

LYONS FERRY COMPLEX ANNUAL OPERATIONS PLAN

For the Period of

OCTOBER 1, 2020 – SEPTEMBER 30, 2021

Prepared by:

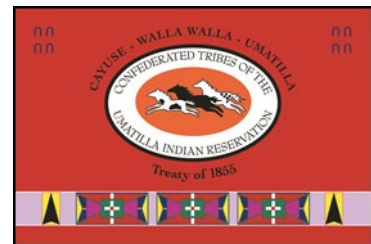
Washington Department of Fish and Wildlife



Nez Perce Tribe



Confederated Tribes of the
Umatilla Indian Reservation



**Funded By the Bonneville
Power Administration through
the
Lower Snake River
Compensation Program**



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PREAMBLE

The Annual Operating Plan (AOP) meeting and AOP/SOP documents are planning, coordination and logistics tools that identify the expected implementation of a number of hatchery operation and research/monitoring activities for the coming year in a transparent, open manner.

It is the responsibility of all AOP parties to participate in AOP meetings, provide follow up information and assistance as requested or needed, and work in good faith to complete the AOP document within the timeframe agreed upon at the AOP coordination meeting. A finalized electronic version of the AOP will be available to all cooperating agencies and serve as the working version of the document.

If a disputed or incomplete item is identified at the AOP meeting and persists to the end of the agreed completion timeframe for finalizing the AOP documents, the AOP will be finalized without the disputed or incomplete section. However, parties to the dispute will add a placeholder in the document, so they can work toward resolution.

After the AOP is finalized, and based on unforeseen or unanticipated circumstances (e.g., lower than expected returns, loss of production, infrastructure issues as examples), changes or deviations from the AOP may be warranted. In those cases, there is an expectation that the lead agency that has identified the issue will communicate with the appropriate AOP parties, through the weekly coordination calls or by email, so they can work collaboratively to address it and/or work towards resolution. Implemented changes should be documented in writing by the lead agency and communicated, to ensure transparency and as documentation of the change. These changes should also be captured in various year-end reports.

I. INTRODUCTION

A. Facilities

Lyons Ferry Complex (LFC; See Figure 1) includes Lyons Ferry Hatchery (LFH), Tucannon Hatchery (TFH), Cottonwood Acclimation Facility (Cottonwood AF), Dayton Acclimation Facility (Dayton AF), and Curl Lake Acclimation Facility (Curl Lake AF).

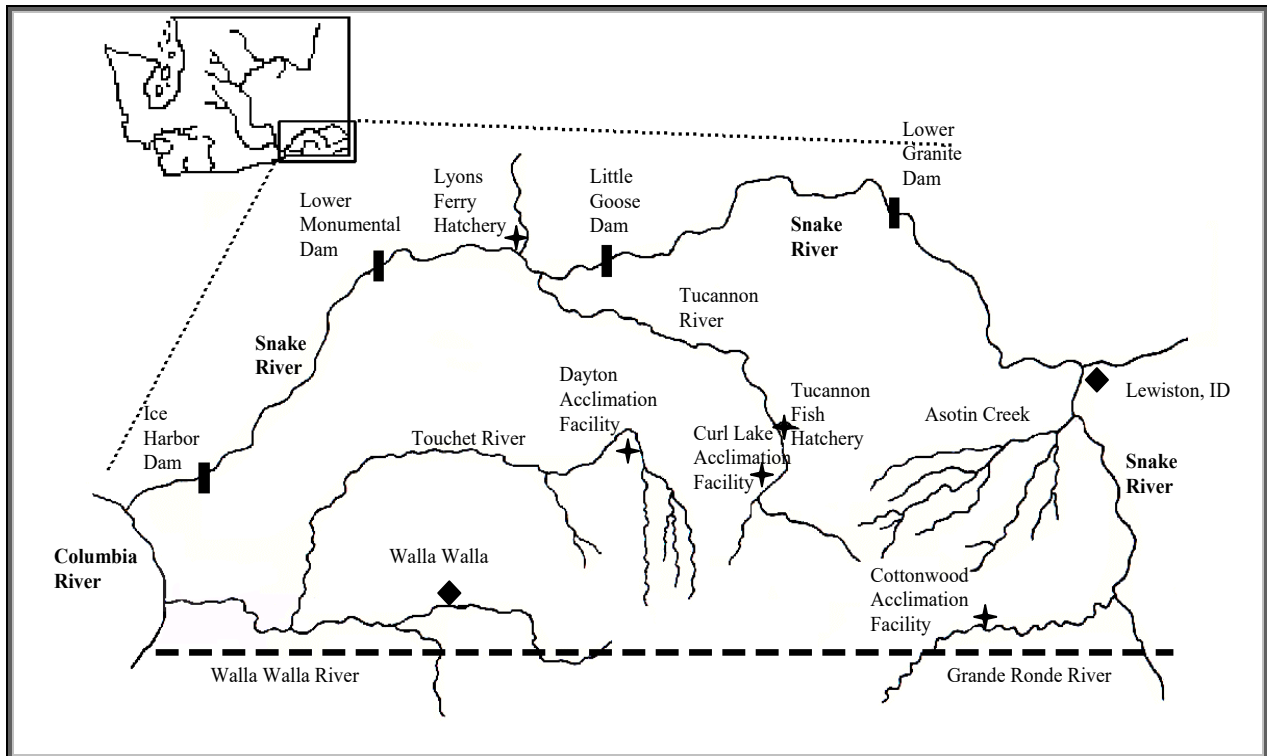


Figure 1. Map of the Lower Snake River Compensation Plan (LSRCP) LFC Facilities, and major rivers and streams in Southeast Washington.

LSRCP funded fish production in Washington began in 1983, with the construction of trout and steelhead rearing facilities at LFH. Construction of salmon hatchery facilities and steelhead acclimation sites followed and were completed in 1985. Major upgrades at TFH also occurred at that time, and operation of that facility has been funded by LSRCP ever since. Production at all facilities has been directed toward meeting established hatchery adult return goals of 18,300 fall Chinook, 1,152 spring Chinook, 4,656 summer steelhead; plus providing 67,500 angler days of fishing opportunity from 79,000 pounds of rainbow trout production (currently planted at 2.5 fish per pound (fpp)). In addition to these LSRCP adult return goals to mitigate for expected hydro system losses (approximately 48% of total desired population returns), the LSRCP hatchery program has contributed to conservation efforts to maintain and restore native populations of salmon and steelhead. Additional hatchery production of jumbo-sized (1.5 pounds each) rainbow trout at TFH that historically was state funded is now funded by the Tri-State Steelheaders (non-profit organization).

1. Lyons Ferry Hatchery

The LFH is located along the Snake River at river mile (RM) 59.1, directly below the confluence of the Palouse River in Franklin County, Washington (Figure 1). Initially it was operated as two separate facilities. Washington Department of Wildlife (WDW) operated the north-side hatchery, producing steelhead and rainbow trout. Washington Department of Fisheries (WDF) operated the south-side hatchery, rearing spring and fall Chinook. A merger of the two agencies in 1994 led to a merging of the two facilities and has since been operated by the Washington Department of Fish and Wildlife (WDFW) through LSRCP funding as LFH.

LFH facilities include two incubation buildings with office space and feed storage, plus adult fish trapping, holding and spawning structures. A visitor center provides interpretive information for guests of the hatchery. There are eight residences on-site for staff to fulfill security and emergency response needs.

The LFH rearing facilities include twenty-eight raceways at 10 ft x 100 ft x 2.8 ft and nineteen raceways at 10 ft x 88.5 ft x 3.5 ft. The raceways rear all species produced at LFH (spring and fall Chinook, summer steelhead, and rainbow trout). These raceways are covered in 2” square mesh netting. There are three large rearing lakes (643,500 cubic feet (ft³) of water each; 1,100 ft x 90 ft x 6.5 ft dimensions) which are also covered in 2” netting. Netting has significantly reduced predation since being installed in 2006-08. The steelhead and spring Chinook adult holding facilities include three 83 ft x 10 ft x 5 ft adult raceways with an enclosed spawning building incorporated over the center of these ponds. There are four 8.5 ft x 150 ft x 4.3 ft and four 10 ft x 150 ft x 4.3 ft adult fall Chinook salmon holding ponds, which also accommodate fall Chinook subyearling rearing in the spring months. The incubation facilities include 112 full Heath Tray stacks (2 units of 8 trays each) of vertical incubators in the south-side hatching building, and 88 shallow eyeing/hatching troughs and four 3.75 ft x 27.5 ft x 2 ft intermediate rearing troughs in the north-side hatching building.

Water is supplied to LFH from the Marmes pump station, which has emergency power backup generation that was completely upgraded between 2013 and 2016. The Marmes pump (wells) facility has three 300 horsepower (hp) pumps, four 200 hp pumps and one 75 hp pump. The well water right for LFH is 53,200 gallons per minute (gpm), or 118.5 cubic feet per second (cfs) of flow and water temperature is a constant 52°F.

2. Tucannon Hatchery

The TFH is located along the Tucannon River, between the towns of Dayton and Pomeroy Washington, at RM 36 in Columbia County (Figure 1). Fish production began in 1949 by the WDW. In 1983, construction began to remodel the hatchery as part of a transfer of ownership to LSRCP. Since November 1986, when construction was completed, the LSRCP has funded operations.

The TFH includes a combined incubation and office building, back-up power generation building, feed storage shed, shop, domestic water building, two well houses and a spring water collection building. There is also a river intake and adult trapping facility located upstream of

Rainbow Lake along the Tucannon River, (Rainbow Lake intake). There are two residences for staff on site to fulfill security and emergency response needs.

The TFH is supplied with three different water sources, (river, well, and spring). River water is captured from the Tucannon River at the Rainbow Lake intake and ranges in temperatures from 33 to 60 °F during use by the hatchery. The Rainbow Lake intake is located one half mile upstream of the hatchery. The captured water from the intake travels down an open channel into Rainbow Lake. From the outlet of Rainbow Lake the water travels through an 18" above ground pipeline (replaced in 2005) to TFH. Rainbow Lake functions as a reservoir to provide the hatchery with cooler water in the summer months and warmer water in the winter months. It also provides a pool of water to draw from when encountering adverse intake conditions along the Tucannon River, resulting in temporary loss of water flows. An estimated 24-36 hours of water supply is currently available following a dredging and restructuring project at Rainbow Lake that was completed in 2018. The water right for the Rainbow Lake intake is 16 cfs. Well water is pumped from two separate sources to an aeration tower, and then gravity fed to the rearing units and the domestic pump building. The combined well water right is 2 cfs, with temperatures from well #2 between 54 – 57 °F and well #3 a constant 61 °F. Spring water is pumped from an underground collection site to the same aeration tower as the well water and gravity fed to the rearing units. The water right for spring water is 5.3 cfs and has a nearly stable temperature of 51 or 52 °F.

The rearing vessels at TFH include 40 concrete 1 ft x 15 ft x 0.5 ft shallow troughs, six concrete round ponds approximately 40 ft in diameter with a maximum of 2,660 ft³ of rearing area each, two concrete 10 ft x 80 ft x 3 ft raceways, one concrete 15 ft x 136 ft x 5 ft raceway and one earthen rearing pond with a maximum of 136,221 ft³ of rearing space (170 ft x 200 ft x 6.5 ft). Species reared at TFH include rainbow trout, spring Chinook and summer steelhead.

3. Cottonwood Acclimation Facility

Cottonwood AF is located along the Grande Ronde River at RM 28.7, directly above the confluence with Cottonwood Creek in Asotin County, Washington (Figure 1). Construction was completed in February 1985.

This facility includes an adult trapping facility on Cottonwood Creek, and a small storage building. Cottonwood AF has a concrete channel with earthen walls and holds ~357,000 ft³ of water. It has a water right of 2,694 gpm (6 cfs) for the period January 1st through July 1st. It is supplied with water from Cottonwood Creek through a gravity water supply system, with the intake integrated into the adult trapping facility located ~ 0.10 miles above the pond. Water temperatures range from 34 to 52 °F during operation of the facility. It also has a small trailer for use by staff required to be on-site at all times while the pond is in operation. It is presently used for acclimation and release of Wallowa stock summer steelhead into the Grande Ronde River.

4. Dayton Acclimation Facility

Dayton AF is located along the Touchet River at RM 53 in Columbia County, Washington (Figure 1). There is an adult trapping and intake facility on the Touchet River just upstream of the acclimation pond at RM 53.3.

Construction of the Dayton AF was completed in October 1986. This pond is asphalt lined and holds ~ 200,000 ft³ of water. The water right to this pond is 2,694 gpm (6 cfs) for the period of Jan 1st – June 1st of each year. It is supplied with water from the Touchet River through a gravity water supply system, with the intake located at the adult trapping and bypass facility approximately 0.3 miles upstream. Water temperatures during operations for steelhead acclimation range from 34 to 52 °F. The pond is located adjacent to the Snake River Lab evaluation office and has a storage garage for equipment and feed. It also has a small trailer for use by staff required to be on-site at all times while the pond is in operation. It is presently used for acclimation and release of Carson stock Spring Chinook, and both Wallowa and Touchet stock summer steelhead into the Touchet River. The water intake for the Dayton AF, adult trap, and fish ladder structure was rebuilt in 2008 and serves multiple functions. During the late spring and summer months, local irrigators collect water from this intake via a separate screen box and pipeline.

5. Curl Lake Acclimation Facility

Curl Lake AF is located along the Tucannon River at RM 41 in Columbia County, Washington (Figure 1). The construction of Curl Lake AF was completed in February 1985. Curl Lake AF is an earthen pond holding ~ 784,000 ft³ of water. It has a water right of 2,694 gpm (6 cfs). It is supplied with water from the Tucannon River through a gravity water supply system. It is currently utilized for acclimation of Tucannon spring Chinook and Tucannon summer steelhead for release into the Tucannon River. Water temperatures during spring acclimation range from 34 to 48 °F. Chinook acclimation in Curl Lake AP started in 1997 following many years of steelhead acclimation at this site. After the spring Chinook are released in mid-April, steelhead are brought in for a 1-2 week acclimation period and are volitionally released from the time they enter to early May. Following the steelhead release, the pond is stocked with resident trout for fishing. It is emptied after fishing season ends October 31st each year and recharged by hatchery staff prior to spring Chinook acclimation the following January.

Due to high predation at Curl Lake on spring Chinook pre-smolts, LSCRP provided the funding for a cyclone fence which was installed in early 2015. WDFW staff maintains and monitors the fence and have added an electric wire around the perimeter to keep predators from climbing over the fence. The fence works great for keeping out mammalian predators, but an avian predation issue may still exist. This potentially high predation issue was found through the use of a PIT tag array that was installed at the outlet of the lake. We will continue to refine the use of the PIT Tag Array and how Curl Lake is drawn down during releases to provide the most accurate estimate of fish released. In 2016, staff also added a propane cannon to scare off avian predators that seemed to help.

6. Fall Chinook Acclimation Project (FCAP)

In addition to WDFW acclimation sites, in 2020 LFC will provide about 1,900,000 subyearling fall Chinook to three acclimation facilities operated by the Nez Perce Tribe (NPT): Pittsburg Landing 600,000 sub yearlings, Captain John's Rapids - 650,000 subyearlings and Big Canyon - 650,000 subyearlings. Pittsburgh Landing will receive two groups of subyearlings, 400,000 in the first group and 200,000 in the second group. Captain John's and Big Canyon will also receive two groups of subyearlings, 450,000 each in the first group and 200,000 each in the second group. Greater details of these facilities and their operations can be found in Appendix D.

B. Fish Production Summary

Annual hatchery production is intended to meet LSRCP adult return goals for several species. Current production levels are set to both conserve and rebuild the Chinook populations, or to meet the adult hatchery return goals for steelhead while minimizing any adverse effects on Endangered Species Act (ESA) listed salmon and steelhead (Table 1). Production levels for salmon and steelhead at LFC have been approved through the U.S. v Oregon (US v OR) 2018-2027 Management Agreement and specified in species specific tables within. The overall fall Chinook production goal is 4.25 million smolts (includes LFH, FCAP, and Idaho Power Company releases). The spring Chinook production goal is 475,000 smolts per year, 225,000 Tucannon stock for the Tucannon River, (initial release of 225,000 began in 2007 from the original program of 132,000 for the Tucannon stock), and 250,000 Carson stock for the Touchet River (as agreed to under US v OR). LFC is currently utilizing two hatchery steelhead stocks (Wallowa and Tucannon) to fulfill harvest mitigation objectives under LSRCP, and also utilizes two stocks (Touchet and Tucannon), for conservation purposes in the Touchet and Tucannon rivers. The summer steelhead production goal is 585,000 (385,000 Wallowa stock, 150,000 Tucannon Stock, and 50,000 Touchet stock).

It is important to stress that *any* change to a specific program at LFH or TFH will potentially impact the other programs, so "current capacity" values shown in (Table 1) represent rearing limits *as the programs are structured today*. Additionally, restrictions anywhere within the rearing cycle will determine program size. Restrictions can be rearing vessels, water, tagging groups and schedules, fish management decisions regarding harvest or adult return contribution and carrying capacity, etc.

Monitoring and Evaluation (M&E) has been ongoing since 1983 and 1985 for trout and salmon programs respectively. Recent emphasis has centered on meeting ESA permitting and recovery planning requirements. Routine monitoring includes length, weight, K factor, external fin evaluation, tag retention and fish health examinations. Pre-release quality control checks on fin clips, tag retention, etc. is completed on all WDFW releases by WDFW staff.

