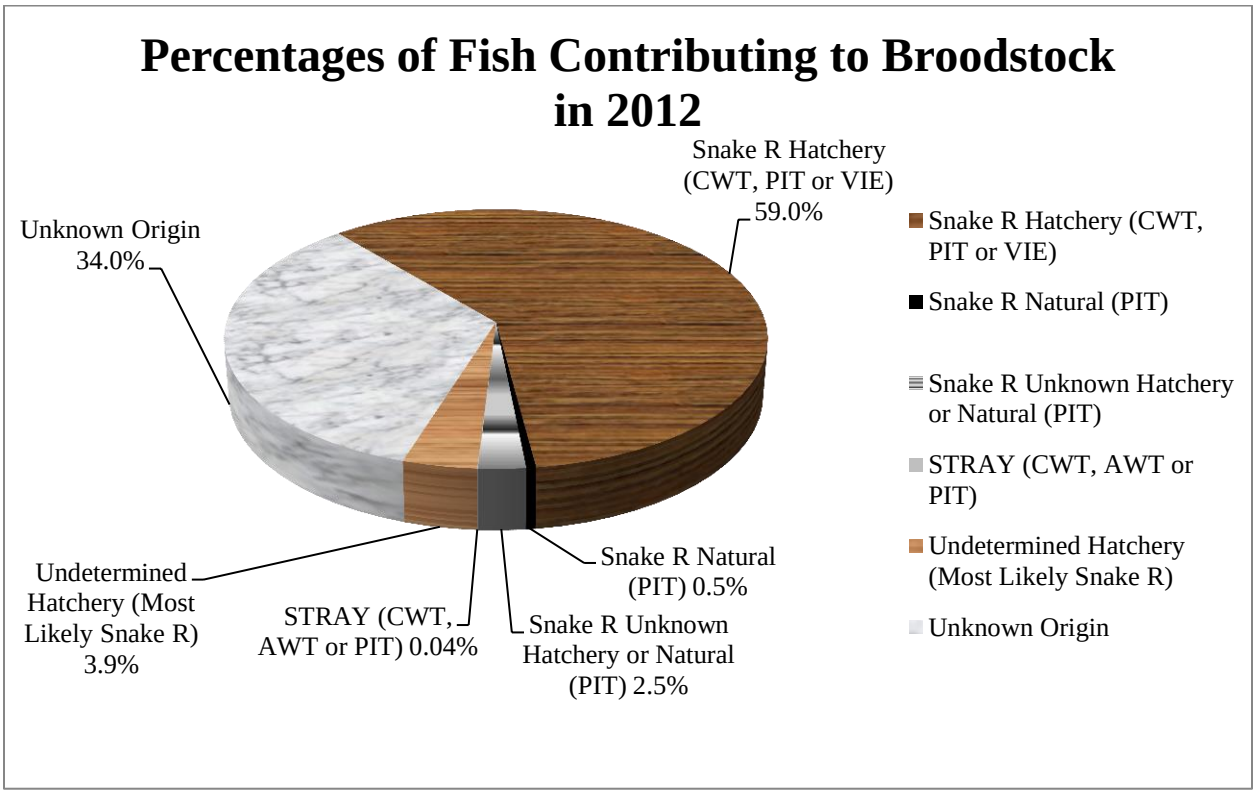


Figure 3. Percentages of fish contributing to broodstock at LFH during 2012.

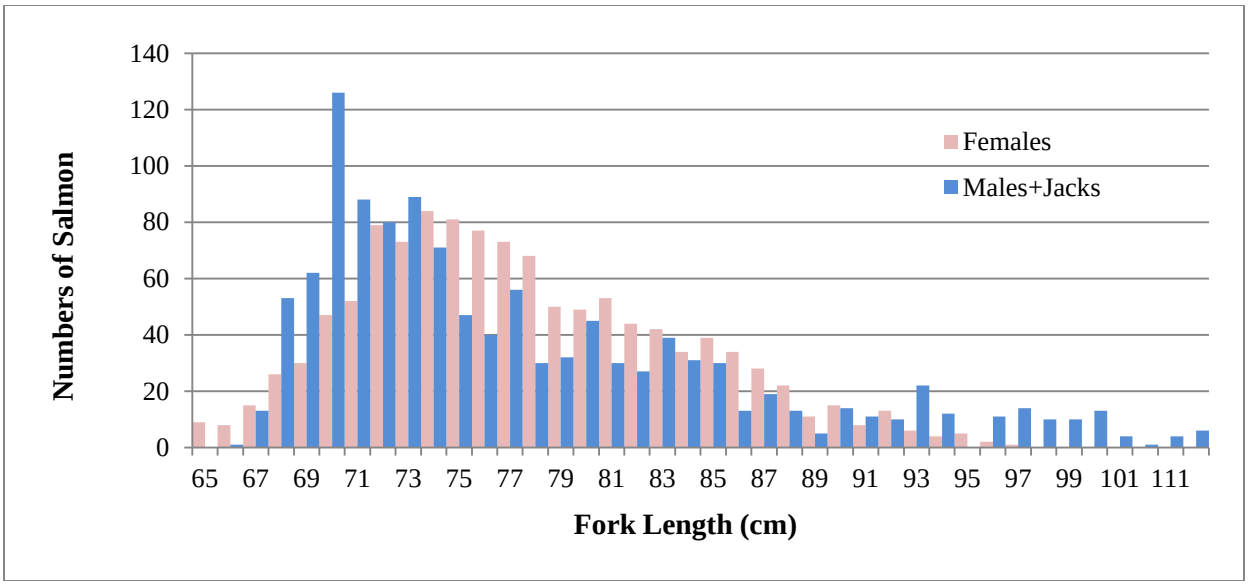


Figure 4. Fork lengths of salmon used as broodstock at LFH in 2012.[a]

Spawn timing

PIT tagged fish (males and females) trapped at LGR Dam were evaluated to determine if there was a relationship between trapping date and spawning date (Figure 5). Run timing was not a predictor of spawn timing for fish trapped during that time.

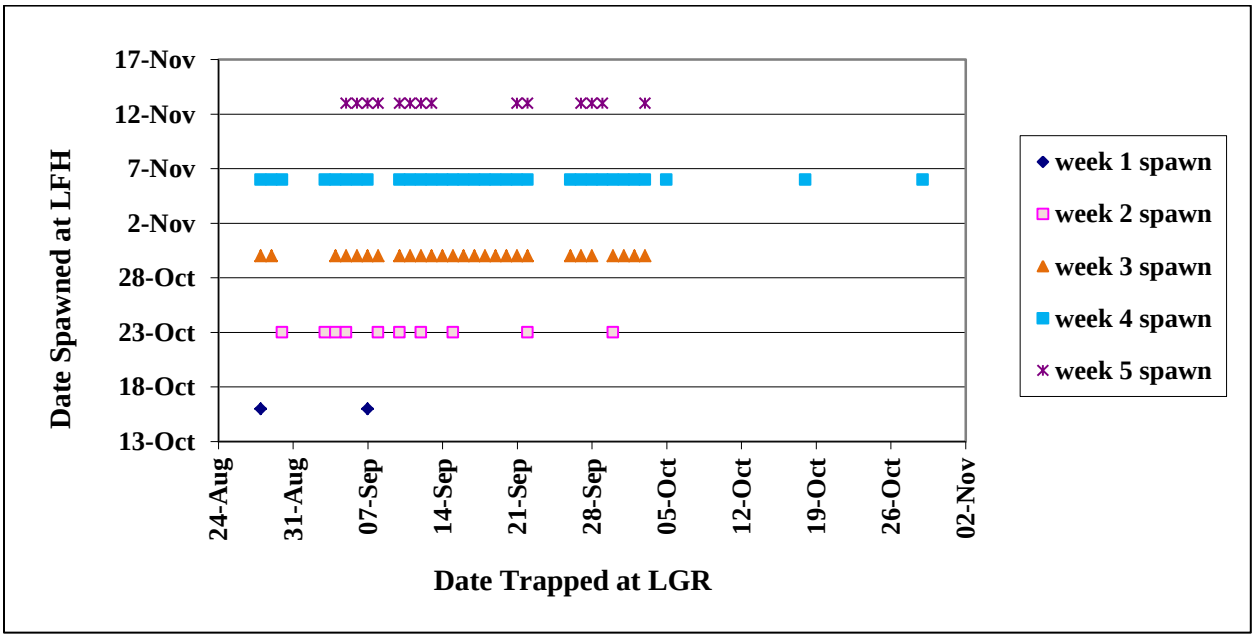


Figure 5. Spawn timing of PIT tagged fish trapped at LGR in 2012.

Males used in broodstock

Fish collected at LGR for broodstock, run reconstruction, and monitoring and evaluation purposes were hauled to LFH and NPTH with a goal of an 80-20 split. Males hauled to LFH were trapped across the run at LGR Dam (Figure 6). Older aged males were used on multiple females, mimicking nature (Hankin 2009). Of the 571 males spawned, 348 fish were used multiple times (Table 7) to reduce the usage of jacks in the broodstock and to maximize the numbers of adults from subyearlings used. The calculated effective number of male breeders was 424 (N_b) using procedures described in Busack (2006). The effective male breeders are 74.2% of the census number of males, or 35.8% of the male N_b that would have been achieved if enough males had been available to avoid reuse of males.

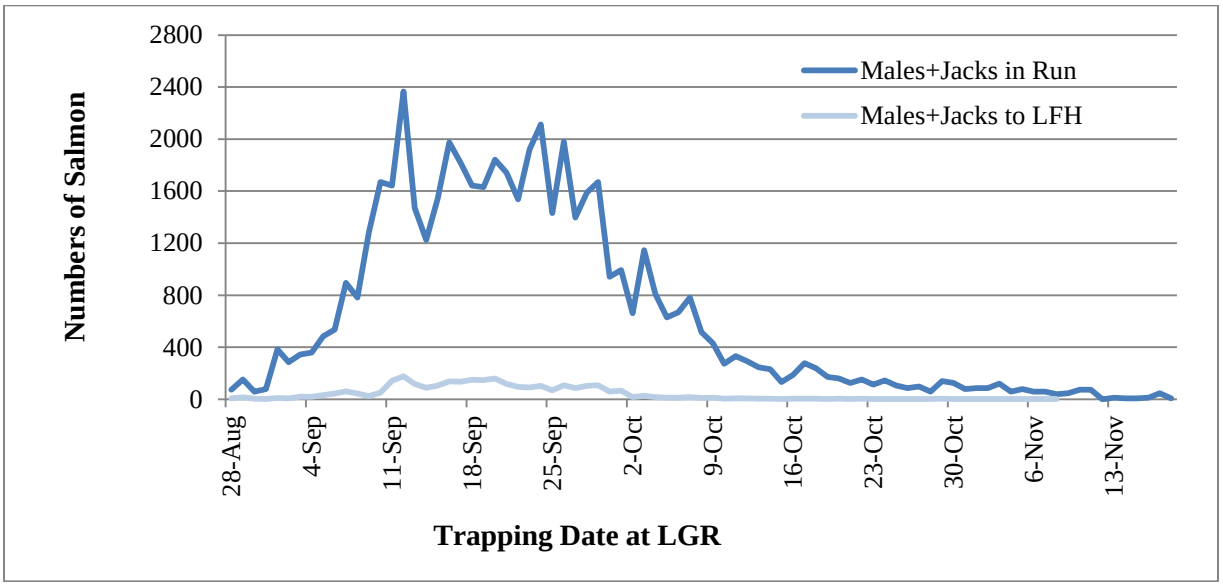


Figure 6. Arrival timing of the run of male fall Chinook at LGR Dam and the proportion hauled to LFH during 2012.

Origin including release site information was determined for 59.4 % of the males spawned based on CWT, VI, or PIT tag data. An additional 3.0 % of the males were identified as hatchery origin based either on an AD clip or lost/unreadable tags. Males that were unmarked/untagged (hatchery and natural origin) represent 37.6 % of the males spawned.

Table 7. Origin and age of males used multiple times during spawning at LFH, 2012.

	Times Each Male was Used for Mating						
Origin Determination Method / Age	**1**	**2**	**3**	**4**	**5**	**6**	**Total Unique**
Snake R Hatchery by CWT or VIE							
subyearling 2 salt (age3)	63	53	20	6		1	**143**
subyearling 3 salt (age4)	2	1	1		1		**5**
subyearling 4 salt (age5)		1		2	1		**4**
yearling 2 salt (age4)	17	16	10	4	1	1	**49**
yearling 3 salt (age5)			1	3			**4**
unknown age				1			**1**
Snake R Hatchery by PIT							
subyearling reservoir reared 2 salt (age4)		1					**1**
subyearling 2 salt (age3)	35	28	11	2			**76**
subyearling 3 salt (age4)	11	5	7	3		2	**28**
subyearling 4 salt (age5)				1	1		**2**
yearling 2 salt (age4)		**2**					**2**
Snake R Natural by PIT							
subyearling 3 salt (age4)		2		1			**3**
Snake R Unknown by PIT							
subyearling 2 salt (age3)		1					**1**
reservoir reared 2 salt (age4)	1						**1**
unknown age	6	6	4	2	1		**19**
Unknown Hatchery by Clip or WIRE							
subyearling 2 salt (age3)	6	6	1		1	2	**16**
unknown age						1	**1**
Unknown Origin							
reservoir reared 1 salt (age3)		1					**1**
reservoir reared 2 salt (age4)	1	2	3	1		1	**8**
reservoir reared 3 salt (age5)	1			3		1	**5**
subyearling 2 salt (age3)	68	50	25	4		2	**149**
subyearling 3 salt (age4)	6	8	5	7		2	**28**
subyearling 4 salt (age5)	2	2	1		2	4	**11**
unknown age	4	5	4				**13**
Total Unique Males	**223**	**190**	**93**	**40**	**8**	**17**	**571**

Females used in broodstock

Females hauled to LFH from LGR Dam were trapped throughout the run (Figure 7). Origin, including release site information, was determined for 66.9 % the females spawned based on CWT or PIT tag data. An additional 4.1 % of the females were identified as hatchery origin based either on an AD clip, Agency wire tag (AWT), lost/unreadable tags or yearling scales with a hatchery check. Females that were not tagged or clipped represent 29.0 % of the females spawned. The estimated age composition and origins of females contributing to broodstock at LFH are listed in Table 8.

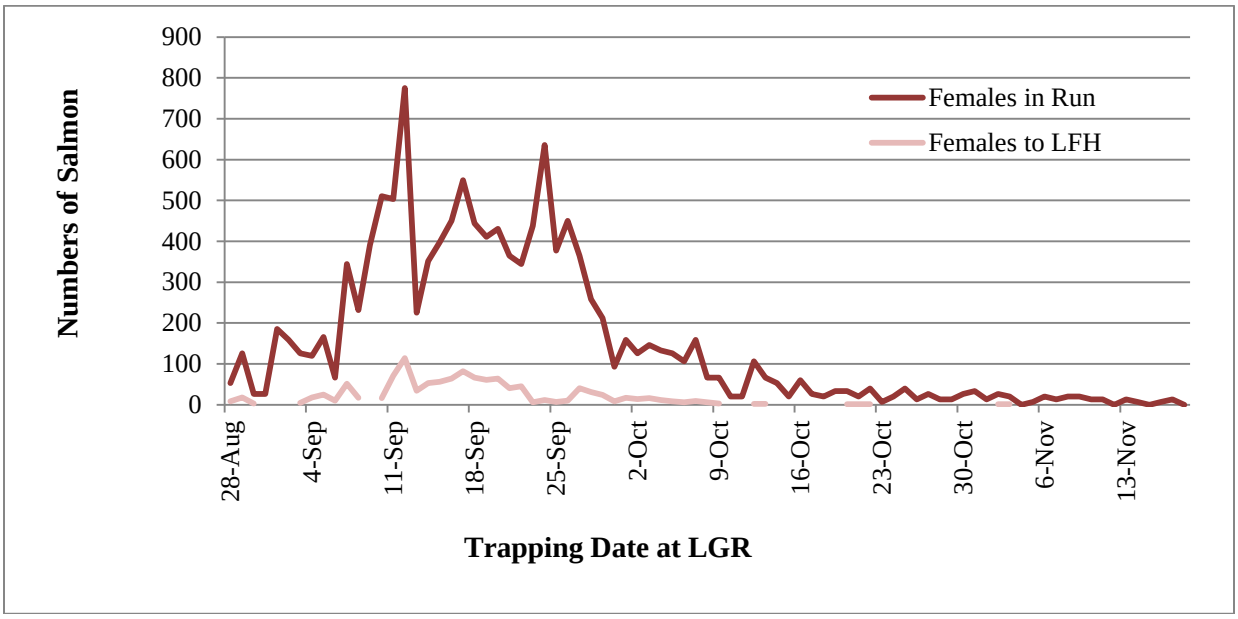


Figure 7. Arrival timing of the run of female fall Chinook at LGR Dam and the proportion of females hauled to LFH during 2012.

Table 8. Origins of females contributing to LFH broodstock during 2012.

Origin Determination Method	Age	Number of Females
Snake R Hatchery		
Snake R Hatchery by CWT or VIE	subyearling reservoir reared 2 salt (age4)	**1**
	subyearling 2 salt (age3)	**170**
	subyearling 3 salt (age4)	**63**
	subyearling 4 salt (age5)	**12**
	yearling 2 salt (age4)	**347**
	yearling 3 salt (age5)	**50**
	yearling 4 salt (age6)	**2**
Snake R Hatchery by PIT	subyearling reservoir reared 2 salt (age4)	**1**
	subyearling 2 salt (age3)	**53**
	subyearling 3 salt (age4)	**51**
	subyearling 4 salt (age5)	**19**
	yearling 2 salt (age4)	**4**
	yearling 3 salt (age5)	**1**
Out of Basin Hatchery		
STRAY Hatchery by CWT or AWT	subyearling 3 salt (age4)	**1**
Natural Origin		
Snake R Natural by PIT	reservoir reared 2 salt (age4)	**1**
	subyearling 3 salt (age4)	**2**
	subyearling 4 salt (age5)	**1**
Unknown Origin		
Snake R Unknown by PIT	reservoir reared 1 salt (age3)	**1**
	reservoir reared 3 salt (age5)	**1**
	subyearling 4 salt (age5)	**1**
	unknown age	**10**
Undetermined Hatchery by Clip, WIRE or yearling scales with a hatchery check	subyearling reservoir reared 2 salt (age4)	**1**
	subyearling 2 salt (age3)	**11**
	subyearling 3 salt (age4)	**10**
	subyearling 4 salt (age5)	**5**
	yearling 1 salt (age3)	**7**
	yearling 2 salt (age4)	**9**
	unknown age	**6**
Unknown Origin	reservoir reared 1 salt (age3)	**2**
	reservoir reared 2 salt (age4)	**17**
	reservoir reared 3 salt (age5)	**14**
	subyearling reservoir reared 2 salt (age4)	**3**
	subyearling reservoir reared 3 salt (age5)	**2**
	subyearling 2 salt (age3)	**128**
	subyearling 3 salt (age4)	**102**
	subyearling 4 salt (age5)	**42**
	unknown age	**33**
Total		**1,184**

Fecundity

Average fecundities from females used in broodstock that were trapped at LGR Dam were 3,814 eggs/female and females trapped at LFH were 3,877 eggs/female. These fecundities are only of fish retained for broodstock and not the average fecundities of females returning to the area due to protocols that minimize jills in broodstock.

Inclusion of natural origin fish This was the tenth year that Snake River natural origin fish were included in broodstock (Table 9). Males used multiple times are only counted once in the table below to describe take for ESA reporting purposes. The goal is to have 30% of the fish used as broodstock come from Snake River natural origin stock. In previous years, scales were analyzed to determine natural versus hatchery origin on unmarked, untagged fish. Recent information has concluded that the scale results are not as accurate in that determination as once thought and are not included in this year's natural origin totals.

Table 9. Unique numbers of Snake River natural origin fall Chinook included in broodstock, 2003-2012.

Return Year	Trapping location	Natural Females	Natural Males	Natural Jacks < 53cm	Total % of Naturals in Broodstock	Total number of fish spawned	Mating protocol goal
2003	LGR LFH	0 2	0 0	0 0	0.1	1560	Unknown x LF
2004	LGR LFH	118 9[a]	2 0	1 0	4.9	2645	Unknown x LF
2005	LGR LFH	110 1	122 2	6 0	9.1	2634	Unknown x LF
2006	LGR LFH	115 2	71 3	0 0	12.2	1567	Unknown x Unknown and Unknown x LF
2007	LGR LFH	43 1	49 3	0 0	3.3	2915	Unknown x Unknown
2008	LGR	110	54	0	6.4	2575	Unknown x Unknown
2009	LGR	36	30	0	3.1	2126	Unknown x Unknown
2010[b]	LGR	1	2	0	0.1	2234	Unknown x Unknown
2011	LGR	3	3	0	0.4	1661	Unknown x Unknown
2012	LGR	4	3	0	0.4	1755	Unknown x Unknown

[a] Includes one female that was a true jill (1-salt).

[b] Natural origin fish were no longer identified using scale analysis. Fish PIT tagged during juvenile seining efforts were identified as naturals.

Jacks and Jills in Broodstock

To document the extent to which jacks and jills were used as broodstock, jacks used multiple times were included multiple times in the estimates (Table 10). Minijack is defined as 0-salt fish and jacks/jills are defined as 1-salt fish. Saltwater age for wire tagged fish was estimated by subtracting 1 from the total age of subyearlings and 2 from the total age of yearlings. This method overestimates saltwater ages for subyearlings since reservoir rearing is not taken into consideration. Untagged fish are scale sampled and reservoir rearing is used to estimate salt water age. Fork length data of jacks and jills used in broodstock are presented in Table 11. Fork lengths of jacks and jills used in broodstock are biased towards larger sizes due to mating protocols employed at the hatchery. Historical uses of jacks and jills in broodstock are presented in Table 12 and should be considered minimum estimates. Intensive monitoring of jacks and jills began in 2010 in order to minimize the contribution of 1-salts in broodstock (Table 13). This monitoring has reduced the total matings with 0 and/or 1-salt parentage by nearly 60% within the last two years.

Table 10. Numbers and percentages of matings with 1-salt jacks and jills that contributed to production at LFH during 2012.

			Jacks	Jills
Age/rearing	**Brood year**	**saltwater age**	**Number of matings**	**Number of matings**
Unk res rear	2009	1	2	3
Totals			**2**	**3**
% of Matings			**0.2%**	**0.3%**

Table 11. Fork lengths of 1- salt jacks and jills used in broodstock at LFH during 2012.

	Number of matings	Average fork length (cm)	Median fork length (cm)	SD of fork length (cm)	Min length (cm)	Max length (cm)
Jacks 1-salt-						
Unk reservoir reared	2	76	-	-	76	76
Jills 1-salt-						
Unk reservoir reared	3	73	73	5.0	68	78

Table 12. Historical number of matings of minijacks, jacks, and jills contributing to broodstock at LFH, 2000-2009.

Year	0-salt	1-salt jack	1-salt jill	Number of matings containing jack x jill mating	% of total matings with 0 and/or 1-salt parentage
2000	195	609	157	127	80.4
2001	9	876	67	47	67.6
2002	4	480	11	9	24.7
2003	3	527	78	63	74.5
2004	28	943	254	204	77.3
2005	14	611	57	25	45.4
2006	1	519	121	91	70.0
2007	0	1138	480	408	83.0
2008	0	345	80	30	30.2
2009	1	539	503	143	69.6
Average	**26**	**659**	**181**	**115**	**62.3**

Table 13. Number of matings of minijacks, jacks, and jills contributing to broodstock at LFH, 2010-2012.

Year	0-salt	1-salt jack	1-salt jill	Number of matings containing jack x jill mating	% of total matings with 0 and/or 1-salt parentage
2010	0	38	2	0	3.2
2011	0	50	37	3	6.7
2012	0	2	3	0	0.4
Average	**0**	**30**	**14**	**1**	**3.4**

Rearing and Marking

Information regarding numbers of juvenile fish ponded are included in Table 14. Historical ponding information is listed in Appendix G. Rearing followed standard hatchery procedures as described in the Snake River fall Chinook HGMP available at http://www.fws.gov/lsnakecomplan/Reports/HGMPreports.htm. Detailed information regarding type and size of vessels used for rearing can be found in Lyons Ferry Hatchery Annual Reports available at http://www.fws.gov/lsnakecomplan/Reports/WDFWreports.html.

Table 14. Egg take and survival numbers by life stage of Lyons Ferry origin fall Chinook spawned at LFH, brood years 2008-2012.

Brood Year	Eggs Taken	ELISA Loss	Eggs Shipped[a]	Eyed Eggs Retained	Fry Ponded	Intended Program
2008	5,010,224	0	1,810,800	2,969,200	1,000,000 1,969,200 0	Yearling Subyearling Research
2009	4,574,182	0	1,507,300	2,853,020	977,667 1,875,353 0	Yearling Subyearling Research
2010	4,619,533	0	1,630,000	2,865,100	980,000 1,885,100 0	Yearling Subyearling Research
2011	4,723,501	0	1,785,600	2,772,900	960,000 1,812,900 0	Yearling Subyearling Research
2012	4,526,108	0	1,480,000	2,904,500	1,010,000 1,894,000 0	Yearling Subyearling Research

[a] Includes eyed eggs shipped for research

Marking was consistent with the *United States v. Oregon 2008-2017 Management Agreement* recommendations. Fish were ADCWT tagged and marked from 19 July – 28 July and CWT only fish were tagged 28 July – 1 August. After CWT tagging and marking, all but 32,000 fish were diverted to the rearing lake. Approximately 16,000 ADCWT fish were diverted into one raceway and 16,000 CWT only fish were diverted into a second raceway. Staff performed tag and clip quality control checks from of a sample of each group immediately prior to their release (Table 15).

Table 15. Numbers of fall Chinook sampled by WDFW for marking and tagging quality control checks.

	Release site	Mark Type	CWT	Number sampled	AD/CWT	AD ONLY	CWT ONLY	Unmarked/ Untagged
2011 Yearling	LFH	AD+CWT	636444	1,506	1,486 (98.7%)	5 (0.3%)	5 (0.3%)	10 (0.7%)
	LFH	CWT ONLY	636443	1,511	0 -	0 -	1,494 (98.0%)	17 (1.1%)
2011 Subyearling	LFH	AD+CWT	636417	1,501	1,481 (98.7%)	17 (1.1%)	2 (0.1%)	1 (0.1%)
	CCD	AD+CWT	636418	1,514	1,481 (97.8%)	27 (1.8%)	5 (0.3%)	1 (0.1%)
	GRR	AD+CWT	636419	1,522	1,449 (95.2%)	73 (4.8%)	0 -	0 -

Staff PIT tagged 30,000 BY11 onstation yearlings and 20,000 BY11 onstation subyearlings for the purpose of monitoring adult returns in-season and to compare two methods of estimating smolt-to-adult survivals (SARs) using CWTs and PIT tags. The tag lists were submitted to PTAGIS and fish were assigned to monitor mode to allow them to be treated like non-PIT tagged fish when intercepted at dams. Initial tag loss and mortalities of the yearlings could not be collected and scanned for PIT tags, as the fish were diverted directly into the earthen rearing pond where they remained until release. No PIT tags were recovered from the rearing lake for reuse on fish at release to increase the sample size. After release, the pond and outlet structure were scanned for shed tags. A total of 705 tags (2.4%) from BY11 were detected leaving an estimated 29,295 PIT tags representing the yearling release. The majority of tags recovered from the rearing lake were located at the head of the lake where fish entered the lake via a transfer pipe after tagging. The array at the outlet structure was not used during the release as the fall Chinook exit the lake in such a short period f of time that multiple PIT tags collide with each other within the field of the antenna, resulting in neither being detected. PIT tagged BY11 onstation subyearlings were returned to the raceway after tagging. A total of 57 PIT tags were collected in the raceway, including 34 mortalities, leaving an estimated 19,943 PIT tags representing the subyearling release.

