Lyons Ferry Hatchery Evaluation
Fall Chinook Salmon
Annual Report: 2013

by

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Cooperative Agreements
F13AC00096 and F14AC00010

March 2015

Citation of this publication: Milks, D., and A. Oakerman. 2015. Lyons Ferry Hatchery Evaluation Fall Chinook Salmon Annual Report: 2013. Washington Department of Fish and Wildlife, Olympia, WA. http://www.fws.gov/lsnakecomplan/reports/WDFWreports.html.

Executive Summary

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 2013 through 15 April 2014.

During 2013, WDFW collected 2,919 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. The collection of fish at LGR was delayed due to trapping restrictions related to high water temperatures. As a result, the first 61.4% of the run passed the dam without being sampled. At the end of the season, 10 females were returned to the river to spawn.

In 2013, we spawned 1,240 females for an estimated total green eggtake of 4,565,660; numerically less than full production goals listed in the *United States v. Oregon* Management Agreement 2008-2017, but well within precision levels expected from large production hatcheries. Green egg to eye-up survival was 97.4%. Based on hatchery records, overall average fecundity of LGR and LFH trapped females combined was 3,682 eggs/female. At LFH, of the 675 males spawned, 334 fish were used multiple times to minimize the use of jacks. Due to broodstock shortages, jacks contributed to 0.7% of the matings, jills contributed to 3.6% of the matings, and strays contributed to 5.2% of the matings to meet eggtake goals.

Hatchery staff released BY12 subyearlings into the Snake River at LFH, the Snake River ear Couse Creek, and into the Grande Ronde River near Cougar Creek in 2013 and BY12 yearlings into the Snake River at LFH in 2014. All release groups (subyearling and yearling) were represented by a coded wire tag (CWT) group and additionally may have received a passive integrated transponder (PIT) tag as identified in the *US v. Oregon* production tables. PIT tags in 29,810 of the released onstation yearlings (BY12) and 19,772 of the released subyearlings (BY12) will be used to monitor adult and jack returns in-season

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 for spawning fall Chinook. An estimated 386 fall Chinook redds were constructed in the river during fall 2013, resulting in an estimated spawning escapement of 1,158 Chinook. Spawning ground surveys also occurred on Asotin Creek with 53 fall Chinook redds observed.

Juvenile production in the Tucannon River was estimated at 124,951 naturally produced fall Chinook from the 2012 spawners with an estimated 231 smolts/redd. Naturally produced coho parr and smolts were estimated at 2,372 from the 2011 and 2012 spawners

Fish trapped at LFH consisted of 85.4% inbasin hatchery, 5.7% out-of-basin strays, 4.4% hatchery from unknown releases, and 4.6% were unmarked and untagged. Of the PIT tagged LFH onstation releases that crossed LGR Dam, 29.6% of the yearlings and 25.0% of the subyearlings were later detected downstream.

We calculated a minimum of 46.1% of the total LSRCP mitigation goal (91,500 fish) was met in 2013 (WDFW and FCAP). We estimate a minimum of 29,668 LSRCP fall Chinook (adults + jacks) 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.

The escapement goal (18,300 hatchery fish) to the Snake River Basin was exceeded in 2013 (WDFW and FCAP). An estimated 11,524 true jacks and jills (1-salt) and 18,144 adults (2-5 salt) contributed to the returns. An additional 8,937 minijacks (0-salt) were also estimated to have returned to the Snake River, but do not count toward the mitigation goal. The run size of natural origin fish estimated to reach LGR Dam was 21,124 fish $\geq$ 53 cm fork length and 6,338 fish <53 cm fork length. The remaining portion of the run consisted of 34,500 fish $\geq$ 53 cm fork length and 13,885 fish < 53 cm fork length, all likely hatchery origin. The stray rate was estimated at 3.1% for fish $\geq$ 53 cm fork length and 0.1% 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 2,711 fish in sport fisheries and 8,132 in commercial fisheries, representing a 1:3 split between fishery types in 2013. The majority (64.1%) of sport recoveries occurred outside of the Snake River Basin.

WDFW released fish were also recovered at hatcheries (two salmon at Bonneville, eight at Priest Rapids, one at 3 Mile Dam, and one at Wells hatchery, < 0.1%) and on spawning grounds (two salmon in the Chelan River, 15 in the Columbia River, 104 in the Hanford reach, and five in the White Salmon River, < 0.1%) outside of the Snake River Basin. WDFW released fish were recovered nearly equally in freshwater (51%) and saltwater (49%) locations.

Of the total number of fish recovered outside of the Snake River, 78.3% came from commercial fisheries, 20.1 % from sport fisheries, 1.5% from spawning ground surveys, and 0.1% were from hatcheries. Harvest occurred in the ocean off the coasts of Washington and California, but the single largest fishery contributor to harvest was the Zone 6 Gillnet fishery which consisted of 39.6 % of all the fish recovered outside the Snake R. Basin.

From WDFW releases only, and only in the ocean fisheries, Alaska and British Columbia catch consisted primarily of subyearlings, and Washington, Oregon, and California catch were primarily from yearling releases. In the Columbia River, catch was primarily from the yearling program. When taking into account the numbers of fish released by freshwater age, the yearling

program provided a 2.1 benefit over the subyearling program in 2013, when recoveries were summed for the Columbia River and Ocean. Calculating only adults (2+ salt) in the Columbia River and Ocean catch, the yearling program benefit reduced to 1.7 over the subyearling program.

In the Snake River, returns of WDFW released fish consisted primarily of yearlings (onstation releases). There was a 12.1 benefit in survival of the yearling program compared to the subyearlings, but this benefit dropped to 3.4 when looking at the adult returns.

Two methodologies for estimating returns to the Snake River were compared; PIT tags and CWTs released from LFH. At the youngest return ages (0-salt and 1-salt) PIT tag estimates were consistently greater than CWT estimates. PIT tag estimates for adults (2-salt and older) were slightly less than estimates derived from CWT expansions. The data for this same comparison with subyearling releases is inadequate at this time.

Discussions have occurred with NOAA regarding revising the original take tables in section 10 permit # 16607. This report notes the changes submitted, and overall we were within allowances of direct take of listed Snake River fall Chinook salmon for adult returns in 2013 and juvenile releases in 2014.

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.

We would like to thank the Snake River Lab staff: Joe Bumgarner, Jerry Dedloff, Michael Gallinat, Jule Keller, Lance Ross, Kaila Johnston, Jacob Crawford, Doug Falkner, Patrick Webster, Ethan Crawford and Mike Herr, and staff from the Dayton Fish Management office for their help.

We thank the personnel at Lyons Ferry Hatchery for their cooperation with sampling and providing information regarding hatchery operations. Thanks also to John Sneva (WDFW) for aging scales collected at LFH and LGR Dam for the run reconstruction.

We appreciate the efforts of Darren Ogden (NOAA Fisheries) and crew at Lower Granite Dam for trapping, tagging, and documenting fall Chinook salmon for transport to Lyons Ferry Hatchery. We also thank Fred Mensik (WDFW) for providing summarized fallback data from the juvenile collection facility at Lower Granite Dam. We also thank Bill Young (NPT), Stuart Rosenberger (Idaho Power) for their assistance in estimating the run composition estimate at Lower Granite Dam in 2013, and Ben Sandford (NOAA) for bootstrapping the data to get bounds around the estimates.

We thank Joe Bumgarner, Andrew Murdoch, and Rod Engle for reviewing a draft of this report and providing valuable comments.

Finally, we thank the U.S. Fish and Wildlife Service, Lower Snake River Compensation Plan Office, for providing funding and encouragement for this program.

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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 2013 to 15 April 2014. WDFW's Snake River Lab (SRL) staff completed this work with Federal fiscal year 2013/2014 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. 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 (HCD) 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 natural-origin fish abundance and harvest using supplementation and harvest mitigation releases, respectively. Fish released at LFH and FCAP are subyearlings and yearlings, and NPTH releases are subyearlings. Information about the NPTH is presented in NPT annual reports and is not presented here. The third program administered by Idaho Power Company (IPC) is primarily mitigation for lost production due to construction of the Hells Canyon Complex (HCC), and consists of subyearling releases. Releases occur at

[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 MCN 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.

10 release locations throughout the basin. The three programs are highly coordinated in their operations, including broodstock collection at Lower Granite Dam (LGR) and fish transfers among facilities. Several out of basin hatchery facilities are utilized (Irrigon and Umatilla) in addition to the inbasin 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 and Hesse 2004). Mark types and quantities have been adopted under the *United States v. Oregon* Management Agreement 2008-2017 (*United States v. Oregon* 2008). At full production levels, 76% of the hatchery produced fish are marked/tagged in some manner, 47% are marked with an adipose fin clip. If changes occur, there is a notification process that needs to be followed per the permit #16607 issued from NOAA-Fisheries (NMFS 2012a, NMFS 2012b).

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

- 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* Management Agreement 2008-2017.

- 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.

- 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

- 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 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 v. 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 2008–2017 *US v. Oregon* Management Agreement 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 2008–2017 *US v. Oregon* Management Agreement 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 LMO Dam, which is comprised of 9,988 from LSRCP, 3,206 from NPTH, and 2,290 from IPC. Returns are estimated in-season to LMO Dam and not to IHR 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.

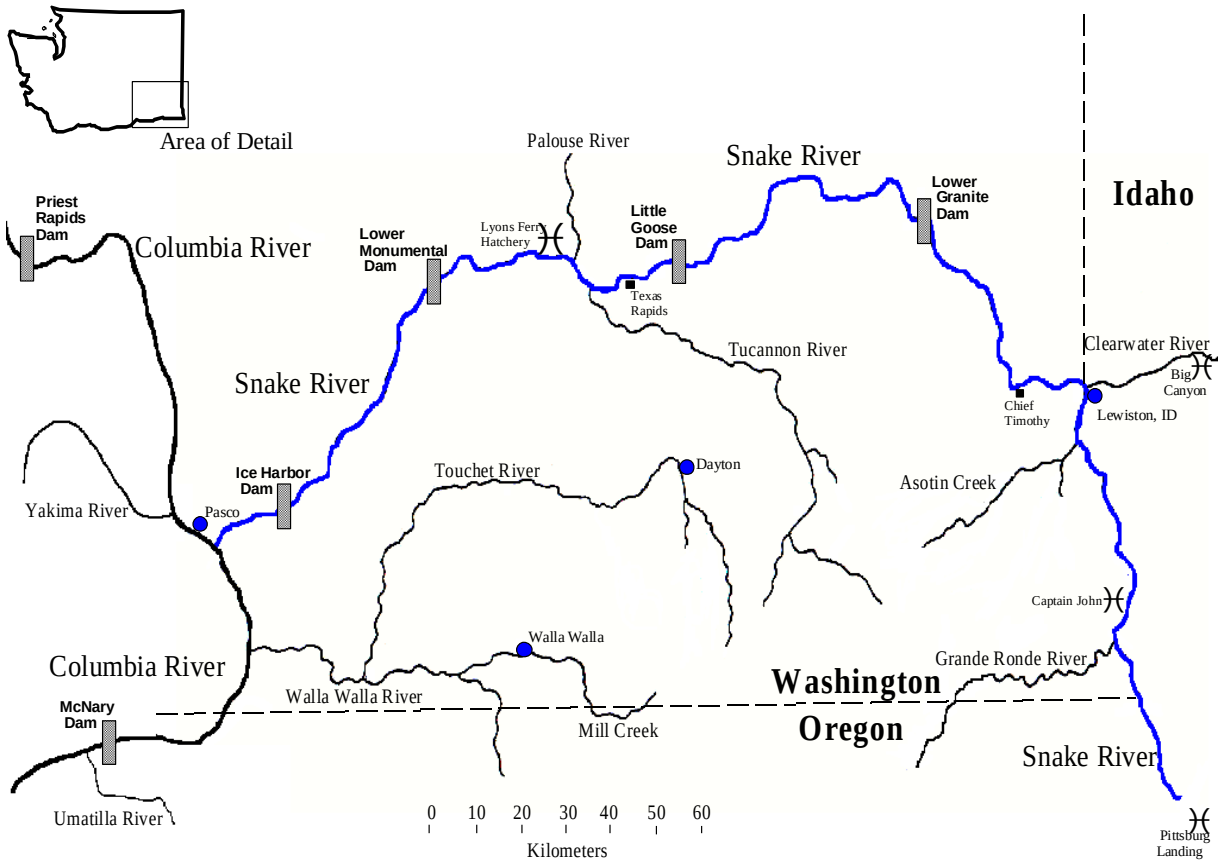
- The long-term goal is for a total return 24,750 hatchery-origin fish above LMO Dam, which is comprised of 18,300 from LSRCP, 3,750 from NPTH, and 2,700 for IPC.

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 LMO Dam.

- Long term goal is to achieve a population of 14,363 natural-origin fall Chinook (adults and jacks) above LMO 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 River Basin showing locations of Lyons Ferry Hatchery, acclimation sites, and major tributaries in the area.

Broodstock Collection and Management 2013

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 discrepancies are likely data recording errors. 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).

Table 2. Numbers of fall Chinook initially collected at LFH and LGR for broodstock, evaluation, and run construction needs in 2013.

Year	Trap location	Number collected/hauled for broodstock	Processed (killed)	Returned to Snake River	Difference from number collected/hauled
2013	LFH	1,063	1,063[a]	0	0
	LGR	1,817	1,842	10	-35

[a] Does not include one coho and three spring Chinook trapped and processed at LFH.

Lower Granite Dam Trapping Operations

Fall Chinook trapping at LGR was delayed until September 23 due to high water temperatures. Approximately 61.4% of the run of fall Chinook passed LGR Dam before trapping began September 23. Fall Chinook were trapped by systematically opening the trap 12% of each hour from 23 September through 1 October, 15% of each hour from 2 October through 8 October and 20% of each hour from 9 October through 24 November. Fish were trapped and hauled to LFH across the later part of 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, to identify different trapping rates. Approximately 78% of the salmon collected for broodstock were shipped to LFH and 22% were hauled to NPTH. Fish slated for LFH were hauled in a 5,678 L aerated tank truck by WDFW personnel.

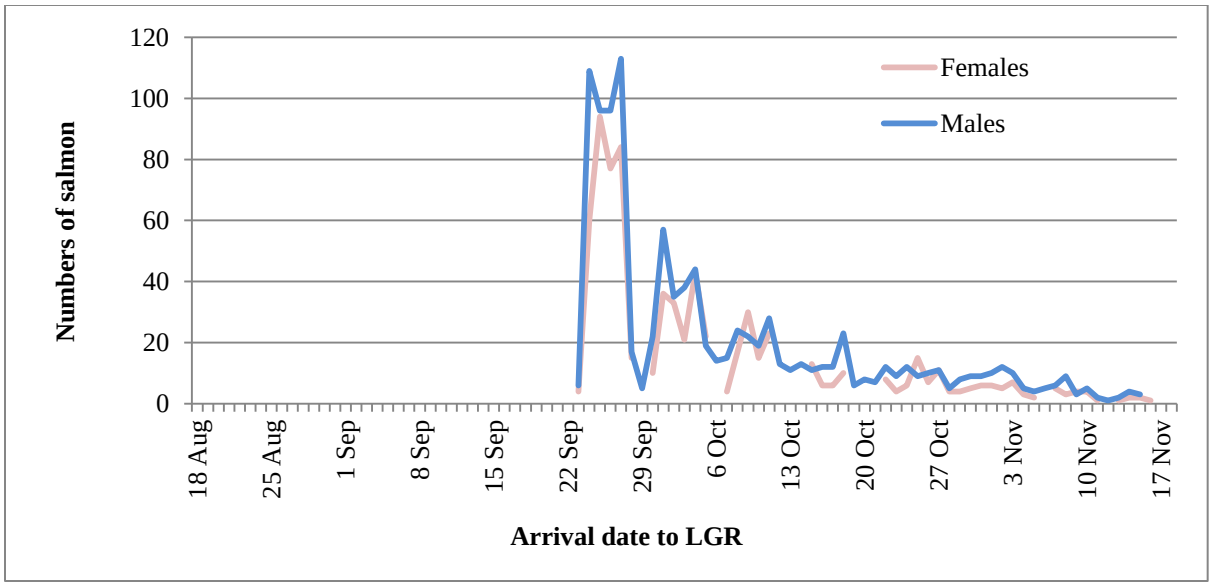


Figure 2. Arrival timing of fall Chinook at LGR Dam that were hauled to LFH in 2013.

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 1 October through 19 November as noted in trapping and sorting protocols provided in Appendix D. A total of 1,067 fish were collected/processed at LFH in 2013.

Hatchery Operations 2013

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 pond at LFH holding fish transported from LGR had approximately 0.5:1 sex ratio (males:female) in the adults (75 cm or greater), and 1.7:1 sex ratio (males:female) 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 pond (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. Milt from unmarked and 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 2013, eggtake goals were attained.

Table 3. Duration and peak of spawning, egg take, and percent egg mortality at LFH, 1984-2013.

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
2013	22 Oct	3 Dec	5 & 6 Nov	4,565,660	10,13,15,16	11,17	2.6

[a] Priority levels as listed in the 2008–2017 *US v. Oregon* Management Agreement production tables (Appendix E).

[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 2013. (LFH and LGR trapped fish are combined and jacks are included with males).

Spawn dates	Hatchery and unknown origin males[a]	Natural origin males	Hatchery and unknown origin females[a]	Natural origin females	Non-viable [b]	Egg take
22-Oct	16	0	36	0	0	141,590
29-Oct	97	1	168	0	0	597,500
5 & 6 Nov	240	0	445	0	1	1,629,700
12 & 13 Nov	123	0	296	0	0	1,086,680
19-Nov	124	1	208	1	1	776,000
25-Nov	41	0	55	0	1	207,190
2-Dec	30	1	30	1	3	127,000
Totals	**671**	**3**	**1,238**	**2**	**6**	**4,565,660**

[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 2013. (LFH and LGR trapped fish are combined; jacks are included with males).

Week ending	Mortality						Killed Outright					
	LF/Snake R.[a]		Natural		Other/Unknown[b]		LF/Snake R.		Natural		Other/Unknown	
	M	F	M	F	M	F	M	F	M	F	M	F
29-Sep	0	0	0	0	0	3	0	0	0	0	0	0
6-Oct	1	1	0	0	0	0	0	0	0	0	0	0
13-Oct	0	0	0	0	0	0	128	5	0	0	8	0
20-Oct	0	0	0	0	0	2	126	3	0	0	5	0
27-Oct	1	1	0	0	1	4	102	0	0	0	8	0
3-Nov	4	0	0	0	0	3	24	0	0	0	5	0
10-Nov	18	6	0	0	8	3	155	0	0	0	44	0
17-Nov	13	3	0	0	6	0	44	0	0	0	11	0
24-Nov	66	16	0	0	42	11	27	15	0	0	24	3
1-Dec	8	2	0	0	6	5	5	0	0	0	4	0
8-Dec	0	2	0	0	1	0	2	0	0	0	4	0
Totals	**111**	**31**	**0**	**0**	**64**	**31**	**613**	**23**	**0**	**0**	**113**	**3**

[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 2 December. A total of 10 unripe, unmarked, untagged females were released. We estimated the composition of the released fish (Table 6) based on the composition of unmarked/untagged females by fork length as calculated in the run reconstruction at LGR. Co-managers agreed in-season that these fish could be returned to the Snake River near LFH at Texas Rapids 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 between LMO Dam and LGR Dams since none were detected in the Tucannon River.

Table 6. Estimated composition of unmarked/untagged fish released into the Snake River near Texas Rapids at the end of the season at LFH.

Origin	Origin estimation method	Sex	Total age	Number
Hatchery	PIT tag[a]	F	3	3
	Run recon	F	3	1
	Run recon	F	4	2
Natural	PIT tag	F	4	1
	Run recon	F	4	3
Totals				**10**

[a] PIT tag identification of Snake River hatchery surrogate released in the Clearwater River as a juvenile.
[b] PIT tag identification of Snake River natural origin seined fish.

Broodstock Profile

This was the third year fin tissues were taken from all fish contributing to broodstock, including those that were spawned but not used (Appendix F). This was the second 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 and unspawned) from LGR by staff from the University of Idaho to determine where fall Chinook are rearing in the Snake River basin based on strontium levels found in the otoliths (Hegg 2013).

A concentrated effort is occurring to spawning larger sized males because of the large number of jacks that had been used in the past and possible heritability of the trait. While not a completely accurate representation of the overall genetic contribution of those fish to the broodstock, due to some males being used repeatedly, 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 includes hatchery and natural origin fish. An estimated 21.3% of the males and 40.6% of the females that contributed gametes for production were returns from yearling releases. Of the broodstock contributing to production, 36.7% were collected at the LFH trap.

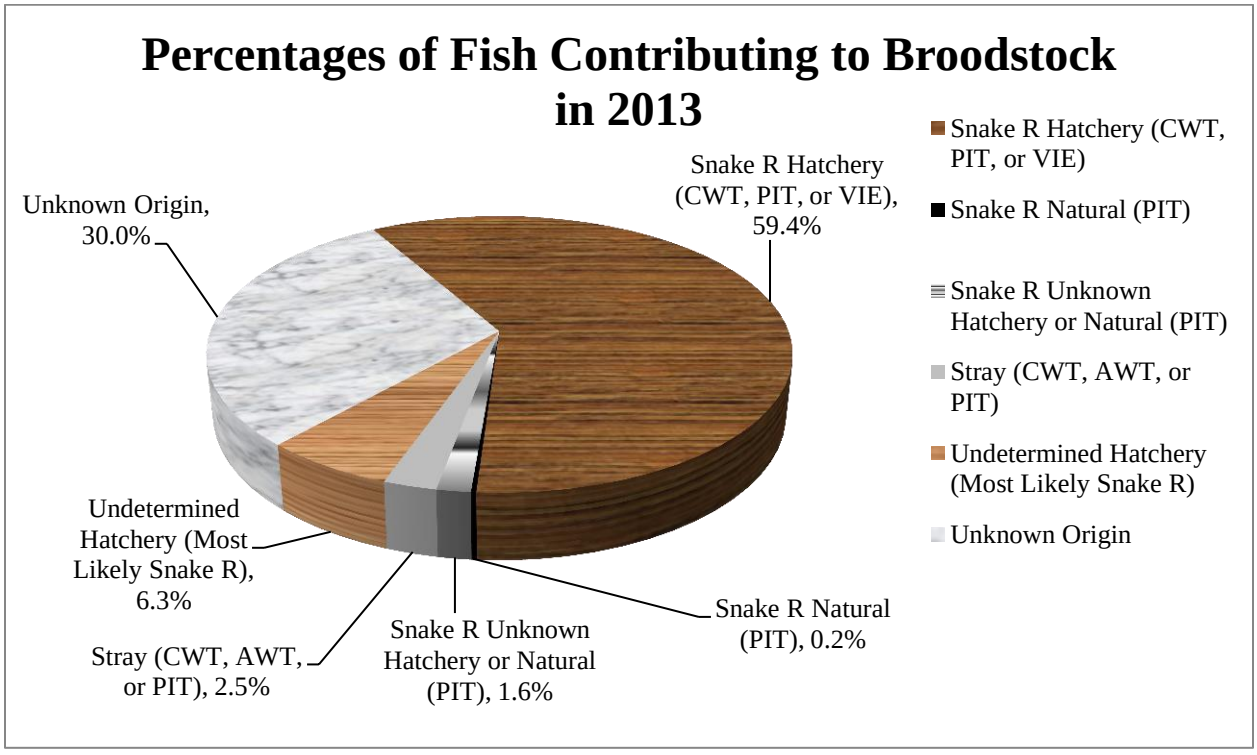


Figure 3. Percentages of fish contributing to broodstock at LFH during 2013.