Table 1. LFC production capacities (historical design versus current 2020-21 production goals).

| Facility | Location River (Mile) | Water Source | Species | Designed Capacity (#Fish) | Designed Capacity (Pounds) | Current Program Capacity (#Fish) | Current Program Capacity (Pounds) |
|--------------------------|-----------------------|-----------------------------|----------------|---------------------------|----------------------------|----------------------------------|-----------------------------------|
| Lyons Ferry ^a | Snake (59) | Wells | Fall Chinook | 9,160,000 | 101,800 | 3,050,000 | 131,141 |
| | | | Spring Chinook | 132,000 | 8,800 | 475,000 | 30,033 |
| | | | Steelhead | 931,200 | 116,400 | 585,000 | 111,944 |
| | | | Rainbow | 260,000 | 86,000 | 126,750 | 48,443 |
| | | | TOTALS | 10,483,200 | 313,000 | 4,686,750 | 277,357 |
| Tucannon ^b | Tucannon (36) | Wells, Springs, Tucannon R. | Spring Chinook | 132,000 | 8,800 | 225,000 | 14,056 |
| | | | Rainbow | 210,000 | 39,285 | 98,000 | 43,719 |
| | | | Steelhead | -0- | -0- | 50,000 | 11,111 |
| | | | TOTALS | 342,000 | 48,085 | 373,000 | 68,886 |
| Cottonwood AF | Grande Ronde (28.7) | Cottonwood Creek | Steelhead | 250,000 | 31,250 | 225,000 | 50,000 |
| Curl Lake AP | Tucannon (41) | Tucannon R. | Steelhead | 160,000 | 32,000 | 50,000 | 11,111 |
| | | | Spring Chinook | | | 225,000 | 18,750 |
| | | | TOTALS | 160,000 | -0- | 275,000 | 29,861 |
| Dayton AF | Touchet (53) | Touchet R. | Steelhead | 125,000 | 27,750 | 150,000^c | 33,333^c |

^a Lyons Ferry Hatchery was designed to accommodate subyearling Chinook based on the traditional density factor of 0.18. However, with regards to fish health, fish quality, increased yearling production, marking strategies that have been implemented since construction, and water composition, the density index must not exceed 0.09 for subyearlings and 0.14 for yearlings.

^b Tucannon Hatchery was initially designed for rainbow and spring Chinook. Following facility modifications in the 1980's, and the construction of Curl Lake as an acclimation site, increased production for rainbow trout, spring Chinook, and incorporating a steelhead conservation program, were all implemented.

^c 50,000 endemic smolts will be added to the AF when volitional release begins on the Wallowa stock. No feeding will occur at this point and fish will be leaving the pond.

Table 2. LFC plants and transfers by brood years (BY) – three-year profile.

| Species | Year slated for release/transfer | | | | |
|---------------------------------|----------------------------------|----------------------------------|------------------------|---------------------------------|----------------------------------|
| | 2020 Goal | 2020 Actual Plants and Transfers | 2021 Goal ^a | Fish/Eggs on Hand For 2021 Goal | 2022 Tentative Plan ^a |
| Fall Chinook | | | | | |
| <u>Yearling releases:</u> | <u>BY 2018</u> | <u>BY 2018</u> | <u>BY 2019</u> | <u>BY 2019</u> | <u>BY 2020</u> |
| LFH-on station | 450,000 | 438,314 | 450,000 | 455,000 | 450,000 |
| NPT – FCAP (transfer) | 0 | 0 | 0 | 0 | 0 |
| <u>Subyearling releases:</u> | <u>BY 2019</u> | <u>BY 2019</u> | <u>BY 2020</u> | <u>BY 2020</u> | <u>BY 2021</u> |
| LFH-on station | 700,000 | 698,531 | 700,000 | 0 | 700,000 |
| NPT – FCAP | 1,900,000 | 1,944,683 | 1,900,000 | 0 | 1,900,000 |
| NPT – Capt. John 2 | 0 | 0 | 0 | 0 | 0 |
| <u>Eyed Egg Transfers:</u> | <u>BY 2019</u> | <u>BY 2019</u> | <u>BY 2020</u> | <u>BY 2020</u> | <u>BY 2021</u> |
| Irrigon-IPC | 1,100,000 ^b | 1,100,500 | 1,100,000 ^b | 0 | 1,100,000 ^b |
| Irrigon - Direct – GRR | 213,000 ^b | 232,284 | 213,000 ^b | 0 | 213,000 ^b |
| Spring Chinook (Stock) | | | | | |
| | <u>BY 2018</u> | <u>BY 2018</u> | <u>BY 2019</u> | <u>BY 2019</u> | <u>BY 2020</u> |
| Tucannon River (Tucannon) | 225,000 | 192,521 | 225,000 | 100,063 | 225,000 |
| Touchet River (Carson) | 250,000 | 259,978 | 250,000 | 252,521 | 250,000 |
| Summer Steelhead (Stock) | | | | | |
| | <u>BY2019</u> | <u>BY 2019</u> | <u>BY2020</u> | <u>BY 2020</u> | <u>BY 2021</u> |
| On Station (Wallowa) | 60,000 | 60,123 | 60,000 | 65,000 | 60,000 |
| Touchet (Wallowa) | 100,000 | 101,036 | 100,000 | 110,000 | 100,000 |
| Cottonwood (Wallowa) | 225,000 | 234,135 | 225,000 | 230,000 | 225,000 |
| Tucannon (Endemic, Mit) | 100,000 | 62,298 | 100,000 | 66,387 | 100,000 |
| Tucannon (Endemic, Cons) | 50,000 | 38,163 | 50,000 | 56,000 | 50,000 |
| Touchet (Endemic WxW) | 50,000 | 48,529 | 50,000 | 51,000 | 0 |
| Spokane Rainbow Trout | | | | | |
| <u>Mitigation</u> | <u>BY 2018</u> | <u>BY 2018</u> | <u>BY 2019</u> | <u>BY 2019</u> | <u>BY 2020</u> |
| Catchables | 197,500 | 215,883 ^c | 197,500 | 222,500 ^d | 197,500 |
| | 79,000lbs | 73,688lbs ^c | 79,000lbs | 79,000lbs | 79,000lbs |
| Jumbo's | 1,000 | 960 | 1,000 | 1,200 | 1,000 |
| | 1,493lbs | 1,497lbs | 1,493lbs | 1,493lbs | 1,493lbs |
| IDFG Catchables | 16,000 | 15,007 | 16,000 | 16,200 | 16,000 |
| | 5,333lbs | 3,193lbs | 5,333lbs | 5,333lbs | 5,333lbs |
| Jumbo's – NPT's | 1,650 | 1,330 | 1,650 | 1,700 | 1,650 |
| | 1,650lbs | 1,330lbs | 1,650lbs | 1,650lbs | 1,650lbs |
| <u>State Program</u> | | | | | |
| Jumbo's – TSS organization | 4,000 | 3,965 | 4,000 | 5,564 | 4,000 |
| | 5,714lbs | 6,259lbs | 5,714lbs | 5,714lbs | 5,714lbs |

^a Based on the *US v. Oregon* table B4.;

^b Transfer numbers include an overage to assure meeting mitigation goals due to possible coagulated yolk .

^c Not all fish were released as catchables. 10,015 fish at 5.3fpp & 5,421 fish at 7.8fpp were released in Oct 18.

^d All excess fish will be planted out in Oct 19.

II. SNAKE RIVER FALL CHINOOK

The fall Chinook production program at LFH is the cornerstone of a highly coordinated and integrated artificial program for Snake River fall Chinook, implemented through the LSRCP program, the Idaho Power Company (IPC) Hells Canyon Settlement Agreement, and the Nez Perce Tribal Hatchery (NPTH) with funding through BPA. Broodstock for the program at LFH are primarily collected at Lower Granite Dam (LGR) but may be collected at LFH if trapping at LGR is limited.

The *US v OR* 2018-2027 Management Agreement Table B4 shows priority release locations and numbers for fall Chinook production at LFH. A new production Table has been agreed to by the managers and NOAA Fisheries finished consultation. The new table reflects the most recent changes in production and priorities and marking/tagging for fish produced from LFH and Irrigon (Table 3).

Table 3. *US v OR* 2018-2027 Management Agreement Table B4

| Priority | Production Program | | | | |
|--------------|---------------------|------------------|-----|-----------------------|------------------------------------|
| | Rearing Facility | Number | Age | Release Location(s) | Mark/Tag |
| 1 | Lyons Ferry | 450,000 | 1+ | On Station | 450,000 Ad/CWT |
| 2 | Lyons Ferry | 450,000 | 0+ | Captain John Rapids | 200,000 Ad/CWT 250,000 Unmarked |
| 3 | Lyons Ferry | 450,000 | 0+ | Big Canyon | 200,000 Ad/CWT 250,000 Unmarked |
| 4 | Lyons Ferry | 500,000 | 0+ | On Station | 200,000 Ad/CWT 300,000 Unmarked |
| 5 | Lyons Ferry | 400,000 | 0+ | Pittsburgh Landing | 200,000 Ad/CWT 200,000 Unmarked |
| 6 | Lyons Ferry | 200,000 | 0+ | Captain John Rapids 2 | 200,000 Ad/CWT |
| 7 | Lyons Ferry | 200,000 | 0+ | Big Canyon 2 | 200,000 Ad/CWT |
| 8 | Lyons Ferry | 200,000 | 0+ | Pittsburg Landing 2 | 200,000 Ad/CWT |
| 9 | Irrigon | 1,000,000 | 0+ | Salmon River | 200,000 Ad/CWT 800,000 Unmarked |
| 10 | Irrigon | 200,000 | 0+ | Grande Ronde | 200,000 Ad/CWT |
| 11 | Lyons Ferry | 200,000 | 0+ | On Station | 200,000 Unmarked |
| TOTAL | Yearlings | 450,000 | | | |
| | Subyearlings | 3,800,000 | | | |

The LFH was initially designed to release 9.16 million fall Chinook subyearlings (Table 1) at around 90 fpp. 2019 production at LFH will be 700,000 subyearlings at approximately 50fpp and another 450,000 yearlings at 10-12 fpp. LFH will transfer another 1,900,000 subyearlings to the FCAP facilities. Size at transfer to the FCAP facilities is 65 - 75 fpp for subyearlings. Size at release goal for acclimated fall Chinook at the FCAP facilities is 50 fpp. Approximately 1,310,000 eyed eggs will be transferred to and reared at the Oregon Department of Fish and Wildlife’s (ODFW) Irrigon Hatchery for the LSRCP and IPC programs. The size at release for these subyearling programs are also 50 fpp. 1,000,000 subyearlings will be released into the Salmon River near Hammer Creek for the IPC program and another 200,000 subyearlings will be released into the Grande Ronde River near Cougar Creek as part of LSRCP production. An additional 200,000 subyearlings that were previously reared and released by Irrigon Hatchery into the Grande Ronde River are now reared and released at LFH. This decision was made and agreed upon due to the low success of Grande Ronde River released fish, and the expected greater survival from releasing them at LFH, which will equate to greater downriver fishery contributions, and overall adult returns back to the project area.

A. Fish on Hand

Brood Year 2019

In mid-September 2020, LFH had 402,135 juvenile Snake River fall Chinook on hand. Direct release of yearlings at LFH, with ~10,000 of the on-station yearlings PIT tagged at release (Table 4) will be in the spring on 2021.

Table 4. BY19 Snake River yearling fall Chinook tagging, transfers and proposed releases.

| Site | Expected Transfer | Expected Release | Size (fpp) | Age | Mark/Tag | PIT Tags | Transfer/Release Date |
|------|-------------------|------------------|------------|-----|-----------------|----------|-----------------------|
| LFH | N/A | 442,00 | 10 | 1+ | 442,000 Ad/ CWT | 10,000 | Mid-March 2021 |

B. Trapping

Brood Year 2020

Tribal, state and federal inter-jurisdictional management of fisheries for conservation of natural populations, sharing of harvestable returns and ESA take, trapping of hatchery broodstocks and distribution of fish trapped in excess of brood needs is extremely complex. In an effort to better coordinate hatchery and harvest management, agencies in the basin have implemented a structured pre-season planning, in-season coordination, post season review and evaluation process. Weekly in-season coordination teleconferences occur and run projections, harvest estimates and hatchery trapping and broodstock collection data are exchanged. Co-managers have agreed to maximize natural origin fish that are incorporated into the broodstock. Trapping protocols at LGR (within reasonable assumptions of what the Lower Granite Trap can handle) and broodstock spawning in-season management will be targeted to achieve 30% proportion of Natural Origin in Broodstock (pNOB) if possible.

The trapping objective, (**Appendix B**), for broodstock at Lyons Ferry is up to 2,600 fish based upon previously observed stray rates and pre-spawning mortalities. The female collection goal for 2020 is 1,250 ($\geq 70\text{cm}$). Each male may be used on multiple females so males are not needed at a 1:1 rate and fewer may be collected. This goal is the total numbers of fish that will need to be trapped to meet egg take goals through *Priority 11*. Brood collection occurs primarily at LGR but may also occur at LFH or NPTH. Adults trapped at NPTH may be used to supplement LFH production shortages of LGR and volunteer adult returns, and vice versa.

1. Lyons Ferry Hatchery

Trapping at LFH will not occur unless necessary to meet broodstock goals.

2. Lower Granite Dam

Trapping of fall Chinook at LGR was scheduled to begin in early August, but limitations due to COVID restrictions and NOAA staffing at LGR made that not possible. In 2020, the managers agreed to set the trap rate at 80% from the August 18th through September 7th. After September 7th, the trap will be lowered to 18%. Trap rate was reduced to 18% on the 2nd due to the number of adults the hatcheries had already collected. Specific dates of shifting the trap rate is provided here as guidelines for trap operators and the managers, but dates may be shifted depending on broodstock collection, updated run estimates, and anticipated impact rates on summer steelhead. Collected broodstock are divided between the LFH and NPTH (usually 70:30 ratio) as agreed upon annually, with a predetermined hauling schedule shared between both facilities to meet this need and adjusted as necessary. Additional fish (fish with CWT from an assortment of size and sex) needed for run reconstruction needs will be hauled to LFH (Appendix B). The goal will focus on females in calculating the 70:30 split.

C. Spawning

Brood Year 2020

Spawning will occur weekly, generally on Tuesdays and Wednesdays, starting on the 27th of October. It will continue until late November or early December, as necessary to meet egg-take goals.

CWT's on males will be read prior to matings to determine origin and age (we want to avoid using strays and jacks if possible). This practice started with BY18 adults. We will continue to increase the percentage of four and five-year-old fish in the broodstock to offset the past high incorporation rate of jacks in the broodstock and the higher harvest rate of these older age classes in lower river fisheries. Also, the goal for BY20 is to continue the strategy for reducing the number of "true jacks or jills" (i.e. one-salt fish) in the broodstock. Fork length criteria for broodstock will be adjusted in season to reflect accurate size at age estimates.

Full exclusion of strays in broodstock is preferred to retain Snake River stock integrity. To abide by the *US v Or* agreement to reach eggtake goals, if broodstock limited, stray females may be included in broodstock as long as matings including a stray do not exceed 5% of the total

numbers of matings at LFH. Strays will be incubated separately until we can determine if production goals can be met with Snake River origin females. If the goals can be met without using strays, the progeny will be culled. Jills, (one salt fish), will not be used in production unless it has been determined that we are broodstock limited, but their eggs will be fertilized for fecundity estimates (part of a 5-year evaluation on fecundity). Jills that are spawned are to be mated with true adults. We desire to minimize the numbers of jills in the broodstock so they will be incubated separately until we can determine if production goals can be met with older aged females. If production goals can be met without using jills: 1) the progeny of jills will be culled after fecundity counts at eye up, or 2) released as unfed fry as they would be tagged by Parental Based Tagging (PBT), with option one as the top preference. See Table 5 for disposition of these unfed fry. If we are short on males during spawning, jacks may be used if they come from subyearling production groups. Priority would be to keep known Snake River origin jills before keeping gametes from strays.

The mating protocol, (**Appendix C**), will minimize hatchery stray incorporation into LFH broodstock while incorporating potentially as many wild fall Chinook as possible, striving to maximize pNOB.

Tissue samples (fin clips) will be collected on all broodstock and any unmarked fish during spawning. This action began with the 2011 broodstock. Refer to the Hatchery and Genetic Management Plan (HGMP) and its Addendum for the full intent of the marking and tagging program.

Fertilized eggs will be water hardened for one hour in 100 ppm iodophor and incubated in vertical stack incubators. Distribution of progeny based on BKD ELISA sampling as identified in the fish health section of this document.

There is the potential that surplus Snake River origin fall Chinook may be available at the broodstock collection stations once egg take goals have been met. If so, all LGR transported adults with CWT will be sacrificed and sampled if needed for run reconstruction purposes, and any remaining non-CWT fish will be released back into the Snake River according to Table 5. In the event of broodstock releases during an ongoing fishery, the fish will be marked with a top caudal lobe clip to identify them as fish exposed to MS-222 or Aqui-S 20E. At this time LFH is not using Aqui-S as an anesthetic.

Table 5. Identified areas for fall Chinook juvenile and *adult out planting as presented in the June 1, 2006 Draft SRFMP.

| Facility | Out plant Locations | | |
|----------------------|---|---|--|
| | Adults/jacks | Fry | Subyearlings |
| Lyons Ferry Hatchery | -Tucannon River -Grande Ronde River -Mainstem Snake River | -Tucannon River -Mainstem Snake River near LFH -Mainstem Snake River above LGR -Mouth of Palouse River | -Mainstem Snake near Captain John Rapids -Big Canyon -Grande Ronde River -Mainstem Snake downstream of Clearwater River |
| NPTH | -Lower mainstem Clearwater River, below North Fork | -Lower mainstem Clearwater River | -Lower mainstem Clearwater River |

*-According to fish health guidelines, adults receiving antibiotic injections and/or being anesthetized must meet the withdrawal period for the antibiotic and/or anesthetic used prior to out planting.

D. Rearing

Brood Year 2020

Eggs are reared in the vertical incubators and are treated with formalin at a rate of 1:600 to control fungus on a daily basis. Eggs are shocked at eye-up around 580 temperature units (TU's). After eggs are picked, vexas screening is added to each tray to simulate substrate. Formalin treatments stop just before hatching. Hatched fry are transferred to raceways for rearing after yolk sac absorption at approximately 1,600 fpp, at approximately 1,900 TU's. Head troughs providing well water to the incubators are alarmed and visual inspections of flow through the trays along with head trough levels are conducted daily. BY 2019 will be the second BY in which all release groups will be independently PBT marked and reared to the release site/time.

In addition to the standard raceways available for rearing fall Chinook, the adult salmon holding raceways are also utilized for subyearling fall Chinook rearing. By utilizing these larger ponds, densities in other raceways are substantially reduced. In addition, this will be the third BY that the on-station subyearling release group will be partially reared (April/May) in one of the large rearing lakes, immediately following the release of yearlings from that same lake. All subyearling release groups will have a 200,000 Ad/CWT group and the remainder of each release group will be unmarked untagged. The 450,000 on-station yearlings will be 100% Ad/CWT, this will be the third year this entire group is Ad clipped. Previously it was 50% CWT only. The current density index for fall Chinook subyearlings up to marking is monitored so as not to exceed 0.09 lbs/ft³/in. Density index values can increase on a sliding scale to a maximum value of 0.14 lbs/ft³/in. for yearlings at 10-12 fpp. These density index goals were developed and agreed upon by all parties to improve fish quality and survival.