Juvenile Releases

Brood year 2011

Subyearling

Subyearling fall Chinook at LFH were released 29-30 May 2012. Fish were measured and weighed and visually appeared in good condition, with no external signs of BKD, pop-eye, or descaling from bird beaks. Fish were visually examined for sexual precocity at release [precocious fish expel semen when handled and are dark colored (non-smolted)]. None of the subyearlings released were precocious based on visual examination. An estimated 200,900 fish were released as an AD+CWT group. Hatchery staff calculated the release at 50.0 fpp. Fish used in the pound counts were set aside for SRL staff to subsample for individual lengths and

weights (Table 16). Snake River flows on 30 May at the LMO Dam tailrace were 78.9 kcfs with 27.4 kcfs spill. Total dissolved gases were at 118.3%. Columbia River flows at MCN Dam were 295.0 kcfs with 121.2 kcfs spill on 30 May and total dissolved gases were at 116.0%.

Subyearling fall Chinook slated for Couse Creek were released 29-30 May 2012. Fish were measured and weighed and visually appeared in good condition, with no external signs of BKD, pop-eye, descaling or sexual precocity. An estimated 199,300 fish were released as an AD+CWT group. Hatchery staff calculated the release at 54.0 fpp.

Subyearling fall Chinook reared at Irrigon FH were released into the Grande Ronde River on 24 May. An estimated 202,719 fish were released as an AD+CWT group and 181,281 were released as unmarked/untagged. Fish were measured and weighed and visually appeared in good condition, with no external signs of BKD, pop-eye, descaling or sexual precocity. ODFW staff provided pound counts and the release was calculated at 48.0 fpp.

Table 16. Length and weight data from subyearling fall Chinook (BY11) sampled by WDFW and released into the Snake and Grande Ronde Rivers during 2012.

	Snake R at LFH	Snake R at Couse Creek	Grande Ronde R at Cougar Creek
Length/weight data	Sample Date	Sample date	Sample date
	29-May-12	29-May-12	21-May-12
Number sampled	245	362	416
Avg. length (mm)	92	89	94
Median	92	91	95
Range	80-110	50-110	64-109
STDS	5.9	10.1	6.2
CV	6.4	11.4	6.6
Avg. weight (g)	9.1	8.4	10.2
STDS	1.9	2.6	2.1
CV	20.0	31.4	20.2
Avg. K factor	1.15	1.16	1.20
FPP	49.7	54.0	44.4

Yearling

Yearling fall Chinook at LFH were released from 10 April to 12 April 2012, with peak emigration occurring on 10 and 11 April. Fish were measured and weighed and visually appeared in good condition, with no external signs of BKD, pop-eye, or descaling from bird beaks. None of the yearlings observed were precocious based on that visual examination. Fish were well smolted, slender and very uniform in size. An estimated 243,649 fish were released from the AD+CWT group, and 245,851 were released from the CWT ONLY group. Hatchery staff calculated the release at 10.2 fpp. Fish used in the pound counts were set aside for SRL staff to subsample for individual lengths and weights (Table 17). Most of emigration occurred prior to 12 April. The Lake was fully drained 12 April with the last few fish leaving that day. From 10 – 12 April, Snake River flows at LMO Dam ranged from 61.0 – 66.4 kcfs with 29.9 –

30.1 kcfs spill and total dissolved gases were 118.9% – 119.3%. Columbia River flows at MCN Dam ranged from 264.6 – 281.5 kcfs with 128.8 – 147.1 kcfs spill and total dissolved gases were 117.6% – 118.4%. The release occurred during an increasing hydrograph in each basin. Historical releases by WDFW, NPT, IDFG, and NOAA are provided in Appendix H.

Table 17. Length and weight data from yearling fall Chinook (BY11) released at LFH in 2013.

	Yearlings	
	ADCWT	**CWT ONLY**
CWT code	636444	636443
Number sampled	205	225
Avg. length (mm)	162	160
Median	161	160
Range	122-219	130-198
STDS	12.5	11.3
CV	7.7	7.0
Avg. weight (g)	44.6	43.6
STDS	12.3	10.0
CV	27.6	22.9
Avg. K factor	1.03	1.04
FPP	10.2	10.4

Survival Rates to Release

The estimated number of eggs and fish present at life stages in the hatchery were used for 2007-2011 broods to calculate survival rates within the hatchery environment (Table 18). Historical survivals between various life stages at LFH for fall Chinook are presented in Appendix I.

Table 18. Estimated survivals (%) between various life stages at LFH for fall Chinook of LFH/Snake River hatchery origin, 2007-2011 brood years.

Brood year	Release stage	Green egg-ponded fry	Ponded fry-release[a]	Green egg-release
2007	Yearling	95.8	95.4	91.4
	Subyearling	95.8	100.3	95.5
2008	Yearling	95.8	95.3	91.3
	Subyearling	95.8	105.9	90.4
2009	Yearling	94.1	97.9	92.1
	Subyearling	94.1	100.3	93.8
2010	Yearling	96.4	101.9	98.2
	Subyearling	96.4	101.1	95.4
2011	Yearling	95.0	102.8	97.7
	Subyearling	95.0	98.5	96.4
Yearling mean:	**%**	**95.4**	**98.7**	**94.2**
	SD	**0.9**	**3.5**	**3.4**
Subyearling mean:	**%**	**95.4**	**101.4**	**94.1**
	SD	**0.9**	**3.3**	**2.8**

[a] Survival estimates exceed 100% due to inventory tracking methodologies used at LFH.

Migration timing

Interrogation summary from the PTAGIS website (www.ptagis.org) were used to populate Table 19 and Table 20 on 19 July 2013. PIT tagged subyearlings released at Couse Creek and Grande Ronde are to only represent migration timing in this report. From release site at Couse Creek to detection facility, juvenile salmon averaged 4.0 km/day to LGR, 6.7 km/day to LGO, 7.8 km/day to LMO Dam, 9.5 km/day to IHR dam, 10.9 km/day to MCN Dam, 13.0 km/day to John Day Dam, and 17.2 km/day to Bonneville Dam. From release site at Cougar Creek located on the Grande Ronde to detection facility, juvenile salmon averaged 5.9 km/day to LGR, 9.0 km/day to LGO, 10.2 km/day to LMO Dam, 10.9 km/day to IHR dam, 12.9 km/day to MCN Dam, 15.0 km/day to John Day Dam, and 18.4 km/day to Bonneville Dam.

Interrogation summary from the PTAGIS website (www.ptagis.org) were used to populate Table 22 and Table 22 on 30 July 2013. Migration timing of PIT tagged subyearlings and yearlings released onstation represent the non-PIT tagged release because they were designated as monitor mode fish at the dams. From release site to detection facility, juvenile salmon subyearlings averaged 2.4 km/day to LMO Dam, 4.4 km/day to ICH Dam, 5.9 km/day to MCN Dam, 8.7 km/day to John Day Dam and 12.7 km/day to Bonneville Dam. Migration timing of juvenile salmon yearlings averaged 5.6 km/day to LMO Dam, 7.2 km/day to IHR Dam, 10.5 km/day to

MCN Dam, 15.9 km/day to John Day Dam, and 21.2 km/day to Bonneville Dam. Minimum survival to Bonneville Dam could not be estimated due to low detections because of tag collision with the PIT tag array at the LFH release structure.

Table 19. Migration timing of BY11 PIT tagged subyearlings released at Couse Creek in 2012.

	Detection Facilities						
	LGR	**LGO**	**LMO**	**ICH**	**MCN**	**JDD**	**BONN[a]**
Number Detected	**1,691**	**2,100**	**732**	**206**	**690**	**1,068**	**464**
Median Travel Days from Couse Creek[b]	20	21	24	25	28	33	32
Median Passage Date	18 Jun	19 Jun	22 Jun	23 Jun	26 Jun	1 Jul	30 Jun
First Detection Date	3 Jun	6 Jun	8 Jun	14 Jun	13 Jun	17 Jun	18 Jun
Last Detection Date	21 Jul	19 Jul	19 Jul	12 Jul	23 Jul	13 Oct	20 Aug
10% of Run Passage Date	11 Jun	15 Jun	16 Jun	20 Jun	22 Jun	25 Jun	25 Jun
90% of Run Passage Date	27 Jun	27 Jun	29 Jun	1 Jul	5 Jul	10 Jul	7 Jul
TDG on Median Date (%)[c]	117.5	114.1	117.9	116.7	120.1[d]	119.4[e]	117.4[f]
Outflow on Median Date (kcfs)[c]	83.7	94.6	78.5	85.7	406.3	407.0	394.1
Spill on Median Date (kcfs)[c]	41.6	34.1	21.9	67.7	297.0	142.2	167.4

[a] TDG, outflow and spill for BONN are detected six miles downstream at Warrendale.
[b] Travel days are calculated from 29 May.
[c] Detections are from the tailrace of each dam.
[d] TDG at McNary Dam was not reported on 26 June. On 23 June, TDG was 120.1% and outflow was 353.6 kcfs.
[e] TDG at John Day Dam was not reported on 1 Jul. On 2 Jul, TDG was 119.4% and outflow was 371.3 kcfs.
[f] TDG at Bonneville Dam was not reported on 30 June. On 3 July, TDG was 117.4% and outflow was 362.1 kcfs.

Table 20. Migration timing of BY11 PIT tagged subyearlings released at GRR in 2012.

	Detection Facilities						
	LGR	**LGO**	**LMO**	**ICH**	**MCN**	**JDD**	**BONN[a]**
Number Detected	**3,990**	**5,146**	**1,596**	**335**	**1,840**	**1,932**	**959**
Median Travel Days from GRR[b]	25	23	25	28	29	33	33
Median Passage Date	18 Jun	16 Jun	18 Jun	21 Jun	22 Jun	26 Jun	26 Jun
First Detection Date	28 May	31 May	4 Jun	7 Jun	8 Jun	11 Jun	14 Jun
Last Detection Date	23 Jul	8 Apr	20 Jul	11 Jul	11 Aug	23 Jul	24 Jul
10% of Run Passage Date	4 Jun	8 Jun	9 Jun	11 Jun	15 Jun	19 Jun	20 Jun
90% of Run Passage Date	21 Jun	23 Jun	26 Jun	26 Jun	2 Jul	6 Jul	4 Jul
TDG on Median Date (%)[c]	117.5	113.3	113.9	116.1	120.1	118.4	118.3[d]
Outflow on Median Date (kcfs)[c]	83.7	83.8	80.4	82.6	364.4	398.0	389.0
Spill on Median Date (kcfs)[c]	41.6	25.8	23.9	35.9	222.6	168.4	197.2

[a] TDG, outflow and spill for BONN are detected six miles downstream at Warrendale.
[b] Travel days are from the date of release.
[c] Detections are from the tailrace of each dam.
[d] TDG at Bonneville Dam was not reported on 26 June. On 23 June, TDG was 118.3% and outflow was 367.2 kcfs.

Table 21. Migration timing of BY11 PIT tagged subyearlings released at LFH in 2012.

	Detection Facilities				
	LMO	**ICH**	**MCN**	**JDD**	**BONN[a]**
Number Detected	**1,062**	**288**	**1,001**	**1,301**	**408**
Median Travel Days from LFH[b]	12	18	25	31	30
Median Passage Date	10 Jun	16 Jun	22 Jun	28 Jun	27 Jun
First Detection Date	30 May	3 Jun	7 Jun	10 Jun	13 Jun
Last Detection Date	22 Jul	13 Jul	17 Jul	19 Jul	13 Jul
10% of Run Passage Date	4 Jun	6 Jun	15 Jun	22 Jun	20 Jun
90% of Run Passage Date	22 Jun	28 Jun	3 Jul	6 Jul	5 Jul
TDG on Median Date of Passage (%)[c]	117.9	116.7	120.1	118.4[d]	118.3[e]
Outflow on Median Date of Passage (kcfs)[c]	89.2	85.9	364.4	392.1	421.0
Spill on Median Date of Passage (kcfs)[c]	37.3	65.0	222.6	160.4	215.7

[a] TDG, outflow and spill for BONN are detected six miles downstream at Warrendale.
[b] Travel days are from the date of release.
[c] Detections are from the tailrace of each dam.
[d] TDG at John Day Dam was not reported on 28 June. On 26 June, TDG was 118.4%.
[e] TDG at Bonneville Dam was not reported on 27 June. On 23 June, TDG was 118.3%.

Table 22. Migration timing of BY11 PIT tagged yearlings released at LFH in 2013.

	Detection Facilities				
	LMO	**ICH**	**MCN**	**JDD**	**BONN[a]**
Number Detected	2,450	642	4,877	4,181	1,589
Median Travel Days from LFH[b]	5	11	14	17	18
Median Passage Date	15 Apr	21 Apr	24 Apr	27 Apr	28 Apr
First Detection Date	11 Apr	13 Apr	14 Apr	16 Apr	19 Apr
Last Detection Date	19 May	17 May	13 Jun	13 Jun	25 May
10% of Run Passage Date	13 Apr	15 Apr	17 Apr	20 Apr	22 Apr
90% of Run Passage Date	25 Apr	30 Apr	5 May	7 May	10 May
TDG on Median Date of Passage (%)[c]	119.3	114.8	113.7	114.2	114.7
Outflow on Median Date of Passage (kcfs)[c]	59.2	59.8	217.1	222.0	229.2
Spill on Median Date of Passage (kcfs)[c]	31.0	45.4	86.7	66.5	89.6

[a] TDG, outflow and spill for BONN are detected six miles downstream at Warrendale.
[b] Travel days are from the date of release.
[c] Detections are from the tailrace of each dam.

Adult progeny to parent ratio

We are unable to estimate the adult progeny to parent ratio because we are unable to identify untagged hatchery returns. This was the second year parental based tagging (PBT) of broodstock was used at LFH. Combining data from PBT of broodstock at NPTH and LFH will result in the ability to identify all in basin hatchery releases at return. In 2016, the whole return of inbasin hatchery fish will be identifiable through PBT analysis which will enable the estimation of adult progeny to parent ratios for both hatchery and natural origin fish.

Hatchery Stock Profile Evaluation

Size at age of return was calculated for wire tagged yearling (Table 23) and subyearling (Table 24) LSRCP releases (including FCAP) and out-of-basin strays processed by WDFW. Recoveries of fish that are part of IPC and NPTH programs are not included below. These data provide the reader a general idea of the size of the fish at return, not the extent of the return by age because of size selective (non-random) trapping protocols. In addition, the reader must be aware that age 3 subyearlings include some jacks that reservoir reared.

In general, fish trapped at LFH are primarily from yearling releases while fish trapped at LGR consist of a higher proportion of adults from subyearling releases. The sizes at age of return of LSRCP fish were not different than the sizes of out-of-basin strays processed. Historical sizes at age of return for LSRCP program fish are provided in Appendix J.

Table 23. Size at age of return by sex for CWT fall Chinook processed by WDFW that were part of yearling production in 2012.

			Age at Return				
Sex	**Origin**	**Fork length**	0 salt	1 salt	2 salt	3 salt	4 salt
Male	LFH	N=	342	438	120	6	-
		Median (cm)	**35**	**56**	**69**	**84**	**-**
		Range (cm)	28-67	32-69	51-92	56-94	-
	Stray	N=	2	2	1	-	-
		Median (cm)	**-**	**-**	**-**	**-**	**-**
		Range (cm)	32-36	62-68	76	-	-
Female	LFH	N=	-	24	475	59	2
		Median (cm)	**-**	**63**	**76**	**83**	**-**
		Range (cm)	-	50-68	62-89	72-95	77-86
	Stray	N=	-	1	1	-	-
		Median (cm)	**-**	**-**	**-**	**-**	**-**
		Range (cm)	-	62	74	-	-

Table 24. Size at age of return by sex for CWT fall Chinook processed by WDFW that were part of subyearling production in 2012.

			Age at Return				
Sex	**Origin**	**Fork length**	0 salt	1 salt	2 salt	3 salt	4 salt
Male	LFH	N=	-	371	627	7	2
		Median (cm)	**-**	**48**	**65**	**75**	**-**
		Range (cm)	-	35-62	41-85	65-84	81-88
	Stray	N=	-	5	-	-	-
		Median (cm)	**-**	**49**	**-**	**-**	**-**
		Range (cm)	-	44-57	-	-	-
Female	LFH	N=	-	-	255	56	10
		Median (cm)	**-**	**-**	**71**	**80**	**82**
		Range (cm)	-	-	54-82	72-88	70-92
	Stray	N=	-	-	1	1	1
		Median (cm)	**-**	**-**	**-**	**-**	**-**
		Range (cm)	-	-	74	79	97

Tucannon River Natural Production 2012

Adult Salmon Surveys

Fall Chinook Redd Surveys

WDFW personnel have conducted spawning ground surveys for fall Chinook salmon surveys on the lower Tucannon River since 1985 (Appendix K). Survey sections in 2012 covered the river from Rkm 1.1 to Rkm 33.6; a 3.6 Rkm increase in surveyed area. The first 1.1 kilometers of the Tucannon River are deep slack water from the Snake River's LMO Dam reservoir and no surveys or estimates are made for that area; the habitat is poor in this area and it is presumed no spawning occurs there. During 2012, landowner access restrictions prevented the surveying of 1.5 kilometers of river above the Starbuck Bridge within survey sections 5 and 6. A pre-survey was conducted the week of 7 October in order to ensure no spring Chinook redds were counted as a fall Chinook redds. Regular weekly surveys began the week of 21 October and continued until week of 25 November. High flows and low visibility prevented further surveys for the season.

An estimated 541 fall Chinook and 34 coho redds were constructed in the Tucannon River during 2012. A total of 284 redds (from all species) were counted in the Tucannon River (Table 25) and we estimate an additional 290 redds occurred in sections of river not accessed due to landowner restrictions or in sections not surveyed due to high flows and low visibility later in the season. The estimated number of redds built in inaccessible sections was done by calculating redds/Rkm in an adjacent surveyed section and applying it to the non-surveyed area. The number of estimated redds built during high flows was calculated based on the number of redds built in those sections during that time period in years 2007 and 2009-2011. Redd counts in 2008 were not used as surveys were not conducted the week of 13 November.

Table 25. Date and number of redds and carcasses counted on the Tucannon River in 2012.

Week beginning	Total Redds [a]	Carcasses Sampled	
	Chinook & Coho [b]	Chinook	Coho
7 Oct[c]	1	0	0
14 Oct	0	0	0
21 Oct	15	0	3
28 Oct	39	1	2
4 Nov	119	11	0
11 Nov	91	19	1
18 Nov	9	20	0
25 Nov	10	28	0
16 Dec	no data	2	0
Totals	**284**	**81**	**6**

[a] Observed redds not expanded for sections with access restrictions.
[b] Chinook & Coho redd data estimated through visual counts were combined.
[c] This was a presurvey to ensure no spring Chinook redds were counted as fall Chinook redds.
[d] High flows and low visibility prevented surveys from being completed this week forward.

Escapement and Composition of Run

Using the revised number of fall Chinook and coho redds as described in the prior section, we applied a 3 fish/redd calculation and estimated that 1,623 fall Chinook and 102 coho escaped to the Tucannon River (Table 26). We recovered 83 fall Chinook carcasses equating to 5.1% of the estimated total escapement to the Tucannon River.

Table 26. Estimated escapement, redd construction, and resulting estimates of smolts/redd and total number of migrants from fall Chinook spawning in the Tucannon River, 2001-2012.[a]

			Redd Construction[a]			Success of Spawning		
Brood Year	Estimated escapement [b]	% Strays in carcasses sampled	# Redds observed	# Redds in no access areas (est.)	Total # of Redds (est.)	Estimated smolts/redd [c]	Total # Estimated emigrants [d]	Adult progeny to Escapement ratio
2001	219	14.9	65	8	73	336	24,545	0.63
2002	630	35.1	183	27	210	81	17,030	0.05
2003	474	65.8	143	15	158	460	72,656	0.04
2004	345	29.4	111	4	115	631	72,655	0.03
2005	198	60.0	61	5	66	320	21,170	0.17
2006 [e]	460	9.7	127	26	153	289	44,296	0.04[f]
2007	326	7.0	93	16	109	unknown[g]	unknown[g]	0.15[h]
2008	763	16.5	209	45	254	20	5,030	Pending
2009[i]	756	10.7	217	35	252	147	36,991	Pending
2010	972	27.0	281	43	324	76	24,315	Pending
2011	906	4.2	278	24	302	67	20,261	Pending
2012	1,623	4.9	256	285	541	231	125,029	Pending

[a] Numbers presented in this table may be different from prior reports and represent the most accurate estimates of escapement and production in the Tucannon to date.
[b] These estimates were derived using three fish per redd and no adjustments were made for super imposition of redds.
[c] This estimate was derived using redds counted above the smolt trap and estimates of emigration the following spring.
[d] This estimate was derived using the smolt per redd estimate above the trap and applying it to the total number of redds in the Tucannon River.
[e] Includes approximately 2.3% summer Chinook in escapement that contributed to production estimate.
[f] Estimate through age 4 returns.
[g] No estimate was made because the smolt trap sampling box had a hole in it and fish escaped.
[h] Estimate through age 3 returns.
[i] First year of using new methodology to estimate proportion of fall Chinook redds based upon proportions of fall Chinook in carcass recoveries. Excludes one summer Chinook redd located below the smolt trap.

The methodology used to estimate run composition of fall Chinook was modified in 2012 to account for carcass recovery bias. Each year more recoveries of females occur than males, primarily because females remain in the vicinity of redds when they die. The numbers of females in the composition were expanded to match the estimated number of redds, presuming 1 redd/female. The remainder of the run composition was based on the origins of males collected. CWT and scale analysis were used to determine the origin and age of each carcass. Compositions of recovered carcasses are presented in Table 27 and Table 28. Females

represented 60% of the recoveries; primarily adult 2-salt and 3-salt fish. DNA was collected and archived from 53 fall Chinook (DNA sample numbers 12KO4, 12KN1-12KN15, and 12KN18-12KN54.). CWT and scale analysis were used to determine the origin and age of each carcass.

Table 27. Composition of carcasses recovered and estimated run composition of fall Chinook on the Tucannon River, 2012.

					RAW TOTALS			EXPANDED TO RUN			
	Clip	CWT ORIGIN	CWT	European Age	F	M	<53 M	F	M	<53 M	TOTAL
In Basin Wire Fish	AD	LF07YO	634680		3			33	0	0	**33**
		LF08YO	635165		2			22	0	0	**22**
		LF08YO	635166		17	1		188	34	0	**222**
		LF09SO	635180		5	1		55	34	0	**89**
		LF09YO	635564		1	1	2	11	34	67	**112**
		LF10YO	636080			1	2	0	34	67	**101**
	NO	LF10SBCA	220118			1		0	34	0	**34**
		LF07YO	634681		2			22	0	0	**22**
		LF08YO	635165		12	2		133	67	0	**200**
		LF08YO	635166		2	2		22	67	0	**89**
		LF09YO	635510			3	1	0	100	35	**135**
		LF10YO	636079				1	0	0	34	**34**
	U	LF08YO	635165		1			11	0	0	**11**
		LF08YO	635166		1			11	0	0	**11**
		LF09YO	635510			1		0	34	0	**34**
		LF09YO	635564			1		0	34	0	**34**
Out of Basin Wire Fish	AD	BON08YUMA	090246		1			11	0	0	**11**
		UMA10SUMA	090434				1	0	0	34	**34**
	NO	UMA08SUMA	090224			1		0	34	0	**34**
No Wire Fish	AD			1.2	1			11	0	0	**11**
	NO			0.2		4		0	135	0	**135**
	U					1		0	34	0	**34**
Unknown Wire Fish	AD			0.2		1		0	34	0	**34**
				1.2	1			11	0	0	**11**
	NO			0.2		1		0	34	0	**34**
				1.1		1		0	34	0	**34**
				1.2		2		0	68	0	**68**
				GRAND TOTAL	**49**	**25**	**7**	**541**	**845**	**237**	**1,623**

Table 28. Estimated composition of fall Chinook run to Tucannon River by salt water age and origin, 2012.

Origin	0 salt	1 salt		2+ salt		Total	% of Return
	minijack	True jack	True jill	Adult F	Adult M		
Snake River Hatchery (wire, VIE)	135	338	11	497	202	1,183	72.9%
Presumed Snake River Hatchery (AD clip or yearling scales)	0	34	0	22	102	158	9.7%
Out-of-basin hatchery (wire-CWT or BLANK)	0	34	0	11	34	79	4.9%
Unknown Origin	0	0	0	0	203	203	12.5%
Total	**135**	**406**	**11**	**530**	**541**	**1623**	**100.0%**
% of return	**8.3%**	**25.0%**	**0.7%**	**32.7%**	**33.3%**		

Coho

DNA was collected and archived from 5 coho. Coho produced an estimated 39 redds when expanded for areas not surveyed. Six coho carcasses were recovered resulting in a 5.9% sample of the total coho escapement estimate. The majority of coho were untagged fish of unknown origin (Table 29).

Table 29. Composition of Coho carcasses recovered on the Tucannon River in 2012.

Origin		Females			Males			Totals
		AD clip	No clip	Unknown	AD clip	No clip	Unknown	
Wire Tagged Coho								
Clearwater (CWTs)	220004	1	0	0	0	0	0	1
No Wire								
Unknown origin		0	3	0	0	1	1	5
Total		**1**	**3**	**0**	**0**	**1**	**1**	**6**

Juvenile Salmon Emigration

Fall Chinook

Juvenile fall Chinook (BY11) were observed at the smolt trap (Rkm 3.0) from 7 February through 23 July 2012, the last day of trapping before the trap was pulled for the season (Gallinat and Ross, 2012). Trapping efficiency for fall Chinook ranged from 0.0% to 25.6% (Table 30). Median passage date for fall Chinook passing the trap was 7 June. Staff captured 2,039 fall Chinook and estimate that 14,475 (95% C.I. = 12,390-17,271) naturally produced fall Chinook smolts passed the Tucannon River smolt trap during 2012. Based on 215 redds estimated above the smolt trap during 2011, a calculated 67 smolts/redd were produced. After including juvenile production from below the smolt trap, an estimated 20,331 naturally produced fall Chinook smolts left the Tucannon during 2012.

Staff selected fish by size in the same proportions as trapped, with the goal of measuring 20 fish per day. A total of 1,618 fall Chinook were measured and ranged from 31-109 mm fork length and averaged 76 mm with a median of 79 mm. Length and weights were taken on 612 fish. For this group, fork lengths ranged from 35-109 mm and averaged 77 with a median of 78 mm. Weights ranged from 0.4 g to 16.1 g, with a mean and median of 5.8 g. K-factors ranged from 0.90-2.08, with a mean of 1.20 and a median of 1.19. The regression line in Figure 8 shows a correlation between size and trapping date indicating that the fish sampled might be from the same brood year. Scale results verified this hypothesis. PIT tags originally planned for use in fall Chinook on the Tucannon were re-directed to another study this year.

Table 30. Trapping efficiency estimates for fall Chinook and Coho at smolt trap on the Tucannon River in 2012.

	Fall Chinook	Coho
Week Ending	Recapture efficiency	Recapture efficiency
5-Feb	unknown	100.00%
19-Feb	unknown	50.00%
25-Mar	unknown	unknown[a]
8-Apr	unknown	unknown[a]
15-Apr	unknown	0.00%
22-Apr	unknown	unknown[a]
29-Apr	unknown	13.33%
6-May	5.88%	13.21%
13-May	8.16%	11.11%
20-May	15.31%	5.00%
27-May	16.26%	22.22%
3-Jun	25.57%	11.11%
10-Jun	10.05%	20.83%
17-Jun	16.11%	5.88%
24-Jun	14.85%	18.46%
1-Jul	5.88%	8.33%
8-Jul	0.00%	0.00%
15-Jul	0.00%	28.57%
22-Jul	0.00%	unknown

[a] Invalid trial due to either fish escaping or pulled trap.