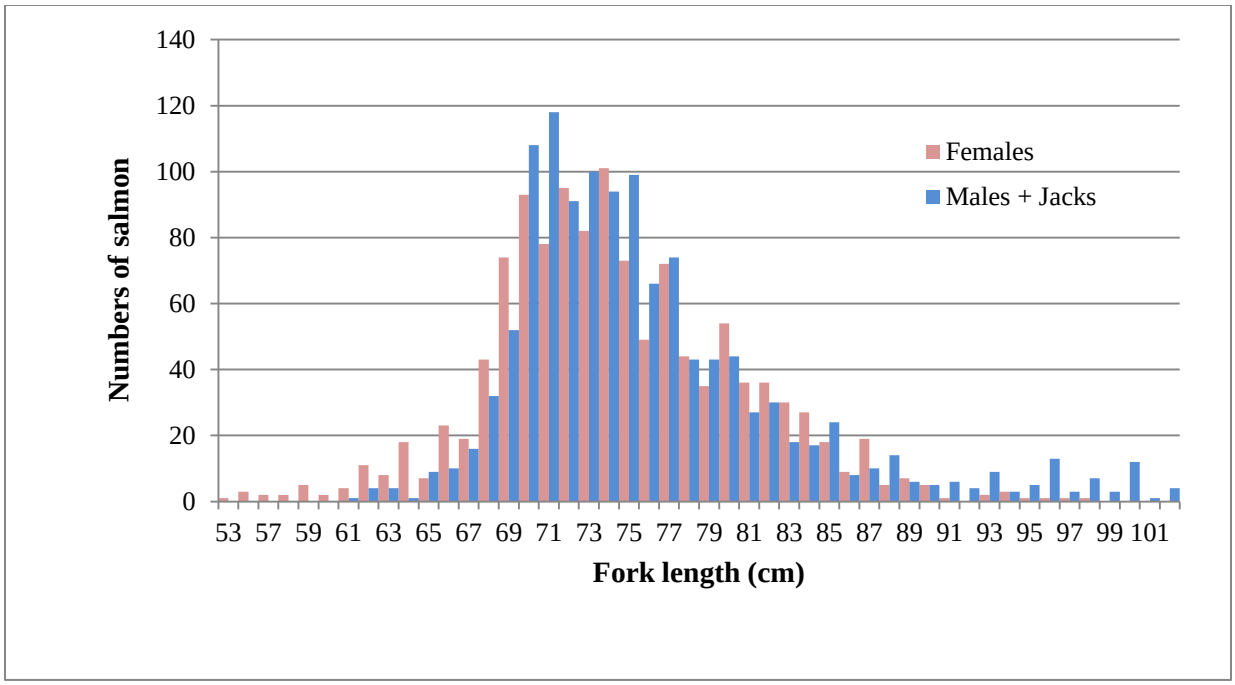


Figure 4. Fork lengths of salmon used as broodstock at LFH in 2013.[a]

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 a 70:30 split. Males hauled to LFH were trapped at LGR Dam throughout the shortened season the trap was operational (Figure 5). Older aged males were used on multiple females, mimicking nature (Hankin 2009). Of the 675 males spawned, 334 fish were used multiple times (Table 7) to:

- reduce the usage of jacks (1-salt) in the broodstock,
- maximize the numbers of larger, older aged adults,
- select more brood with subyearling rearing history,
- increase natural origin fish used.

The calculated effective number of male breeders was 490 (N_b) using procedures described in Busack (2006). The effective male breeders are 72.6% of the census number of males, or 39.5% of the male N_b that would have been achieved if enough males had been available to avoid reuse of males.

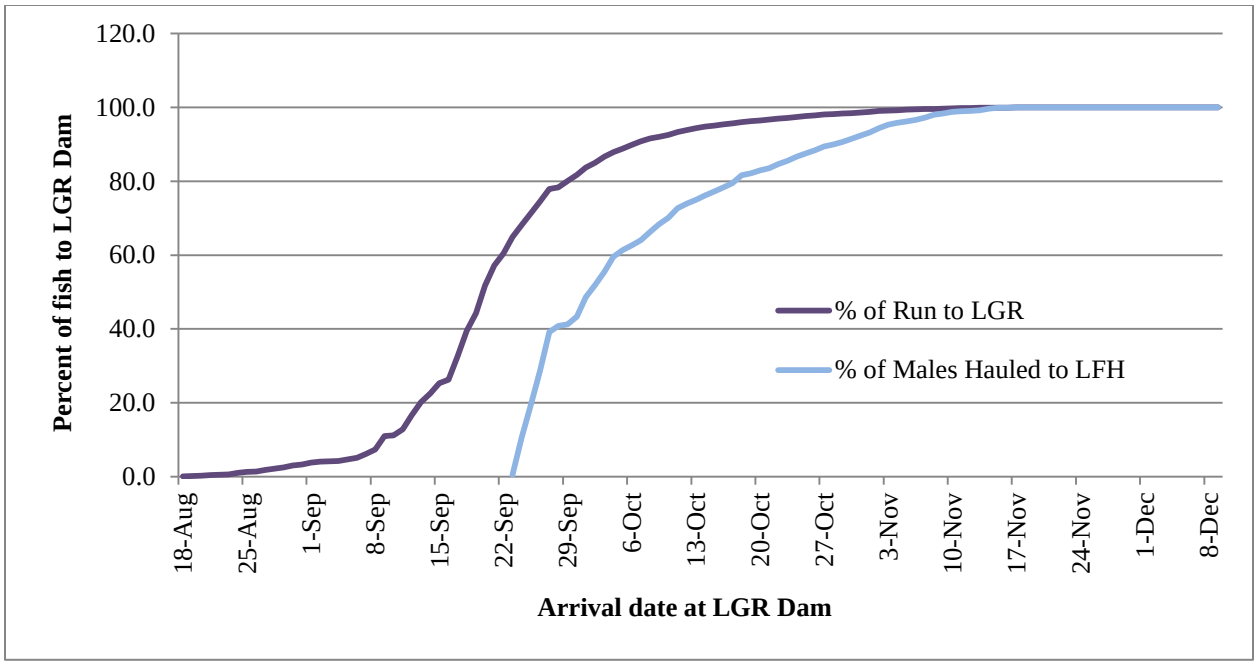


Figure 5. Arrival timing of the run of male fall Chinook at LGR Dam compared to the arrival dates of fall Chinook hauled to LFH during 2013.

Origin including release site information was determined for 54.7 % of the males spawned based on CWT, VI, or PIT tag data. An additional 7.4 % of the males were identified as hatchery origin based AD clip, lost/unreadable tags, or yearling scales with a hatchery check. Males that were unmarked/untagged (hatchery and natural origin) represent 37.9 % of the males spawned.

Table 7. Origin and age of males used multiple times, that contributed to production at LFH, 2013.

	Times each male was used for matings						
Origin determination method / age	**1**	**2**	**3**	**4**	**5**	**6**	**Total unique**
Snake R hatchery by CWT or VIE							
Subyearling 2 salt (age3)	68	35	17	3	1	0	124
Subyearling 3 salt (age4)	24	13	5	3	0	1	46
Yearling 1 salt (age3)	3	1	0	0	0	0	4
Yearling 2 salt (age4)	57	27	19	5	1	5	114
Yearling 3 salt (age5)	0	0	3	2	0	1	6
Snake R hatchery by PIT							
Subyearling 2 salt (age3)	10	15	6	0	0	1	32
Subyearling 3 salt (age4)	7	3	2	1	0	0	13
Yearling 2 salt (age4)	1	0	0	0	0	0	1
Subyearling reservoir reared 2 salt (age4)	1	1	1	0	0	0	3
Snake R natural by PIT							
Subyearling 3 salt (age4)	1	1	0	0	0	0	2
Subyearling reservoir reared 2 salt (age4)	1	0	0	0	0	0	1
Snake R unknown by PIT							
Subyearling 2 salt (age3)	1	1	0	0	0	0	2
Subyearling 3 salt (age4)	3	5	2	0	0	0	10
Reservoir reared 2 salt (age4)	4	1	0	1	0	0	6
Out of basin hatchery stray by CWT or PIT							
Subyearling 2 salt (age3)	4	0	0	0	0	0	4
Yearling 2 salt (age4)	0	1	0	0	0	0	1
Unknown hatchery by clip, wire or yearling scales							
Subyearling 2 salt (age3)	17	8	3	1	0	2	31
Subyearling 3 salt (age4)	5	1	3	3	0	1	13
Yearling 1 salt (age3)	1	2	0	0	0	0	3
Yearling 2 salt (age4)	0	0	0	1	0	0	1
Unknown age	1	0	0	0	0	1	2
Unknown origin							
Reservoir reared 1 salt (age3)	1	1	0	0	0	0	2
Reservoir reared 2 salt (age4)	3	7	1	0	0	0	11
Subyearling 2 salt (age3)	85	43	11	5	1	1	146
Subyearling 3 salt (age4)	33	18	16	6	0	3	76
Subyearling 4 salt (age5)	0	1	0	0	0	0	1
Unknown age	10	5	3	2	0	0	20
Total unique males	**341**	**190**	**92**	**33**	**3**	**16**	**675**

Females used in broodstock

Females hauled to LFH were trapped at LGR Dam throughout the shortened season the trap was operational (Figure 6). Origin including release site information was determined for 73.1 % the females spawned based on CWT or PIT tag data. An additional 3.8 % of the females were identified as hatchery origin based AD clip, agency wire tag (AWT), lost/unreadable tags, or yearling scales with a hatchery check. Females that were not tagged or clipped represent 23.1 % of the females spawned. The estimated age composition and origins of females contributing to broodstock at LFH are listed in Table 8.

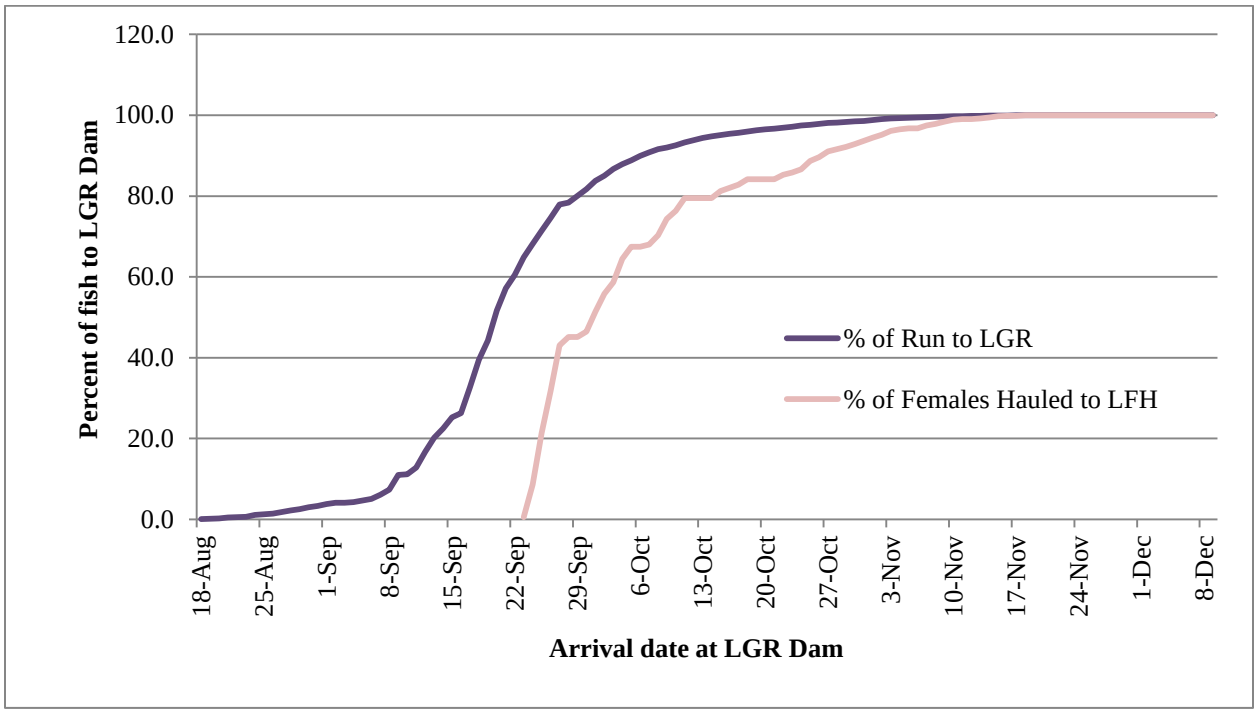


Figure 6. Arrival timing of the run of female fall Chinook at LGR Dam compared to arrival dates of fall Chinook hauled to LFH during 2013.

Table 8. Origins of females contributing to LFH broodstock during 2013.

Origin determination method	Age	Number of females
Snake R hatchery		
Snake R hatchery by CWT or VIE	subyearling 2-salt (age3)	149
	subyearling 3-salt (age4)	131
	subyearling 4-salt (age5)	3
	yearling 1-salt (age3)	43
	yearling 2-salt (age4)	376
	yearling 3-salt (age5)	60
	yearling 4-salt (age6)	1
Snake R hatchery by PIT	subyearling 2-salt (age3)	28
	subyearling 3-salt (age4)	36
	subyearling 4-salt (age5)	1
	subyearling reservoir reared 2-salt (age4)	8
	subyearling reservoir reared 3-salt (age5)	3
Out-of-basin Hatchery		
Stray hatchery by CWT, AWT or PIT	subyearling 2-salt (age3)	26
	subyearling 3-salt (age4)	17
	subyearling 4-salt (age5)	1
	yearling 1-salt (age3)	1
	yearling 2-salt (age4)	6
	yearling 3-salt (age5)	6
Natural Origin		
Snake R natural by PIT	reservoir reared 2-salt (age4)	1
	subyearling 3-salt (age4)	1
Unknown Origin		
Snake R unknown by PIT	reservoir reared 2-salt (age4)	3
	subyearling 3-salt (age4)	3
	unknown age	2
Undetermined hatchery by clip, wire or yearling scales with a hatchery check	subyearling 2-salt (age3)	16
	subyearling 3-salt (age4)	18
	yearling 1-salt (age3)	1
	yearling 2-salt (age4)	8
	yearling 3-salt (age5)	1
	unknown age	3
Unknown origin	reservoir reared 2-salt (age4)	14
	reservoir reared 3-salt (age5)	1
	subyearling reservoir reared 2-salt (age4)	3
	subyearling reservoir reared 3-salt (age5)	1
	subyearling 2-salt (age3)	102
	subyearling 3-salt (age4)	145
	subyearling 4-salt (age5)	10
	unknown age	11
Total		**1,240**

Fecundity

Average fecundity of females used in broodstock that were trapped at LGR Dam were 3,857 eggs/female and females trapped at LFH were 3,434 eggs/female. These fecundities are only of fish retained for broodstock and not the average fecundity of females returning to the area due to protocols that minimize jills in broodstock.

Inclusion of natural origin fish

This was the eleventh year that Snake River natural origin fish were included in the 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. Prior to 2010, scales were analyzed to determine natural versus hatchery origin on unmarked, untagged fish. Scale results are no longer used to identify natural origin fish. Starting with 2016, PBT will be used to identify all untagged inbasin returns, which will allow us to estimate natural origin fish by process of elimination.

Table 9. Unique numbers of Snake River natural origin fall Chinook included in broodstock, 2003-2013.

Return year	Trapping location	Natural females	Natural males	Natural jacks < 53cm	Total % of naturals in broodstock	Total number of fish spawned	Mating protocol goal (origin x origin)
2003	LGR LFH	0 2	0 0	0 0	0.1	1560	Unknown[a] x inbasin[b]
2004	LGR LFH	118 9[c]	2 0	1 0	4.9	2645	Unknown x inbasin
2005	LGR LFH	110 1	122 2	6 0	9.1	2634	Unknown x inbasin
2006	LGR LFH	115 2	71 3	0 0	12.2	1567	Unknown x unknown and Unknown x inbasin
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[d]	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
2013	LGR	2	3	0	0.3	1914	Unknown x unknown

[a] Unknown means unknown origin of unmarked/untagged fish.
[b] Inbasin means inbasin origin verified through CWT or PIT tag.
[c] Includes one female that was a true jill (1-salt).
[d] 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 that 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. 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-salt and/or 1-salt parentage by nearly 60% within the last four years.

Table 10. Numbers and percentages of matings with 1-salt jacks and jills that contributed to production at LFH during 2013.

			Jacks	Jills
Age/rearing	**Brood year**	**Saltwater age**	**Number of matings**	**Number of matings**
Hatchery yearling	2010	1	6	45
Unknown reservoir reared subyearling	2010	1	3	0
Totals			**9**	**45**
% of Matings			**0.7%**	**3.6%**

Table 11. Fork lengths of 1- salt jacks and jills used in broodstock at LFH during 2013.

Age/rearing	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-						
Hatchery yearling	6	65	65	2.9	61	70
Unknown reservoir reared subyearling	3	70	70	0.6	69	70
Jills 1-salt-						
Hatchery yearling	45	62.3	62	4.9	56	85

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

Year	0-salt	1-salt jack	1-salt jill	Number of matings containing jack x jill mating	% of total matings with 0-salt 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, 2010-2013, during selective size mating protocol.

Year	0-salt	1-salt jack	1-salt jill	Number of matings containing jack x jill mating	% of total matings with 0-salt 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
2013	0	9	45	1	4.3
Average	**0**	**25**	**22**	**1**	**3.7**

Inclusion of strays in broodstock

Regarding strays, our goal is to fully exclude strays from broodstock to maintain the genetic integrity of the fish LFH produces. In cases where we are broodstock limited, it was agreed that strays may be included in spawners up to 5%. To assure productions goals were met as mandated in *United States v. Oregon* Management Agreement 2008-2017, strays were spawned and gametes were retained in 2013. Contributors to broodstock were primarily females, although 5 males were used in matings. Overall, out-of-basin strays contributed to 5.2% of the matings in 2013 (Table 14). Males used multiple times are included multiple times in the table below.

Table 14. Historical use of out of basin strays in broodstock: 1994-2013.

Year	Stray males	Stray females	Number of matings containing stray x stray mating	% of total matings with stray parentage
1994	0	0	0	0.0%
1995	0	0	0	0.0%
1996	0	0	0	0.0%
1997	5	2	0	1.9%
1998	0	0	0	0.0%
1999	0	0	0	0.0%
2000	0	0	0	0.0%
2001	0	0	0	0.0%
2002	1	0	0	0.1%
2003	0	0	0	0.0%
2004	0	7	0	1.0%
2005	52	31	0	5.7%
2006	34	43	9	8.7%
2007	3	7	0	0.7%
2008	1	0	0	0.1%
2009	0	1	0	0.1%
2010	3	9	0	1.0%
2011	0	6	0	0.5%
2012	0	1	0	0.1%
2013	6	59	1	5.2%
Average	**5**	**8**	**1**	**1.2%**

Rearing and Marking

Information regarding numbers of fish ponded is included in Table 15. 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 15. Egg take and survival numbers by life stage of Lyons Ferry origin fall Chinook spawned at LFH, brood years 2009-2013.

Brood year	Eggs taken	ELISA loss	Eggs shipped[a]	Eyed eggs retained	Fry ponded	Intended program
2009	4,574,182	0	1,507,300	2,853,020	977,667	Yearling
					1,875,353	Subyearling
2010	4,619,533	0	1,630,000	2,865,100	980,000	Yearling
					1,885,100	Subyearling
2011	4,723,501	0	1,785,600	2,772,900	960,000	Yearling
					1,812,900	Subyearling
2012	4,526,108	0	1,480,000	2,904,500	1,010,000	Yearling
					1,894,000	Subyearling
2013	4,565,660	0	1,558,800	2,887,310	980,000	Yearling
					1,907,310	Subyearling

[a] Includes eyed eggs shipped for research.
[b] This number includes 364,983 eyed-eggs that were destroyed as ponded fry in January and February 2007.

Marking was consistent with the 2008- 2017 *US v. Oregon* Management Agreement. Yearling fish were ADCWT marked/tagged and CWT tagged from 15 July – 1 August. After marking and tagging, 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 movement to the rearing lake following PIT tagging (Table 16).

Subyearling (BY12) fish were ADCWT marked/tagged from 28 March - 3 April. All subyearlings were kept in raceways prior to release. Staff performed tag and clip quality control checks from a sample of each group prior to release.

Table 16. Numbers of fall Chinook sampled by WDFW for marking and tagging quality control checks.

Broodyear/ age	Release site	Mark type	CWT	Number sampled	AD/ CWT	AD only	CWT only	Unmarked/ untagged
2012 Yearling	LFH	ADCWT	636583	1,500	1,481 (98.7%)	3 (0.2%)	10 (0.7%)	6 (0.4%)
	LFH	CWT ONLY	636584	1,500	0 -	0 -	1,488 (99.2%)	12 (0.8%)
2012 Subyearling	LFH	ADCWT	636574	1,531	1,523 (99.5%)	7 (1.0%)	1 (0.5%)	0 -
	CCD	ADCWT	636575	1,629	1,604 (98.5%)	8 (0.5%)	16 (1.0%)	1 (0.1%)
	GRR	ADCWT	636576	1,521	1,512 (99.4%)	6 (0.4%)	3 (0.2%)	0 -

Staff PIT tagged 30,000 BY12 onstation yearlings and 20,000 BY12 onstation subyearlings for the purpose of monitoring 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 PIT 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 190 shed tags (0.6%) from BY12 were detected, leaving an estimated 29,810 PIT tags representing the yearling release.

PIT tagged BY12 onstation subyearlings were returned to the raceways. Tagging events resulted in 391 mortalities, of which 163 were reinserted prior to release, leaving an estimated 19,772 PIT tags representing the subyearling release. Staff measured 47 of the mortalities to determine if the fish tagged were too small, but only one of the mortalities was < 65 mm. Mortalities were examined and it was determined that 24% of the fish did not have PIT tag insertion marks. The remaining mortality was caused by improper tagging techniques primarily associated with the left side of the fish (50%), belly of the fish along the centerline (15%), and right side tagging (11%). Staff reduced the numbers of fish anesthetized, shortened the anesthesia period, and tagged on the right side. Staff also PIT tagged 2,985 of the Couse Creek release on 25 April 2013. Mortalities in the Couse Creek pond was 0.3% of which 12.5% were untagged fish. We attribute the much lower loss to the modified tagging procedures.

Juvenile Releases

Brood year 2012

Subyearling

Subyearling fall Chinook at LFH were released 10 May 2013. Fish were measured and weighed and visually appeared in good condition, with no external signs of BKD, pop-eye, or descaling from bird beaks. An estimated 211,600 fish were released as an ADCWT group. Hatchery staff calculated the release at 68.0 fish/lb (fpp). Fish used in the pound counts were set aside for SRL staff to subsample for individual lengths and weights (Table 17). Individual length/weight samples and average pound count were very similar. Snake River flows on 10 May at the LMO Dam tailrace were 99.0 kcfs with 23.6 kcfs spill. Total dissolved gases were at 118.3%. Columbia River flows at McNary (MCN) Dam were 295.0 kcfs with 121.2 kcfs spill on 10 May and total dissolved gases were at 115.4%.

Subyearling fall Chinook slated for Couse Creek were released 9-10 May 2013. Fish were measured and weighed and visually appeared in good condition, with no external signs of BKD, pop-eye, or descaling. An estimated 205,300 fish were released as an ADCWT group. Hatchery staff calculated the release at 68.0 fpp.

Subyearling fall Chinook reared at Irrigon FH were released into the Grande Ronde River on 21 May 2013. An estimated 218,180 fish were released as an ADCWT group and 183,093 were released as unmarked/untagged. Fish were measured and weighed and visually appeared in good condition, with no external signs of BKD, pop-eye, or descaling. ODFW staff provided pound counts and the release was calculated at 49.5 fpp.

Table 17. Length and weight data from subyearling fall Chinook (BY12) sampled by WDFW and released into the Snake and Grande Ronde Rivers during 2013.

Length/weight data	Snake R. at LFH	Snake R. at Couse Creek	Grande Ronde R. at Cougar Creek
Sample date	9-May-13	9-May-13	20-May-13
Number sampled	216	243	202
Avg. length (mm)	83	83	92
Median	84	83	92
Range	62-100	60-98	72-106
SD	6.2	6.3	5.9
CV	7.5	7.6	6.4
Avg. weight (g)	6.7	6.6	8.8
SD	1.6	1.6	1.8
Avg. K factor	1.13	1.14	1.12
FPP	67.7	68.4	51.6

Yearling

Yearling fall Chinook at LFH were released from 8 April to 11 April 2014, with peak emigration occurring on 8 and 9 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 250,892 fish were released from the ADCWT group, and 252,381 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 18). Individual length/weight samples and pound count were very similar. Most of the emigration occurred prior to 10 April. The rearing lake was fully drained 12 April with the last few fish leaving that day. From 10 – 12 April, Snake River total dissolved gases at LMO Dam ranged from 118.7% – 118.9%. Outflow and spill ranged from 80.1 – 85.9 kcfs and 27.0 – 29.4 kcfs. Columbia River total dissolved gases at MCN Dam ranged from 114.0% – 114.5%. Outflow and spill ranged from 222.2 – 241.6 kcfs and 88.9 – 98.5 kcfs. The release occurred during an increasing hydrograph in each basin. Historical releases by WDFW, NPT, IDFG, and NOAA are provided in Appendix H.

Table 18. Length and weight data from yearling fall Chinook (BY12) released at LFH in 2014.

	Yearlings	
Length/weight data	**ADCWT**	**CWT only**
CWT code	636584	636583
Number sampled	211	257
Avg. length (mm)	164	166
Median	163	165
Range	139-212	125-202
SD	13.1	12.1
CV	8.0	7.3
Avg. weight (g)	46.5	47.9
SD	12.1	10.7
Avg. K factor	1.03	1.03
FPP	9.8	9.5

Survival Rates to Release

The estimated number of eggs and fish present at life stages in the hatchery were used for 2008-2012 broods to calculate survival rates within the hatchery environment (Table 19). Historical survivals between various life stages at LFH for fall Chinook are presented in Appendix I.

Table 19. Estimated survivals (%) between various life stages at LFH for fall Chinook of LFH/Snake River hatchery origin, 2008-2012 brood years.