E. Tagging, Transfers and Releases

Brood Year 2020

This section outlines the anticipated subyearling and yearling production for BY20 assuming full production of Table 3. All tagging, transfers and releases are listed in Table 6.

Egg Transfers

Irrigon Hatchery will receive 1,310,000 eyed eggs for the IPC program and Grande Ronde direct release (LSRCP program). Eyed eggs are transferred from LFH to the Irrigon Hatchery in mid-December where the fish are reared, marked and tagged prior to release. Coded wire tags for the fish destined for the Grande Ronde will be purchased by WDFW and will have a WDFW Agency prefix. Quality control checks will be completed by WDFW and PIT tags will be inserted by IPC and WDFW staff as part of a cooperative effort. During late May, or by the first week of June, ODFW will direct stream release 200,000 subyearlings at 50 fpp into the Grande Ronde River at Cougar Creek near the Washington border. All 200,000 subyearlings will be Ad/CWT marked/tagged, (*Priority 10* in Table 3), with 4,500 PIT tags. See also Table 6.

The IPC subyearling program at Irrigon Hatchery will receive eggs from LFH in December. Coded wire tags for this release will be funded by IPC and will have an ODFW Agency prefix. Quality control checks will be completed by WDFW and funded by IPC. PIT tags will be inserted by IPC and WDFW staff as part of a cooperative effort. The IPC group is direct released into the Salmon River at the Hammer Creek boat ramp at a release goal of 50 fpp. The release date target is mid to late May. These fish will be 200,000 Ad/CWT and 800,000 unmarked (*Priority 9* in Table 3), with 4,500 PIT tags. See also Table 6.

Sub-Yearling Releases

A total of 700,000 subyearlings with a release goal of 50fpp are intended to be released from LFH into the Snake River in early to mid-May 2021. A total of 200,000 will be Ad/CWT marked and the remaining 500,000 will be unmarked, (*Priorities 4 & 11* in Table 3). See also Table 6. WDFW staff will insert 15,000 PIT tags into the on-station subyearlings as they are being released into the Snake River at the release structure. Quality control checks will be completed by WDFW staff. The 200,000 fish from priority 11 are the last priority of the program and this production will not happen if broodstock needs are not met. The 500,000 fish that will be unmarked will be moved from the raceways directly to Lake 1 once the yearling fall Chinook have been released.

All FCAP release sites will receive two different release groups of subyearlings, (*Priorities 2, 3, 5, 6, 7 & 8* in Table 3). See also Table 6. Captain John Rapids (CJR) Acclimation Facility (AF) will receive the first group, 450,000, tentatively on April 26, 2021 with a planned release date of May 13. The second group, 200,000, is planned to be received on May 17 with a planned release date of June 3. Big Canyon (BC) AF will receive the first group, 450,000, tentatively on April 26 with a planned release date of May 12. The second group, 200,000, is planned to be received on May 17 with anticipated release date of June 2. Both release sites will have 200,000 Ad/CWT and 250,000 unmarked/untagged fish in the first groups and 100% Ad/CWT fish in the second groups. Pittsburg Landing (PL) AF will receive the first group, 400,000, tentatively on April 19 with a planned release date of May 5. The second group, 200,000, is planned to be received on May 10 with a planned release date of May 26. The first group will be comprised of

200,000 Ad/CWT and 200,000 unmarked/untagged fish and the second group will be 100% Ad/CWT.

All marking and CWT tagging is completed by WDFW in March and April, prior to transfer. PIT tagging may occur prior to and/or post transfer to acclimation sites. All of these subyearling groups are acclimated and released by NPT at a goal of 50 fpp. Quality control checks, PIT tagging, and the purchase of the PIT tags for fish destined for FCAP facilities will be completed by NPT staff.

Yearlings

A yearling release of 450,000 fish from LFH directly into the Snake River at 10 fpp is programmed for 2022. All of these fish will be Ad/CWT'd during August-September 2021 and transferred into Lake 1. A portion of these fish will also be PIT tagged at release. In 2022, these fish will be released over an anticipated 3 to 4-day period into the Snake River in mid- to late-March.

Table 6. Proposed BY20 Snake River fall Chinook tagging, transfers and releases.

| Site | Transfer Goal | Release Goal | Size (fpp) | Age | Mark/Tag | PIT Tags | Transfer/Release Date |
|-------------------------------|---------------|--------------|------------|-----|------------------------------------|---------------------|--------------------------|
| Irrigon (IPC) | 1,100,000 | 1,000,000 | Eyed Eggs | 0+ | 200,000 Ad/CWT 800,000 Unmarked | 4,500 ¹ | Dec 2020 (eggs transfer) |
| Grande Ronde Direct - Irrigon | 210,000 | 200,000 | Eyed Eggs | 0+ | 200,000 Ad/CWT | 4,500 ² | Dec 2020 (egg transfer) |
| LFH | N/A | 700,000 | 50 | 0+ | 200,000 Ad/CWT 500,000 Unmarked | 15,000 ² | May 2021 |
| Capt. John 1 | 451,000 | 450,000 | 75 | 0+ | 200,000 Ad/CWT 250,000 Unmarked | 26,000 ³ | April – 2021 (transfer) |
| Big Canyon 1 | 451,000 | 450,000 | 75 | 0+ | 200,000 Ad/CWT 250,000 Unmarked | 11,000 ³ | April - 2021 (transfer) |
| Pittsburg Landing 1 | 401,000 | 400,000 | 75 | 0+ | 200,000 Ad/CWT 200,000 Unmarked | 26,000 ³ | April – 2021 (transfer) |
| Capt. John 2 | 201,000 | 200,000 | 75 | 0+ | 200,000 Ad/CWT | 4,500 ⁴ | May - 2021 (transfer) |
| Pittsburg Landing 2 | 201,000 | 200,000 | 75 | 0+ | 200,000 Ad/CWT | 4,500 ⁴ | May – 2021 (transfer) |
| Big Canyon 2 | 201,000 | 200,000 | 75 | 0+ | 200,000 Ad/CWT | 4,500 ⁴ | May - 2021 (transfer) |
| LFH | N/A | 450,000 | 10 | 1+ | 450,000 Ad/CWT | 10,000 ² | March 2022 |

¹ Provided by Idaho Power Company

² Provided by LSRCP

³ Provided by the Fish Passage Center for Comparative Survival Studies (CSS).

⁴ Provided by the Bonneville Power Administration (BPA).

III. TUCANNON SPRING CHINOOK

The Tucannon River Spring Chinook Hatchery production began in 1985 using endemic broodstock. Currently, both natural origin and hatchery supplementation fish are collected for broodstock. Returning adults are collected at the Rainbow Lake Intake and transported to LFH for holding, spawning, hatching and initial rearing. The release goal is 225,000 yearling smolts. WDFW has initiated internal discussions on different rearing/release strategies for the future.

A. Fish on Hand

Brood Year 2019

Mid-September 2020, LFH had 95,877 juvenile spring Chinook on hand.

B. Tagging, Transfers, and Releases

Brood Year 2019

In March 2020, the BY19 progeny were 100% CWT tagged with no fin clip at LFH. The BY19 spring Chinook at LFH will be reared at LFH until late October or early November before they are transferred to the Tucannon FH. Discussion have occurred with all managers to do three different release options over the next three release years (2021-2023). See [Appendix I](#) for more details on this study. Currently, a release will occur at Tucannon FH, a direct stream release into the lower Tucannon River, and a group put on a barge at LFH. Per standard protocols, checks for CWT retention will be conducted when the fish are PIT tagged for the study groups at Tucannon FH.

Table 7. Proposed BY19 Tucannon River spring Chinook tagging, transfers and releases.

| Site (Type) | BY19 Release Goal | Expected at release | Size (fpp) | Age | Mark/Tag | PIT Tags | Release Date |
|--|-------------------|---------------------|------------|-----|-------------------|----------|--------------|
| Tucannon FH | 225,000 | ~50,000 | 12 | 1+ | No Mark, 100% CWT | 15,000 | April 2021 |
| Lower Tucannon River (site TBD) | | 15,000 | 12 | 1+ | No Mark, 100% CWT | 15,000 | April 2021 |
| Lyons Ferry (Barge) | | 15,000 | 12 | 1+ | No Mark, 100% CWT | 15,000 | April 2021 |
| Tucannon River (site TBD) ¹ | | ~10,000 | 12 | 1+ | No Mark, 100% CWT | None | April 2021 |

¹ The high ELISA group broke with BKD early in the rearing cycle and has not responded to medicated treatments. These fish have been isolated at LFH and will remain at LFH until release directly into the Tucannon River in the spring of 2021 (site TBD). These fish will not be part of any study group but have been CWT'd per standard tagging of program fish.

C. Spawning / Outplants

Brood Year 2020

The egg take goal for BY20 is approximately 245,000 green eggs. Seventy-five females are needed to meet the egg take goal at a fecundity of 3,500. For BY20, 26 females are anticipated to be spawned with an estimated fecundity of 2,800. Fish being held for broodstock were inoculated for a second time on August 5th as they were sorted at LFH.

A 2 x 2 spawning matrix protocol will be followed for spring Chinook spawning at LFH. During the spawning activity, eggs and milt are collected in individual bags and placed in a cooler until fertilization. Spawning matrices are determined after all fish are spawned, all CWT's are checked for origin, and then fertilization takes place at the spawning building. Fertilized eggs are then brought to the dirty room where they are laid down individually into heath baskets, rinsed and placed into heath stacks to water harden in 100 ppm iodophor for one hour. All pre-spawn mortalities and spawned spring Chinook carcasses are disposed of on site or will be used for nutrient enhancement in the upper Tucannon River if possible.

Due to high pre-spawn mortality of adults passed above the trap in the Tucannon River in the past, and expected low returns for 2020, agreement was reached to bring all adults that would be passed above the trap back to LFH to be held for spawning or adult out planting. WDFW has been doing this for five years now. Given the low number of adults captured to date at the Tucannon FH adult trap, it's unlikely any fish will be outplanted in 2020.

D. Rearing

Brood Year 2020

The production goal for BY20 is 225,000 smolts at release (Table 8). Eggs are treated with formalin daily to reduce fungus and are reared in vertical incubation trays. At eye-up, eggs from individual females are shocked, picked and placed in separate trays with vexar screening to simulate substrate. Upon complete yolk-sac absorption (~1600 fpp), they will be transferred to the north side shallow troughs for introduction to feed or ponded directly into raceways on the south side of LFH.

Table 8. Proposed BY20 Tucannon River spring Chinook tagging, transfers and releases

| Site (Type) | BY20 Release Goal | Expected at release | Size (fpp) | Age | Mark/Tag | PIT Tags | Transfer/Release Date |
|---------------------------------|-------------------|---------------------|------------|-----|-------------------|----------|-----------------------|
| Tucannon FH | 225,000 | ~50,000 | 12 | 1+ | No Mark, 100% CWT | 15,000 | April 2022 |
| Lower Tucannon River (site TBD) | | 15,000 | 12 | 1+ | No Mark, 100% CWT | 15,000 | April 2022 |
| Lyons Ferry (Barge) | | 15,000 | 12 | 1+ | No Mark, 100% CWT | 15,000 | April 2022 |

E. Trapping

Brood Year 2021

Trapping for the spring Chinook broodstock program is conducted exclusively at the TFH adult trap, located upstream of TFH and incorporated to the Rainbow Lake Intake. Broodstock collection is permitted up to 170 adults. The proportion of hatchery and natural origin adults incorporated into the broodstock is based on the estimated run size and the Tucannon Spring Chinook HGMP sliding scale (Appendix H) and will be adjusted in-season, if necessary, to meet the 225,000 smolt production goal. One-ocean age (jacks: <61 cm FL) fish may be included in the brood at a rate not to exceed 10% of the adult males during low run years.

Adults collected for spawning are transferred by truck to LFH for holding. Adults will receive 167 ppm formalin treatments every-other day to control fungus and decrease pre-spawning mortality

Depending on the pre-season forecast, experience from past out planting success, and expected environmental conditions in the Tucannon River in 2021, WDFW (with co-manager agreement) may collect and hold some portion or all of the returning adults that would normally be passed upstream to spawn naturally. All held fish will be brought back to LFH and released back into the river just prior to spawning in August 2021. Percentage collected will be dependent upon preseason run forecasts and actual numbers back to the river. Conversations will be ongoing up to and through adult collection.

Staff will pass, or collect for holding, hatchery jacks to mimic the NOR jacks returning to the best of their ability and cull the excess hatchery jacks at the trap. Jacks culled at the adult trap will be utilized for food bank or stream enrichment purposes. On a low male proportion year, we will pass more HOR jacks to help ensure there are enough males on the spawning grounds.

IV. ASOTIN CREEK SPRING CHINOOK

WDFW has begun exploring options with the co-managers to implement a spring Chinook program in Asotin Creek using Tucannon River stock. This program would allow for another broodstock source in years of low returns and would act as a safety net to the Tucannon River population. Much planning still needs to occur, along with ESA consultation with NOAA Fisheries before such a program can be implemented. WDFW has completed a draft HGMP for this program at the currently agreed to program level of 75,000 smolts. WDFW is committed to work with the co-managers and LSRCP over the coming year to develop an agreed upon plan and finalize up the HGMP.

Discussions are being planned in the near future to discuss possible options of using a different hatchery stock (instead of Tucannon stock), for release in Asotin Creek. This would be an action to fulfill mitigation requirements for spring Chinook under the LSRCP. This could be a temporary action, and if returns to the Tucannon River improve in the future, options to start a program in Asotin Creek using Tucannon River stock could be implemented at that time.

V. TOUCHET SPRING CHINOOK

WDFW brought forth a proposal to PAC in January of 2018 to initiate a harvest mitigation program for spring Chinook in the Touchet River. This proposal was agreed to in PAC, passed on and accepted through the US vs OR Policy Committee. The HGMP for this program has been submitted to NOAA Fisheries for consultation. WDFW received ~275,000 eyed Carson stock eggs from the USFWS Little White Salmon facility in 2019 to produce 250,000 smolts to be released in the spring of 2021. Hatching and rearing has taken place at LFH. Fry will be ponded and reared in raceways and/or one of the large rearing lakes until they are shipped to the Dayton Acclimation Facility in February 2021 (see table 9). Smolts will be PIT tagged before they are moved to the Dayton AF. Smolts will be released from the Dayton AF in mid to late-March 2021. Descriptions of future broodstock collections, spawning and rearing of this group of fish at LFH will be provided in future AOP's.

A. Fish on Hand

Brood Year 2019

Mid-September 2020, LFH had 252,521 juvenile spring Chinook on hand. This group is in Lake #2 for rearing at LFH and will be transferred to the Dayton AF in February.

B. Tagging, Transfers, and Releases

Brood Year 2019

In March 2020, the BY19 progeny were 100% Ad clipped and CWT tagged at LFH.

Table 9. Proposed BY19 Touchet River spring Chinook tagging, transfers and releases.

| Site (Type) | BY19 Release Goal | Expected at release | Size (fpp) | Age | Mark/Tag | PIT Tags | Release Date |
|--------------------|-------------------|---------------------|------------|-----|----------------------------------|----------|--------------|
| Dayton AP Facility | 250,000 | 250,000 | 12 | 1+ | 85,000 Ad/CWT 165,000 Ad Only | 15,000 | March 2021 |

C. Spawning

Brood Year 2020

The goal for eyed eggs to be shipped in is 270,000. For 2020, eyed eggs are to be provided from Little White Salmon NFH but may come from Carson or Leavenworth Federal Hatcheries as green eggs dependent on adult availability.

D. Rearing

Brood Year 2020

The production goal for BY20 is 250,000 smolts at release (Table 10). Eggs are treated with formalin daily to reduce fungus and are reared in vertical incubation trays. At eye-up (if we receive green eggs), eggs from individual females are shocked, picked and placed in separate trays with vexar screening to simulate substrate. Upon complete yolk-sac absorption (~1600 fpp), they will be ponded directly into raceways at LFH. It's currently anticipated that these fish will also be reared in one of the large rearing lakes at LFH.

Table 10. Proposed BY20 Touchet River spring Chinook tagging, transfers and releases.

| Site (Type) | BY20 Release Goal | Expected at release | Size (fpp) | Age | Mark/Tag | PIT Tags | Transfer/Release Date |
|---------------|-------------------|---------------------|------------|-----|----------------------------------|----------|-----------------------|
| Touchet River | 250,000 | 250,000 | 12 | 1+ | 85,000 Ad/CWT 165,000 Ad Only | 15,000 | March 2022 |

E. Trapping

Brood Year 2021

For BY21 there is no plan of trapping adults at the Touchet River trap. We will not see any returning adults until 2022. However, WDFW evaluation staff will be operating the Dayton adult trap to capture returning jacks to get an idea of how successful future trapping efforts may be. In 2022, it's anticipated that we may have to get some eggs from Carson or Little White Salmon NFH's until we have enough adults returning to meet broodstock needs.

In 2021, with some jacks anticipated to be captured at the Dayton adult trap, WDFW will work with CTUIR on providing any jacks to tribal members if desired. To confirm that the jacks did come from the Touchet River program, WDFW would prefer to remove the head of any CWT'd jacks, but the remaining carcass can be available for tribal subsistence if still desired. A live pen can/will be set up in the Dayton Adult trap so fish can be kept alive until tribal members arrive.

VI. SUMMER STEELHEAD - GENERAL

The LFC currently uses two stocks of steelhead in the Snake River basin, (Tucannon and Wallowa) and two stocks in the Walla Walla basin (Touchet and Wallowa). The Wallowa stock is a non-endemic stock and was originally collected by ODFW from Lower Snake River dams (likely comprised of both A- and B-run fish from Washington, Oregon and Idaho), and then released in the Wallowa River in the Grande Ronde Basin. The Wallowa stock steelhead will be released in the Grand Ronde and Touchet rivers, and on-station at LFH into the Snake River.

The NMFS 1999 Biological Opinion ruled that continued use of Lyons Ferry and Wallowa stocks were causing jeopardy to listed ESU Steelhead populations in the Snake and mid-Columbia rivers. It was recommended by NMFS to convert to endemic stock populations where possible. The Touchet and Tucannon endemic broodstock programs began with BY2000. Additional changes to the steelhead program are likely in response to results from evaluation of fish stock performance and ESA related concerns regarding the ongoing releases of Wallowa stock steelhead into the Snake, Touchet and Grande Ronde rivers. Such changes may require a departure from the general mitigation approach used for steelhead so far, but also will need careful planning to ensure that the change can be implemented within the limits of the hatchery facilities now or as planned to exist in the near future.