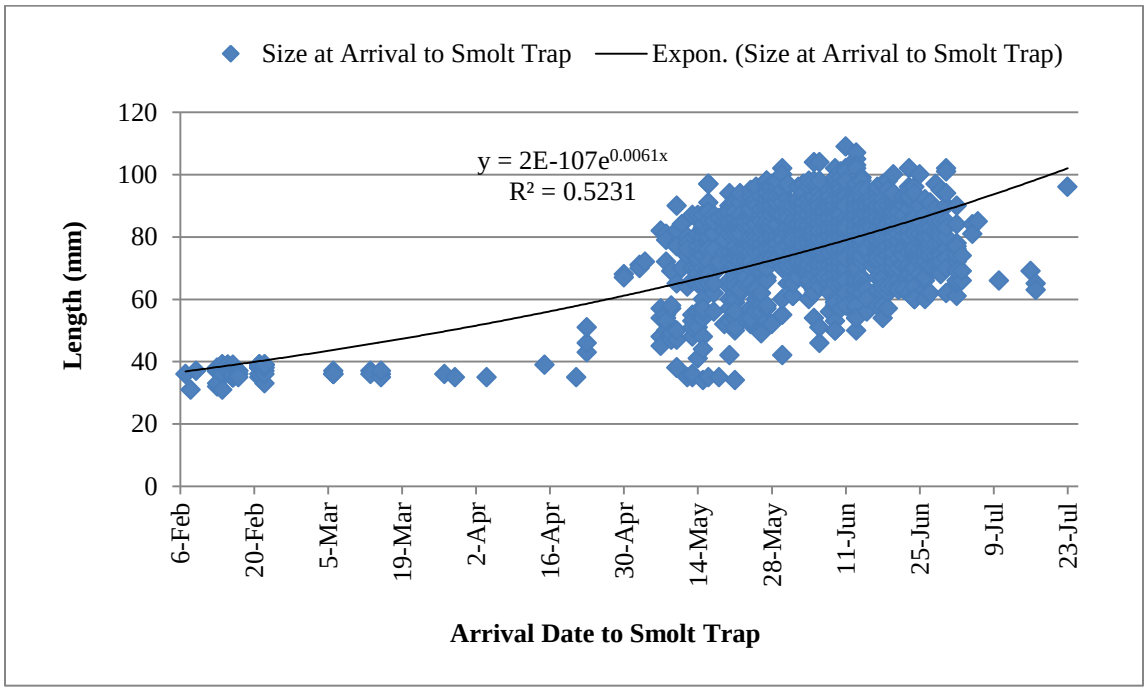


Figure 8. Arrival dates and sizes of juvenile natural origin fall Chinook trapped on the Tucannon River in 2012.

Coho

Juvenile coho salmon were incidentally captured at the smolt trap. Mark-recapture trap efficiencies were calculated, but were highly variable. Excluding the invalid tests, efficiencies averaged 20.5% during the trapping period (Table 30). Staff captured 381 coho and estimate that 2,495 (95% C.I. = 1,862-3,437) naturally produced coho parr and smolts passed the Tucannon River smolt trap during 2012. Juvenile coho were observed at the smolt trap from 6 December through 19 July. Median passage date was 11 June. Staff took fork lengths on 303 fish which ranged from 36-155 mm in length, with a mean of 98 mm and median of 95 mm. Weights from 160 fish ranged from 1.9-43.1 g. with a mean of 12.7 and a median of 10.4 g. K-factors ranged from 0.91-1.67, with a mean of 1.19 and a median of 1.18.

Based on scale results and fork length, it was determined there are two age classes of the emigrants as shown in Figure 9. There is a strong correlation between size and arrival date for subyearlings and a slight correlation for suspected yearlings. Determining age classes enables us to estimate productivity and to compare it with fall Chinook productivity. Of the 134 scale samples taken for coho, 92 were determined to be subyearlings. Fork lengths of the subyearlings ranged from 44-127 mm with a mean and median of 88 mm. Yearlings ranged from 115-155 mm in length with a mean of 129 mm and a median of 130 mm.

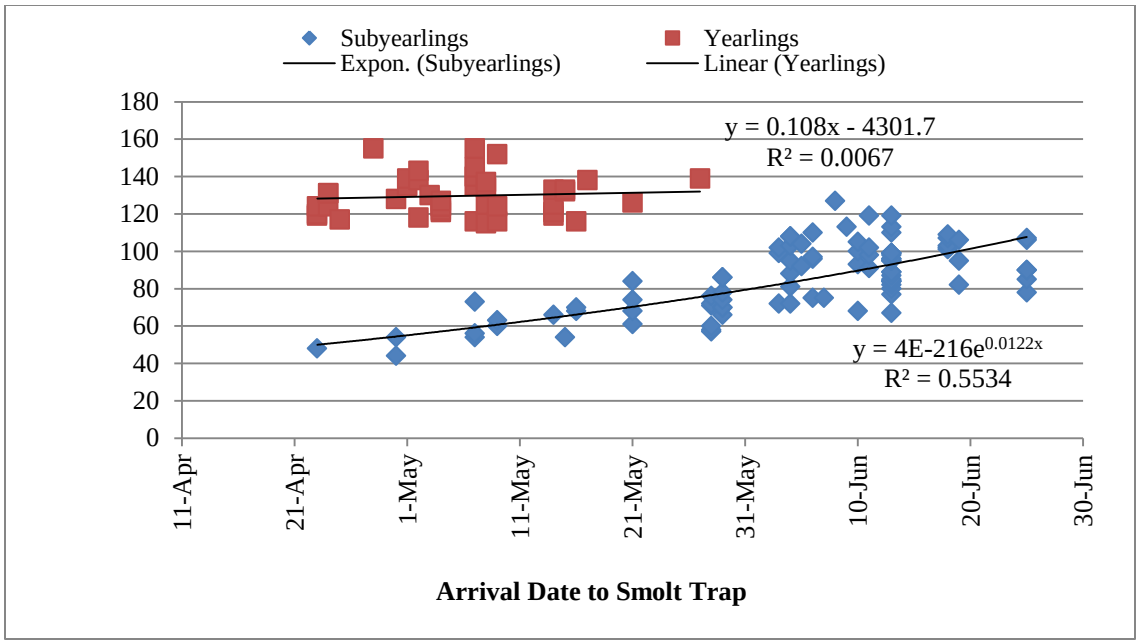


Figure 9. Arrival dates and sizes of natural origin coho trapped on the Tucannon River in 2012 by age classes.

Fall Chinook Run Size and Composition 2012

Return to LFH

Fish trapped at LFH are not systematically trapped and marked; therefore, neither the full run size nor the true composition of the run to LFH can be estimated. The estimated composition of fall Chinook trapped at LFH that were killed during spawning is listed in Table 31.

Table 31. Estimated composition of fall Chinook trapped at LFH and killed in 2012 by program and saltwater age.

	0 salt	1 salt		2+ salt			
Program	**Minijack**	**True jack**	**True jill**	**Adult F**	**Adult M**	**Total**	**% of total**
Umatilla/BONN	0	0	0	0	0	0	0.0%
Bonneville	0	0	0	0	0	0	0.0%
Umatilla	0	0	0	1	0	1	0.5%
NPTH	0	0	0	0	1	1	0.5%
LSRCP	3	5	3	158	28	197	99.0%
Natural	0	0	0	0	0	0	0.0%
Total	**3**	**5**	**3**	**159**	**29**	**199**	**100.0%**

Returns to LGR Dam and Composition of Fish Hauled to LFH from LGR Dam

Chinook were counted 24 hours per day during August, 16 hours per day September through October, and 10 hours per day from November through 15 December at the counting window at LGR Dam (U.S. Army Corps of Engineers, 2012). Window counts estimated 34,688 adults and 21,990 jacks (30 cm-52 cm fork length) reached LGR Dam in 2012 (Figure 10). The Chinook passing LGR Dam after 17 August are designated as falls based on arrival date, which may be inaccurate because of the overlap between the fall and summer Chinook runs. In addition, fish counts do not count fish less than 30 cm long nor do they adjust for fish that crossed the dam and fell back through the juvenile bypass system (fallback event) nor fish that re-crossed the dam after a fallback event (double counting). Fish hauled from LGR to LFH that were processed (killed) are listed in Appendix L.

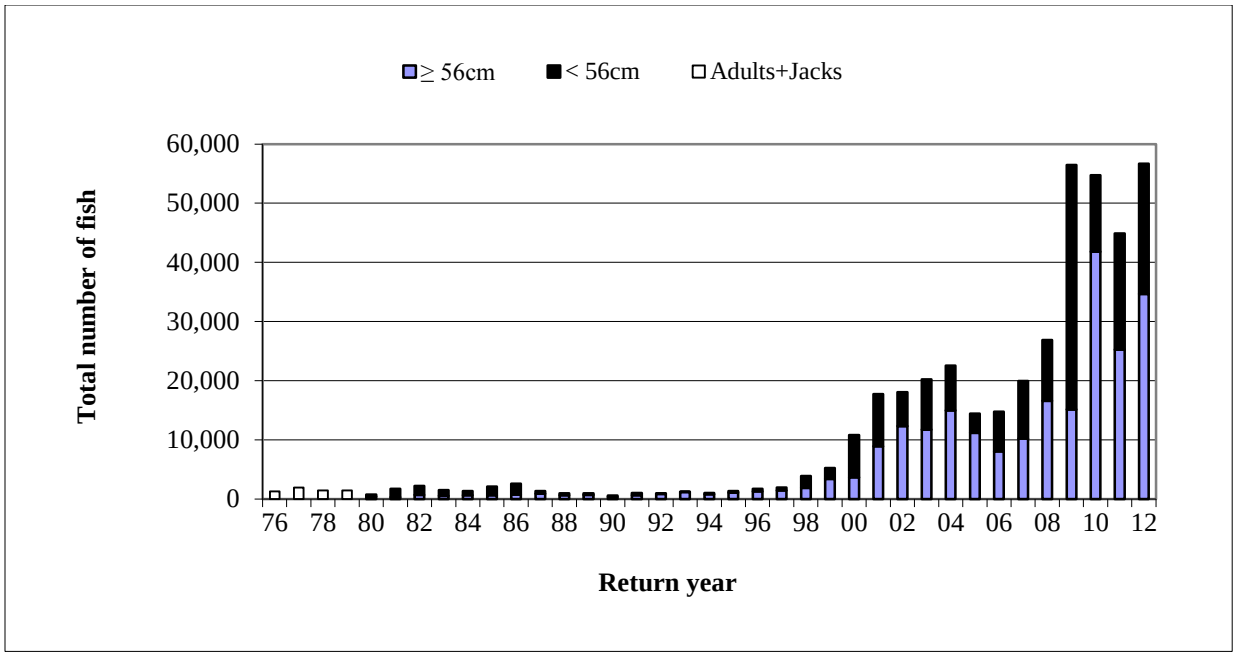


Figure 10. Fall Chinook window counts at LGR Dam, 1976-2012.

An estimated 55,281 fall Chinook (30.6% wild, 69.1% inbasin hatchery, and 0.3% out of basin hatchery) reached LGR in 2012 (Table 32). The fall Chinook run reconstruction technical team consists of staff from NPT, WDFW, IPC, NOAA, and CRITFC. The estimates were bootstrapped by Ben Sandford of NOAA and confidence intervals were derived for the dataset. Females, regardless of size, were summarized together and males were summarized according to fork length. Data was grouped by total age as requested by TAC. The data does not specifically show true jacks because age 2 fish consist of minijacks (0-salt yearlings) and jacks (1-salt subyearlings) and age 3 fish consist of jacks (1-salt yearlings) and adults (2-salt subyearlings).

Table 32. Estimated composition, standard errors, and confidence intervals for fall Chinook reaching LGR during 2012.

Estimates						Bootstrap Standard Error						Bootstrap 95% Confidence Interval (Upper CI, Lower CI)				
Total Run by Origin																
Origin	**F**	**M ≥53cm**	**M <53cm**	**F+M ≥53cm**		**Origin**	**F**	**M ≥53cm**	**M <53cm**	**F+M ≥53cm**		**Origin**	**F**	**M ≥53cm**	**M <53cm**	**F+M ≥53cm**
Wild	3904	8893	4143	12797		Wild	197	283	232	336		Wild	3510, 4299	8333, 9443	3689, 4642	12154, 13463
Hatchery	8175	15366	14800	23541		Hatchery	238	318	299	359		Hatchery	7705, 8632	14746, 15960	14236, 15416	22830, 24222
Totals	12079	24259	18943	36338		Totals	235	289	261	272		Totals	11628, 12583	23683, 24805	18480, 19484	35775, 36828
Run by origin and age																
Origin	**F**	**M ≥53cm**	**M <53cm**	**F+M ≥53cm**		**Origin**	**F**	**M ≥53cm**	**M <53cm**	**F+M ≥53cm**		**Origin**	**F**	**M ≥53cm**	**M <53cm**	**F+M ≥53cm**
wild age 2	34	441	3712	475		wild age 2	15	79	228	80		wild age 2	6, 63	288, 586	3267, 4194	316, 623
wild age 3	1594	7577	431	9171		wild age 3	149	272	59	307		wild age 3	1317, 1905	7024, 8084	318, 555	8549, 9756
wild age 4	1589	761	0	2350		wild age 4	118	75	0	137		wild age 4	1375, 1833	597, 896	0, 0	2088, 2632
wild age 5	687	115	0	802		wild age 5	74	52	0	92		wild age 5	536, 831	27, 231	0, 0	621, 992
wild age 6	0	0	0	0		wild age 6	0	0	0	0		wild age 6	0, 0	0, 0	0, 0	0, 0
Hat age 2	0	971	13425	971		Hat age 2	0	104	315	104		Hat age 2	0, 0	778, 1198	12772, 14030	778, 1198
Hat age 3	3747	13242	1297	16988		Hat age 3	177	314	128	348		Hat age 3	3439, 4101	12650, 13875	1064, 1568	16323, 17732
Hat age 4	3752	960	11	4712		Hat age 4	162	92	11	181		Hat age 4	3408, 4051	781, 1139	0, 34	4324, 5025
Hat age 5	637	154	0	792		Hat age 5	74	55	0	92		Hat age 5	488, 783	51, 267	0, 0	602, 961
Hat age 6	7	0	0	7		Hat age 6	6	0	0	6		Hat age 6	0, 20	0, 0	0, 0	0, 20
stray age 2	0	8	67	8		stray age 2	0	7	28	7		stray age 2	0, 0	0, 23	22, 133	0, 23
stray age 3	20	16	0	35		stray age 3	12	11	0	16		stray age 3	0, 46	0, 39	0, 0	7, 70
stray age 4	0	8	0	8		stray age 4	0	7	0	7		stray age 4	0, 0	0, 23	0, 0	0, 23
stray age 5	7	0	0	7		stray age 5	6	0	0	6		stray age 5	0, 20	0, 0	0, 0	0, 20
stray age 6	0	0	0	0		stray age 6	0	0	0	0		stray age 6	0, 0	0, 0	0, 0	0, 0
agency wire-stray	7	8	0	14		agency wire-stray	6	7	0	9		agency wire-stray	0, 20	0, 23	0, 0	0, 36
stray wild	0	0	0	0		stray wild	0	0	0	0		stray wild	0, 0	0, 0	0, 0	0, 0

Fallbacks

A total of 2,347 fallback events were counted at the juvenile collection facility (Table 33) and the separator (Table 34) located below LGR Dam. These fallback events occur when fish encounter the traveling screens that bypass fish away from the turbines and shunt them to the juvenile collection facility. Fish can also fallback over the spillway, go through the turbines or navigation lock, but we did not estimate fallback for those routes.

Table 33. Documented fallbacks of Chinook at the LGR juvenile collection facility during 2012 by clip and wire.

Run	Fin clip	Wire	<30cm	30-50cm[a]	Grand Total
Chinook[b]	AD	No wire	1	1	2
		Wire	0	5	5
		Unknown	6	60	66
	No clip	No wire	1	1	2
		Wire	4	23	27
		Unknown	4	65	69
Fall Chinook Total			**16**	**155**	**171**
% Known Hatchery Origin			68.8%	57.4%	58.5%

[a] Category does not differentiate males from females , although they are likely males.
[b] The run of Chinook is not identified during sampling and may include summer Chinook.

Fish encountered at the juvenile collection facility and separator were examined for size, fin clips, VIE tags, and operculum punches (**Table 34**). More than half of the fish less than 50 cm fork length were hatchery fish. No VIE tags were detected in 2012. An estimate of at least 60.3% of the fish $\geq$ 53 cm sampled at the separator were of hatchery origin based solely on adipose clips, but we expect the rate is actually much greater since some of the hatchery fish released inbasin are unclipped.

Table 34. Composition of fallbacks at the LGR Dam separator in 2012 by clip and length.

Clip	<53cm[a]	$\geq$53 cm[a]	Grand Total
AD Clip	716	581	1,297
No Clip	496	383	879
Grand Total	**1,212**	**964**	2,176

[a] Category includes males and females.

Characteristics of fall Chinook reaching LGR Dam

The following figures were built using data collected at the LGR adult trap. These analyses include hatchery and natural origin fall Chinook.

Arrival timing

The actual numbers of fish trapped were expanded to estimate the magnitude of the run arriving at LGR each day (Figure 11) the trap was operated.

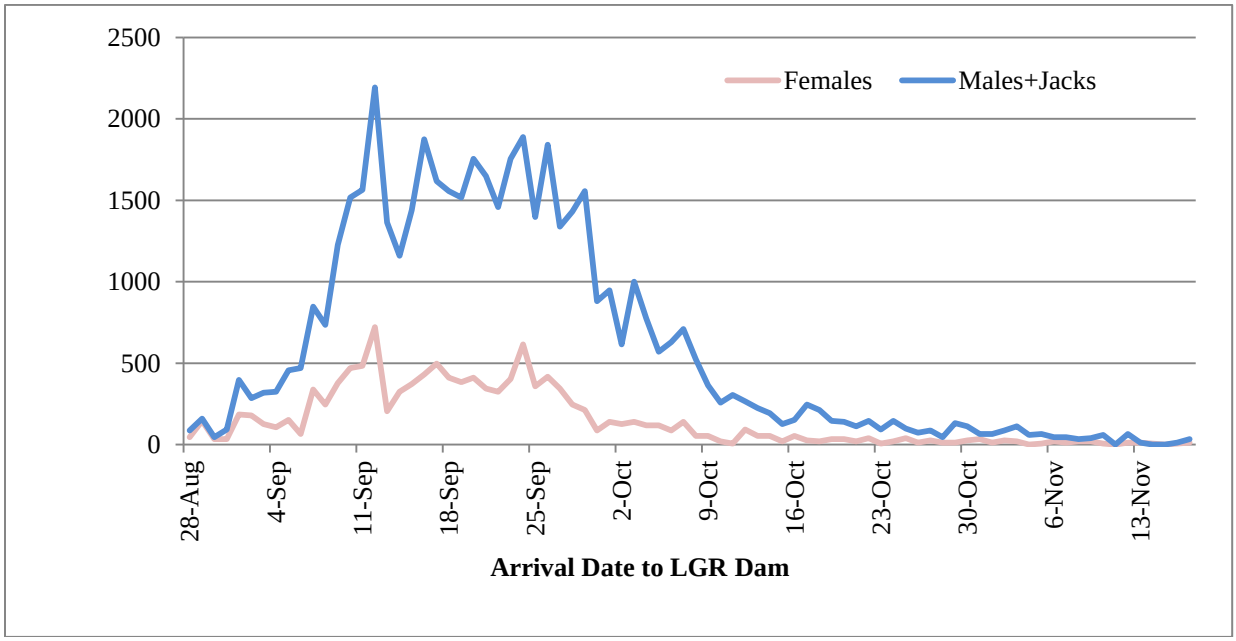


Figure 11. Run timing of fall Chinook to LGR Dam by sex in 2012.

Sex Ratio

The 2012 return consisted of 78.1% males, including jacks. The sex ratio of the return was calculated at 3.6 males+jacks/female. After removal of fish for broodstock, the fish calculated passing LGR Dam were 80.0% males resulting in 4.0 males+jacks/female.

Length frequencies

Fish trapped at LGR were measured and numbers of fish at each length were expanded to account for trapping rate (Figure 12). Median fork length for males and females was 55 cm and 73 cm, respectively. Figure 13 shows the length frequencies of fish passing LGR Dam after broodstock was removed.

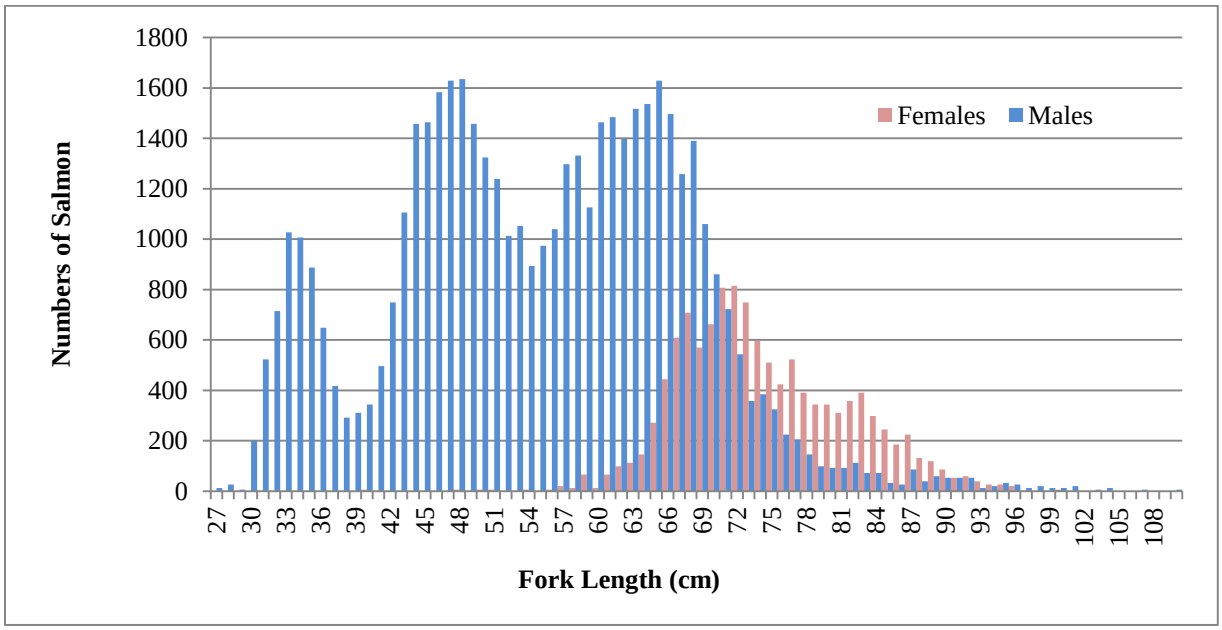


Figure 12. Estimated length frequencies of the fall Chinook run to LGR Dam by sex in 2012.

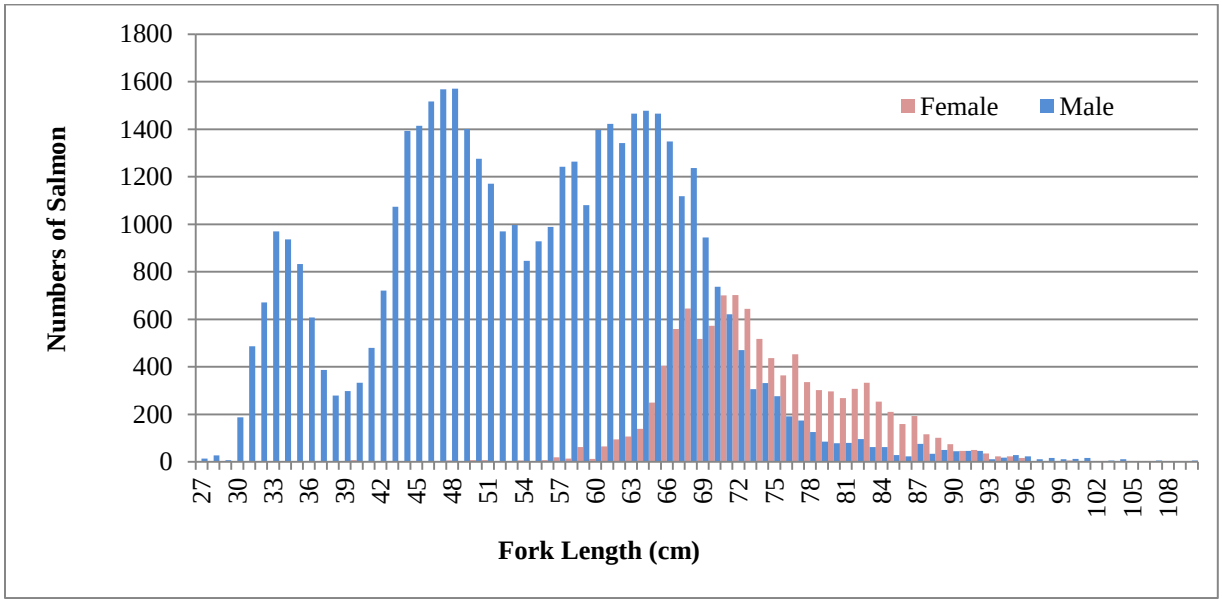


Figure 13. Estimated length frequencies of fall Chinook passing LGR Dam by sex in 2012.

Status of Mitigation Requirements

Overall Mitigation Level

To estimate the overall mitigation return, certain caveats of the data are required. Salt water age was estimated by subtracting 1 from the total age of subyearlings and subtracting 2 from the total age of yearlings. These estimates underestimate jacks and overestimate adults because they do not take into account reservoir rearing of the subyearling component. Estimated recoveries of WDFW releases outside of the Snake River are fully expanded, but the FCAP recoveries only include CWT recoveries and are not expanded to account for untagged fish associated with those groups or adjusted for detection method. Mitigation numbers presented in this report are therefore considered minimum estimates. The RMIS website was queried on 25 February 2014 for the 2012 returns of CWT tagged fish associated with the LSRCP (FCAP and WDFW releases).

A minimum estimated 40.6% of the total LSRCP mitigation goal of 91,500 fish was achieved in 2012. An estimated 24,744 fall Chinook (adults+jacks) returned from WDFW and FCAP releases into the Snake River, and at least an additional 12,377 fall Chinook were recovered outside of the Snake River basin, totaling 37,121 fish contributing to LSRCP mitigation in 2012.

Returns to the Project Area

The LSRCP mitigation goal of 18,300 fish returning to the Snake River was exceeded in 2012 (Table 35). Combining recoveries of fish harvested below LGR Dam, killed at LFH, the estimated run to the Tucannon River, and the estimated run to LGR Dam provides the best estimate of mitigation returns (tagged and untagged fish). These estimates do not include in-basin hatchery returns from the IPC and the NPTH programs.

Table 35. Estimated returns of LSRCP (WDFW and FCAP) fall Chinook to the Snake River and levels of mitigation goals met in 2012

	Saltwater age						% of LSRCP goal to the Snake River
	0-salt	1-salt		2-5 salt			
Location	Mini jack[a]	Jack[b]	Jill[c]	Adult F	Adult M	Total (A+J)	
Harvested FCH below LGR[d]	9	7	0	4	4	15	0.0
LFH trapped and killed during processing	3	5	3	158	28	194	1.1
Estimated run to Tucannon R.	135	338	11	519	372	1,240	6.8
Run to LGR dam[e]	3,916	10,010	853	5,595	6,837	23,295	127.3
Total	**4,063**	**10,360**	**867**	**6,276**	**7,241**	**24,744**	**135.2**

[a] Minijacks are males that did not spend a year in salt water.
[b] Jacks are males that spent 1 year in salt water.
[c] Jills are females that spent 1 year in salt water.
[d] Harvest estimates were not expanded unless 5% of the catch was sampled.
[e] Estimated run to LGR Dam for LSRCP and FCAP releases and includes fish hauled to LFH and NPTH for processing as well as fish released from the dam

In 2012, anglers in Washington were allowed a daily harvest of three adult fall Chinook (24 inches in length or larger) and three jacks (less than 24 inches in length, but larger than 12 inches), all of which must be adipose clipped. In Idaho, anglers were allowed a daily limit of six adipose-clipped adults. There was no limit for jack retention.

On the Snake, there were 484 recoveries based on expanded catch record card data (Table 36), but for mitigation purposes we did not use the expanded number of recoveries unless the sample rate was at least 5% of the catch record card estimate. Tribal catch was not reported.

Table 36. Estimated Snake River basin recoveries in 2012 of fall Chinook as reported on WDFW catch record cards (all origins).

Freshwater sport location		Sept	Oct	Total
BELOW LGR	Snake R Ice Harbor-LMO	0	15	15
	Snake LMO –LGO	88	300	396
	Snake LGO - LGR	51	22	73
ABOVE LGR	Snake R above LGR	290	561	851
Totals		**429**	**898**	**1,335**

Recoveries outside of the Snake River Basin

Approximately 17 % of the 73,200 fish harvest goal was met through returns from LSRCP releases in 2012. An estimated 12,377 salmon were harvested from LSRCP and LSRCP FCAP releases after expanding for sampling methodologies reported and including associated untagged fish estimated in catches (fully expanded estimates).