Brood year	Release stage	Green egg-ponded fry	Ponded fry-release	Green egg-release
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
2012	Yearling	95.9	99.9	95.8
	Subyearling	95.9	103.1	93.0
	%	**95.8**	**100.7**	**96.1**
Yearling mean:	**SD**	**1.3**	**2.0**	**2.6**
	%	**95.8**	**101.1**	**94.6**
Subyearling mean:	**SD**	**1.3**	**1.8**	**1.3**

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

Migration timing

The PTAGIS website (www.ptagis.org) was queried on 3 April 2014 for Couse Creek and Grande Ronde releases and again on 1 July for onstation releases. Interrogation summaries were used to populate Table 20 – Table 23. PIT tagged subyearlings released near Couse Creek and in the Grande Ronde are only for documenting migration timing, and will not be used for adult return analysis in future reports. PIT tagged subyearlings and yearlings released at LFH will be used for migration timing and adult return analysis. Migration speed increased for all releases as fish moved downstream through the system (Figure 7) and yearlings migrated at a faster rate than subyearlings.

Table 20. Migration timing of BY12 PIT tagged subyearlings released at Couse Creek in 2013.

	Detection facilities						
Metric	**LGR**	**LGO**	**LMO**	**IHR**	**MCN**	**JDD**	**BONN[a]**
Number detected	**331**	**293**	**141**	**206**	**364**	**154**	**96**
Median travel days from Couse Creek[b]	21	27	31	33	36	41	43
Median passage date	30 May	5 Jun	9 Jun	11 Jun	14 Jun	19 Jun	21 Jun
First detection date	11 May	24 May	3 Jun	3 Jun	5 Jun	7 Jun	11 Jun
Last detection date	10 Jul	14 Jul	2 Aug	4 Jul	16 Jul	18 Jul	23 Jul
10% of run passage date	16 May	31 May	5 Jun	7 Jun	10 Jun	12 Jun	15 Jun
90% of run passage date	9 Jun	12 Jun	21 Jun	21 Jun	23 Jun	1 Jul	1 Jul
TDG on median date (%)[c]	111.2	111.8	115.2	115.1	115.9	113.7	113.5
Outflow on median date (kcfs)[c]	70.1	63.1	73.1	68.1	242.4	210.4	226.6
Spill on median date (kcfs)[c]	20.1	18.9	20.6	42.2	97.3	63.0	94.1

[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.

Table 21. Migration timing of BY12 PIT tagged subyearlings released at GRR in 2013.

	Detection facilities						
Metric	**LGR**	**LGO**	**LMO**	**IHR**	**MCN**	**JDD**	**BONN[a]**
Number detected	**289**	**274**	**72**	**65**	**314**	**139**	**95**
Median travel days from GRR[b]	18	21	22	27	27	34	34
Median passage date	8 Jun	11 Jun	12 Jun	17 Jun	17 Jun	24 Jun	24 Jun
First detection date	25 May	1 Jun	4 Jun	7 Jun	9 Jun	27 May	15 Jun
Last detection date	1 Jul	14 Jul	30 Jul	21 Jul	17 Jul	17 Jul	21 Jul
10% of run passage date	4 Jun	7 Jun	9 Jun	10 Jun	13 Jun	17 Jun	1 -Jun
90% of run passage date	16 Jun	23 Jun	24 Jun	30 Jun	29 Jun	3 Jul	7 Jul
TDG on median date of passage (%)[c]	110.8	112.1	115.4	112.5	116.2	114.5	117.2
Outflow on median date of passage (kcfs)[c]	75.0	68.1	63.3	47.5	207.6	250.0	254.1
Spill on median date of passage (kcfs)[c]	20.2	20.4	21.3	17.9	83.7	79.9	99.6

[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.

Table 22. Migration timing of BY12 PIT tagged subyearlings released at LFH in 2013.

Metric	Detection facilities				
	LMO	**IHR**	**MCN**	**JDD**	**BONN[a]**
Number detected	**1,262**	**689**	**2,325**	**912**	**592**
Median travel days from LFH[b]	12	30	33	36	37
Median passage date	1-Jun	9-Jun	12-Jun	15-Jun	16-Jun
First detection date	10-May	13-May	15-May	27-May	3-Jun
Last detection date	28-Jun	30-Jun	7-Jul	13-Jul	22-Jul
10% of run passage date	11-May	25-May	7-Jun	9-Jun	12-Jun
90% of run passage date	10-Jun	14-Jun	18-Jun	25-Jun	25-Jun
TDG on median date of passage (%)[c]	118.5	115.8	118.0	113.6	115.6
Outflow on median date of passage (kcfs)[c]	68.8	74.2	246.9	240.8	214.8
Spill on median date of passage (kcfs)[c]	28.2	31.0	108.6	72.1	96.1

[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.

Table 23. Migration timing of BY12 PIT tagged yearlings released at LFH in 2014.

Metric	Detection facilities				
	LMO	**IHR**	**MCN**	**JDD**	**BONN[a]**
Number detected	**4,054**	**968**	**5,508**	**4,812**	**1,123**
Median travel days from LFH[b]	8	10	15	19	19
Median passage date	16-Apr	18-Apr	23-Apr	27-Apr	27-Apr
First detection date	9-Apr	11-Apr	12-Apr	15-Apr	17-Apr
Last detection date	29-May	10-May	8-Jun	13-Jun	8-Jun
10% of run passage date	11-Apr	13-Apr	16-Apr	21-Apr	22-Apr
90% of run passage date	25-Apr	29-Apr	1-May	5-May	7-May
TDG on median date of passage (%)[c]	118.6	115.5	113.8	115.5	116.5
Outflow on median date of passage (kcfs)[c]	70.0	77.7	258.0	256.1	276.6
Spill on median date of passage (kcfs)[c]	28.0	55.3	107.7	89.0	106.7

[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.

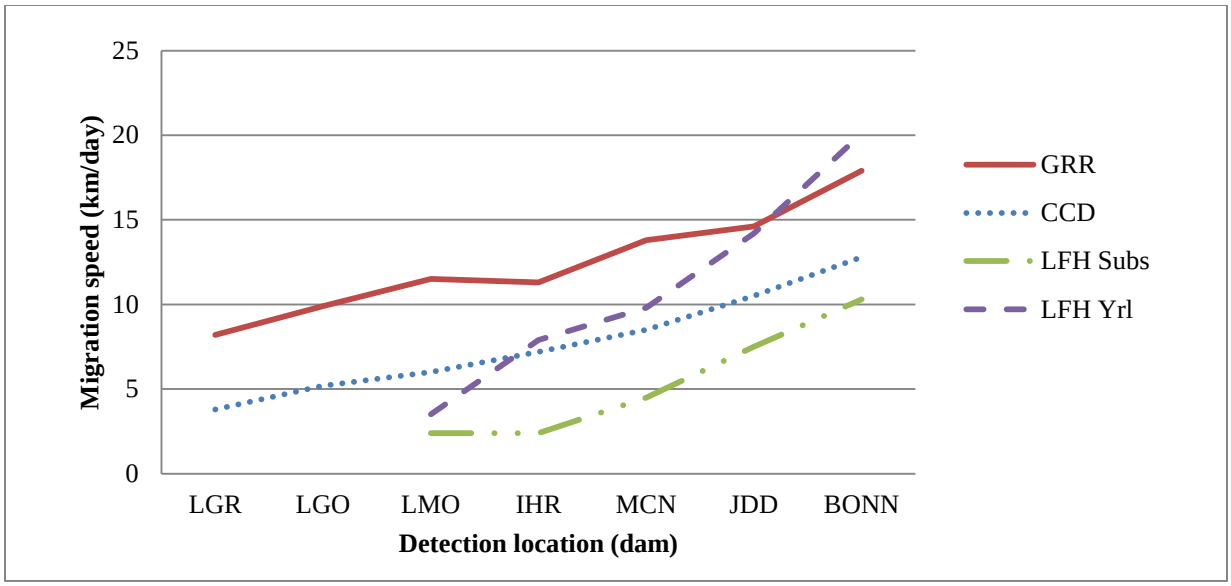


Figure 7. Migration speed of BY12 subyearlings and BY12 yearling fall Chinook as they passed Snake and Columbia River dams.

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 third year parental based tagging (PBT) of broodstock was used at LFH. PBT samples were collected by WDFW staff and fin clips were placed on Whatman paper and identified with a unique fish identification number. Samples were shipped to the DNA lab run by Columbia Intertribal Fish Commission for profiling. Combining data from PBT of broodstock at NPTH and LFH will result in the ability to identify all inbasin hatchery releases at return. In 2016, all returns 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. Unfortunately, the analysis will not be completed before the run reconstruction estimates are submitted to TAC for return forecasting. It is possible to get the PBT samples analyzed by the January 31 deadline, but there are no funds in place to increase staffing to do so.

Hatchery Stock Profile Evaluation

Size at age of return was calculated for wire tagged yearling (Table 24) and subyearling (Table 25) 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 LSRCP program fish are provided in Appendix J.

Table 24. Sex, origin, and fork length by age at return of CWT fall Chinook processed in 2013 by WDFW that were part of yearling juvenile releases.

			Age at return				
Sex	**Origin**	**Fork length**	0-salt	1-salt	2-salt	3-salt	4-salt
Male	LFH	*N*	260	263	193	10	-
		Median (cm)	35	57	71	79	-
		Range (cm)	29-54	38-73	52-88	68-90	-
	Stray	*N*	-	3	3	3	-
		Median (cm)	-	59	79	82	-
		Range (cm)	-	48-65	72-80	80-90	-
Female	LFH	*N*	-	60	393	62	1
		Median (cm)	-	61	72	78	-
		Range (cm)	-	49-85	62-83	68-91	82
	Stray	*N*	-	-	6	6	-
		Median (cm)	-	-	75	83	-
		Range (cm)	-	-	69-80	75-85	-

Table 25. Sex, origin, and fork length by age at return of CWT fall Chinook processed in 2013 by WDFW that were part of subyearling juvenile releases.

			Age at return				
Sex	**Origin**	**Fork length**	**0-salt**	**1-salt**	**2-salt**	**3-salt**	**4-salt**
Male	LFH	*N*	-	10	116	42	-
		Median (cm)	-	46	69	75	-
		Range (cm)	-	41-58	51-78	62-99	-
	Stray	*N*	-	-	17	9	-
		Median (cm)	-	-	70	74	-
		Range (cm)	-	-	61-78	68-81	-
Female	LFH	*N*	-	-	104	95	2
		Median (cm)	-	-	70	78	-
		Range (cm)	-	-	57-80	65-89	90
	Stray	*N*	-	-	23	16	1
		Median (cm)	-	-	71	79	-
		Range (cm)	-	-	64-79	72-85	84

Tucannon River Natural Production 2013

Adult Salmon Surveys

Fall Chinook Redd Surveys

WDFW personnel have conducted spawning ground surveys for fall Chinook salmon on the lower Tucannon River since 1985 (Appendix K). Survey sections in 2013 covered the river from river kilometer (rkm) 1.1-33.6; a 3.6 km increase in the upper survey 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 2013, landowner access restrictions prevented the surveying of 1.5 kilometers of river above the Starbuck Bridge within survey sections 5 and 6. Pre-surveys were conducted the weeks of 29 September and 20 October in order to ensure no spring Chinook redds were counted as fall Chinook redds. Regular weekly surveys began the week of 27 October and continued until week of 26 November. High flows and low visibility prevented further surveys for the season.

An estimated 386 fall Chinook and 13 coho redds were constructed in the Tucannon River during 2013. A total of 274 redds (from all species) were counted in the Tucannon River (Table 26) and we estimate an additional 125 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/km 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. The size, locations, and timing of redd building for coho is similar to that for fall Chinook. Two methods were compared to estimate the numbers of coho redds on the Tucannon River. The first method was visual estimation which could only be verified if fish were during the survey. The second method applies the proportion of coho found during carcass surveys to the total redd count (fall Chinook + coho) to estimate the total number of redds built by coho.

Table 26. Date and number of redds and carcasses counted on the Tucannon River in 2013.

Week beginning	Total redds [a]	Carcasses sampled	
	Chinook & Coho [b]	Chinook	Coho
29 Sept[c]	0	0	0
6 Oct[c]	1	0	0
13 Oct[c]	0	0	0
20 Oct[c]	0	0	0
27 Oct	31	1	0
3 Nov	61	13	3
10 Nov	129	49	1
17 Nov	30	81	7
24 Nov	22	33	0
1 Dec[d]	no data	no data	no data
8 Dec[d]	no data	no data	no data
15 Dec[d]	no data	no data	no data
Totals	**274**	**177**	**11**

[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 pre-survey to ensure no spring Chinook redds were counted as fall Chinook redds. Any redds found during these surveys were presumed spring/summer Chinook.
[d] High flows and low visibility prevented surveys from being completed this week forward.

Escapement and Composition of the Fall Chinook Run in the Tucannon River

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 1,158 fall Chinook and 39 coho escaped to the Tucannon River (Table 27). We recovered 177 fall Chinook carcasses equating to 15.3% of the estimated total spawning escapement to the Tucannon River. Coho were also identified on the Tucannon River and associated tables can be found in Appendix K.

Table 27. Estimated escapement, redd construction, and resulting estimates of smolts/redd and total number of emigrants from fall Chinook spawning in the Tucannon River, 2001-2013.[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
2007	326	7.0	93	16	109	unknown[f]	unknown[f]	0.53
2008	763	16.5	209	45	254	20	5,030	0.03
2009[g]	756	10.7	217	35	252	147	36,991	0.33[h]
2010	972	27.0	281	43	324	76	24,315	0.12[i]
2011	906	4.2	278	24	302	67	20,331[j]	pending
2012	1,623	4.9	256	285[k]	541	231	124,951[j]	pending
2013	1,158	8.5	261	125[k]	386	24	9,262	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] No estimate was made because the smolt trap sampling box had a hole in it and fish escaped
[g]. 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.
[h] Estimate through age 4 returns..
[i] Estimate through age 3 returns
[j] Corrected calculation since 2012 Annual Report.
[k] Adjustment includes estimates for weeks not walked due to temperature and water conditions.

The methodology used to estimate run composition of fall Chinook in the Tucannon River was modified in 2012 to account for carcass recovery bias. Generally, more recoveries of females occur than males, primarily because females remain in the vicinity of redds when they die, but during 2013 this was not the case. 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 28 and Table 29. An estimated composition of the run to the Tucannon River is presented in Table 30.

Females represented 31% of the recoveries; primarily adult 2-salt and 3-salt fish. DNA was collected and archived from 167 fall Chinook (DNA sample numbers 12KN57, 13LP002-13LP004, 13LP007-13LP023, 13LP025-13LP081, 13LP083-13LP165, 13LQ02-13LQ03, 13LQ07-13LQ08, and 13LQ10.). CWT and scale analysis were used to determine the origin and age of each carcass.

Table 28. Composition of wire tagged carcasses recovered and estimated run composition of fall Chinook on the Tucannon River, 2013.

				Raw totals			Expanded to run			
	Clip	CWT origin	CWT	F	M ≥53cm	M <53cm	F	M ≥53cm	M <53cm	Total
Inbasin wire fish	AD	LF09SO	635180	1	0	0	7.3	0.0	0.0	7.3
		LF09YO	635564	5	1	0	36.4	6.2	0.0	42.6
		LF10SO	635998	3	1	0	21.8	6.2	0.0	28.1
		LF10YO	636079	3	2	0	21.8	12.5	0.0	34.3
		LF10YO	636080	3	20	7	21.8	124.5	43.6	189.9
		LF11YO	636444	0	0	2	0.0	0.0	12.5	12.5
		LF11SCCD	636418	0	0	1	0.0	0.0	6.2	6.2
		LF11SO	636417	0	0	2	0.0	0.0	12.5	12.5
	NO	LF08YO	635165	2	0	0	14.6	0.0	0.0	14.6
		LF09SO	635180	0	1	0	0.0	6.2	0.0	6.2
		LF09YO	635510	5	3	0	36.4	18.7	0.0	55.1
		LF10SO	635998	0	1	0	0.0	6.2	0.0	6.2
		LF10YO	636079	4	26	1	29.1	161.9	6.2	197.2
		LF10YO	636080	2	2	0	14.6	12.5	0.0	27.0
		LF11YO	636443	0	1	3	0.0	6.2	18.7	24.9
		LF09YBCA	220312	1	0	0	7.3	0.0	0.0	7.3
		LF11SBCA	220328	1	0	0	7.3	0.0	0.0	7.3
Out-of-basin wire fish	AD	BON09YUMA	90356	1	0	0	7.3	0.0	0.0	7.3
		UMA10SUMA	90434	0	2	0	0.0	12.5	0.0	12.5
		KLICK10SO	635978	0	1	0	0.0	6.2	0.0	6.2
		LWS10SLWS	54599	0	1	0	0.0	6.2	0.0	6.2
		UMA08SUMA	90330	1	0	0	7.3	0.0	0.0	7.3
		UMA10SUMA	90433	1	1	0	7.3	6.2	0.0	13.5
		UMA10SUMA	90434	1	2	0	7.3	12.5	0.0	19.7
		UMA10SUMA	90435	2	0	0	14.6	0.0	0.0	14.6
		UMA10SUMA	90436	0	2	0	0.0	12.5	0.0	12.5
	NO	BON09YUMA	90355	0	2	0	0.0	12.5	0.0	12.5
		UMA09SUMA	90327	0	1	0	0.0	6.2	0.0	6.2
		GRAND TOTAL		**36**	**70**	**16**	**262.2**	**435.9**	**99.7**	**797.6**

Table 29. Composition of <u>untagged</u> carcasses recovered and estimated run composition of fall Chinook on the Tucannon River, 2013.

			Raw totals			Expanded to the run			
Origin	Clip	European age	F	M ≥53cm	M <53cm	F	M ≥53cm	M <53cm	Total
Hatchery	AD	0.2	1	1	0	12.1	12.5	0	24.6
		0.3	1	0	0	12.1	0	0	12.1
		1.1	1	1	0	12.1	12.5	0	24.6
		1.2	0	0	1	0	0	12.5	12.5
		Unknown age	2	3	0	0	0	0	0.0
Unknown	No	0.1	0	1	0	0	8.7	0	8.7
		0.2	5	8	0	43.7	69.3	0	113.0
		0.3	4	6	0	35.0	52.0	0	86.9
		Unknown age	2	8	1	0	0	0	0.0
Hatchery	No	1.1	1	6	1	8.7	52.0	8.7	69.4
		1.2	0	1	0	0	8.7	0	8.7
Totals			**18**	**34**	**3**	**123.7**	**215.7**	**21.2**	**360.4**

Table 30. Estimated composition of fall Chinook run to Tucannon River by salt water age and origin, 2013.

	0-salt	1-salt		2+ salt			
Origin	Minijack	True jack	True jill	Adult F	Adult M	Total	% of return
Snake River hatchery (wire, VIE)	37.4	379.9	94.6	123.8	43.5	679.2	58.6%
Presumed Snake River hatchery (AD clip or yearling scales)	0	73.2	20.8	24.2	33.7	151.9	13.1%
Out-of-basin hatchery (wire-CWT or BLANK)	0	0	0	43.8	74.8	118.6	10.2%
Unknown origin	0	8.7	0	78.7	121.3	208.7	18.0%
Total	**37.4**	**461.8**	**115.4**	**270.5**	**273.3**	**1,158**	**100.0%**
% of return	**3.2%**	**39.9%**	**10.0%**	**23.4%**	**23.6%**		

Juvenile Salmon Emigration

Fall Chinook

Juvenile fall Chinook (BY12) were observed at the Tucannon River smolt trap rkm 3.0 from 4 February through 5 July 2013. The last day of trapping before the trap was pulled for the season was 10 July (Gallinat and Ross, 2013). Trapping efficiency for fall Chinook ranged from 4.3% to 27.9% (Table 31). Median passage date for fall Chinook passing the trap was 13 June. Staff captured 16,063 fall Chinook and estimate that 99,817 (95% C.I. = 91,627-109,832) naturally produced fall Chinook parr and smolts passed the smolt trap during 2013. Based on 432 redds estimated above the smolt trap during 2012, an estimated 231 smolts/redd were produced. After including potential juvenile production from redds found below the smolt trap in 2012, an estimated 124,951 naturally produced fall Chinook smolts left the Tucannon during 2013.

Staff selected fish by size in the same proportions as trapped, with the goal of measuring 20 fish per day. A total of 2,559 fall Chinook were measured and ranged from 29-114 mm fork length and averaged 70 mm with a median of 75 mm. Length and weights were taken on 851 of the 2559 fish sampled. For this group, fork lengths ranged from 35-109 mm and averaged 77 with a median of 78 mm. Weights ranged from 1.0 g to 13.8 g, with a mean of 6.4 and median of 6.3 g. K-factors ranged from 0.68-1.80, with a mean of 1.23 and a median of 1.22. 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.

Staff PIT tagged 1,000 naturally produced fall Chinook at the smolt trap from 7 May through 30 June 2013. Lengths ranged from 65-107 mm with a mean and median of 80 mm. The median passage time to LMO Dam was 7 days (Table 32). Natural origin fall Chinook had faster migration speeds through the system when compared to onstation subyearlings released at LFH (Figure 9).

Table 31. Trapping efficiency estimates for fall Chinook and coho at the smolt trap on the Tucannon River in 2013.

Week ending	Fall Chinook recapture efficiency	Coho recapture efficiency
27 Jan	unknown	0.0%
3 Feb	unknown	0.0%
24 Mar	unknown	0.0%
31 Mar	unknown	100.0%
7 Apr	unknown	9.1%
14 Apr	unknown	18.2%
21 Apr	unknown	18.8%
28 Apr	unknown	18.2%
5 May	unknown	15.4%
12 May	27.9%	13.3%
19 May	22.9%	23.1%
26 May	12.0%	12.0%
2 Jun	13.2%	21.7%
9 Jun	15.1%	0.0%
16 Jun	14.8%	50.0%
23 Jun	8.9%	unknown
30 Jun	4.3%	unknown

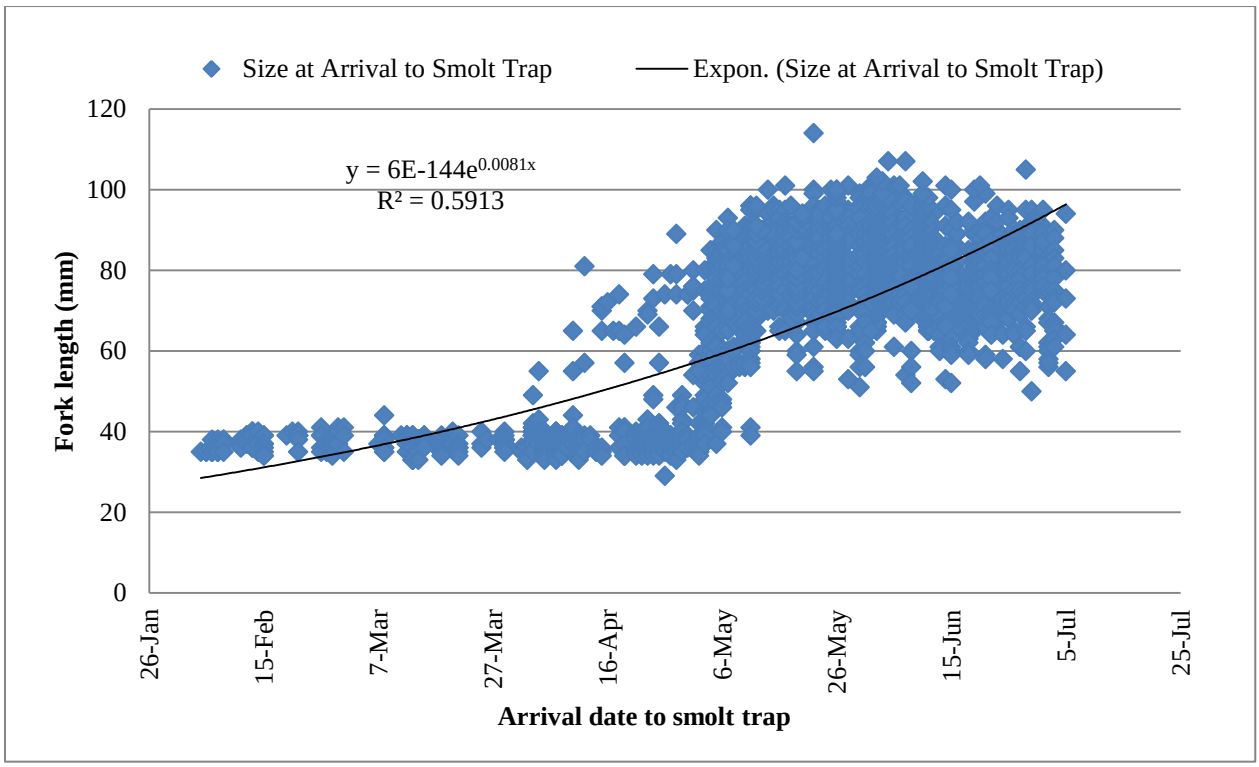


Figure 8. Arrival dates and sizes of juvenile natural origin fall Chinook trapped on the Tucannon River in 2013.