VII. TOUCHET SUMMER STEELHEAD

The Touchet River summer steelhead program is considered an endemic program. The current goal of this program is to produce 50,000 smolts annually released at ~4.5 fish/lb. Should this program ever be expanded to replace the Wallowa stock program in the Touchet River, the production goal would likely increase to 100,000-150,000 smolt annually, depending on co-manager agreement.

Through BY2014, all production was derived from natural parentage broodstock. Between BY2015 to BY2018, per co-manager agreement, WDFW conducted a study which incorporated hatchery origin returns (Touchet stock – CWT only fish) into the broodstock to test smolt to adult survival differences, and whether incorporating hatchery fish in to the program would increase the relatively poor survival we've observed from this program since it began in 2000. During fertilization, crosses consisted of either WxW or HxW origin fish. To simplify the matings and during broodstock collection females were either hatchery or wild origin, while only wild origin males were collected each year. For each study year, 5,000 PIT tags each were inserted into each rearing group (WxW or HxW). See the research section from preliminary results to date. Adult returns from the study will be complete in the 2021 run year, and a management decision about how to move forward with this program will occur at that time.

With the initial part of the study complete (broodstock crosses and rearing), broodstock collections switched back to 100% wild origin fish for broodstock in 2019. This is consistent with the HGMP that was submitted and approved by NOAA Fisheries while the matings study results are pending.

Broodstock adults are trapped on the Touchet River at the Dayton AF intake structure and transferred to LFH for holding and spawning. Historically progeny from this program were planted in the North Fork of the Touchet River as yearlings each spring. Starting in BY15 (same year the mating study was initiated), smolts were trucked to the Dayton AF and allowed 10 to 14 days to acclimate with the Wallowa stock at the time the volitional release began. At the end of the acclimation period, the remaining fish will be forced out to the Touchet River. All adults trapped and handled are anesthetized by electronarcosis (EN).

A. Fish on Hand

Brood Year 2020

Mid-September 2020, LFH had approximately 49,983 Touchet River summer steelhead juveniles on hand.

B. Tagging, Transfers, and Releases

Brood Year 2020

In September, all Touchet River endemic stock steelhead were CWT tagged, with no external fin clips, thereby making them unsusceptible to sport fisheries. Smolts will be put into the Dayton AF and allowed to comingle with the Wallowa stock and then volitionally outmigrate with the Wallowa stock.

Table 11. Proposed BY20 Touchet summer steelhead tagging, transfers and releases.

| Site | BY20 Goal | Expected at release | Size (fpp) | Age | Mark/Tag | PIT Tags | Transfer/Release Date |
|---------------------------------|-----------|---------------------|------------|-----|-------------------|----------|-----------------------|
| WxW - Touchet River (Dayton AF) | 50,000 | 49,500 | 4.5 | 1+ | No Mark, 100% CWT | 5,000 | April 2021 |

C. Trapping

Brood Year 2021

Trapping of BY21 Touchet River endemic stock will begin in January or February (depending on seasonal weather) at the Dayton AF adult trap (located adjacent to the pond intake) and is generally completed by early May. WDFW evaluation staff checks the trap daily, using EN to calm the fish for handling, transferring only a portion of natural origin adults to LFH based on broodstock needs. All remaining NOR's and any captured endemics are released upstream of the trap. All trapped Wallowa stock fish are: 1) transferred to the Dayton Juvenile Fishing Pond to remove them from the river and provide additional fishing opportunities within Dayton, 2) sacrificed for CWT retrieval, and/or 3) donated to a local food bank.

Current survival estimates indicate that 14-15 spawned females (depending on age structure) should provide enough eggs to meet the smolt production goal (Table 11). Per co-manager agreement, WDFW evaluation staff target collecting 16 females and 20 males for the broodstock (100% natural origin)

D. Spawning

Based on fecundity and survival estimates, LFH typically spawns 14-15 females to provide 65,000 green eggs for the program. Up to 60,000 smolts may be reared full cycle and planted as yearlings in the spring. Fish in excess of 60,000, will be planted into the Touchet River as fingerlings in the fall, untagged. Spawning usually occurs in March and April. A matrix-type spawning protocol is employed, (2x1; two males to every female), to increase the effective breeder population (N_b) due to the relatively small founding population for this program. If not enough males are ripe to achieve this goal; 1:1 spawning is employed.

E. Rearing

After spawning, fertilized eggs are water hardened in 100 ppm iodophor. They are incubated in down-welling iso-incubation buckets (one fish per bucket) until the eggs eye up. The eyed eggs are shocked, ran through an automated egg sorting machine or handpicked and enumerated, and placed in hatching baskets suspended over shallow troughs. After hatch and swim-up, they are introduced to feed, and transferred to intermediate raceways at around 500 fpp in June. They are transferred again to outside raceways at roughly 200 fpp in July.

Table 12. Proposed BY21 Touchet summer steelhead tagging, transfers and releases.

| Site | BY21 Goal | Expected at release | Size (fpp) | Age | Mark/Tag | PIT Tags | Transfer/Release Date |
|---------------------------------|-----------|---------------------|------------|-----|-------------------|----------|-----------------------|
| WxW - Touchet River (Dayton AF) | 50,000 | 50,000 | 4.5 | 1+ | No Mark, 100% CWT | 5,000 | April 2022 |

VIII. TUCANNON SUMMER STEELHEAD

The Tucannon River summer steelhead program is considered an endemic program, meaning all original production was derived from natural parentage, and in later years, from 1st generation hatchery reared endemic stock fish as well. The adults for this program are collected at TFH and their progeny planted in the Tucannon River as yearlings. Current release goal is 150,000 smolts at 4.5 fpp, with 50,000 smolts being released for the conservation portion of the program (unclipped) and 100,000 smolts being released for the mitigation portion (ad-clipped) of the program. According to the Tucannon Steelhead Program broodstock sliding scale, the 50,000 smolts for the conservation portion will come from NOR's and unclipped endemic returns (conservation group). The 100,000 smolts for the mitigation portion will come from hatchery endemic returns and consist of ad-clipped/cwt or cwt-only adults, with no NOR's at lower NOR return levels.

A. Fish on Hand

Brood Year 2020

Mid-September 2020, LFH had an estimated 109,348 Tucannon River summer steelhead juveniles on hand. 55,000 fish for the conservation program and 64,800 fish for the mitigation program.

B. Tagging, Transfers, and Releases

In September, all Tucannon River endemic steelhead for the conservation portion of the program will be CWT only. The mitigation portion of the program will be 100% ad-clipped with 25,000 also receiving a CWT. In October 2020, the conservation group fish (45,000) will be moved to the TFH where they will be reared until release as yearlings in April or early May from Curl Lake AF. Prior to 2016, releases have been roughly five miles upstream of the TFH, just below the Curl Lake intake structure. Beginning in 2016, WDFW staff began transferring the smolts into Curl Lake after the spring Chinook were released. This release method is expected to continue into the future. The group marked for harvest mitigation will be split into three different release groups per performance evaluation being conducted. This evaluation is to test survival differences at different locations and release timing, as well as getting more identifiable fish (AD/CWT marked/tagged) so they can be utilized for broodstock if needed. A total of 15,500 fish will be PIT tagged by Biomark Inc. prior to release (Table 12).

Table 13. Proposed BY20 Tucannon River summer steelhead production.

| Site | BY20 Goal | Expected at Release | Size (fpp) | Age | Mark/Tag | PIT Tags | Transfer/Release Date |
|---------------------------------------|-----------|---------------------|------------|-----|----------------|----------|-----------------------|
| Tucannon River at Curl Lake | 50,000 | 45,000 | 4.5 | 1+ | 100% CWT Only | 5,000 | April 2021 |
| Tucannon River (Marengo Bridge Early) | 100,000 | 19,500 | 4.5 | 1+ | 19,500 Ad Only | 3,500 | March 2021 |
| Tucannon River (Marengo Bridge Late) | | 19,500 | 4.5 | 1+ | 19,500 Ad Only | 3,500 | April 2021 |
| Tucannon River (Tucannon FH) | | 25,000 | 4.5 | 1+ | 25,000 AD/CWT | 3,500 | April 2021 |

C. Trapping

Brood Year 2021

Trapping of BY21 Tucannon River endemic stock will begin in February (depending on seasonal weather) at the Tucannon FH adult trap (located adjacent to the Rainbow Lake Intake) and is generally completed by mid-May. Tucannon FH staff use EN to calm the fish for handling, transferring only a portion of unmarked natural origin adults and tagged endemic origin adults to LFH based on broodstock needs. All NOR's and endemic stock (CWT only, AD, and AD/CWT fish) not needed for broodstock are released upriver of the trap (per guidance in the Tucannon Summer steelhead sliding scale).

Current survival estimates indicate that 35-38 spawned females (depending on age structure) will provide enough eggs to meet the current smolt production goal. WDFW will target 40 to 42 females to be brought to the hatchery for broodstock needs, with up to 14 being NOR. Any females not used will be returned to the river to spawn naturally. Per co-manager agreement, a pre-season estimate based on PIT tag returns on the number natural origin fish expected at the TFH adult trap will be made. Per the Tucannon Steelhead Broodstock Sliding Scale (Appendix G), the appropriate number of natural and hatchery origin fish will be collected for either the conservation or mitigation broodstock.

D. Spawning

Based on fecundity and survival estimates, LFH typically spawns 35-38 females to provide 180,000 green eggs to meet the current conservation and harvest program release goals (Table 13). Spawning occurs in March and April. Matrix spawning is employed due to the relatively small founding population for this program. The intent of this protocol is to spawn two males with each female, increasing genetic diversity and helping ensure successful fertilization of eggs. If not enough males are ripe to achieve this goal; a 1:1 spawning matrix is employed.

E. Rearing

After spawning, fertilized eggs are water hardened in 100 ppm iodophor. They are incubated in down-welling iso-incubation buckets (one fish per bucket) until the eggs eye up. The eyed eggs are shocked, ran through an automated egg sorting machine or handpicked and enumerated, and placed in hatching baskets suspended over shallow troughs. After hatch and swim-up, they are introduced to feed, and transferred to intermediate raceways at around 500 fpp in June. They are transferred again to outside raceways at roughly 200 fpp in July.

Table 14. Proposed BY21 Tucannon River summer steelhead production.

| Site | BY21 Goal | Expected at Release | Size (fpp) | Age | Mark/Tag | PIT Tags | Transfer/Release Date |
|---------------------------------------|-----------|---------------------|------------|-----|----------------|----------|-----------------------|
| Tucannon River at Curl Lake | 50,000 | 50,000 | 4.5 | 1+ | 100% CWT Only | 5,000 | April 2022 |
| Tucannon River (Marengo Bridge Early) | 100,000 | 37,000 | 4.5 | 1+ | 37,500 Ad Only | 3,500 | March 2022 |
| Tucannon River (Marengo Bridge Late) | | 37,500 | 4.5 | 1+ | 37,500 Ad Only | 3,500 | April 2022 |
| Tucannon River (Tucannon FH) | | 25,000 | 4.5 | 1+ | 25,000 AD/CWT | 3,500 | April 2022 |

IX. WALLOWA SUMMER STEELHEAD

The Wallowa stock program was initiated to provide a fishery for summer steelhead in the Grande Ronde River (for both Oregon and Washington anglers), and contribute to both tribal, and sport fisheries in the mainstem Columbia and Snake rivers. The overall production of this stock was increased in December 2012, following the elimination of the Lyons Ferry stock steelhead program, and now produces steelhead that are released in the Touchet River from the Dayton AF (100,000), Grande Ronde River from the Cottonwood AF (225,000) and into the Snake River at Lyons Ferry (60,000).

A. Fish on Hand

Brood Year 2020

Mid-September 2020, LFH had 456,258 Wallowa stock summer steelhead juveniles on hand. After marking, all fish in excess of the needs in Table 2 will be out planted into local lakes.

B. Tagging, Transfers, and Releases

Brood Year 2020

All of these fish were 100% adipose fin clipped into Lake #3 in September 2020. BY18 was the first group that a single CWT group was used to represent all three release groups, with the CWT fish reared in the lake with the AD only fish (Table 14). A portion of each release group will be PIT tagged just prior to release.

In early February 2021, 225,000 smolts from Lake 3 will be transferred to the Cottonwood AF for final rearing and released into the Grande Ronde River. The fish will be reared/acclimated at Cottonwood AF for approximately 2.5 months and then volitionally released. A total of 6,000 juveniles will be PIT tagged by WDFW for Cottonwood AF prior to release in April; 2,000 of those PIT tags will be used as part of the Comparative Survival Study (CSS) for steelhead production above LGR (Fish Passage Center). After the Touchet spring Chinook are released from the Dayton AF in March, 100,000 will be moved from LFH into Dayton AF. This group will be PIT tagged in the release structure just prior to transfer. They will then remain in the Dayton AF for approximately 2-4 weeks and will be volitionally released during the month of April. The final remaining fish from Lake #3 will be released directly from LFH into the Snake River in April, with a portion being PIT tagged at release in the release structure.

Table 15. Proposed BY20 Wallowa stock summer steelhead production.

| Site | BY20 Goal | Expected at Release | Size (fpp) | Age | Mark/Tag | PIT Tags | Transfer/Release Date |
|------|-----------|---------------------|------------|-----|----------|----------|-----------------------|
| | | | | | | | |

| | | | | | | | |
|---|---------|---------|-----|----|------------------------------------|--------|--|
| Cottonwood AF on the Grande Ronde River | 225,000 | 225,000 | 4.5 | 1+ | ~201,623 Ad Only ~23,377 Ad/CWT | 6,000* | Transfer to Cottonwood AF in Feb from LFH, release in April 2021 |
| Dayton AF on the Touchet River | 100,000 | 100,000 | 4.5 | 1+ | ~89,610 Ad Only ~10,390 Ad/CWT | 4,000 | Transfer to Dayton AF in mid-March, released in April 2021. |
| Snake River (On site at LFH)** | 60,000 | 60,000 | 4.5 | 1+ | ~53,766 Ad Only ~6,234 Ad/CWT | 4,000 | On station release in mid-April 2021. |

*2,000 of these PIT tags are part of the CSS study from the Fish Passage Center

C. Trapping

Brood Year 2021

Trapping of returning Wallowa stock adults occurs on Cottonwood Creek (a small tributary to the Grande Ronde River) March and April. This creek also supplies water to the Cottonwood AF. Because of potential low egg survival and/or IHN virus (both of which have been experienced in recent years), about 110 complete spawned females are needed to provide 475,000 green eggs for the program of 385,000 smolts (Table 15). All unmarked (presumably natural origin) steelhead captured in the Cottonwood Creek adult trap are passed upstream to spawn naturally. All spawned carcasses not considered good quality for food banks will be returned to LFH for burial. If low water flow in the creek does not allow returning adults access to the trap, three alternate strategies may be employed: 1) release juveniles early and begin trapping adults, 2) collection of broodstock at Big Canyon or the Wallowa Hatchery may occur and 3) trap at LFH. Disposition of excess fish (Wallowa Stock HGMP) include 1) killed to collect any CWT fish, 2) offered to local food banks, or 3) killed outright to prevent hatchery swamping of natural origin spawners and hauled to LFH to be buried.

D. Spawning

Spawning generally occurs in late March and early April on a weekly basis. All fish are spawned at the Cottonwood Creek trap site, with the gametes transported to LFH for fertilization, incubation and rearing. A 1:1 male to female mating ratio will continue to be employed whenever possible (see research section below). Adults trapped at LFH or excess adults from ODFW's Wallowa Hatchery or Big Canyon site may be used to provide eggs for this program in the event that enough adults are not collected at Cottonwood Creek.

E. Rearing

After spawning, fertilized eggs are water hardened in 100 ppm iodophor. They are incubated in down-welling iso-incubation buckets (one fish per bucket) until the eggs eye up. The eyed eggs are shocked, ran through an automated egg sorting machine or handpicked and enumerated and placed in hatching baskets suspended over shallow troughs. After hatch and swim-up, they are introduced to feed, and transferred to outside raceways at roughly 500 fpp in June.

Table 16. Proposed BY21 Wallowa stock summer steelhead production.

| Site | BY21 Goal | Size (fpp) | Age | Mark/Tag | PIT Tags | Transfer/Release Date |
|---|-----------|------------|-----|------------------------------------|----------|--|
| Cottonwood AF on the Grande Ronde River | 225,000 | 4.5 | 1+ | ~201,623 Ad Only ~23,377 Ad/CWT | 6,000* | Transfer to Cottonwood AF in Feb from LFH, release in April 2022 |
| Dayton AF on the Touchet River | 100,000 | 4.5 | 1+ | ~89,610 Ad Only ~10,390 Ad/CWT | 4,000 | Transfer to Dayton AF in March, release in April 2022. |
| Snake River (On site at LFH) | 60,000 | 4.5 | 1+ | ~53,766 Ad Only ~6,234 Ad/CWT | 4,000 | Direct stream release in mid-April 2022 |

*2,000 of these PIT tags are part of the CSS study from the Fish Passage Center

X. SPOKANE RAINBOW TROUT

Rainbow trout are reared and planted in both southeast Washington and northwest Idaho to meet LSRCP mitigation goals in both states for lost fishing opportunities as a result of construction and operation of the lower Snake River dams. The original LSRCP goal was 93,000 lbs. However, the WDW determined that in stream habitat improvements, equivalent to the cost of producing 7,000 lbs. annually of hatchery trout, was a reasonable exchange, and that was implemented in 1983, which reduced the annual production goal to 86,000 lbs. for the Snake River Basin. The SE Washington production goal is 79,000 lbs. and the NW Idaho production goal is 7,000 lbs. A small, privately funded program (Tri-State Steelheaders, TSS) at the TFH rears rainbow to 1.5 lbs. each, providing a unique fishing opportunity in local lakes. This locally funded program replaced the previously state funded program in 2011 which had been in place since the LSRCP took ownership of the Tucannon Hatchery. The agreement at that time was that the state funded program would be allowed to continue at the TFH.

A. Fish on Hand

Brood Year 2019

Mid-September 2020, LFH and TFH had a combined total of approximately 240,200 Spokane stock rainbow trout on hand, this includes diploids and triploids. LFC will keep approximately 5% over release goals in the fall to accommodate for mortality and predation.

