

**LOWER SNAKE RIVER FISH AND WILDLIFE COMPENSATION PLAN
GRANDE RONDE AND IMNAHA BASINS ANNUAL OPERATION PLAN**

**FOR THE PERIOD OF
JANUARY 1 – DECEMBER 31, 2015**

**PREPARED BY:
OREGON DEPARTMENT OF FISH AND WILDLIFE
CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION
NEZ PERCE TRIBE
FOR
LOWER SNAKE RIVER COMPENSATION PLAN
U.S. FWS ADMINISTRATION
and
BONNEVILLE POWER ADMINISTRATION**

March 6, 2015

In Attendance December 8, 2014 pre-AOP: CTUIR (McLean, Boe), ODFW (Aschenbrenner, Bailey, Blessing, Clarke, Deal, Feldhaus, Flesher, Garst, Gaston, Gibbs, Harrod, Hoffnagle, Myatt, Onjukka, Requa, Stanton, Traxler, Yanke), NPT (Daniel, Harbeck, Johnson, Vatland, Vogel, Zollman), LSRCP (Engle, Starr, Yundt).

In Attendance February 2, 2015 AOP: CTUIR (McLean, Crump), ODFW (Aschenbrenner, Bailey, Blessing, Clarke, Feldhaus, Garst, Harrod, Hoffnagle, Myatt, Onjukka, Requa, Schmidt, White, Yanke), LSRCP (Engle, Starr, Yundt), NPT (Harbeck, Johnson, Vatland, Vogel, Zollman).

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Steelhead (Oncorhynchus mykiss)

I. Summer Steelhead - 2014 Brood Year (Grande Ronde & Innaha basins)

This is the seventh year for releasing smolts from Wallowa stock adults returning from fall collected brood stock. The fall brood component has increased to half (400,000) of the total Wallowa production goal. A recent program change is that ~44,000 smolts from Irrigon Hatchery will be released at Cottonwood Acclimation on the lower Grande Ronde and an equal number of Wallowa stock smolts will be transferred from Lyons Ferry to the Wallowa Hatchery Acclimation ponds. Wallowa stock fin marking and tagging has been adapted to meet changed production goals. Marking and tagging is summarized in tables 4 and 5.

A. Allocations –The estimated number of smolts from Irrigon is 1,104,650 fish weighing 234,351 pounds. A total of 858,950 are Wallowa stock. The early group that consists of 250,500 will be transferred at 5 fish per pound (fpp). The remaining 603,950 will be transferred at 4.5 (fpp). Wallowa fish will be acclimated at the Wallowa and Big Canyon facilities. Wallowa release will occur in two acclimation periods and the Big Canyon release will also have an early group and late group component. A total of 245,700 are Little Sheep stock transferred at 5.0 fpp. The Little Sheep stock will be acclimated in the Little Sheep facility. Smolt transfers and releases are summarized in Table 1 and Appendix A.

B. Liberations

I. Schedule

- a. Wallowa Acclimation:** Approximately 473,424 smolts will be transferred from Irrigon Hatchery to Wallowa Hatchery and Cottonwood Creek acclimation ponds in 2014.

Early Group: Approximately 339,315 smolts will be released after 10 weeks of acclimation			
Location	Transfer in date	Release dates	Comments
Lower Acclimation Pond	Jan. 20-21	April 4	The screens in the lower sections will be pulled on April 4 allowing fish to leave for 2 day. On April 6, the remaining fish will be forced out of the lower pond.
		April 6	
Upper Acclimation Pond	Jan 21-22	April 5	The screens in the upper sections will be pulled on April 5. On April 6, the remaining fish will be forced out.
		April 6	
Note: Approximately 25,000 smolts released will be used for fall brood evaluations. Note: In early-Feb. 44,000 smolts will be transferred to Cottonwood and 44,000 will transferred from Lyons Ferry Hatchery to Wallowa Hatchery acclimation as part of a reciprocal study (see tables 4 & 5 for details) Note: One raceway (~ 44,000 smolts) will be transferred to Wallowa Hatchery on Feb. 20 to compare the effect of a long and short acclimation on survival and straying .			
Late Group: Approximately 178,109 smolts will be released after 1 to 3 weeks of acclimation.			
Location	Transfer in date	Release dates	Comments
Lower Acclimation Pond	April 6 - 7	April 20	The screens in the lower section will be pulled on April 20 allowing fish to leave for 10 days. On April 30, the remaining fish will be forced out.
		April 30	
Note: Approximately 25,000 smolts released will be used for fall collected brood evaluations.			

- b. Big Canyon Acclimation:** Approximately 340,211 smolts will be transferred from Irrigon Hatchery to the Big Canyon acclimation ponds, 170,387 in the early group and 169,824 in the late group.

Early Group: Approximately 170,387 smolts will be released after 5 to 7 weeks of acclimation.			
Location	Transfer in date	Release dates	Comments

Lower Acclimation Pond	Feb 23	April 15	The screens in the lower sections will be pulled on April 15 allowing fish to leave for 24 hours. On April 17, the remaining fish will be forced out of the lower pond.
		April 17	
Upper Acclimation Pond	Feb 24	April 16	The screens in the upper sections will be pulled on April 16 allowing fish to leave for 24 hours. On April 17, the remaining fish will be forced out of the lower pond.
		April 17	
Note: Approximately 25,000 smolts released will be used for fall collected brood evaluations.			

Late Group: Approximately 169,824 smolts will be released after 1 to 3 weeks of acclimation.			
Location	Transfer in date	Release dates	Comments
Lower Acclimation Pond	April 20	May 1	The screens in the lower section will be pulled on May 1 allowing fish to leave for 12 days. On May 12, the remaining fish will be forced out.
		May 12	
Upper Acclimation Pond	April 21	May 2	The screens in the upper section will be pulled on May 2 allowing fish to leave for 11 days. On May 12, the remaining fish may be forced out.
		May 12	
Note: On May 12, ODFW Fish Research will sample smolts in the acclimation pond. If >70% of the sample contains <i>males</i> , fish will be enumerated and up to 2,000 released in Wallowa Wildlife pond and 500 in Victor. If outplanted, Fish Research will scan for PIT tags.			

- c. Little Sheep Acclimation:** Approximately 245,234 smolts will be transferred to the Little Sheep Acclimation facility for release in Little Sheep.

Acclimation. Approximately 245,234 smolts will be released after 4 to 8 weeks of acclimation.			
Location	Transfer in date	Release dates	Comments
Acclimation Pond	Feb 25 - 27	April 1	Screens will be pulled on April 1 allowing fish to leave for a minimum of 28 days. In late April, the river conditions will be assessed and fish may be retained longer to coincide with higher flows. Downstream rotary trap operators will be notified if changes are made to the April 28 release date.
		April 28	
Note: Prior to forced release, ODFW Fish Research will sample smolts in the acclimation pond. If >70% of the sample contains <i>males</i> , remaining fish will be estimated and up to 7,500 fish released in Kinney Lake.			

- d. Big Sheep Direct Release:** Beginning in 2011, smolts targeted for direct release into Big Sheep will instead be transferred to Little Sheep Acclimation facilities, because of safety concerns with the bridge to access the release location in Big Sheep. Planning goal for 50,000 smolts.

C. Monitoring and Evaluation

We will determine and compare rearing performance, smolt condition, juvenile migration performance, and smolt-to-adult survival of steelhead released from the Wallowa Hatchery, Big Canyon, Little Sheep and Cottonwood Creek facilities. For the Imnaha supplementation program we will also evaluate the effects of hatchery releases on natural origin abundance. Fish will be sampled prior to transfer and release from acclimation facilities for lengths (100), weights (50), and smolt condition. Brood year 2014 is the final year of representative PIT tagging to compare run reconstruction metrics (e.g., smolt-to-adult survival) with those derived from coded-wire tags. PIT tags will also be used to determine juvenile migration performance to Lower Granite Dam, evaluate the ODFW-WDFW reciprocal release experiment, evaluate run timing performance of the fall broodstock, provide in season run forecasts, and to support the Comparative Survival Study (CSS). PIT tags were supplied by LSRCP and CSS and to meet the M&E objectives. To determine smolt-

to-adult survival and straying we will CWT 25,000 fish from each release group. All fish will be AD clipped. Ventral clips will not be used for purposes of CWT recovery.

Specific Objectives

- 1. Hatchery Spawning**
 1. Data collection – origin, length, age, marks/tags, return timing
 2. Tissue collection – snout/scales, genetic sample
- 2. Weir/trap Mortalities**
 1. Data collection – count, origin, length, marks/tags, gender
 2. Tissue collection – snout/scales, genetic sample, otoliths
- 3. Monitor**
 1. CWT vs. PIT run reconstruction, Grande Ronde basin harvest
 2. PIT tag detections at dams and weirs for in season run forecasts, run timing – detections at Bonneville and Lower Granite dam, Wallowa River, Wallowa Hatchery
- 4. Studies**
 1. Fall brood return timing
 2. ODFW-WDFW reciprocal release study
 3. Comparative survival study (CSS)
 4. Effect of no. of days of acclimation on survival, straying
- 5. Genetic sampling** - ODFW Fish Research (Flesher, Eddy) will collect tissue samples from all brood used in production for Matt Campbell's (Eagle Genetics Lab, ID) parental based tagging study.
- 6. Imnaha Reproductive Success genetic analysis** – Relative reproductive success of hatchery and wild Imnaha adults is evaluated using genetics. All fish released above the weir and used for broodstock are sampled.
- 7. Marking and tagging**

Fish Research—Fish Research staffs will coordinate efforts with the hatchery staffs for pre-release sampling and other marking efforts (Table 2).

Fish Marking

- a. Wallowa Hatchery**
 - 200,518 AdRV
 - 50,000 AdRVCWT
 - 25,000 AdLVCWT
 - 122,906 Ad
 - 75,000 Ad CWT
- b. Cottonwood**
 - 25,000 Ad CWT
 - 18,963 Ad
- c. Big Canyon**
 - 25,000 Ad CWT
 - 171,395 Ad only
 - 50,000 FB Ad CWT
 - 93,816 FB Ad
- a. Little Sheep**
 - 180,066 Ad
 - 25,000 AdCWT
- b. Big Sheep** (volitional release into Little Sheep)

- 40,168 Ad

Pit Tagging: Scheduled for Dec. 2014 (37,800 tags) and Jan. 2015 (4,000 tags) (Table 5).

- Wallowa Hatchery – 13,600
- Cottonwood – 4,000
- Big Canyon – 9,200
- Little Sheep – 12,500
- Big Sheep – 2,500

D. Fish Health—Fish Health will coordinate with hatchery staff to conduct a pre-release health examination (Appendix B). Standard disinfection and sanitation guidelines will apply (Appendix C).

E. Satellite Operation—Wallowa staff will set-up Big Canyon acclimation facility ponds in late-February. Big Canyon and Wallowa adult traps will be deployed in late-January. Little Sheep adult trap will be installed in February, weather permitting.

F. Key Contacts

I. ODFW (Harrod) will notify Yanke, Garner, Jonasson and P. Keniry (ODFW), Harbeck and Olson (NPT), and Putnam (IDFG) of steelhead releases.

II. Summer Steelhead - 2015 Brood Year - Wallowa Stock

The LSRCP mitigation goal is 9,184 adults above the project area.¹

A. Smolt Goal – Produce 800,000 smolts at 4.0 fpp for release in 2016. Target production includes:

- 400,000 Production
- 400,000 Fall Brood

B. Egg Take Goal – Collect 1,111,100 green eggs to produce 1,000,000 eyed eggs (90% survival green to eyed eggs). Transfer 1,000,000 eyed eggs to Irrigon Hatchery to produce 800,000 smolts (80% survival eyed eggs to smolt).

C. 2014 Adult Collection

I. Predicted Run (Table 3)

- Marked – 3,631
- Unmarked – 77
- Total – 3,708
- a. Wallowa Hatchery**
 - Marked – 2,353 (1,102-3,605 95% CI)
- b. Big Canyon Satellite**
 - Marked – 1,278 (431-2,127 95% CI)
 - Unmarked – 77 (30-122 95% CI)
 - Total – 1,355

D. Trap Operations

I. Wallowa Trap Operation – Wallowa trap will be installed when winter conditions allow, typically in late January. Collections will continue until no fish are caught for 10 consecutive days.

- Trap/sorting Frequency** - Work trap Wednesdays with hatchery staff as needed.
- Disposition of Trapped Fish** - The estimated surplus of Wallowa stock (Wallowa and Big Canyon combined) is ~3,000 adults. The majority of surplus fish will be distributed to food banks. ODFW Grande Ronde Fish District has requested stocking of 50 fish in Roulet pond; and ODFW Wallowa District has requested 100 fish in Marr Pond and 70 fish in Wallowa wildlife pond. Stocking should occur by April 3rd. Stocked fish will be identified by a missing adipose

fin and 2-left opercle punches (2-LOP). Fish not outplanted or given to food banks will be buried at Wallowa Hatchery.

1) *Unmarked*—Transport unmarked fish to the Fish Hatchery Lane Bridge and release. Sampling shall include genetic (from opercle punch), sex, and length.

2) *Residual Steelhead* – Count and sample all residuals weekly, take snouts from all AdLV's and AdRV's, and euthanize all fish marked Ad only. After smolts have been released from acclimation pond, discontinue residual sampling.

3) *Bull Trout* – Record date, number trapped, and estimated fork length (minimizing handling effects and avoid anesthetics). Send summary to Yanke (ODFW) and Krakker (USFWS).

2. Big Canyon Trap Operations—No broodstock will be required from Big Canyon. The Big Canyon trap will be installed when winter conditions allow, which is typically in early-February. Collections will continue until no fish are caught for 10 consecutive days.

a. Period of Trap Operation - From initial start-up through April 15, the ladder will be operated from 5 pm Monday through Friday morning. After sorting on Fridays, the ladder will remain closed through Monday 5 pm to increase hatchery fish availability to anglers. Beginning April 16, the ladder will remain open throughout the trapping operation.

b. Trap/sorting/recycle Frequency - Work trap weekly with a preference for Fridays.

c. Disposition of Trapped Fish

1) *Unmarked* - Pass all fish above the weir in Deer Creek. Measure all released fish and mark with a 1-LOP.

2) *Marked* - No marked fish will be passed. No marked (Ad) adults will be released, but will be sampled for CWT recovery. Surplus hatchery fish will be provided to local food banks or landfill.

3) *Bull Trout* – Record date, number trapped, and estimated fork length (minimizing handling effects and avoid anesthetics). Send summary to Yanke (ODFW) and Krakker (USFWS).

4) *Residual Steelhead* - Count weekly until first smolt release. Sample all AdLV's and take snouts. Euthanize all Ad only. Efforts will be made to prevent residual steelhead from escaping when working the adult trap. After smolt release, discontinue sampling.

d. Disposition of Fallback Fish - Staff will collect and sample all fish that fall back on the Deer Creek weir to determine passed to un-passed ratio, h/w ratio, and number spawned out. Staff will collect otolith or head from moribund or dead unmarked steelhead, scales from both live and dead fish and pass live fish downstream.

E. Hatchery Broodstock/Collection Guidelines

1. Wallowa Hatchery - Wallowa steelhead are held and spawned at Wallowa Hatchery.

Production will consist of approximately 50% Production Brood and 50% Fall Brood. Some Fall Broodstock may be from angler-caught fish in the Lower Grande Ronde steelhead fishery during the previous October. Upon capture, these fish will be transferred to Wallowa Hatchery and held until spawn. Fall broodstock collection at Lower Granite Dam is also being discussed with the ACOE. Angler and dam collection activities will be led by the Wallowa District and will be dependent on fish returns and volunteer resources.

a. Broodstock Needs –A total of 472 adults should be spawned to meet production goals.

- Males – 236 (114 Ad or AdLV and 122 RV)

- Females – spawn 236 (114 Ad or AdLV and 122 RV).

The five-year average fecundity is 5,000 eggs per female.

2. Wallowa Hatchery Spawning Guidelines

a. Expected 1st Spawn – Wednesday, March 11.

b. Spawning Dates – Wednesday.

- March 4 – RV's only as needed
 - March 11 – 17 females (Ad or AdLV); RVs as needed
 - March 18 - 21 females (Ad or AdLV); RVs as needed
 - March 25 - 26 females (Ad or AdLV); RVs as needed
 - April 1 - 22 females (Ad or AdLV); RVs as needed
 - April 8 - 18 females (Ad or AdLV); RVs as needed
 - April 15 – 11 females (Ad or AdLV); RVs as needed
- c. The first 244 RV clipped fish trapped will be held at a 50:50 Male / Female ratio. In-season adult collection adjustments will be made depending on mortality and spawning success. Ripe fish will be spawned weekly. A total of 244 (122 males and 122 females) will be spawned (Appendix J).
- d. **Spawning Strategies** - 1:1 ratio and incubate eggs from 1-2 females per tray. Segregate the eggs collected from fall returning broodstock. Males from fall-collected brood may be used twice in the spawning protocols.

F. Incubation Strategies - Wallowa/Irrigon - Green eggs will be incubated at Wallowa Hatchery. Embryos will be transferred to Irrigon Hatchery as eyed eggs and will represent six egg takes.