Table 32. Migration timing of naturally produced fall Chinook leaving the Tucannon River in 2013.

Metrics	Detection facilities				
	LMO	IHR	MCN	JDD	BONN[a]
Number detected	96	37	121	58	40
Median travel days from TUC[b]	6	11	19	25	26
Median passage date	10-Jun	15-Jun	22-Jun	30-Jun	30-Jun
First detection date	10-May	19-May	29-May	4-Jun	2-Jun
Last detection date	28-Jun	15-Jul	28-Jul	31-Jul	27-Jul
10% of run passage date	19-May	2-Jun	11-Jun	15-Jun	13-Jun
90% of run passage date	24-Jun	1-Jul	9-Jul	13-Jul	18-Jul
TDG on median date of passage (%)[c]	115.6	113.7	117.6	116.6	116.7
Outflow on median date of passage (kcfs)[c]	70.8	54.3	273.5	262.2	277.2
Spill on median date of passage (kcfs)[c]	21.0	37.8	137.3	100.7	104.4

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

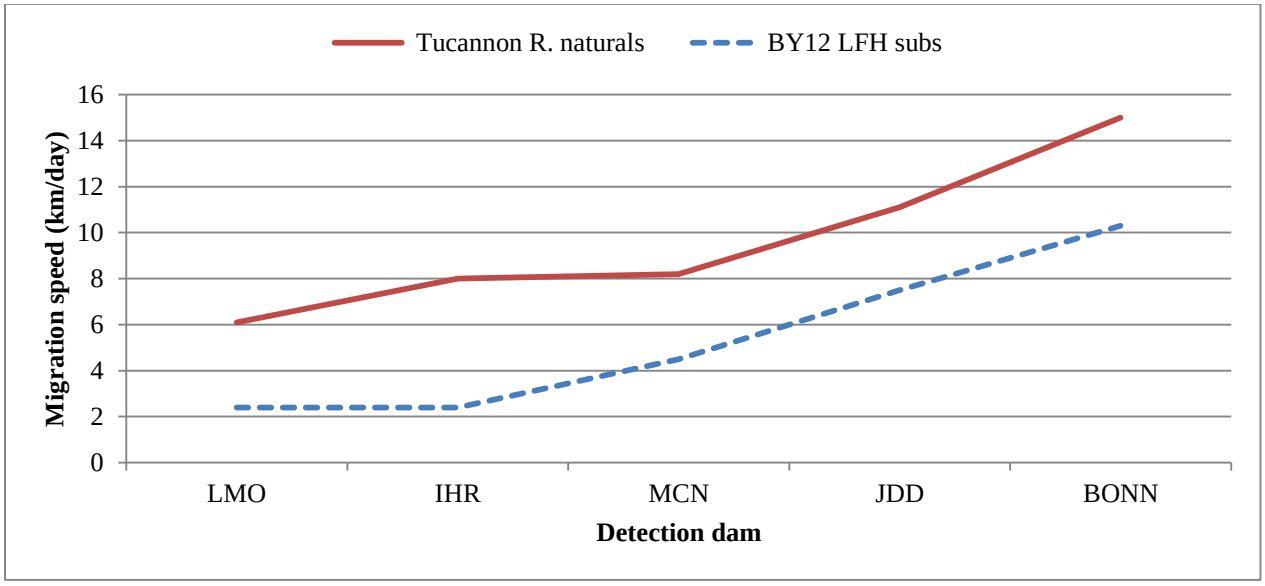


Figure 9. Migration speed of Tucannon River naturals and BY12 subyearlings released at LFH in 2013.

Asotin Creek Spawning Ground Surveys

Spawning Ground Surveys

Surveys were conducted on 6 November and 14 November, 2013. Staff counted a total of 53 redds. A total of 27 fall Chinook carcasses were sampled, five of which were females. Based on CWT's and AD clips, 29.6% of the carcasses were of hatchery (Table 33). DNA was collected and archived from all 27 carcasses (DNA sample numbers 13AX1491-13AX1517).

Table 33. Composition of fall Chinook carcasses recovered in the Asotin creek in 2013.

	Clip	CWT origin	CWT	European age	F	M ≥53cm	M <53cm	Total
Inbasin wire tagged	AD	LF10SCCD	635997		1	0	0	1
		LF10SCJA	220119		0	1	0	1
		LF11SGRRD	636419		0	1	0	1
		LF11IPCHC	90587		0	1	0	1
		LOST TAG		0.2	0	1	0	1
	No	LF10SCJA	220120		0	1	0	1
		LF10YCJA	220320		0	1	0	1
Out-of-basin wire tagged	AD	UMA10SUMA	90433		0	1	0	1
Unknown no Wire	AD			0.2	1	1	0	2
	No			0.1	0	0	1	1
				0.2	0	11	0	11
				0.3	3	1	0	4
				1.1	0	1	0	1
			Grand total		**5**	**21**	**1**	**27**
			% of Total		**18.5**	**77.8**	**3.7**	**100.0**

Fall Chinook Run Size and Composition 2013

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 composition of fish trapped at LFH that were killed during spawning is listed Table 34 and Appendix L.

Table 34. Composition of fall Chinook trapped at LFH and killed in 2013 by program and saltwater age.

	0-salt	1-salt		2+ salt			
Program	**Minijack**	**Jill**	**Jack**	**F**	**M**	**Total[a]**	**Comp %**
LSRCP+FCAP	30	33	111	447	258	879	82.6
NPTH	0	0	0	0	1	1	0.1
IPC	0	0	1	0	0	1	0.1
Bonneville	0	0	2	9	3	14	1.3
Umatilla	0	0	0	18	23	41	3.9
Little White Salmon	0	0	0	0	1	1	0.1
Priest Rapids	0	0	0	1	0	1	0.1
Ringold	0	0	0	0	1	1	0.1
Hatchery unknown	0	2	7	12	51	72	6.8
Unknown origin	0	0	3	24	25	52	4.9
Total	**30**	35	125	511	363	1,064	**100**

[a] Does not include three spring Chinook and one coho incidentally trapped during fall Chinook collections.

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, 2013). Window counts estimated 78,960 fall Chinook ($\geq$ 30 cm fork length) reached LGR Dam in 2013 (Figure 10), which includes 22,395 "jacks" by size (30 cm-52 cm fork length). 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 , spillway, turbines, or locks.

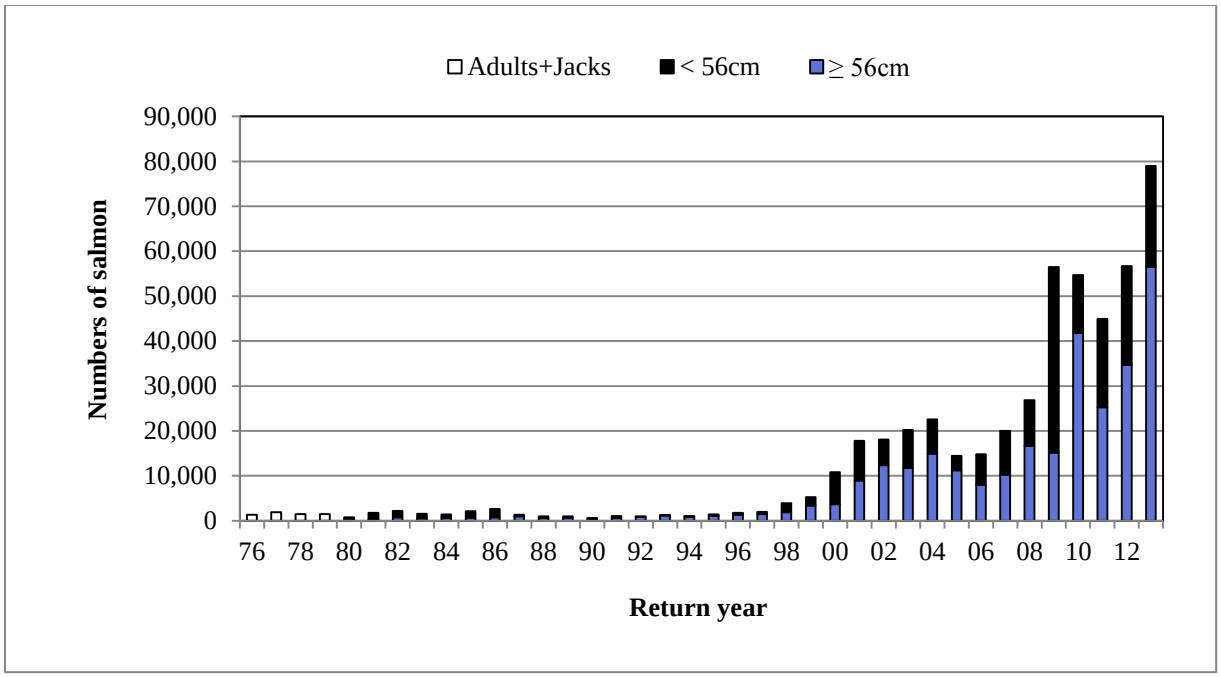


Figure 10. Fall Chinook window counts at LGR Dam, 1976-2013.

An estimated 75,846 fall Chinook (36.2% wild, 61.5% inbasin hatchery, and 2.3% out of basin hatchery) reached LGR in 2013 (Table 35). After accounting for reascension and fallback, the final run estimate to LGR Dam was 4% less than window count estimates documented at www.fpc.org. 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 35. Estimated composition, standard errors, and confidence intervals for fall Chinook reaching LGR during 2013.

Estimates					Bootstrap standard error					Bootstrap 95% confidence interval Upper CI, Lower CI				
Total run by origin														
Origin	**F**	**M ≥53cm**	**M <53 cm**	**Total ≥53cm**	**Origin**	**F**	**M ≥53 cm**	**M <53 cm**	**Total ≥53cm**	**Origin**	**F**	**M ≥ 53cm**	**M <53 cm**	**Total ≥53 cm**
Total wild	5001	16123	6338	21124	total wild	389	627	352	721	total wild	4276, 5763	14811, 17255	5736, 7090	19604, 22433
Total hatchery	10693	23806	13885	34500	total hatchery	441	648	433	714	total hatchery	9880, 11620	22595, 25182	13020, 14729	33180, 35923
Totals	15694	39929	20222	55624	Totals	827	1274	785	1429	Totals	14156, 17383	37405, 42438	18756, 21819	52784, 58356
Run by origin and age														
Origin	**F**	**M ≥53cm**	**M <53 cm**	**Total ≥53cm**	**Origin**	**F**	**M ≥53cm**	**M <53cm**	**Total ≥53cm**	**Origin**	**F**	**M ≥53cm**	**M <53 cm**	**Total ≥53 cm**
Wild age 2	0	486	6169	486	wild age 2	0	163	363	163	wild age 2	0, 0	181, 814	5559, 6961	181, 814
Wild age 3	2032	13819	168	15852	wild age 3	255	601	103	647	wild age 3	1545, 2548	12638, 14951	-13, 402	14591, 17109
Wild age 4	2760	1723	0	4483	wild age 4	297	344	0	450	wild age 4	2184, 3374	1051, 2375	0, 0	3609, 5348
Wild age 5	208	95	0	303	wild age 5	61	48	0	79	wild age 5	86, 328	14, 200	0, 0	149, 460
Hat age 2	0	91	10511	91	Hat age 2	0	71	565	71	Hat age 2	0, 0	0, 268	9453, 11667	0, 268
Hat age 3	4019	16794	3253	20813	Hat age 3	316	740	442	786	Hat age 3	3446, 4721	15490, 18387	2288, 4087	19384, 22516
Hat age 4	5737	5595	92	11332	Hat age 4	346	556	67	660	Hat age 4	5054, 6403	4508, 6725	0, 242	9998, 12632
Hat age 5	435	52	0	487	Hat age 5	92	44	0	101	Hat age 5	247, 610	0, 149	0, 0	288, 672
Hat age 6	0	51	0	51	Hat age 6	0	51	0	51	Hat age 6	0, 0	0, 167	0, 0	0, 167
Stray age 3	221	947	28	1168	stray age 3	62	274	31	280	stray age 3	109, 354	484, 1525	0, 112	674, 1782
Stray age 4	269	277	0	546	stray age 4	69	110	0	129	stray age 4	137, 409	91, 528	0, 0	315, 821
Stray age 5	11	0	0	11	stray age 5	11	0	0	11	stray age 5	0, 34	0, 0	0, 0	0, 34

Fallbacks at the Juvenile Collection Facility

A total of 4,074 fallback events were counted at the juvenile collection facility (Table 36) and the separator (Table 37) 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 36. Documented fallbacks of Chinook at the LGR juvenile collection facility during 2013 by clip and wire.

Run	Clip	Wire	<30cm	30-50cm[a]	Grand total
Chinook[b]	AD	No wire	4	0	4
		Wire	6	12	18
		Unknown	5	26	31
	No	No wire	0	0	0
		Wire	5	25	30
		Unknown	6	36	42
Fall Chinook total			**26**	**99**	**125**

[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. Of the fish < 53 cm, at least 60.6% were hatchery origin, although we expect the actual number of hatchery fish was greater because unclipped fish were not scanned for wire at the separator. Likewise, at least 54.6% of the fish $\geq$ 53 were of hatchery origin based solely on adipose clips.

Table 37. Composition of fallbacks at the LGR Dam separator in 2013 by clip and length.

Clip	<53cm[a]	≥53 cm[a]	Grand total
AD	1,058	1,160	2,218
No	768	963	1,731
Grand total	**1,826**	**2,123**	**3,949**

[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

Due to high water temperatures it is estimated the first 64.1% of the adults salmon ≥ 53 cm and 54.5% of the jacks (<53 cm) were not sampled. Based on historical run timing data, that is when older aged fish and females pass, thus they are likely underrepresented in our estimates.

Sex Ratio

The estimated 2013 return, based on run reconstruction estimates, consisted of 80.0% males, including jacks. The sex ratio of the return was calculated at 4.0 males+jacks/female. After removal of fish for broodstock, the fish calculated passing LGR Dam were 81.4% males resulting in 4.4 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 11). Median fork length for males and females was 59 cm and 74 cm, respectively.

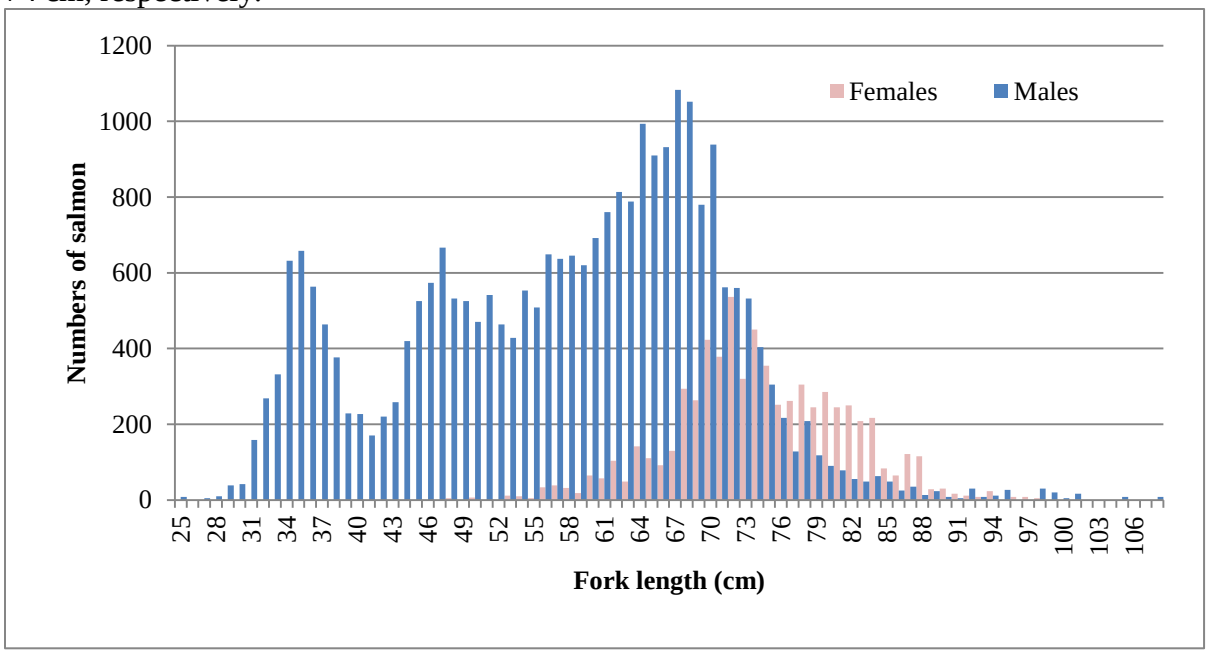


Figure 11. Estimated length frequencies of the fall Chinook run to LGR Dam by sex in 2013.

Fallback Rates of Onstation Releases at LGR Dam

PIT tagged fish from onstation releases were detected at LGR dam throughout the return season. Concerns have been raised about onstation released fall Chinook passing LGR Dam, which could be considered straying away from the release site. Of the 324 onstation yearling returns that passed LGR dam, 29.6% were later detected downstream, 2.2% were detected further upstream, leaving LGR dam as the last detection site for 68.2% (Table 38). A total of 20 onstation subyearlings were detected passing LGR dam. Of those, 25% were later detected downstream, 5% upstream, and 70% last detected at LGR dam (Table 39).

Table 38. Fallback rate of PIT tagged onstation yearlings that crossed LGR Dam in 2013.

	Last known detection								
Age	**LOMO**	**Tuc R.**	**LGO**	**LGR juvenile bypass**	**LGR adult ladder**	**Asotin Cr.**	**CLW R.**	**Total**	**Fallback by age (%)**
Age 2 (0-salt)			3	6	25			34	26.5
Age 3 (1-salt)	1	10	19	38	140	1	2	211	32.2
Age 4 (2-salt)		3	7	9	51	2	2	74	25.7
Age 5 (3-salt)					4			4	0.0
Age 6 (4-salt)					1			1	0.0
Total	**1**	**13**	**29**	**53**	**221**	**3**	**4**	**324**	**Overall Fallback %**
Comp (%)	**0.3**	**4.0**	**9.0**	**16.4**	**68.2**	**0.9**	**1.2**	**100.0**	**29.6**

Table 39. Fallback rate of PIT tagged onstation subyearlings that crossed LGR Dam in 2013.

	Last known detection							
Age	**LOMO**	**LFH**	**Tuc R.**	**LGO**	**LGR adult ladder**	**Salmon R.**	**Total**	**Fallback by age (%)**
Age 2 (1-salt)	2	1	1	1	14	1	20	**25.0**
Comp (%)	**10.0**	**5.0**	**5.0**	**5.0**	**70.0**	**5.0**	**100.0**	

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 9 December 2014 for the 2013 returns of CWT tagged fish associated with the LSRCP (FCAP and WDFW releases).

A minimum estimated 46.1% of the total LSRCP mitigation goal of 91,500 fish was achieved in 2013. An estimated 29,668 fall Chinook (adults+jacks) returned from WDFW and FCAP releases into the Snake River, and at least an additional 12,482 fall Chinook were recovered outside of the Snake River basin, totaling 42,150 fish contributing to LSRCP mitigation in 2013.

Returns to the Project Area

The LSRCP mitigation goal of 18,300 fish returning to the Snake River was exceeded in 2013 (Table 40). Combining recoveries of fish harvested below LGR Dam, killed at LFH, the carcasses recovered on 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 inbasin hatchery returns from the IPC and the NPTH programs.

In 2013, anglers in Washington were allowed a daily harvest of three adult fall Chinook and three jacks, 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 in Idaho.

On the Snake, there were 974 recoveries (not including LSRCP-FCAP) based on expanded catch record card data from WDFW and observed counts from IDFG (Table 41). Tribal catch was not reported.

Table 40. Estimated returns of LSRCP (WDFW and FCAP) fall Chinook to the Snake River and levels of mitigation goals met in 2013.

	Saltwater age								% of LSRCP goal to the Snake River
	0-salt	1-salt			2-5 salt				
Location	Mini-jack[a]	Jack[b]	Jill[c]	Unknown sex	Adult F	Adult M	Unknown sex	Total (A+J)	
Harvested FCH below LGR[d] Dam	112			179			197	376	2.1
LFH trapped and killed during processing	30	112	33		447	258		850	4.6
Carcasses recovered in the Tucannon R.	37	380	95		124	44		643	3.5
Run to LGR Dam[e] (wire+nowire)	8,758	10,148	577		6,639	10,435		27,797	151.9
Total	**8,937**	**10,640**	**705**	**179**	**7,210**	**10,737**	**197**	**29,668**	**162.1**

[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 includes recoveries of fish released by WDFW and FCAP.
[e] Estimated run to LGR Dam for LSRCP (includes surrogates part of the transportation study) and FCAP releases and includes fish hauled to LFH and NPTH for processing as well as fish released from the dam.

Table 41. Estimated Snake River basin recoveries in 2013 of fall Chinook released by WDFW releases as reported to RMIS. Estimates do not include FCAP recoveries.

Freshwater sport location		0-salt Minijack	1-salt	2+salt	Total ESTD	% Catch by location
Below LGR	Snake R Mouth-IHR	0	8	0	8	0.8
	Snake R IHR-LMO	11	0	0	11	1.1
	Snake R LMO-LGO	69	144	52	265	27.2
	Snake R LGO -LGR	0	11	22	33	3.4
Above LGR	Snake R basin above LGR	1	271	385	657	67.5
Totals		**81**	**434**	**459**	**974**	

Recoveries outside of the Snake River Basin

Approximately 17 % of the 73,200 fish harvest goal was met through returns from LSRCP and LSRCP FCAP releases in 2013. An estimated 8,132 salmon (11% of the mitigation goal) were harvested outside of the Snake River Basin from WDFW releases after expanding for sampling methodologies reported and including associated untagged fish estimated in catches (fully expanded estimates). An additional 4,353 CWT tagged fish (adults and jacks) from FCAP releases were reported to RMIS (not fully expanded for untagged fish harvested or adjusted for detection method), although we do not include them further in this report.

To document where recoveries of LFH/Snake River hatchery fish occurred in 2013, the RMIS database was queried on 9 December 2014 for tag codes associated with brood years 2007-2012. Estimates of harvest for fish released by WDFW are listed in Table 42 – Table 44 and do not include recoveries of fish released by the NPT (LSRCP-FCAP or NPTH programs) or ODFW or IDFG (IPC program).

Outside of the Snake River Basin, the majority (51.1 %) of recoveries reported to RMIS occurred in freshwater locations and 48.9% occurred in saltwater locations. Of the total number of fish recovered outside of the Snake River Basin, 78.3% came from commercial fisheries, 20.1 % were from sport fisheries, 1.5% were from spawning ground surveys on the Chelan River, Hanford reach and White Salmon River, and 0.1% were from hatcheries. Harvest primarily occurred in the ocean off the coasts of Washington and British Columbia, but the single largest fishery contributor to harvest was the Zone 6 Tribal Gillnet fishery which accounted for 39.6 % of all the fish harvested in 2013.

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 for non-CWT fish 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

Adjustment summary

For WDFW releases, Columbia River harvest estimated catch was increased by a factor of 1.54 and the estimated ocean harvest estimated catch was increased by a factor of 1.17. The overall adjustment resulted in 2,001 more fish harvested than were reported to RMIS, if only the ESTD were summed. Most of these adjustments were for unclipped tagged fish caught in non-selective fisheries sampled using visual detections.

Table 42. Fully expanded recovery estimates of tagged and untagged fall Chinook recovered in the Columbia River Basin (freshwater areas) during 2013 for WDFW releases. Jacks and minijacks included in the estimates.

		Yearlings			Subyearlings							Total recoveries	
		LFH			LFH		CCD		GRR				
Recovery area	Fishery/ Hatchery/ River	EST CWT	EST CWT adj [a]	Total EST Wire +no wire[b]	EST CWT	EST wire + no wire	EST CWT	EST wire + no wire	EST CWT	EST wire + no wire	Total EST wire + no wire[b]	Grand total EST CWT	Grand total EST wire + no wire
COL R Gillnet	COL R Gillnet Zone 6	876	1,661	1,734	395	401	498	505	325	638	1,544	2,094	3,277
	COL R Gillnet Zone 1-5	171	329	343	74	75	62	63	53	105	243	360	586
Estuary Sport	COL R Estuary-Bouy 10	98	98	99	30	30	52	52	17	34	116	197	214
Freshwater Net	COL R- Hanford Reach	5	5	5	0	0	0	0	0	0	0	5	5
Freshwater Sport	COL R- Hanford Reach	0	0	0	5	5	4	4	0	0	9	9	9
Hatchery	Bonneville	1	1	1	0	0	1	1	0	0	1	2	2
	Priest Rapids	0	0	0	0	0	2	2	3	6	8	5	8
	3 Mile Dam Brood Ponds	0	0	0	0	0	1	1	0	0	1	1	1
	WELLS	1	1	1	0	0	0	0	0	0	0	1	1
Spawning Ground	Chelan R.	1	2	2	0	0	0	0	0	0	0	1	2
	COL R - General	0	0	0	0	0	15	15	0	0	15	15	15
	COL R-Hanford Reach	39	39	39	0	0	13	13	26	51	64	78	104
	White Salmon R	5	5	5	0	0	0	0	0	0	0	5	5
	Totals	**1,197**	**2,141**	**2,229**	**504**	**511**	**648**	**656**	**424**	**833**	**2,001**	**2,773**	**4,230**

[a] Estimate adjusted for unclipped CWT fish caught in nonselective fisheries using visual detection method and electronic detections where unclipped CWT fish were not harvested at the same rate as the ADCWT fish

[b] Estimate adjusted for untagged fish caught in nonselective fisheries..