B. Tagging, Transfers, and Releases

The IDFG fall catchables will be planted in the Moose Creek Reservoir by IDFG staff in late September or early October 2020. All fish for IDFG are triploids from the Spokane stock rainbow trout. Refer to Table 15.

In the spring of 2021, 74,000 catchable diploids (2.5 fpp) and 1,000 jumbos (1.5 lbs. each) will be planted by LFH staff into various lakes in southeast Washington. Spring planting begins in February and is completed in early April.

At the TFH, the goal is to plant 94,000 rainbow trout into various lakes in southeast Washington as catchables (2.5 fpp average.). Planting typically begins in April and is generally completed by the end of June. The jumbo trout from TSS program (usually around 4,000) are planted February through May each year, supplementing catchable plants. No Spokane stock rainbow trout are tagged or fin clipped at LFH or TFH.

Table 17. Proposed BY19 Spokane rainbow trout tagging, transfers and plants

| Facility | BY19 Goal | Expected at release | Size (fpp) | Lbs. | Age | Transfer/Release Date |
|-------------|-----------|---------------------|------------|--------|-----|--|
| Lyons Ferry | 16,000 | 16,000 | 3.0 | 5,333 | 1+ | Transfer to and planted by IDFG in Sept/Oct 2020 |
| | 32,500 | 32,500 | 3.0 | 9,833 | 1+ | Planted in early Oct 2020 |
| | 74,000 | 74,000 | 2.5 | 29,600 | 1+ | Planted in Feb-Apr 2021 |
| | 1,000 | 1,000 | 0.67 | 1,493 | 1+ | Planted in Feb-Apr 2021 |
| | 1,650 | 1,700 | 1.0 | 1,650 | 1+ | Transfer to and planted by NPT in Mar-May 2021 |
| Tucannon | 95,185 | 105,348 | 2.5 | 38,074 | 1+ | Planted in Mar-June 2021 |
| | 4,000* | 4,000* | 0.7 | 5,714 | 1+ | Planted in Feb-May 2021 |

* These fish are funded by TSS.

C. Rearing

Brood Year 2020

Eggs for Washington’s legal and jumbo programs, along with Idaho’s fall catchable plants come from WDFW’s Spokane Hatchery (Spokane stock). WDFW managers completed an Inland Trout Stocking Plan in 2012 for all hatcheries and water bodies in Washington. The management strategy is to plant larger catchables (2.5 fpp) at reduced numbers. Total pounds reared were not affected (Table17).

Approximately 65,000 eyed triploid rainbow eggs for IDFG, NPT and the WDFW Rock Lake fall plant will be transferred from the Spokane Trout Hatchery to LFH in December. After trough rearing, they are transferred to outside standard raceways in March. In January, LFH will receive about 91,500 eyed Spokane diploid rainbow eggs for the balance of its catchable and jumbo program. Early rearing is conducted in either shallow troughs or intermediate raceways before transfer to outside standard raceways in April.

The Tucannon Hatchery will receive about 125,000 eyed rainbow eggs in January. Of these, 94,000 will be destined for planting as catchables (2.5 fpp) and 4,000 are destined for planting as jumbos (1.5 lbs each). After receiving these eggs in January, a small portion (1,750) is transferred from TFH to regional education programs, now privately funded by the TSS club. The catchable program group is started in shallow troughs, intermediate reared in outside round tanks and final reared in the earthen rearing pond. The jumbos start in shallow troughs as well and finish in the round tanks. The entire jumbo program at TFH is privately funded by the TSS organization.

Table 18. Proposed BY20 Spokane rainbow trout releases.

| Facility | BY20 Goal | Expected at release | Size (fpp) | Lbs. | Age | Transfer/Release Date |
|-------------|-----------|---------------------|------------|--------|-----|--|
| Lyons Ferry | 16,000 | 16,000 | 3.0 | 5,333 | 1+ | Transfer to and planted by IDFG in Sept/Oct 2021 |
| | 32,500 | 32,500 | 3.0 | 9,833 | 1+ | Planted in early Oct 2021 |
| | 74,000 | 74,000 | 2.5 | 29,600 | 1+ | Planted in Feb-Apr 2022 |
| | 1,000 | 1,000 | 0.67 | 1,493 | 1+ | Planted in Feb-Apr 2022 |
| | 1,650 | 1,700 | 1.0 | 1,650 | 1+ | Transfer to and planted by NPT in Mar-May 2022 |
| Tucannon | 94,000 | 105,348 | 2.5 | 37,600 | 1+ | Planted in Mar-June 2022 |
| | 4,000* | 4,000* | 0.67 | 6,119 | 1+ | Planted in Feb-May 2022 |

*NOTE; Jumbo trout from TSS funding. Total numbers and/or pounds not included in mitigation.

XI. RESEARCH

WDFW (Fish Management or Fish Science staff) are involved in a variety of research, monitoring and evaluation projects throughout SE Washington. Funding of these activities comes from a variety of sources and many are not directly related to the LSRCP Lyons Ferry/Tucannon Annual Operations Plan, but are provided here in general context for the co-managers so they are aware of activities. Some of the below activities are covered under the RM&E Statement of Work submitted to LSRCP under the hatchery evaluation program.

Fall Chinook

- 1) WDFW currently conducts fall Chinook spawning ground surveys in the Tucannon River to document abundance, distribution, and origin of spawners. Coho salmon redds are also estimated during these surveys. (LSRCP)
- 2) WDFW operates a smolt trap on the lower Tucannon River for estimating natural origin salmonid smolt production (spring Chinook, fall Chinook, and summer steelhead). Monitoring of the fall Chinook portion consists of estimating smolt out-migration only and smolt/redd. (LSRCP)
- 3) In 2020, WDFW will again collect fecundity samples from fall Chinook spawned at Lyons Ferry. With PBT being able to distinguish between hatchery and natural origin fall Chinook, a subsample of individual females will be sampled at eye-up so fecundity by origin (hatchery [yearling or subyearling] or natural) can be documented. 2020 will be the final year of the evaluation. (LSRCP)

Spring Chinook

- 1) Due to the recent history of high pre-spawn mortality for Tucannon River spring Chinook salmon, and very low run prediction for 2020, it was agreed that all the fish captured at the TFH adult trap be kept at LFH for broodstock or adult out planting in late August. Based on the numbers on hand currently, it's doubtful that outplants will occur in 2020. (LSRCP)

- 2) WDFW currently conducts spring Chinook carcass and spawning ground surveys in the Tucannon River to document pre-spawn mortality, abundance, distribution, and origin of spawners. Surveys are also used to estimate total returns to the river. (LSRCP)
- 3) WDFW operates a smolt trap on the lower Tucannon River for estimating natural origin smolt production (spring Chinook, fall Chinook, and summer steelhead). Annually, up to 5,000 NOR spring Chinook are PIT tagged for juvenile outmigration and adult return monitoring. (LSRCP)
- 4) WDFW conducts spring Chinook redd surveys (as needed) in the Touchet River to document spawning from adult outplants by CTUIR in the North Fork and Wolf Fork of the Touchet River. Spawning ground surveys in the future to monitor the Touchet River spring Chinook program have yet to be determined if they will occur. (BPA, WDFW State Funds)

Summer Steelhead (by basin)

Asotin Creek:

- 1) WDFW operates adult weirs for summer steelhead in the Asotin Creek population. Current trap locations include Asotin Creek, George Creek, and Alpowa Creek. The weirs are used to estimate natural and hatchery origin abundance at all locations, and for collection of biological samples of returning steelhead for population age and genetic structure. (BPA)
- 2) WDFW operates a smolt trap in the mainstem of Asotin Creek (below the Asotin Creek and George Creek weirs) for estimating natural origin smolt production (primarily summer steelhead, but spring/fall Chinook are also captured) from the basin. Annually, up to 3,500 summer steelhead are PIT tagged for juvenile outmigration and adult return monitoring. (BPA)
- 3) WDFW is partially funded by the Asotin Creek Intensively Monitored Watershed (IMW) for juvenile sampling in the upper basin, some hook/line sampling and PIT tagging of summer steelhead, and maintenance/operation of PIT Tag arrays within the Asotin Creek basin that are part of the IMW study. (Pacific Salmon Coastal Fund, WA State Salmon Recovery Fund).

Small Snake River Tributaries:

- 1) WDFW operates adult weirs (rotating panel selection) of small tributaries located between the mouth of the Tucannon River and Lower Granite Dam. Currently, these tributaries have been designated as part of the Tucannon steelhead population. The weirs are used to estimate natural and hatchery origin abundance at all locations, and for collection of biological samples of returning steelhead for population age and genetic structure. (BPA project #2010-028-00)

Touchet:

- 1) A paired release study was being performed utilizing 10,000 PIT tags to monitor the success of WxW or WxH crosses in the Touchet Endemic steelhead program. Four years of tagging have been completed (BY15 – BY18), with adult returns to be finalized in the

coming years. Releases of both study groups occurred from the Dayton AF. First year of release was in 2016, final year of release was in 2019, and final adult returns will be completed with the 2021 run year. Results to date indicate a small survival advantage for the WxH group compared to the WxW group (0.48% to 0.38%). (LSRCP, BPA, - Walla Walla Monitoring Project)

- 2) WDFW operates a smolt trap on the lower Touchet River for estimating natural origin smolt production (primarily summer steelhead, but spring and fall Chinook have also been captured/documentated). Annually, we target 4,000 (or more) summer steelhead to PIT tag for juvenile outmigration, estimating adult returns, and overshoot monitoring. (WA State Salmon Recovery Fund – Fish In/Fish Out Projects, BPA – Walla Walla Monitoring Project, LSRCP)
- 3) WDFW operates adult steelhead traps on Coppei and Patit creeks to monitor abundance of natural and hatchery origin spawners, and collection of biological samples for age composition. (Walla Walla Monitoring Project – BPA)
- 4) WDFW currently conducts summer steelhead spawning ground surveys in the Touchet River basin (locations above Dayton) to estimate abundance and distribution of spawners. (LSRCP)
- 5) WDFW operates and maintains a series of PIT tag arrays (Harvey Shaw, Bolles, Coppei, Patit, and Dayton), for monitoring adult steelhead (hatchery and wild) returns to the basin. (BPA – Walla Walla Monitoring Project, LSRCP)
- 6) WDFW operates the Dayton Adult Trap to capture summer steelhead for broodstock collection and other biological samples from the steelhead run. Bull trout, brown trout, whitefish, suckers and other species are also captured. In addition, this trap will be used in the future to capture Touchet River spring Chinook (Carson stock) for broodstock.

Tucannon:

- 1) WDFW operates a smolt trap on the lower Tucannon River for estimating natural origin smolt production (spring Chinook, fall Chinook, and steelhead). Annually, we target 2,500 summer steelhead (or more) for PIT tagging for adult return estimation and overshoot monitoring. (LSRCP, BPA – PIT Tags for Steelhead only)
- 2) WDFW currently conducts summer steelhead spawning ground surveys in the upper Tucannon River only (and Cummings Creek) to estimate abundance of spawners in correlation with fish passed at the Tucannon adult trap. (BPA)
- 3) WDFW operates and maintains a series of PIT tag arrays (Lower Tucannon, Middle Tucannon, Upper Tucannon, Tucannon FH), for monitoring adult steelhead (hatchery and wild) returns and distribution throughout the basin. Arrays are also used for adult spring Chinook and bull trout monitoring. (BPA, LSRCP)
- 4) Beginning with the 2021 release year, a 3-year evaluation of different release locations/strategies will be conducted. Further details of this evaluation can be found in Appendix I.

Grande Ronde:

- 1) See additional document sent with the 2014/2015 AOP, Wallowa Stock rearing/acclimation study proposed by WDFW and ODFW: *A Survival and Straying Comparison of Wallowa Stock Steelhead Reared at WDFW's Lyons Ferry and ODFW's*

Irrigon Fish Hatcheries. This study is examining survival and stray rate differences from summer steelhead reared at either Irrigon Fish Hatchery or Lyons Ferry Fish Hatchery. Groups from each rearing facility were transferred to either Wallowa Hatchery or Cottonwood Acclimation for release. At Cottonwood, both CWT's and PIT's will be used to evaluate the groups, while at Wallowa Hatchery, just PIT tags will be used for comparisons. The 2020 steelhead return marks the final year of 2-salt returns from the study, and over the following year the final CWT information should be available for summary. A summary progress report will be completed in the fall of 2020, and a presentation of results summarized to date can be made available upon request.

Overall, survival of LFH reared fish has averaged 2-3 times greater than those reared at Irrigon FH, regardless of release location, with statistically significant differences in most years (Figures 2 and 3). To date, differences in stray rates based on CWT or PIT tag detections from these groups, from either release location, are very similar and small relative to the total return of fish (<5%). (LSRCP)

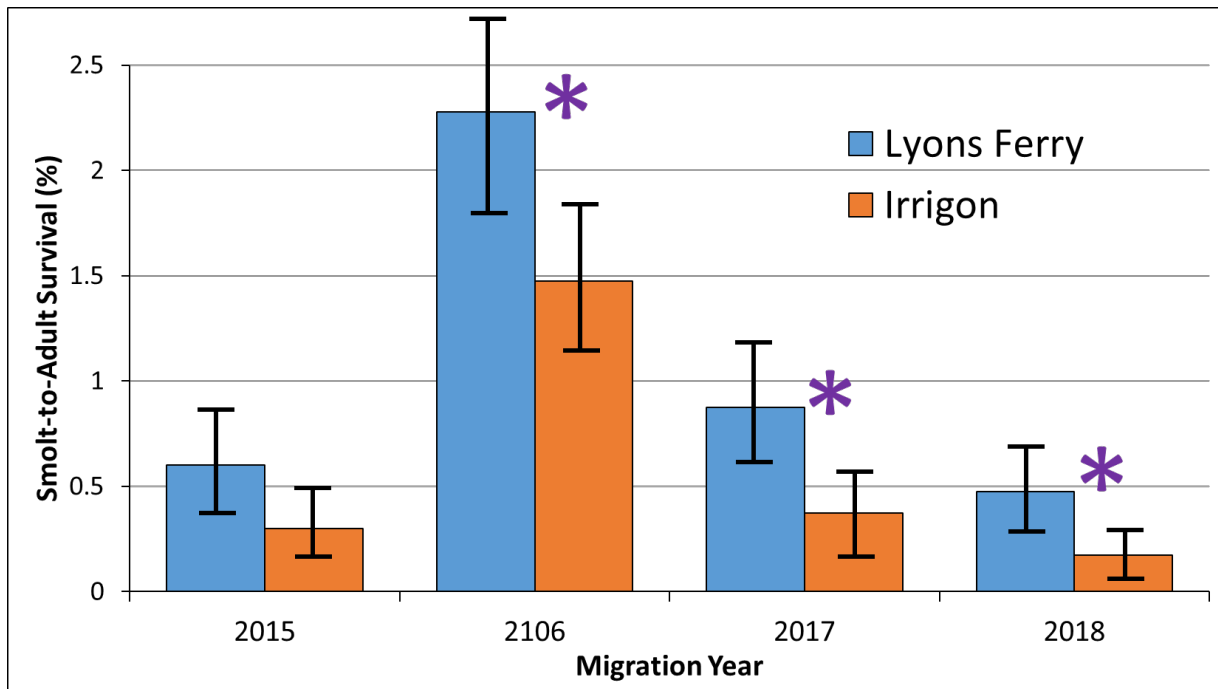


Figure 2. Smolt-to-adult survival comparisons of summer steelhead released at Cottonwood AF for the Wallowa stock reciprocal study. Asterisks denote a significant difference in survival.

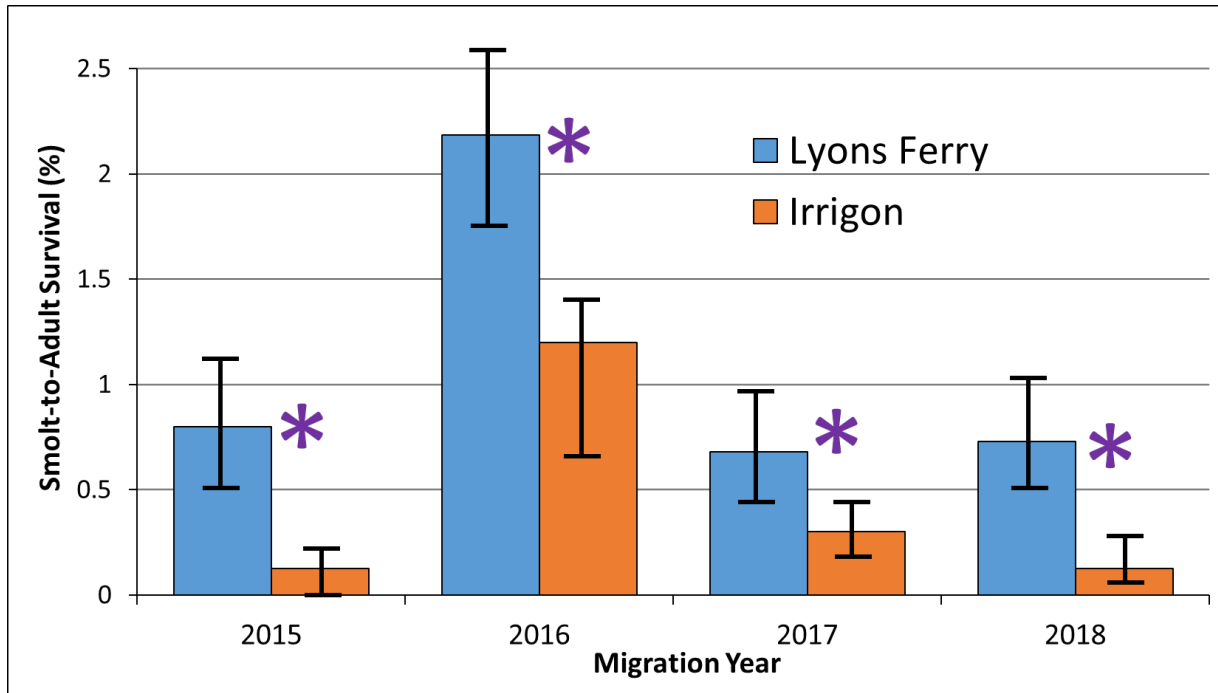


Figure 3. Smolt-to-adult survival comparisons of summer steelhead released at Wallowa Hatchery for the Wallowa stock reciprocal study. Asterisks denote a significant difference in survival.