G. Rearing Program - Irrigon

Eggs will be hatched and reared at Irrigon Hatchery. Eyed eggs will be trayed at 50 ounces per tray, with vexar screens used as a substrate.

1. **Standing Transfer Goal** – First group will be transferred to Wallowa Hatchery in January at 5 and second group will be transferred at 4.1 fpp.
 - a. **Excess** – No excess is expected. However, if survival is greater than expected, eggs can be culled, smolts produced, used for resident trout production, or ODFW will propose release location such as Kinney Lake or Oxbow Reservoir. Co-managers are looking for other water body options should there be a large excess of fish. Excess smolts will not be marked.
 - b. **Progeny** from fall brood will be segregated.
2. **No Wallowa stock will be graded.**

H. Fish Health

1. **Broodstock Monitoring Plan** (Appendix B).

- a. Treatment plan: Formalin bath treatments for fall brood hook and line caught or any transfer from Lower Granite Dam as needed to control fungus under a veterinary prescription.

- b. Disinfection and Sanitation Guidelines (Appendix C).

I. Monitoring & Evaluation

M&E activities for brood year 2015 are anticipated to be similar to those for 2014 (see page 2) with one exception; the representative PIT tagging used to compare PIT and CWT derived run reconstruction metrics will end. This change is expected to result in 8,000 fewer Imnaha stock smolts receiving LSRCP PIT tags. The CSS has not decided if they will change the number of PIT tags (14,000) they supplied during brood years 2007-2014. Table 6 shows the new LSRCP tag allocation. Table 4 shows the anticipated marked fish to be released.

III. Summer Steelhead - 2015 Brood Year – Little Sheep Stock

*Co-managers have agreed to manage production to meet the LSRCP mitigation goal of 2,000 adults above the project area. The goal consists of fish returning to Little Sheep, Big Sheep, and compensation area harvest.*¹

A. Smolt Goal — Produce 215,000 smolts at 4.5 fpp for release in 2015.

Production and releases include: 215,000 Little Sheep Cr. (acclimated) smolts

B. Egg Take Goal – A total 317,000 green eggs will be taken to produce 282,200 eyed eggs (89%) and 215,000 smolts (76.2% eyed eggs to smolts).

C. Adult Collection

1. Predicted Run – (Table 3).

- a. Marked – 1,359 (361-2,362 95% CI; (634 males and 726 females)
- b. Unmarked – 167 (81-248 95% CI); (67 males and 100 females)

D. Weir Management and Trap Operations

1. Little Sheep Trap Operation – Little Sheep trap will be installed when winter conditions allow, typically in late-February. Collections will continue until no fish are caught for 10 consecutive days.

- a. **Trap/sorting Frequency** - Work trap Mondays and Thursdays.

2. Broodstock Needs

- Total – 132 (28% wild) Males – 66
- Females – 66
- Broodstock numbers were determined based on a fecundity of 4,800.
 - a. **Wild** broodstock – 19 males and 19 females needed for brood. Release remainder above the weir.
 - b. **Hatchery** broodstock – 47 males and 47 females are needed for brood. Approximately 120 (9%) hatchery adults will be released above the Little Sheep weir.

<u>Week Ending</u>	Wild – keep 24		Hatchery – keep 108 (+4 males)*	
	<u>Avg. % by Week</u>	<u>Number Kept</u>	<u>Avg. % by Week</u>	<u>Number Kept</u>
March 20	5.4	1	6.9	7
March 27	9.7	2	8.6	9
April 3	8.6	2	12.6	14
April 10	16.0	4	18.8	20 (+1 male)
April 17	16.5	4	19.2	21 (+1 male)
April 24	15.2	4	13.9	15 (+1 male)
May 1	14.8	4	11.6	13 (+1 male)
May 8	9.2	2	5.7	6
May 15	2.6	1	1.8	2
May 22	1.3	0	0.7	1
May 29+	0.7	0	0.2	0
Totals		24		108+4=112

- * Keep one extra hatchery male per full week in April
- * Pass five hatchery fish for every four wild fish passed, match sex ratios
- * Last spawn can include the last fish in the Table and added to the May 15 egg take
- * If short for a particular week, make up the difference at the first opportunity

3. Disposition of Trapped Fish

- a. **Wild** – Wild adults collected and not retained for broodstock will be marked with a 1-LOP and placed above the weir. Number of wild fish released above the weir is estimated at 130 fish with a wild composition of 52% for natural spawning.
- b. **Hatchery** – Approximately 120 hatchery fish should be released above the weir for a prescribed spawner composition of 48%. Hatchery fish released above the weir should be opercle punched 1-LOP.
- c. **In season modification** - The run size will be reviewed around April 1 and adjustment can be made for broodstock collections.
- d. **Bull Trout** – Record date, number trapped, and estimated fork length (minimizing handling effects and avoid anesthetics). Send summary to Yanke (ODFW) and Krakker (USFWS).
- e. **Residual Steelhead** – Count and sample all residuals weekly until first smolt release, take snouts from all AdLV's and euthanize all Ad only. After volitional release begins, discontinue residual sampling.
- f. **Genetics tissue samples** - Tissue sample all wild and hatchery fish passed above the weir for genetic analysis by ODFW (for NOAA Fisheries).
- g. **Big Sheep outplants** - Surplus steelhead trapped and handled on Thursday will be outplanted to Big Sheep (up to 500). Surplus fish trapped and handled on Monday will be used for distribution. If a third day is required to work through the fish, they can be outplanted in Big Sheep. Live outplanted fish will be opercle punched with 2-LOP. NPT will provide staff and vehicle for Big Sheep adult outplants.
- h. **Surplus fish** may be used for distribution (food bank).
- i. **Recaptured and fall back fish** - All recaptured Big Sheep (2-LOP) hatchery fish will be processed according to the day re-collected. Fallback (fish passed above the weir but fall back below the weir and recaptured) Little Sheep fish (1-LOP) will be released above the weir again.
- j. **Carcass Disposal** - Spawned fish not suitable for distribution can be placed in the stream for nutrient enhancement or buried in a landfill. If IHNV prevalence $\geq 30\%$ then nutrient enrichment would have to stop. Contact Jim Harbeck (NPT) for carcass availability.
- k. **Strays** - All unidentified marked fish (e.g. RV only, maxillary clip) will be sacrificed.
- l. **Scales** - Samples will be collected from all wild adults.

E. Adult Identification Guidelines — Adults returning to Little Sheep trap will have a variety of marks. Summary of marks include:

Mark	Disposition
Ad	Subsistence, carcass, outplant or pass above the weir
AdLV+CWT	Subsistence, carcass, outplant, pass above weir, or spawn
No Mark wild	Spawn or pass above weir
No Mark hatchery	Outplant or Kill not spawn (missed clip)
AdRV (out of basin)	Kill not spawn (recover CWT)

* For Passed or Outplanted -- record clip, sex, location, genetic sample for passed fish, fork length

* For KNS - record clip, sex, OP punch, fork length, and snouts from all AdLV clipped fish

* The dorsal fin will be inspected to help identify no mark hatchery fish.

F. Spawning Guidelines

1. Little Sheep Satellite

- **First Spawn** - March 17.
- **Expected Spawning Frequency** – Weekly on Tuesdays.

2. **Spawning Strategies** – A 2 x 2 or 3 x 3 spawning matrix will be utilized. A matrix will include at least one natural fish, whenever possible. When eggs have been fertilized, the embryos will be combined into groups of three females. These groups will be tracked. Note: Live spawn all wild males retained for broodstock, collect genetic tissue sample (1 LOP), and release above the weir.

G. Incubation Strategies

Green eggs will be incubated at Wallowa Hatchery. Embryos will be transferred to Irrigon Hatchery as eyed eggs and will represent all egg takes. Plan to administer iodophor flush treatment for CWD prevention trial to approximately 50% of the females (the first ~33 females).

H. Rearing Program

Embryos will be hatched and fish reared at Irrigon Hatchery. Eyed eggs at Irrigon will be trayed down to 50 ounces/tray, with a vexas screen as substrate.

1. **Programmed for Release** - 215,000 smolts
 - a. 215,000 Little Sheep
 - b. Target size at transfer is 5.0 fpp. Single acclimation is expected with April volitional release.
2. **No Little Sheep stock will be graded.**
3. **Excess production** - Fish in excess of program needs will be reared to smolts and incorporated with the Little Sheep Creek release providing they can be acclimated in one release group.

I. Fish Health - Monitoring Plans

1. **Broodstock Monitoring Plan** (Appendix B)
2. **Disinfection and Sanitation Guidelines** (Appendix C).

J. Monitoring & Evaluation

Monitoring and evaluation activities for brood year 2015 are anticipated to be similar to those for 2014 (described on page 2). Tables 4 and 6 show anticipated marking, coded wire, and PIT tagging allocations.

K. Key contacts

1. **ODFW** (Flesher, Clarke) will provide ODFW (Yanke), NPT (B. Johnson, Hesse, Vogel, Harbeck, Young), CTUIR (Zimmerman, McLean) and USFWS (Engle) with weekly summary on collected and passed steelhead adults at Little Sheep.

IV. Summer Steelhead Monitoring: Catherine Creek/Grande Ronde River/Lookingglass Creek/Lostine River/Joseph Creek - 2015

Goal - to monitor natural escapement and hatchery strays into natural production areas and collect basic life history information for management planning—No fish production goals.

A. Monitoring and Evaluations

1. Adult Enumeration/Weir Collections

- **Weir locations** - Catherine Creek (CC), Grande Ronde River (UGRR), Lookingglass Creek (LGCR), Lostine River (LR), and Joseph Creek (JC). CC and UGRR weirs installed, operated and maintained by CTUIR. LGCR weir installed and operated by ODFW and CTUIR. LR and JC weirs installed and operated by NPT.
- **Period of Trap Operation** – CC, UGRR, and LGCR will be operated March 1 through August 1, environmental conditions permitting. Few steelhead are captured after mid-June. Lookingglass trap pickets may be pulled in May due to high run-off, but staff will attempt to operate from March 1 through September 10 to collect steelhead, bull trout and spring Chinook. LR weir will begin operating mid-February but may be periodically lowered when debris or high flow threaten the structure. JC weir will begin operating in January.

2. Disposition of steelhead at weirs

- a. **Catherine Creek, Upper Grande Ronde, and Lookingglass Creek Weirs**

- **Live, unclipped, first-time captures** – Enumerate, fork length, maturity, migration status, scales, sex, marks/tags, condition, take ONE opercle punch (preserve in vial for genetic analysis) and pass above the weir (or below if kelt). All UGR and LGCR fish will have scales collected. Catherine Creek fish will be sub-sampled for scales (schedule to be given to CTUIR O&M). All steelhead will be scanned for CWTs and PIT tags.
- **Live, unclipped, previously punched captures** - Enumerate, fork length, maturity, migration status, sex, marks/tags, and pass above the weir (or below if kelt). Note the number and position of existing opercle punches and the direction of capture (upstream or downstream).
- **Live, clipped captures or clipped mortalities** - Enumerate, fork length, maturity, migration status, sex, marks/tags, condition. At CC, UGRR, and LGCR weir a single right opercle punch (1 ROP) will be taken to mark the fish and the tissue will be stored in a uniquely labeled envelope for later genetic analysis. All steelhead will be scanned for CWTs and PIT tags. At LGCR, steelhead will be euthanized. If staff from both ODFW and CTUIR are present when the trap is checked, ODFW will euthanize them. If only CTUIR staff are present, any hatchery-origin fish will be put in a holding pen in the trap, ODFW hatchery staff notified, and ODFW will euthanize. AT CC and UGRR, steelhead will be released in the direction in which they were traveling (i.e. fish captured in the upstream trap box will be released upstream of the weir).
- **Weir/Trap Unclipped Mortalities - (First time captures at CC or UGRR)** Enumerate, fork length, maturity, migration status, scales, sex, marks/tags, condition, take two opercle punches (preserve one in vial for CTUIR), take otolith and preserve with second opercle punch in vial for ODFW-Research (Flesher). Return carcass to stream. **(Recaptures at CC or UGRR)**– Enumerate, fork length, maturity, migration status, sex, marks/tags, condition, take ONE opercle punch and otolith and preserve both in vial for ODFW-Research (Flesher). Return carcass to stream. **(First time capture or recapture at Lookingglass Creek)** Collect same data and tissues as for CC or UGRR. **Retain mortalities in freezer in labeled bag.** Collaborate with Fish Health when working dead fish at any of the three streams.

b. Lostine River Weir

Goal: to quantify natural and hatchery adult escapement and determine life history characteristics (NPT)—No Production goals.

- **Adult Escapement** – Population estimate using mark-recapture methodology.
- **Live unclipped first time captures** - LR unclipped steelhead will have the following noted: number captured, direction of capture (upstream or downstream), fork length, sex, fin clips/marks/tags, condition. A single right opercle punch (1 ROP) will be taken to mark the fish and the tissue will be stored in a uniquely labeled envelope for later genetic analysis. All steelhead will be scanned for CWTs and PIT tags. Steelhead will be released in the direction in which they were traveling (i.e. fish captured in the upstream trap box will be released upstream of the weir).
- **Live, unclipped, previously punched captures** – Spawned out kelts that wash downstream onto the weir will serve as recaptures for the mark-recapture estimate. Downstream captures of steelhead may also be obtained by seining or dip netting at the upstream face of the Lostine River weir. No attempt will be made to capture steelhead occupying a redd. Previously captured steelhead will be identified by the presence of a 1 ROP. In addition to the existing opercle punch, the following will be noted: number captured, direction of capture (upstream or downstream), fork length, maturity (green, ripe, or kelt), sex, fin clips/marks/tags, condition. All steelhead will be scanned for CWTs and PIT tags.
- **Live clipped first time captures** – LR fin clipped steelhead will be treated the same as unclipped steelhead.
- **Live, clipped, previously punched captures** – Recaptured LR fin clipped steelhead will be treated the same as unclipped steelhead.

- **Weir/Trap Mortalities** - Note the location of all steelhead carcasses and mortalities as upstream of weir, in trap box, in pickets, or downstream of weir. Inspect all steelhead carcasses for fin clips/marks/tags and scan for coded wire and PIT tags. Collect fork length, sex, percent spawned (if female) and inspect the operculum plates for a punch. If no punch exists, take a 1 ROP punch for genetic analysis. If no fin clips are present, collect scales. If a fin clip is present, collect the snout. Cut the tail off and place downstream of the weir.

c. **Joseph Creek Weir**

Goal: to quantify natural and hatchery adult escapement and determine life history characteristics (NPT)—No Production goals.

- **Adult Escapement** - Enumeration using floating weirs with standoff structures going to the bank and a PIT tag array.
- **Wild/Hatchery** – No broodstock collection. Trap, collect data, and release only.
- **Kelts** – No broodstock collection. Trap, collect data, and release only.
- **Period of Trap Operation** – January through June, or until 10 days after last capture. Trap is operated on a daily basis. If fish numbers warrant, then trap will be emptied multiple times per day to ensure the safety of the fish.
- **Trapping Strategies** - Traps checked every day.
- **Disposition of Steelhead** – Steelhead in the upstream movement box will be dipped out with cotton dip net and placed into a moist canvas sling/measuring box. Steelhead will be scanned for the presence of PIT tags. Data including fin clips, sex, spawning condition (pre/post), and fork length will be recorded. Scales will be collected from just behind the dorsal fin and above the lateral line using a blunt knife and forceps. Tissue from a single right opercle punch will be taken for genetic analysis. Each untagged fish will be PIT tagged and given a 1 ROP. Steelhead captured moving downstream will be examined for the presence of opercle punches and PIT tags. Marked fish will be checked for spawning condition (pre or post-spawn) and released downstream. Unmarked steelhead moving downstream will be handled according to the same procedures as upstream moving fish with the exception of a downstream release.
- **Disposition of Bull trout** – Record date, number trapped, and estimated fork length (minimizing handling effects and avoid anesthetics). Report take to US Fish and Wildlife Service Under Section 6 (4d limitation) Bull Trout Permit #TE001598-1 with copy of data to ODFW (Yanke) and LSRCP (Krakker).
- **Disposition of other non-target species** – Enumerate, subsample for length and release.
- **Adult Mortalities** – Natural mortalities will be sampled for biological information and their heads retained for otolith extraction.

B. Remote PIT Tag Array Monitoring Section

The Nez Perce Tribe operates remote in-stream detection systems in the Grande Ronde basin as part of the larger Integrated Status Effectiveness Monitoring Project (ISEMP) to monitor juvenile and adult salmon and steelhead abundance. These PIT tag arrays will be operated year round and are part of a long-term monitoring effort. Information about PIT tag recapture information can be viewed at [“www.ptocentral.org/dbaccess/InStrmDtctn/InStrmDtctn_query.html”](http://www.ptocentral.org/dbaccess/InStrmDtctn/InStrmDtctn_query.html). Grande Ronde Basin PIT Arrays, Site code, and GPS locations include:

1. *Site Code (JOC) – Joseph Creek at rkm 3 - N 46.030016, W 117.016042 – installed 10/15/2010.*
2. *Site Code (UGR) - Upper Grande Ronde at rkm 155 - N 45.593338, W 117.903124- installed 10/18/12.*
3. *Site Code (WRI) - Wallowa River at rkm 14 - N 45.633769, W 117.73369- installed 8/16/2013.*

C. Key Contacts

1. CTUIR (McLean). Distribute bull trout and steelhead data collected to ODFW District offices (Bailey, Yanke).
2. NPT (Vogel, Cleary, Kucera). Distribute bull trout and steelhead data collected to ODFW District offices.