To document where recoveries of LFH/Snake River hatchery fish occurred in 2012, the RMIS database was queried on 25 February 2013 for LSRCP released fish. Estimates of harvest for fish released by WDFW are listed in Table 37 and Table 38 and do not include recoveries of fish released by the NPT (LSRCP or NPTH programs) or ODFW or IDFG (IPC program).

In 2012, an estimated 10.6% of the 73,200 fish harvest goal was met by WDFW releases. The sport harvest estimate is a minimum, and includes harvest in the Snake River (0.2% of total harvest goal). Expanded estimates of harvest of NPT fish (FCAP) that were part of the LSRCP mitigation are not presented in this report and will be documented in a future NPT report.

Outside of the Snake River Basin, the majority (57 %) of recoveries reported to RMIS and expanded by WDFW occurred in saltwater locations and 43% occurred in freshwater locations. Of the total number of fish recovered outside of the Snake River Basin, 63.4% came from commercial fisheries, 35.7 % were from sport fisheries, 0.8% were from spawning ground surveys on the Hanford reach, and 0.2% were from hatcheries. Harvest occurred in the ocean off the coasts of Washington, British Columbia, and Oregon but the single largest fishery contributor to harvest was the Zone 6 Tribal Gillnet fishery which accounted for 23.9 % of all the fish harvested in 2012.

Harvest Adjustments for Non-Selective Fisheries

Non-selective fisheries retain any fall Chinook captured. Non-selective fisheries include all the current commercial and tribal net fisheries. The WA and OR sport fisheries in the Columbia River, and Canadian and Alaskan sport fisheries are also non-selective. The RMIS database was used to generate estimated (ESTD) harvest data of CWT tagged fish. Fish without CWTs are not reported to RMIS and therefore the CWT harvest estimates must be expanded to reflect total harvest for mitigation purposes. Adjustments to RMIS harvest data were calculated differently based upon CWT detection methods listed below.

Visual Detection Method

Visual detection means only adipose fin clipped fish were scanned for CWTs. Since Oregon, Canada, and Alaska only sample adipose clipped fish, but allow take of all fish, we expanded the RMIS estimated recoveries (ESTD) by determining an expansion factor based on release data for each tag code recovered. For example, if the tagcode recovered was from a release of fish that had ADCWT, CWT only, AD only, and unmarked/untagged fish in the release, we used the following formula to expand harvest data of CWT fish to represent the total take:

ESTD CWTs harvested by fisheries from RMIS x (total # released that were associated with a tagcode/# ADCWT in the release) = Revised ESTD total take

Electronic Detection Method

Electronic detection method means all fish were scanned for wire regardless of fin clip. For this detection type we used the following formula to expand the harvest data of CWT fish to estimate the total take:

ESTD CWTs harvested by fisheries from RMIS x (total # released that were associated with a tagcode/(# ADCWT in the release + # CWT in the release) = Revised ESTD total take

Table 37. Fully expanded recovery estimates of tagged and untagged fall Chinook in areas outside of the Snake River basin in 2012 for WDFW releases.

			Yearlings			Subyearlings							Total recoveries	
			LFH			LFH		CCD		GRR				
Region	Recovery area	Fishery/Hatchery/River	EST CWT	EST CWT adj for detect method	Total EST wire + no wire	EST CWT	EST wire + no wire	EST CWT	EST wire + no wire	EST CWT	EST wire + no wire	Total EST wire + no wire	Grand Total EST CWT	Grand Total EST wire + no wire
AK	Troll		24	40	40	24	25	3	3	23	31	59	89	99
	Purse Seine		2	3	3	3	3	0	0	3	3	6	9	9
	Gillnet					0	0	2	2	0	0	2	2	2
	Marine Sport					2	2	0	0	5	7	10	8	10
BC	Troll		284	284	288	99	100	69	71	86	151	322	537	610
	Sport		225	412	415	91	92	41	42	102	191	326	646	741
CA	Troll		34	64	65	3	3	6	6	6	8	17	78	82
	Sport		34	64	65	4	4	11	11	8	15	30	86	95
COL	COL R Gillnet Zone 6	ABOVE BNVILLE NET	579	1,100	1,116	212	215	159	162	173	339	717	1,644	1,833
	COL R Gillnet Zone 1-5		121	222	225	48	48	57	60	39	70	178	366	403
	COL R Marine Sport		93	93	94	12	12	16	16	12	24	52	133	146
	COL R Sport		214	214	216	122	123	102	105	88	163	391	526	607
	Estuary Sport	COL R ESTUARY	141	141	142	23	24	10	10	34	64	98	208	240
	Freshwater Sport	COL R MNARY-PASCO	9	9	9	0	0	9	9	0	0	9	18	18
		HANFORD REACH (36)	0	0	0	0	0	0	0	9	17	17	9	17
	Mid-COL R Sport	JOHN DAY POOL LWR/	1	1	1	0	0	0	0	0	0	0	1	1
		BONNEVILLE POOL UPPER	0	0	0	1	1	0	0	0	0	1	1	1
	Spawning Ground	COL R @ HANFORD REACH(36)	0	0	0	8	9	8	9	17	36	53	34	53
		YAKIMA R-LOW 37.0002	0	0	0	0	0	0	0	5	6	6	5	6
	Hatchery	Priest Rapids/Ringold Springs/Umatilla	0	0	0	0	0	2	2	5	10	12	7	12
HS	Trawl bycatch		0	0	0	0	0	0	0	1	2	2	1	2
OR	Ocean Troll		423	423	429	53	55	19	19	30	52	126	525	555
	River Seine non-COL R	ROGUE R	149	149	150	0	0	0	0	0	0	0	149	150
	Ocean Sport		59	59	59	20	20	10	10	14	26	56	104	115
	Estuary Sport		1	1	1	0	0	0	0	0	0	0	1	1
WA	Troll (Non-Treaty)		252	252	256	24	24	18	19	27	55	99	321	355
	Treaty Troll		351	351	356	90	92	114	117	115	225	433	670	789
	Non-treaty Drift Gillnet		4	4	4	1	1	4	4	4	9	14	14	18
	Marine Sport		472	472	476	87	88	52	53	78	150	291	689	767
Totals			3,472	4,358	4,411	927	942	711	730	884	1,654	3,325	6,879	7,736

Table 38. Fully expanded recovery estimates (tagged and untagged) of 2012 returns by recovery region, rear type, and release location for fall Chinook released by WDFW. Minijacks and jacks are included in the estimates.

	Yearlings		Subyearlings							
	LFH		LFH		CCD		GRR		Total Subyearlings	
Region	Total ESTD wire+ nowire	Return comp by region (%)	Total ESTD wire+nowire	Return comp by region (%)	Total ESTD wire+nowire	Return comp by region (%)	Total ESTD wire+nowire	Return comp by region (%)	Total ESTD wire+nowire	Return comp by region (%)
AK	43	1%	30	3%	4	1%	42	3%	76	2%
BC	703	16%	193	20%	113	15%	342	21%	648	19%
CA	130	3%	6	1%	18	2%	24	1%	48	1%
HS	0	0%	0	0%	0	0%	2	0%	2	0%
OR	639	14%	75	8%	29	4%	78	5%	182	5%
WA	1092	25%	206	22%	193	26%	438	27%	837	25%
COL R	1803	41%	432	46%	373	51%	728	44%	1533	46%
Total	4,410	1	942		730		1,654		3,325	

Total age of yearling and subyearlings recovered outside of the Snake River basin

Recoveries in 2012 from yearling (Table 39) and subyearling released fish (Table 40-Table 42) were primarily age 4 yearling (2-salt) and age 3 subyearling (2-salt) fish. Data were summarized only for ADCWT marked releases in the tables below. Adjustments were not made to the original data presented by RMIS as ESTD in the tables below.

Table 39. Final locations of ADCWT yearling fall Chinook released onstation at LFH to areas outside of the Snake River basin in 2012 by total age.

Brood year:	**2010**	**2009**	**2008**	**2007**	**2006**	
Total age:	**2 (Minijack)**	**3 (Jack)**	**4**	**5**	**6**	
Tag code:	**636080**	**635564**	**635166**	**634680**	**633987**	
ADCWT at release:	**247,578**	**226,621**	**250,814**	**220,723**	**231,534**	**A+J**
Total released (wires+nowire):	**249,062**	**227,391**	**254,203**	**227,364**	**233,663**	**Totals**
AK	0	2	10	10	0	22
BC	0	154	152	42	0	348
CA	0	0	61	7	0	68
COL	45	190	692	109	5	991
OR	91	14	281	7	0	302
WA	6	108	478	24	0	610
Grand Total	142	468	1,674	199	5	2,341
Percent of recoveries out-of-basin	**5.7%**	**18.8%**	**67.3%**	**8.0%**	**0.2%**	

Table 40. Final locations of ADCWT subyearling fall Chinook released onstation at LFH to areas outside of the Snake River basin in 2012 by total age.

Brood year:	**2010**	**2009**	**2008**	**2007**	
Total age:	**2 (Jack)**	**3**	**4**	**5**	
Tag code:	**635998**	**635180**	**634995**	**634672**	
ADCWT at release:	**200,502**	**198,457**	**191,407**	**194,723**	**A+J**
Total released (wires+nowire):	**202,200**	**202,328**	**200,695**	**200,733**	**Totals**
AK	0	7	19	3	29
BC	9	155	19	7	190
CA	0	6	0	0	6
COL	79	296	25	26	426
OR	0	56	18	0	74
WA	6	174	22	0	202
Grand Total	94	694	103	36	927
Percent of recoveries out-of-basin	**10.1%**	**74.9%**	**11.1%**	**3.9%**	

Table 41. Final locations of ADCWT subyearling fall Chinook released into the Snake River near Couse Creek to areas outside of the Snake River basin in 2012 by total age.

Brood year:	**2010**	**2009**	**2008**	**2007**	
Total age:	**2 (Jack)**	**3**	**4**	**5**	
Tag code:	**635997**	**635181**	**634996**	**634671**	
ADCWT at release:	**200,945**	**199,326**	**187,434**	**195,058**	**A+J**
Total released (wires+nowire):	**202,300**	**203,162**	**200,744**	**230,401**	**Total**
AK	0	2	3	0	5
BC	10	82	10	8	110
CA	0	7	10	0	17
COL	35	260	57	11	363
OR	0	29	0	0	29
WA	4	158	19	7	188
Grand Total	49	538	99	26	712
Percent of recoveries out-of-basin	**6.9%**	**75.6%**	**13.9%**	**3.6%**	

Table 42. Final locations of ADCWT subyearling fall Chinook released into the Grande Ronde to areas outside of the Snake River basin in 2012 by total age.

Brood year:	**2010**	**2009**	**2008**	**2008**	
Total age:	**2 (Jack)**	**3**	**4**	**4**	
Tag code:	**635999**	**635182**	**612676**	**634997**	
ADCWT at release:	**199,460**	**197,252**	**165,146**	**193,275**	**A+J**
Total released (wires+nowire):	**397,428**	**386,840**	**181,400**	**441,050**	**Totals**
AK	0	3	24	4	31
BC	0	152	29	3	184
CA	0	11	3		14
COL	10	267	45	59	381
HS	0	1	0	0	1
OR	0	34	11	0	45
WA	0	199	8	17	224
Grand Total	10	667	120	83	880
Percent of recoveries out-of-basin	**1.1%**	**75.8%**	**13.7%**	**9.4%**	

Returns to the Snake River estimated using PIT tags and CWTs

The trap at LGR Dam is not designed to retain small (zero-salt) fish. Small fish can slip between the bars of the grail and are thought to be able to fit between the bars in the ladder, thus allowing them to avoid being diverted into the trap. The trap at LFH can hold small fish but a similar problem occurs when the fish are shunted into the fallback channel and crowded. The bars on the crowder are not designed to keep small fish from escaping so although they may be trapped, they are not accounted for at spawning because they never make it into the spawning building for processing.

To address this issue, we compared two methods of estimating returns to the Snake River: 1) PIT tag detections at return and 2) estimated returns of CWT fish. Data presented is preliminary since return information by brood year is incomplete. PIT tag detections were downloaded 5 March 2013. PIT tags used for estimating returns to the Snake River consisted of fish detected at arrays in the Snake River (Table 43). Data presented in Table 44 include returns of CWT fish in 2012.

By using PIT tagged returns of yearling fall Chinook released at LFH, we were able to detect an average 3.1 times greater return estimates of 0-salt fish compared to estimates using conventional CWT estimates based on trapping rates and detections. As fish returned at older ages the differences between estimation methods decreased, and CWT estimates resulted in 1.4 and 1.3 times greater return estimates for 1-salt and 2-salt fish than from PIT tag estimates. However, 3-salt fish with PIT tags resulted in 2.0 times greater SAR than when using CWT estimates. We currently have no explanation for these differences, but will continue to utilize both procedures and evaluate sources of error and bias in the sampling that might account for the difference.

Table 43. Return estimates to the Snake River for yearling fall Chinook released at LFH estimated using PIT tag detections in the Snake River through 2012.

Brood year	0-salt	1-salt	2-salt	3-salt	4-salt	Total Return to Date	Total PIT tagged at Release
2006	4.0% 1,183	1.7% 500	0.8% 233	0.04% 13	0.0%- 0	6.5% 1,929	29,806
2007	0.4% 106	0.7% 195	0.3% 83	0.06% 17	-	1.5% 401	26,757
2008	0.6% 157	0.9% 250	0.5% 132	-	-	2.0% 539	26,975
2009	0.4% 130	0.5% 149	-	-	-	0.9% 279	29,890
2010	0.4% 128	-	-	-	-	0.4% 128	29,990

Table 44. Return estimates to the Snake River for yearling fall Chinook released at LFH estimated using CWT recoveries and return estimates of live fish through 2011.

Brood year	0-salt	1-salt	2-salt	3-salt	4-salt	Total Return to Date	Total Tagged at Release	Tag codes
2006	1.3% 5,737	3.3% 14,856	1.0% 4,541	0.03% 151	0.0% 0	5.6% 25,285	452,340	634092 633987
2007	0.1% 522	1.1% 4,987	0.6% 2,502	0.07% 312	-	1.9% 8,323	442,640	634680 634681
2008	0.1% 324	0.6% 2,783	0.4% 2,086	-	-	1.1% 5,193	472,359	635165 635166
2009	0.2% 1,102	0.5% 2,168	-	-	-	0.7% 3,270	463,729	635510 635564
2010	0.2% 1,115	-	-	-	-	0.2% 1,115	490,000	636079 636080

Total survival estimated using CWT and PIT tags

Total survival estimates include recoveries or detections in the Snake River as well as harvest recoveries and detections at downstream locations (Table 45 and Table 46). PIT tag detections result in an average 3.4 times greater 0-salt survival estimate than occurred by using CWT estimation methods. However, as fish returned at older ages the differences between methods reversed and the CWT estimation method resulted in 1.6 and 1.7 and 1.5 times greater survival estimate of 1-salt, 2-salt, and 3-salt fish than estimated by using PIT tags. Although returns are not complete for the brood years evaluated, it appears that CWT estimation methods result in accounting for more jacks and adults than PIT tag detections, but PIT tags are useful for estimating the abundance of minijacks. We do not presently know the cause of the difference in estimated returns between PIT tags and CWTs for older fish.

Table 45. Total survival estimates of yearling fall Chinook released at LFH estimated using PIT tag detections in the Snake and Columbia rivers during 2012.

Brood year	0-salt	1-salt	2-salt	3-salt	4-salt	Total Return to Date	Total PIT tagged at Release
2006	4.8% 1,418	2.1% 635	1.4% 405	0.1% 26	-	8.3% 2,484	29,806
2007	0.5% 142	0.8% 225	0.6% 161	0.1% 25	-	2.1% 553	26,757
2008	0.7% 198	1.1% 292	0.7% 177	-	-	2.5% 667	26,975
2009	0.6% 181	0.5% 159	-	-	-	1.1% 340	29,890
2010	0.6% 173	-	-	-	-	0.6% 173	29,990

Table 46. Total survival estimates of yearling fall Chinook released at LFH estimated using ocean and freshwater CWT recoveries and return estimates of live fish through 2012.

Brood year	0-salt	1-salt	2-salt	3-salt	4-salt	Total Return to Date	Total Tagged at Release	Tag codes
2006	1.3% 5,800	3.9% 17,749	2.0% 9,000	0.1% 490	0.0% 10	7.3% 33,049	452,340	634092 633987
2007	0.1% 572	1.4% 6,034	1.4% 6,202	0.2% 719	-	3.1% 13,527	442,640	634680 634681
2008	0.1% 324	1.0% 4,851	1.1% 5063	-	-	2.2% 10,238	472,359	635165 635166
2009	0.3% 1,377	0.6% 2,994	-	-	-	0.9% 4,371	463,729	635510 635564
2010	0.3% 1,305	-	-	-	-	0.3% 1,305	490,000	636079 636080

Direct take of listed Snake River fall Chinook salmon during fall of 2012 and spring of 2013

The section 10 permit # 16607 was finalized in November of 2012. For this report, direct take consists of adults spawned in 2012 as broodstock at LFH and NPTH, and eggs/loss/release data associated with BY12 subyearlings released in 2013 and BY11 yearlings released in 2013 that were part of LSRCP, LSRCP-FCAP, and IPC programs. Direct takes of listed Snake River fall Chinook were calculated in Table 47 and Table 48 and were generally within allowances except for juvenile take associated with marking/tagging/release of BY12 subyearlings. The number of unmarked/untagged juveniles released by these programs totaled 976,218 fish, which are not included in the table below. Trapping and handling of juvenile fall Chinook on the Tucannon River (Table 48) were also exceed during 2012. We have begun talks with NOAA about revising juvenile take calculations and allowances. Adult estimates for permit # 16607 for LFH production and permit # 16615 for NPTH production have been combined in the tables below and were highlighted in gray.

Table 47. Permissible direct take and actual take of listed Snake River fall Chinook salmon adults returning in 2012 and juveniles released in 2013 for fish cultural purposes for the LFH, IPC, and FCAP programs. Red cells indicate take exceeded permitted limit and gray cells combine take from LFH and NPTH programs.

		Annual Take of Listed Fish By Life Stage							
		Egg/fry		Juvenile or smolt		Adult [b]		Carcass	
Type of Take	Mark [a]	Limit	Take	Limit	Take	Limit	Take	Limit	Take
Observe or harass [c]	No fin clip								
	AD clip								
Collect for transport [d]	No fin clip								
	AD clip								
Capture, handle, and release [e]	No fin clip								
	AD clip								
Capture, handle, tag/marked/tissue sample, and release [f]	No fin clip			777,000	822,754	1,500 [j]	326		
	AD clip			1,335,000	2,272,668	1,100 [j]	101		
Intentional lethal take [g]	No fin clip					2,600 [h]	1,726		
	AD clip					2,200 [h]	791		
Unintentional lethal take [i]	No fin clip	7.5%	5.0%	7.5%	1.5%	500	205		
	AD clip	7.5%	5.0%	7.5%	1.5%	450	94		

[a] "No fin clip" salmon include hatchery-origin and natural –origin fish.

[b] For purposes of this permit, adults are defined as fall Chinook salmon that are at least 3 years old that have spent at least 2 years in the ocean. Fish that spend only one year in the ocean, called "jacks" or "1-salts," represent a natural life history and are thought to contribute to natural production at a low but relatively constant level. These fish are almost exclusively males (females are called "jills"). Jack returns are highly variable and cannot be accurately forecasted. In-season management and take monitoring will classify fish less than 53 cm (FL) as jacks. Post-season reporting will be based on estimated ocean age. Adult take limits are based on programmatic needs-broodstock number and run-0reconstruction numbers – and limits to the overall sampling rate, of the run at age, at the LGR trap and/or supplemental trapping efforts at Lyons Ferry Hatchery and Nez Perce Tribal Hatchery are not to exceed 20%. Any non-lethal take of jacks during trapping efforts is permitted.

[c] Contact with listed fish that could occur from migration delay at dam or traps. Specifically, this refers to fish trapped at LFH and returned to the river without handling, the vast majority being clipped and/or tagged hatchery fish.

[d] Take associate with weir or trapping operations where listed fish are captured and transported, These levels represent full broodstock collection at LGR – see intentional lethal take below.

[e] Take associated with weir or trapping operations where listed fish are captured, handled, and released upstream or downstream.

[f] Take of juveniles due to tagging/marking/PIT tagging prior to release and does not include 1,336,000 unclipped and untagged fish released. The number shown assumes full production through priority 17 (able B4B. U.S. v. Oregon agreement [2009]) and does not include NPTH production. This number could vary depending on annual egg takes and survival in the hatchery .

[g] Intentional mortality of listed fish as broodstock only. Values represent total need for all program components (LFH, FCAP, NPTH, and IPC). Priority collection occurs at the LGR trap, alternative collection at LFH and NPTH.

[h] Take goal for natural-origin fish for broodstock is 1500 adults. Jacks can compose up to 10% of total broodstock collection

[i] Unintentional mortality from operation of adult traps, including loss of fish during trapping, transport, and holding prior to spawning or release back into the wild after broodstock sorting. Also includes estimates of in-hatchery incubation and rearing mortality, by life-stage. Adult mortality estimates based on 15% prespawning mortality, including adult trapping, holding, and transport.

[j] Adult fish in excess to broodstock needs that are returned to the river from the LFH and the NPTH. These fish are typically fin clipped for re-capture identification.

Table 48. Permissible direct take and actual take of listed Snake River fall Chinook salmon adults returning in 2012 and juveniles released in 2013 for RM&E activities associated with the LFH fall Chinook salmon programs not directly related to fish culture. Red cells indicate take exceeded permitted limit and gray cells combine take from LFH and NPTH programs.

		Annual Take of Listed Fish By Life Stage							
		Egg/fry		Juvenile or smolt		Adult		Carcass	
Type of Take	Mark	Limit	Take	Limit	Take	Limit	Take	Limit	Take
Observe or harass [a]	No fin clip	0				200 [i]	98 [j]		
	AD clip	0				600 [i]	63 [j]		
Collect for transport [b]	No fin clip	0							
	AD clip	0							
Capture, handle, and release [c]	No fin clip			5,000 [h]	14,994			10	0
	AD clip							10	0
Capture, handle, tag/mark/tissue sample, and release [d]	No fin clip	0		2,700 [h]	1,000	4,000 [i]	1935	50 [i]	31 [j]
	AD clip	0				2,500 [i]	702	150 [i]	34 [j]
Removal (e.g. broodstock) [e]	No fin clip	0							
	AD clip	0							
Intentional lethal take [f]	No fin clip	0				1,000	605		
	AD clip	0				1,000	612		
Unintentional lethal take [g]	No fin clip	0		300 [h]	69				
	AD clip	0		100 [h]	0				

[a] Contact with live, ESA-listed fish through juvenile and adult spawning surveys.
[b] Take of listed fish for transportation only.
[c] Take associated with smolt trapping operations where listed fish are captured, handled, and released. Adult numbers represent adults captured, handled, and released from juvenile trapping operations.
[d] Take associated with adult and juvenile sampling and monitoring projects. These include; adult fall Chinook salmon trapped, handled, sampled, tagged and released from adult trapping facilities and weirs, and juvenile fall Chinook salmon captured, handled, sampled, tagged, and released from juvenile trapping, netting, and electro-fishing projects.
[e] RM&E activities do not include broodstock collection.
[f] Intentional mortality of hatchery fish as a result of run reconstruction needs. These are coded-wire tagged hatchery fish.
[g] Unintentional mortality of listed fish, including loss of fish during smolt trapping.
[h] WDFW activities associated with emigrant studies using rotary screw trap and spawning ground surveys on the Tucannon River.
[i] Adults (non-jacks) used for run reconstruction at LGR trap.
[j] Take associated with spawning ground surveys on Asotin Creek located above LGR Dam.

Reference Population

Deschutes River fall Chinook

Review of the Deschutes River fall Chinook as a viable reference population to compare Snake River fall Chinook has been delayed and will be presented in a future report.

Conclusions and Recommendations

The fall Chinook program at LFH requires substantial coordination. The program is currently being managed to meet the goals and objectives of Tribal, state, and federal co-managers. Conclusions and recommendations listed below are not prioritized and represent only the opinion of Snake River Lab Evaluation staff.

1. Run Reconstruction methodologies were changed and historical estimates were revised for 2005-2012. Prior to 2005, sub-sampling of VIE tagged fish with CWTs occurred at LFH which will require adjustments to the method employed for 2005-2012.

Recommendation: Assist the Run Reconstruction group in developing methodologies to address sampling changes that occurred prior to 2005.

Recommendation: Continue to assist with documentation of historical methodologies used to develop run estimates.

2. Concerns have been raised about onstation released fall Chinook passing LGR Dam, which could be considered straying away from the release site.

Recommendation: Calculate the percent of the onstation releases that are crossing LGR Dam and the estimated final location of these fish.

3. Ages of fish presented in this report underestimate jacks. Scales are primarily taken on untagged fish so salt water ages are accurate and take into account reservoir rearing. Salt water ages of wire tagged fish are calculated by subtracting 1 year from the total age of subyearling and 2 years from the total age of yearlings. This method does not take into account reservoir rearing of subyearlings and therefore over estimates the saltwater age.

Recommendation: Continue to take scale samples from all fish used as broodstock to document true jacks and jills possibly included in the broodstock.

Recommendation: Take stratified scale samples of subyearling wire tagged fish during processing at LFH based on sex and fork length to profile the rate of reservoir rearing in this group.

4. Estimates of returns using PIT tags and CWTs vary by age at return. Tagging constitutes a significant program cost annually for fall Chinook and methods for monitoring and evaluating program performance need to be cost efficient.

Recommendation: Continue to evaluate the use of both types of tagging to determine if some optimum proportion of PIT and CWT could be used to accurately portray fish performance and reduce tagging costs.

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Appendix A: Fall Chinook Run to LFH, IHR, LMO, and LGR Dams: 2008-2012

(Numbers of fall Chinook observed at Snake River Dams and numbers of fall Chinook trapped and processed at LFH. LGR trapped fish that were processed at LFH are listed under LGR Dam data with COE window counts).

Appendix A Table 1. Numbers of fall Chinook processed at LFH and window counts at Ice Harbor, Lower Monumental, and Lower Granite dams, 2008-2012.

		Daytime Counts				Night Video[a]				Totals[b]	
		Through October		Nov and Dec		Through Oct		Nov and Dec			
Year	Location	Adults	Jacks	Adults	Jacks	Adults	Jacks	Adults	Jacks	≥ 52 cm FL	< 53 cm FL
2008	IHR Dam	21,907	11,544	nc	nc	nc	nc	nc	nc	21,907	11,544
	LOMO Dam	20,923	10,465	nc	nc	nc	nc	nc	nc	20,923	10,465
	LFH									1208	792
	LGR Dam	16,443	10,076	185	152	nc	nc	nc	nc	16,628	10,228
2009	IHR Dam	24,824	38,611	nc	nc	nc	nc	nc	nc	24,824	38,611
	LOMO Dam	22,184	39,241	nc	nc	nc	nc	nc	nc	22,184	39,241
	LFH									542	742
	LGR Dam	15,058	40,973	109	312	nc	nc	nc	nc	15,167	41,285
2010	IHR Dam	46,541	12,230	nc	nc	nc	nc	nc	nc	46,541	12,230
	LOMO Dam	42,718	15,408	nc	nc	nc	nc	nc	nc	42,718	15,408
	LFH									339	75
	LGR Dam	41,311	12,730	504	165	nc	nc	nc	nc	41,815	12,895
2011	IHR Dam	31,405	19,578	nc	nc	nc	nc	nc	nc	31,405	19,578
	LOMO Dam	27,594	17,855	nc	nc	nc	nc	nc	nc	27,594	17,855
	LFH									666	154
	LGR Dam	24,819	19,516	430	139	nc	nc	nc	nc	25,249	19,655
2012	IHR Dam	38,546	21,554	nc	nc	nc	nc	nc	nc	38,546	21,554
	LOMO Dam	33,518	22,883	nc	nc	nc	nc	nc	nc	33,518	22,883
	LFH									193	6
	LGR Dam	34,060	21,814	628	176	nc	nc	nc	nc	34,688	21,990

[a] Night counts occurred during 18-31 August.
[b] Total from LFH consists of killed fish that were identified at processing as LFH trapped.
[c] No counts (nc) were completed at the dam during that time of year.