Table 43. Fully expanded recovery estimates of tagged and untagged fall Chinook in areas outside of the Snake River Basin (saltwater areas) during 2013 for WDFW releases. Jacks and minijacks are included in the estimates.

		Yearlings			Subyearlings							Total recoveries	
		LFH			LFH		CCD		GRR				
Region	Fishery	EST CWT	EST CWT adj	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	Aboriginal Seine	0	0	0	0	0	5	5	0	0	5	5	5
	Commercial Seine	2	4	4	0	0	0	0	2	4	4	4	8
	Ocean Sport	0	0	0	0	0	2	2	1	2	4	3	4
	Ocean Troll - Day Boat	7	13	14	9	9	12	12	10	20	41	38	55
	Ocean Troll (non-treaty)	9	18	18	37	38	12	12	32	63	113	90	131
	Terminal Seine	0	0	0	0	0	3	3	0	0	3	3	3
BC	Aboriginal Troll	5	6	6	2	2	10	10		0	12	17	18
	Mixed Net and Seine	1	2	2	0	0	0	0	0	0	0	1	2
	Ocean Sport	178	312	314	50	51	76	77	63	124	252	367	566
	Ocean Troll (non-treaty)	207	216	217	60	61	87	88	57	112	260	411	477
	Sport (private)	11	11	11	0	0	11	11	0	0	11	22	22
CA	Ocean Sport	8	16	16	3	3	0	0	5	10	13	16	29
	Ocean Troll (non-treaty)	22	45	45	38	39	11	11	40	79	129	111	174
COL	Sport (private in marine area)	85	85	86	10	10	26	26	12	18	54	133	140
HS	Ground fish Observer (Gulf of Alaska)	0	0	0	0	0	1	1	0	0	1	1	1
OR	Ocean Sport	88	64	88	14	14	18	18	10	10	42	130	130
	Ocean Troll (non-treaty)	272	272	273	22	22	30	30	31	61	113	355	386
WA	Estuary Sport	32	32	32	3	3	6	6	0	0	9	41	41
	Ocean Sport	0	0	0	0	0	3	3	0	0	3	3	3
	Ocean Troll (non-treaty)	433	433	434	51	52	66	66	44	87	204	594	639
	Sport (charter)	176	176	178	21	21	29	29	8	15	65	234	243
	Sport (private)	207	207	208	39	39	46	46	23	43	128	315	336
	Treaty Troll	383	383	384	75	76	60	60	54	106	242	572	626
	Totals	**2,126**	**2,296**	**2,330**	**434**	**439**	**514**	**518**	**392**	**753**	**1,710**	**3,466**	**4,040**

Table 44. Fully expanded recovery estimates (tagged and untagged) of 2013 returns by region, rear type, and release location for fall Chinook released by WDFW. Jacks and minijacks are included in the estimates.

	Yearlings		Subyearlings								Yearlings and subyearlings combined	
	LFH		LFH		CCD		GRR		Total subyearlings			
Region	ESTD wire +no wire	Recovery comp %	ESTD wire +no wire	Recovery comp by region %	ESTD wire +no wire	Recovery comp by region %	ESTD wire +no wire	Recovery comp by region %	ESTD wire +no wire	Recovery comp by region %	EST	Recovery comp by region %
COL R. (freshwater)	2,229	49%	512	54%	656	56%	833	53%	2,001	54%	4,230	51%
AK	36	1%	47	5%	35	3%	89	6%	170	4%	206	2%
BC	550	12%	113	12%	186	16%	236	15%	535	12%	1,086	13%
CA	61	1%	42	4%	11	1%	89	6%	142	3%	203	2%
COL R (marine)	86	2%	10	1%	26	2%	18	1%	54	1%	140	2%
HS	0	0%	0	0%	1	0%	0	0%	1	0%	1	0%
OR	361	8%	36	4%	48	4%	71	4%	155	3%	516	6%
WA	1236	27%	191	20%	211	18%	250	16%	652	14%	1,888	23%
Total recoveries	**4,559**		**951**		**1,174**		**1,586**		**3,711**		**8,269**	
Recoveries by rear type	**55%**								**45%**			

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

The Columbia River was the primary area fish were recovered outside of the Snake River for both yearling and subyearling production groups (Table 45 – Table 48). Fish from yearling production were primarily recovered as age 4 fish (2-salt) and subyearlings were recovered as age 3 fish (2-salt), although one release group had age 4 fish (3-salt) recovered at a higher rate. 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 and do not include untagged fish.

Table 45. Final locations of ADCWT yearling fall Chinook released onstation at LFH to areas outside of the Snake River basin in 2013 by total age, based on estimated recoveries reported to RMIS.

Brood year:	**2011**	**2010**	**2009**	**2008**	**2007**		**Non-Snake R. recovery location comp %**
Total age:	**2**	**3**	**4**	**5**	**6**		
Tag code:	**636444**	**636080**	**635564**	**635166**	**634680**		
ADCWT at release:	**240,413**	**246,918**	**226,621**	**250,814**	**220,723**	**A+J Totals**	
Total released (wires+nowire):	**243,649**	**249,062**	**227,391**	**254,203**	**227,364**		
AK		2	8	8		18	1%
BC		58	188	18		264	11%
CA			30			30	1%
COL	33	376	673	82	4	1,135	49%
OR		20	141	6		167	7%
WA		162	492	28		682	30%
Grand total	33	618	1,532	142	4	2,296	
Percent of release recovered	**1.4%**	**26.5%**	**65.8%**	**6.1%**	**0.2%**		

Table 46. Final locations of ADCWT subyearling fall Chinook released onstation at LFH to areas outside of the Snake River Basin in 2013 by total age, based on estimated recoveries reported to RMIS.

Brood year:	**2011**	**2010**	**2009**	**2008**		**Non-Snake R. recovery location comp %**
Total age:	**2 (Jack)**	**3**	**4**	**5**		
Tag code:	**636417**	**635998**	**635180**	**634995**		
ADCWT at release:	**198,228**	**200,502**	**198,457**	**191,407**	**A+J Totals**	
Total released (wires+nowire):	**200,900**	**202,200**	**202,328**	**200,695**		
AK		16	30		46	5%
BC		44	68		112	12%
CA		2	39		41	4%
COL	13	262	235	4	514	55%
OR		22	14		36	4%
WA	0	124	65		189	20%
Grand total	13	470	451	4	938	
Percent of recoveries out-of-basin	**1.4%**	**50.1%**	**48.1%**	**0.4%**		

Table 47. Final locations of ADCWT subyearling fall Chinook released into the Snake River near Couse Creek to areas outside of the Snake River Basin in 2013 by total age, based on estimated recoveries reported to RMIS.

Brood year:	2011	2010	2009	2008		Non-Snake R. recovery location comp %
Total age:	2 (Jack)	3	4	5		
Tag code:	636418	635997	635181	634996		
ADCWT at release:	194,955	200,945	199,326	187,434	A+J Totals	
Total released (wires+nowire):	199,300	202,300	203,162	200,744		
AK		5	29		34	4%
BC		94	90		184	20%
CA		3	8		11	1%
COL	13	418	238	5	674	72%
OR		1			1	0%
WA	5	142	63		210	22%
Grand total	18	663	428	5	1,114	
Percent of recoveries out-of-basin	**1.6%**	**59.5%**	**38.4%**	**0.4%**		

Table 48. Final locations of ADCWT subyearling fall Chinook released into the Grande Ronde to areas outside of the Snake River Basin in 2013 by total age, based on estimated recoveries reported to RMIS.

Brood year:	2011	2010	2009	2008	2008		Non-Snake R. recovery location comp %
Total age:	2 (Jack)	3	4	5	5		
Tag code:	636419	635999	635182	612676	634997		
ADCWT at release:	192,996	199,460	197,252	165,146	193,275	A+J Totals	
Total released (wires+nowire):	384,000	397,428	386,840	181,400	441,050		
AK	2	2	40		1	45	6%
BC		26	94			120	15%
CA		4	39		2	45	6%
COL	27	68	327	4	10	436	53%
OR		16	25			41	5%
WA		38	88	3		129	16%
Grand total	29	154	613	7	13	816	
Percent of recoveries out-of-basin	**3.6%**	**18.9%**	**75.1%**	**0.9%**	**1.6%**		

Returns to the Snake River estimated using PIT tags and CWTs

PIT tags were used inseason to assist with estimating returns to the Snake River and to estimate returns to areas below LGR Dam. Over the years, broodstock trapping protocols have focused more on LGR Dam in an effort to increase natural origin fish in broodstock, and less on trapping at LFH. With these changes, fish homing to LFH may not be fully estimated using only returns to the Tucannon and trapping at LGR because the fish might be remaining in the reservoir waiting for entry into LFH.

Another concern about accounting for the returns is the accuracy of 0-salt estimates. The trap at LGR Dam is not designed to hold small (0-salt) fish. Small fish can slip between the bars of the brail 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 hatchery 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 these concerns, we compared two methods of estimating returns to the Snake River: 1) PIT tag detections at return and 2) estimated returns of CWT fish. PIT tag detections of our onstation releases were downloaded 28 April 2014 from www.ptagis.org. Comparisons of estimates of yearlings are presented in Table 49 and Table 50, and estimates of subyearlings are presented in Table 51 and Table 52. Data highlighted in red are based on fish sampled in 2013, during the last 40% of the return and may be biased.

By using PIT tagged returns of yearling fall Chinook released at LFH, we detected on average, 2.9 times and 1.1 times greater return estimates of 0-salt and 1-salt fish, respectively, and 0.8 times less return of 2+ salt fish compared to estimates using conventional CWT estimates when all years were combined. This is the first year of returns from the PIT tagged subyearlings released at LFH. Comparisons using PIT tagged subyearling fall Chinook released at LFH had similar results to CWT estimates, although there is only one year of data, since subyearlings do not return as 0-salts.

Table 49. Return estimates to the Snake River for yearling fall Chinook released at LFH estimated using PIT tag detections in the Snake River through 2013.

Brood year	0-salt	1-salt	2-salt	3-salt	4-salt	Total return to date (1-4 salts)
2006	4.0% 18,284	1.7% 7,728	0.8% 3,601	0.0% 201	0.0% -	2.5% 11,530
2007	0.4% 1,804	0.7% 3,319	0.3% 1,413	0.1% 289	0.0% 17	1.1% 5,039
2008	0.6% 2,788	0.9% 4,439	0.5% 2,344	0.0% 160	-	1.4% 6,942
2009	0.4% 2,018	0.5% 2,313	0.4% 1,925	-	-	0.9% 4,238
2010	0.4% 2,102	1.3% 6,321	-	-	-	1.3% 6,321
2011	0.6% 2,900	-	-	-	-	-

Table 50. Return estimates to the Snake River for yearling fall Chinook released at LFH estimated using CWT recoveries and return estimates of live fish through 2013. Cells highlighted in red indicate possible biased data due to trapping restrictions during 2013. (Data presented has been corrected for all years)

Brood year	0-salt	1-salt	2-salt	3-salt	4-salt	Total return to date (1-4 salts)	Total release (wire+nowire)	Tag codes
2006	0.7% 3,435	2.2% 10,188	0.9% 4,103	0.0% 160	0.0% 0-	3.1% 14,451	459,634	634092 633987
2007	0.1% 420	0.5% 2,241	0.6% 2,688	0.1% 321	0.0% 1	1.2% 5,251	455,152	634680 634681
2008	0.1% 531	0.6% 3,014	0.4% 2,114	0.1% 279	-	1.1% 5,407	478,852	635165 635166
2009	0.2% 1,097	0.5% 2,165	0.6% 2,948	-	-	1.1% 5,113	463,729	635510 635564
2010	0.2% 1,128	1.0% 4,842	-	-	-	1.0% 4,842	490,000	636079 636080
2011	0.7% 3658					- -	489,500	636443 636444

Table 51. Return estimates to the Snake River for subyearling fall Chinook released at LFH estimated using PIT tag detections in the Snake River through 2013.

Brood year	0-salt	1-salt	2-salt	3-salt	4-salt	Total return to date (1-4 salts)
2011	0.0% 0	0.1% 252	-	-	-	0.1% 252
2012	0.0% 0	-	-	-	-	-

Table 52. Return estimates to the Snake River for subyearling fall Chinook released at LFH estimated using CWT detections in the Snake River through 2013. Cells highlighted in red indicate possible biased data due to trapping restrictions during 2013.

Brood year	0-salt	1-salt	2-salt	3-salt	4-salt	Total return to date (1-4 salts)	Total release (wire+nowire)	Tag codes
2011	0.0% 0	0.1% 274	-	-	-	0.1% 274	200,900	636417
2012	0.0% 0	-	-	-	-	-	211,599	636574

Total survival above Bonneville Dam estimated using CWT and PIT tags

Total survival estimates include recoveries or detections in the Snake River as well as harvest recoveries and detections above Bonneville Dam (Table 53 and Table 54). PIT tag detections result in an average 3.6 times and 1.2 times greater 0-salt and 1-salt survival estimates, and 0.9 times less 2+ salt estimates than occurred by using CWT estimation methods when all years were combined. Total survival estimates using PIT tagged subyearling fall Chinook released at LFH resulted in slightly larger returns than CWT estimates, although there is only one year of data, since subyearlings do not return as 0-salts (Table 55 and Table 56).

Table 53. Total survival estimates of yearling fall Chinook released at LFH estimated using PIT tag detections in the Snake and Columbia rivers during 2013.

Brood year	0-salt	1-salt	2-salt	3-salt	4-salt	Total survival estimate (1-4 salts)
2006	4.8%	2.1%	1.4%	0.1%	0.0%	3.6%
	21,916	9,814	6,260	402	0	16,476
2007	0.5%	0.8%	0.6%	0.1%	0.0%	1.5%
	2,417	3,830	2,741	426	17	7,013
2008	0.7%	1.1%	0.7%	0.1%	-	1.8%
	3,516	5,185	3,143	231		8,558
2009	0.6%	0.5%	0.8%	-	-	1.3%
	2,810	2,468	3,586			6,054
2010	0.6%	1.6%	-	-	-	1.6%
	2,840	7,848				7,848
2011	1.0%	-	-	-	-	0.0%
	4,944					0

Table 54. Total survival estimates of yearling fall Chinook released at LFH estimated using freshwater CWT recoveries above Bonneville Dam and return estimates of live fish through 2013. Cells highlighted in red indicate possible biased data due to trapping restrictions during 2013. (Data for all years have been corrected.)

Brood year	0-salt	1-salt	2-salt	3-salt	4-salt	Total survival estimate (1-4 salts)	Total release (wire+nowire)	Tag codes
2006	0.8% 3,639	2.4% 11,153	1.4% 6,283	0.1% 248	0.0% 3	3.8% 17,687	459,634	634092 633987
2007	0.1% 456	0.6% 2,623	0.9% 4,116	0.1% 473	0.0% 10	1.6% 7,222	455,152	634680 634681
2008	0.1% 531	0.7% 3,555	0.6% 2,911	0.1% 412	-	1.4% 6,878	478,852	635165 635166
2009	0.3% 1,167	0.5% 2,299	0.9% 4,066	-	-	1.4% 6,365	463,729	635510 635564
2010	0.2% 1,149	1.1% 5,317	-	-	-	1.1% 5,317	490,000	636079 636080
2011	0.8% 3,712	-	-	-	-	- -	489,500	636443 636444

Table 55. Total survival estimates of subyearling fall Chinook released at LFH estimated using PIT tag detections in the Snake and Columbia rivers during 2013.

Brood year	0-salt	1-salt	2-salt	3-salt	4-salt	Total survival estimate (1-4 salts)
2011	0.0% 0	0.2% 322	-	-	-	0.2% 322
2012	0.0% 0	-	-	-	-	-

Table 56. Total survival estimates of subyearling fall Chinook released at LFH estimated using freshwater CWT recoveries above Bonneville Dam and return estimates of live fish through 2013. Cells highlighted in red indicate possible biased data due to trapping restrictions during 2013.

Brood year	0-salt	1-salt	2-salt	3-salt	4-salt	Total survival estimate (1-4 salts)	Total release (wire+nowire)	Tag codes
2011	0% 0	0.1% 285	-	-	-	0.1% 285	200,900	636417
2012	0.0% 0	-	-	-	-	-	211,599	636574

Direct take of listed Snake River fall Chinook salmon during fall of 2013 and spring of 2014

Discussions have occurred with NOAA regarding revising the original take tables in section 10 permit # 16607. The proposed changes submitted to NOAA are highlighted in yellow in the following tables. For this report, direct take consists of adults spawned in 2013 as broodstock at LFH and NPTH (highlighted in gray), and eggs/loss/release data associated with BY13 subyearlings released in 2014 and BY12 yearlings released in 2014 that were part of LSRCP, LSRCP-FCAP, and IPC programs. Direct takes of listed Snake River fall Chinook were calculated in Table 57and Table 58 and were generally within limits. The number of unmarked/untagged juveniles released by these programs totaled 1,041,987 fish, which are not included in the table below. 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 57. Proposed permissible direct take and actual take of listed Snake River fall Chinook salmon adults returning in 2013 and juveniles released in 2014 for fish cultural purposes for the LFH, IPC, and FCAP programs. Yellow cells indicate proposed take changes to permit , 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	0		0		1,000		0	
	AD clip	0		0		1,000		0	
Collect for transport [d]	No fin clip	0		0		0		0	
	AD clip	0		0		0		0	
Capture, handle, and release [e]	No fin clip	0		0		0		0	
	AD clip	0		0		0		0	
Capture, handle, tag/marked/tissue sample, and release [f]	No fin clip	0		810,455	812,113	1,500 [j]	10	0	
	AD clip	0		2,335,000	2,299,521	1,100 [j]	0	0	
Intentional lethal take [g]	No fin clip	0		0		2,600 [h]	1,743	0	
	AD clip	0		0		2,200 [h]	859	0	
Unintentional lethal take [i]	No fin clip	7.5%	3.9%	7.5%	2.8%	500	150	0	
	AD clip	7.5%	3.9%	7.5%	2.8%	450	72	0	

[a] "No fin clip" salmon include hatchery-origin and natural –origin fish. The majority of unclipped fish are hatchery origin.

[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 954,545 unclipped and untagged fish released by LSRCP and LSRCP-FCAP programs. The number shown assumes full production through priority 17 (Table B4B. in *United States v. Oregon* Management Agreement 2008-2017) 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 58. Proposed permissible direct take and actual take of listed Snake River fall Chinook salmon adults returning in 2013 and juveniles released in 2014 for RM&E activities associated with the LFH fall Chinook salmon programs not directly related to fish culture. Yellow cells indicate proposed take changes to permit, 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	131 [j]	0	
	AD clip	0				600	53 [j]	0	
Collect for transport [b]	No fin clip	0		0		0		0	
	AD clip	0		0		0		0	
Capture, handle, and release [c]	No fin clip	0		Up to 15% of natural juvenile production not to exceed 25,000 fish [h]	90			10	0
	AD clip	0						10	0
Capture, handle, tag/mark/tissue sample, and release [d]	No fin clip	0		2,700 [h]	1,000	4,000 [i]	1373	100	61 [j]
	AD clip	0				2,500 [i]	434	300	19 [j]
Removal (e.g. broodstock) [e]	No fin clip	0		0		0		0	
	AD clip	0		0		0		0	
Intentional lethal take [f]	No fin clip	0		0		1,000 [i]	302	0	
	AD clip	0		0		1,000 [i]	64	0	
Unintentional lethal take [g]	No fin clip	0		300 [h]	69	0		0	
	AD clip	0		100 [h]	0	0		0	

[a] Contact with live, ESA-listed fish through juvenile and adult spawning surveys on the Tucannon River and adult spawning surveys on Asotin Creek.
[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, carcass sampling during spawning ground surveys on the Tucannon River and Asotin Creek, 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

Deschutes River fall Chinook may be a viable reference population to compare Snake River fall Chinook and is already being used in analysis by NOAA, therefore we will not be doing any analysis of that population in house.

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, power company, 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 in 2013 and reanalysis of run reconstructions back to 2004 have occurred. Prior to 2004, sub-sampling of VIE tagged fish with CWTs occurred at LFH which will require adjustments to the method employed for 2004-2012.

Recommendation: Assist the Run Reconstruction group in developing methodologies to address sampling changes that occurred prior to 2004.

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: Continue to 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 under estimate 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 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.

5. The 2008–2017 *US v. Oregon* Management Agreement will be renegotiated in 2018. Returns from yearling and subyearling programs need to be summarized and provided to policy parities so they can make informed management decisions during the renegotiation. This 2013 report shows the contributions of yearlings in fisheries and the overall contribution of subyearlings from onstation, Snake River near Couse Creek, and Grande Ronde release, but it does not split out the data by release site.

Recommendation: Calculate the benefit of each of the WDFW release sites by combining completed recoveries and dividing by the total number of fish released.

Recommendation: Meet with the NPT to standardize analysis methods and work towards consistency of data comparisons between WDFW and FCAP release sites.

Recommendation: Summarize returns to the Snake River, Columbia River, and each State of harvest interception.

Literature Cited

Busack, C. 2007. The Impact of Repeat Spawning of Males on Effective Number of Breeders in Hatchery Operations. Aquaculture (2007), doi:10.1016/j.aquaculture.2007.03.027.

Gallinat, M. P., and L.A. Ross. 2011. Tucannon River Spring Chinook Salmon Hatchery Evaluation Program, 2012 Annual Report, Draft. Washington Department of Fish and Wildlife Fish Program Report to U. S. Fish and Wildlife Service, Boise, ID.

Gallinat, M. P., and L.A. Ross. 2012. Tucannon River Spring Chinook Salmon Hatchery Evaluation Program, 2013 Annual Report, Draft. Washington Department of Fish and Wildlife Fish Program Report to U. S. Fish and Wildlife Service, Boise, ID.

Hankin, D.G., L J. Fitzgibbons, and Y. Chen. 2009. Unnatural random mating policies select for younger age at maturity in hatchery Chinook salmon (*Oncorhynchus tshawytscha*) populations. Can. J. Fish. Aquat. Sci. 66: 1505–1521 (2009).

Heath, D. D., C. W. Fox and J. W. Heath. 1999. Maternal effects on offspring size: variation through early development of Chinook salmon. Evolution 53 (5): 1605-1611.

Hegg, J. 2013. Spatial and Temporal Variation in Juvenile Salmon Life History: Implications of Habitat Alteration. Master of Science Thesis, University of Idaho, Moscow, ID.

Herrig, Dan. 2006. Personal communication, LSRCP project manager.

Knudsen, C. M., S. L. Schroder, C. Busack, M. V. Johnston, T. N. Pearsons, and C. R. Strom. 2008. Comparison of Female Reproductive Traits and Progeny of First-Generation Hatchery and Wild Upper Yakima River Spring Chinook Salmon. Transactions of the American Fisheries Society 137:1433-1445.

Milks, D., M. Varney, J. Jording, and M. Schuck. 2007. Lyons Ferry Hatchery Evaluation Fall Chinook Salmon Annual Report: 2005. Washington Department of Fish and Wildlife, Olympia, WA. Report #FPA 07-04.

Milks, D., M. Varney, and M. Schuck. 2009. Lyons Ferry Hatchery Evaluation Fall Chinook Salmon Annual Report: 2006. Washington Department of Fish and Wildlife, Olympia, WA. Report #FPA 09-04.

Milks, D., A. Grider, M. Varney, and M. Schuck. 2011. Lyons Ferry Hatchery Evaluation Fall Chinook Salmon Annual Report: 2007-2008. Washington Department of Fish and Wildlife, Olympia, WA. Report #FPA 11-02.

Milks, D., A. Grider, and M. Schuck. 2011. Lyons Ferry Hatchery Evaluation Fall Chinook Salmon Annual Report: 2009. Washington Department of Fish and Wildlife, Olympia, WA. http://www.fws.gov/lsnakecomplan/Reports/WDFWreports.html.

Milks, D., A. Grider, and M. Schuck. 2012. Lyons Ferry Hatchery Evaluation Fall Chinook Salmon Annual Report: 2010. Washington Department of Fish and Wildlife, Olympia, WA. http://www.fws.gov/lsnakecomplan/Reports/WDFWreports.html.