V. Summer Steelhead - Imnaha Tributaries (Cow, Camp, Big Sheep, Freezeout, Dry, and Gumboot creeks)

Goal: to quantify natural and hatchery adult escapement and determine life history characteristics (NPT)—No Production goals.

A. Weir Monitoring

1. **Adult Escapement** - Enumeration using floating and picket weirs with standoff structures going to the bank. Population estimates will be determined by mark recapture methodology.
 - a. *Weir locations* – Freezeout, Dry and Gumboot creeks.
2. **Trap Operations**
 - a. *Wild/Hatchery* – No broodstock collection. Trap, collect data, and release only.
 - b. *Kelts* – No broodstock collection. Trap, collect data, and release only.
 - c. *Period of Trap Operation* – March through June, or until 10 days after last capture.
 - d. *Trapping Strategies*-Traps checked twice daily.
 - e. *Disposition of Fish*
 - Steelhead – Steelhead in the upstream movement box will be dipped out with dip net and placed into a moist canvas sling or watered measuring box. Steelhead will be scanned for the presence of PIT tags. Data including fin clips, sex, spawning condition (pre/post), and fork length will be recorded. Scales will be collected from just behind the dorsal fin and above the lateral line using a blunt knife and forceps. Tissue from a single right opercle punch (1 ROP) will be taken for genetic analysis in Freezeout, Dry and Gumboot creeks. Each untagged fish will be PIT tagged. Steelhead captured moving downstream will be examined for the presence of opercle punches and PIT tags. Marked fish will be checked for spawning condition (pre or post-spawn) and released downstream. Unmarked steelhead moving downstream will be handled according to the same procedures as upstream moving fish with the exception of a downstream release.
 - Bull trout – Record date, number trapped, and estimated fork length (minimizing handling effects and avoid anesthetics). Report take to US Fish and Wildlife Service Under Section 6 (4d limitation) Bull Trout Permit #TE001598-1 with copy of data to ODFW (Yanke) and LSRC (Krakker).
 - Other non-target species – Enumerated, subsampled for length and released.
 - f. **Adult Mortalities** – Natural mortalities will be sampled for biological information.

B. Remote PIT Tag Array Monitoring Section

The Nez Perce Tribe operates remote in-stream detection systems in the Imnaha river basin as part of the larger Integrated Status Effectiveness Monitoring Project (ISEMP) to monitor juvenile and adult salmon and steelhead abundance. These PIT tag arrays will be operated year round and are part of a long-term monitoring effort. Information about PIT tag recapture information can be viewed at “www.ptocentral.org/dbaccess/InStrmDtctn/InStrmDtctn_query.html”. Imnaha Basin PIT Arrays, Site code, and GPS locations include:

1. *Site Code (IR1) – Lower Imnaha River at rkm 7 - N 45.761162, W 116.750658- installed 12/3/2010.*

2. *Site Code (IR2) - Lower Imnaha River at rkm 10 - N 45.742839, W 116.764563- installed 11/13/2010.*
3. *Site Code (IR3) – Lower Imnaha River at rkm 41 - N 45.49004, W 116.80393 - installed 2/15/2011.*
4. *Site Code (COC) – Cow Creek at rkm 1 - N 45.76774, W 116.744037- installed 1/12/2011.*
5. *Site Code (BSC) – Big Sheep Creek at rkm 6 - N 45.50649, W -116.85067- installed 10/20/2010.*
6. *Site Code (CMP) – Camp Creek at rkm 2 - N 45.552014, W 116.86688 - installed 2/21/2013.*
7. *Site Code (CZY) – Crazyman Creek at rkm 0.6 - N 45.22930, W 116.84478 - installed 11/8/2013.*

C. Key Contacts

NPT (Vogel, Hesse, Young, Harbeck)

CHINOOK (O. tshawytscha)

Eleven raceways will be prioritized for Grande Ronde tributary production and 7 raceways for Imnaha production at Lookingglass Hatchery. Priorities for the adult ponds have not been determined. Current priorities include:

- Lostine; 4 raceways
- Upper Grande Ronde; 4 raceways – 4 for conventional
- Catherine Creek; 3 raceways
- Lookingglass Creek; adult holding ponds
- Imnaha; 7 raceways

VI. Grande Ronde Basin - 2013 Brood Year Spring/Summer Chinook – Catherine Creek, Lookingglass Creek, U. Grande Ronde & Lostine River

Smolts target size was 25 fpp (actual~ 28.5 fpp) by October 31 with an expected release size of 22 fpp in April.

A. Allocation — The estimated number of smolts for the Grande Ronde Subbasin 2015 release is 798,000 fish weighing 31,920 pounds (Appendix A). Release target breakdown by tributary is as follows:

1. Catherine Creek (CC) – 146,500
 - a. Conv – 146,500
2. Lostine River (LR) – 250,000
 - a. Conv – 250,000
3. U. Grande Ronde (UGR) – 225,000
 - a. Conv – 225,000
4. Lookingglass (LGCR) – 176,500
 - a. Conv – 176,500

B. Liberations

1. **Schedule**—All facilities will be set-up and operational at least 2 days prior to scheduled delivery of smolts. Release number will be determined by last physical inventory minus mortality. Facility operators will report final numbers to the ODFW LGH staff or Shari Beals.

a. **Lostine Acclimation Schedule**

Approximately 126,000 smolts will be released after 1.5 weeks of acclimation.				
Location	Transfer in date	Release dates	Force Release Date	Comments
LGH ½ R11 to pond A	March 9	March 21	March 31	The screens will be pulled on March 21 allowing fish to leave for 10 days. On March 31, the remaining fish will be forced out
LGH ½ R11 to pond B				
LGH ½ R12 to pond C				
LGH ½ R12 to pond D				
Approximately 124,000 smolts will be released after 1.5 weeks of acclimation.				
Location	Transfer in date	Release dates	Force Release Date	Comments
LGH ½ R13 to pond A	April 1	April 12	April 22	The screens will be pulled on April 12 allowing fish to leave for 10 days. On April 22 the

LGH ½ RW 13 to pond B				remaining fish will be forced out.
LGH ½ RW 14 to pond C				
LGH ½ RW14 to pond D				

b. Catherine Creek Acclimation Schedule

Catherine Creek Acclimation				
Location	Transfer in date	Volitional Release Date	Forced Release Date	Comments
LGH R2 to pond A	Mar 17	Mar 19	Apr 15	Conventional
LGH R2 to pond B	Mar 17	Mar 19	Apr 15	Conventional
LGH R3 to pond C	Mar 17	Mar 19	Apr 15	Conventional
LGH R3, to pond D	Mar 17	Mar 19	Apr 15	Conventional
Approximately 146,500 smolts @ 25 fpp will be released after 29 days of acclimation. The fish will be split equally into the acclimation raceways.				

c. Upper Grande Ronde Acclimation Schedule

Upper Grande Ronde Acclimation				
Location	Transfer in date	Volitional Release Date	Forced Release Date	Comments
LGH R15 to pond A	Mar 16	Mar 18	Mar 30	Conventional
LGH R15 to pond B	Mar 16	Mar 18	Mar 30	Conventional
LGH R18 to pond C	Mar 16	Mar 18	Mar 30	Conventional
LGH R18 to pond D	Mar 16	Mar 18	Mar 30	Conventional
Approximately 117,500 smolts @ 25 fpp will be released after 15 days of acclimation. The fish will be split equally into the acclimation raceways.				
Late Group				
LGH R16 to pond A	Mar 31	Apr 2	Apr 15	Conventional
LGH R16 to pond B	Mar 31	Apr 2	Apr 15	Conventional
LGH R17 to pond C	Mar. 31	Apr 2	Apr 15	Conventional
LGH R17 to pond D	Mar 31	Apr 2	Apr 15	Conventional
Approximately 107,500 smolts @ 25 fpp will be released after 15 days of acclimation. The fish will be split evenly into the acclimation raceways.				

d. Lookingglass Creek Release Schedule

Approximately 176,500 smolts will be released into Lookingglass Creek			
Location		Release dates	Comments
LGH R1,4,10	NA	April 1 - through April 14	The screens will be pulled on April 1 allowing fish to leave for 14 days. On April 15, the remaining fish will be forced out

Notes: Contingency— Fish may be released earlier than scheduled if conditions warrant. Downstream rotary trap operators should be notified immediately and co-manager within 24 hours: Brian Jonasson, Scott Favrot, Brad Garner, Pat Keniry, Mike McLean, Steve Yundt.

All acclimation mortalities will be scanned for PIT tags. Tags or code numbers will be provided to NPT (Vatland) and ODFW (Keniry). Mortalities will be provided to fish health for examination.

C. Monitoring and Evaluation— A variety of M&E efforts are ongoing (Tables 2 and 6).

1. **Genetic tissue collection** for monitoring and pedigree analysis, 50 samples/stock.
2. **Pre-liberation sampling** – in each raceway
 - a. Collect 50 weights
 - b. Collect 250 lengths
 - c. Check 500 fish for tag retention and fin clip quality
3. **Monitor:**
 - a. Downstream migration survival and rate
 - b. PIT survival studies (CSS) for Catherine Creek
 - c. Hatchery vs. Natural production, growth and survival (in collaboration with ODFW Early Life History Project)
4. **Studies**
 - a. CSS

D. Marked Groups.

1. Catherine Creek
 - a. 40,762 Ad
 - b. 106,367 AdCWT
2. Lostine River
 - a. 59,564 AdCWT, 66,692 Ad only (raceways 11 and 12)
 - b. 86,442 AdCWT, 38,138 Ad only (raceways 13 and 14)
3. Upper Grande Ronde
 - a. CV 116,416 CWT (raceways 16 and 18)
 - b. CV 109,488 AdCWT (raceways 15 and 17)
4. Lookingglass Creek-
 - a. CV 99,365 ADCWT
 - b. 78,996 Ad

E. PIT Tags

1. Catherine Creek – 20,971
2. Lostine River – 2,301
3. Upper Grande Ronde – 2,002
4. Lookingglass Creek- 1,992

E. Fish Health - Fish Health will coordinate with hatchery staff on pre-release health examinations (Appendix E). Standard disinfection and sanitation guidelines will apply (Appendix C).

F. Key contacts

1. **Hatcheries:** CTUIR (McLean), ODFW (Gibbs), NPT (Zollman).
2. **Fish Research:** CTUIR (McLean) ODFW (Hoffnagle, Feldhaus, Jonasson), and NPT (Hesse, Vogel, Vatland, Young).

VII. Grande Ronde Basin - 2014 Brood Year Spring/Summer Chinook – Catherine, Lookingglass, Lostine & U. Grande Ronde

Smolt target size is 30 fpp by October 31 and 20-25 fpp at release for Catherine and Lostine and Upper Grande Ronde. The CTUIR would prefer a smolt target release size of 20 fpp. Expected transfer size is 22-26 fpp. Lookingglass Creek target release size is 20 fpp.

A. Allocation – Scheduled for transfer target size of 26 fpp in mid-March 2016.

1. **Anticipated Grande Ronde basin production** is 931,438 smolts for release in 2016 produced from Lookingglass Hatchery.
 - a. **Estimated Conventional brood** numbers are:
 - Catherine Creek 162,054
 - Lostine River 250,000
 - U. Grande Ronde 221,627
 - Lookingglass Creek 306,000

B. Final Rearing — Catherine Creek, Lostine River, Lookingglass Creek and U. Grande Ronde fry will be transferred outside in late April or early May at 200 fpp (Appendix F).

C. Monitoring and Evaluation

1. Monitor
 - a. PIT tag survival studies (CSS) for Catherine Creek and Lostine River
 - b. Hatchery vs. Natural production, growth and survival (in collaboration with ODFW Early Life History Project)
2. Studies
 - a. CSS

D. Marking Program-

1. **AD/CWT** is scheduled for August 2015.
 - a. **Catherine Creek**
 - 104,000 AdCWT
 - 52,000 Ad only
 - b. **Lostine River**
 - 130,000 AdCWT
 - 130,000 Ad only
 - c. **Lookingglass Creek**
 - 97,000 AdCWT
 - 97,000 Ad only
 - d. **Upper Grande Ronde**
 - 115,000 AdCWT
 - 115,000 CWT only

Note: During marking, equipment will be disinfected between stocks. Within a stock, operations will start with the healthiest raceway of fish and progress to least healthy raceway of fish based on the latest Fish Health information. Raceways with abnormal mortality rates will be marked last by stock. Additional efforts will be made for equipment disinfections.

2. **PIT tagging** is scheduled for October 2015 (Table 7). Numbers by stock include:
 - a. Catherine Creek - 21,000 CSS
 - b. U. Grande Ronde - 2,000
 - c. Lostine (conventional) – 2,300

- d. Lookingglass Creek - 3,000

E. Fish Health

1. **Disinfection and Sanitation Guidelines** (Appendix C).
2. **Juvenile health monitoring and disease treatments** (Appendix E).

F. Key contacts

1. **Fish Marking:** ODFW (Haugen, Onjukka, Feldhaus, LaPoint, Hoffnagle and Keniry), NPT (Vatland, Vogel)

VIII. Grande Ronde Basin - Conventional - 2015 Brood Year - Spring/Summer Chinook Catherine, Lookingglass, Lostine, and Upper Grande Ronde

The LSRCP production goal is 900,000 smolts to produce 5,720 adults.

A. Smolt Production -

1. Production targets include:
 - a. Catherine Creek - 150,000 smolts
 - b. Lookingglass Creek - 250,000 smolts
 - c. Lostine - 250,000 smolts
 - d. Upper Grande Ronde - 250,000 smolts

B. 2014 Adult Collection

1. **Predicted Runs** (Tables 7, 8, 9, 10) female contribution estimated at 50% of adults.
 - a. **Catherine Creek**
 - **792 adults (192 jacks)**
 - Natural – 444 adults (plus 37 jacks)
 - Hatchery – 348 adults (plus 155 jacks)
 - b. **Lostine River**
 - **3,903 Adults (1,410 jacks)**
 - Natural – 1,072 adults (plus 109 jacks)
 - Hatchery – 2,831 Adults (plus 1,031 jacks)
 - c. **Upper Grande Ronde**
 - **1,130 adults (286 jacks)**
 - Natural - 390 adults (plus 15 jacks)
 - Hatchery - 740 adults (plus 271 jacks)

d. Lookingglass Creek

- **1,087 adults (255 jacks)**
 - Natural - 223 adults (71 jacks)
 - Hatchery – 864 adults (218 jacks)

2. Broodstock needs are based on fecundity and green egg to smolt survival summarized in Appendix G.

- a. CC** - A target of 110 (55 females, 51 males, 4 jacks) fish should be collected with 49 females spawned to produce 150,000 smolts. The estimate is based on an average of 3,043 (2005-2008, 2012, lowest 5 years) smolts released/female spawned and a prespawn mortality of 12%.
- b. LGCR** - An estimated 85 pairs should be collected to produce 250,000 smolts. This is based on performance history of the CC stock. Additional production can be obtained from the Catherine Creek captive brood production.
- c. LR** - A target of 83 adult pairs (83 natural and 83 hatchery origin adults), plus 6 hatchery jacks, should be collected (73 spawned) to produce 250,000 smolts. These estimates are based on female survival of 95%, fecundity of 4,448, and 84.3% green egg to smolt survival (Table 16).
- d. UGR** - A target of 178 (89 females, 81 males, 8 jacks) fish should be collected with 79 females spawned to produce 250,000 smolts. The estimate is based on an average of 3,158 (2005-2007, 2009, 2012, lowest 5 years) smolts released/female spawned and a prespawn mortality of 12%.

D. Trap Operation

- 1. CC and UGR Trap Operation (CTUIR)** – Trapping will begin in March to monitor steelhead abundance. Overnight staffing will occur after April 16 and trapping will continue, if river conditions allow, through July 31. Electroanesthesia will be used at both weirs.
- 2. LR Trap Operation (NPT)** - Trapping for Chinook salmon brood on the Lostine River will begin in May and continue until 10 days without capturing a fish after September 1. LR trap operation will begin in mid-February for steelhead monitoring and continue through Chinook broodstock collection.
- 3. Lookingglass (ODFW)** — The intake trap at Lookingglass Hatchery will be operated from March (as environmental conditions allow) through mid-September. If pickets are removed due to debris and high water, notes will be made on the trap sheet.
- 4. General Guidelines**
 - a.** Trapping facilities will be checked daily.
 - b.** Water temperature data will be collected. It is expected that as water temperatures increase, facility operators will adjust their schedule to best coincide their work with the coolest water temperatures. Water temperatures can be monitored with Onset temperature loggers. When water temperature exceeds 68° F (20° C) on the Upper Grande Ronde, the trap will be removed.