Appendix B: Trapping and Sampling Protocols at LGR Adult Trap for 2012

2012 Fall Chinook Trapping/Sampling Protocol
by

Debbie Milks, WDFW
Bill Arnsberg/Bill Young, NPT
Stuart Rosenberger, IPC
Stuart Ellis, CRITFC
August 24, 2012

The sample rate at LGR Trap will be set at 15% and kept at that level throughout the season. If the trap is swamped with fish: Shut down trap for an hour or so but clearly identify in the data when the trap was shut down and when it was started up again. Do not shut down and stay shut down for the rest of the day because we need to have a pre and post shut down sample so we can average them to estimate what passed during the shutdown.

WDFW is providing 2 staff for helping with the broodstock collection activities at LGR. Scales sampled at the LGR Trap for run reconstruction needs will be mounted by WDFW staff at LGR and sent to Olympia every two weeks.

If you are getting jacks suspected of being summers we will need to subsample those fish for wires as well.

In an effort to reduce the numbers of jills and jacks hauled to the hatcheries and to reduce the numbers of fish sacrificed with wire for run reconstruction purposes the following protocol was approved by co-managers in the basin on 8/17/2012. The sub-sampling of wire tagged fish should allow for ample recoveries for evaluation purposes.

Protocols:

All fish hauled will be given 1-ROP
All fish released will be given 1-LOP, and untagged fish will be scale sampled
Sort by code fish follow the same haul/release protocol below
Fish <65 cm will be held separately and hauled to LFH.

Wire tagged fish:

Fork Length	Action
>74cm	haul all wires
65-74	haul all wires
53-64	haul all wires (do not inoculate and hold separately)
<53 cm	haul 2 out of 3 wires (do not inoculate- hold with fish <65)
	Release 1 out of 3 wires (no scales collected)

Untagged fish:

Fork Length	Action
>74	haul all
65-74	haul all
<65	Release all (collect scales on all)

2012 Fall Chinook Trapping/Sampling Protocol

by

Debbie Milks, WDFW
Bill Arnsberg/Bill Young, NPT
Stuart Rosenberger, IPC
Stuart Ellis, CRITFC
Implemented September 21, 2012

The sample rate at LGR Trap will be set at 15% and kept at that level throughout the season.

After data analysis of the return it is apparent that there are many jacks. As of the morning of 09/20/12 there are 2,249 males hauled to LFH and NPTH: 751 are less than 65 cm (jacks), 1,211 are 65-74 cm (mostly jacks), and 287 are larger than 74 cm (adults). There have been 1,255 females hauled to the hatcheries which include 292 females less than 70 cm (likely jills). In an effort to reduce the numbers of jills and jacks hauled to the hatcheries and to reduce the numbers of fish sacrificed with wire for run reconstruction purposes the following protocol was approved by co-managers in the basin on 9/20/2012.

Protocols:

All fish hauled will be given 1-ROP
All fish released will be given 1-LOP, and untagged fish will be scale sampled
Sort by code fish follow the same haul/release protocol below
Fish <70 cm will be held separately and hauled to LFH.

Wire tagged fish:

Fork Length	Action
≥ 70cm	haul all wires
<70 cm	haul 2 out of 3 wires (do not inoculate- hold separately)
	Release 1 out of 3 wires (no scales collected)

Untagged fish:

Fork Length	Action
≥ 70 cm	haul all
<70 cm	Release all (collect scales on all)

Appendix C: Systematic Sampling Rates at Lower Granite Dam 2003-2012

Appendix C 1. Dates, times, and trapping rates of fall Chinook at Lower Granite Adult trap, 2003-2011.

Year	Date opened trap	Trapping rate (%)	Date trap closed	Date/time trapping rate changed	Modified trapping rate (%)	Date trapping rate changed	Modified trapping rate (%)	Date Trap Closed
2003	9 Sept	11	-	-	nc[a]	-	nc	19 Nov
2004	2 Sept	15	3&5 Sept[b]	10 Sept	13	-	nc	22 Nov
2005	6 Sept	13	-	-	nc	-	nc	20 Nov
2006	1 Sept	13	-	-	nc	-	nc	21 Nov
2007	1 Sept	20	-	-	nc	-	nc	20 Nov
2008	24 Aug 8:00am[c]	20	-	12 Sept 2:52pm	12	26 Sept 3:00pm	10	21 Nov
2009	18 Aug 7:37am	12	-	9 Sept 7:25am	9	-	nc	15 Nov
2010	22 Aug 11:05 am	12	10 Sept-10:50 am [d] 18 Sept-10:50am [b]	18 Sept 3:00pm	10	-	nc	18 Nov
2011	18 Aug 10:30 am	10	-	-	nc	-	nc	21 Nov
2012	28 Aug 10:36 am	15	-	-	nc	-	nc	19 Nov

[a] No change (nc) was made to the trapping rate.
[b] Trap was closed down for two hours each day.
[c] Trap was operated between 8-8:30 am, then 12:30-12:55 pm, then 2:20-3:02 pm on 24 Aug due to water temperature restrictions. Full operation began 25 August
[d] Trap was closed down at 10:50 am for three hours due to large numbers of fall Chinook.

Appendix D: Trapping and Sorting Protocols at Lyons Ferry Hatchery 2012

2012 Fall Chinook Trapping/Sampling Protocol at LFH
8/27/12 Version

Open the trap on September 17 to avoid spring and summer Chinook.
Trap up to 300 fish >80 cm to increase numbers of older aged fish for broodstock.
Tally the numbers of Chinook returned to the river by size: 1)≥53 cm, 2) 30-52, 3) <30

Sorting protocol
Sort Volunteers on October 9
Do not inoculate fish to allow for distribution to food banks
Count and sex all fish: 1) Males and Females ≥ 75, 2) Males and Females <75
Sort LGR fish on October 9
Count and sex all fish: 1) Males and females ≥ 75, 2) Males and females 65-74, 3) Males <65 cm (Possibly kill some males <65 for food bank)

Mating protocol at LFH
All wire tagged fish must wait until their CWTs are decoded before they are used in a mating.
Strays will be culled based on CWTs.
Wire tagged Males verified as adults can be used on multiple females
Untagged Males ≥75 cm can be used on multiple females
Untagged Males 65-74 cm will only be used in 1 x 1 crosses
Males <65 cm will not be used in matings.
Jills verified by CWTs will be spawned with male of a larger fork length. Any male used on a jill must also be used on a larger or older aged fish that will be retained for production. This will be done to ensure if the jill is culled or a fry plant is made, the gametes from the male will still contribute elsewhere in production.

Jills
An estimated 141 jills may be identified during spawning, resulting in approximately 309K eggs at 2,200 eggs/female. Eggtake goal should account for these eggs not going toward production identified in B4B. Jills will be held separately. If we have enough adult females to make production goals, progeny of jills will be released as unfed fry into the Palouse River. Any surviving returns from this release will be identifiable as production from LFH due to PBT profiling of broodstock.
NOTE: THE PBT PROPOSAL COVERS SAMPLING OF PRODUCTION GROUPS LISTED IN US V OREGON B4B. **PRODUCTION FROM JILLS ARE IN EXCESS OF B4B GOALS AND ARE THEREFORE NOT FUNDED THROUGH THE PROPOSAL**. THE ESTIMATED COST TO RUN 141 SAMPLES IS $5,640 (141 x $40).

Appendix E: United States v. Oregon Production and Marking Table

Appendix E Table B4B. Revised production table listing Snake River fall Chinook salmon production priorities for LFH per the *Us v. OR* Management Agreement, Table *B4B*, and agreed upon by members of the SRFMP for Brood Years 2008-2017.

Priority	Production Program				
	Rearing Facility	**Number**	**Age**	**Release Location(s)**	**Marking[a]**
1	Lyons Ferry	450,000	1+	Onstation	225KAdCWT 225K CWT
2	Lyons Ferry	150,000	1+	Pittsburg Landing	70K AdCWT 80K CWT only
3	Lyons Ferry	150,000	1+	Big Canyon	70K AdCWT 80K CWT only
4	Lyons Ferry	150,000	1+	Captain John Rapids	70K AdCWT 80K CWT only
5	Lyons Ferry	200,000	0+	Onstation	200K AdCWT
6	Lyons Ferry	500,000	0+	Captain John Rapids	100K AdCWT 100K CWT only 300K Unmarked
7	Lyons Ferry	500,000	0+	Big Canyon	100K AdCWT 100K CWT only 300K Unmarked
8	Lyons Ferry	200,000	0+	Pittsburg Landing	100K AdCWT 100K CWT only
9	Oxbow	200,000	0+	Hells Canyon Dam	200K AdCWT
10	Lyons Ferry	200,000	0+	Pittsburg Landing	200K Unmarked
11	Lyons Ferry	200,000	0+	Direct stream evaluation Near Captain John Rapids	200K AdCWT
~~12~~	~~DNFH/Umatilla~~	~~250,000~~	~~0+~~	~~Transportation Study[b,c]~~	~~250K PIT Tag only~~
13	Irrigon[d]	200,000	0+	Grande Ronde River	200K AdCWT
~~14~~	~~DNFH/Umatilla~~	~~78,000~~	~~0+~~	~~Transportation Study[b,c]~~	~~78K PIT tag only~~
15	Umatilla	200,000	0+	Hells Canyon Dam	200K AdCWT
16	Irrigon[d]	200,000	0+	Grande Ronde River	200K Unmarked
17	Umatilla	600,000	0+	Hells Canyon Dam	600K Ad only
TOTAL	**Yearlings**	**900,000**			
	Subyearlings	**3,200,000[e]**			

Footnotes for Table B4B:

[a] The Parties expect that fisheries conducted in accordance with the harvest provisions of this Agreement will not compromise broodstock acquisition. If broodstock acquisition is nevertheless compromised by the current mark strategy and as a result of implementation of mark selective fisheries for fall Chinook in the ocean or Columbia/Snake River mainstem, the Parties will revisit the marking strategy during the course of this Agreement.

[b] Production of transportation study surrogates is in effect for five brood years. After this group of fish has been provided for five years the transportation study group will be removed from the table and the groups of fish below will move up one step in priority. If eggs available for subyearling production are 1.2M or less, production of the transportation study surrogate group will be reduced to 250K or be deferred for that year. The PAC will review broodstock collected and projected egg take and make a recommendation to the policy group on whether to provide 250,000 fish or defer by November 1.

[c] USACOE Transportation Study natural-origin surrogate groups direct stream released into the Clearwater and mainstem Snake River.

[d] For logistical purposes, fish may be reared at Irrigon (LSRCP).

[e] Total does not include 328,000 from Transportation Study.

Appendix F: LFH 2012 Broodstock PBT Tissue Samples

Appendix F: LFH 2012 Broodstock PBT Tissue Samples.

DNA ID	FISH ID	DNA ID	FISH ID	DNA ID	FISH ID	DNA ID	FISH ID
1	M4001	41	2009	81	2031	121	2066
2	1002	42	2008	82	2030	122	M4046
3	1001	43	2014	83	M4035	123	2063
4	M4002	44	M4016	84	M4036	124	2071
5	M4003	45	M4014	85	2032	125	2070
6	M4004	46	M4017	86	2033	126	M4047
7	1003	47	M4018	87	2034	127	M4048
8	M4005	48	2017	88	M4037	128	2068
9	M4006	49	M4015	89	M4038	129	2069
10	1005	50	2019	90	M4039	130	2073
11	1004	51	2018	91	M4040	131	2074
12	1006	52	2013	92	M4041	132	2072
13	1007	53	2015	93	2035	133	2062
14	1009	54	2020	94	2036	134	2065
15	1008	55	M4019	95	2037	135	M4049
16	1010	56	2016	96	2042	136	M4050
17	1011	57	M4020	97	2040	137	2076
18	1012	58	M4021	98	2038	138	2077
19	1013	59	M4022	99	2039	139	2075
20	1014	60	M4023	100	2041	140	2078
21	1015	61	2021	101	2043	141	2059
22	M4007	62	2022	102	2044	142	2064
23	1017	63	2023	103	2045	143	2060
24	M4008	64	M4024	104	2046	144	2067
25	1018	65	2025	105	2047	145	2061
26	M4010	66	M4025	106	2048	146	3011
27	M4009	67	M4027	107	2049	147	3080
28	M4011	68	M4028	108	2050	148	M4066
29	2001	69	2024	109	2051	149	3074
30	2004	70	M4026	110	2052	150	3075
31	2003	71	2026	111	2053	151	3076
32	2006	72	2027	112	M4042	152	M4064
33	2005	73	M4029	113	M4043	153	3022
34	M4012	74	M4030	114	2057	154	3071
35	M4013	75	M4031	115	2054	155	3072
36	2002	76	M4032	116	2055	156	3077
37	2007	77	M4033	117	M4044	157	3047
38	2011	78	2028	118	2056	158	3078
39	2012	79	M4034	119	2058	159	3029
40	2010	80	2029	120	M4045	160	3070

Appendix F: LFH 2012 Broodstock PBT Tissue Samples.

DNA ID	FISH ID	DNA ID	FISH ID	DNA ID	FISH ID	DNA ID	FISH ID
161	3004	202	M4112	243	3018	284	M4070
162	3081	203	M4108	244	3027	285	3056
163	3051	204	M4107	245	3001	286	M4086
164	3053	205	M4109	246	3012	287	3055
165	3073	206	3100	247	3007	288	M4090
166	3013	207	M4113	248	3003	289	M4093
167	3017	208	3103	249	3035	290	M4085
168	3016	209	3102	250	3036	291	M4092
169	3033	210	M4114	251	3038	292	M4091
170	3008	211	3106	252	M4068	293	3063
171	M4063	212	3086	253	M4067	294	M4088
172	3019	213	M4110	254	3034	295	3060
173	3021	214	3107	255	3039	296	M4095
174	M4061	215	M4115	256	3041	297	3059
175	M4058	216	3104	257	3043	298	3061
176	M4060	217	M4117	258	3049	299	M4096
177	M4055	218	3114	259	3045	300	M4087
178	M4057	219	3110	260	3042	301	3069
179	M4052	220	3115	261	M4081	302	M4084
180	M4053	221	3112	262	3054	303	M4094
181	3014	222	3111	263	M4080	304	3067
182	M4051	223	3108	264	3050	305	3064
183	M4059	224	M4116	265	3057	306	M4099
184	M4056	225	3084	266	3048	307	M4100
185	M4054	226	3101	267	3044	308	3066
186	3015	227	3109	268	M4077	309	M4101
187	M4062	228	3085	269	M4079	310	M4098
188	M4105	229	3113	270	3046	311	M4083
189	M4104	230	3096	271	3052	312	M4089
190	M4106	231	3099	272	M4075	313	M4072
191	M4102	232	3088	273	3040	314	M4097
192	M4103	233	3105	274	3037	315	3062
193	3093	234	3082	275	M4071	316	3058
194	3092	235	3087	276	3030	317	M4076
195	3094	236	3095	277	3031	318	M4065
196	3097	237	3090	278	3032	319	M4074
197	3091	238	3026	279	3002	320	3068
198	3089	239	3024	280	3028	321	3005
199	3098	240	3020	281	3009	322	3006
200	3083	241	3023	282	M4078	323	M4069
201	M4111	242	3025	283	M4073	324	M4082

Appendix F: LFH 2012 Broodstock PBT Tissue Samples.

DNA ID	FISH ID	DNA ID	FISH ID	DNA ID	FISH ID	DNA ID	FISH ID
325	3079	366	3146	407	3165	448	3181
326	3065	367	3148	408	3163	449	3180
327	3010	368	M4136	409	3171	450	3184
328	3116	369	3151	410	M4130	451	3177
329	3120	370	M4144	411	3167	452	3174
330	3119	371	3153	412	3159	453	M4161
331	M4123	372	M4142	413	3170	454	3173
332	3122	373	M4143	414	3143	455	M4160
333	M4118	374	3149	415	M4132	456	3176
334	M4119	375	M4146	416	M4131	457	3186
335	3124	376	M4148	417	3145	458	3211
336	3123	377	M4145	418	3140	459	3179
337	M4120	378	M4147	419	M4141	460	3213
338	3117	379	M4149	420	M4137	461	3217
339	M4127	380	M4152	421	M4134	462	M4159
340	M4125	381	M4133	422	3138	463	M4158
341	M4122	382	M4151	423	3136	464	3216
342	M4126	383	3147	424	3191	465	3208
343	3118	384	3157	425	M4157	466	M4163
344	3127	385	3150	426	3201	467	M4165
345	3129	386	M4150	427	3202	468	3226
346	3128	387	3144	428	3203	469	3222
347	3126	388	3160	429	3200	470	3227
348	3125	389	3155	430	3206	471	3210
349	3133	390	3137	431	3197	472	3229
350	3121	391	3158	432	3199	473	3228
351	M4124	392	3154	433	3204	474	3225
352	3131	393	3161	434	3196	475	3223
353	3134	394	M4153	435	3194	476	3224
354	3130	395	3156	436	3198	477	3233
355	M4121	396	M4154	437	3205	478	3230
356	M4138	397	M4156	438	3193	479	3232
357	M4140	398	3152	439	3192	480	3220
358	3135	399	M4129	440	3189	481	M4162
359	3132	400	M4155	441	3195	482	3214
360	3139	401	3166	442	3188	483	3231
361	M4139	402	3168	443	3187	484	M4164
362	M4135	403	3169	444	3190	485	3219
363	3141	404	3172	445	3183	486	3178
364	3142	405	3162	446	3185	487	3218
365	M4128	406	3164	447	3182	488	3175

Appendix F: LFH 2012 Broodstock PBT Tissue Samples.

DNA ID	FISH ID	DNA ID	FISH ID	DNA ID	FISH ID	DNA ID	FISH ID
489	3207	530	3260	571	3277	612	3314
490	3215	531	M4175	572	3275	613	3315
491	3221	532	3256	573	3274	614	3270
492	3209	533	M4179	574	3290	615	M4203
493	3212	534	M4181	575	3276	616	3325
494	M4167	535	3265	576	3286	617	3323
495	M4170	536	3263	577	3280	618	3322
496	M4169	537	3259	578	3269	619	M4202
497	M4168	538	3262	579	3279	620	3320
498	M4171	539	3264	580	3272	621	3321
499	M4173	540	3266	581	3267	622	3324
500	3234	541	3249	582	M4201	623	3319
501	M4172	542	M4180	583	M4199	624	3329
502	3235	543	3285	584	M4198	625	3327
503	3242	544	M4184	585	3310	626	3333
504	3239	545	3287	586	3308	627	M4204
505	3240	546	M4189	587	M4197	628	3334
506	3238	547	M4192	588	M4200	629	M4205
507	3236	548	3293	589	3317	630	M4206
508	M4166	549	M4193	590	3309	631	3335
509	3247	550	3292	591	3311	632	3328
510	3244	551	M4194	592	3313	633	M4207
511	3241	552	3298	593	3318	634	3326
512	3243	553	M4196	594	3316	635	3338
513	M4174	554	3304	595	3307	636	3332
514	3237	555	3297	596	3312	637	3339
515	3248	556	3288	597	3306	638	M4210
516	M4177	557	3305	598	3278	639	M4209
517	3245	558	3296	599	3291	640	3340
518	M4176	559	3302	600	3303	641	M4211
519	3246	560	3282	601	M4183	642	3341
520	3253	561	3299	602	M4188	643	M4208
521	3251	562	3295	603	M4182	644	3336
522	M4178	563	3294	604	M4186	645	3337
523	3252	564	3281	605	M4187	646	3330
524	3250	565	3268	606	3284	647	3331
525	3255	566	M4195	607	M4190	648	M4212
526	3257	567	3300	608	3289	649	M4213
527	3258	568	3301	609	M4185	650	3344
528	3254	569	3273	610	M4191	651	3346
529	3261	570	3271	611	3283	652	3347

Appendix F: LFH 2012 Broodstock PBT Tissue Samples.

DNA ID	FISH ID	DNA ID	FISH ID	DNA ID	FISH ID	DNA ID	FISH ID
653	3348	694	4141	735	M4322	776	M4229
654	3349	695	4140	736	M4317	777	M4230
655	M4216	696	4131	737	4154	778	M4228
656	3351	697	M4303	738	4152	779	M4224
657	3342	698	M4298	739	4162	780	M4231
658	M4215	699	4115	740	4156	781	M4223
659	3352	700	4132	741	M4320	782	4016
660	3343	701	4122	742	4150	783	M4226
661	M4219	702	4125	743	M4316	784	4017
662	3354	703	M4292	744	4168	785	4014
663	3355	704	M4289	745	4173	786	4023
664	M4220	705	M4287	746	4151	787	4026
665	3358	706	M4296	747	4155	788	4022
666	3356	707	M4286	748	4148	789	4018
667	M4218	708	M4295	749	4149	790	4013
668	3353	709	M4310	750	4153	791	4024
669	M4217	710	M4313	751	4172	792	4020
670	3357	711	M4315	752	4142	793	4011
671	3359	712	M4312	753	4144	794	4015
672	M4222	713	M4311	754	M4329	795	4009
673	M4221	714	M4307	755	M4324	796	4019
674	3345	715	M4309	756	4146	797	4005
675	M4214	716	M4314	757	M4333	798	4007
676	3361	717	M4308	758	M4338	799	4008
677	3360	718	4159	759	M4336	800	4004
678	3350	719	4158	760	M4342	801	4012
679	4123	720	4163	761	M4341	802	4001
680	4119	721	4157	762	4147	803	4010
681	4118	722	4166	763	M4340	804	4002
682	4137	723	4160	764	M4344	805	4003
683	4117	724	M4325	765	4143	806	M4236
684	4126	725	M4328	766	4145	807	4006
685	4134	726	4161	767	M4345	808	M4235
686	4116	727	M4331	768	4182	809	4021
687	4120	728	M4330	769	M4332	810	M4233
688	4121	729	M4326	770	4180	811	M4234
689	4136	730	4174	771	4183	812	4025
690	M4301	731	4171	772	4187	813	M4232
691	M4304	732	M4323	773	M4334	814	M4227
692	4128	733	4167	774	4191	815	4031
693	M4288	734	4165	775	M4225	816	4038

Appendix F: LFH 2012 Broodstock PBT Tissue Samples.

DNA ID	FISH ID	DNA ID	FISH ID	DNA ID	FISH ID	DNA ID	FISH ID
817	4040	858	4067	899	M4277	940	M4257
818	4037	859	4077	900	M4275	941	4081
819	4028	860	4074	901	M4271	942	4091
820	4036	861	4078	902	M4261	943	M4253
821	4034	862	4079	903	M4260	944	4073
822	4035	863	4076	904	4080	945	M4255
823	4046	864	4075	905	M4256	946	4070
824	M4240	865	4057	906	M4258	947	M4246
825	M4239	866	4072	907	M4259	948	M4241
826	4052	867	4060	908	4097	949	4051
827	4029	868	4055	909	4098	950	M4294
828	4043	869	4058	910	4102	951	M4293
829	4044	870	4059	911	4087	952	M4291
830	4050	871	4066	912	4104	953	M4299
831	4039	872	4054	913	4105	954	M4300
832	4030	873	4063	914	4082	955	4124
833	4027	874	4065	915	4100	956	4127
834	4041	875	M4264	916	4113	957	M4302
835	4042	876	M4263	917	4112	958	M4305
836	4049	877	M4262	918	4101	959	M4306
837	4048	878	4053	919	4093	960	M4297
838	4045	879	4056	920	4089	961	4138
839	4032	880	M4254	921	4090	962	M4284
840	M4242	881	4071	922	4092	963	4139
841	M4244	882	M4266	923	4094	964	4135
842	M4243	883	M4268	924	4095	965	M4290
843	4033	884	M4269	925	4096	966	M4285
844	M4237	885	M4270	926	4107	967	4130
845	M4238	886	4064	927	4103	968	4129
846	4047	887	M4272	928	4106	969	4133
847	M4248	888	M4274	929	4083	970	4194
848	M4249	889	M4276	930	4085	971	4192
849	M4252	890	M4267	931	4099	972	4190
850	M4251	891	M4279	932	4088	973	4195
851	M4247	892	M4265	933	4086	974	4193
852	M4250	893	M4280	934	4084	975	4197
853	4061	894	M4282	935	4111	976	4181
854	4062	895	M4273	936	4109	977	M4335
855	4068	896	M4281	937	4110	978	4184
856	M4245	897	M4283	938	4114	979	4185
857	4069	898	M4278	939	4108	980	4189

Appendix F: LFH 2012 Broodstock PBT Tissue Samples.

DNA ID	FISH ID	DNA ID	FISH ID	DNA ID	FISH ID	DNA ID	FISH ID
981	M4343	1022	4221	1063	M4375	1104	4277
982	4178	1023	4236	1064	M4374	1105	4281
983	4196	1024	4233	1065	4243	1106	4276
984	4188	1025	4231	1066	4244	1107	4283
985	M4337	1026	4234	1067	4241	1108	4285
986	4179	1027	4232	1068	M4376	1109	4282
987	4175	1028	4238	1069	M4377	1110	4275
988	M4339	1029	4237	1070	4242	1111	4284
989	4186	1030	4235	1071	M4380	1112	4286
990	4169	1031	4229	1072	M4382	1113	4280
991	4178	1032	4225	1073	4198	1114	4279
992	M4348	1033	4230	1074	M4385	1115	4256
993	4177	1034	4227	1075	M4383	1116	4247
994	M4346	1035	4220	1076	M4381	1117	4261
995	4164	1036	4222	1077	M4371	1118	4263
996	4170	1037	4228	1078	M4378	1119	4250
997	M4351	1038	4219	1079	M4367	1120	M4370
998	M4349	1039	4216	1080	4254	1121	4258
999	M4350	1040	4218	1081	M4373	1122	4266
1000	M4347	1041	4210	1082	4257	1123	4245
1001	M4327	1042	4215	1083	4252	1124	M4386
1002	M4353	1043	4206	1084	4260	1125	4217
1003	M4354	1044	4211	1085	4265	1126	M4384
1004	M4355	1045	4209	1086	4255	1127	M4366
1005	M4352	1046	4208	1087	4264	1128	4278
1006	M4356	1047	4203	1088	4267	1129	20492
1007	M4357	1048	4212	1089	4251	1130	20509
1008	M4360	1049	4205	1090	4269	1131	20496
1009	M4359	1050	4207	1091	4268	1132	M4470
1010	M4358	1051	4199	1092	4271	1133	M4477
1011	M4362	1052	M4368	1093	4259	1134	M4475
1012	M4363	1053	4200	1094	4249	1135	M4473
1013	M4364	1054	4214	1095	4273	1136	M4478
1014	M4361	1055	M4369	1096	M4379	1137	M4476
1015	M4365	1056	4202	1097	4270	1138	M4469
1016	M4318	1057	4204	1098	4248	1139	M4471
1017	M4321	1058	M4372	1099	4253	1140	M4472
1018	4223	1059	4201	1100	4262	1141	M4474
1019	M4319	1060	4213	1101	4246	1142	20489
1020	4226	1061	4239	1102	4272	1143	M4479
1021	4224	1062	4240	1103	4274	1144	20510

Appendix F: LFH 2012 Broodstock PBT Tissue Samples.