Milks, D., A. Grider, and M. Schuck. 2013. Lyons Ferry Hatchery Evaluation Fall Chinook Salmon Annual Report: 2011. Washington Department of Fish and Wildlife, Olympia, WA. http://www.fws.gov/lsnakecomplan/Reports/WDFWreports.html.

Milks, D., A. Oakerman, and M. Schuck. 2014. Lyons Ferry Hatchery Evaluation Fall Chinook Salmon Annual Report: 2012. Washington Department of Fish and Wildlife, Olympia, WA. http://www.fws.gov/lsnakecomplan/Reports/WDFWreports.html.

NMFS (United States Department of Commerce) and USFWS (Bureau of Sport Fisheries and Wildlife, United States Department of Interior). 1972. A Special Report on the Lower Snake River Dams: Ice Harbor, Lower Monumental, Little Goose, and Lower Granite in Washington and Idaho.

NMFS. 1993. Biological Opinion for 1993 Hatchery Operations in the Columbia River Basin.

NMFS. 2012a. Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat (EFH) Consultation. Snake River Fall Chinook Salmon Hatchery Programs, ESA section 10(a)(1)(A) permits, numbers 16607 and 16615. NMFS Consultation Numbers: 2011/03947 and 2011/03948.

NMFS. 2012b. National Marine Fisheries Service ESA Section 10(a)(1)(A) Permit for Take of Endangered/Threatened Species. Permit 16607 Snake Fall Chinook – LFH/FCAP/IPC.

Rocklage, S., J.A. Hesse. 2004. Snake River Basin Fall Chinook Salmon Production Program Marking Justification. Pre-Decisional White Paper from the Nez Perce Tribe for *US v. Oregon* TAC/PAC Review.

United States v. Oregon. 2008. *United States v. Oregon* Management Agreement 2008-2017.

U.S. Army Corps of Engineers. 1975. Special report: Lower Snake River Fish and Wildlife Compensation Plan. Walla Walla, WA.

U.S. Army Corps of Engineers. 2013. Annual fish passage report, 2012. Columbia River and Snake River projects for salmon, steelhead, and shad, Draft. North Pacific Division, Walla Walla, WA.

WDF (Washington Department of Fisheries). 1994. Lower Snake River Compensation Plan, Snake River Hatchery Evaluation Program five-year plan 1994-1998. Washington Department of Fisheries, Olympia, WA

Appendix A: Fall Chinook Run to LFH, IHR, LMO, and LGR Dams: 2008-2013

(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 IHR, LMO, and LGR dams, 2008-2013.

		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
2013	IHR Dam	57,850	19,133	nc	nc	nc	nc	nc	nc	57,850	19,133
	LOMO Dam	53,399	23,031	nc	nc	nc	nc	nc	nc	53,399	23,031
	LFH									1,025	42
	LGR Dam	55,839	22,019	726	376	nc	nc	nc	nc	56,565	22,395

[a] Night counts occurred during 18-31 August.
[b] Total from LFH consist 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 2013

2013 Fall Chinook Trapping/Sampling Protocols

by

Debbie Milks, WDFW
Bill Arnsberg/Bill Young, NPT
Stuart Rosenberger, IPC
Stuart Ellis, CRITFC
August 27, 2013

The sample rate at LGR Trap will be set at 12% and kept at that level throughout the season, if possible. If the trap is swamped with fish: Shut down the 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 two staff for helping with the broodstock collection activities at LGR and the COE and NPT are providing Aqui-S for the fall trapping period. WDFW will be providing some Aqui-S for the 2014 trapping period but discussions will need to occur about who will supply the rest of the Aqui-S for the fall period. 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.

In an effort to reduce the numbers of jacks and jills hauled to the hatcheries and to reduce the numbers of fish sacrificed with wire for run reconstruction purposes the following protocols were approved by co-managers in the basin on 8/22/2013. The sub-sampling of wire tagged fish should allow for ample recoveries for evaluation purposes.

Mangers are in contact with food banks and it appears that it may be possible to fillet some of the fish after sampling, and use them in the food bank. Food bank fish will primarily come from the early wire tagged "SMALLS" group of males <70 cm wire tagged group trapped early in the season. Wire tagged females <70 cm will be added to the "BIGS" group of fish and may be used for broodstock if needed. If not needed for broodstock, these smaller younger aged females will be used for run reconstruction needs.

Protocols:

1) This is the first year we will NOT operculum punch fish trapped at LGR.
2) This is the first year females will not be inoculated. Males will not be inoculated either.
3) Sort by code fish follow the same haul/release protocol below unless the tag action code indicates that the fish should be radio tagged
4) LFH will haul 70% of the fish trapped fish >70 cm and the NPT will haul 30%.
5) All wire tagged males <70 cm (aka: SMALLS) will be held separately in a tank and hauled to LFH.
6) Wire tagged females <70 will be added to the tank of "LARGE" fish and either hauled to LFH or NPTH.
7) Jacks suspected of being summers will need to be subsampled for wires.

Wire tagged fish:

Fork Length	Action
≥ 70cm	Haul all wires (no scales collected)
<70 cm	Haul 1 out of 5 wires (put F in with "LARGES" and M go into "SMALLS" tank)
	Release 4 out of 5 wires (no scales collected)

Untagged fish:

Fork Length	Action
≥ 70 cm	Haul all fish (collect scales on 1 in 3) data will be used to document arrival timing and profile the run for reconstruction needs.
<70 cm	Release all (collect scales on 1 in 3) data will be used to document arrival timing and profile the run for reconstruction needs.

2013 Fall Chinook Trapping/Sampling Protocols

by

Debbie Milks, WDFW
Bill Arnsberg/Bill Young, NPT
Stuart Rosenberger, IPC
Stuart Ellis, CRITFC
October 2, 2013

The sample rate at LGR Trap will be changed to 15% to provide more fish for broodstock. If the trap is swamped with fish: Shut down the 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 two staff for helping with the broodstock collection activities at LGR and the COE and NPT are providing Aqui-S for the fall trapping period. WDFW will be providing some Aqui-S for the 2014 trapping period but discussions will need to occur about who will supply the rest of the Aqui-S for the fall period. 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.

In an effort to reduce the numbers of jacks and jills hauled to the hatcheries and to reduce the numbers of fish sacrificed with wire for run reconstruction purposes the following protocols were approved by co-managers in the basin on 8/22/2013. The sub-sampling of wire tagged fish should allow for ample recoveries for evaluation purposes.

Mangers are in contact with food banks and it appears that it may be possible to fillet some of the fish after sampling, and use them in the food bank. Food bank fish will primarily come from the early wire tagged "SMALLS" group of males <70 cm wire tagged group trapped early in the season. Wire tagged females <70 cm will be added to the "BIGS" group of fish and may be used for broodstock if needed. If not needed for broodstock, these smaller younger aged females will be used for run reconstruction needs.

Protocols:

1) Give 1-ROP for fish trapped at 15% trap rate.
2) This is the first year females will not be inoculated. Males will not be inoculated either.
3) Sort by code fish follow the same haul/release protocol below unless the tag action code indicates that the fish should be radio tagged
4) LFH will haul 70% of the fish trapped fish >70 cm and the NPT will haul 30%.
5) All wire tagged males <70 cm (aka: SMALLS) will be held separately in a tank and hauled to LFH.
6) Wire tagged females <70 will be added to the tank of "LARGE" fish and either hauled to LFH or NPTH.
7) Jacks suspected of being summers will need to be subsampled for wires.

Wire tagged fish:

Fork Length	Action
≥ 70cm	Haul all wires (no scales collected)
<70 cm	Haul 1 out of 5 wires (put F in with "LARGES" and M go into "SMALLS" tank)
	Release 4 out of 5 wires (no scales collected)

Untagged fish:

Fork Length	Action
≥ 70 cm	Haul all fish (collect scales on 1 in 3) data will be used to document arrival timing and profile the run for reconstruction needs.
<70 cm	Release all (collect scales on 1 in 3) data will be used to document arrival timing and profile the run for reconstruction needs.

2013 Fall Chinook Trapping/Sampling Protocols

by

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

October 9, 2013

The sample rate at LGR Trap will be changed to 20% at the end of the day, 10/9/13, to provide more fish for broodstock. In addition, any females trapped will be hauled to the hatcheries regardless of size.

To date, 141 fall Chinook <70 cm have been given to the Asotin Food bank. The data from these fish will be used for run reconstruction purposes. Wire tagged males <70cm will be kept in the "smalls" tank and held separately at LFH until the food bank can process the fish.

All females, regardless of length will be added to the "BIGS" group of fish and may be used for broodstock if needed.

Protocols:

1) Give 1-LOP for all fish hauled to hatcheries to indicate 20% trapping rate. In prior years LOP was given to fish released at the trap.
2) This is the first year females will not be inoculated. Males will not be inoculated either.
3) Sort by code fish follow the same haul/release protocol below unless the tag action code indicates that the fish should be radio tagged and released
4) LFH will haul 70% of the fish trapped fish >70 cm and the NPT will haul 30%.
5) 1 out of 5 wire tagged males <70 cm (aka: SMALLS) will be held separately in a tank and hauled to LFH.
6) All Females will be hauled to LFH or NPTH, unless they are identified for radio tagging.
7) Jacks suspected of being summers will need to be subsampled for wires.

Wire tagged fish:

Fork Length	Action
≥ 70cm	Haul all wires (no scales collected)
<70 cm	Females: Haul all Males: Haul 1 out of 5 wires
	Males: Release 4 out of 5 wires (no scales collected)

Untagged fish:

Fork Length	Action
≥ 70 cm	Haul all fish (collect scales on 1 in 3) data will be used to document arrival timing and profile the run for reconstruction needs.
<70 cm	Females: Haul all Males (collect scales on 1 in 3) data will be used to document arrival timing and profile the run for reconstruction needs.

2013 Fall Chinook Trapping/Sampling Protocols

by

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Stuart Ellis, CRITFC
November 1, 2013

Broodstock goals at LFH and NPTH have been met, but include jills and strays. In an effort to increase the numbers of larger fish available for spawning and to reduce the numbers of jills contributing to production, the trapping protocol will be changed back to the October 2 version, although the trap rate will remain at 20%, and fish will still get 1-LOP if hauled.

Protocols:

1) Give 1-LOP for all fish hauled to hatcheries to indicate 20% trapping rate. In prior years LOP was given to fish released at the trap.
2) This is the first year females will not be inoculated. Males will not be inoculated either.
3) Sort by code fish follow the same haul/release protocol below unless the tag action code indicates that the fish should be radio tagged and released
4) LFH will haul 70% of the fish trapped fish >70 cm and the NPT will haul 30%.
5) 1 out of 5 wire tagged males and females <70 cm (aka: SMALLS) will be held separately in a tank and hauled to LFH.
6) All females and males ≥70 will be hauled to LFH, unless they are identified for radio tagging.
7) Jacks suspected of being summers will need to be subsampled for wires.

Wire tagged fish:

Fork Length	Action
≥ 70cm	Haul all wires (no scales collected)
<70 cm	Females: Haul 1 out of 5 Males: Haul 1 out of 5 wires
	Female and Males: Release 4 out of 5 wires (no scales collected)

Untagged fish:

Fork Length	Action
≥ 70 cm	Haul all fish (collect scales on 1 in 3) data will be used to document arrival timing and profile the run for reconstruction needs.
<70 cm	Females: Release all (collect scales on 1 in 3) Males: release all (collect scales on 1 in 3) data will be used to document arrival timing and profile the run for reconstruction needs.

Appendix C: Systematic Sampling Rates at Lower Granite Dam 2003-2013

Appendix C Table 1. Dates, times, and trapping rates of fall Chinook at Lower Granite adult trap, 2003-2013.

Year	Date opened trap	Trap rate (%)	Date trap closed	Date/time trapping rate changed	Modified trapping rate (%)	Date/time trapping rate changed	Adjusted 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 8:00 am[c]	20	-	12 Sept 2:52 pm	12	26 Sept 3:00 pm	10	21 Nov
2009	18 Aug 7:37 am	12	-	9 Sept 7:25 am	9	-	nc	15 Nov
2010	22 Aug 11:05 am	12	10 Sept-10:50 am [d] 18 Sept-10:50 am [b]	18 Sept 3:00 pm	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
2013	23 Sept 10:07 am	12	27 Sept- 3:00 pm[e]	01 Oct 2:22 pm	15	8 Oct 2:22 pm	20	24 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.
[e] Trap was closed down at 3:00 pm for two hours due to large numbers of fall Chinook.

Appendix D: Trapping and Sorting Protocols at Lyons Ferry Hatchery 2013

2013 Trapping protocol at LFH

10/9/13 version

Open the trap on Oct 2.
Trap any fish > 75 cm to increase numbers of older aged fish for broodstock.
Processing fish for the food bank
Oct 7 we processed 141 fish < 70 cm FL for run reconstruction needs and food bank needs.
Oct 17 we will process the next group of small males for the food bank.

Sorting protocol

Sort Volunteers on October 22
Count and sex all fish: 1) Males and Females ≥ 75, and 2) Males and Females <75
Lower Granite count of females on October 22
Count and sex all fish.

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 70 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.

2013 Trapping protocol at LFH

10/21/13 version

Open the trap on Oct 2.
Trap any fish > 75 cm to increase numbers of older aged fish for broodstock.
Processing fish for the food bank
Oct 7 we processed 141 fish < 70 cm FL for run reconstruction needs and food bank needs.
Oct 17 we will process the next group of small males for the food bank.

Sorting protocol

Sort Volunteers on October 22
Count and sex all fish: 1) Males and Females ≥ 75, and 2) Males and Females <75
Lower Granite count of females on October 22
Count and sex all fish.

Mating protocol at LFH

All wire tagged fish must wait until their CWTs are decoded before they are used in a mating.
Wire tagged Males verified as adults can be used on multiple females
Untagged Males ≥75 cm can be used on multiple females
Untagged Males 70-75 cm will primarily be used in 1 x 1 crosses, but may be used multiple times if we are short on males.
Males <70 cm will not be used in matings unless they are verified as adults. These
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.
Stray females verified by CWTs will be spawned with known origin males.

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 *United States v. Oregon* Management Agreement 2008-2017, Table *B4B*.

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 2013 Broodstock PBT Tissue Samples

Appendix F Table 1: Lyons Ferry Hatchery 2013 broodstock PBT tissue samples by fish ID number.

DNA ID	Fish_ID	DNA ID	Fish_ID	DNA ID	Fish_ID	DNA ID	Fish_ID
1	M3001	41	1029	81	2022	121	2040
2	1001	42	1026	82	2024	122	2039
3	M3002	43	1025	83	2019	123	M3051
4	1002	44	1027	84	M3029	124	M3033
5	M3003	45	M3016	85	M3031	125	2032
6	M3004	46	1030	86	M3032	126	2048
7	1003	47	1031	87	M3035	127	2036
8	1004	48	1032	88	M3030	128	2051
9	1005	49	M3017	89	M3037	129	M3053
10	M3005	50	1033	90	2025	130	2052
11	1006	51	1034	91	2018	131	M3052
12	M3006	52	1035	92	2016	132	2054
13	M3007	53	1036	93	2017	133	2050
14	1007	54	M3018	94	2034	134	2056
15	1008	55	M3019	95	2033	135	2058
16	1009	56	M3020	96	2004	136	2059
17	1010	57	2001	97	2014	137	M3056
18	1011	58	2002	98	2035	138	M3060
19	1012	59	M3021	99	2030	139	2060
20	1013	60	2006	100	2031	140	M3064
21	M3008	61	M3022	101	M3043	141	M3063
22	M3009	62	2005	102	M3045	142	M3067
23	1014	63	2007	103	2029	143	2049
24	1015	64	2009	104	M3044	144	2065
25	1016	65	2010	105	2043	145	M3057
26	1018	66	2011	106	M3047	146	M3069
27	1019	67	2008	107	2045	147	M3072
28	1020	68	2003	108	2028	148	M3070
29	1017	69	2013	109	M3048	149	2066
30	1021	70	2012	110	2046	150	2070
31	M3010	71	M3025	111	M3046	151	M3073
32	M3011	72	M3027	112	M3050	152	M3065
33	M3012	73	M3024	113	2044	153	M3062
34	M3013	74	M3023	114	M3042	154	2062
35	1022	75	M3026	115	M3041	155	M3075
36	M3014	76	M3028	116	2026	156	2069
37	1023	77	2020	117	2041	157	2075
38	M3015	78	2015	118	M3034	158	M3061
39	1024	79	2021	119	M3036	159	2057
40	1028	80	2023	120	M3049	160	M3077

Appendix F Table 1: Lyons Ferry Hatchery 2013 broodstock PBT tissue samples by fish ID number.

DNA ID	Fish_ID	DNA ID	Fish_ID	DNA ID	Fish_ID	DNA ID	Fish_ID
161	2073	202	2084	243	M3098	284	M3109
162	M3071	203	2083	244	2120	285	M3108
163	2076	204	2097	245	2134	286	2148
164	M3076	205	2098	246	2133	287	2112
165	M3066	206	2099	247	M3086	288	M3107
166	2072	207	2095	248	2118	289	2149
167	2077	208	2101	249	2139	290	2153
168	M3078	209	2085	250	M3097	291	M3106
169	2078	210	2100	251	2146	292	M3112
170	M3059	211	2104	252	2138	293	M3103
171	2081	212	2106	253	2140	294	2160
172	M3055	213	2102	254	2144	295	M3120
173	2074	214	2103	255	2141	296	M3121
174	2080	215	2107	256	M3095	297	2163
175	M3079	216	2108	257	2136	298	M3123
176	M3080	217	2110	258	2129	299	2162
177	M3068	218	2109	259	2119	300	2154
178	M3058	219	2111	260	2127	301	2168
179	2061	220	M3081	261	M3093	302	2165
180	2064	221	M3083	262	2143	303	M3099
181	2082	222	2105	263	M3096	304	M3105
182	M3038	223	M3082	264	M3087	305	M3116
183	2047	224	2089	265	2145	306	M3119
184	2063	225	M3085	266	2128	307	M3117
185	2071	226	2116	267	2121	308	M3124
186	M3074	227	2117	268	2135	309	2156
187	2027	228	M3084	269	2126	310	2159
188	2055	229	M3088	270	M3100	311	M3114
189	2038	230	2091	271	2124	312	2161
190	M3039	231	M3090	272	2142	313	2157
191	M3040	232	2123	273	2130	314	M3122
192	2053	233	2122	274	2094	315	M3118
193	2068	234	M3089	275	M3091	316	2167
194	M3054	235	2131	276	M3102	317	2164
195	2042	236	2090	277	2132	318	2155
196	2037	237	2096	278	2137	319	2147
197	2079	238	2093	279	M3104	320	M3115
198	2067	239	M3092	280	2115	321	2150
199	2088	240	2092	281	2114	322	2152
200	2087	241	M3094	282	M3110	323	2166
201	2086	242	2125	283	M3113	324	M3111

Appendix F Table 1: Lyons Ferry Hatchery 2013 broodstock PBT tissue samples by fish ID number.

DNA ID	Fish_ID	DNA ID	Fish_ID	DNA ID	Fish_ID	DNA ID	Fish_ID
325	M3101	366	M3237	407	3221	448	3034
326	2151	367	M3245	408	3216	449	3033
327	2113	368	3177	409	3219	450	3029
328	2158	369	M3240	410	3218	451	3037
329	3112	370	3174	411	3203	452	3036
330	3118	371	3171	412	3224	453	M3151
331	3124	372	3154	413	3212	454	M3156
332	3115	373	3147	414	3209	455	3030
333	M3202	374	3158	415	M3127	456	M3140
334	3111	375	3168	416	M3125	457	3006
335	3105	376	3156	417	M3126	458	3002
336	3117	377	M3242	418	M3129	459	M3146
337	M3217	378	3160	419	M3132	460	M3138
338	3109	379	3165	420	M3133	461	M3154
339	3103	380	M3250	421	M3128	462	M3159
340	M3206	381	3164	422	3008	463	M3152
341	3106	382	3140	423	M3134	464	M3149
342	3102	383	3181	424	3012	465	M3153
343	3101	384	3183	425	M3130	466	M3164
344	3064	385	M3249	426	3016	467	3040
345	M3188	386	M3251	427	M3142	468	3041
346	M3181	387	3151	428	3011	469	3042
347	M3184	388	M3256	429	3019	470	M3161
348	M3148	389	M3257	430	3014	471	3043
349	3020	390	3184	431	M3144	472	3045
350	M3135	391	3179	432	3018	473	3046
351	3058	392	3196	433	3009	474	M3166
352	3010	393	M3252	434	3005	475	M3168
353	M3136	394	3195	435	3023	476	3044
354	M3137	395	M3261	436	3024	477	M3163
355	3017	396	M3266	437	M3141	478	M3175
356	3013	397	3201	438	3022	479	M3173
357	M3225	398	3198	439	3001	480	M3165
358	M3224	399	M3264	440	3003	481	M3167
359	M3229	400	3213	441	3021	482	M3169
360	M3230	401	3211	442	M3157	483	3047
361	3155	402	M3271	443	M3158	484	M3162
362	3162	403	M3265	444	3028	485	M3176
363	M3243	404	3215	445	3032	486	M3177
364	3167	405	3214	446	M3139	487	3049
365	3170	406	M3269	447	3031	488	M3170

Appendix F Table 1: Lyons Ferry Hatchery 2013 broodstock PBT tissue samples by fish ID number.

DNA ID	Fish_ID	DNA ID	Fish_ID	DNA ID	Fish_ID	DNA ID	Fish_ID
489	M3172	530	3066	572	3076	613	3210
490	M3174	531	3069	573	M3203	614	M3262
491	M3171	532	M3187	574	M3204	615	3193
492	3050	533	M3192	575	3070	616	3187
493	3048	534	M3183	576	M3205	617	3206
494	3026	535	M3196	577	M3193	618	3190
495	3025	536	3071	578	3096	619	3208
496	M3160	537	3074	579	3098	620	3191
497	M3147	538	M3199	580	M3208	621	3197
498	3038	539	3075	581	M3210	622	3152
499	3035	540	M3198	582	M3207	623	3142
500	M3155	541	3077	583	M3211	624	3161
501	3027	542	3073	584	M3212	625	3144
502	3053	543	3079	585	3108	626	3180
503	3054	544	3078	586	3100	627	3220
504	3007	545	M3200	587	M3215	628	3182
505	M3150	546	3094	588	M3216	629	3192
506	3056	547	3090	589	3113	630	3153
507	3052	548	3088	590	M3214	631	3166
508	3055	549	M3194	591	3104	632	M3233
509	3015	550	3092	592	M3219	633	M3254
510	M3178	551	3093	593	3120	634	M3244
511	3004	552	3080	594	M3221	635	3173
512	3039	553	3086	595	M3218	636	3176
513	3051	554	3095	596	M3213	637	M3231
514	M3179	555	3087	597	M3220	638	3146
515	M3145	556	3083	598	3110	639	M3239
516	M3131	557	M3197	599	3128	640	3134
517	M3180	558	3091	600	3126	641	3217
518	3057	559	3085	601	M3209	642	3200
519	M3143	560	M3190	602	3107	643	3207
520	3059	561	3089	603	3121	644	3204
521	3061	562	3082	604	3114	645	3189
522	3060	563	M3201	605	3125	646	3222
523	3063	564	3081	606	3116	647	3194
524	M3185	565	M3191	607	3099	648	3223
525	M3189	566	3084	608	3127	649	M3258
526	3062	567	3068	609	3119	650	M3270
527	3065	568	M3195	610	3097	651	M3268
528	M3186	569	3072	611	3122	652	3205
529	M3182	570	3067	612	3123	653	3139

Appendix F Table 1: Lyons Ferry Hatchery 2013 broodstock PBT tissue samples by fish ID number.