- c. Surveys will be conducted by walking the streambank below each weir. Survey frequency ranges from daily to weekly depending on water temperatures and fish activity. Information is used to determine if salmon are accumulating below the weirs. Surveys may include snorkeling.
- d. Attempts will be made to haul or pass captured adults on a daily basis. Adults in CC and UGR will be worked on a M, W, F schedule, but will be worked more often during the peak of the run, if necessary. Fish may be held up to 72 hours.
- e. With the exception of the Lostine River stock, fish retained for broodstock will be injected with tulathromycin and oxytetracycline (Appendix H). For the LR stock only 50% of the broodstock will be injected with both antibiotics to evaluate the effect of no injections.

5. Weir Management Guidelines

a. **Catherine Creek** - The projected adult run is 792, including 444 natural adults. The adult sliding scale for broodstock collection with a projected run exceeding 500 adults is $\leq 20\%$ of wild return. Hatchery-origin adults released above the weir should be $\leq 50\%$ of the total. Ten percent of the males above the weir may be age-3 hatchery males. The pNOB goal for CC at this return level is $>30\%$, however due to the strong NOR forecasted this year the target for 2015 will be a pNOB of 71%. The goal is to have 71% (75 of 106) broodstock from natural origin adults In-season PIT tag projections will used to reassess the run. Surplus hatchery adults can be transferred to Lookingglass Creek and released below the hatchery. Up to 50 pairs of adults (5 jacks) that are surplus can be released into Indian Creek. No surplus is expected based on preseason projections. If surplus occurs, the first 50 should be outplanted to Indian Creek, then 100 to Lookingglass Creek, then 50 to Indian Creek.

- **Catherine Creek Spring Chinook broodstock/upstream passage management guidelines (Table 13)**
- **Catherine Creek Broodstock Collection Guidelines**

		Nat Female	Hat Female	Nat Male	Hat Male	Nat Jack	Hat Jack
Week	Nat	39	16	36	15	3	1
6-May	0.0	0	0	0	0	0	0
13-May	0.8	0	0	0	0	0	0
20-May	1.6	1	1	1	1	0	0
27-May	6.5	2	1	2	1	0	0
3-Jun	14.6	6	2	5	2	0	0
10-Jun	14.6	6	2	5	2	1	0
17-Jun	27.6	11	4	10	4	1	1
24-Jun	17.9	7	3	7	3	1	0
1-Jul	8.1	3	1	3	1	0	0
8-Jul	4.1	2	1	2	1	0	0
15-Jul	2.4	1	1	1	0	0	0
22-Jul	0.8	0	0	0	0	0	0
29-Jul	0.8	0	0	0	0	0	0

- b. **Upper Grande Ronde** – The projected adult run estimates is 1,143, including 324 natural adults. The Grande Ronde conventional program calls for collection of up to 50% of natural fish and up to 100% of conventional return to reach the broodstock goal. Pass 100% of captives.

- **Grande Ronde Broodstock Collection Guidelines**

		Female	Male	Jack	Hi temp	Female	Male	Jack
Week	Nat	89	81	8		89	81	8
6-May	0.0	0	0	0		0	0	0
13-May	0.0	0	0	0		0	0	0
20-May	0.0	0	0	0		0	0	0
27-May	0.0	0	0	0		2	2	0
3-Jun	3.7	3	2	2		5	5	2
10-Jun	28.0	25	23	2		27	24	2
17-Jun	40.2	36	33	2		38	34	2
24-Jun	17.1	15	14	2		17	16	2
1-Jul	7.3	7	6	0		Run missed		
8-Jul	0.0	0	0	0				
15-Jul	2.4	2	2	0				
22-Jul	1.2	1	1	0				
29-Jul	0.0	0	0	0				

a. **Lostine River** - At the projected run level of 1072 natural adult returns, NPT and ODFW agree to manage at the 1.5 to 2 times viable population level of the sliding scale where up to 25% of the fish passed upstream can be hatchery origin and a minimum of 50% of the fish taken for broodstock will be natural origin. We chose 1.5 to 2 times viable level of the sliding scale as opposed to the >2 viable level because of uncertainty in the point estimate and its closeness to the 1000 fish threshold. Ten percent of the male fish passed upstream can be age 3 hatchery Chinook (< 63 cm). Observations of PIT-tagged Lostine River hatchery Chinook salmon at mainstem hydroelectric dams will be monitored in-season by ODFW and the NPT. If in-season monitoring indicates that natural adult returns are not returning as projected, co-managers will discuss changes to management. Natural and hatchery origin fish may be radio tagged and released at the weir. Radio tagged hatchery origin fish will be included in the percent of hatchery origin fish above the weir for 2015. The basic collection guidelines are as follows:

- **Lostine Creek Spring Chinook broodstock/upstream passage management guidelines (Table 14).**
- **Lostine Broodstock Collection Guidelines**

Start of Week (Sun)	Natural	Hatchery	Weekly Goal
14-Jun	3	3	6
21-Jun	1	1	2
28-Jun	5	5	10
5-Jul	6	6	12
12-Jul	18	18	36
19-Jul	13	13	26
26-Jul	6	6	12
2-Aug	3	3	6
9-Aug	5	5	10
16-Aug	4	4	8
23-Aug	11	11	22
30-Aug	6	6	12
6-Sep	2	2	4
13-Sep	0	0	0
Total	83	83	166

Surplus hatchery origin fish are expected and they will be available for both distribution and out-planting as specified below.

- Hatchery origin fish will be out-planted to the Wallowa River below the McDaniel's restoration project.
- Outplanted fish will be as representative as possible in age and sex structure to those captured at the Lostine weir after July 20.
- • If outplants occur in new reaches, subsequent spawning success will be monitored in target reaches by NPT and/or ODFW staff.

- Surplus fish beyond those outplanted in Wallowa River will be outplanted in previously agreed to streams.
- Age 3- 5 hatchery origin fish may be transferred to Wallowa Hatchery for distribution or recycled. Fish held for distribution will be sampled according to Appendix G.

Note: CTUIR does not agree with the current spring Chinook disposition plans at the Imnaha and Lostine River weirs.

c. Lookingglass Creek

Lookingglass Creek Broodstock Collection Guidelines.

Start of Week (Sun)	Natural	Hatchery	Weekly Goal
May 17	0	1	1
May 24	1	1	2
May 31	2	6	8
Jun 7	7	15	22
Jun 14	12	26	38
Jun 21	10	24	34
Jun 28	4	16	20
Jul 5	1	4	5
Jul 12	0	2	2
Jul 19	1	1	2
Jul 26	1	1	2
Aug 2	2	2	4
Aug 9	1	2	3
Aug 16	3	6	9
Aug 23	2	4	6
Aug 30	0	0	0
Total	47	111	158

- Adults (ad clipped and unmarked) allocated for natural production will be identified with an opercle punched (1-ROP), then released upstream of the weir. Fish collected for hatchery broodstock will be injected and transported to the hatchery.
- Hatchery jacks will be incorporated into the broodstock at a target rate of one for every 10 adult males collected (8 fish). All natural jacks will be released upriver. No hatchery jacks will be released upriver. All CWT hatchery jacks will be sacrificed for tag recovery and carcasses could be used for foodbank. Other hatchery jacks will either be sacrificed with carcasses provided to the Tribes or food banks or recycled into lower Lookingglass Creek for harvest benefits.
- All Chinook passed upstream of the intake trap will have tissue collected (opercle punch; 1 ROP) for future genetic analysis (pedigree)
- Additional information can be found in the Lookingglass Creek Spring Chinook Management Plan, finalized January 2011.

Notes: General comments - No marked fish from other streams or basins will be passed upstream. UGR fish may be added to the broodstock or held for return to the Upper Grande Ronde River. CC fish can be used consistent with Lookingglass Creek management. Captive brood jacks may be sacrificed for CWT recovery.

6. Disposition of Trapped Fish

- a. **Bull Trout** – Enumerate and estimate length (minimize handling). Data and reports sent to ODFW (ODFW District and Regional offices), and LSRCP (Krakker).
- b. **Steelhead** -- Enumerate and determine hatchery or wild origin. Ad clipped fish will be euthanized at LGCR. Data and reports sent to ODFW (ODFW District and Regional offices), and LSRCP (Krakker).
- c. **Unmarked Chinook** - A data sheet should be provided to Lookingglass Hatchery for all transferred fish. Each fish trapped will be measured to the nearest mm fork length, and sex determined. Fish passed above the weir will be allowed to fully recover in sheltered flow before being released. Fish placed above the weir will be opercle punched (UGR=1ROP, CC=1ROP, LR=1 LOP) for population estimates. Lookingglass fish receive a ROP prior to release above the Lookingglass Hatchery weir. Opercle tissues are used for both a mark/recapture population estimate and for genetics analysis. LR fish taken to Lookingglass Hatchery will receive one opercle punches (1-ROP) and white Tyvek tag.
- d. **Hatchery Chinook** trapped on Lookingglass Creek, and identified as CC or UGR, will be disposed of as follows: UGR returned to UGR, CC released below the weir or added to CC or LG broodstock if needed.
- e. **Trapping mortalities** – Because of take permit issues, trapped mortalities will be processed as kept fish and transported to Fish health, fresh if possible, for examination. Fish dead for less than 24 hrs keep on ice. Fish dead more than 24 hours freeze. Weir mortalities or other pre-spawning mortalities discovered during stream bank surveys or unusual loss will be coordinated with Fish Health. Data will be sent to ODFW Fish Research (Feldhaus). Following examination, the carcasses may be disposed of in the landfill.

Note: Tumors- Fish will be inspected for tumors along the gum line. If a tumor is suspected, fish will be held for consultation.

- 7. **Broodstock Transportation Procedures** – CTUIR will provide transportation of adult fish from CC and UGR and NPT will provide transportation from the Lostine. ODFW Regional Transport coordinator will provide back-up transportation.
 - a. **Attempt to haul broodstock adults daily.** Adults will not be held more than 72 hours.
 - b. **Driver is responsible for completing a transfer data sheet** and providing to the Lookingglass Hatchery staff upon arrival, for data entry in the HMIS system.
 - c. **Thermal shock will be minimized during transport.** Hauling will normally occur in the morning to take advantage of cooler stream temperatures. Temperature differences between transport container and facility water will not exceed 10° F or 5.6° C. Tempering may be necessary to reduce temperature difference.
 - d. **Fish Handling** - Fish will be netted from the transport tank and placed in holding tanks at Lookingglass Hatchery. Lookingglass Hatchery personnel will record all observations on data sheets and report to Fish Health at the end of the season.
- 8. **Adult holding** - The adult holding plan includes:
 - a. **Catherine Creek** - Endemic building
 - b. **Lookingglass Creek** - One adult holding pond
 - c. **Lostine River** - One adult holding pond
 - d. **Imnaha** - One adult holding pond. Outplants will be held at Imnaha facility
 - e. **Upper Grande Ronde** - One adult holding pond
 - f. **Safety Net** - Endemic building

E. Spawning Guidelines (for each stock)

- 1. **Anesthetic** - MS222 or Electro-Anesthesia for Lostine and Imnaha stocks and Electro-Anesthesia for Lookingglass, Catherine Creek, and Upper Grande Ronde stocks.
- 2. **Sorting** – The first sort will occur the week of August 11th

3. **Expected First Spawn** – The week of August 11th
4. **Spawning Frequency** - Once per week or as required (deceased females will not be spawned). Tentative Schedule: Tuesday-IM, LR; Thursday-UGR, CC; Wednesday -LG CR. Two additional days will be added during peak of spawning on Wednesday to spawn LR and IM fish due to both stocks being held in AHPs.
5. **Spawning Strategies** - All surviving broodstock collected will be spawned at Lookingglass Hatchery. Sorting and spawning to take place the same day. Hatchery and co-manager staffs will determine fertilization matrices. All Tyvek tag numbers will be recorded on the spawning matrix sheets. A maximum of 10% of the eggs can be fertilized with three year old males and a target of 30% of the eggs will be spawned with assumed five year old males (UGR, LGC, and CC males >80cm and LR males >85cm). Large males may be spawned up to 3 times. Jack spawning will be conducted with 1 female to 1 jack matrix. Most adult spawning matrices will be 2 females x 2 males, but matrices of 1 x 1, 1 x 2, 2 x 1, or 3 x 2 can be used if necessary. Fertilized eggs will be incubated at Lookingglass hatchery. Fecundity will be determined at eye-up. If a ripe female is observed during sorting and no ripe male is available, the female will be returned to the holding pond until a ripe male is located. Ripe male gametes can be collected in an emergency (priority intended):
 - **Sperm on ice** from fish passed at weirs - These fish will be given a 1LOP opercle punch so they can be identified during spawning surveys and counted as “taken”.
 - **If milt is not available after 7 days** of holding a ripe female, transport female(s) to river of origin.
 - a. **General fertilization techniques**
 - Sort and euthanize ripe females
 - Collect eggs preventing addition of outside containments (other body parts)
 - Store individual female eggs separately
 - Drain ovarian fluid from eggs
 - Sort males, spawn in dry cup
 - Mix sperm with eggs, activate with pathogen free water (~100 ml)
 - Wait 60 seconds, rinse eggs
 - Fertilized and rinsed eggs in 100 ppm iodophore solution for minimum of 45 minutes
 - Tray eggs, 1 female eggs per tray
6. **Surplus brood** - may be returned to stream of origin, provided that MS 222 withdrawal time has been met. Fish injected with antibiotics will not be used for human consumption or released where legal harvest is possible. LGH is currently using Electro anesthesia. CC stock return will be dependent on percentages above CC weir. CC fish could be released into LGC.

F. BKD Management

Fish Health recommends only rearing progeny from parents with low (<.200 OD units) BKD titer levels.

G. Incubation Strategies – All stocks will be incubated at Lookingglass Hatchery using a combination of chilled and un-chilled well water, UV treated (>60,000 uw/cm²/sec) creek water and heath trays.

1. **Hatchery Program** – Each female’s eggs will be incubated in one tray until disease screening profiles results are completed. Eggs may be combined after fecundity estimates are completed.
2. **Heath Trays** will be used for eggs from all Lookingglass Creek adults, U. Grande Ronde and Imnaha adults.
3. **Heath Trays** will be used for eggs from all Catherine Creek and Lostine River adults.

H. Early Rearing Program

1. **Lookingglass** – Catherine, Grande Ronde, Lostine, and Lookingglass fry will be loaded at 30 to 50 thousand per trough.

2. **Segregation of eyed-eggs and progeny will occur based on BKD ELISA** values of kidneys from spawned females. If at all possible, only BKD lows will be reared (<0.200 OD units).
3. **Catherine Creek, Lostine, Lookingglass and Grande Ronde** smolts produced will be targeted for ~250 fpp April 30, 2014 and 30 fpp October 2014.

I. Monitoring and Evaluation

1. Spawning ground surveys
 - a. Carcasses – count, length, marks/tags, snout/scales, kidney sample, genetic sample
 - b. Live fish – count
 - c. Redds – count, GPS
2. Hatchery Spawning
 1. Data collection – length (all fish), weight (females), marks/tags, eyed egg weights, individual fecundity
 2. Tissue collection – snout/scales, kidney sample, genetic sample
3. Weir/trap morts
 1. Data collection – count, length, scan, marks/tags
 2. Tissue collection – snout/scales, kidney sample, genetic sample
4. Monitor
 1. Hatchery vs. Natural production, growth and survival (in collaboration with ODFW Early Life History Project)
 2. PIT tag detections at dams and weirs for run timing – Catherine Creek and Lostine River
5. Studies
 1. CSS
6. Fish Health Monitoring Plans
 - a. **Disinfection and Sanitation Guidelines** (Appendix C).
 - b. **Broodstock Monitoring and Treatment Plan** (Appendix H)
 - c. Within each tributary, collect 40 kidneys from natural spawning females (20 N and 20 H) above the weir (Appendix H).
7. Hatchery versus Natural egg weights at eyed egg stage

J. Key Contacts

1. **Transportation - Facility Operators (NPT and CTUIR)** will coordinate all hauling and notify LGH (Gibbs) of the stock, number being hauled and estimated arrival time.
2. **Adult records (AAT's)** will be completed weekly by ODFW (requires timely completion of weekly trapping data).

Communications - Weekly or bi-weekly draft summaries of adult collections will be distributed to co-managers. Wallowa hatchery will provide a summary of fish provided for subsistence.

IX. Grande Ronde Basin - Safety Net Spring/Summer Chinook Grande Ronde

Smolt production (F_1) and potential outlets of production will be consistent with locations identified by co-managers.

A. Allocation All Grande Ronde Captive brood adults will be transported to LGH from Bonneville Hatchery in mid to late June and held in circular tanks until possible spawning. If not needed in the production, they will be outplanted into Meadow and/or Sheep Creek in the first week of August. If the SNAP fish are spawned at LGH, the same spawning protocols as for the Upper Grande Ronde stock will be used. The SNAP production will be utilized as follows:

1. If production from the conventional program is anticipated to be 150,000 smolts or more in a given year, mature SNAP adults will be outplanted into Meadow and/or Sheep Creek.
2. If less than 150,000 smolt production from the conventional program is anticipated in a given year, all mature SNAP adults will be spawned.
3. Enough eggs will be retained and reared to smolt in order to maintain a total release program of 150,000 (conventional + SNAP). The remaining SNAP eggs will be outplanted into Meadow and/or Sheep Creek.