DNA ID	FISH ID	DNA ID	FISH ID	DNA ID	FISH ID	DNA ID	FISH ID
1145	M4481	1186	M4494	1227	19582	1268	4332
1146	M4483	1187	M4490	1228	19596	1269	M4396
1147	M4485	1188	M4493	1229	M4387	1270	4299
1148	20519	1189	20565	1230	4308	1271	4327
1149	20514	1190	20564	1231	M4388	1272	4291
1150	20517	1191	20567	1232	4309	1273	4296
1151	20521	1192	M4492	1233	4306	1274	4342
1152	20524	1193	20561	1234	4312	1275	4340
1153	20516	1194	20566	1235	4315	1276	4349
1154	20515	1195	M4495	1236	4310	1277	4343
1155	M4468	1196	20563	1237	4319	1278	4293
1156	20529	1197	M4486	1238	4314	1279	4354
1157	20530	1198	20569	1239	4318	1280	4292
1158	20531	1199	M4489	1240	4323	1281	4358
1159	20523	1200	20568	1241	4301	1282	4336
1160	20526	1201	M4488	1242	4305	1283	4347
1161	20522	1202	20558	1243	4322	1284	4357
1162	M4480	1203	20556	1244	4303	1285	4288
1163	20528	1204	20562	1245	4313	1286	4348
1164	20527	1205	M4497	1246	4317	1287	4326
1165	20520	1206	20554	1247	4320	1288	4341
1166	20525	1207	M4498	1248	4321	1289	4360
1167	M4484	1208	20553	1249	M4389	1290	4350
1168	M4482	1209	19571	1250	M4390	1291	4295
1169	20518	1210	20552	1251	M4391	1292	4355
1170	20513	1211	20549	1252	4300	1293	4337
1171	20508	1212	20535	1253	4298	1294	4353
1172	20484	1213	20543	1254	4316	1295	4356
1173	20536	1214	20547	1255	4330	1296	4351
1174	20545	1215	20532	1256	M4392	1297	4346
1175	20538	1216	20534	1257	4333	1298	4359
1176	20541	1217	20537	1258	4334	1299	4338
1177	20548	1218	19573	1259	M4394	1300	4352
1178	20546	1219	20542	1260	M4393	1301	4345
1179	20550	1220	20544	1261	4335	1302	4339
1180	20555	1221	19576	1262	4331	1303	4289
1181	20551	1222	19580	1263	M4397	1304	4344
1182	M4496	1223	19579	1264	4329	1305	4290
1183	M4487	1224	19589	1265	4328	1306	4294
1184	20559	1225	19584	1266	M4398	1307	4287
1185	M4491	1226	19586	1267	M4395	1308	4311

Appendix F: LFH 2012 Broodstock PBT Tissue Samples.

DNA ID	FISH ID	DNA ID	FISH ID	DNA ID	FISH ID	DNA ID	FISH ID
1309	4297	1350	20460	1391	M4459	1432	4377
1310	4324	1351	20464	1392	M4456	1433	4364
1311	4302	1352	M4442	1393	M4466	1434	4363
1312	4307	1353	20462	1394	M4458	1435	4371
1313	4304	1354	4391	1395	M4467	1436	M4407
1314	4325	1355	20433	1396	M4460	1437	M4399
1315	4373	1356	20448	1397	20478	1438	M4402
1316	4374	1357	20441	1398	M4462	1439	M4408
1317	4375	1358	20454	1399	20466	1440	M4404
1318	4370	1359	20438	1400	20468	1441	M4406
1319	4372	1360	20424	1401	20481	1442	M4403
1320	4368	1361	20432	1402	M4455	1443	4378
1321	4381	1362	20429	1403	20488	1444	M4401
1322	4382	1363	4393	1404	20486	1445	M4400
1323	4380	1364	M4449	1405	20483	1446	M4405
1324	4376	1365	20417	1406	20480	1447	M4409
1325	4365	1366	M4433	1407	20482	1448	M4414
1326	4369	1367	M4450	1408	20485	1449	M4415
1327	4361	1368	20402	1409	20504	1450	M4419
1328	4362	1369	M4452	1410	20487	1451	M4412
1329	M4441	1370	4397	1411	20503	1452	M4420
1330	20451	1371	M4454	1412	20502	1453	M4418
1331	20453	1372	20435	1413	20495	1454	M4422
1332	20452	1373	M4451	1414	20491	1455	M4423
1333	20449	1374	20408	1415	20505	1456	M4424
1334	20447	1375	M4453	1416	20512	1457	M4413
1335	20458	1376	20473	1417	20511	1458	20406
1336	20450	1377	20469	1418	20490	1459	M4411
1337	M4445	1378	20475	1419	20498	1460	M4416
1338	M4447	1379	20472	1420	20507	1461	M4425
1339	M4446	1380	20474	1421	20494	1462	M4417
1340	M4448	1381	20470	1422	20479	1463	M4410
1341	M4443	1382	M4461	1423	20497	1464	M4421
1342	20457	1383	20471	1424	20493	1465	M4426
1343	M4444	1384	20476	1425	20499	1466	4399
1344	20463	1385	20477	1426	20506	1467	20405
1345	20465	1386	M4457	1427	20500	1468	20412
1346	20461	1387	20467	1428	20501	1469	20416
1347	20459	1388	M4463	1429	4379	1470	20414
1348	20455	1389	M4464	1430	4367	1471	20415
1349	20456	1390	M4465	1431	4366	1472	20403

Appendix F: LFH 2012 Broodstock PBT Tissue Samples.

DNA ID	FISH ID	DNA ID	FISH ID	DNA ID	FISH ID	DNA ID	FISH ID
1473	20407	1514	20445	1555	5021	1596	5048
1474	20404	1515	4386	1556	5026	1597	5052
1475	4396	1516	4400	1557	5010	1598	5020
1476	4389	1517	4383	1558	M4535	1599	5047
1477	4387	1518	M4435	1559	5030	1600	M4551
1478	20418	1519	4390	1560	M4529	1601	5038
1479	20410	1520	4389	1561	M4534	1602	M4532
1480	M4429	1521	4384	1562	M4528	1603	M4550
1481	4388	1522	M4436	1563	M4526	1604	M4549
1482	20411	1523	M4438	1564	M4509	1605	5046
1483	M4431	1524	M4437	1565	M4532	1606	M4548
1484	M4432	1525	M4439	1566	5019	1607	5054
1485	20413	1526	20446	1567	5029	1608	5049
1486	20401	1527	20443	1568	5008	1609	M4538
1487	20419	1528	M4440	1569	5031	1610	5056
1488	20409	1529	5002	1570	5016	1611	M4539
1489	4392	1530	5005	1571	M4530	1612	5061
1490	M4428	1531	M4520	1572	5027	1613	5043
1491	4394	1532	5003	1573	5022	1614	5064
1492	20428	1533	M4519	1574	5036	1615	5066
1493	M4427	1534	5001	1575	M4537	1616	5039
1494	20421	1535	M4514	1576	5033	1617	5067
1495	20426	1536	M4510	1577	5040	1618	5062
1496	M4430	1537	5017	1578	5035	1619	5065
1497	20430	1538	5009	1579	M4541	1620	5055
1498	20425	1539	M4524	1580	5028	1621	5037
1499	20436	1540	M4525	1581	5024	1622	5060
1500	20431	1541	5007	1582	M4543	1623	5059
1501	20420	1542	M4523	1583	5032	1624	5063
1502	20422	1543	5015	1584	M4540	1625	5057
1503	20434	1544	M4527	1585	M4547	1626	5042
1504	20437	1545	5011	1586	5025	1627	5053
1505	20423	1546	5013	1587	M4544	1628	M4522
1506	4395	1547	5006	1588	5044	1629	5058
1507	20444	1548	M4531	1589	5045	1630	5014
1508	20427	1549	5012	1590	M4542	1631	M4554
1509	20439	1550	5018	1591	5041	1632	M4555
1510	20442	1551	5004	1592	M4545	1633	5034
1511	20440	1552	M4533	1593	5050	1634	M4553
1512	M4434	1553	M4536	1594	5051	1635	M4557
1513	4385	1554	5023	1595	M4546	1636	M4521

Appendix F: LFH 2012 Broodstock PBT Tissue Samples.

DNA ID	FISH ID	DNA ID	FISH ID	DNA ID	FISH ID	DNA ID	FISH ID
1637	M4556	1678	M4578	1719	19598	1760	19614
1638	M4559	1679	5072	1720	M4499	1761	19613
1639	M4518	1680	5074	1721	M4500	1762	19611
1640	M4558	1681	M4569	1722	19593	1763	19610
1641	M4560	1682	M4574	1723	19590	1764	19617
1642	M4517	1683	M4571	1724	19587	1765	19616
1643	M4562	1684	5083	1725	19600	1766	19618
1644	M4516	1685	5089	1726	19585	1767	M4504
1645	M4563	1686	5091	1727	19581	1768	19621
1646	M4512	1687	5093	1728	19583	1769	M4507
1647	M4561	1688	5094	1729	19592	1770	M4506
1648	M4515	1689	5090	1730	19575	1771	19622
1649	M4564	1690	5085	1731	19601	1772	19629
1650	M4513	1691	5092	1732	19588	1773	19626
1651	M4568	1692	5088	1733	19595	1774	19625
1652	5071	1693	M4511	1734	19607	1775	19620
1653	M4570	1694	5087	1735	19608	1776	19624
1654	M4566	1695	5084	1736	19606	1777	19619
1655	5076	1696	M4508	1737	19604	1778	19623
1656	M4572	1697	5086	1738	19603	1779	19628
1657	5073	1698	5100	1739	19602	1780	19627
1658	5080	1699	5103	1740	19577		
1659	M4573	1700	5106	1741	19609		
1660	M4567	1701	5105	1742	19605		
1661	5081	1702	5104	1743	19594		
1662	5082	1703	5107	1744	19578		
1663	M4565	1704	5101	1745	20533		
1664	5077	1705	5102	1746	20560		
1665	5078	1706	5099	1747	20540		
1666	5079	1707	5095	1748	19574		
1667	M4575	1708	5096	1749	19597		
1668	5068	1709	5097	1750	20539		
1669	M4579	1710	M4584	1751	20557		
1670	5070	1711	M4585	1752	19572		
1671	M4576	1712	5098	1753	20570		
1672	M4580	1713	5108	1754	M4501		
1673	M4577	1714	M4583	1755	M4503		
1674	M4581	1715	5110	1756	M4502		
1675	M4582	1716	5109	1757	M4505		
1676	5069	1717	19591	1758	19615		
1677	5075	1718	19599	1759	19612		

Appendix G: Egg Take and Early Life Stage Survival Brood Years: 1990-2012

Appendix G: Egg take and survival numbers by life stage of Lyons Ferry origin fall Chinook spawned at LFH, brood years 1990-2012.

Brood Year	Eggs Taken	ELISA Loss [a]	Eggs Shipped [b]	Eyed Eggs Retained	Fry Ponded	Intended Program
1990	1,103,745	0	0	1,011,998	729,311	Yearling
					228,930	Subyearling
1991	906,411	0	0	828,514	807,685	Yearling
					0	Subyearling
1992	901,232	0	0	855,577	624,961	Yearling
					210,210	Subyearling
1993	400,490	0	0	363,129	352,461	Yearling
					0	Subyearling
1994	583,871	0	0	553,189	542,461	Yearling
					0	Subyearling
1995[c]	1,056,700	0	0	1,022,700	847,241	Yearling
					112,532	Subyearling
1996	1,433,862	0	0	1,377,202	941,900	Yearling
					419,677	Subyearling
1997	1,184,141	0	0	1,134,641	1,037,221	Yearling
					63,849	Subyearling
1998	2,085,155	0	0	1,978,704	916,261	Yearling
					1,010,344	Subyearling
1999	3,980,455	156,352	0	3,605,482	991,613	Yearling
					2,541,759	Subyearling
2000	3,576,956	53,176	115,891	3,249,377	998,768	Yearling
					2,159,921	Subyearling
2001	4,734,234	144,530	200,064	4,230,432	1,280,515	Yearling
					2,697,406	Subyearling
					125,600	Research
2002	4,910,467	44,900	1,195,067	3,540,000	1,032,205	Yearling
					2,376,251	Subyearling
					73,229	Research
2003	2,812,751	0	250,400	2,476,825	985,956	Yearling
					1,455,815	Subyearling
					0	Research
2004	4,625,638	0	1,053,278	3,421,751	914,594	Yearling
					2,191,102	Subyearling
					184,682	Research
2005	4,929,630	0	1,180,000	3,562,700[d]	980,940	Yearling
					2,078,206	Subyearling
					216,417	Research

Appendix G: Egg take and survival numbers by life stage of Lyons Ferry origin fall Chinook spawned at LFH, brood years 1990-2012.

Brood Year	Eggs Taken	ELISA Loss [a]	Eggs Shipped [b]	Eyed Eggs Retained	Fry Ponded	Intended Program
2006	2,819,004	0	127,564	2,601,679	961,105	Yearling
					1,640,574	Subyearling
					2,000	Research
2007	5,143,459	0	1,761,500	3,212,900[e]	960,900	Yearling
					1,894,933	Subyearling
					0	Research
2008	5,010,224	0	1,810,800	2,969,200	1,000,000	Yearling
					1,969,200	Subyearling
					0	Research
2009	4,574,182	0	1,507,300	2,853,020	977,667	Yearling
					1,875,353	Subyearling
					0	Research
2010	4,619,533	0	1,630,000	2,864,400	980,000	Yearling
					1,884,400	Subyearling
					0	Research
2011	4,723,501	0	1,785,600	2,772,900	960,000	Yearling
					1,812,900	Subyearling
					0	Research
2012	4,526,108	0	1,480,000	2,904,500	1,010,000	Yearling
					1,894,500	Subyearling
					0	Research

[a] Eggs from ELISA positive females were incorporated into the rest of the broodstock in 1997-1998 and 2003-2004.

[b] Includes eyed eggs shipped for research.

[c] An overage of 58,500 fish was found during marking. This number was added (unexpanded) to total green and eyed eggs and fry ponded. Also includes 83,183 fry up to ponding that were accidentally released as strays. Back calculated to estimate 32,088 eggs for subyearlings and 91,808 eggs for escaped fry (resulting in 847,241 ponded for yearling release).

[d] This number includes 154,100 eyed-eggs that were destroyed as ponded fry and 30,000 eyed-eggs that were shipped as fry to NPTH in February 2006.

[e] This number includes 364,983 eyed-eggs that were destroyed as ponded fry in January and February 2007.

Appendix H: LFH/Snake River Origin Fall Chinook Releases Brood Years: 2004-2011

Appendix H: LFH/Snake River hatchery origin fall Chinook releases with number marked, tagged, and unmarked by release year and type.

Release Year	S/Y[b]	Brood Year	Release Location-Type	Release Date	CWT Code	Number of Fish Released[a] AD Clip +CWT	CWT Only	AD Clip Only	No Clip or CWT	FPP	VIE Mark	% VIE	PIT Tagged[c]
2005	S	2004	BC1-direct	30-31 May	612504	96,630	98,657	1,377	-	55.3			2,498
2005	S	2004	CJ1 Acclimated [vs. CC]-volitional	28-31 May	610154	94,164	87,888	9,015	-	46.8			3,494
2005	S	2004	Snake R. below HC Dam-Oxbow hatchery-IPC-direct	28 April	106676	53,548	-	4,726	-	61.5			3,098
2005	S	2004	Snake R. below HC Dam-Oxbow hatchery-IPC-direct	28 April	109370	21,094	-	1,861	-	61.5			1,209
2005	S	2004	Snake R. below HC Dam-Oxbow hatchery-IPC-direct	28 April	100471	20,578	-	1,816	-	61.5			1,180
2005	S	2004	Snake R. below HC Dam-Oxbow hatchery-IPC-direct	28 April	106776	54,047	-	4,769	-	61.5			3,098
2005	S	2004	Snake R. below HC Dam-Oxbow hatchery-IPC-direct	28 April	107176	24,709	-	2,180	-	61.5			1,416
2005	S	2004	PL1-Umatilla hatchery-IPC-direct	25-26 May	073336	211,302	-	186,402	-	50.4			2,492
2005	S	2004	Snake R. below HC Dam-Umatilla hatchery-IPC-direct	8-12 May	none	-	-	394,055	-	63.0			0
2005	S	2004	NPTH1-volitional	17 May	612669	-	106,079	-	74,575	120.8			Unk
					612672	140,171	-	365	98,176	120.8			Unk
2005	S	2004	NPTH1-volitional	17 May	610108	-	194,334	-	100,753	115.3			Unk
					612670	101,580	-	408	52,876	115.3			
2005	S	2004	NPTH1-volitional	17 May	none	-	-	-	57,764	110.0			
2005	S	2004	Couse Creek Direct [vs. CJ1 Accl.]	26 May	610155	183,401	1,937	14,853	-	49.2			3,465
2005	S	2004	Snake R. at Couse Creek-direct	23 May	none	-	-	-	234,030	59.0			0
2005	S	2004	Grande Ronde R. -direct	25 May	632782	191,868	610	8,050	241	56.0			0
2005	S	2004	Grande Ronde R. unmarked-direct	24 May	none	-	-	-	281,688	66.0			0
2005	S	2004	LFH-direct	27 May	632787	195,367	934	3,870	-	51.0			1,498
2005	S	2004	Snake R at Couse Creek-Surrogates	16-27 May	none	-	-	-	124,783	113			124,447
2005	S	2004	Clearwater R at BC-Surrogates	21 June-08 July	none	-	-	-	47,790	110.6			45,790
2005	S	2004	BC1 unassociated vessel	31 May	none	-	-	-	313,562	55.3			0
2005	S	2004	CJ1 unassociated vessel	30 May	none	-	-	-	314,020	46.8			0
2006	Y	2004	LFH-direct	5-10 April	633283	223,151	1,489	213	-	9.8	LR	92.5	

Appendix H: LFH/Snake River hatchery origin fall Chinook releases with number marked, tagged, and unmarked by release year and type.

Release Year	S/Y[b]	Brood Year	Release Location-Type	Release Date	CWT Code	Number of Fish Released[a]				FPP	VIE Mark	% VIE	PIT Tagged[c]
						AD Clip +CWT	CWT Only	AD Clip Only	No Clip or CWT				
2006	Y	2004	LFH-direct	5-10 April	633284	-	220,952	-	4,195	10.3	LR	89.6	
2006	Y	2004	PL1-direct	05 April	610150	66,987	-	2,516	-	10.3			2,320
2006	Y	2004	PL1-direct	05 April	610153	-	77,644	-	2,410	10.3			2,673
2006	Y	2004	BC1-direct	12-13 April	610148	66,732	-	1,965	-	9.3			2,642
2006	Y	2004	BC1-direct	12-13 April	610144	-	59,465	-	1,636	9.3			2,394
2006	Y	2004	CJ1-volitional	11-14 April	610151	70,185	-	490	-	8.9			2,284
2006	Y	2004	CJ1-volitional	11-14 April	610152	-	78,156	-	2,291	8.9			2,600
2006	S	2005	Snake R. below HC Dam-Oxbow hatchery-IPC-direct	02 May	109477	66,879	-	1,091	-	80.3			0
2006	S	2005	Snake R. below HC Dam-Oxbow hatchery-IPC-direct	02 May	109577	68,040	-	1,110	-	80.3			0
2006	S	2005	Snake R. below HC Dam-Oxbow hatchery-IPC-direct	02 May	108977	41,257	-	673	-	80.3			0
2006	S	2005	Snake R. below HC Dam-Umatilla hatchery-IPC-direct	09-10 May	none	-	-	330,172	1,993	80.3			23,969
2006	S	2005	PL1-Umatilla hatchery-IPC-direct	22-24 May	094419	185,413	-	211,654	-	52.5			24,162
2006	S	2005	CJ1-volitional	25-29 May	610177	-	99,366	-	-	45.6			2,792
2006	S	2005	CJ1-volitional	25-29 May	610176	98,699	-	2,313	-	45.6			695
2006	S	2005	BC1-direct	25-26 May	610175	-	98,994	-	-	56.7			46,698
2006	S	2005	BC1-direct	25-26 May	610174	97,763	-	3,336	-	56.7			11,697
2006	S	2005	Couse Creek Direct [vs. CJ1 Accl. Study]	30-31 May	633583	195,701	262	4,463	394	55.6			11,995
2006	S	2005	Couse Creek Direct (late release)	22 June	610178	207,606	1,076	2,153	673	50.0			10,872
2006	S	2005	LFH-direct (accidental release)	04 April	none	-	-	-	71,000	181.0			0
2006	S	2005	LFH-direct	01 June	633582	200,369	789	790	263	52.3			12,095
2006	S	2005	GRR Direct	19-21 June	633584	196,630	335	3,467	-	50.6			25,357
2006	S	2005	Snake R at Couse Creek-Surrogates (NOAA)	15 May-03 Jun	none	-	-	-	229,097	115.0			229,063
2006	S	2005	Clearwater R at BC-Surrogates (NOAA)	19 Jun-09 July	none	-	-	-	150,054	83.0			109,186
2006	S	2005	NPTH-North Lapwai Valley Accl.	17 May	612707	-	98,670	-	1,148	72.3			unk
2006	S	2005	NPTH-North Lapwai Valley Accl.	17 May	612671	99,438	-	490	-	72.3			unk
2006	S	2005	NPTH-Site 1705	6-15 June	612709	-	197,659	-	134,787	59.0			2,314

Appendix H: LFH/Snake River hatchery origin fall Chinook releases with number marked, tagged, and unmarked by release year and type.

Release Year	S/Y[b]	Brood Year	Release Location-Type	Release Date	CWT Code	Number of Fish Released[a]				FPP	VIE Mark	% VIE	PIT Tagged[c]
						AD Clip +CWT	CWT Only	AD Clip Only	No Clip or CWT				
2006	S	2005	NPTH-Site 1705	6-15 June	612698	99,163	-	488	-	59.0			693
2006	S	2005	NPTH-Cedar Flats Accl.	13 June	612653	-	16,077	-	187	32.9			3,145
2006	S	2005	NPTH-Cedar Flats Accl.	13 June	612660	-	9,401	-	109	32.9			1,839
2006	S	2005	NPTH-Lukes Gulch Accl.	13 June	612655	-	25,099	-	292	36.6			4,971
2006	S	2005	CJ1 unassociated vessel	25-29 May	none	-	-	-	306,594	45.6			0
2006	S	2005	BC1 unassociated vessel	25-26 May	none	-	-	-	304,613	56.7			0
2006	S	2005	GRR unassociated vessel	19-21 June	none	-	-	-	208,733	50.6			0
2007	Y	2005	LFH-direct	2-6 April	633598	226,442	-	1,805	24,143	11.0	LR	87.8	0
2007	Y	2005	LFH-direct	2-6 April	633597	-	220,825	5,489	24,457	10.1	LR	85.5	0
2007	Y	2005	PL1-direct	16-17 April	612505	64,106	-	128	2,291	10.0			2,252
2007	Y	2005	PL1-direct	16-17 April	612510	-	72,805	-	476	10.0			2,481
2007	Y	2005	PL1-direct	16-17 April	612661	6,863	-	-	14	10.0			233
2007	Y	2005	BC1-direct	18-19 April	612507	67,891	-	-	-	10.0			2,128
2007	Y	2005	BC1-direct	18-19 April	612508	-	77,220	-	10,369	10.0			2,746
2007	Y	2005	CJ1-volitional	13 April	612506	69,180	-	112	9,911	10.0			1,996
2007	Y	2005	CJ1-volitional	13 April	612509	-	78,588	-	708	10.0			1,999
2007	S	2006	LFH-direct	23 May	633986	191,436	1,810	6,000	571	61.3			0
2007	S	2006	LFH-Unassociated	23 May	none	-	-	-	875	103.0			0
2007	S	2006	PL1-	26 May	612732	97,668	-	1,117	-	50.0			712
2007	S	2006	PL1-	26 May	612731	-	98,046	-	1,122	50.0			714
2007	S	2006	PL1-Unassociated	26 May	none	-	-	-	202,971	56.3			1,463
2007	S	2006	CJ1	29 May	612727	99,017	-	1,456	-	50.0			565
2007	S	2006	CJ1	29 May	612728	-	99,212	-	1,459	50.0			566
2007	S	2006	CJ1-Unassociated	29 May	none	-	-	-	313,339	50.0			1,761
2007	S	2006	BC1	28-29 May	612729	98,546	-	789	--	50.0			567
2007	S	2006	BC1	28-29 May	612730	-	100,103	-	2,013	50.0			583
2007	S	2006	BC1-Unassociated	28-29 May	none	-	-	-	305,255	50.0			1,741
2007	S	2006	Snake R. below HC Dam-Oxbow hatchery-IPC-direct	08 May	101273	11,247	-	1,419	-	55.0			1,067
2007	S	2006	Snake R. below HC Dam-Oxbow hatchery-IPC-direct	08 May	104480	48,621	-	6,135	-	55.0			4,613
2007	S	2006	Snake R. below HC Dam-Oxbow hatchery-IPC-direct	08 May	103880	44,638	-	5,633	-	55.0			4,235
2007	S	2006	NPTH-Site 1705	11-15 June	612699	98,947	-	665	-	37.9			627

Appendix H: LFH/Snake River hatchery origin fall Chinook releases with number marked, tagged, and unmarked by release year and type.