XII. FISH HEALTH

A. Guiding Policies

All fish production at LFH is conducted according to the Salmonid Disease Control Policy of the Fisheries Co-Managers of Washington State and Integrated Hatchery Operations Team (IHOT) fish health policy. Specifically, all lots of fish are monitored for fish health, all broodstock are inspected annually, strict hatchery sanitation procedures and fish culture practices (rearing criteria) are followed, and egg and fish transfer and release requirements are met. The attending aquatic veterinarian will respond to all fish disease outbreaks and oversee fish health-related services. Bacterial kidney disease (BKD) management for Chinook stocks, imposed by Idaho and Oregon state agencies’ transfer policies, is outlined in Section C.

B. Monitoring

The aquatic veterinarian will regularly visit LFH and TFH to inspect stock, address mortality events, and provide consultation per their discretion and as needed to maintain a veterinary client patient relationship (VCPR). During site visitations, any fish cohorts exhibiting clinical signs, morbidity, and/or abnormal mortality may be examined by the veterinarian; approximately five to ten fish of each species may be sacrificed for necropsy. Updated mortality records, loading forms, and treatments logs will be provided to the veterinarian upon their request. Copies of fish health reports, veterinary feed directives (VFDs), and prescriptions referencing fish at each respective hatchery will be kept on file on site for at least three years.

At spawning, all broodstock will be tested for viral pathogens. Samples of ovarian fluid from 60 females and kidney/spleen tissue from 60 adults of either sex will be submitted for testing. Samples will be pooled into groups of up to five individual fish. In the event that 60 female fish cannot be obtained, all eligible fish from the population will be sampled (i.e. steelhead stocks for the Tucannon and Touchet). Standard hatchery practices of egg disinfection and use of pathogen-free rearing water during early rearing are considered sufficient fish health measures for the control of viral pathogens, including infectious hematopoietic necrosis virus (IHNV).

To comply with Idaho's fish import regulation, kidney/spleen samples from 60 rainbow trout will be tested for viral pathogens four to six weeks before transfer. Upon completion, results will be communicated to IDFG.

C. Specific Fish Health Management

1. BKD Management – Fall Chinook

Starting with BY16, all females spawned at Lyons Ferry will be 100% tested using ELISA. This is to allow more flexibility in shipping eggs and also for using fry for either yearling or subyearling programs.

WDFW categorizes BKD-ELISA optical densities as follows:

- Below-low = < 0.099,
- Low = 0.099 to 0.198,
- Moderate = 0.199 to 0.45,
- High = > 0.45

Progeny of negative (below low) females will be selected for the yearling fall Chinook program. Eggs from below low and low females will be selected for shipment to the states of Oregon and Idaho. ODFW has agreed to perform the sampling and testing on 150 females at LFH during spawning. WDFW takes the remaining samples, with a portion of the ELISA testing paid for by IPC (350 females/season). Progeny of all low, moderate and high BKD-ELISA females may be utilized in the subyearling fall Chinook program for WDFW releases and Captain John's landing.

2. BKD Management – Spring Chinook

Starting with BY17, all pre-spawning antibiotic injections intended for 1) the control of adult mortalities associated with *Renibacterium salmoninarum* and/or 2) the mitigation of vertical transmission of *R. salmoninarum* to progeny were suspended until an evidence-based risk of disease, confirmed by necropsy findings and appropriate ancillary testing, and which reasonably threatens the welfare of the broodstock program, was established. Starting with BY18, all female spring Chinook broodstock will receive a pre-spawning injection of tulathromycin (Draxxin®) at a target dose of 2.5 mg/kg in the dorsal sinus upon collection and a second injection of tulathromycin (Draxxin®) at the same dose in the dorsal sinus 30 days prior to spawning. WDFW may go back to Erythromycin with it once again being available for use. Pre-spawning female spring Chinook will be evaluated for BKD-antigen via ELISA assay and indexed

according to the resulting value. (Refer to WDFW categorizes of optical densities under section C. 1. “BKD Management of Fall Chinook”). The following culling program is intended to minimize bacterial load within the population and reduce risk of infection:

Until the ELISA results are known, eggs from individual females will be incubated separately. Egg reductions required to meet production targets will begin with the highest ELISA range and proceed downward by range until the production target is met. If possible, all eggs from adults with an ELISA value of 0.45 or higher will be culled from the program. If it is determined that all eggs must be kept to meet program requirements, and space is available, groups with ELISA readings above 0.45 may be segregated and reared separately. No segregation between production groups with ELISA readings below 0.45 will occur. Preferably, only the eggs from females with the lowest ELISA values will be kept for the program.

3. Summer Steelhead

At spawning, all broodstock will be tested for viral pathogens. Samples of ovarian fluid from 60 females and kidney/spleen tissue from 60 adults of either sex will be submitted for testing. Samples will be pooled into groups of up to five individual fish. In the event that 60 female fish cannot be obtained, all eligible fish from the population will be sampled (i.e. steelhead stocks for the Tucannon and Touchet). Standard hatchery practices of egg disinfection and use of pathogen-free rearing water during early rearing are considered sufficient fish health measures for the control of viral pathogens, including infectious hematopoietic necrosis virus (IHNV). No culling is planned due to IHNV.

4. Broodstock and Egg Fungus Management

All adult Chinook and steelhead held for broodstock or for adult out planting will be treated with formalin every other day to control external fungus. All eggs will be treated with formalin daily to control fungus. Treatments will be started 24 hours after fertilization. Treatment of Chinook eggs will halt seven days before hatch. Steelhead egg treatments will stop when the eggs are transferred to baskets for hatching.

Rainbow trout eggs are received at the eyed stage and are not treated with formalin.

XIII. COMMUNICATION

The list of people on the following table are either directly involved in the operation of the LFC, or in related programs and facilities.

| Name | Agency | Position | Phone | Email |
|--------------------|--------|----------------------------|---------------|--|
| Policy | | | | |
| Chris Donley | WDFW | Reg. 1 Fish Program Mgr. | 509-892-7861 | christopher.donley@dfw.wa.gov |
| Nate Wiese | USFWS | LSRCP Project Lead | | |
| Mark Robertson | USFWS | LSRCP Permitting | 208-378-5323 | mark_robertson@fws.gov |
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| Dave Johnson | NPT | Fisheries Dept. Mgr. | 208-621-3736 | davej@nezperce.org |
| Lance Hebdon | IDFG | Anadromous Fish Mgr. | 208-334-3791 | lhebdon@idfg.idaho.gov |
| Production | | | | |
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| Doug Maxey | WDFW | TFH Manager | 509-843-1430 | Douglas.Maxey@dfw.wa.gov |
| Chris Starr | USFWS | Hatchery Coordination | 208-378-5329 | chris_starr@fws.gov |
| | CTUIR | Production Supervisor | | |
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| Carl East | NPT | Assitant Manager | 208-621-3503 | Carle@nezperce.org |
| Terry Blessing | ODFW | Umatilla Complex Mgr. | 541-922-5732 | Terry.Blessing@state.or.us |
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| Evaluation | | | | |
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| Michael Gallinat | WDFW | Spring Chinook Biologist | 509-382-4755 | Michael.Gallinat@dfw.wa.gov |
| Todd Miller | WDFW | Steelhead Biologist | 509-382-1710 | Todd.Miller@dfw.wa.gov |
| Rod Engle | USFWS | Fishery Biologist | 208-378-5298 | Rod.Engle@fws.gov |
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| Jason Vogel | NPT | Research Division | 208-621-3602 | jasonv@nezperce.org |
| Bill Young | NPT | Hatchery Eval Coordinator | 208-634-5290 | billy@nezperce.org |
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| Stuart Rosenberger | IPC | Hatchery Supervisor | 208-388-6121 | srosenberger@idahopower.com |
| Management | | | | |
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| Joe Dupont | IDFG | Regional Fisheries Manager | 208-799-5010 | Joe.DuPont@idfg.idaho.gov |
| Fish Health | | | | |
| Kelly Britt | WDFW | Aquatic Veteranarian | 360-522-2142 | Kelly.Britt@dfw.wa.gov |
| Richard Stocking | ODFW | Fish Pathologist | 541-962-3823 | richard.w.stocking@state.or.us |

Appendix A: 2021 Requests for Fall Chinook Production Fish/Eggs (2021 Broodyear)

| 2018-2027 US v Oregon | Who | Release site | Age | # for release | transfer | Survival to release or transfer (revised 6/22/16) | Expanded for loss prior release (1/F) | Estim # green eggs to meet priority | SRL Calcs | Total estim eggtake which will cover needs through this priority |
|---|------------|--------------------|-----------|---------------------------|-----------|---|---|---|--|---|
| 1 | WDFW | onstation | yearlings | 450,000 | | 94.2% | 1.06123 | 477,555 | 94.2% mean survival BY11-15 | 477,555 |
| | | total yearlings | 450,000 | | | | | | | |
| 2 | NPT | CJ | subs | 450,000 | 453,492 | 94.9% | 1.05383 | 474,223 | 99.23% survival transfer to rel BY11-15 | 951,778 |
| 3 | NPT | BC | subs | 450,000 | 453,492 | 94.9% | 1.05383 | 474,223 | 3.1% green to eye, est 2% eye-transf, 1% transf-rel | 1,426,002 |
| 4 | WDFW | onstation | subs | 500,000 | | 94.4% | 1.05988 | 529,942 | 94.4% mean survival BY11-15 | 1,955,943 |
| 5 | NPT | PIT | subs | 400,000 | 403,104 | 94.9% | 1.05383 | 421,532 | 99.95% surv transf to rel BY13-15 | 2,377,475 |
| 6 | NPT | CJ2 | subs | 200,000 | 200,100 | 94.9% | 1.05383 | 210,766 | | 2,588,241 |
| 7 | NPT | BC2 | subs | 200,000 | 200,100 | 94.9% | 1.05383 | 210,766 | | 2,799,007 |
| 8 | NPT | PIT2 | subs | 200,000 | 200,100 | 94.9% | 1.05383 | 210,766 | | 3,009,773 |
| 11 | WDFW | onstation | subs | 200,000 | | 94.4% | 1.05988 | 211,977 | | 4,574,175 |
| | | total subyearlings | 2,600,000 | | | | | | 2,618,231 | |
| 9 | WDFW/Irigo | Salmon R | eyed eggs | 1,000,000 | 1,100,000 | 96.9% | 1.03199 | 1,135,191 | 3.1% green to eye loss at LFH (BY11-BY15) | 4,144,964 |
| 10 | WDFW/Irigo | GRR-direct rel | eyed eggs | 200,000 | 210,500 | 96.9% | 1.03199 | 217,234 | requested numbers by IPC and Irigo | 4,362,198 |
| | | total eyed eggs | 1,200,000 | | | | | | 1,352,425 | |
| | | | | 4,250,000 released | | | | 4,574,175 green eggs to meet needs through priority 11 | | |
| number of Snake River origin females needed to spawn | | | | | | | | 1236 | (Estimated using 3700 eggs/F), BY16-18 LGR, LFH (3,820 eggs/F) | |
| Female trapping goal to meet requests through priority 11: | | | | | | | | 1323 | (approx 5% strays, 2% mortality, non-viable) | |

2020 Fall Chinook Trapping/Sampling Protocols at LGR

August 18, 2020

- 1) This protocol assumes a 24 hour/day, 7 days per week trapping at 80% continuing through September 7th, and then dropping to 18% through the end of the season.

All fish hauled to hatcheries during the 80% trapping period will receive an operculum punch on the left side (LOP) and will not receive an operculum during the 18% trapping period.

- 2) Males and females will not be inoculated.
- 3) All fish ≥ 70 cm will be hauled to LFH and NPTH. LFH will haul ~70% and the NPT will haul ~30%.
- 4) Wire tagged MALES <70 cm and >29 cm will be hauled to LFH (1 out of 3 trapped).
- 5) Wire tagged FEMALES <70 and >29 cm will be hauled to LFH and NPTH (1 out of 3 trapped) under the normal 70/30 split.
- 6) Unmarked/untagged females <70 and >29 cm will be hauled to LFH.
- 7) Fish >25 cm and <29 cm will be included in the adult database.
- 8) Jacks suspected of being summers will need to be subsampled for wires.
- 9) Only scale sample fish released from the trap. Do not scale sample hauled fish.
- 10) DNA sample all fish trapped regardless if hauled to the hatchery or released.

Wire tagged fish:

| Fork Length | Action |
|------------------------|--|
| ≥ 70 cm | Haul all fish (DNA sample all) |
| < 70 cm and >29 cm | Haul 1 out of 3 wires for LFH and NPT. M go into tank for LFH only), DNA sample all Release 2 out of 3 wires (DNA sample all) |

Untagged fish:

| Fork Length | Action |
|------------------------|---|
| ≥ 70 cm | Haul all fish (DNA sample all). |
| < 70 cm and >29 cm | Haul 1 out of 3 F to LFH (DNA sample all). Release 2 out of 3 F (collect scales and DNA). Release all M (collect scales and DNA). |

Appendix C: 2020 Trapping, Mating, and Sampling Protocols at LFH

LFH may start up the volunteer trap if a shortfall of females or males being collected at LGR happens. If volunteer trap is started, staff will try to high grade for larger adults.

Sorting protocol

Count and sex all fish: 1) Males and females.

Count LGR trapped females returned to the pond during the spawn day.

Sampling protocol

LFH staff processing DIPS: Document Fork length, sex, presence/absence of CWT, and PIT tag number. Take scales and take the snout of the fish if CWT is detected.

SRL staff processing during spawning days:

Processing table: Fin clips for DNA: take sample on every fish so data can be used for run reconstruction purposes, as well as profiling broodstock.

Scales: taken on all fish

Female broodstock total body weights

1st week of spawning: weigh first 50 females that have a CWT and the first 50 females that are unmarked/untagged (appear wild) and note fish ID number

2nd week-4th week: weigh first 25 females that have a CWT and 25 females that are unmarked/untagged each spawn day

Carcasses for nutrient enhancement: After otoliths are taken from the carcasses, a tote of fish will be filled and dumped into a bin next to the loading dock. These fish will be frozen separately and taken to the Tucannon River for nutrient enhancement after ELISA testing.

Mating protocol at LFH

Our goals are to maximize the use of potentially natural origin fish and larger/older aged fish and to exclude jills and strays from broodstock.

All wire tagged males must wait until their CWTs are decoded before they are used in a mating.

Stray males will be culled based on CWTs. If broodstock limited, up to 56 stray females may be spawned and retained, presuming 1,112 matings are needed to make production. Any male used on a stray female must also be used on another female that will be retained for production (inbasin hatchery origin, or untagged unknown origin).

Wire tagged males verified as adults can be used on multiple females, with a goal of one male to two females.

Untagged Males ≥ 75 cm can be used on multiple females.

Untagged Males 70-74 cm will only be used in 1 x 1 crosses unless there is a shortage of males.

Males <70 cm will not be used in matings unless they are verified as adults. This size criteria may be adjusted in season.

Fecundity monitoring and Jills

All females will be spawned when ripe and the gametes will be held in incubators until we can determine if we have enough adult females to offset the culling, and to monitor fecundity. If we have enough adult females to make production goals, after eye up and fecundity estimation, jills will be culled. Jills verified by CWTs will be spawned with males 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.

Appendix D: FCAP Facilities

1.1 Pittsburg Landing

The acclimation facility at Pittsburg Landing consists of: 16 -20ft aluminum circular tanks; 2 aluminum distribution boxes; 4 river intake screens; ring lock flexible hose: 4" = 1,260 ft, 6" = 1,780 ft, 8" = 3,110 ft; camlock flexible hose: 6" = 2,080 ft; 1 - 500 gallon diesel storage tank; 1 - 20ft storage container; 2 - 30ft camp trailers; 1 - 1996 Chevy S-10 pickup; two alarm systems; 16 emergency oxygen systems - hoses, micro diffusers and regulators (1 per tank); a trailer mounted 4,000 watt generator light plant; one utility storage trailer; 16 camouflage nets; 2 trailer mounted hydrocyclones; miscellaneous bolts, seals, camlock fittings, etc. Equipment used at Pittsburg Landing and the other two facilities was purchased by USCOE, Walla Walla under the FY95 Congressional Add-on (Senate Report, 103-672, p7).

Water is pumped directly from the Snake River to the acclimation tanks by four, 4-inch electric pumps powered by diesel generators. Generators are rented from a contractor because leasing appeared to offer the least cost over a ten-year life cycle. Each pump has a portable water intake screen that is placed into the river each year and connected to the pump by 120 ft of 6-inch plastic hose. The pumps provide 500 gpm of water and operate 24 hours each day throughout the 6-week acclimation period except for oil checks and servicing. A 1,000 gallon tank, placed within a spill containment barrier, supplies fuel for the pumps. The water is pumped to one of two 12 ft. high water distribution boxes, containing degassing towers to remove nitrogen gas, before flowing through a series of downsizing pipes to the rearing units.

The rearing units consist of 16 circular aluminum tanks, 20 ft in diameter and 4 feet deep. The tanks are transported from the storage area by a 20 ft flatbed lift-truck and placed on leveled 6-inch by 6-inch wood timbers. The tanks, made in two pieces and bolted together, drain water from the center of the tank through an 8-inch pipe placed in a plywood manhole running under the tank. The tank is fitted with vertical 12-inch circular perforated aluminum screen and the water depth controlled by a 6-inch center PVC standpipe. The rearing water enters the tank through a 4-inch pipe located on the edge of the tank and is directed in a manner to facilitate a circular motion to aid the movement of fish waste and mortality to the center screen. Water flow is controlled by a 4-inch gate valve located on the incoming line and maintains flows at 100 gpm. The water discharge line is connected from the tank to the river by an 8-inch flexible plastic pipe, which is also used to release the fish.

A 24-volt alarm system constantly monitors water levels in each rearing tank and each of the two water distribution towers. An enunciator panel that provides a visual and audio alarm when a low water level is detected monitors the alarm system. The alarm control box and enunciator panel is located near the staff-housing trailer.

Assembly of the acclimation site begins in February each year with the transport of equipment and material from an offsite storage area. In 2006, the U.S. Forest Service (USFS) agreed to a trial operation of allowing the NPT to leave half of the assembled fish rearing tanks in place and remove the other half and related equipment at a storage site near the fish acclimation site. This

agreement should greatly reduce equipment fatigue and reduced assembly and disassembly time by half.