B. Spawning - See Section VII. E. Spawning Guidelines.

C. BKD Management – See Section VII. F BKD Management

D. Incubation - See Section VII. G Incubation Strategies.

E. Fish Health - If a decision is made to spawn SNP fish at Lookingglass Hatchery then these fish will be injected with tulathromycin and oxytetracycline as soon as possible as per Appendix H. Either way, formalin will be administered for fungus control as per Appendix H.

F. Key Contact - Safety Net/Captive Brood TOT project leader (Hoffnagle, McLean)

X. Imnaha - 2013 Brood Year - Spring/Summer Chinook

A. Anticipated smolt release – A total of 332,000 smolts at 22 fpp (current size 28 fpp).

1. Acclimated: 200,000 (3 raceways)
2. Direct stream: 132,000 (2 raceways)

B. Liberations (See Appendix A)

1. **Transfer and Acclimation** – Approximately 200,000 smolts will be transferred to Imnaha Satellite between March 26 and held for acclimation. Satellite personnel will begin volitional release April 1. Any remaining fish will be forced out on April 14. Release number will be determined by transfer inventory minus mortality.
2. **Direct Stream Release** – Approximately 132,000 smolts will be direct released from 2 raceways (8 and 9) on April 14. Fish will be released directly above the weir.

Notes : Contingency— Fish may be released earlier than scheduled if conditions warrant. Downstream rotary trap operators should be notified immediately and co-manager within 24 hours: Brian Jonasson, Scott Favrot, Brad Garner, Steve Yundt, Jim Harbeck, Jason Vogel.

C. Imnaha Satellite Operation

1. **Schedule and Operations** – Open road to facility and begin set-up in mid-March. Close down facility in late April.
2. **Scan mortality for PIT tags** - ODFW staff

D. Monitoring and Evaluation

1. **Innaha** summary of marked Chinook for release in 2015.
 - a. 233,000 AdCWT
 - b. 114,500 Ad only
 - c. 20,850 PIT
2. **Fish Research** staffs will coordinate efforts with hatchery staff for pre-release sampling efforts (Table 2).
3. **Genetic tissue collection for monitoring and pedigree analysis** – 50 samples
4. **Pre-liberation sampling** – in each raceway
 - a. Collect 50 weights
 - b. Collect 250 lengths
 - c. Check 500 fish for tag retention and fin clip quality
5. **Monitor**
 - a. Downstream migration survival and rate
 - b. PIT tag survival studies (CSS)
 - c. Hatchery vs. Natural production, growth and survival (in collaboration with ODFW Early Life History Project)
6. **Studies**
 - a. CSS
 - b. Direct Stream Release

E. Fish Health - Fish Health will coordinate with hatchery staff to conduct a pre-release health examine (Appendix E). Standard disinfection and sanitation guidelines will apply (Appendix C).

F. Key Contacts

1. **ODFW** – LGH staff will notify NPT (B. Johnson, Hesse, Olson, Vatland, Young, Vogel), ODFW (D. Eddy, Feldhaus, Hoffnagle), CTUIR (McLean, Zimmerman), LSRCP office and FPC (Tuomikoski (503-230-4287)) of date and numbers of fish released.

XI. Innaha – 2014 Brood Year - Spring/Summer Chinook

A. Smolt Production - An estimated 515,000 smolts will be produced at a target size of 20-25 fpp at release. An additional estimated 52,547 surplus fry will be released at 200 fpp in May 2015.

1. **Early Rearing** – Fry will be reared in double deep troughs at Lookingglass Hatchery on UV treated Lookingglass Creek water. Fish will be transferred outside to raw creek water in April or May.
2. **Final Rearing** - After marking, fish will be divided into 7 raceways with approximately 72,843 fish per raceway (Appendix F).

B. Monitoring and Evaluation

1. **Fish marking**- All fish will be Ad clipped August-September 2015. Approximately 324,000 fish will receive a CWT.
2. **PIT tag**- 21,000 fish will be PIT tagged in October 2015 for CSS (Table 6).
3. **Monitor**
 - a. Downstream migration survival and rate
 - b. PIT tag survival studies (CSS)

- c. Hatchery vs. Natural production, growth and survival (in collaboration with ODFW Early Life History Project)

4. Studies

- a. Acclimated vs. Direct Release
- b. CSS

C. Marking Program

1. AdCWT – 324,000
2. AD – 166,000
3. PIT – 21,000 CSS

D. Fish Health

1. **Disinfection and Sanitation Guidelines** (Appendix C).
2. **Juvenile health monitoring and treatments** (Appendix E).

E. Key Contacts

1. **Lookingglass** (Gibbs)
2. **Fish Health** (Onjukka)
3. **Fish Research** (Feldhaus, Hoffnagle and Vogel)

XII. Imnaha – 2015 Brood Year - Spring/Summer Chinook

The production goal is 490,000 smolts for the Imnaha River reared in 7 raceways. Based on a 490,000 smolt production, the adult return goal above the project area is 2,340.

A. Smolt goal - 490,000 smolts at 20-25 fpp for release 2017.

B. Adult Collection

1. **Predicted Runs**- Total estimated return to river is 3,183 adults and 1,636 jacks. The breakdown includes 2,495 hatchery origin and 688 natural origin adults (Table 12).

D. Trap Operations

1. **Period of Trap Operation** – The trap will be installed as soon as river conditions allow and operated until September 11, or until the last scheduled spawning ground survey.
2. **Facility Staffing and Operations**
 - a. ODFW will provide three staff people stationed at the Imnaha satellite facility Monday-Thursday and one Friday-Sunday, 24/7.
 - b. The NPT will provide one technician Monday through Friday and a transportation vehicle.
 - c. LSRCP will fund two 3 month seasonal technicians for ODFW to assist with weir and facility operations and culture activities at Lookingglass Hatchery. LSRCP will also provide funding to cover increased costs associated with fish transport to Lookingglass and Wallowa hatcheries.
 - d. ODFW staff will determine which fish are selected for broodstock, passed above the weir, recycled to the fishery, transported to Wallowa Hatchery for CWT recovery, provided for subsistence or foodbank use, and outplanted.
 - e. ODFW will collect all the relevant data from fish worked at the Imnaha weir, and provide this information daily (upon request) and in weekly summaries of trap operations.
 - f. Prior to Chinook trapping operations commencing at the Imnaha weir, ODFW and NPT staff will hold a preseason meeting at the facility and walk through logistics, fish handling, holding, pass:keep, recycling, transportation, communication operations, etc.
3. **General Guidelines**
 - a. Trapping facilities will be checked daily and fish removed and worked up Monday-Friday.

- b. Broodstock collection will occur on Monday and Thursday of each week, or as needed to make broodstock. If there is a deficit in brood numbers collected one week, that number will be added to the broodstock collection target for the following week.
- c. Tuesday, Wednesday, and Friday and fish collected above broodstock needs on Monday and Thursday will be passed, recycled for harvest (1 LOP), transported to Wallowa Hatchery for CWT recovery, distributed for subsistence or food bank use, or outplanted
- d. If 200 or more fish are in the trap on Friday, the trap will be worked on Saturday. Likewise, if 200 or more fish are in the trap on Saturday, the trap will be worked on Sunday. Distribution of fish trapped on the weekend will be as for Tuesday, Wednesday, and Friday.

4. **Weir Management Guidelines** – Pre-season adult projections are listed above in section XII.B.1 and Table 12. Based on these projections and sliding scale agreements, 50% of the fish released above the weir can be of hatchery origin. All natural-origin jacks will be released above the weir and hatchery jacks may be released above the weir to meet a jack composite of 10% of the total males (adult + jacks). Co-managers acknowledge that these guidelines are based on pre-season estimates and will be adjusted accordingly as the run materializes.

5. **Disposition of Trapped Fish**

- a. **Bull Trout** - Bull trout captured at the Imnaha weir may be incorporated into an ongoing Idaho Power Company (IPC) research project to evaluate abundance and life history of fluvial bull trout in the Snake and Imnaha Rivers.
 - Upon capture, bull trout will be enumerated and scanned for existing PIT tags.
 - When conditions allow, unmarked bull trout will be anesthetized and implanted with a PIT tag using standard procedures.
 - When water temperatures exceed 61°F (16°C), PIT tags will not be applied and expedited handling procedures will be followed.
 - Expedited handling procedures will include enumeration, scan for existing tags, and estimating length (within 2-inch size class).
 - PIT tags and tagging procedures will be provided by IPC (Wilkeson).
 - Bull trout mortalities will be stored frozen for further analysis.
 - Data, tag codes, and reports will be sent to ODFW (Yanke), LSRCP (Krakker), and IPC (Wilkeson)
 - All bull trout handled will be reported under LSRCP Section 7 permit, PIT tagged bull trout will be reported under ODFW Section 6 permit.
- b. **Steelhead** - Enumerate, estimate length and determine hatchery or wild origin. Ad clipped fish will be euthanized. Data and reports sent to ODFW (ODFW District and Regional offices), and LSRCP (Krakker). Wild fish collected in the trap will be released upstream and wild kelts downstream of the weir.
- c. **Chinook Adults and jacks** – Fish retained for broodstock will be injected with tulathromycin and oxytetracycline (Appendix H). Surplus hatchery jacks and adults are expected. Priority of use for hatchery origin surplus fish includes:
 - Adults and jacks recycled (early in season) for a fishery and released downstream at co-manager agreed to locations on agreed to dates. All recycled fish will receive a 1 LOP.
 - Adults and jacks can be used for Tribal and non-tribal distribution/foodbank. These fish may be transported to, and held at, Wallowa Hatchery. If fish are exposed to MS-222, a 21-day period is required before they are used for consumption. Fish held for distribution will be sampled according to Appendix G.
 - All CWT jacks will be taken to Wallowa Fish Hatchery for M&E and subsequently tribal or non-tribal distribution.
 - 300 adults can be outplanted (later in season) to Big Sheep and Lick Creek tributaries combined.

- Carcasses can be placed in Imnaha River and other out-planted sites; and
 - Surplus live jacks can be released in Big Sheep after the last redd count survey.
- d. **Tumors** - Chinook will be inspected for tumors along the gum line. If a tumor is suspected, fish will be held for consultation.
 - e. **Disposition of Carcasses** - Trapping mortalities will be processed as kept fish. The first 20 weir mortalities will be labeled, frozen, and provided to Fish Health for examination. Following Fish Health examination, carcasses will be disposed of in the landfill.
 - f. **Additional mortalities** collected on the weir through mid-August (prior to redd surveys) will be sampled by the Imnaha staff (length, sex, pre-spawn status, scales (natural fish), recapture (opercle punch), and origin). After mid-August, the redd survey crews will collect weir mortality data. Carcasses should be clearly identified as sampled (tails removed) and returned to the river below the weir. Biological data will be sent to ODFW Fish Research (Feldhaus).
6. **Broodstock Transportation Procedures** – ODFW or NPT will provide transportation of fish from the Imnaha weir to Lookingglass Hatchery. Broodstock will be hauled on Monday and Thursday, or as needed to make broodstock.

Note: CTUIR does not agree with the current spring Chinook disposition plans at the Imnaha and Lostine River weirs.

E. Hatchery Broodstock Collection Guidelines

1. **Egg take** – To produce 490,000 smolts, 597,561 green eggs will be collected assuming 82% survival from green egg to smolt. We assume an estimated five-year fecundity average of 4,482.
 - a. **Adult Collection** - Based on pre-season run estimates and adult survival of 95% from collection to spawn (Return estimates will likely change as the run materializes, and these guidelines will be adjusted accordingly) (Table 17):
 - **Males – 141 (spawn 134)**
 - 42 natural (spawn 40)
 - 99 hatchery (spawn 94 adults)
 - **Females – 141 (spawn 134)**
 - 42 natural (spawn 40)
 - 99 hatchery (spawn 94)

- 2. Brood collections guidelines:** Pre-season adult projections are listed above in section XII.B.1 and Table 12. Based on these projections and sliding scale agreements, we will target a broodstock composition of 30% natural-origin and 70% hatchery-origin salmon. Weekly broodstock collection guidelines are outlined below. Return estimates will likely change as the run materializes, and these guidelines will be adjusted accordingly.

	N-O	H-O	Total
Broodstock Goal	85	197	282

	N-O	H-O
Pre-Season Adult Estimate	688	2,495

Collection Week (Sat-Fri)	% of Collection Goal		No. Adults	
	N-O	H-O	N-O	H-O
May 30-Jun 19	0.04	0.04	4	7
Jun 20-Jun 26	0.12	0.13	10	26
Jun 27-Jul 3	0.28	0.21	23	41
Jul 4-Jul 10	0.24	0.21	20	41
Jul 11-Jul 17	0.12	0.14	10	28
Jul 18-Jul 23	0.10	0.11	9	22
Jul 24-Jul 30	0.04	0.09	4	17
Jul 31-Aug 7	0.03	0.01	2	2
Aug 8-Aug 14	0.00	0.01	0	2
Aug 15-Aug 21	0.03	0.04	2	7
Aug 22-Aug 28	0.00	0.01	0	2
Total	1.0	1.0	84	197

F. Spawning Guidelines

- 1. Anesthetic Used** – MS222 or Electroanesthesia.
- 2. Expected First Spawn** - Tuesday, August 12th.
- 3. Spawning Frequency** – Once per week or as needed.
- 4. Spawning Strategies** - Surviving broodstock collected will be spawned up to the brood goal and the remainder will be released. Sorting and spawning to take place the same day. Hatchery and co-manager staffs will determine fertilization matrices. A maximum of 10% of the eggs can be fertilized with three year old males and a minimum of 30% of the eggs will be spawned with assumed five year old males (>85cm). Large males may be spawned up to 3 times. Jack spawning will be conducted with 1 female to 1 jack matrix. Most adult spawning matrices will be 2 females x 2 males, but matrices of 1 x 1, 1 x 2, 2 x 1, or 3 x 2 can be used if necessary. Fecundity will be determined at eye-up.
- 5. Natural Origin Surplus** – Natural origin fish collected but not spawned for broodstock will be returned to the Imnaha River. Fish injected with antibiotics will not be used for human consumption or released where legal harvest is possible.
- 6. Adult Spawning** - The Nez Perce Tribe will provide fish culture support for spawning of the Imnaha River adults.

G. Incubation

- 1. Imnaha eggs** will be incubated to eyed stage at Lookingglass Hatchery. The intent is to incubate one female's eggs per tray. After eye-up, eggs will be enumerated and segregated by disease profile.

2. **Water Sources** – Lookingglass-chilled and un-chilled well water and UV treated Lookingglass Creek. Use of Heath Trays.
3. **Egg Picking and Fish Culture for Resulting Juveniles** – The Nez Perce Tribe will provide fish culture support for the resulting progeny of the Imnaha River program starting with egg care through the release.

H. Fish Health Monitoring plans

1. **Disinfection and Sanitation Guidelines** (Appendix C).
2. **Broodstock Monitoring and Treatment Plan** (Appendices H)

I. Monitoring and Evaluation

1. Spawning ground surveys
 - a. Carcasses – count, length, marks/tags, snout/scales, kidney sample, genetic sample
 - b. Live Fish – count
 - c. Redds – count, GPS
2. Hatchery spawning
 - a. Data collection – length (all fish), weight (females), marks/tags, eyed egg weights, individual fecundity
 - b. Tissue collection – snout/scales, kidney sample, genetic sample
3. Weir/trap morts
 - a. Data collection – count, length, marks/tags
 - b. Tissue collection – snout/scales, kidney sample, genetic sample
4. Monitor
 - a. Hatchery vs. Natural production, egg size, growth and survival (in collaboration with ODFW Early Life History Project)
 - b. PIT tag detections at dams and weir for run timing
5. Studies
 - a. CSS
 - b. Direct Release

J. Key Contacts

1. **Lookingglass** (Gibbs) monthly reports to ODFW (Grande Ronde & Wallowa Fish Districts, Hoffnagle, and Feldhaus), CTUIR (Zimmerman and McLean), NPT (B. Johnson, Hesse, Young, Harbeck, Zollman), LSRCP office.
2. **Fish Health** (Onjukka) monthly reports to ODFW (Grande Ronde & Wallowa Fish Districts, and Research), CTUIR (Zimmerman and McLean), NPT (B. Johnson, Hesse, Vatland, Young).
3. **Fish Research** (Feldhaus) monthly trap reports to ODFW (Grande Ronde & Wallowa Fish Districts, and Hoffnagle), CTUIR (James, McLean), NPT (B. Johnson, Hesse, Vogel, Zollman).

XIII. Snake River – 2014 Brood Year - Fall Chinook

The production goal is 1.4 million sub-yearling smolts for the lower Grande Ronde and upper Snake rivers. This goal includes 1 million to the upper Snake and 400,000 for the lower Grande Ronde River.