Release Year	S/Y[b]	Brood Year	Release Location-Type	Release Date	CWT Code	Number of Fish Released[a]				FPP	VIE Mark	% VIE	PIT Tagged[c]
						AD Clip +CWT	CWT Only	AD Clip Only	No Clip or CWT				
2007	S	2006	NPTH-Site 1705	11-15 June	612696	-	194,988	-	196,824	37.9			2,468
2007	S	2006	NPTH-North Lapwai Valley Accl.	22-23 May	612710	100,303	44,538	674	17,916	50.9			3,090
2007	S	2006	NPTH-Lukes Gulch Accl.	4 June	612733	-	24,906	-	49	37.2			3,093
2007	S	2006	NPTH-Cedar Flats Accl.	11 June	612734	-	24,890	-	98	47.3			3,100
2008	Y	2006	LFH	7-10 April	633987	231,534	456	1,673	-	10.3	LR	93.4	14,972
2008	Y	2006	LFH	7-10 April	634092	-	220,350	-	5621	10.1	LR	89.5	14,972
2008	Y	2006	CJ1	14 April	612511	69,056	-	768	-	8.4			8,597
2008	Y	2006	CJ2	14 April	612514	-	82,934	-	922	8.4			10,324
2008	Y	2006	BC1	15 April	612513	68,199	-	880	-	9.3			8,794
2008	Y	2006	BC1	15 April	612516	-	77,749	-	1,004	9.3			10,324
2008	Y	2006	PL1	14 April	612512	68,129	-	343	-	9.8			8,426
2008	Y	2006	PL1	14 April	612515	-	81,476	-	409	9.8			10,076
2008	S	2007	LFH-Direct	2 June	634672	194,723	2,270	3,606	134	48.7			0
2008	S	2007	Couse Creek Direct [vs. CJ1 Accl. Study]	28 May	634671	195,058	2,794	2,129	30,420	59.1			16,054
2008	S	2007	CJ1	28 May	612518	98,282	-	1,647	-	65.0			7,630
2008	S	2007	CJ1	28 May	612521	-	98,734	-	314,082	65.0			31,522
2008	S	2007	BC1	26 May	612517	98,903	-	676	-	55.0			7,517
2008	S	2007	BC1	26 May	612520	-	99,367	-	321,089	55.0			31,740
2008	S	2007	PL1	27 May	612519	99,371	-	395	-	60.0			7,896
2008	S	2007	PL1	27 May	612522	-	99,802	-	202,639	60.0			23,938
2008	S	2007	GRR Direct[b]	29 May	634670	-	190,424	-	112,846	46.2			25,745
2008	S	2007	NPTH-Cedar Flats Accl.	12 June	612736	-	99,641	-	653	59.3			8,275
2008	S	2007	NPTH-Lukes Gulch Accl.	12 June	612737	-	99,456	-	912	46.0			8,332
2008	S	2007	NPTH-North Lapwai Valley Accl.	15 May	612694	98,251	69,725	378	269	73.4			3,059
2008	S	2007	NPTH-Site 1705	10-15 June	612716	100,665	-	388	244,354	50.7			2,131
2008	S	2007	NPTH-Site 1705	10-15 June	612695	-	149,162	-	1,368	50.7			928
2008	S	2007	Snake R. below HC Dam-Oxbow hatchery-IPC-direct	6 May	107171	22,795	-	2,369	-	51.4			2,022
2008	S	2007	Snake R. below HC Dam-Oxbow hatchery-IPC-direct	6 May	103680	55,816	-	5,799	-	51.4			4,952
2008	S	2007	Snake R. below HC Dam-Oxbow hatchery-IPC-direct	6 May	107502	55,004	-	5,714	-	51.4			4,880
2008	S	2007	Snake R. below HC Dam-	6 May	107271	23,092	-	2,399	-	51.4			2,048

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Release Year	S/Y[b]	Brood Year	Release Location-Type	Release Date	CWT Code	Number of Fish Released[a] AD Clip +CWT	CWT Only	AD Clip Only	No Clip or CWT	FPP	VIE Mark	% VIE	PIT Tagged[c]
2008	S	2007	Oxbow hatchery-IPC-direct Snake R. below HC Dam-	6 May	104381	17,650	-	1,833	-	51.4			1,566
2008	S	2007	Oxbow hatchery-IPC-direct Snake R. below HC Dam-Oxbow hatchery-IPC-direct	20-22 May	090136	142,500	-	627,850	-	44.0			64,436
2008	S	2007	Snake R at Couse Creek-Surrogates	19 May- 5 June	none	-	-	-	203,185	Unk			201,845
2008	S	2007	Clearwater R at BC-Surrogates	23 June-11 July	none	-	-	-	111,719	unk			105,444
2009	Y	2007	LFH	6-10 April	634680	220,723	424	5,935	282	9.1	LR	92.2	13,390
2009	Y	2007	LFH	6-10 April	634681	-	221,493	-	6,295	8.7	LR	91.8	13,395
2009	Y	2007	CJ1	3 April	612752	70,325	-	854	-	9.1			9,467
2009	Y	2007	CJ2	3 April	612755	-	66,821	-	2,784	9.1			9,257
2009	Y	2007	BC1	4-6 Mar	612750	72,770	-	146	-	10.6			8,769
2009	Y	2007	BC1	4-6 Mar	612753	-	80,783	-	651	10.6			9,793
2009	Y	2007	PL1	2-3 Mar	612751	71,169	-	-	-	9.5			8,846
2009	Y	2007	PL1	2-3 Mar	612754	-	78,673	-	2,433	9.5			10,082
2009	S	2008	LFH	2 June	634995	191,407	823	8,230	235	51.7			1,509
2009	S	2008	Couse Creek Direct [vs. CJ1 Accl. Study]	26 May	634996	187,434	488	11,967	855	46.5			13,740
2009	S	2008	GRR-extras	2-3 June	612676	165,146	1,191	6,024	9,039	50.0			0
2009	S	2008	CJ1	26 May	610180	100,383	-	-	-	57.0			2,645
2009	S	2008	CJ1	26 May	610183	99,521	-	-	325,006	57.0			11,186
2009	S	2008	BC1	26 May	610179	100,093	-	-	-	62.5			2,901
2009	S	2008	BC1	26 May	610182	-	99,332	-	275,443	62.5			10,862
2009	S	2008	PL1	24 May	610181	95,227	-	5,012	-	59.3			3,320
2009	S	2008	PL1	24 May	610184	-	99,727	-	216,025	59.3			10,457
2009	S	2008	GRR-direct	28-29 May	634997	193,275	535	7,892	239,348	67.1			27,764
2009	S	2008	NPTH-Cedar Flats Accl.	9 June	612760	-	100,760	-	1,202	59.7			7,104
2009	S	2008	NPTH-Cedar Flats Accl.	9 June	612761	95,840	-	2,296	-	59.7			6,838
2009	S	2008	NPTH-Lukes Gulch Accl.	10 June	612762	-	98,025	-	11,008	51.6			7,276
2009	S	2008	NPTH-Lukes Gulch Accl.	10 June	612763	98,486	-	2,359	-	51.6			6,730
2009	S	2008	NPTH-North Lapwai Valley Accl.	15 May	612766	-	182,328	-	213,149	85.3			2,381
2009	S	2008	NPTH-North Lapwai Valley Accl.	15 May	612738	97,751	-	2,341	-	85.3			602
2009	S	2008	NPTH-Site 1705	8-12 June	612739	90,953	-	27,725	-	51.5			559
2009	S	2008	NPTH-Site 1705	8-12 June	612697	-	181,522	-	328,615	51.5			2,404

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Release Year	S/Y[b]	Brood Year	Release Location-Type	Release Date	CWT Code	Number of Fish Released[a] AD Clip +CWT	CWT Only	AD Clip Only	No Clip or CWT	FPP	VIE Mark	% VIE	PIT Tagged[c]
2009	S	2008	Snake R. below HC Dam-Oxbow hatchery-IPC-direct	8 May	107582	64,892	-	7,289	-	54.7			5,090
2009	S	2008	Snake R. below HC Dam-Oxbow hatchery-IPC-direct	8 May	107682	65,514	-	7,359	-	54.7			4,854
2009	S	2008	Snake R. below HC Dam-Oxbow hatchery-IPC-direct	8 May	107482	51,950	-	5,836	-	54.7			4,900
2009	S	2008	Snake R. below HC Dam-Umatilla hatchery-IPC-direct	12-14 May	090228	233,692	-	569,793	-	60.2			55,488
2009	S	2008	Snake R at Couse Creek-Surrogates	18 May-5 June	none	-	-	-	237,829	Unk			237,741
2009	S	2008	Clearwater R at BC-Surrogates	29 June-17 July	none	-	-	-	90,912	unk			90,039
2010	Y	2008	LFH	12-15 April	635166	250,814	169	2,542	678	9.8			13,488
2010	Y	2008	LFH	12-15 April	635165	-	221,376	-	3,273	9.8			13,487
2010	Y	2008	CJ1	5 April	220305	70,925	-	1,284	-	8.0			8,922
2010	Y	2008	CJ1	5 April	220300	-	81,467	-	961	8.0			10,184
2010	Y	2008	BC1	14 April	220303	70,043	-	1,993	-	9.0			8,925
2010	Y	2008	BC1	14 April	220302	-	79,756	-	1,907	9.0			10,117
2010	Y	2008	PL1	13 April	220304	70,834	-	984	-	9.3			8,902
2010	Y	2008	PL1	13 April	220301	-	80,417	-	1,244	9.3			10,123
2010	S	2009	LFH	25 May	635180	198,457	1,068	2,803	-	52.4			0
2010	S	2009	CJ1	24 May	220309	100,778	-	392	-	47.0			7,376
2010	S	2009	CJ1	24 May	220308	-	102,167	-	325,440	47.0			31,174
2010	S	2009	BC1	25 May	220307	100,461	-	441	-	52.3			7,587
2010	S	2009	BC1	25 May	220306	-	101,207	-	309,127	52.3			30,855
2010	S	2009	PL1	24 May	220311	100,537	-	765	-	50.5			7,725
2010	S	2009	PL1	24 May	220310	-	100,619	-	203,120	50.5			23,162
2010	S	2009	Couse Creek Direct [vs. CJ1 Accl. Study]	24 May	635181	199,326	926	2,381	529	58.0			15,445
2010	S	2009	GRR Direct	24 May	635182	197,252	-	2,868	186,720	42.0			30,488
2010	S	2009	Snake R. below HC Dam-Oxbow hatchery-IPC-direct	6 May	104383	50,433	-	4,609	-	47.0			4,208
2010	S	2009	Snake R. below HC Dam-Oxbow hatchery-IPC-direct	6 May	100142	64,144	-	5,862	-	47.0			5,352
2010	S	2009	Snake R. below HC Dam-Oxbow hatchery-IPC-direct	6 May	106482	61,977	-	5,664	-	47.0			5,171

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						AD Clip +CWT	CWT Only	AD Clip Only	No Clip or CWT				
2010	S	2009	Snake R. below HC Dam-Umatilla hatchery-IPC-direct	25-27 May	090331	208,330	1,242	476,055	-	46.3			50,036
2010	S	2009	NPTH-Cedar Flats Accl.	14 June	612764	-	74,939	-	14,328	48.3			6,737
2010	S	2009	NPTH-Cedar Flats Accl.	14 June	612765	97,930	-	1,214	-	48.3			7,482
2010	S	2009	NPTH-Lukes Gulch Accl.	9 June	612747	-	99,116	-	415	44.4			8,208
2010	S	2009	NPTH-Lukes Gulch Accl.	9 June	612748	98,220	-	1,218	-	44.4			8,201
2010	S	2009	NPTH-North Lapwai Valley Accl.	14 May	220201	-	164,981	-	200,716	81.2			2,424
2010	S	2009	NPTH-North Lapwai Valley Accl.	14 May	220202	99,024	-	1,228	-	81.2			665
2010	S	2009	NPTH-Site 1705	7 June	220200	99,100	-	1,229	-	54.2			577
2010	S	2009	NPTH-Site 1705	7 June	612772	-	199,710	-	236,960	54.2			2509
2010	S	2009	Snake R at Couse Creek-Surrogates	17 May- 4 June	none				195,534				195,493
2010	S	2009	Clearwater R at BC-Surrogates	21 June- 9 July	none				113,162				112,577
2011	Y	2009	LFH	12-15 April	635564	226,621	462	308		9.9			14,657
2011	Y	2009	LFH	12-15 April	635510	-	236,175	-	163	9.9			15,233
2011	Y	2009	CJ1	1 April	220315	71,407	-	867	-	10.3			8,862
2011	Y	2009	CJ1	1 April	220314	-	80,830	-	1,482	10.3			10,092
2011	Y	2009	BC1	14 April	220317	71,096	-	286	-	9.9			8,300
2011	Y	2009	BC1	14 April	220312	-	89,325	-	1,637	9.9			10,577
2011	Y	2009	PL1	12 April	220316	69,415	-	2,766	-	9.5			8,218
2011	Y	2009	PL1	12 April	220313	-	93,103	-	1,126	9.5			10,729
2011	S	2010	LFH	1 June	635998	200,502	283	1,415		50.0			0
2011	S	2010	CJ1	22 May	220119	100,967		200		45.3			8,037
2011	S	2010	CJ1	22 May	220120		100,986		314,327	45.3			32,992
2011	S	2010	BC1	25 May	220117	100,622		200		51.0			8,111
2011	S	2010	BC1	25 May	220115		100,748		307,576	51.0			32,847
2011	S	2010	PL1	23 May	220121	100,987		201		49.0			8,044
2011	S	2010	PL1	23 May	220122		100,999		211,097	49.0			24,811
2011	S	2010	Couse Creek Direct [vs. CJ1 Accl. Study]	2-3 June	635997	200,945	971	384		49.0			16,459
2011	S	2010	GRR Direct	24 May	635999	199,460	134	1,206	196,628	79.5			32,441
2011	S	2010	Snake R. below HC Dam-Oxbow hatchery-IPC-direct	5 May	100153	167,137		15,769	11,903	48.2			14,927
2011	S	2010	Snake R. below HC Dam-Irrigon hatchery-IPC-direct	24-26 May	090447	195,414	397	435,100	7,989	81.0			36,925

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						AD Clip +CWT	CWT Only	AD Clip Only	No Clip or CWT				
2011	S	2010	NPTH-Cedar Flats Accl.	15 June	220205		103,007		323	54.5			8,244
2011	S	2010	NPTH-Cedar Flats Accl.	15 June	220206	96,604		5,622		54.5			8,155
2011	S	2010	NPTH-Lukes Gulch Accl.	14 June	220207		99,115		5,364	50.2			8,283
2011	S	2010	NPTH-Lukes Gulch Accl.	14 June	220208	101,688		1,315		50.2			8,166
2011	S	2010	NPTH-North Lapwai Valley Accl.	14 May	220203		202,265		206,799	75.0			2,392
2011	S	2010	NPTH-North Lapwai Valley Accl.	14 May	220204	99,174		1,282		75.0			588
2011	S	2010	NPTH-Site 1705	7-15 June	220210		201,980		224,365	52.5			2,412
2011	S	2010	NPTH-Site 1705	7 June	220209	94,893		5,523		52.5			568
2011	S	2010	NPTH late release-Site 1705	6-11 July	220211		99,907		313	93.0			1,038
2011	S	2010	NPTH late release-Site 1705	6-11 July	220212		94,673		91,694	93.0			1,931
2011	S	2010	Snake R at Couse Creek-Surrogates	23 May-10 June	none				202,462				201,608
2011	S	2010	Clearwater R at BC-Surrogates	20 June-8 July	none				116,668				114,127
2012	Y	2010	LFH	10-13 Apr	636080	246,918	660	495	989	10.4			15,244
2012	Y	2010	LFH	10-13 Apr	636079		236,056		4,882	10.4			14,746
2012	Y	2010	CJ1	28 Mar	220321	72,233		432		10.3			8,881
2012	Y	2010	CJ1	28 Mar	220320		81,042		1,427	10.3			10,080
2012	Y	2010	BC1	12 Apr	220323	74,973		903		9.7			8,441
2012	Y	2010	BC1	12 Apr	220318		86,184		1,555	9.7			9,760
2012	Y	2010	PL1	11 Apr	220322	79,519		316		9.4			8,777
2012	Y	2010	PL1	11 Apr	220319		90,110		1,177	9.4			10,036
2012	S	2011	LFH	29-30 May	636417	198,228	261	2,270	141	50.0			19,943
2012	S	2011	CJ1	21 May	220326	101,194		202		47.0			20,586
2012	S	2011	CJ1	21 May	220327		100,818			47.0			20,469
2012	S	2011	BC1	23 May	220329	101,565				46.0			20,555
2012	S	2011	BC1	23 May	220328		101,327			46.0			20,507
2012	S	2011	PL1	22 May	220324	100,850		405		47.0			16,497
2012	S	2011	PL1	22 May	220325		100,500			47.0			16,373
2012	S	2011	Couse Creek Direct [vs. CJ1 Accl. Study]	29-30 May	636418	194,955	658	3,548	139	54.0			16,313
2012	S	2011	GRR Direct	24 May	636419	192,996		9,723	181,281	48.0			32,432
2012	S	2011	Snake R. below HC Dam-Oxbow hatchery-IPC-direct	3 May	100201	187,146		15,135		48.0			14,910
2012	S	2011	Snake R. below HC Dam-Irrigon hatchery-IPC-direct	22-24 May	090587	200,844	273	587,232	12,051	46.0			36,927

Appendix H: LFH/Snake River hatchery origin fall Chinook releases with number marked, tagged, and unmarked by release year and type.

Release Year	S/Y[b]	Brood Year	Release Location-Type	Release Date	CWT Code	Number of Fish Released[a]				FPP	VIE Mark	% VIE	PIT Tagged[c]
						AD Clip +CWT	CWT Only	AD Clip Only	No Clip or CWT				
2012	S	2011	NPTH-Cedar Flats Accl.	12 June	220213		99,570		495	52.0			8,309
2012	S	2011	NPTH-Cedar Flats Accl.	12 June	220214	94,079		5,305		52.0			8,252
2012	S	2011	NPTH-Lukes Gulch Accl.	13 June	220215		95,710		5,771	50.0			8,377
2012	S	2011	NPTH-Lukes Gulch Accl.	13 June	220216	96,099		1,276		50.0			8,038
2012	S	2011	NPTH-North Lapwai Valley Accl.	8&30 May	220224		191,699		268,454	115/54			2,440
2012	S	2011	NPTH-North Lapwai Valley Accl.	8&30 May	220218	98,697		4,363		115/54			546
2012	S	2011	NPTH-Site 1705	11-15 June	220223		202,095		291,091	51/53			4,877
2012	S	2011	NPTH-Site 1705	11-15 June	220217	103,487		1,813		51/53			1,041
2012	S	2011	Snake R at Couse Creek-Surrogates	21 May-8 June	none				226,852				226,786
2012	S	2011	Clearwater R at BC-Surrogates	18 June-6 July	none				101,062				92,964
2013	Y	2011	LFH	10-12 Apr	636444	240,413	809	809	1,618	10.2			14,582
2013	Y	2011	LFH	10-12 Apr	636443		243,085		2,766	10.2			14,713
2013	Y	2011	CJ1	1 Apr	220335	71,930		580		9.5			1,372
2013	Y	2011	CJ1	1 Apr	220332		89,993		720	9.5			1,716
2013	Y	2011	BC1	17 Apr	220333	71,973		580		9.8			1,369
2013	Y	2011	BC1	17 Apr	220331		85,359		1,005	9.8			1,629
2013	Y	2011	PL1	16 Apr	220334	71,679		564		9.7			1,285
2013	Y	2011	PL1	16 Apr	220330		88,908		1,761	9.7			1,612

[a] Numbers presented do not necessarily match hatchery records for fish per pound because of reporting constraints for the hatchery. Release information for some NPT release sites that had multiple CWT codes was estimated by WDFW based upon proportions of fish at tagging since those data were not available at the time this report was printed.

[b] S/Y indicates subyearling or yearling rearing strategy.

[c] Numbers of fish PIT tagged are included in the Number of Fish Released categories.

Appendix I: Historical Estimated Survivals (%) Between Various Life Stages at LFH Brood Years: 1990-2011

Appendix I: Estimated survivals (%) between various life stages at LFH for fall Chinook of LFH/Snake River hatchery origin.

Brood year	Release stage	Green egg-ponded fry	Ponded fry-release	Green egg-release
1990	Yearling	86.8	94.5	82.1
	Subyearling	86.8	98.0	85.1
1991	Yearling	89.1	94.1	83.8
1992	Yearling	92.7	96.5	89.5
	Subyearling	92.7	98.4	91.2
1993	Yearling	88.0	99.0	87.1
1994	Yearling	92.7	99.3	92.1
1995	Yearling	90.8	94.8	86.1
	Subyearling	90.8	99.0	89.9
1996	Yearling	95.0	76.6	72.8
	Subyearling	95.0	89.5	85.0
1997	Yearling	93.0	92.5	86.0
	Subyearling	93.0	97.6	90.8
1998	Yearling	92.4	94.8	87.6
	Subyearling	92.4	95.1	87.9
1999	Yearling	92.4	66.3	61.3
	Subyearling	92.4	95.2	87.9
2000	Yearling	92.8	91.3	84.8
	Subyearling	92.8	94.9	88.1
2001	Yearling	93.6	79.5	74.5
	Subyearling	93.6	97.7	95.8
2002	Yearling	95.3	86.8	82.8
	Subyearling	95.3	94.8	90.3
2003	Yearling	95.5	75.7	72.3
	Subyearling	95.5	95.1	90.8
2004	Yearling	93.0	96.8	90.1
	Subyearling	93.0	97.6	90.8
2005	Yearling	92.2	99.3	91.5
	Subyearling	92.2	104.9	96.7
2006	Yearling	95.7	95.4	91.3
	Subyearling	95.7	100.2	95.5
2007	Yearling	95.8	95.4	91.4
	Subyearling	95.8	100.3	95.5
2008	Yearling	95.8	95.3	91.3
	Subyearling	95.8	107.1	89.4
2009	Yearling	94.1	98.3	92.5
	Subyearling	94.1	100.2	94.0
2010	Yearling	96.4	101.9	98.2
	Subyearling	96.4	101.1	95.4
2011	Yearling	95.0	102.8	97.7
	Subyearling	95.0	98.5	96.4
Yearling mean:	**%**	**93.1**	**92.1**	**85.8**
	SD	**2.6**	**9.4**	**8.9**
Subyearling mean:	**%**	**93.6**	**98.2**	**91.4**
	SD	**2.3**	**3.9**	**3.8**

Appendix J: Historical Size at Age of Return of CWT LSRCP Origin Fish Processed by WDFW: 1985-2011

(Size at return of fish processed may not represent the full run depending upon trapping and sampling protocols. WDFW and LSRCP releases are included. Historical recoveries (1985-1987) of subyearling fall Chinook released from Hagerman National Fish hatchery are not included. Caution must be taken when comparing historical data because of changes in the program including addition of releases upstream of LGR Dam. Another item for consideration is the BY89 which was progeny from broodstock consisting of a large proportion of strays. Although the BY89 is presented in Appendix I, they were never used as broodstock when they returned.)

Appendix J Table 1: Size at age of return in 1985-1990 by sex for CWT LSRCP fish processed by WDFW that were part of yearling production.

Return Year	Sex		Total Age at Return					
			2(Minijack)	3(Jack)	4	5	6	7
1985	Male	N=	1870	-	-	-	-	-
		Median (cm)	**35**	**-**	**-**	**-**	**-**	**-**
		Range (cm)	29-53	-	-	-	-	-
	Female	N=	15	-	-	-	-	-
		Median (cm)	**35**	**-**	**-**	**-**	**-**	**-**
		Range (cm)	30-40	-	-	-	-	-
1986	Male	N=	48	636	-	-	-	-
		Median (cm)	**36**	**57**	**-**	**-**	**-**	**-**
		Range (cm)	31-40	37-70	-	-	-	-
	Female	N=	-	15	-	-	-	-
		Median (cm)	**-**	**63**	**-**	**-**	**-**	**-**
		Range (cm)	-	50-73	-	-	-	-
1987	Male	N=	241	88	552	-	-	-
		Median (cm)	**36**	**54**	**80**	**-**	**-**	**-**
		Range (cm)	29-49	40-64	41-100	-	-	-
	Female	N=	1	1	868	-	-	-
		Median (cm)	**-**	**-**	**78**	**-**	**-**	**-**
		Range (cm)	35	66	31-98	-	-	-
1988	Male	N=	225	239	55	110	-	-
		Median (cm)	**35**	**55**	**68**	**97**	**-**	**-**
		Range (cm)	26-43	35-66	55-93	55-111	-	-
	Female	N=	-	2	42	165	-	-
		Median (cm)	**-**	**-**	**74**	**88**	**-**	**-**
		Range (cm)	-	64-67	58-90	54-106	-	-
1989	Male	N=	81	226	203	21	3	-
		Median (cm)	**34**	**54**	**70**	**85**	**92**	**-**
		Range (cm)	30-46	33-66	44-93	63-105	84-94	-
	Female	N=	-	4	200	38	4	-
		Median (cm)	**-**	**64**	**75**	**82**	**93**	**-**
		Range (cm)	-	58-66	54-89	60-93	76-104	-
1990	Male	N=	293	75	71	57	2	-
		Median (cm)	**34**	**54**	**73**	**93**	**-**	**-**
		Range (cm)	28-40	43-62	58-93	62-102	103-109	-
	Female	N=	-	2	120	94	1	1
		Median (cm)	**-**	**-**	**75**	**83**	**-**	**-**
		Range (cm)	-	54-61	56-86	68-94	84	89

Appendix J Table 2: Size at age of return in 1991-1996 by sex for CWT LSRCP fish processed by WDFW that were part of yearling production.

Return			Total Age at Return					
Year	**Sex**		**2(Minijack)**	**3(Jack)**	**4**	**5**	**6**	**7**
1991	Male	N=	-	197	71	44	8	-
		Median (cm)	**-**	**52**	**73**	**94**	**89**	**-**
		Range (cm)	-	31-65	45-88	61-109	86-101	-
	Female	N=	-	2	123	89	9	-
		Median (cm)	**-**	**-**	**73**	**81**	**92**	**-**
		Range (cm)	-	57-74	60-86	56-95	79-103	-
1992	Male	N=	129	-	161	22	-	-
		Median (cm)	**34**	**-**	**73**	**89**	**-**	**-**
		Range (cm)	29-39	-	46-110	60-102	-	-
	Female	N=	-	-	241	34	1	-
		Median (cm)	**-**	**-**	**71**	**80**	**85**	**-**
		Range (cm)	-	-	55-90	68-94	85	-
1993	Male	N=	102	58	-	60	1	-
		Median (cm)	**33**	**51**	**-**	**85**	**-**	**-**
		Range (cm)	28-41	40-68	-	51-99	77	-
	Female	N=	-	2	-	102	-	-
		Median (cm)	**-**	**-**	**-**	**80**	**-**	**-**
		Range (cm)	-	53-75	-	67-94	-	-
1994	Male	N=	241	283	54	-	4	-
		Median (cm)	**35**	**53**	**75**	**-**	**83**	**-**
		Range (cm)	29-51	36-82	42-91	-	76-98	-
	Female	N=	-	4	86	-	10	-
		Median (cm)	**-**	**58**	**73**	**-**	**79**	**-**
		Range (cm)	-	57-63	58-86	-	67-92	-
1995	Male	N=	1781	230	26	122	-	-
		Median (cm)	**35**	**55**	**78**	**78**	**-**	**-**
		Range (cm)	22-47	41-72	51-90	57-105	-	-
	Female	N=	-	14	53	175	-	1
		Median (cm)	**-**	**61**	**75**	**75**	**-**	**-**
		Range (cm)	-	56-68	60-90	55-95	-	80
1996	Male	N=	380	374	238	18	2	-
		Median (cm)	**33**	**51**	**72**	**90**	**-**	**-**
		Range (cm)	27-47	37-66	54-98	77-105	77-83	-
	Female	N=	-	20	314	32	1	-
		Median (cm)	**-**	**60**	**74**	**83**	**-**	**-**
		Range (cm)	-	54-80	56-92	70-92	95	-

Appendix J Table 3: Size at age of return in 1997-2002 by sex for CWT LSRCP fish processed by WDFW that were part of yearling production.

Return			Total Age at Return					
Year	Sex		2(Minijack)	3(Jack)	4	5	6	7
1997	Male	N=	434	401	224	55	-	-
		Median (cm)	**34**	**50**	**70**	**90**	**-**	-
		Range (cm)	28-40	37-68	48-93	57-104	-	-
	Female	N=	-	-	347	116	2	-
		Median (cm)	**-**	**-**	**73**	**82**	**-**	-
		Range (cm)	-	-	55-89	57-97	77-102	-
1998	Male	N=	136	1770	289	136	2	-
		Median (cm)	**35**	**52**	**70**	**88**	**-**	-
		Range (cm)	22-43	33-73	45-97	56-121	96-98	-
	Female	N=	1	142	301	351	3	-
		Median (cm)	**-**	**57**	**73**	**84**	**77**	-
		Range (cm)	34	49-78	49-91	61-106	77-82	-
1999	Male	N=	358	394	571	43	11	-
		Median (cm)	**36**	**53**	**69**	**87**	**96**	-
		Range (cm)	30-49	37-70	35-95	50-104	60-108	-
	Female	N=	-	14	741	96	27	-
		Median (cm)	**-**	**61**	**72**	**85**	**89**	-
		Range (cm)	-	49-70	53-86	64-96	74-99	-
2000	Male	N=	412	1066	188	97	1	-
		Median (cm)	**36**	**59**	**70**	**88**	**-**	**-**
		Range (cm)	28-44	34-72	55-95	59-110	86	-
	Female	N=	-	110	292	249	4	-
		Median (cm)	**-**	**64**	**77**	**82**	**92**	**-**
		Range (cm)	-	54-74	54-89	58-94	91-92	-
2001	Male	N=	14	858	221	29	3	1
		Median (cm)	**34**	**57**	**75**	**91**	**97**	**-**
		Range (cm)	32-40	39-74	57-98	69-103	84-103	78
	Female	N=	-	60	614	111	13	-
		Median (cm)	**-**	**63**	**77**	**84**	**92**	-
		Range (cm)	-	52-76	55-95	65-98	79-100	-
2002	Male	N=	219	471	241	35	2	-
		Median (cm)	**35**	**55**	**74**	**98**	**-**	**-**
		Range (cm)	27-51	40-67	51-96	71-112	73-97	-
	Female	N=	-	6	505	94	3	-
		Median (cm)	**-**	**64**	**77**	**86**	**86**	**-**
		Range (cm)	-	60-80	51-93	73-97	84-87	-

Appendix J Table 4: Size at age of return in 2003-2008 by sex for CWT LSRCP fish processed by WDFW that were part of yearling production.

Return			Total Age at Return					
Year	**Sex**		**2(Minijack)**	**3(Jack)**	**4**	**5**	**6**	**7**
2003	Male	N=	690	846	232	24	-	-
		Median (cm)	**35**	**54**	**72**	**88**	**-**	**-**
		Range (cm)	27-53	31-78	47-90	62-105	-	-
	Female	N=	-	63	269	158	3	-
		Median (cm)	**-**	**62**	**76**	**83**	**90**	**-**
		Range (cm)	-	45-68	52-88	68-101	85-96	-
2004	Male	N=	329	1444	259	21	3	-
		Median (cm)	**36**	**59**	**69**	**95**	**99**	**-**
		Range (cm)	30-43	40-74	31-97	60-113	86-101	-
	Female	N=	-	249	513	104	4	-
		Median (cm)	**-**	**64**	**74**	**84**	**88**	**-**
		Range (cm)	-	44-84	57-91	65-98	70-95	-
2005	Male	N=	438	472	346	69	1	-
		Median (cm)	**36**	**58**	**71**	**84**	**-**	**-**
		Range (cm)	29-47	43-71	50-96	60-106	84	-
	Female	N=	-	55	917	192	7	-
		Median (cm)	**-**	**64**	**77**	**81**	**83**	**-**
		Range (cm)	-	50-82	52-90	61-95	74-90	-
2006	Male	N=	660	964	109	8	-	-
		Median (cm)	**35**	**59**	**71**	**75**	**-**	**-**
		Range (cm)	28-45	41-80	56-86	67-95	-	-
	Female	N=	-	125	266	88	8	-
		Median (cm)	**-**	**65**	**76**	**84**	**85**	**-**
		Range (cm)	-	49-74	60-88	70-99	74-96	-
2007	Male	N=	281	1759	285	5	-	-
		Median (cm)	**33**	**60**	**73**	**83**	**-**	**-**
		Range (cm)	27-56	42-79	52-98	76-92	-	-
	Female	N=	-	513	780	35	2	-
		Median (cm)	**-**	**63**	**76**	**83**	**-**	**-**
		Range (cm)	-	50-83	58-96	75-93	80-84	-
2008	Male	N=	1244	723	120	6	-	-
		Median (cm)	**35**	**57**	**75**	**82**	**-**	**-**
		Range (cm)	28-54	32-79	59-99	75-100	-	-
	Female	N=	-	75	494	58	-	-
		Median (cm)	**-**	**65**	**78**	**83**	**-**	**-**
		Range (cm)	-	57-80	60-97	62-92	-	-

Appendix J Table 5: Size at age of return in 2009-2011 by sex for CWT LSRCP fish processed by WDFW that were part of yearling production.