DNA ID	Fish_ID	DNA ID	Fish_ID	DNA ID	Fish_ID	DNA ID	Fish_ID
654	3149	695	M3287	736	M3298	777	3310
655	3199	696	3242	737	3254	778	3314
656	M3259	697	M3290	738	3269	779	3317
657	M3260	698	3245	739	3237	780	3304
658	3188	699	3246	740	3264	781	3306
659	M3263	700	3247	741	3225	782	3308
660	3186	701	3248	742	3226	783	3312
661	3185	702	3250	743	M3275	784	3316
662	M3267	703	M3293	744	3235	785	3322
663	3143	704	M3284	745	3259	786	M3341
664	3145	705	3252	746	M3297	787	3303
665	M3253	706	M3291	747	3283	788	3298
666	M3255	707	3238	748	3285	789	3302
667	3202	708	3244	749	M3311	790	3297
668	3178	709	3233	750	3229	791	3323
669	3159	710	3236	751	3228	792	3326
670	3163	711	3231	752	3227	793	M3347
671	M3222	712	3253	753	3230	794	3327
672	3150	713	3256	754	M3315	795	3295
673	M3248	714	3257	755	3272	796	3328
674	3148	715	3239	756	3284	797	3329
675	M3227	716	3260	757	M3316	798	M3343
676	3175	717	3261	758	M3319	799	3336
677	M3247	718	3255	759	M3309	800	3332
678	M3223	719	M3308	760	M3317	801	3333
679	M3226	720	3265	761	M3318	802	3335
680	3157	721	M3310	762	M3324	803	M3326
681	3172	722	3271	763	M3325	804	M3328
682	M3238	723	3266	764	M3314	805	M3334
683	3169	724	3276	765	M3300	806	3346
684	M3232	725	3274	766	M3322	807	M3344
685	3129	726	3281	767	M3321	808	3345
686	3131	727	3280	768	M3323	809	3342
687	3130	728	3282	769	3309	810	3307
688	3132	729	M3303	770	M3320	811	M3345
689	M3272	730	3277	771	3315	812	3305
690	M3274	731	M3305	772	3318	813	M3346
691	M3279	732	3268	773	3321	814	M3336
692	M3282	733	M3281	774	3319	815	3320
693	M3283	734	3234	775	3313	816	3262
694	M3285	735	3267	776	3311	817	3258

Appendix F Table 1: Lyons Ferry Hatchery 2013 broodstock PBT tissue samples by fish ID number.

DNA ID	Fish_ID	DNA ID	Fish_ID	DNA ID	Fish_ID	DNA ID	Fish_ID
818	M3280	859	M3353	900	M3329	941	3389
819	M3288	860	3371	901	3340	942	M3363
820	M3312	861	M3331	902	3344	943	3401
821	M3294	862	M3351	903	M3337	944	3399
822	M3313	863	M3338	904	3292	945	3384
823	3278	864	M3364	905	3305	946	M3366
824	3279	865	3374	906	3251	947	3393
825	3263	866	M3328	907	3337	948	3395
826	M3340	867	3377	908	3354	949	3397
827	M3306	868	3296	909	M3348	950	M3375
828	M3273	869	3369	910	M3355	951	M3372
829	M3302	870	3376	911	3338	952	M3362
830	3275	871	3294	912	M3332	953	3394
831	M3277	872	M3327	913	3362	954	M3361
832	3232	873	3363	914	3356	955	M3371
833	M3276	874	M3313	915	3378	956	3387
834	3273	875	3372	916	3361	957	3391
835	3270	876	M3352	917	3366	958	M3374
836	M3307	877	3289	918	3359	959	3398
837	M3304	878	3341	919	3358	960	M3369
838	M3299	879	3328	920	3353	961	3390
839	M3301	880	3351	921	3355	962	M3368
840	M3296	881	3368	922	M3354	963	3400
841	M3289	882	3364	923	M3358	964	3388
842	3243	883	3293	924	M3356	965	3379
843	M3295	884	3288	925	M3357	966	M3370
844	3240	885	M3312	926	M3349	967	M3359
845	M3278	886	3290	927	3348	968	M3364
846	3241	887	3307	928	3375	969	3287
847	M3292	888	M3346	929	3349	970	3360
848	3251	889	3291	930	3383	971	3396
849	M3286	890	M3342	931	M3376	972	3409
850	3249	891	3343	932	3381	973	3432
851	3357	892	M3304	933	3386	974	3443
852	3339	893	3334	934	3385	975	M3387
853	3350	894	3345	935	3324	976	3438
854	3373	895	3330	936	3382	977	3419
855	3367	896	3347	937	3380	978	3405
856	M3372	897	M3335	938	M3373	979	M3384
857	3370	898	M3339	939	M3365	980	3436
858	M3360	899	3286	940	3392	981	3437

Appendix F Table 1: Lyons Ferry Hatchery 2013 broodstock PBT tissue samples by fish ID number.

DNA ID	Fish_ID	DNA ID	Fish_ID	DNA ID	Fish_ID	DNA ID	Fish_ID
982	3430	1023	3421	1064	M3405	1105	4038
983	3445	1024	3425	1065	4020	1106	M3436
984	3440	1025	M3380	1066	4021	1107	4030
985	3433	1026	M3377	1067	M3427	1108	M3414
986	3410	1027	3424	1068	4022	1109	M3446
987	3439	1028	M3381	1069	M3426	1110	M3447
988	3442	1029	3417	1070	4013	1111	M3404
989	3434	1030	3403	1071	M3421	1112	M3400
990	M3388	1031	3406	1072	4024	1113	M3415
991	3435	1032	M3393	1073	M3431	1114	M3411
992	M3386	1033	M3396	1074	M3434	1115	M3437
993	3407	1034	4001	1075	M3425	1116	M3441
994	3431	1035	M3402	1076	4014	1117	4028
995	3420	1036	4003	1077	M3429	1118	M/unclipped
996	3408	1037	M3395	1078	M3433	1119	M/unclipped
997	3411	1038	M3398	1079	M3428	1120	M3449
998	M3390	1039	4006	1080	M3432	1121	4057
999	M3389	1040	M3394	1081	M3424	1122	4061
1000	M3383	1041	M3403	1082	M3430	1123	M3455
1001	M3382	1042	4007	1083	4037	1124	M3453
1002	3414	1043	M3407	1084	M3439	1125	4056
1003	3422	1044	M3399	1085	4036	1126	4062
1004	3413	1045	4008	1086	4041	1127	4065
1005	3429	1046	M3406	1087	4040	1128	4064
1006	3428	1047	4009	1088	M3420	1129	4058
1007	3426	1048	M3397	1089	4050	1130	4055
1008	3402	1049	4011	1090	4046	1131	4059
1009	M3379	1050	4012	1091	4042	1132	4063
1010	3427	1051	M3409	1092	M3392	1133	M3456
1011	3418	1052	M3408	1093	M3443	1134	M3450
1012	3415	1053	M3401	1094	4051	1135	M3454
1013	3404	1054	4002	1095	M3442	1136	M3448
1014	3441	1055	M3412	1096	4053	1137	M/unclipped
1015	3444	1056	M3418	1097	M3410	1138	M3451
1016	3446	1057	4005	1098	4044	1139	4047
1017	M3391	1058	M3413	1099	4048	1140	M3422
1018	M3385	1059	4004	1100	4054	1141	M3445
1019	3412	1060	M3419	1101	4033	1142	M3438
1020	3423	1061	4017	1102	4029	1143	4082
1021	3416	1062	M3423	1103	4031	1144	4083
1022	M3378	1063	4016	1104	4027	1145	4077

Appendix F Table 1: Lyons Ferry Hatchery 2013 broodstock PBT tissue samples by fish ID number.

DNA ID	Fish_ID	DNA ID	Fish_ID	DNA ID	Fish_ID	DNA ID	Fish_ID
1146	4081	1187	M3461	1228	4032	1269	4165
1147	4079	1188	4102	1229	4034	1270	4162
1148	4075	1189	M3463	1230	4026	1271	4151
1149	4084	1190	4107	1231	M3460	1272	4142
1150	4088	1191	4109	1232	M3444	1273	4157
1151	4092	1192	4099	1233	4137	1274	4023
1152	4093	1193	M3464	1234	4135	1275	4019
1153	4089	1194	4117	1235	4025	1276	4155
1154	4078	1195	4112	1236	M3465	1277	4158
1155	4074	1196	4115	1237	4136	1278	M3416
1156	4091	1197	4119	1238	M3417	1279	4010
1157	4073	1198	4116	1239	M3466	1280	4015
1158	4072	1199	4113	1240	4140	1281	4169
1159	4076	1200	4122	1241	4018	1282	4171
1160	4067	1201	4118	1242	M3467	1283	4177
1161	4069	1202	4114	1243	4138	1284	4179
1162	4066	1203	4127	1244	4141	1285	4184
1163	4068	1204	4132	1245	4145	1286	4183
1164	4070	1205	4130	1246	M3471	1287	4180
1165	4080	1206	4125	1247	4148	1288	4174
1166	4086	1207	4123	1248	4147	1289	M3474
1167	4071	1208	4120	1249	4149	1290	4181
1168	4090	1209	4129	1250	4150	1291	4175
1169	4087	1210	4134	1251	M3472	1292	4182
1170	4085	1211	4104	1252	M3468	1293	M3476
1171	4045	1212	4121	1253	M3470	1294	4178
1172	4060	1213	4124	1254	4152	1295	4173
1173	M3458	1214	4133	1255	4144	1296	4176
1174	M3459	1215	M3462	1256	4159	1297	M3475
1175	4039	1216	4105	1257	4139	1298	4170
1176	4035	1217	4108	1258	4160	1299	4172
1177	4049	1218	4126	1259	4161	1300	M3477
1178	M3440	1219	4095	1260	4156	1301	M3473
1179	4052	1220	4110	1261	4164	1332	4185
1180	4094	1221	4106	1262	4163	1333	4187
1181	M3457	1222	4128	1263	M3469	1334	4186
1182	4098	1223	4131	1264	4154	1335	4193
1183	4097	1224	4111	1265	4167	1336	4195
1184	4100	1225	4043	1266	4166	1337	M3491
1185	4101	1226	M3435	1267	4153	1338	4200
1186	4103	1227	4096	1268	4146	1339	M3489

Appendix F Table 1: Lyons Ferry Hatchery 2013 broodstock PBT tissue samples by fish ID number.

DNA ID	Fish_ID	DNA ID	Fish_ID	DNA ID	Fish_ID	DNA ID	Fish_ID
1340	M3495	1381	4228	1422	4267	1464	4257
1341	M3498	1382	4233	1424	4260	1465	4244
1342	4192	1383	M3482	1425	4262	1466	4247
1343	4190	1384	4213	1426	M3514	1467	4229
1344	M3501	1385	M3492	1427	4253	1468	4272
1345	4196	1386	M3483	1428	4254	1469	M3526
1346	M3499	1387	4227	1429	4266	1470	M3500
1347	M3496	1388	4236	1430	4265	1471	M3524
1348	4197	1389	M3523	1431	4268	1472	4245
1349	M3485	1390	4238	1432	4263	1473	4237
1350	4189	1391	4239	1433	4252	1474	4224
1351	M3504	1392	4231	1434	4256	1475	M3505
1352	M3506	1393	4232	1435	4270	1476	M3517
1353	M3510	1394	M3513	1436	4249	1477	4222
1354	4209	1395	4246	1437	4271	1478	M3488
1355	4207	1396	4240	1438	4276	1479	4211
1356	M3508	1397	4242	1439	4278	1480	4206
1357	4205	1398	4235	1440	M3532	1481	4198
1358	4203	1399	M3527	1441	4286	1482	4199
1359	4204	1400	4234	1442	4281	1483	4269
1360	M3494	1401	4230	1443	M3531	1484	M3509
1361	M3503	1402	M3530	1444	4284	1485	M3497
1362	4208	1403	4241	1445	4292	1486	M3521
1363	4212	1404	M3529	1446	4290	1487	M3486
1364	4202	1405	4243	1447	4294	1488	M3515
1365	4217	1406	4210	1448	4296	1489	M3493
1366	M3519	1407	4248	1449	4295	1490	4225
1367	4221	1408	M3511	1450	4293	1491	M3479
1368	M3518	1409	4250	1451	4288	1492	M3481
1369	M3516	1410	M3478	1452	4287	1493	M3484
1370	M3507	1411	4251	1453	4289	1494	4215
1371	4220	1412	4259	1454	4285	1495	4191
1372	4201	1413	4255	1455	4283	1496	M3490
1373	4223	1414	M3512	1456	4291	1497	4188
1374	M3487	1415	M3520	1457	4277	1498	M3502
1375	4226	1416	4258	1458	4273	1499	M3536
1376	4219	1417	M3525	1459	4274	1500	M3533
1377	4214	1418	M3522	1460	4279	1501	M3542
1378	4218	1419	M3528	1461	4275	1502	5001
1379	M3480	1420	4264	1462	4282	1503	M3534
1380	4216	1421	4261	1463	4280	1504	5002

Appendix F Table 1: Lyons Ferry Hatchery 2013 broodstock PBT tissue samples by fish ID number.

DNA ID	Fish_ID	DNA ID	Fish_ID	DNA ID	Fish_ID	DNA ID	Fish_ID
1505	5003	1546	M3574	1587	5065	1628	M3535
1506	M3547	1547	5046	1588	5081	1629	M3624
1507	M3550	1548	5047	1589	5073	1630	5077
1508	5006	1549	5049	1590	M3610	1631	M3567
1509	M3549	1550	M3587	1591	5078	1632	M3572
1510	5007	1551	5053	1592	M3588	1633	M3599
1511	M3551	1552	M3565	1593	5076	1634	M3600
1512	5005	1553	5056	1594	M3558	1635	M3608
1513	M3546	1554	M3570	1595	5082	1636	5074
1514	M3548	1555	5058	1596	M3582	1637	M3592
1515	5009	1556	5050	1597	5088	1638	M3604
1516	5010	1557	5048	1598	5091	1639	M3584
1517	M3554	1558	M3561	1599	5093	1640	M3590
1518	5011	1559	5043	1600	5096	1641	5055
1519	M3537	1560	5041	1601	5095	1642	M3571
1520	M3544	1561	M3581	1602	M3617	1643	M3586
1521	M3553	1562	5032	1603	5083	1644	5042
1522	M3543	1563	5059	1604	5085	1645	M3575
1523	M3555	1564	5031	1605	M3615	1646	5035
1524	5012	1565	5034	1606	5087	1647	5038
1525	M3560	1566	5037	1607	M3625	1648	M3541
1526	5014	1567	5060	1608	M3622	1649	5054
1527	M3563	1568	5033	1609	M3619	1650	5057
1528	5017	1569	M3598	1610	5092	1651	5044
1529	5018	1570	M3601	1611	M3614	1652	5051
1530	M3539	1571	M3596	1612	M3603	1653	M3576
1531	5019	1572	M3605	1613	5097	1654	5036
1532	5020	1573	M3589	1614	5084	1655	5030
1533	M3538	1574	5061	1615	5090	1656	M3569
1534	M3556	1575	5063	1616	M3591	1657	5024
1535	M3559	1576	5070	1617	5089	1658	M3545
1536	5025	1577	M3609	1618	M3618	1659	M3568
1537	5026	1578	5071	1619	5098	1660	M3562
1538	5027	1579	5062	1620	M3612	1661	5022
1539	5028	1580	5064	1621	M3633	1662	M3557
1540	M3573	1581	5075	1622	5072	1663	5021
1541	M3577	1582	5069	1623	5086	1664	5016
1542	5029	1583	5080	1624	5094	1665	5023
1543	M3579	1584	M3607	1625	M3578	1666	5015
1544	M3583	1585	5079	1626	M3621	1667	5004
1545	5039	1586	5067	1627	M3580	1668	M3552

Appendix F Table 1: Lyons Ferry Hatchery 2013 broodstock PBT tissue samples by fish ID number.

DNA ID	Fish_ID	DNA ID	Fish_ID	DNA ID	Fish_ID	DNA ID	Fish_ID
1669	M3566	1710	5129	1751	M3667	1792	5169
1670	5013	1711	5122	1752	M3627	1793	5175
1671	M3540	1712	M3657	1753	M3613	1794	5165
1672	5008	1713	5126	1754	M3634	1795	5157
1673	M3655	1714	M3662	1755	M3678	1796	5161
1674	5123	1715	5120	1756	M3616	1797	5173
1675	M3677	1716	M3654	1757	M3674	1798	5177
1676	5140	1717	5121	1758	M3623	1799	5168
1677	M3661	1718	5128	1759	M3606	1800	5152
1678	M3651	1719	5100	1760	5134	1801	5176
1679	M3653	1720	5124	1761	M3630	1802	5172
1680	M3648	1721	5130	1762	M3593	1803	5151
1681	M3645	1722	5106	1763	M3635	1804	5153
1682	5108	1723	5101	1764	5139	1805	5186
1683	5112	1724	M3636	1765	5145	1806	5156
1684	5119	1725	M3650	1766	5147	1807	5183
1685	5116	1726	5114	1767	M3669	1808	5185
1686	M3644	1727	5107	1768	5144	1809	5170
1687	M3641	1728	M3640	1769	5149	1810	5181
1688	M3628	1729	5102	1770	M3638	1811	5191
1689	5148	1730	M3652	1771	M3665	1812	5198
1690	5142	1731	5105	1772	M3666	1813	5199
1691	M3676	1732	M3639	1773	M3656	1814	5203
1692	5137	1733	M3642	1774	M3671	1815	5202
1693	M3673	1734	5110	1775	M3664	1816	5204
1694	5146	1735	5103	1776	M3620	1817	5194
1695	5138	1736	M3631	1777	M3647	1818	5207
1696	5136	1737	5117	1778	M3602	1819	5196
1697	5135	1738	5118	1779	5143	1820	5206
1698	5131	1739	M3646	1780	M3626	1821	5195
1699	5133	1740	M3643	1781	M3672	1822	5193
1700	M3679	1741	5115	1782	M3668	1823	5209
1701	M3649	1742	5111	1783	5141	1824	5197
1702	M3658	1743	5109	1784	5150	1825	5187
1703	M3675	1744	5113	1785	5160	1826	5189
1704	5132	1745	5104	1786	5158	1827	5192
1705	5127	1746	5099	1787	5167	1828	5178
1706	M3670	1747	M3629	1788	5166	1829	5162
1707	M3659	1748	M3632	1789	5154	1830	5205
1708	M3597	1749	M3637	1790	5174	1831	5184
1709	5125	1750	M3660	1791	5171	1832	5188

Appendix F Table 1: Lyons Ferry Hatchery 2013 broodstock PBT tissue samples by fish ID number.

DNA ID	Fish_ID	DNA ID	Fish_ID	DNA ID	Fish_ID	DNA ID	Fish_ID
1833	5201	1874	M3704	1915	M3717	1956	M3739
1834	5208	1875	M3700	1916	6033	1957	M3736
1835	5180	1876	M3701	1917	6032	1958	M3735
1836	5159	1877	M3707	1918	6028	1959	M3737
1837	5210	1878	M3711	1919	6012	1960	M3730
1838	5200	1879	M3709	1920	M3697	1961	M3741
1839	5182	1880	6007	1921	6005	1962	M3742
1840	5164	1881	M3715	1922	M3680	1963	M3744
1841	5155	1882	M3716	1923	M3691	1964	M3743
1842	5179	1883	6030	1924	M3688	1965	M3732
1843	5190	1884	M3713	1925	M3692	1966	M3740
1844	5163	1885	6031	1926	M3683	1967	M3745
1845	M3682	1886	6035	1927	6015	1968	M3746
1846	M3685	1887	6034	1928	6013	1969	M3747
1847	M3687	1888	6038	1929	6016	1970	M3750
1848	M3690	1889	6043	1930	6002	1971	M3751
1849	6001	1890	M3706	1931	M3724	1972	M3752
1850	M3689	1891	6041	1932	6054	1973	M3754
1851	6003	1892	6045	1933	6055	1974	M3749
1852	6004	1893	M3703	1934	6056	1975	M3755
1853	M3694	1894	M3699	1935	6049	1976	M3753
1854	M3693	1895	6046	1936	6050	1977	M3759
1855	6010	1896	6042	1937	6053	1978	M3748
1856	M3695	1897	6047	1938	M3718	1979	M3757
1857	M3696	1898	6037	1939	M3720	1980	M3758
1858	6017	1899	6029	1940	M3725	1981	M3762
1859	6019	1900	6026	1941	M3723	1982	M3756
1860	M3686	1901	6027	1942	M3719	1983	M3763
1861	6021	1902	6039	1943	M3726	1984	M3761
1862	M3684	1903	6025	1944	6052	1985	7032
1863	6011	1904	6023	1945	6048	1986	M3760
1864	6014	1905	6024	1946	M3727	1987	7030
1865	6008	1906	6022	1947	M3722	1988	7027
1866	6018	1907	6036	1948	6051	1989	7034
1867	6006	1908	6044	1949	M3721	1990	7026
1868	6020	1909	M3708	1950	M3728	1991	7024
1869	6009	1910	M3698	1951	M3729	1992	7025
1870	M3681	1911	M3714	1952	M3731	1993	7022
1871	M/unclipped	1912	M3712	1953	M3738	1994	7023
1872	M3702	1913	6040	1954	M3733	1995	7017
1873	M3705	1914	M3710	1955	M3734	1996	7010

Appendix F Table 1: Lyons Ferry Hatchery 2013 broodstock PBT tissue samples by fish ID number.

DNA ID	Fish_ID	DNA ID	Fish_ID	DNA ID	Fish_ID	DNA ID	Fish_ID
1997	7013	2038	M3329				
1998	7015	2039	3331				
1999	7018	2040	3300				
2000	7020	2041	M3337				
2001	7012	2042	3338				
2002	7016	2043	M3335				
2003	7033	2044	M3333				
2004	7009	2045	M3330				
2005	7003	2046	M3342				
2006	7007	2047	M3367				
2007	7006	2048	4143				
2008	7001	2049	4168				
2009	7005	2050	4194				
2010	7004	2051	5066				
2011	7029	2052	M3594				
2012	7002	2053	M3595				
2013	7021	2054	5052				
2014	7011	2055	5068				
2015	7014	2056	5040				
2016	7019	2057	M3585				
2017	7031	2058	M3564				
2018	7028	2059	M3611				
2019	7008	2060	5045				
2020	3299	2063	M3663				
2021	3135						
2022	3133						
2023	M3228						
2024	3136						
2025	M3225						
2026	3137						
2027	M3234						
2028	M3236						
2029	M3241						
2030	3138						
2031	M3246						
2032	3141						
2033	UNK						
2034	M3348						
2035	M3350						
2036	3334						
2037	3340						

Appendix G: Egg Take and Early Life Stage Survival Brood Years: 1990-2008

Appendix G Table 1: Egg take and survival numbers by life stage of Lyons Ferry origin fall Chinook spawned at LFH, brood years 1990-2008.

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
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
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
2008	5,010,224	0	1,810,800	2,969,200	1,000,000	Yearling
					1,969,200	Subyearling

[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: 2004-2012

Appendix H Table 1: 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 Table 1: 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
2006	S	2005	NPTH-Site 1705	6-15 June	612698	99,163	-	488	-	59.0			693

Appendix H Table 1: 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]
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
2007	S	2006	NPTH-Site 1705	11-15 June	612696	-	194,988	-	196,824	37.9			2,468

Appendix H Table 1: 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-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	14,932
2008	Y	2006	LFH	7-10 April	634092	-	220,350	-	5621	10.1	LR	89.5	14,807
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-Oxbow hatchery-IPC-direct	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]				FPP	VIE mark	% VIE	PIT tagged[c]
						AD clip +CWT	CWT only	AD clip only	No clip or CWT				
2008	S	2007	Snake R. below HC Dam-Oxbow hatchery-IPC-direct	6 May	104381	17,650	-	1,833	-	51.4			1,566
2008	S	2007	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	13,370
2009	Y	2007	LFH	6-10 April	634681	-	221,493	-	6,295	8.7	LR	91.8	13,369
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
2009	S	2008	Snake R. below HC Dam-Oxbow	8 May	107582	64,892	-	7,289	-	54.7			5,090

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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]
			hatchery-IPC-direct										
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			13,479
2010	Y	2008	LFH	12-15 April	635165	-	221,376	-	3,273	9.8			13,490
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
2010	S	2009	Snake R. below HC Dam-	25-27 May	090331	208,330	1,242	476,055	-	46.3			50,036

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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				
			Umatilla hatchery-IPC-direct										
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			14,932
2011	Y	2009	LFH	12-15 April	635510	-	236,175	-	163	9.9			14,940
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
2011	S	2010	NPTH-Cedar Flats Accl.	15 June	220205		103,007		323	54.5			8,244

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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]
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			14,930
2012	Y	2010	LFH	10-13 Apr	636079		236,056		4,882	10.4			14,914
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		303,514	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		308,737	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		200,645	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
2012	S	2011	NPTH-Lukes Gulch Accl..	13 June	220213	94,079		5,305		49.6			8,179

Appendix H Table 1: 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]
2012	S	2011	NPTH-Lukes Gulch Accl.	13 June	220214		99,570		496	49.6			8,236
2012	S	2011	NPTH-Cedar Flats Accl..	12 June	220215	96,099		1,276		51.7			8,110
2012	S	2011	NPTH-Cedar Flats Accl.	12 June	220216		95,710		5,771	51.7			8,451
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			14,675
2013	Y	2011	LFH	10-12 Apr	636443		243,085		2,766	10.2			14,531
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
2013	S	2012	LFH	10 May	636574	210,494	138	967		68.0			19,772
2013	S	2012	CJ1	17 May	220141	101,234				47.0			1,497
2013	S	2012	CJ1	17 May	220143		100,631		297,721	47.0			1,489
2013	S	2012	BC1	22 May	220142	100,804		202		44.0			1,505
2013	S	2012	BC1	22 May	220144		99,807		301,474	44.0			1,488
2013	S	2012	PL1	20 May	220145	100,673		404		44.0			1,495
2013	S	2012	PL1	20 May	220146		101,085		195,865	44.0			1,495
2013	S	2012	Couse Creek Direct [vs. CJ1 Accl. Study]	9-10 May	636575	202,159	2,012	1,006	123	68.0			2,985
2013	S	2012	GRR Direct	21 May	636576	216,159	430	861	183,093	49.5			3,000
2013	S	2012	Snake R. below HC Dam-Irrigon hatchery-IPC-direct	20-22 May	90703	228,054	156	651,123	413	50.4			2,994
2013	S	2012	NPTH-Cedar Flats Accl.	10 June	220221		101,113		10,899	49.4			1,570
2013	S	2012	NPTH-Cedar Flats Accl.	10 June	220222	97,468		4,384		49.4			1,427
2013	S	2012	NPTH-Lukes Gulch Accl.	11 June	220219		94,062		11,357	48.5			1,545
2013	S	2012	NPTH-Lukes Gulch Accl.	11 June	220220	96,387		2,524		48.5			1,450

Appendix H Table 1: 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]
2013	S	2012	NPTH-North Lapwai Valley Accl.	10 May	220231		199,689		194,398	85.0			2,374
2013	S	2012	NPTH-North Lapwai Valley Accl.	10 May	220225	100,435		1,015		85.0			611
2013	S	2012	NPTH-Site 1705	7 June	220226		194,561		387,401	74.0			2,532
2013	S	2012	NPTH-Site 1705	13 June	220232	97,477		7,154		74.0			455
2014	Y	2012	LFH	8-11 April	636583		250,362		2,019	9.6			14,902
2014	Y	2012	LFH	8-11 April	636584	247,714	1,673	502	1,003	9.6			14,908
2014	Y	2012	CJ1	1 April	220338		86,972		350	9.9			530
2014	Y	2012	CJ1	1 April	220339	76,256		306		9.9			464
2014	Y	2012	BC1	17 April	220336		86,380		580	8.8			526
2014	Y	2012	BC1	17 April	220341	75,180		1,274		8.8			463
2014	Y	2012	PL1	14 April	220337		88,140		295	9.0			533
2014	Y	2012	PL1	14 April	220340	76,657		774		9.0			466

[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: 1990-2007

Appendix I Table 1: Estimated survivals (%) between various life stages at LFH for fall Chinook of LFH/Snake River hatchery origin.