A. Allocation – Fall Chinook production at Irrigon hatchery is prioritized in the US v Oregon tables. Priorities 13 and 15 target a total production of 400,000 sub-yearlings scheduled for release in the Grande Ronde River around May 29 at 50 fpp. Marks include:

1. 200,000 AdCWT
2. 200,000 no marks

Priorities 14 and 16 target a total production of 1 million sub-yearlings, and scheduled for release in the Snake River at Hells Canyon Dam in late May at 50 fpp. Marks include:

1. 200,000 AdCWT
2. 800,000 Ad only

B. Adult collections and Spawning - See Lyons Ferry 2013 AOP.

C. Incubation/rearing

1. **Fall Chinook** incubation occurs at Lyons Ferry. After eye-up, inventory, and disease profiles, Lyons Ferry staff will combine eggs and ship to Irrigon Hatchery in December. Only eggs from females below BKD titers levels 0.2 are transferred.
2. Fish are reared and tagged at Irrigon Hatchery prior to release.
3. In late May or early June, ODFW will direct stream release 400,000 subyearlings at 50 fpp into the Grande Ronde River at Cougar Creek near the Washington border.
4. In late May, ODFW will direct release 1,000,000 at the Forest Service boat launch below Hells Canyon Dam at a release goal of 50 fpp.

D. Key Contact

1. **Lyons Ferry Hatchery** (Bumgarner)
2. **ODFW** (Garst, Keniry)
3. **CTUIR** (Zimmerman)
4. **IDFG** (Putnam)
5. **NPT** (Johnson)
6. **IPC** (Rosenburger)

XIV. Snake River – 2015 Brood Year - Fall Chinook

The production goal is 1.4 million sub-yearling smolts for the lower Grande Ronde and upper Snake rivers. This goal includes 1 million to the upper Snake (1,000,000 reared at Irrigon Hatchery) and 400,000 for the lower Grande Ronde River.

A. Allocation – Fall Chinook production at Irrigon hatchery is prioritized in the US v Oregon tables. Priorities 13 and 15 target a total production of 400,000 sub-yearlings scheduled for release in the Grande Ronde River around May 29 at 50fpp. Marks include:

1. 200,000 AdCWT
2. 200,000 no marks

Priorities 14 and 146 target a total production of 1 million sub-yearlings, 800,000 reared at Irrigon Hatchery, scheduled for release in the Snake River at Hells Canyon Dam in early May at 50fpp. Marks include:

1. 200,000 AdCWT
2. 800,000 Ad only

B. Adult collections and Spawning - See Lyons Ferry 2014 AOP.

C. Incubation/rearing

1. **Fall Chinook** incubation occurs at Lyons Ferry. After eye-up, inventory, and disease profiles, Lyons Ferry staff will combine eggs and ship to Irrigon Hatchery in December. Only eggs from females below BKD titers levels 0.2 are transferred.

D. Key Contact

1. **Lyons Ferry Hatchery** (Bumgarner)
2. **ODFW** (Garst, Keniry)

3. CTUIR (Zimmerman)
4. IDFG (Putnam)
5. NPT (Johnson)
6. IPC (Rosenburger)

COHO (*O. kiscutch*)

XV. Grande Ronde Basin – 2014 Brood Year – Wallowa River

The production goal is 500,000 smolts for release in 2016 in the Wallowa River if funding is available. Co-managers will work to update the reintroduction plan and determine facility constraints/opportunities, marking plan, and monitoring/evaluation plan. Coordination with local governments will take place early in the planning process.

XVI. Pacific Lamprey

The purpose of this stop gap effort is to avoid local extirpation in the Snake River Basin and maintain a population of ammocoetes that serve as a source of pheromone attractants drawing adults upstream to spawn in the abundant habitat in this region, thereby continuing a presence in the Snake River Basin until upstream adult and downstream juvenile passage problems are identified and corrected, and healthy, harvestable populations are restored. The Nez-Perce Tribes believes it is imperative to restore this important component of the ecosystem and retain cultural values.

CTUIR Lamprey Program –Up to 500 adult lamprey are currently being held at Minthorn Springs in the Umatilla Basin for outplanting into the Grande Ronde Basin in 2015. All have been injected with oxytetracycline for furunculosis and treated with formalin to control fungus. After holding these adults through the winter/spring, CTUIR plans to outplant them in June. Up to 400 will be outplanted to spawn naturally in the upper Grande Ronde at River Campground (~RM 163) and up to 100 into Catherine Creek at Catherine Creek State Park (~RM 49).

NPT Program Nez Perce Tribal Hatchery – During the summer of 2014, NPT Fisheries again conducted trapping operations for adult lamprey at Bonneville, The Dalles, and John Day dams and transported them to Nez Perce Tribal Hatchery. From June 18 to July 2, 2014, a total of 254 lamprey were collected at Bonneville Dam, and from July 9 to August 6 an additional 84 lamprey were obtained from John Day Dam, and from July 23 to August 6 an additional 45 lamprey were collected from traps at The Dalles Dam. A total of 383 lamprey were collected from these trapping efforts, and all were injected with oxytetracycline by NPT staff for furunculosis. After holding these adults through the winter months, NPT plans to outplant them during April/May 2015 in Lolo Creek, Orofino Creek, and Newsome Creek, Big Canyon Creek, and the South Fork Salmon in Idaho, Asotin Creek in Washington, and the Wallowa River in Oregon, to spawn naturally. Genetic samples are collected by NPT staff for analysis by CRITFC in the lab at Hagerman NFH. A highlight of this year's efforts was the construction of a designated lamprey-only steel building at NPTH to house "eel" operations.

Fish Health – Fish Health recommends an examination (up to 5 grab-sampled) be conducted prior to lamprey being transferred to Oregon waters. At a minimum, all moribund and dead lamprey should be examined during rearing in Oregon and Idaho to develop a pathogen history. If unable to lethally sample due to tribal policy, then develop a pathogen history as best as possible with moribund and dead lamprey. For lamprey releases in Oregon, Fish Health recommends source lamprey for holding in Idaho come from direct transfer from the dam collection site or the CTUIR holding site near Pendleton, OR rather than Yakima Indian Nation site near Prosser.

Table 1
2015 Irrigon Summer Steelhead Transport Schedule

<u>Date</u>	<u>Stock</u>	<u>From Ponds</u>	<u>To</u>	<u>Number</u>	<u>Est. Pounds</u>
Jan. 20-22	5614	7*,8*,9	Wallowa Lower Acc	162,518	32,504
Jan. 20-22	5614	10*,11,12	Wallowa Upper Acc	88,741	17,749
Feb. 2	5614	14*	Cotton Wood	43,963	9,770
Feb. 20	5614	16*	Wallowa Acc	44,056	9,791
Feb. 23	5614	13,15*	Big Cany. Lower Acc	81,745	18,166
Feb. 24	5614	17,18*	Big Cany. Upper Acc	88,642	19,699
Feb. 25-27	2914	27,28*,29,31,30	Little Sheep Acc	205,066	41,014
Feb. 27	2914	32	Little Sheep Acc (Big Sheep)	40,168	8,034
Apr. 6-7	5614	19,21*,22*24	Wallowa Lower Acc	178,109	39,580
Apr. 20	5614	23*,20	Big Cany. Lower Acc	85,616	19,026
Apr. 21	5614	25,26	Big Cany. Upper Acc	<u>84,208</u> 1,102,832	<u>18,713</u> 234,046

*Denotes
CWT Pond

Table 2. Juvenile spring Chinook salmon and summer steelhead sampling schedule at LSRCP facilities, 2015. PS = Periodic sampling which includes length and weight. RS = Release sampling which includes length and weight by fin clip. CWT = retention sampling for CWT and associated fin clips. GS = Genetic monitoring using 50 fish samples. RVC=Right ventral clip quality. TBD = To Be Determined.

Sample Date	Stock	Location	Pond	Purpose
<i>Spring Chinook</i>				
Feb. 9-13	Catherine	Lookingglass	2-3	CWT, RS, GS
Feb. 9-13	Lookingglas	Lookingglass	1,4,10	CWT, RS, GS
Feb. 9-13	U. Grande Ronde	Lookingglass	15-18	CWT, RS, GS
Feb. 9-13	Lostine	Lookingglass	11-14	CWT, RS, GS
Feb. 9-13	Imnaha	Lookingglass	5-9	CWT, RS, GS
June 4-5	All	Lookingglass	1-18	PS
<i>Summer Steelhead (brood 14)</i>				
October 2014	Wallowa Fall Brood	Irrigon	7, 11, 15, 19	CWT
October 2014	Wallowa	Irrigon	10, 14, 18, 23, 25	CWT
December 2014	Wallowa	Irrigon	8	CWT
December 2014	Wallowa Fall Brood	Irrigon	7, 9, 11, 13, 19, 21	RVC
October 2014	Imnaha	Irrigon	28	CWT
January 30	Wallowa	Wallowa	UAP	PS
February 2	Wallowa	Irrigon	14	PS
February 20	Wallowa	Wallowa	UAP	PS
March 31	Imnaha	Little Sheep	AP	RS, GS
April 03	Wallowa	Wallowa	LAP, UAP	RS
April 14	Wallowa	Big Canyon	LAP, UAP	RS, GS
April 20	Wallowa	Wallowa	LAP	RS, GS
April 30	Wallowa	Big Canyon	LAP, UAP	RS
April 28	Imnaha	Little Sheep	AP	sex ratio
May 12	Wallowa	Big Canyon	AP	sex ratio

Table 3 . Summer Steelhead run projections to LSRCF Facilities in 2015. Estimates of marked and unmarked returns (with 95% confidence intervals) are made using the best fitting linear regression model derived from an adult steelhead count at a Columbia or Snake river dam and the corresponding hatchery weir count for return years 1995-2014. PIT tag derived estimates are based on current year tag recoveries at Lower Granite Dam of hatchery adults and are expanded for the untagged portion of hatchery release groups.

2015 PROJECTED Returns to Wallowa Hatchery					
MARKED FISH					
	Age	Males	Females	Total	95% C.I.
Marked	1:1	962	596	1,558	
Marked	1:2	217	561	778	
Marked	2:1	7	6	13	
Marked	2:2	1	3	4	
		1,187	1,166	2,353	1,102 –
Total					3,605

Mark Return Based on PIT TAGS – 2,104

2015 PROJECTED Returns to Big Canyon Facility					
MARKED AND UNMARKED FISH					
	Age	Males	Females	Total	95% C.I.
Marked	1:1	468	392	860	
Marked	1:2	101	310	411	
Marked	2:1	2	2	4	
Marked	1:3	1	2	3	
Subtotal		572	706	1,278	431 –
					2,127
Unmarked	2:1	11	12	23	
Unmarked	2:2	7	14	21	
Unmarked	3:1	13	9	22	
Unmarked	3:2 & 4:1	4	7	11	
Subtotal		35	42	77	30 – 122
Total		607	748	1,355	

Mark Return Based on PIT TAGS – 1,733

2015 PROJECTED Returns to L. Sheep Cr. Facility					
MARKED AND UNMARKED FISH					
	Age	Males	Females	Total	95% C.I.
Marked	1:1	562	465	1,027	
Marked	1:2	67	254	321	
Marked	2:1	4	5	9	
Marked	3:1	0	2	2	
Subtotal		634	726	1,359	361-2,362
Unmarked	2:1	37	46	83	
Unmarked	2:2	10	31	41	
Unmarked	3:1	17	15	32	
Unmarked	3:2 & 4:1	3	8	11	
Subtotal		67	100	167	81-248
Total		701	826	1,526	

Mark Return Based on PIT TAGS – 1,138

Table 4. Estimated numbers of marked fish to be released in 2016, from 2015 brood summer steelhead and 2014 brood spring Chinook salmon. WAP indicates Wallowa Acclimation Ponds at Wallowa Hatchery, BC is Big Canyon Facility, CC is the WDFW Cottonwood Creek Facility.

Species, Location, Group	Number Marked	Type of Mark	Marking Period	Marking Location
Summer Steelhead				
<u>2015 Brood Year</u>				
WAP, early transfer, April release	25,000	AdLV+CWT	Sept.	Irrigon
WAP, fall brood, April release	25,000	AdRV+CWT	Sept.	Irrigon
WAP, early transfer, April release	25,000	Ad+CWT	Sept.	Irrigon
WAP, late transfer, April release	25,000	Ad+CWT	Sept.	Irrigon
WAP, fall brood, May Release	25,000	AdRV+CWT	Sept.	Irrigon
WAP, production May release	25,000	Ad+CWT	Sept.	Irrigon
WAP, fall brood (Apr+May)	190,000	AdRV	Sept.	Irrigon
WAP, production (Apr+May)	125,000	Ad	Sept.	Irrigon
LF, early transfer, April release	40,000	Ad	Sept.	Lyons Ferry
CC, early transfer, April release	40,000	25K AdCWT+ 15K Ad	Sept.	Irrigon
BC, forced April release	25,000	Ad+CWT	Sept.	Irrigon
BC, Fall Brood April release	25,000	Ad+CWT	Sept.	Irrigon
BC, Fall Brood May release	25,000	Ad+CWT	Sept.	Irrigon
BC, Production	135,000	Ad	Sept.	Irrigon
BC, Fall Brood	110,000	Ad	Sept.	Irrigon
Little Sheep	25,000	Ad+CWT	Sept.	Irrigon
Little Sheep	190,000	Ad	Sept.	Irrigon
Spring Chinook Salmon				
<u>2014 Brood Year</u>				
Imnaha River	360,000	Ad+CWT	AUG	Lookingglass
Imnaha River	130,000	Ad only	AUG	Lookingglass
Catherine	100,000	Ad+CWT	AUG	Lookingglass
Catherine	70,000	Ad only	AUG	Lookingglass
Lostine	125,000	Ad+CWT	AUG	Lookingglass
Lostine	130,000	Ad only	AUG	Lookingglass
U. Grande Ronde	120,000	Ad+CWT	AUG	Lookingglass
U. Grande Ronde	120,000	CWT only	AUG	Lookingglass
Lookingglass	125,000	Ad+CWT	AUG	Lookingglass
Lookingglass	125,000	Ad only	AUG	Lookingglass

Table 5. PIT-tagging of 2014 brood steelhead at Irrigon Hatchery scheduled for December 2014 and January 2015. Not shown are 4,000 PIT tags implanted into Lyons Ferry smolts destined to be released at the Wallowa Hatchery. Comparative Survival Study (CSS) provides 14,000 tags to supplement the LSRCP tagging and achieve a 70% LSRCP and 30% CSS split. WAP indicates Wallowa Acclimation Ponds at Wallowa Hatchery, BC is Big Canyon Facility, CC is the WDFW Cottonwood Creek Facility.

Stock, group	Raceway	LSRCP tags	CSS tags	Total tags
Wallowa stock				
WAP, forced April	8,10,16	3,200	1,100	4,300
WAP, volitional May	22	1,700	800	2,500
WAP, fall brood April	7	3,000	1,400	4,400
WAP, fall brood, vol. May	21	1,600	800	2,400
BC, forced April	18	2,000	1,000	3,000
BC, fall brood, forced April	15	1,100	500	1,600
BC, forced May	26	1,600	700	2,300
BC, fall brood, forced May	23	1,600	700	2,300
CC, tagging in January		4,000		4,000
Subtotal		19,800	7,000	26,800
Imnaha stock				
Little Sheep, volitional April	28,30	6,700	5,800	12,500
Big Sheep, volitional April	32	1,300	1,200	2,500
Subtotal		8,000	7,000	15,000
Grand total		27,800	14,000	41,800

Notes: The tagging trailer will be used. December tagging should take 7 days to complete, January tagging 1 day to complete. Trailer set-up is on Monday, tagging begins Tuesday. A long-handled magnet will be used in raceways to recover shed tags. Fish should be off feed 2 days prior to tagging to reduce tag loss. Crowd fish in raceways to obtain a random sample. When tagging, note whether the fish is Ad, AdLV, or AdRV.

Table 6. Planned PIT tagging for 2015 brood year steelhead at Irrigon Hatchery. Not shown are 3,000 WDFW PIT tags implanted into Lyons Ferry (LF) smolts for release at Wallowa Hatchery. Comparative Survival Study (CSS) assumes they will provide 14,000 tags to supplement the LSRCP tagging. WAP indicates Wallowa Acclimation Ponds at Wallowa Hatchery, BC is Big Canyon Facility, CC is the WDFW Cottonwood Creek Facility, U = upper, L = lower.

Stock, release group	Acclima- tion Pond ^a	Fin Clip	LSRCP PIT tags	CSS PIT tags	Total PIT tags
<u>Wallowa stock</u>					
WAP, early transfer, April release	U	Ad	1,000	1,300	2,300
WAP, Autumn Line, early transfer, April release	L	Ad-RV	1,000	1,200	2,200
WAP, early transfer, April release	L	Ad-LV	1,000	600	1,600
WAP, late transfer, April release	U	Ad	1,000	400	1,400
WAP, Autumn Line May	L	Ad-RV	1,000	700	1,700
LF, early transfer, April release	U	Ad	1,000	0	1,000
CC, early transfer, April release	N/A	Ad	4,000	0	4,000
BC, forced April	U	Ad	1,000	1,000	2,000
BC, Autumn Line April	L	Ad	1,000	400	1,400
BC, volitional May	U	Ad	1,000	1,100	2,100
BC, Autumn Line May	L	Ad	<u>1,000</u>	<u>300</u>	<u>1,300</u>
Subtotal			14,000	7,000	21,000
<u>Imnaha stock</u>					
Little Sheep, vol. April	TBD	Ad	3,000	2,500	5,500
Little Sheep, vol. April	TBD	Ad	3,200	2,700	5,900
Little Sheep, direct April (if agreed)	TBD	Ad	<u>1,800</u>	<u>1,800</u>	<u>3,600</u>
Subtotal			<u>8,000</u>	<u>7,000</u>	<u>15,000</u>
Grand total			22,000	14,000	36,000

Table 7. Fish PIT-tagging numbers for spring Chinook salmon at Lookingglass Fish Hatchery, October 2015 (BY 2014). Note: Fish must be off feed 2 days prior and 2 days after PIT tagging to reduce tag loss.