1.2 Big Canyon

The Big Canyon facility uses identical or similar equipment to that of Pittsburg Landing. The rearing tank assembly has been changed over the years to include a single row of tanks that sit flat on the gravel surface. The center drain line is located in a trench dug under the tank, thus eliminating the need for 12-inch deep gravel pad that was previously used. This method can only be used where the proper elevation is available to facilitate water discharge to the river.

The USCOE agreed to furnish electric pumps to replace the diesel units that were rented each year. Electric pumps were installed and tested before the 2002 acclimation season. The electric pumps provide the same performance as the diesel pumps while reducing rental and maintenance costs, allowing onsite staff reduction and eliminates the risk of a major fuel spill.

FCAP Project Leader received verbal agreement from the Nez Perce Tribe that allows the fish rearing tanks and water distribution tower to remain assembled at the site the entire year. This eliminates the need for an assembly and disassembly contract and reduces equipment fatigue hence provide dollar savings to the program.

1.3 Capt. John Rapids

The Capt. John Rapids Fall Chinook Acclimation Facility is a single 150'X50' in-ground, lined pond that is supplied with Snake River water by two independent 1,250 gpm submersible electric pumps. Other facility equipment and capital construction consists of: 2 river intake screens; one camp trailer; one standby propane generator; one water well (domestic water); septic system; commercial electric service; alarm system; telephone service. The pumps and intake screens were designed to be placed into the river and then removed following fish acclimation each year but were replaced in 2001 with permanent intake screens located in the main Snake River channel. The pump intake screens are provided with an air back flush system to remove debris and an alarm system is available to monitor flows.

The pumps deposited large amounts of sand in the acclimation pond, which was removed by hand tools between each group of fish. The deposited sand created extremely poor environmental conditions for the fish during release

Negotiations with the USCOE resulted in the installation of two sand separators, two larger sized water pumps, and upgrade of the electrical and pump control panels and changes in the pond water alarm system. Installation of the new equipment began in the fall of 2007 and testing indicated that the sand separators removed most of the sand load that had been deposited in previous years.

2. Operations

2.1 Fish transport

Approximately 500,000 sub-yearlings will be transferred to the Big Canyon and CJR facilities and 400,000 will be transferred to Pittsburg Landing. CJR sub-yearlings will be transported by WDFW, while Pittsburg Landing and Big Canyon transports will be shared by NPT and WDFW. Big Canyon and Captain John Rapids sub-yearlings will be transferred in late April while Pittsburg landing sub-yearlings will be transferred around the third week in April. Lyons Ferry Hatchery personnel provide schedules and facilitate loading and enumeration of the fish. Fish transport permits will be requested from IDFG.

The final release of yearlings was in 2019 as the program has shifted to a sub-yearling only release with two groups being released at each facility. The second release group of approximately 200,000 sub-yearlings will be transferred to all three facilities approximately 4-5 days after the release of the first group.

2.2 Rearing

During acclimation, staff perform daily scheduled fish culture duties that includes: checking and recording oxygen levels in the rearing units three times each day, feeding the rearing units three times each day and picking fish mortality twice each day. Staff also observes fish behavior for abnormalities and assist in fish health checks and the fish-marking program. The fish are fed Bio-Clark's fry and Bio-Pro, manufactured by Bio-Oregon of Longview Washington. Fish culture methods are the same as per Integrated Hatchery Operations Team (IHOT) guidelines and consistent with WDFW fish culture techniques at Lyons Ferry Hatchery. Environmental precautions are necessary to handle diesel and oil for the portable water pumps.

Fish health services are provided by contract with the USFWS, Dworshak Fish Health Center (DFHC). The contract provides diagnostic and pathogen survey services for all fall Chinook juveniles and smolts transported to the fish acclimation facilities. The services include a fish health check before transfer, and a pre-release exam. Other health checks are performed as requested. Fish health protocols are as per AFS Blue Book, IHOT and Nez Perce Tribe fish health protocols.

2.3 Marking

Sub-yearling fish will be marked with coded wire tags (CWT), adipose fin clipped and pit tagged prior to transfer to the FCAP facilities.

2.4 Release

Sub-yearling fish are acclimated approximately three weeks before release in early to mid May at 50fpp. The second group of sub-yearlings will be released in late May to early June, also at 50 fpp. Anticipated sub-yearling transfer and release dates for 2020:

- Pittsburg Landing – Transfer April 19 – Release May 5
- Pittsburg Landing(2) – Transfer May 10 – Release May 26
- Captain John Rapids – Transfer April 26 – Release May 13
- Captain John Rapids(2) – Transfer May 17 – Release June 3
- Big Canyon – Transfer April 26 – Release May 12
- Big Canyon(2) – Transfer May 17 – Release June 2

Emergency low water, water temperatures or facility equipment failure may necessitate an early release of fish from the facilities. The facility operator is authorized to determine when to release the fish if emergency circumstances warrant. Co-management agencies will be contacted within 24 hours with notification of an early release.

2.3 Communication

Verbal communications between FCAP personnel and co-managers is done on an as needed basis to facilitate planning, transportation and acclimation. Co-managers will be involved in any planned deviation to the fish acclimation schedule.

Fish release numbers will be reported and a FCAP fish acclimation summary will be completed by Nez Perce Tribe Research division. FCAP fish acclimation summary and other pertinent information will be presented to co-managers at the Snake River Fall Chinook Technical Group meeting.

FCAP personnel will complete and submit a project annual report to LSRC in August each year.

FCAP contact list:

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Appendix E: 2021 Releases - Fall Chinook Pit Tag Allocation (USvOR agreement)

Summary of PIT tag allocation for release year 2019 Snake River fall Chinook salmon hatchery production.

| Priority | Production Program | | | | | | Release numbers available for PIT tagging | | Tagging Lead / Uploading |
|------------------|-------------------------|------------------|---------------------|--------------------------|---------------------------------|--------------------|---|----------------------------------|--------------------------|
| | | | | | | | Subyearlings | | |
| | Yearlings | | | | | | | | |
| | Subyearling Sample Size | | | | | | | | |
| Rearing Facility | Number | Age | Release Location(s) | PIT Tag #'s Monitor Mode | PIT Tag #'s Bypass if Collected | BIC | Representative Allocation | | |
| 1 | Lyons Ferry | 450,000 | 1+ | On station | 10,000 ¹ | 0 | | WDFW/WDFW(monitor mode for SARs) | |
| 2 | Lyons Ferry | 450,000 | 0+ | Capt. John Rapids 1 | 18,200 ² | 7,800 ² | | NPT/NPT | |
| 3 | Lyons Ferry | 450,000 | 0+ | Big Canyon 1 | 7,700 ² | 3,300 ² | | NPT/NPT | |
| 4 | Lyons Ferry | 500,000 | 0+ | On Station | 15,000 ¹ | | | WDFW/WDFW(monitor mode for SARs) | |
| 5 | Lyons Ferry | 400,000 | 0+ | Pittsburg Landing 1 | 18,200 ² | 7,800 ² | | NPT/NPT | |
| 6 | Lyons Ferry | 200,000 | 0+ | Captain John Rapids 2 | | 4,500 ³ | | NPT/NPT | |
| 7 | Lyons Ferry | 200,000 | 0+ | Big Canyon 2 | | 4,500 ³ | | NPT/NPT | |
| 8 | Lyons Ferry | 200,000 | 0+ | Pittsburg Landing 2 | | 4,500 ³ | | NPT/NPT | |
| 9 | Irrigon | 1,000,000 | 0+ | Salmon River | | 4,500 ⁴ | | IPC/IPC | |
| 10 | Irrigon | 200,000 | 0+ | Grande Ronde | | 4,500 ¹ | | WDFW/WDFW | |
| 11 | Lyons Ferry | 200,000 | 0+ | On Station | | | | | |
| NPTH 1 | NPTH | 500,000 | 0+ | NPTH | | 4,500 ³ | | NPT/NPT | |
| NPTH 2 | NPTH | 200,000 | 0+ | Lukes Gulch | | 4,500 ³ | | NPT/NPT | |
| NPTH 2 | NPTH | 200,000 | 0+ | Ceder Flats | | 4,500 ³ | | NPT/NPT | |
| NPTH 3 | NPTH | 500,000 | 0+ | North Lapwai Valley | | 4,500 ³ | | NPT/NPT | |
| TOTAL | Yearlings | 450,000 | | | | | 0 | PIT Yearlings | PIT Subyearlings |
| | Subyearlings | 5,200,000 | | | | | | 10,000 | 118,500 |

Total PIT tags:

- 1. LSRCP tags 29,500
- 2. FPAC 63,000
- 3. BPA tags 21,500
- 4. IPC tags 4,500

Appendix F: Tucannon spring Chinook Sliding Scale

| Appendix F - Adult Disposition Model for Tucannon spring Chinook (to be reconsidered and revised by 2017) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|-------------------|--|--|--|----------|--|------------------------------|-------|--|-------|-----------|--------------------|----------------------------------|------------|-------------|--|-------------|--|-----------|--|-------------|--|-----------|--|------------|--|-----------|--|------------|--|-------|--|
| HOR = Hatchery origin return | | | | modified based on Tribal comments on Jan 18, 2013 | | | | | | -corrected formulas for 65% of run at trap | | | | | | | | | | | | | | | | | | | | | | | |
| NOR = Natural origin return | | | | MAT = 750, so 555 NOR at trap provides ~750 NOR to river | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Predicted HOR = 203 | | at trap | | Total predict. HOR= | | 312 | | Disposition Table | | | | | | PNI Prior to harvest or transfer | | | | | | | | | | | | | | | | | | | |
| Predicted NOR = 51 | | at trap | | Total predict. NOR= | | 78 | | NOR | NOR | HOR | HOR | Program | Tribal & Nontribal | | pNOB= 0.32 | | | | | | | | | | | | | | | | | | |
| Tot. Est Return at Trap = 254 | | at trap | | | | | | Brood | SpEsc | Brood | SpEsc | Size | Harvest | Transfer | PNI | pNOS= 0.12 | | | | | | | | | | | | | | | | | |
| Total River Return = 391 | | w/ 35% below trap | | | | 391 | | 50 | 23 | 106 | 175 | 225,000 | 0 | 0 | 0.27 | pHOS= 0.88 | | | | | | | | | | | | | | | | | |
| Brood Target = 156 | | | | | | | | w/o harvest or transfer mgmt | | | | | | | | | | | | | | | | | | | | | | | | | |
| Enter predicted Adult run size at the TFH trap in cells C5 and C6 | | | | | | | | | | Total Escap | | Total NOS | | pNOS | | Total HOS | | pHOS | | | | | | | | | | | | | | | |
| Predicted | | | | PNOB | | At trap | | At trap | | At Trap | | At trap | | NOR | | HOR | | Total River | | Total Run | | Total Escap | | Total NOS | | pNOS | | Total HOS | | pHOS | | | |
| at Trap | | Broodst. | | Broodst. | | Brood %) | | SpEsc | | SpEsc | | Esc | | Esc% | | total river | | total river | | Escapem | | Size | | after 15% | | Escapement | | (NOS | | Escapement | | (HOS | |
| 50 | | 50 | | 106 | | 32% | | 0 | | 97 | | 97 | | 0.0% | | 27 | | 206 | | 233 | | 389 | | 198 | | 23 | | 11.5% | | 175 | | 88.5% | |
| 100 | | 50 | | 106 | | 32% | | 50 | | 97 | | 147 | | 34.0% | | 104 | | 206 | | 310 | | 466 | | 264 | | 88 | | 33.5% | | 175 | | 66.5% | |
| 150 | | 75 | | 81 | | 48% | | 75 | | 122 | | 197 | | 38.1% | | 156 | | 231 | | 387 | | 543 | | 329 | | 132 | | 40.2% | | 197 | | 59.8% | |
| 200 | | 85 | | 71 | | 54% | | 115 | | 132 | | 247 | | 46.6% | | 223 | | 241 | | 464 | | 620 | | 394 | | 189 | | 48.0% | | 205 | | 52.0% | |
| 250 | | 85 | | 71 | | 54% | | 165 | | 132 | | 297 | | 55.6% | | 300 | | 241 | | 541 | | 697 | | 460 | | 255 | | 55.4% | | 205 | | 44.6% | |
| 300 | | 100 | | 56 | | 64% | | 200 | | 147 | | 347 | | 57.6% | | 362 | | 256 | | 618 | | 774 | | 525 | | 307 | | 58.5% | | 218 | | 41.5% | |
| 350 | | 110 | | 46 | | 71% | | 240 | | 157 | | 397 | | 60.5% | | 428 | | 266 | | 695 | | 851 | | 591 | | 364 | | 61.7% | | 226 | | 38.3% | |
| 400 | | 125 | | 31 | | 80% | | 275 | | 172 | | 447 | | 61.5% | | 490 | | 281 | | 772 | | 928 | | 656 | | 417 | | 63.5% | | 239 | | 36.5% | |
| 450 | | 140 | | 16 | | 90% | | 310 | | 187 | | 497 | | 62.4% | | 552 | | 296 | | 849 | | 1005 | | 721 | | 469 | | 65.1% | | 252 | | 34.9% | |
| 500 | | 156 | | 0 | | 100% | | 344 | | 203 | | 547 | | 62.9% | | 613 | | 312 | | 926 | | 1082 | | 787 | | 521 | | 66.3% | | 265 | | 33.7% | |
| 550 | | 156 | | 0 | | 100% | | 394 | | 203 | | 597 | | 66.0% | | 690 | | 312 | | 1002 | | 1158 | | 852 | | 587 | | 68.8% | | 265 | | 31.2% | |
| 600 | | 156 | | 0 | | 100% | | 444 | | 203 | | 647 | | 68.6% | | 767 | | 312 | | 1079 | | 1235 | | 917 | | 652 | | 71.1% | | 265 | | 28.9% | |
| 650 | | 156 | | 0 | | 100% | | 494 | | 203 | | 697 | | 70.9% | | 844 | | 312 | | 1156 | | 1312 | | 983 | | 717 | | 73.0% | | 265 | | 27.0% | |
| 700 | | 156 | | 0 | | 100% | | 544 | | 203 | | 747 | | 72.8% | | 921 | | 312 | | 1233 | | 1389 | | 1048 | | 783 | | 74.7% | | 265 | | 25.3% | |
| 750 | | 156 | | 0 | | 100% | | 594 | | 203 | | 797 | | 74.5% | | 998 | | 312 | | 1310 | | 1466 | | 1114 | | 848 | | 76.2% | | 265 | | 23.8% | |
| 800 | | 156 | | 0 | | 100% | | 644 | | 203 | | 847 | | 76.0% | | 1075 | | 312 | | 1387 | | 1543 | | 1179 | | 914 | | 77.5% | | 265 | | 22.5% | |
| 850 | | 156 | | 0 | | 100% | | 694 | | 203 | | 897 | | 77.4% | | 1152 | | 312 | | 1464 | | 1620 | | 1244 | | 979 | | 78.7% | | 265 | | 21.3% | |
| 900 | | 156 | | 0 | | 100% | | 744 | | 203 | | 947 | | 78.6% | | 1229 | | 312 | | 1541 | | 1697 | | 1310 | | 1044 | | 79.7% | | 265 | | 20.3% | |
| 950 | | 156 | | 0 | | 100% | | 794 | | 203 | | 997 | | 79.6% | | 1306 | | 312 | | 1618 | | 1774 | | 1375 | | 1110 | | 80.7% | | 265 | | 19.3% | |
| 1000 | | 156 | | 0 | | 100% | | 844 | | 203 | | 1047 | | 80.6% | | 1382 | | 312 | | 1695 | | 1851 | | 1441 | | 1175 | | 81.6% | | 265 | | 18.4% | |
| 1100 | | 156 | | 0 | | 100% | | 944 | | 203 | | 1147 | | 82.3% | | 1536 | | 312 | | 1849 | | 2005 | | 1571 | | 1306 | | 83.1% | | 265 | | 16.9% | |
| 1200 | | 156 | | 0 | | 100% | | 1044 | | 203 | | 1247 | | 83.7% | | 1690 | | 312 | | 2002 | | 2158 | | 1702 | | 1437 | | 84.4% | | 265 | | 15.6% | |
| 1300 | | 156 | | 0 | | 100% | | 1144 | | 203 | | 1347 | | 84.9% | | 1844 | | 312 | | 2156 | | 2312 | | 1833 | | 1567 | | 85.5% | | 265 | | 14.5% | |
| 1400 | | 156 | | 0 | | 100% | | 1244 | | 203 | | 1447 | | 86.0% | | 1998 | | 312 | | 2310 | | 2466 | | 1964 | | 1698 | | 86.5% | | 265 | | 13.5% | |
| 1500 | | 156 | | 0 | | 100% | | 1344 | | 203 | | 1547 | | 86.9% | | 2152 | | 312 | | 2464 | | 2620 | | 2094 | | 1829 | | 87.3% | | 265 | | 12.7% | |

| Model Calculations and Assumptions | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|
| Cell C5 - Predicted HOR at Tucannon FH trap: This is an entered number based on preseason projection | | | | | | | | | |
| Cell C6 - Predicted NOR at Tucannon FH trap: This is an entered number based on preseason projection | | | | | | | | | |
| Cell C7 - Total Estimated Run at the trap: Sum of HOR and NOR preseason projections | | | | | | | | | |
| Cell C8 - Total run at trap divided by 0.65 to estimate total return to Tucannon River, including downstream of trap (35%). | | | | | | | | | |
| Cell C9 - Brood Number: This is a constant number of 170 based on a 225,000 production level at HOR levels >500 - would be adjusted downward at lower HOR levels | | | | | | | | | |
| Column A - Predicted NOR at the trap: Lookup value column based on cell C6 preseason projection at trap. | | | | | | | | | |
| Column B - NOR Broodstock Requirement: generally 50% of brood need up to 350 NOR predicted return to trap, except at NOR < 100 | | | | | | | | | |
| Column C - HOR Brood Requirement: Total brood need - NOR brood | | | | | | | | | |
| Column D - NOR Brood Percent: % NOR in broodstock | | | | | | | | | |
| Column E - NOR at trap minus NOR broodstock taken | | | | | | | | | |
| Column F - HOR Spawning Escapement above the trap after broodstock taken | | | | | | | | | |
| Column G - Total NOR and HOR Spawning Escapement above the trap: after broodstock | | | | | | | | | |
| Column H - % NOR Escapement Percent above trap | | | | | | | | | |
| Column I - NOR total spawning escapement (trap passage plus 35% below the trap) | | | | | | | | | |
| Column J - HOR total spawning escapement (trap passage plus 35% below trap) | | | | | | | | | |
| Column K - Sum of NOR and HOR total spawning escapement (trap passage plus 35% below trap) | | | | | | | | | |
| Column L - Total return to the Tucannon River, including all broodstock taken | | | | | | | | | |
| Column M - Total escapement in the Tucannon River after broodstock collection, minus 15% prespawn mortality | | | | | | | | | |
| Column N - NOR escapement after broodstock collection and 15% prespawning loss in river | | | | | | | | | |
| Column O - HOR escapement after broodstock collection and 15% prespawning loss in river | | | | | | | | | |