Brood year	Release age	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
Yearling mean:	**%**	**92.6**	**90.5**	**83.7**
	SD	**2.6**	**9.6**	**8.4**
Subyearling mean:	**%**	**93.1**	**97.2**	**90.8**
	SD	**2.3**	**3.5**	**3.7**

Appendix J: Historical Size at Age of Return of CWT LSRCP Origin Fish Processed by WDFW: 1985-2012

(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	867	-	-	-
		Median (cm)	**-**	**-**	**78**	**-**	**-**	**-**
		Range (cm)	35	66	46-98	-	-	-
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	76-82	-
1999	Male	N=	358	394	570	42	10	-
		Median (cm)	**36**	**53**	**69**	**88**	**96**	-
		Range (cm)	30-49	37-70	45-95	63-104	76-108	-
	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**	**85**	-
		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 2009-2012 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 (cm)	**35**	**59**	**77**	**93**	**-**	-
		Range (cm)	30-56	48-77	50-105	84-100	89	-
	Female	N=	-	20	504	20	-	-
		Median (cm)	**-**	**67**	**79**	**86**	**-**	-
		Range (cm)	-	53-74	55-98	72-92	-	-
2011	Male	N=	165	457	155	7	-	-
		Median (cm)	**35**	**57**	**72**	**85**	**-**	**-**
		Range (cm)	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	-
2012	Male	N=	342	438	120	6	-	-
		Median (cm)	**35**	**56**	**69**	**84**	**-**	-
		Range (cm)	28-67	32-69	51-92	56-94	-	-
	Female	N=	-	24	475	59	2	-
		Median (cm)	**-**	**63**	**76**	**83**	**-**	**-**
		Range (cm)	-	50-68	62-89	72-95	77-86	-

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**	**88**	**-**	**-**	**-**
		Range (cm)	-	32-57	48-74	62-100	-	-	-
	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=	-	-	16	16	3	-	-
		Median (cm)	**-**	**-**	**70**	**79**	**81**	**-**	**-**
		Range (cm)	-	-	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 2009-2012 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=	-	611	17	28	-	-	-
		Median	**-**	**48**	**67**	**78**	**-**	**-**	**-**
		Range	-	39-61	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	-	-	-
2012	Male	N=	-	371	627	7	2	-	-
		Median	**-**	**48**	**65**	**75**	**-**	**-**	**-**
		Range	-	35-62	41-85	65-84	81-88	-	-
	Female	N=	-	-	255	56	10	-	-
		Median	**-**	**-**	**71**	**80**	**82**	**-**	**-**
		Range	-	-	54-82	72-88	70-92	-	-

Appendix K: Tucannon River Survey Sections, Historical Escapement, and coho data

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, 2013.

Section	Description	Length of section (km)[a]	Length surveyed (km)	% of productive reach surveyed[b]	Estimated total # of redds[c]
1	Mouth of Tucannon R to highway 261 Bridge	2.8	1.7	100	39
2	Highway 261 Bridge to Smolt trap	0.2	0.2	100	15
3	Smolt trap to Powers Bridge	0.5	0.5	100	51
4	Powers Bridge to upper hog barns	1.2	1.2	100	32
5	Hog barns to Starbuck Br.	2.5	2.4	96	36.5
6	Starbuck Bridge To Fletchers Dam	2.7	1.3	48	43.6
7	Fletcher's Dam to Smith Hollow	2.9	2.9	100	21
8	Smith Hollow to Ducharme's Sheep Ranch Br.	4.4	4.4	100	25
9	Ducharme's Bridge to Highway 12	5.5	5.5	100	22
10	Highway 12 to Brines Bridge	6.2	6.2	100	0
11	Brines Bridge to 4.7 km above Brines Bridge	4.7	4.7	100	0
	Total	**33.6**	**31.0**	**95**	**285**

[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 emigrants from fall Chinook spawning in the Tucannon River, 1985-2000.

	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

[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.

Escapement and Composition of the fall Chinook Run to the Tucannon River in 2011

The run composition to the Tucannon for 2011 was not presented in the 2011 report, due to changes in estimation techniques. It was stated that the revised composition would be presented in the 2012 Annual report, but unfortunately it was overlooked. The updated 2011 run estimates are provided below.

Appendix K, Table 3. Estimated run composition of fall Chinook to the Tucannon River in 2011.

			Raw totals			Expanded run			
Age and origin	**CWT origin**	**CWT**	**F**	**M ≥53 cm**	**M <53 cm**	**F**	**M ≥53 cm**	**M <53 cm**	**Total**
In Basin Wire Fish									
HLF06YLCWT5	LF06YO	633987	1			4	0		4
HLF07SSCWT4	LF07SO	634672	5	1		19	12		31
HLF07YLCWT4	LF07YO	634680	4	2		15	23		39
	LF07YO	634681	12	1		46	12		57
HLF08SSCWT3	LF08SO	634995		2		0	23		23
HLF08YLCWT3	LF08YO	635165	11	15	2	42	174	23	240
	LF08YO	635166	13	9		50	105		154
HLF09SSCWT2	LF09SO	635180	1	1	2	4	12	23	39
HLF09YLCWT2	LF09Y0	635510			1	0	0	12	12
HCL08YLCWT3	LF08YBCA	220303		1		0	12		12
Out of Basin Wire									
HHS07SSCWT4	UMA07SUMA	90133	1			4	0		4
	UMA07SUMA	90134	1			4	0		4
	UMA07SUMA	90135	2	1		8	12		19
HHS08SSCWT3	UMA08SUMA	90330	1			4	0		4
HHS07YLAWT4	09BLANK	09BLANK	1			4	0		4
HHS55XXAWTX	09BLANK	09BLANK	1			4	0		4
No Wire Fish									
HXX07SSCLP4				1		0	12		12
HXX08YLCLP3			2	1		8	12		19
HXX55XXCLPX			1			4	0		4
UXX07SSSCA4			13	4		50	46		96
UXX08SSSCA3			1	1		4	12		15
UXX55XXSCAX				1		0	12		12
UXX55XXXXXX			1			4	0		4
Unknown if Fish had wire									
HXX07SSCLP4			1			4	0		4
HXX07YLSCA4			2	2		8	23		31
HXX08YLCLP3			1	1		4	12		15
HXX08YLSCA3			1	2		4	23		27
HXX55XXCLPX			1			4	0		4
UXX55XXSCAX			1	1		4	12		15
		Grand total	**79**	**47**	**5**	**302**	**546**	**58**	**906**

Escapement and Composition of Coho Run to the Tucannon River in 2013

DNA was collected and archived from 9 coho. Coho produced an estimated 13 redds when expanded for areas not surveyed. Eleven coho carcasses were recovered resulting in a 28.2% sample of the total Coho escapement estimate. The majority of coho were untagged fish of unknown origin

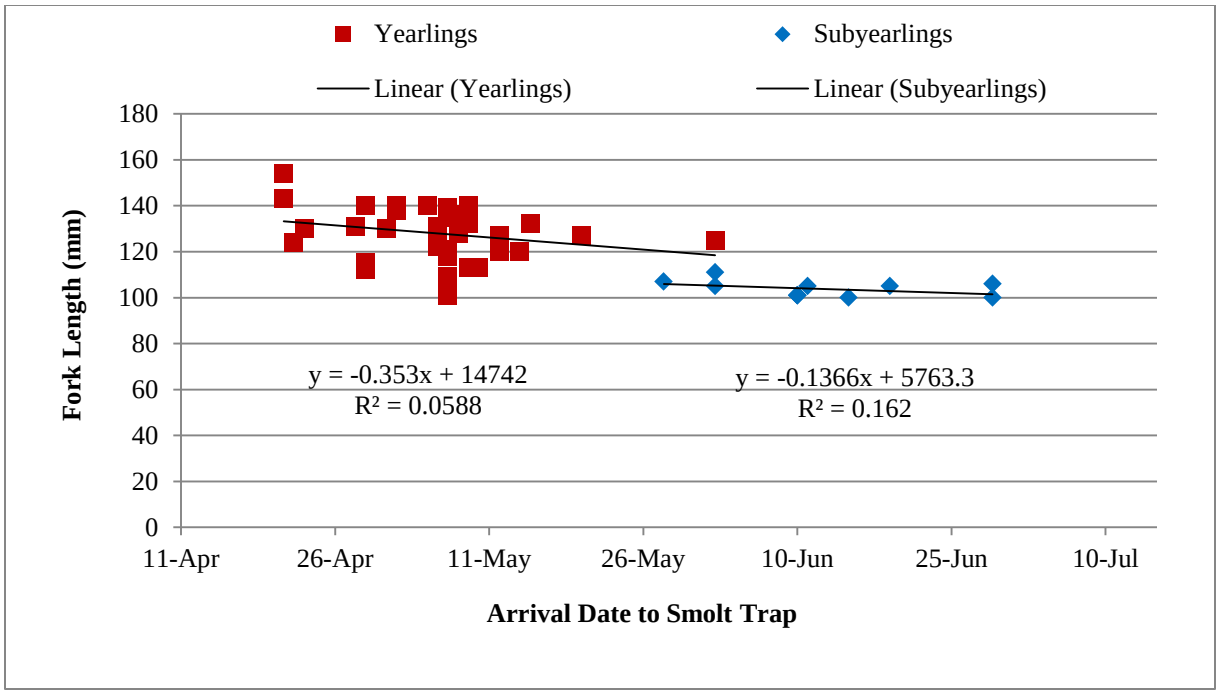
Appendix K, Table 4. Composition of coho carcasses recovered on the Tucannon River in 2013.

	Females			Males			
Origin	**AD clip**	**No clip**	**Unknown**	**AD clip**	**No clip**	**Unknown**	**Totals**
Wire Tagged coho							
Clearwater (CWTs) 635465	0	1	0	0	0	0	1
No Wire							
Unknown origin	0	3	0	0	7	0	10
Total	**0**	**4**	**0**	**0**	**7**	**0**	**11**

Juvenile Coho Emigration

Juvenile coho salmon were also captured at the Tucannon River smolt trap. Mark-recapture trap efficiencies were calculated, but were highly variable. Excluding the invalid tests, efficiencies averaged 20.0% during the trapping period. Staff captured 430 coho and estimate that 2,301 (95% C.I. = 1,676-3,313) naturally produced coho parr and smolts passed the Tucannon River smolt trap during 2013. Juvenile coho were observed at the smolt trap from 27 November through 9 July. Median passage date was 18 May. Staff took fork lengths on 415 fish which ranged from 32-163 mm in length, with a mean of 101 mm and median of 100 mm. Weights from 246 fish ranged from 1.3-53.3 g. with a mean of 16.8 and a median of 13.8 g. K-factors ranged from 0.69-1.80, with a mean and median of 1.17.

Based on scale results and fork length, it was determined there are two age classes of the emigrants as shown in Appendix K, Figure 1. There is a strong correlation between size and arrival date for subyearlings and a slight correlation for suspected yearlings. Of the 49 scale samples taken for coho, 11 were determined to be subyearlings. Fork lengths of the subyearlings ranged from 100-111 mm with a mean of 104 and median of 105 mm. Yearlings ranged from 101-154 mm in length with a mean of 128 mm and a median of 129 mm.



Appendix K, Figure 1. Arrival dates and sizes of natural origin coho trapped on the Tucannon River in 2013 by age classes.

Appendix L: Salmon Processed and Killed at LFH in 2013

(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, onstation at LFH).

Appendix L Table 1: Estimated composition of non-wire tagged salmon trapped and killed at LFH during 2013.

Age/origin determinations by method	< 53 cm Males	Females	≥ 53 cm Males	Grand total
Snake R. hatchery age 3 (2-salt) by PIT	0	1	1	2
Unknown hatchery AD age 3 (2-salt) by scales	0	3	23	26
Unknown hatchery AD age 4 (3-salt) by scales	0	2	2	4
Unknown hatchery AD unknown age	0	0	8	8
Unknown hatchery yearling age 3 (1-salt) by scales	0	1	1	2
Unknown hatchery yearling age 4 (2-salt) by scales	0	2	5	7
Unknown hatchery yearling age 5 (3-salt) by scales	0	1	0	1
Unknown origin age 3 (2-salt) by scales	0	11	19	30
Unknown origin age 4 (3-salt) by scales	0	12	6	18
Unknown age/origin (presume hatchery)	0	4	7	11
Total	**0**	**37**	**72**	**109**

Appendix L Table 2: Estimated composition of wire tagged fall salmon trapped and killed at LFH during 2013.

Origin by CWT	CWT	<53 cm Males	Females	≥ 53 cm Males	Grand total
LF07YO	634681	0	1	0	1
LF08YBCA	220303	0	0	1	1
LF08YCJA	220300	0	0	1	1
LF08YO	635165	0	22	4	26
	635166	0	23	3	26
LF09SBCA	220306	0	1	0	1
	220307	0	2	0	2
LF09SCCD	635181	0	0	3	3
LF09SCJA	220308	0	0	1	1
	220309	0	1	1	2
LF09SGRRD	635182	0	0	1	1
LF09SO	635180	0	35	13	48
LF09YBCA	220312	0	1	1	2
	220317	0	0	1	1
LF09YCJA	220314	0	1	1	2
LF09YO	635510	0	171	91	262
	635564	0	134	70	204
LF09YPLA	220316	0	3	0	3
LF10SBCA	220117	0	0	2	2
	220118	0	0	4	4
LF10SCCDA	635997	0	2	3	5
LF10SCJA	220119	0	1	1	2
	220120	0	1	1	2

Appendix L Table 2: Estimated composition of wire tagged fall salmon trapped and killed at LFH during 2013.

Origin by CWT	CWT	<53 cm Males	Females	≥ 53 cm Males	Grand total
LF10SO	635998	0	47	53	100
LF10SPLA	220121	0	0	1	1
LF10YO	636079	7	16	54	77
	636080	2	17	46	65
LF11SO	636417	1	0	1	2
LF11SIPCHC	090587	1	0	0	1
LF11YO	636443	16	0	0	16
	636444	14	0	0	14
NPTH10SLGA	220207	0	0	1	1
BON08YUMA	090246	0	3	0	3
	090329	0	2	3	5
BON09YUMA	090355	0	3	0	3
	090356	0	1	0	1
BON10YUMA	090492	0	0	1	1
	090493	0	0	1	1
LWS09SLWS	054597	0	0	1	1
PRIEST10SCOL	635766	0	1	0	1
RING10SCOL	090488	0	1	0	1
UMA09SUMA	090327	0	1	1	2
	090328	0	3	1	4
	090330	0	2	2	4
UMA10SUMA	090433	0	6	4	10
	090434	0	2	5	7
	090435	0	0	4	4
	090436	0	3	6	9
COHO09CRH	090335	0	0	1	1
METHOW10SPCH	636064	0	1	1	2
TWISP10SPCH	635584	0	0	1	1
LOST TAG	Age 4 (3-salt)	0	0	1	1
	Age 4 (2-salt)	0	1	2	3
	Age 3 (1-salt)	0	0	1	1
	unknown age	0	1	11	12
UNREADABLE TAG	Age 3 (2-salt)	0	1	0	1
Total		**41**	**511**	**406**	**958**

Appendix L Table 3: Estimated composition of non-wire tagged salmon trapped at LGR Dam that were hauled to LFH and killed during 2013.

Age/origin determinations by method	< 53 cm Males	Females	≥53 cm Males	Grand total
Snake R. natural sub res rear age 4 by PIT tag	0	0	1	1
Snake R. natural res rear age 4 by PIT tag	0	1	0	1
Snake R. natural sub age 3 by PIT tag	0	0	1	1
Snake R. natural sub age 4 by PIT tag	0	2	1	3
Snake R. hatchery sub res rear age 3 by PIT tag	0	1	1	2
Snake R. hatchery sub res rear age 4 by PIT tag	0	8	4	12
Snake R. hatchery sub res rear age 5 by PIT tag	0	3	0	3
Snake R. hatchery sub age 3 by PIT tag	0	30	38	68
Snake R. hatchery sub age 4 by PIT tag	0	38	13	51
Snake R. hatchery sub age 5 by PIT tag	0	1	0	1
Snake R. hatchery yearling age 4 by PIT tag	0	0	1	1
Unknown Snake R. res rear age 4 by PIT tag	0	3	6	9
Unknown Snake R. sub age 4 by PIT tag	0	0	3	3
Unknown Snake R. sub age 5 by PIT tag	0	6	8	14
Unknown Snake R. unknown age by PIT tag	0	2	3	5
Out-of-basin hatchery sub age 4	0	1	0	1
Unknown hatchery AD age 2(1-salt) by scales	2	0	0	2
Unknown hatchery AD age 3(2-salt) by scales	0	14	13	27
Unknown hatchery AD age 4(3-salt) by scales	0	14	8	22
Unknown hatchery yearling age 3(1-salt) by scales	0	1	1	2
Unknown hatchery yearling age 4(2-salt) by scales	0	7	2	9
Unknown hatchery age/origin by AD clip	0	5	0	5
Unknown origin sub res rear age 4(2-salt) by scales	0	3	0	3
Unknown origin sub res rear age 5(3-salt) by scales	0	1	0	1
Unknown origin res rear age 3(1-salt) by scales	0	0	2	2
Unknown origin res rear age 4(2-salt) by scales	0	14	10	24
Unknown origin res rear age 5(3-salt) by scales	0	1	1	2
Unknown origin age 2(1-salt) by scales	0	95	161	256
Unknown origin age 3(2-salt) by scales	0	143	81	224
Unknown origin age 4(3-salt) by scales	0	11	1	12
Unknown age/origin (Presume hatchery)	2	20	31	53
Total	**4**	**425**	**391**	**820**

Appendix L Table 4: Estimated composition of wire tagged salmon that were trapped at LGR, hauled to LFH, and killed during 2013.

Origin by CWT	CWT	<53 cm Males	Females	≥53 cm Males	Grand total
LF08SCCD	634996	0	1	0	1
LF08SPLA	610181	0	1	0	1
LF08YBCA	220302	0	1	0	1
	220303	0	1	0	1
LF08YCJA	220300	0	4	0	4
	220305	0	1	0	1
LF08YO	635165	0	4	1	5
	635166	0	3	0	3
LF08YPLA	220301	0	2	0	2
	220304	0	1	0	1
LF09SBCA	220306	0	2	1	3
	220307	0	3	1	4
LF09SCCD	635181	0	9	5	14
LF09SCJA	220308	0	3	2	5
	220309	0	4	3	7
LF09SGRRD	635182	0	6	5	11
LF09SIPCHC	090331	0	9	6	15
	100142	0	1	0	1
	104383	0	3	0	3
	106482	0	1	1	2
LF09SO	635180	0	13	3	16
LF09SPLA	220310	0	9	2	11
	220311	0	8	1	9
LF09YBCA	220312	0	1	1	2
	220317	0	4	2	6
LF09YCJA	220314	0	7	0	7
	220315	0	3	0	3
LF09YO	635510	1	33	16	50
	635564	0	38	8	46
LF09YPLA	220313	0	0	1	1
	220316	0	2	0	2
LF10SBCA	220117	0	4	4	8
	220118	0	2	6	8
LF10SCCDA	635997	1	12	8	21
LF10SCJA	220119	0	3	4	7
	220120	0	7	3	10
LF10SGRRD	635999	0	1	1	2
LF10SIPCHC	090447	0	2	0	2
	100153	0	1	0	1

Appendix L Table 4: Estimated composition of wire tagged salmon that were trapped at LGR, hauled to LFH, and killed during 2013.

Origin by CWT	CWT	<53 cm Males	Females	≥53 cm Males	Grand total
LF09SO	635998	0	25	21	46
LF10SPLA	220121	0	4	1	5
	220122	0	3	3	6
LF10YBCA	220318	3	2	8	13
	220323	4	1	6	11
LF10YCJA	220320	4	2	7	13
	220321	0	0	4	4
LF10YO	636079	17	6	43	66
	636080	16	12	37	65
LF10YPLA	220319	7	3	3	13
	220322	2	3	8	13
LF11SBCA	220328	1	0	0	1
LF11SCJA	220326	1	0	0	1
LF11SIPCHC	090587	1	0	0	1
LF11SO	636417	4	0	1	5
LF11SPLA	220325	1	0	0	1
LF11YBCA	220331	22	0	1	23
	220333	19	0	0	19
LF11YCJA	220332	28	0	0	28
	220335	32	0	0	32
LF11YO	636443	48	0	0	48
	636444	49	0	0	49
LF11YPLA	220330	13	0	0	13
	220334	15	0	0	15
LF11SIPCHC	100201	1	0	0	1
NPTH08SLGA	612763	0	1	0	1
NPTH09SCFA	612764	0	2	1	3
	612765	0	0	1	1
NPTH09SLGA	612747	0	5	1	6
	612748	0	1	0	1
NPTH09SNLVA	220201	0	1	2	3
	220202	0	2	2	4
NPTH09SO	220200	0	3	1	4
	612772	0	9	1	10
NPTH10SCFA	220205	0	2	8	10
	220206	0	4	10	14
NPTH10SLGA	220207	0	5	6	11
	220208	0	6	10	16
NPTH10SNLVA	220203	0	5	2	7

Appendix L Table 4: Estimated composition of wire tagged salmon that were trapped at LGR, hauled to LFH, and killed during 2013.

Origin by CWT	CWT	<53 cm Males	Females	≥53 cm Males	Grand total
NPTH10SNLVA	220204	0	3	4	7
NPTH10SO	220209	0	9	10	19
	220210	0	6	18	24
	220211	0	1	5	6
	220212	0	2	4	6
NPTH11SO	220217	2	0	0	2
NPTH11SLGA	220214	1	0	0	1
BON08YUMA	090329	0	1	0	1
BON09YUMA	090355	0	0	1	1
	090356	0	2	2	4
BON10YUMA	090489	1	0	0	1
KLICK08SO	634874	0	1	0	1
KLICK09SO	635368	0	0	1	1
LWS10SLWS	054599	0	0	1	1
PRIEST10SCOL	635764	0	1	0	1
SELWAY10SCOL	100123	0	1	0	1
UMA09SUMA	090327	0	4	1	5
	090328	0	4	1	5
	090330	0	2	1	3
UMA10SUMA	090433	0	2	4	6
	090434	0	4	2	6
	090435	0	5	6	11
	090436	0	2	5	7
COHO09CRH	090335	0	0	1	1
TUC09SPCH	635566	1	0	0	1
Lost tag	Age 3(2salt)	0	0	7	7
	Age 4(3salt)	0	1	1	2
	Age 4(2salt)	0	1	0	1
	unknown age	11	2	6	19
Unreadable tag	Age 4(3salt)	0	1	0	1
Total		**306**	**372**	**354**	**1,032**

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