Experimental group	Raceway	Estimated # per raceway	Number to PIT tag
Lookingglass Creek	1	103,333	599
Catherine Conventional	2	84,500	10,480
Catherine Conventional	3	84,500	10,491
Lookingglass Creek	4	103,333	692
Imnaha River	5	114,316	4247
Imnaha River	6	114,316	4132
Imnaha River	7	114,316	4188
Imnaha River	8	114,316	4187
Imnaha River	9	114,316	4203
Lookingglass Creek	10	103,333	701
Lostine Conventional	11	65,600	597
Lostine Conventional	12	65,600	600
Lostine Conventional	13	65,600	600
Lostine Conventional	14	65,600	504
U. Grande Ronde River	15	59,619	499
U. Grande Ronde River	16	59,619	502
U. Grande Ronde River	17	59,619	499
U. Grande Ronde River	18	59,619	502
Grand Total			48,223

fish numbers are before any planned reductions in 2015

Table 8. The ODFW estimated preseason spring/summer Chinook returns to the mouth of Catherine Creek, 2015. The ODFW draft 2014 total return to the river estimates and the minimum, median, mean, and maximum return estimates for each age class.

Origin	Age	2015 ODFW point est.	Summary statistics: ODFW estimated total return to the river mouth (BY 1998-present)				
			2014 draft return est.	Min.	Median	Mean	Max.
<u>Hatchery</u>	3	155	106	7	86	142	624
	4	323	502	122	216	374	935
	5	25	15	0	20	23	64
	Total (3-5)	503					
Adults (4-5)		348					
<u>Natural</u>	3	37	42	2	16	28	95
	4	362	589	40	109	201	589
	5	82	20	4	24	39	192
	Total (3-5)	481					
Adults (4-5)		444					

Table 9. ODFW estimated preseason spring/summer Chinook returns to the mouth of the Upper Grande Ronde River, 2015. The ODFW draft 2014 total return to the river estimates and the minimum, median, mean, and maximum return estimates for each age class.

Origin	Age	2015 ODFW point est.	Summary statistics: ODFW estimated total return to the river mouth (BY 1998-present)				
			2014 draft return est..	Min.	Median	Mean	Max.
<u>Hatchery</u>	3	271	179	0	55	157	616
	4	709	707	3	437	544	2,350
	5	31	3	1	10	18	64
	Total (3-5)	1,011					
Adults (4-5)		740					
<u>Natural</u>	3	15	60	0	8	13	60
	4	283	708	10	77	140	706
	5	107	24	0	11	40	220
	Total (3-5)	405					
Adults (4-5)		390					

Table 10. ODFW estimated preseason spring/summer Chinook returns to the mouth of the Lostine River, 2015. The ODFW draft 2014 total return to the river estimates and the minimum, median, mean, and maximum return estimates for each age class.

Summary statistics: ODFW estimated total return to the river mouth (BY 1998/hatchery and BY 1995 for natural-present)							
Origin	Age	2015 ODFW point est.	2014	Min.	Median	Mean	Max.
			draft return est.				
<u>Hatchery</u>	3	1,031	1,208	45	177	452	1,444
	4	2,730	1,273	142	617	929	3,611
	5	101	36	11	68	93	449
	Total (3-5)	3,862					
	Adults (4-5)	2,831					
<u>Natural</u>	3	109	133	1	35	50	231
	4	882	1,063	57	201	320	846
	5	190	53	27	50	86	222
	Total (3-5)	1,181					
	Adults (4-5)	1,072					

Table 11. ODFW estimated preseason spring/summer Chinook to the mouth of Lookingglass Creek, 2015. The ODFW draft 2014 total return to the river estimates and the minimum, median, mean, and maximum return estimates for each age class.

Summary statistics: ODFW estimated total return to the river mouth (BY 2002-present)							
Origin	Age	2015 ODFW point est.	2014 draft return est.	Min.	Median	Mean	Max.
<u>Hatchery</u>	3	218	377	18	118	281	967
	4	836	1,337	36	445	703	1,934
	5	28	16	0	18	23	75
Total (3-5)		1,082					
Adults (4-5)		864					
<u>Natural</u>	3	71	49	1	14	27	84
	4	200	290	18	84	127	288
	5	23	5	2	8	9	18
Total (3-5)		294					
Adults (4-5)		223					

Table 12. ODFW estimated preseason spring/summer Chinook returns to the mouth of the Innaha River, 2015. The ODFW draft 2015 total return to the river estimates and the minimum, median, mean, and maximum return estimates for each age class.

Origin	Age	2015 ODFW point est.	Summary statistics: ODFW estimated total return to the river mouth (BY 1983-present)				
			2014 draft return est.	Min.	Median	Mean	Max.
<u>Hatchery</u>	3	1,528	2,482	11	300	690	4,869
	4	2,337	1,351	18	808	1,012	3,720
	5	158	86	8	85	164	969
	Total (3-5)	4,023					
Adults (4-5)		2,495					
<u>Natural</u>	3	108	101	2	48	78	249
	4	442	808	87	252	401	2,097
	5	246	52	32	97	182	891
	Total (3-5)	796					
Adults (4-5)		688					

Table 13. Catherine Creek Spring Chinook broodstock/upstream passage management guidelines

Estimated total adult escapement to the mouth (hatchery plus natural) ^a	Ratio of hatchery to natural adults at the mouth	Maximum % of natural adults to retain for broodstock	% of hatchery adults to retain for broodstock ^b	% of adults released above the weir can be of hatchery origin	Minimum % of broodstock of natural origin	% strays allowed above the weir ^c
<250	Any	40	40	d	d	≤5
251-500	Any	20 ^d	20	≤70	≥20	≤5
>500	Any	≤20	e	≤50	≥30	≤5
<ul style="list-style-type: none"> • ^aPre-season estimate of total escapement • ^b Conventional hatchery adults only, all captive brood adults released to spawn naturally or outplanted • ^c For hatchery adults originating from different gene conservation groups (Rapid River stock or strays from outside the Grande Ronde basin) • ^d Not to exceed 150,000 smolt production • ^e Not decision factor at this level of escapement, percentage determined by other criteria 						

Table 14. Lostine This assumes a program of 250,000 smolts - 168 adults for broodstock.

Estimated Natural Run of ADULTS to River Mouth as a Proportion of minimum Interior Columbia Technical Recovery Team recommended abundance threshold ¹	Number of ADULT Natural Fish to River Mouth	Max % Natural ADULTS for Broodstock	Number of ADULT Natural Fish Retained for Broodstock (Proportion of Natural Brood)	Max Proportion of ADULT Hatchery Fish Released Above Weir	Minimum % Natural ADULTS in Broodstock
< .05 of Critical	< 8	0	0	NA	NA
.05 - .5 of Critical	8 - 74	50%	04 - 37	NA	NA
.5 - Critical	75 - 149	40%	30 - 60	70%	20%
Critical - .5 of Viable	150 - 249	40%	60 - 100	60%	25%
.5 Viable - Viable	250 - 499	30%	75 - 150	50%	30%
Viable - 1.5 Viable	500 - 749	30%	150 - 225	40%	40%
1.5 - 2 Viable	750 - 999	25%	188 - 250	25%	50%
> 2 Times Viable	> 1000	25%	> 250	<10%	100%

¹ Lostine River contributes about 50% of production for Wallowa/Lostine Population - Viable level is 50% of TRT recommended minimum abundance threshold for Wallowa/Lostine population (1000) after broodstock collection and fishery.

Table 15. Imnaha River Adult Management Table for natural and hatchery origin fish. This scale assumes program of 490,000 smolts - 322 adults for broodstock.

Estimated Natural Run of ADULTS to River Mouth as a Proportion of minimum Interior Columbia Technical Recovery Team recommended abundance threshold	Number of ADULT Natural Fish to River Mouth	Expected Handle Rate at Weir of ADULT Natural Fish (50%)	Max % Natural ADULTS for Broodstock	Number of ADULT Natural Fish Retained for Broodstock (Proportion of Natural Brood)	Proportion of ADULT Hatchery Fish Released Above Weir	% Natural ADULTS in Broodstock
< .05 of Critical	< 15	< 8	0	0	NA	NA
.05 - .5 of Critical	15 - 149	8 - 74	50%	04 - 37	NA	NA
.5 - Critical	150 -299	75 -149	40%	30 - 60	70%	20%
Critical - .5 of Viable	300 - 499	150 -249	40%	60 - 100	60%	25%
.5 Viable - Viable	500 - 999	250 - 499	30% 40%	75 - 150	50%	30%
Viable - 1.5 Viable	1000 - 1499	500 - 749	30% 40%	150 - 225	40% 30%	40%
1.5 - 2 Viable	1500 - 1999	750 - 999	25%	188 - 250	25%	50%
> 2 Times Viable	> 2000	> 1000	25%	> 250	<10%	100%

BOLD values would be used after 3 consecutive years (or 3 year mean) @ viable or greater.

Table 16. Wallowa-Lostine harvest and weir management expectations based on pre-season estimates and sliding scale agreements.

2015 Wallowa-Lostine Spring Chinook Run Projections and Distribution					
<i>Pre-Season Projections 12/1/14 (set for 1.5X-2X Viable line)</i>					
Projections, Allocations and Predicted Results			Wild	Hatchery	Total
<u>Run Projections and Expected Harvest Impacts</u>					
1	Projected adult run to Lostine		1,072	2,831	3,903
2	Projected run to Wallowa - Lostine		1,501	2,831	4,332
3	Projected composition (Wallowa - Lostine)		34.6%	65.4%	100.0%
4	Allowable Wild Impact from FMEP (Wallowa-Lostine)		36		
5	Allowable Wild Impact Rate (Wallowa - Lostine)		2.40%		
6	Allowable Wild Fish Handle @ 10% Hooking Mortality		360		
7	Resulting maximum hatchery fish sport harvest			679	
8	Alternative maximum impact & harvest @ 50% of defined surplus		65	1233	
9	Proposed sport harvest impact and harvest (lesser of row 7 and 8)		36	679	715
10	Anticipated Treaty Harvest (estimated here as 50% harvest share for our purposes)		196	519	715
11	Projected Minam River Return		513	0	513
12	Allowable Wild Impact from FMEP (Minam)		5		
13	Allowable Wild Impact Rate (Minam)		0.97%		
14	Allowable Wild Fish Handle @ 10% Hooking Mortality		50		
<u>Post Harvest Allocations and Predicted Results</u>					
15	Post Sport Harvest Adult Escapement (Wallowa - Lostine)		1,269	1,633	2,902
16	Post Sport Harvest Adult Escapement (Lostine)		852	1,633	2,485
17	Escapement to Weir (0.85)		724	1,388	2,112
18	Escapement above Weir Before Weir in Place (0.2)		145	278	423
19	Fish Expected to Be Handled at Weir		579	1,110	1,689
20	Broodstock Composition Target		50%	50%	100%
21	Broodstock (per AOP)		83	83	166
22	Post Broodstock Escapement Handled At Weir		496	1,027	1,523
23	Target Percentage Passed above weir		75%	25%	
24	Target Passed Above the Weir		496	165	661
25	Available for Outplanting and Other Use		na	862	862
<u>Spawner Composition - Lostine</u>					
26	Spawning Upstream of Weir		641	443	1,084
27	Composition of Natural Spawners above Weir		59%	41%	100%
28	Spawning Downstream of Weir (.15 of line 16)		128	245	373
29	Composition of Natural Spawners Downstream of Weir		34%	66%	100%
30	Lostine River Natural Spawners		769	688	1,457
31	Composition of Lostine River Natural Spawners		53%	47%	100%
<u>Spawner Composition - Wallowa/Lostine</u>					
32	Natural Spawners w/ sport harvest w/o outplants & tribal harvest		953	2069	3022
33	Comp. of Natural Spawners w/sport harvest w/o outplants & tribal harvest		32%	68%	100%
34	Natural Spawners w/o sport harvest, outplants and tribal harvest		989	2748	3737
35	Comp. of Natural Spawners w/o sport harvest, outplants and tribal harvest		26%	74%	100%

Table 17. Imnaha River harvest and weir management expectations based on pre-season estimates and sliding scale agreements.

Imnaha River Spring Chinook Run Projections and Distribution, 2015				
<i>Pre-season (12/5/14)</i>				
Projections, Allocations and Predicted Results		Wild	Hatchery	Total
<u>Run Projections and Expected Harvest Impacts</u>				
1	Projected adult run	688	2,495	3,183
2	Projected composition	21.6%	78.4%	100.0%
3	Allowable Wild Impact from FMEP	12		12
4	Allowable Wild Fish Handle @ 10% hooking mortality	120		120
5	Allowable Wild Impact Rate	1.74%		
6	Resulting maximum hatchery fish harvest		435	
7	Maximum hatchery fish harvest as 50% of defined surplus		915	
8	Proposed sport harvest impact (lesser of row 6 and 7)	12	435	447
9	Anticipated Tribal Harvest (estimated here as 50% harvest share for our purposes)	34	413	447
<u>Post-Harvest Allocations</u>				
10	Post Harvest Adult Escapement	642	1,647	2,289
11	Escapement to Weir (.70 W and .70 H of line 10)	449	1,153	1,602
12	Escapement above Weir Before Weir in Place (.53 W and .59 H of line 11)	238	680	918
13	Fish Expected to Be Handled at Weir (Line 11 - Line 12)	211	473	684
14	Broodstock Composition Target	30%	70%	100%
15	Broodstock (per AOP)	85	197	282
16	Post Broodstock Escapement At Weir	126	276	402
17	Target Wild Percentage Passed above weir	50%	50%	
18	Passed Above the Weir	126	126	253
19	Available for Outplant or Other Use	na	149	149
20	To Big Sheep Creek (\leq 300 fish)	na	149	149
21	Available for Alternative Use	na	0	0
<u>Spawner Composition w/ Tribal and Sport Harvest</u>				
22	Spawning Upstream of Weir	364	806	1,171
23	Composition of Natural Spawners above Weir	31.1%	68.9%	100.0%
24	Spawning Downstream of Weir (Line 10 - Line 11)	193	494	687
25	Composition of Natural Spawners Downstream of Weir	28.1%	71.9%	100.0%
26	Imnaha River Natural Spawners (w/o B. Sheep)	557	1,300	1,857
27	Composition of Imnaha River Natural Spawners (w/o B. Sheep)	30.0%	70.0%	100.0%

APPENDIX A. PROPOSED JUVENILE SALMONID RELEASES IN THE GRANDE RONDE (GR) AND IMNAHA (IM) BASINS IN 2015.