Return			Total Age at Return					
Year	Sex		2(Minijack)	3(Jack)	4	5	6	7
2009	Male	N=	43	1293	130	5	-	-
		Median (cm)	**34**	**59**	**74**	**89**	-	-
		Range (cm)	29-42	39-75	56-92	76-96	-	-
	Female	N=	-	545	389	11	1	-
		Median (cm)	**-**	**65**	**77**	**85**	-	-
		Range (cm)	-	53-88	61-90	80-92	80	-
2010	Male	N=	137	201	161	4	1	-
		Median	**35**	**59**	**77**	**93**	-	-
		Range	30-56	48-77	50-105	84-100	89	-
	Female	N=	-	20	504	20	-	-
		Median	**-**	**67**	**79**	**86**	-	-
		Range	-	53-74	55-98	72-92	-	-
2011	Male	N=	165	457	155	7	-	-
		Median	**35**	**57**	**72**	**85**	-	-
		Range	32-45	41-72	60-89	78-102	-	-
	Female	N=	-	142	526	53	2	-
		Median	**-**	**64**	**76**	**80**	-	-
		Range	-	55-79	63-90	66-91	80-87	-

Appendix J Table 6: Size at age of return in 1985-1990 by sex for CWT LSRCP fish processed by WDFW that were part of subyearling production.

Return			Total Age at Return						
Year	Sex		1(Minijack)	2(Jack)	3	4	5	6	7
1985	Male	N=	-	-	-	-	-	-	-
		Median (cm)	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Range (cm)	-	-	-	-	-	-	-
	Female	N=	-	-	-	-	-	-	-
		Median (cm)	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Range (cm)	-	-	-	-	-	-	-
1986	Male	N=	-	34	-	-	-	-	-
		Median (cm)	**-**	**45**	**-**	**-**	**-**	**-**	**-**
		Range (cm)	-	32-55	-	-	-	-	-
	Female	N=	-	-	-	-	-	-	-
		Median (cm)	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Range (cm)	-	-	-	-	-	-	-
1987	Male	N=	-	24	80	-	-	-	-
		Median (cm)	**-**	**44**	**65**	**-**	**-**	**-**	**-**
		Range (cm)	-	37-51	49-76	-	-	-	-
	Female	N=	-	-	37	-	-	-	-
		Median (cm)	**-**	**-**	**72**	**-**	**-**	**-**	**-**
		Range (cm)	-	-	58-81	-	-	-	-
1988	Male	N=	-	153	29	27	-	-	-
		Median (cm)	**-**	**45**	**61**	**62-100**	**-**	**-**	**-**
		Range (cm)	-	32-57	48-74		-	-	-
	Female	N=	-	-	2	32	-	-	-
		Median (cm)	**-**	**-**	**-**	**81**	**-**	**-**	**-**
		Range (cm)	-	-	74-76	66-99	-	-	-
1989	Male	N=	-	6	112	19	5	-	-
		Median (cm)	**-**	**44**	**63**	**81**	**100**	**-**	**-**
		Range (cm)	-	43-50	41-76	57-95	96-105	-	-
	Female	N=	-	-	42	50	5	-	-
		Median (cm)	**-**	**-**	**72**	**81**	**85**	**-**	**-**
		Range (cm)	-	-	59-79	58-92	74-93	-	-
1990	Male	N=	-	6	8	50	17	-	-
		Median (cm)	**-**	**49**	**63**	**92**	**101**	**-**	**-**
		Range (cm)	-	45-55	50-70	57-101	83-110	-	-
	Female	N=	-	-	3	105	16	-	-
		Median (cm)	**-**	**-**	**63**	**84**	**92**	**-**	**-**
		Range (cm)	-	-	59-69	62-99	65-103	-	-

Appendix J Table 7: Size at age of return in 1991-1996 by sex for CWT LSRCP fish processed by WDFW that were part of subyearling production. (Fish highlighted in red were returns of BY89 subyearlings, progeny of broodstock with a high stray component)

Return			Total Age at Return						
Year	Sex		1(Minijack)	2(Jack)	3	4	5	6	7
1991	Male	N=	-	45	10	4	19	1	-
		Median (cm)	**-**	**46**	**63**	**77**	**101**	**-**	**-**
		Range (cm)	-	40-56	49-95	72-88	84-109	98	-
	Female	N=	-	-	3	11	31	1	-
		Median (cm)	**-**	**-**	**70**	**80**	**90**	**-**	**-**
		Range (cm)	-	-	68-73	68-89	73-98	92	-
1992	Male	N=	-	24	59	3	-	-	-
		Median (cm)	**-**	**47**	**67**	**80**	**-**	**-**	**-**
		Range (cm)	-	40-54	48-79	70-83	-	-	-
	Female	N=	-	-	21	14	-	2	1
		Median (cm)	**-**	**-**	**71**	**76**	**-**	**-**	**-**
		Range (cm)	-	-	61-84	61-88	-	79-99	92
1993	Male	N=	-	-	42	23	-	-	-
		Median (cm)	**-**	**-**	**69**	**84**	**-**	**-**	**-**
		Range (cm)	-	-	58-85	68-99	-	-	-
	Female	N=	-	-	20	44	2	-	-
		Median (cm)	**-**	**-**	**71**	**80**	**-**	**-**	**-**
		Range (cm)	-	-	62-79	72-89	66-87	-	-
1994	Male	N=	-	134	-	27	4	-	-
		Median (cm)	**-**	**45**	**-**	**86**	**89**	**-**	**-**
		Range (cm)	-	36-54	-	69-101	83-103	-	-
	Female	N=	-	-	-	67	7	-	-
		Median (cm)	**-**	**-**	**-**	**81**	**88**	**-**	**-**
		Range (cm)	-	-	-	71-90	82-92	-	-
1995	Male	N=	-	-	180	-	8	1	-
		Median (cm)	**-**	**-**	**64**	**-**	**103**	**-**	**-**
		Range (cm)	-	-	46-87	-	88-107	104	-
	Female	N=	-	-	79	-	19	-	-
		Median (cm)	**-**	**-**	**69**	**-**	**89**	**-**	**-**
		Range (cm)	-	-	54-78	-	82-102	-	-
1996	Male	N=	-	-	-	68	-	1	-
		Median (cm)	**-**	**-**	**-**	**82**	**-**	**-**	**-**
		Range (cm)	-	-	-	54-102	-	103	-
	Female	N=	-	-	-	126	-	-	-
		Median (cm)	**-**	**-**	**-**	**79**	**-**	**-**	**-**
		Range (cm)	-	-	-	62-90	-	-	-

Appendix J Table 8: Size at age of return in 1997-2002 by sex for CWT LSRCP fish processed by WDFW that were part of subyearling production.

Return			Total Age at Return						
Year	Sex		1(Minijack)	2(Jack)	3	4	5	6	7
1997	Male	N=	-	-	-	-	5	-	-
		Median (cm)	**-**	**-**	**-**	**-**	**107**	**-**	**-**
		Range (cm)	-	-	-	-	76-121	-	-
	Female	N=	-	-	-	-	12	-	-
		Median (cm)	**-**	**-**	**-**	**-**	**87**	**-**	**-**
		Range (cm)	-	-	-	-	75-93	-	-
1998	Male	N=	-	69	-	-	-	-	-
		Median (cm)	**-**	**46**	**-**	**-**	**-**	**-**	**-**
		Range (cm)	-	35-58	-	-	-	-	-
	Female	N=	-	-	-	-	-	-	-
		Median (cm)	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		Range (cm)	-	-	-	-	-	-	-
1999	Male	N=	-	-	146	-	-	-	-
		Median (cm)	**-**	**-**	**62**	**-**	**-**	**-**	**-**
		Range (cm)	-	-	44-89	-	-	-	-
	Female	N=	-	-	45	-	-	-	-
		Median (cm)	**-**	**-**	**70**	**-**	**-**	**-**	**-**
		Range (cm)	-	-	60-76	-	-	-	-
2000	Male	N=	-	634	-	37	-	-	-
		Median (cm)	**-**	**46**	**-**	**80**	**-**	**-**	**-**
		Range (cm)	-	34-64	-	57-94	-	-	-
	Female	N=	-	-	-	101	-	-	-
		Median (cm)	**-**	**-**	**-**	**80**	**-**	**-**	**-**
		Range (cm)	-	-	-	59-91	-	-	-
2001	Male	N=	-	515	567	-	3	-	-
		Median (cm)	**-**	**46**	**66**	-	**99**	**-**	**-**
		Range (cm)	-	32-61	42-89	-	93-100	-	-
	Female	N=	-	-	375	-	26	-	-
		Median (cm)	**-**	**-**	**70**	**-**	**88**	**-**	**-**
		Range (cm)	-	-	57-87	-	75-93	-	-
2002	Male	N=	-	181	434	144	-	-	-
		Median (cm)	**-**	**43**	**65**	**83**	**-**	**-**	**-**
		Range (cm)	-	35-55	40-91	60-101	-	-	-
	Female	N=	-	-	130	499	-	-	-
		Median (cm)	**-**	**-**	**71**	**82**	**-**	**-**	**-**
		Range (cm)	-	-	55-81	50-99	-	-	-

Appendix J Table 9: Size at age of return in 2003-2008 by sex for CWT LSRCP fish processed by WDFW that were part of subyearling production.

Return			Total Age at Return						
Year	Sex		1(Minijack)	2(Jack)	3	4	5	6	7
2003	Male	N=	-	148	63	33	3	-	-
		Median (cm)	**-**	**43**	**64**	**80**	**100**	**-**	**-**
		Range (cm)	-	32-54	47-78	67-100	98-108	-	-
	Female	N=	-	-	11	91	21	-	-
		Median (cm)	**-**	**-**	**70**	**82**	**90**	**-**	**-**
		Range (cm)	-	-	63-73	65-97	78-97	-	-
2004	Male	N=	-	73	162	4	-	-	-
		Median (cm)	**-**	**49**	**62**	**72**	**-**	**-**	**-**
		Range (cm)	-	34-58	41-78	57-73	-	-	-
	Female	N=	-	-	41	27	10	-	-
		Median (cm)	**-**	**-**	**68**	**81**	**87**	**-**	**-**
		Range (cm)	-	-	56-77	51-88	59-99	-	-
2005	Male	N=	-	39	39	22	2	-	-
		Median (cm)	**-**	**47**	**65**	**74**	**-**	**-**	**-**
		Range (cm)	-	38-58	51-78	62-93	70-100	-	-
	Female	N=	-	-	16	61	4	2	-
		Median (cm)	**-**	**-**	**70**	**79**	**87**	**-**	**-**
		Range (cm)	-	-	65-81	70-89	86-94	82-88	-
2006	Male	N=	-	38	26	4	1	-	-
		Median (cm)	**-**	**48**	**63**	**85**	**-**	**-**	**-**
		Range (cm)	-	38-56	56-76	69-91	80	-	-
	Female	N=	-	-	14	16	12	2	-
		Median (cm)	**-**	**-**	**73**	**80**	**84**	**-**	**-**
		Range (cm)	-	-	63-81	73-89	65-95	87-89	-
2007	Male	N=	-	520	31	2	-	-	-
		Median (cm)	**-**	**48**	**68**	**-**	**-**	**-**	**-**
		Range (cm)	-	34-57	53-82	69-83	-	-	-
	Female	N=	-	1	16	16	3	-	-
		Median (cm)	**-**	**-**	**70**	**79**	**81**	**-**	**-**
		Range (cm)	-	76	67-75	73-87	77-86	-	-
2008	Male	N=	-	75	376	1	1	-	-
		Median (cm)	**-**	**48**	**68**	**-**	**-**	**-**	**-**
		Range (cm)	-	31-55	46-85	65	89	-	-
	Female	N=	-	-	176	5	-	-	-
		Median (cm)	**-**	**-**	**73**	**78**	**-**	**-**	**-**
		Range (cm)	-	-	55-82	69-85	-	-	-

Appendix J Table 10: Size at age of return in 2009-2011 by sex for CWT LSRCP fish processed by WDFW that were part of subyearling production.

Return			Total Age at Return						
Year	Sex		1(Minijack)	2(Jack)	3	4	5	6	7
2009	Male	N=	-	621	17	28	-	-	-
		Median	**-**	**48**	**67**	**78**	**-**	**-**	**-**
		Range	-	35-61	52-80	63-107	-	-	-
	Female	N=	-	-	16	102	-	-	-
		Median	**-**	**-**	**73**	**83**	**-**	**-**	**-**
		Range	-	-	65-80	70-94	-	-	-
2010	Male	N=	-	51	216	-	2	-	-
		Median	**-**	**51**	**68**	**-**	**-**	**-**	**-**
		Range	-	42-64	52-88	-	88-90	-	-
	Female	N=	-	-	185	4	6	-	-
		Median	**-**	**-**	**74**	**85**	**89**	**-**	**-**
		Range	-	-	65-84	78-86	79-99	-	-
2011	Male	N=	-	204	40	17	-	-	-
		Median	**-**	**47**	**68**	**80**	**-**	**-**	-
		Range	-	34-60	53-81	61-86	-	-	-
	Female	N=	-	1	48	122	-	-	-
		Median	**-**	**-**	**72**	**82**	**-**	**-**	-
		Range	-	45	61-86	63-99	-	-	-

Appendix K: Tucannon River Survey Sections and Historical Escapement

Appendix K Table 1: Description and length of sections, survey length, percent of reach surveyed, and estimated total number of fall Chinook redds in the Tucannon River, 2012.

Section	Description	Length of section (Rkm)[a]	Length surveyed (Rkm)	% of productive reach surveyed[b]	Estimated total # of Redds[c]
1	Mouth of Tucannon R to highway 261 Bridge	2.8	1.7	100	99
2	Highway 261 Bridge to Smolt trap	0.2	0.2	100	9
3	Smolt trap to Powers Bridge	0.5	0.5	100	108
4	Powers Bridge to upper hog barns	1.2	1.2	100	96
5	Hog barns to Starbuck Br.	2.5	2.4	96	138
6	Starbuck Br. To Fletchers Dam	2.7	1.3	48	48
7	Fletcher's Dam to Smith Hollow	2.9	2.9	100	12
8	Smith Hollow to Ducharme's Sheep Ranch Br.	4.4	4.4	100	18
9	Ducharme's Bridge to Highway 12	5.5	5.5	100	8
10	Highway 12 to Brines Bridge	6.2	6.2	100	5
11	Brines Bridge to 4.7 Rkm above Brines Bridge	4.7	4.7	100	0
	Total	**33.6**	**31.0**	**92.3**	**541**

[a] Section lengths measured using Maptech, Terrain Navigator Pro version 6.0 software.
[b] Percentage is based upon length of stream that is presumed to successfully produce fry.
[c] Counted redds were expanded based on percent of reach surveyed to estimate total number of redds.

Appendix K Table 2: Estimated escapement, % stray component of the run, and number of redds, and resulting estimates of smolts/redd and total number of migrants from fall Chinook spawning in the Tucannon River, 1985-2002.

	Escapement		Redd Construction			Success of Spawning		
Year	Estimated escapement[a]	% Strays in escapement estimate	# Redds observed	# Redds in no access areas (estim)	Total # of Redds (estim)	Estimated smolts/redd[b]	Total Estimated # emigrants[c]	Adult progeny/ Parent ratio
1985[d]	0	unknown	0	No estim	0	unknown	unknown	Unknown
1986[e]	2[f]	unknown	0	No estim	0	unknown	unknown	Unknown
1987	48	0	16	0	16	unknown	unknown	Pending
1988	78	0	26	0	26	unknown	unknown	Pending
1989	150	27.9	48	2	50	unknown	unknown	pending
1990	186	30.8	62[g]	0	62	unknown	unknown	Pending
1991	150	20.0	50	0	50	unknown	unknown	pending
1992	69	0	23	0	23	unknown	unknown	0.22[h]
1993	84	6.3	28	0	28	unknown	unknown	1.17[h]
1994	75	28.0	25	0	25	unknown	unknown	0.56
1995	87	33.3	29	0	29	unknown	unknown	0.50
1996	144	95.5	43	5	48	0.6[i]	29	0.06
1997	93	5.3	27	4	31	712	22,076	0.71
1998	132	7.1	40	4	44	15	666	0.40
1999	87	9.1	21	8	29	441	12,799	0.67
2000	60	27.8	19	1	20	468	9,352	0.47
2001	219	14.9	65	8	73	336	24,545	0.63
2002	630	35.1	183	27	210	81	17,030	0.05

[a] These preliminary estimates were derived using three fish per redd.
[b] This estimate was derived using redds counted above the smolt trap and estimates of emigration the following spring. Estimates began in 1997 when the smolt trap was moved to its current position at Rkm 3.0, at an area low enough in the system to trap fall Chinook.
[c] This estimate was derived using the smolt per redd estimate above the trap and applying it to the total number of redds in the Tucannon River.
[d] Based on one survey completed 12/17/85.
[e] Based on one survey completed 11/18/86.
[f] Two carcasses counted but not sampled.
[g] Correction of number of redds observed that was presented in the 1990 Annual Report.
[h] Data is incomplete for returns of progeny.
[i] Flood event occurred January of 1997, nearly eliminating all the progeny from the 1996 spawn.

Appendix L: Salmon Processed and Killed at LFH in 2012

(LFH=voluntary return to Lyons Ferry Hatchery, LGR=fish trapped at Lower Granite Dam. Age/Rearing states origin, brood year, age at release, and release site (LF09SO is a LFH hatchery origin fish from the 2009 brood year, released as a subyearling, on-station at LFH).

Appendix L Table 1: Estimated composition of non-wire tagged salmon trapped and killed at LFH during 2012.

Age/Origin Determinations by Method	< 53 cm Males	Females	Males	Grand Total
Snake R. hatchery LR only yearling unknown age	0	0	1	1
Unknown hatchery AD yearling age 4 by scales	0	2	0	2
Unknown origin sub age 2 by scales	1	0	0	1
Unknown origin sub age 4 by scales	0	1	0	1
Unknown age/origin (Presume hatchery)	0	1	1	2
Total	**1**	**4**	**2**	**7**

Appendix L Table 2: Estimated composition of wire tagged fall salmon trapped and killed at LFH during 2012.

Program	OriginCWT	CWT	<53 cm Males	Females	Males	Grand Total
Umatilla	UMA08SUMA	90226	0	1	0	1
LSRCP	LF07YO	634680	0	9	0	9
		634681	0	7	3	10
	LF07YPLA	612754	0	1	0	1
	LF08SO	634995	0	1	0	1
	LF08YO	635165	0	61	6	67
		635166	0	70	12	82
	LF08YBCA	220302	0	0	1	1
	LF09SO	635180	0	3	3	6
	LF09SBCA	220306	0	1	0	1
	LF09SGRRD	635182	0	0	1	1
	LF09SPLA	220311	0	0	1	1
	NPTH09SCFA	612765	0	0	1	1
	LF09YO	635510	2	0	1	3
	LF10YO	636079	1	0	0	1
		636080	1	0	0	1
	LF10YBCA	220323	1	0	0	1
	LOST TAG	unknown age	0	4	0	4
	Total		**5**	**158**	**29**	**192**

Appendix L Table 3: Estimated composition of <u>non-wire</u> tagged salmon trapped at LGR Dam that were hauled to LFH and killed during 2012.

Age/Origin Determinations by Method	< 53 cm Males	Females	Males	Grand Total
Snake R. natural res rear age 4 by PIT tag	0	1	0	1
Snake R. natural sub age 4 by PIT tag	0	1	0	1
Snake R. natural sub age 5 by PIT tag	0	4	6	10
Snake R. hatchery sub res rear age 3 by PIT tag	0	0	1	1
Snake R. hatchery sub res rear age 4 by PIT tag	0	1	2	3
Snake R. hatchery sub age 2 by PIT tag	4	0	1	5
Snake R. hatchery sub age 3 by PIT tag	0	87	215	302
Snake R. hatchery sub age 4 by PIT tag	0	80	39	119
Snake R. hatchery sub age 5 by PIT tag	0	25	2	27
Snake R. hatchery yearling age 3 by PIT tag	0	0	1	1
Snake R. hatchery yearling age 4 by PIT tag	0	1	4	5
Snake R. hatchery yearling age 5 by PIT tag	0	1	0	1
Unknown Snake R. res rear age 3 by PIT tag	0	1	0	1
Unknown Snake R. res rear age 4 by PIT tag	0	1	0	1
Unknown Snake R. res rear age 5 by PIT tag	0	0	1	1
Unknown Snake R. sub age 3 by PIT tag	0	1	1	2
Unknown Snake R. sub age 4 by PIT tag	0	1	0	1
Unknown Snake R. sub age 5 by PIT tag	0	1	0	1
Unknown Snake R. unknown age by PIT tag	0	15	35	50
Unknown hatchery AD sub res rear age 4 by scales	0	1	0	1
Unknown hatchery AD sub age 2 by scales	1	0	0	1
Unknown hatchery AD sub age 3 by scales	0	25	28	53
Unknown hatchery AD sub age 4 by scales	0	11	0	11
Unknown hatchery AD sub age 5 by scales	0	5	0	5
Unknown hatchery yearling age 4 by scales	0	8	2	10
Unknown hatchery age/origin by AD clip	2	5	65	72
Unknown origin sub res rear age 3 by scales	0	0	2	2
Unknown origin sub res rear age 4 by scales	0	5	1	6
Unknown origin sub res rear age 5 by scales	0	3	0	3
Unknown origin res rear age 3 by scales	0	3	1	4
Unknown origin res rear age 4 by scales	0	28	11	39
Unknown origin res rear age 5 by scales	0	19	6	25
Unknown origin sub age 2 by scales	6	0	2	8
Unknown origin sub age 3 by scales	0	210	218	428
Unknown origin sub age 4 by scales	0	149	44	193
Unknown origin sub age 5 by scales	0	62	14	76
Unknown age/origin (Presume hatchery)	0	53	247	300
Total	**13**	**808**	**949**	**1,770**

Appendix L Table 4: Estimated composition of wire tagged salmon that were trapped at LGR, hauled to LFH, and killed during 2012.

Origin/CWT	CWT	<53 cm Males	Females	Males	Grand Total
09BLANK	STRAY/unknown age	0	1	0	1
BON08YUMA	090246	0	0	1	1
	090329	0	1	0	1
BON09YUMA	090355	0	1	1	2
	090356	0	0	1	1
BON09YUMA	090493	2	0	0	2
UMA07SUMA	090134	0	1	0	1
UMA09SUMA	090327	0	1	0	1
UMA10SUMA	090434	1	0	0	1
	090435	2	0	1	3
	090436	1	0	0	1
LF06YCJA	092514	0	2	0	2
LF07SBCA	612520	0	1	1	2
LF07SCCD	634671	0	1	0	1
LF07SCJA	612521	0	0	1	1
LF07SGRRD	634670	0	1	0	1
LF07SIPCHC	103680	0	1	0	1
LF07SO	634672	0	4	0	4
LF07SPLA	612519	0	2	0	2
LF07YBCA	612750	0	1	0	1
	612753	0	2	0	2
LF07YCJA	612752	0	2	0	2
	612755	0	5	0	5
LF07YO	634680	0	15	2	17
	634681	0	11	1	12
LF07YPLA	612751	0	2	0	2
	612754	0	4	0	4
LF08SBCA	610179	0	5	0	5
	610182	0	0	2	2
LF08SCCD	634996	0	12	0	12
LF08SCJA	610180	0	6	2	8
	610183	0	1	0	1
LF08SGRRD1	634997	0	10	0	10
LF08SGRRD2	612676	0	4	0	4
LF08SIPCHC	090228	0	5	0	5
	107482	0	0	1	1
	107682	0	1	0	1
LF08SO	634995	0	4	2	6
LF08SPLA	610181	0	6	0	6
	610184	0	1	0	1
LF08YBCA	220302	0	30	8	38

Appendix L Table 4: Estimated composition of <u>wire</u> tagged salmon that were trapped at LGR, hauled to LFH, and killed during 2012.

	220303	0	29	7	36
LF08YCJA	220300	0	61	12	73
	220305	1	42	11	54
LF08YO	635165	0	49	20	69
	635166	0	76	22	98
LF08YPLA	220301	0	35	13	48
	220304	0	22	7	29
LF09SBCA	220306	0	25	41	66
	220307	0	24	37	61
LF09SCCD	635181	2	18	85	105
LF09SCJA	220308	1	20	66	87
	220309	2	23	54	79
LF09SGRRD	635182	0	28	71	99
LF09SIPCHC	090331	0	23	48	71
	100142	0	6	11	17
	104383	1	7	16	24
	106482	0	14	16	30
LF09SO	635180	1	31	61	93
LF09SPLA	220310	0	15	57	72
	220311	1	18	51	70
LF09YBCA	220312	14	3	30	47
	220317	7	4	38	49
LF09YCJA	220314	6	1	26	33
	220315	8	3	25	36
LF09YO	635510	20	4	74	98
	635564	32	7	81	120
LF09YPLA	220313	4	2	34	40
	220316	8	0	28	36
LF10SBCA	020117	25	0	3	28
	020118	29	0	3	32
LF10SCCDA	635997	60	0	10	70
LF10SCJA	220119	27	0	2	29
	220120	20	0	9	29
LF10SGRRD	612739	15	0	0	15
LF10SIPCHC	090447	12	0	1	13
	100153	28	0	9	37
LF10SO	635998	60	0	6	66
LF10SPLA	220121	20	0	3	23
	220122	22	0	7	29
LF10YBCA	220318	37	0	0	37
	220323	24	0	0	24
LF10YCJA	220320	55	0	1	56
	220321	69	0	0	69

Appendix L Table 4: Estimated composition of wire tagged salmon that were trapped at LGR, hauled to LFH, and killed during 2012.

LF10YO	636079	47	0	0	47
	636080	41	0	0	41
LF10YPLA	220319	36	0	0	36
	220322	28	0	1	29
NPTH07SCFA	612736	0	2	1	3
NPTH07SLGA	612737	0	1	0	1
NPTH07SO	612695	0	3	1	4
	612716	0	1	2	3
NPTH08SCFA	612760	0	3	1	4
	612761	0	6	0	6
NPTH08SLGA	612762	0	2	0	2
	612763	0	4	0	4
NPTH08SNLVA	612738	0	1	0	1
	612766	0	4	0	4
NPTH08SO	612697	0	2	0	2
	612739	0	3	1	4
NPTH09SCFA	612764	2	9	7	18
	612765	0	8	14	22
NPTH09SLGA	612747	1	6	17	24
	612748	0	5	22	27
NPTH09SNLVA	220201	0	7	16	23
	220202	0	6	10	16
NPTH09SO	220200	1	7	17	25
	612772	0	9	36	45
NPTH10SCFA	220205	24	0	9	33
	220206	44	0	5	49
NPTH10SLGA	220207	19	0	2	21
	220208	37	0	5	42
NPTH10SNLVA	220203	33	0	3	36
	220204	14	0	1	15
NPTH10SO	220209	17	0	3	20
	220210	54	0	5	59
	220211	15	0	0	15
	220212	18	0	0	18
LOST TAG	LOST TAG	23	18	31	72
Unreadable Tag	Unreadable	2	8	2	12
COHO_EC09YCLEARWATER	220002	1			1
SAWTOOTH08YSPRSALMONR	101383		1		1
Total		**1074**	**850**	**1332**	**3256**