Appendix G: Tucannon River Summer Steelhead Sliding Scale.

| Estimated NOR Return to Weir (based on PIT Tag Estimates) | Total NOR & HOR needed for Broodstock | Total Broodstock Needed for Conservation Program | Conservation Brood | | Total Broodstock Needed for Mitigation Program | Mitigation Brood | | # of NOR's Used for Total Broodstock needs | # of HOR's Used for Total Broodstock needs | NOR's Released Above Weir | |
|---|---------------------------------------|--|--------------------|-----|--|------------------|-----|--|--|---------------------------|-----|
| | | | NOR | HOR | | NOR | HOR | | | Min | Max |
| <50 | 78 | 26 | 16 | 10 | 52 | 0 | 52 | 16 | 62 | 10 | 34 |
| 50 | 78 | 26 | 18 | 8 | 52 | 0 | 52 | 18 | 60 | 37 | 187 |
| 201 | 78 | 26 | 21 | 5 | 52 | 0 | 52 | 21 | 57 | 185 | 384 |
| 401 | 78 | 26 | 26 | 0 | 52 | 5 | 47 | 31 | 47 | 378 | 577 |
| 601 | 78 | 26 | 26 | 0 | 52 | 10 | 42 | 36 | 42 | 574 | 773 |
| 801 | 78 | 26 | 26 | 0 | 52 | 15 | 37 | 41 | 37 | 770 | 969 |

Table Continued.....

| Estimated NOR Return to Weir (based on PIT Tag Estimates) | Actual HOR Returns | | Total Fish Released Above Weir | | %NOR Used in Broodstock from Total Return to Weir | | % NOR in Conservation Program | % NOR in Total Program | pHOS (effective) above the Weir | | PNI above the Weir | |
|---|--------------------|------|--------------------------------|------|---|-----|-------------------------------|------------------------|---------------------------------|------|--------------------|------|
| | Low | High | Min | Max | Min | Max | PNOB | PNOB | High | Low | Low | High |
| <50 | 68 | 313 | 78 | 347 | NA | 32% | 62% | 21% | 0.96 | 0.58 | 0.39 | 0.51 |
| 50 | 70 | 315 | 107 | 502 | 36% | 9% | 69% | 23% | 0.86 | 0.21 | 0.45 | 0.77 |
| 201 | 73 | 318 | 258 | 702 | 10% | 5% | 81% | 27% | 0.55 | 0.12 | 0.6 | 0.87 |
| 401 | 83 | 328 | 461 | 905 | 8% | 5% | 100% | 40% | 0.38 | 0.09 | 0.73 | 0.92 |
| 601 | 88 | 333 | 662 | 1106 | 6% | 5% | 100% | 46% | 0.29 | 0.07 | 0.78 | 0.93 |
| 801 | 93 | 338 | 863 | 1307 | 5% | 4% | 100% | 53% | 0.23 | 0.06 | 0.81 | 0.94 |

1) F1 hatchery origin fish - from the conservation program - will be used for broodstock needs in both conservation and harvest programs.

2) No AD-clipped fish will be used for broodstock, though some will be passed upstream to meet the maximum hatchery fish upstream of the weir (375-broodstock needs)

3) Goal is to have about 300-350 total hatchery origin fish (of either group - conservation preferred over mitigation) above the weir - to ensure future broodstock needs

Appendix H: Numbers of PIT Tags and Coded-Wire Tags Implanted into spring Chinook, fall Chinook, or summer steelhead at Lyons Ferry Hatchery Complex, and funding source of those tags.

| Species | Stock | Age | Release Location | Program Release Goal | PIT Tag (LSRCP) | PIT Tags (BPA) | PIT Tags (Other) | CWT (LSRCP) | CWT (BPA) | PBT Baseline Evaluation |
|---------|-----------------------|-----|--------------------------------------|----------------------|-----------------|----------------|------------------|--------------------------------------|-----------|-------------------------|
| SPCHK | Tucannon | 1+ | Tucannon River | 225,000 | 7,500 | 7,500 | | 225,000 | | BPA |
| SPCHK | Carson | 1+ | Touchet River | 250,000 | 15,000 | | | 85,000 | | BPA |
| FACHK | Snake River | 1+ | Snake River, Lyons Ferry FH | 450,000 | 10,000 | | | 450,000 | | BPA |
| FACHK | Snake River | 0 | Snake River, Lyons Ferry FH | 700,000 | 15,000 | | | 200,000 | | BPA |
| FACHK | Snake River | 0 | Snake River, Pittsburgh Landing 1 | 400,000 | | 4,500 | | 200,000 | | BPA |
| FACHK | Snake River | 0 | Snake River, Pittsburgh Landing 2 | 200,000 | | 4,500 | | 200,000 | | BPA |
| FACHK | Snake River | 0 | Snake River, Captain Johns Landing 1 | 450,000 | | 4,500 | | 200,000 | | BPA |
| FACHK | Snake River | 0 | Snake River, Captain Johns Landing 2 | 200,000 | | 4,500 | | 200,000 | | BPA |
| FACHK | Snake River | 0 | Clearwater River, Big Canyon 1 | 450,000 | | 4,500 | | 200,000 | | BPA |
| STL | Wallowa | 1+ | Touchet R. @ Dayton Acclimation | 100,000 | 4,000 | | | 40,000 for all three groups combined | | BPA |
| STL | Wallowa | 1+ | Snake River @ Lyons Ferry Hatchery | 60,000 | 4,000 | | | | | BPA |
| STL | Wallowa | 1+ | Grande Ronde R. @ Cottonwood Pond | 225,000 | 4,000 | 2,000 | | | | BPA |
| STL | Touchet Endemic | 1+ | Touchet R., Dayton Acclimation | 50,000 | 5,000 | | | 50,000 | | BPA |
| STL | Tucannon-Mitigation | 1+ | Tucannon River (lower) | 100,000 | | 10,500 | | | 25,000 | BPA |
| STL | Tucannon-Conservation | 1+ | Tucannon River, Curl Lake | 50,000 | | 5,000 | | | 50,000 | BPA |
| SPCHK | Tucannon | 1+ | Tucannon River at Smolt Trap | NA | 5,000 | | | NA | | NA |
| STL | Tucannon | 1+ | Tucannon River at Smolt Trap | NA | | 2,500 | | NA | | NA |

Appendix I:

Study Plans to Examine Alternative Release Strategies for Tucannon River Spring Chinook Hatchery Salmon

Purpose

We propose examining three alternative hatchery release strategies to determine if significant improvements in survival rates can be achieved for Tucannon River hatchery spring Chinook.

Background

While the Tucannon River spring Chinook return has generally followed the same return trends as other Snake River stocks (Figure 1), the Tucannon hatchery program has never achieved the LSRCP assumed target smolt-to-adult return (SAR) goal of 0.87%. In fact, the LSRCP spring Chinook Salmon hatchery programs have only met the 0.87% SAR target approximately 20% of the time (ISRP 2014); prompting the question of whether changes in hatchery release practices could aid in achieving the target SAR?

Based on PIT tag analyses conducted by the Fish Passage Center from 2005-2017, the SAR survival of Tucannon River hatchery spring Chinook salmon from Lower Monumental to Bonneville Dam has been lower than the Lower Granite to Bonneville Dam SAR's for up-river hatchery stocks, even though the reach the Tucannon hatchery fish migrate through is shorter. It has been hypothesized that the up-river stocks may have a survival advantage due to additional opportunities for barge transportation. While some studies have shown barging has affected homing abilities for both Chinook and steelhead (Keefer et al. 2008), evaluating the effect of transport on SARs of Tucannon River fish has not been possible with the available data. A more recent PIT tag analyses was completed by the Fish Passage Center (July 28, 2020) comparing smolt-to-adult survival of Tucannon River hatchery spring Chinook again with up-river stocks, but this time as a direct comparison of smolt-to-adult survivals from Lower Monumental to Bonneville Dam for all stocks. Results from this most recent work show that while Tucannon River hatchery spring Chinook generally track survival of other groups, they were consistently in the lowest tier of the distribution.

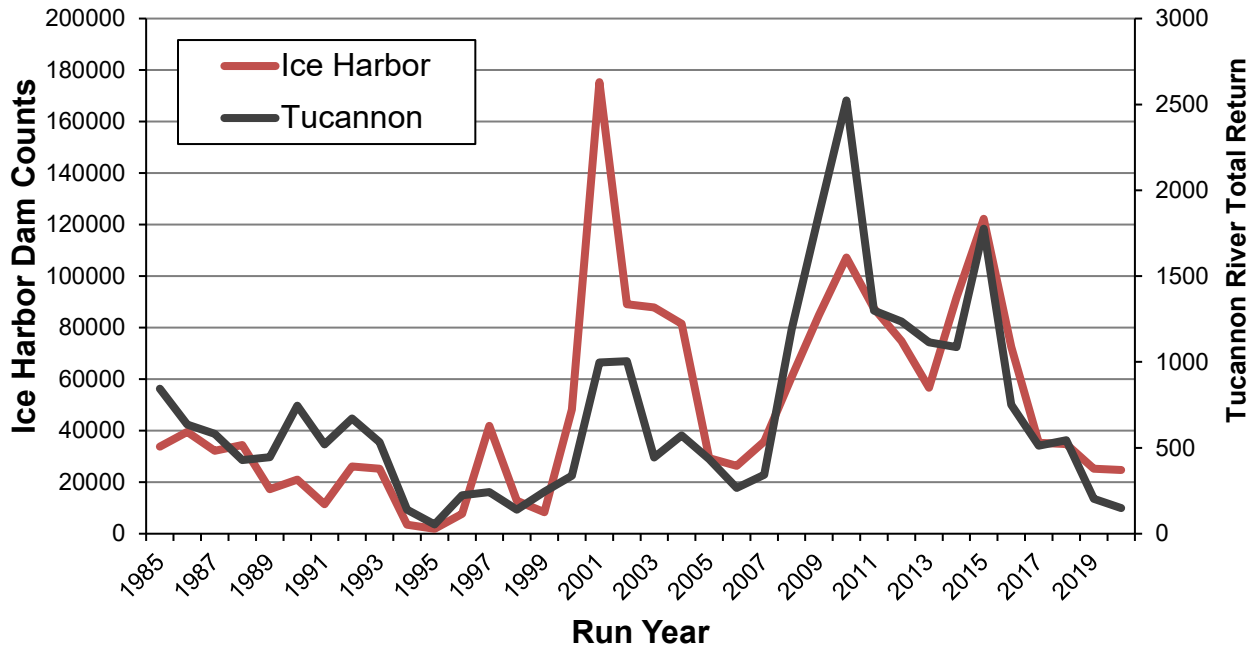


Figure 1. Comparison of Ice Harbor Dam counts of spring Chinook salmon to estimated total returns of Tucannon River spring Chinook. Provided here to give overall context that while the Tucannon SPCH returns are not great, they generally follow the overall patterns of spring Chinook returning to the Snake River basin.

Historically, the default action for PIT tagged fish that are detected at transportation facilities has been to return them to the river. Beginning with the 2015 migration year, PIT tagged Tucannon hatchery spring Chinook salmon have been included in the Comparative Survival Study (CSS) whereby a portion of the tagged fish are returned to the river and a portion are barged. However, the effects of transportation on SARs on Tucannon hatchery fish to date has not been possible based on the low numbers of PIT tagged fish (15,000 total per year). Power Analysis performed by the Fish Passage Center has determined that the number of PIT tagged fish needed to find a significant difference in survival based on historical rates is approximately 15,000 fish/group. We currently have enough PIT tags on hand to tag 45,000 spring Chinook/year for three years.

Note: The 2019 production of Tucannon spring Chinook are being treated for Bacterial Kidney Disease (BKD).

The high ELISA group has been treated twice and had not responded to the treatments, with low level mortality continuing to occur. WDFW (in agreement with co-managers) has decided to keep these fish at Lyons Ferry Hatchery (LFH) until release. The group is currently isolated from other groups and aren't expected to impact other production programs at LFH. These fish will be direct stream released in the spring of 2021 (release time and location to be determined later). At this time, no specific evaluation will occur on this group (i.e., PIT tags), but they have been CWT'd. Status quo mortality to date should result in a release of 10,000 -12,000 smolts.

The other remaining production group just recently was diagnosed with BKD, and treatments began during the last week of July. Should they respond well to the treatment, fish from this group will be used for the study. Should they **not** respond to the treatment, these fish will be sent to the Tucannon FH (TFH) for overwintering, and then released from TFH. A standard PIT tag group (15K) for standard monitoring would be applied.

Methods

The three proposed alternatives are provided in Table 1. Spring Chinook will be transferred from LFH to TFH in October 2020 and reared in the A-Pond. This is to ensure all groups will be treated the same over the fall/winter months prior to PIT tagging.

PIT tagging at TFH will likely occur between the last week in February and second week of March (depending on evaluation staff availability and other PIT tagging needs at LFH). Fish will be removed from the A-Pond for tagging, with the TFH release group put back in the A-Pond, while groups #2 and #3 will be tagged and put in circular ponds for the remainder of their rearing. A subsample of lengths/weights will be collected from all groups during PIT tagging. Length/weights will also be collected from each group just prior to release. PIT tags from the Tucannon FH release and the Direct Stream release groups will be removed from Monitor Mode at the dams and the CSS Study (to compare in-river vs. transported survival).

Table 1. Three release strategies for the Tucannon River Spring Chinook release strategy evaluation (2021-2023 release years).

| Group Description | Brood Years | Min. PIT Tags/Year |
|---|-------------|--------------------|
| 1. Release @ Tucannon FH | 2019-2021 | 15 K |
| 2. Direct Stream Release (Actual Site to be determined later) | 2019-2021 | 15 K |
| 3. Barge Transportation @ LFH | 2019-2021 | 15 K |

Group 1: Release from Tucannon FH (Surrogate Control Group). Fish will be PIT tagged at TFH and put back in the A-Pond and then allowed to volitionally release to the outlet channel and to the river as was done in the past, or if that channel is not suitable for release, then fish would have to be pumped from the A-Pond to the Tucannon River a short distance away. If possible, the volitional release would begin in mid-April to coincide with the release timing of the other two groups (these fish to be at and/or slightly past the mouth of the Tucannon River when the other two releases occur). This group will also contain the remaining available production (CWT only fish).

| Pros | Cons |
|---|--|
| Protected from predators while held at Tucannon FH | Some fish might not return as high as they have from Curl Lake releases |
| Released near the adult trap for future adult returns | Spawning distribution of returning hatchery fish may shift lower in the river |
| One less transfer/handling event (especially since fish have been diagnosed with BKD this year) | Will have to represent the control group to compare results with what we've seen historically (Curl Lake releases), but will not be a true control group |
| | Fish might try to return to the hatchery outlet channel. Will have to set up a temporary adult trap at the bar screen structure just in case |
| | Fish may have trouble exiting the release channel and/or could become concentrated and prone to predation ¹ |
| | If fish have to be pumped to the river from the A-Pond, ensure there is a suitable place to put them in that doesn't immediately wash them downstream. |

¹ The release channel and/or bar screen needs to be evaluated by hatchery and evaluation staff prior to release.

Group 2: Direct Stream Release. Currently proposing that we release this group of fish at the Tucannon River access pullout at the mouth of the Tucannon River just before it enters the Snake River, or at the HWY 261 bridge. Both of these locations are below the Tucannon River smolt trap, and will therefore not impact operations of the smolt trap during the peak outmigration period. Fish will be removed from the A-pond, PIT tagged, and then put into a singular circular pond for final rearing prior to release. The release date of this group will coincide with the arrival of fish from the Tucannon FH release being near the mouth of the Tucannon River (based on PIT tag detections), and/or 1-2 days prior to the Barge Transportation group.

| Pros | Cons |
|--|--|
| Protected from predators while held at Tucannon FH | Greater chance that these fish might stray past the Tucannon River upon adult return |
| Eliminate the mortality that's been estimated from the Curl Lake to the mouth of the Tucannon River in most years (30-50%) | Some fish might not return as high as they have from Curl Lake releases |
| | Spawning distribution of returning hatchery fish may shift lower in the river |
| | An extra transfer/handling event compared to the Control Group |

Group 3: Barge Transportation Group. Fish will be removed from the A-pond, PIT tagged, and then put into a singular circular pond for final rearing prior to release. Arrangements will be made with the Corps of Engineers to have a barge available at LFH between 24-30 April (barging at Snake

River Dams begins on 24 April). On the day the barge is scheduled to arrive at LFH, the fish will be loaded onto a transport truck at TFH, hauled to LFH, and put on the barge that same day.

| Pros | Cons |
|---|--|
| Protected from predators while held at Tucannon FH | Greater chance that these fish might stray in general and/or stray past the Tucannon River upon adult return |
| Could greatly reduce the in-river mortality (Tucannon, Snake, Columbia) that could occur from predation, migratory conditions, etc..... | Some fish might not return as high as they have from Curl Lake releases |
| | Spawning distribution of returning hatchery fish may shift lower in the river |
| | Intermingling of multiple stocks of fish in the barges, possible greater disease transmission |
| | An extra transfer/handling event compared to the Control Group |

****The use of Curl Lake has been an important part of the program in addressing survival and spawning distribution concerns of hatchery fish for this program over the years. Shifting to releases lower in the river could have consequences (survival, adult trapping, and spawning distributions) that are not fully appreciated at this time. Actions to account for some of these (hauling returning adults upstream after capture, additional trapping locations for broodstock collection/hauling, etc...) may have to be implemented. Options to re-use Curl Lake (depending on study results) should be considered in the future.**

Literature Cited

ISRP (Independent Scientific Review Panel). 2014. Summary review of the Lower Snake River Compensation Plan 2011-2014. ISRP 2014-6.

Keefer, M. L., C. C. Caudill, C. A. Peery, and S. R. Lee. 2008. Transporting juvenile salmonids around dams impairs adult migration. *Ecological Applications* 18 (8): 1888-1900.