Basin	Species	Stock	Hatchery	Number ⁽¹⁾	Lbs	fpp	Location	In Facility	In River	Pond # ⁽²⁾	Release Method ⁽³⁾	Marks
GR	STS	5614	IR	128,400	25,680	5.0	Wallowa Lower Acc	Jan 20-22	Apr 4-6	7*, 9, 11, 12	Forced	25K AdRVCWT; 137.5K AdRV
GR	STS	5614	IR	123,000	24,600	5.0	Wallowa Upper Acc	Jan 20-22	Apr 4-6	8*, 10*	Forced	25K AdLVCWT; 25K AdCWT; 38.7K Ad only
GR	STS	5614	IR	44,000	9,778	4.5	CottonWood	Feb 2	Apr 15-16	14*	Forced	25K AdCWT; 19K Ad only
GR	STS	5614	IR	44,000	9,778	4.5	Wallowa Upper Acc	Feb 20	Apr 4-6	16*	Forced	25K AdCWT; 19K Ad only
IM	STS	2914	IR	205,600	41,120	5.0	Little Sheep Acc	Feb 25-27	Apr 1-28	27,28*,29,30,31	Volitional	25K AdCWT; 180K Ad only
IM	STS	2914	IR	40,100	8,020	5.0	Little Sheep Acc	Feb 27	Apr 1-28	32	Volitional	40.1K Ad
GR	STS	5614	IR	178,100	39,578	4.5	Wallowa Lower Acc	April 6-7	Apr 20-30	19*,21*,22*,24	Volitional	25K AdRVCWT; 25K AdCWT; 63K AdRV; 65.1K Ad
GR	STS	5614	IR	88,000	19,555	4.5	Big Canyon Lower Acc	Feb 23	Apr 15-17	15*, 17	Forced	25K AdCWT; 56.7K Ad
GR	STS	5614	IR	81,650	18,145	4.5	Big Canyon Upper Acc	Feb 24	Apr 15-17	13, 18*	Forced	25K AdCWT; 63.6K Ad
GR	STS	5614	IR	88,000	19,555	4.5	Big Canyon Lower Acc	Apr 20	May 1-12	23*, 25	Volitional	25K AdCWT; 60.6K Ad only
GR	STS	5614	IR	82,300	18,289	4.5	Big Canyon Upper Acc	Apr 21	May 1-12	20, 26	Volitional	84.2K Ad Only
				1,102,150	233,895							
GR	CHS	8012	LG	54,016	2,455	22.0	Grande Ronde Acc	Mar. 31	Apr. 2	15	Volitional	100% CWT
GR	CHS	8012	LG	52,163	2,371	22.0	Grande Ronde Acc	Mar. 16	Mar 18	16	Volitional	100% AdCWT
GR	CHS	8012	LG	55,948	2,543	22.0	Grande Ronde Acc	Mar. 31	Apr. 2	18	Volitional	100% CWT
GR	CHS	8012	LG	63,650	2,893	22.0	Grande Ronde Acc	Mar. 16	Mar 18	17	Volitional	100% AdCWT
GR	CHS	20012	LG	62,254	2,830	22.0	Lostine Acc	Mar. 9	Mar. 21	11	Volitional	100% Ad, 51% CWT
GR	CHS	20012	LG	63,491	2,886	22.0	Lostine Acc	Mar. 9	Mar. 21	12	Volitional	100% Ad, 53% CWT
GR	CHS	20012	LG	62,587	2,845	22.0	Lostine Acc	Apr. 1	Apr. 12	13	Volitional	100% Ad, 65% CWT
GR	CHS	20012	LG	61,434	2,792	22.0	Lostine Acc	Apr. 1	Apr. 12	14	Volitional	100% Ad, 60% CWT
GR	CHS	20112	LG	72,286	3,286	22.0	Catherine Creek Acc	Mar. 17	Mar. 19	2	Volitional	100% AdCWT
GR	CHS	20112	LG	74,218	3,374	22.0	Catherine Cr Acc	Mar 17	Mar. 19	3	Volitional	100% AdCWT
GR	CHS	20112	LG				Catherine Cr Acc	Mar. 17	Mar. 19		Volitional	100% Ad
GR	CHS	8112	LG	176,653	8,030	22.0	Lookingglass Creek	NA	Apr. 1-14	1, 4, 10	Volitional	100% Ad, 59% CWT
IM	CHS	2912	LG	198,250	9,011	22.0	Imnaha Acc	March 26	Mar.30-Apr 14	5, 8, 9	Volitional	100% Ad, 50% CWT
IM	CHS	2912	LG	133,885	6,086	22.0	Imnaha Direct Release	N/A	Apr. 14	6, 7	Direct	100% AdCWT
				1,130,835	51,402							

(1) Total release does not include 44,000 steelhead coming from Lyons Ferry to Wallowa Upper Acc in early February. However, note that the 44,000 "CottonWood" are released from WDFW's Cottonwood Creek Facility on the lower Grande Ronde River in Washington, so the total release is correct for the Grande Ronde Basin.

Appendix B. Steelhead Fish Health Monitoring Plan & Disease Treatments

Location	BY	Sp.	Stock	Examination Category	Protocol	Comment
Irrigon Hatchery	2014 2014	StS	Wallowa (56) and Little Sheep (29)	Monthly & Preliberation	-10 mort/moribund per stock examined -kidney smears on TYE-S agar -Gill culture smears on agar if suspect gill disease -Gill and skin wet mounts from a combination of moribund and healthy fish	Treat CWD with Florfenicol using a veterinary feed directive (VFD).
Irrigon Hatchery	2014	StS	56 or 29	Annual Myxobolus cerebralis	60 smolts that have been on the water supply for at least 6 months	Prefer using saved mortalities
Steelhead acclimation sites – WA, BI & LI	2014	StS	56 & 29	Preliberation	Steelhead acclimated more than 3 weeks will be monitored as in monthly protocol above	Fish Health guidelines are that these non-migrants (infected with the agent of Whirling Disease) should not be stocked to other areas
Wallowa Hatchery		Rb		Annual Myxobolus cerebralis	Need to rear and test 60 Rb brought in as eyed eggs on spring water. In addition, legal rainbow will be sampled for Mc before release.	Must be on water supply for 6 months
Wallowa & Little Sheep	2015	StS	56 & 29	Adult Spawners	Minimum of 60 per stock for culturable viruses (up to 30 from returning fall brood) using ovarian fluid and caeca/kidney/spleen sample pools not to exceed 5 fish per pool.	A weekly sample (N=24) of ovarian or milt fluid may be sampled. Regarding Little Sheep Creek: -Must abide by ODFW DEQ Memorandum of Agreement for any nutrient enrichment program
Wallowa & Little Sheep	2015	StS	56 & 29	Adult Mortality	-kidney smears on TYE-S agar -A minimum of 20 or all mortality less than 20 will be examined	
Lookingglass Creek	2015	StS or Sp		Adults	-mortalities examined for culturable viruses, bacteria, <i>R. salmoninarum</i> by ELISA -If possible viral samples (ovarian fluid or milt) will be taken from “ripe” steelhead passed above Lookingglass Hatchery.	The scope of what can be learned from these mortalities will depend on the degree of degradation.

Appendix C (page 1 of 2): Disinfections and Sanitation Guidelines for all LSRCP Hatcheries

Specific Operational Recommendations

For background on the importance of these recommendations see page 1 of Appendix C (2013 AOP)

Applies to Who?	Prevention Control Measure or Sanitary Practice	Guideline Comment
All	Disinfect all gear/equipment prior to entering or leaving hatchery grounds	-As per attached iodophor protocol -Hatchery crew responsible for providing tub of 100 ppm iodophor
Hatchery Crew	Do not go from adult handling operations to juvenile operations activities unless all bib gear is thoroughly disinfected.	-As per attached iodophor protocol -it would be preferable to have bib gear designated for either adult or juvenile use.
Hatchery Crew	Pick mortality on a daily basis	-This is consistent with ODFW's statewide Fish Hatchery and Fish Health Management Policy.
All	Disinfect equipment when moving from raceway to raceway or tank to tank for <u>any</u> fish handling or pond cleaning activities	-As per attached iodophor protocol -Includes CWTing, fin clipping and PIT tag operations. See footnote for marking.
All	Use footbaths upon entering or leaving the work area for a given program	-Use larger tub of disinfectant if involved in a spawning
All	Use a new disposable apron or disinfected personal rain gear while working with fish	
CTUIR Personnel operations at Lookingglass Hatchery	Disinfect all gear/equipment prior to entering or leaving hatchery grounds, Lookingglass Creek, or the intake building and when done with operations at intake	-CTUIR personnel responsible to maintain and use a tub of 100 ppm iodophor at intake building workstation
Hatchery Crew	Assure that individual raceway and tank mortality "picker equipment" is in place at each raceway and tank	-All use these for the specifically designated Raceway
Hatchery Crew	Sanitize each raceway prior to use for the next brood year. (see page 3 for recommendation)	-dry for a minimum of three days
Hatchery Crew	Keep footbaths located at strategic locations refreshed with disinfectant	-As per iodophor label, refreshed as needed
People at Spawning	Disinfect the spawning table and spawning work area between stocks and at the end of the day	-As per attached iodophor protocol
Research, Hatchery Crew & Fish Health Personnel	Handle and necropsy dead fish only in designated areas	-Adult morts: use concrete pad outside spawn area or concrete pad in endemic building at LGH -store snouts only in adult mortality freezer -Juvenile morts: store in freezer in designated area for this purpose.
PIT taggers	-PIT tagging supervisors maintain and keep footbaths by each door of PIT tagging trailer for use during operations -Assure that PIT tagging needles are new or clean and sharp -Disinfect in 70% Isopropyl alcohol -No re-use of PIT tag needles until air dried	-if PIT tag needles are re-used disinfect as per isopropyl protocol attached
Lib Truck Operators	Assure proper disinfection of tank and equipment prior to collection or transfer of fish	-As per attached disinfectant application Summary
Safety Net Operations	See Captive Broodstock AOP	-Appendix 6 Captive Broodstock AOP

**Appendix C (page 2 of 2): Disinfection and Sanitation Guidelines for all LSRCP hatcheries
Summary of Recommended Disinfectants (Concentration and time) and for what Application**

Disinfectant*	Application	Concentration	Time	Comment
Iodophor	Nets, gear and equipment, clipping & tagging van, PIT tag stations, large tub disinfectant containers, spawning colanders and buckets, lib truck, footbaths, floors Note: For raceway sanitization** – thoroughly clean the unit to remove dirt, spray or brush on 75-100 ppm iodophor and let this remain for a minimum of 10 minutes. Leave it to dry for a minimum of 3 days. Allow iodophor to dry and break down with exposure to light. **If the above recommendation cannot be done then sanitize raceways by thoroughly cleaning them and leaving to dry for a minimum of 3 days.	100 ppm Note: to make 100 ppm solution mix 6.7 oz of jug strength iodophor to 5 gallons H ₂ O or 6.7 oz.=189ml	10 min.	-Equipment should be pre-rinsed to remove dirt, mucus or other organic material which reduces the efficacy of disinfection and sanitization -Rinse equipment to remove harmful residue if equipment is going into standing water containing fish or fish are being placed into the equipment (tank or bucket). Remember that iodine at 1:20,000 is harmful to fish. -Argentyne or other buffered iodophors such as Western Chemicals “PVP iodine” would be acceptable. Note: if DRAW 476 is used remember this product is 1.75% active iodine and unbuffered so should not be used for water- hardening eggs
	Water hardening eggs	100 ppm	Minimum 15 minutes	This is the statewide general practice
	Egg transfers - disinfection at receiving station	100 ppm	10 minutes	
Virkon Aquatic	Footbaths, nets, boots & gear			As per label
Chlorine or Aqueous solution as sodium hypochlorite (Household Bleach)	Lib truck tanks	10 ppm	10 min.	Organic matter binds and neutralizes
	Raceway disinfection	100 ppm		Left to dry and breakdown in sun. Need to assure that no bleach goes to effluent.

^aWithin a stock, operations will start with low BKD segregation groups or groups determined to be of lowest disease risk proceeding to raceways of higher disease risk. The latest fish health information should be used to determine the least risky raceway sequence.

^b All chemical use will be done in accordance with label use and reporting requirements. Disinfecting and disinfected water must be disposed of in an approved manner.

Appendix D. Imnaha/Little Sheep steelhead program guidelines

Steelhead smolts production will range from 215,000 to 330,000 smolts to provide a return of 2,000 adults to/above Ice Harbor Dam for harvest, broodstock, and natural escapement.

Escapement goals:

- Big Sheep - 500 adults
- Little Sheep - 250 adults

The base production program consists of:

- Little Sheep - 165,000 Ad clipped smolts, 25,000 CWT and 6,100 PIT
- Big Sheep - 50,000 Ad clipped smolts, 1,900 PIT

Sliding scale production levels:

- Increase production to meet adult return goal up to 330,000 smolts
- If broodstock and escapement goals are not attained at full production (330,000 smolts), unclipped smolts can be released

Weir Management guidelines

Big Sheep- Big Sheep escapement would be estimated from PIT tagged adults crossing Lower Granite Dam. Goal is 500 fish escapement

Little Sheep-Goal of 250 fish escapement

- < 100 natural adults, no management of the proportion of hatchery/natural fraction to meet 250 fish natural escapement.
- 101-150 natural adults, range for between 36-48% natural fish escapement.
- 151-200 natural adults, range for between 48-60% natural fish escapement. Total release up to 250.
- 201-250 natural adults, range for 60-72% or more natural fish escapement. Total release up to 250
- > 251 natural adults, manage natural adult escapement for >72% wild adults, no limit of wild fish above the weir.

Broodstock Management guidelines

Approximately 126-137 adults are required to produce the base program of 215,000 smolts. The guideline for the proportion of natural fish in the broodstock is as follows:

- At less than or equal to 100 natural returns, use 10% of natural run for broodstock
- At greater than 100 natural returns, use 10 natural fish plus 40% of the natural run greater than 100 for broodstock (examples below).
 - Examples:
 - 100 wild - 10 natural adults for broodstock
 - 150 wild - 30 natural adults
 - 200 wild – 50 natural adults
 - 250 wild - 70 natural adults
 - 300 wild – 90 natural adults

Surplus Adults: Adult returns to Little Sheep can be transferred to Big Sheep to meet escapement goal, given to the Tribes for C/S, used for nutrient enhancement, given to local food banks, or placed in the landfill.

Appendix E. Juvenile Chinook Fish Health Monitoring Plan & Disease Treatments

Location	Brood year	Stock	Examination Category	Protocol	Comment/Disease Treatment
Lookingglass Hatchery	2014	200 201 80 29 81	Monthly	-10 mort/moribund per stock, kidney smears on TYE-S agar, gill culture smears if suspect gill disease, R. salmoninarum (BKD) if suspect disease or starting monthly sampling by October 2015, Gill & skin wet mounts from a combination of moribund and healthy fish. -tissues (gill/ kidney/spleen) will be assayed for culturable viruses from a sub-sample of fish -5 grab-sampled fish every other month and any moribund fish for EIBS (blood smears and hematocrits).	A 28-day Aquamycin 2.25% feed will be implemented for all fish in July 2015. Disease outbreaks - treated on a case-by-case basis. Therapies and remedial measures are based on conventional and available treatments, new information, and innovation. Warm water temperature therapy would be used if EIBS became a problem on a priority basis determined by co-managers. Formalin treatments would be implemented for Ichthyobodo infestations. Fungus - Formalin flushes (1 hour) are prescribed after fin clipping, PIT tagging, VIE tagging and coded wire tagging for two consecutive days. Formalin is used under a veterinarian prescription. Treat CWD with Florfenicol using a Veterinary Feed Directive (VFD) INAD..
Lookingglass Hatchery	2013	200 201 80 29 81	Monthly Pre-transfer & Annual Myxobolus cerebralis testing	Monthly: As above Pre-transfer: 60 grab-sampled smolts per stock -R. salmoninarum by ELISA -tissues (gill/kidney/spleen) from 3 fish pools for culturable viruses -wet mounts of skin & gill tissue from a minimum of 5 fish -sub-sample for EIBS -one stock on water supply for 6 months (60 fish) for <i>Myxobolus cerebralis</i>	Pre-transfer grab-sample numbers may vary depending on disease history and number of fish for a given brood year.
Chinook acclimation IM, LR, CC & UGR	2013		Pre-liberation	-Smolt groups held at acclimation sites longer than 3 weeks will be evaluated with a lesser number of “grab-sampled” fish as in pre-transfer protocol above. -Mortalities will be examined (as in monthly)	Pre-liberation grab-sample numbers at acclimation sites may vary depending on disease history and number of fish for a given brood year.

Appendix F. Production plan for 2015 at Lookingglass Hatchery

Group	Strategy Treatment	Fry/Eggs (01/31/15)	Initial Ponding	Initial Raceway#	Smolts AD marked	Final Pond #	Smolt Numbers	Mark	Mark %	Release Site	Release Timing
Lookingglass CR	Conventional	306,000	83,300	1	83,300	AHP A	62,500	ADCWT/AD	50%/100%	LGC	Acc
Lookingglass CR	Conventional		83,300	4	83,300	AHP B	62,500	ADCWT/AD	50%/100%	LGC	Acc
Lookingglass CR	Conventional		83,300	10	83,300	AHP C	62,500	ADCWT/AD	50%/100%	LGC	Acc
Lookingglass CR	Conventional					AHP D	62,500	ADCWT/AD	50%/100%	LGC	Acc
Lookingglass CR	Conventional		43,000	Circulars	43,000	Circulars	40,850	AD	0%/100%	LGC	Acc
Total Lookingglass CR			292,900		292,900		290,850				
Catherine Creek	Conventional	168,428	75,000	2	75,000	1	50,000	ADCWT/AD	67%/100%	CC	Acc
Catherine Creek	Conventional		75,000	3	75,000	2	50,000	ADCWT/AD	67%/100%	CC	Acc
Catherine Creek	Conventional					3	50,000	ADCWT/AD	67%/100%	CC	Acc
Total Catherine Creek			150,000		150,000		100,000				
Imnaha River	Conventional	567,547	81,700	5	81,700	4	70,000	ADCWT/AD	100%/100%	IM	Acc
Imnaha River	Conventional		81,700	6	81,700	5	70,000	ADCWT/AD	100%/100%	IM	Acc
Imnaha River	Conventional		81,700	7	81,700	6	70,000	ADCWT/AD	100%/100%	IM	Direct Stream
Imnaha River	Conventional		81,700	8	81,700	7	70,000	ADCWT/AD	100%/100%	IM	Direct Stream
Imnaha River	Conventional		81,700	9	81,700	8	70,000	ADCWT/AD	33%/100%	IM	Acc
Imnaha River	Conventional					9	70,000	ADCWT/AD	33%/100%	IM	Acc
Imnaha River	Conventional		81,700	14	81,700	10	70,000	ADCWT/AD	0%/100%	IM	Acc
Imnaha River	Conventional		52,547	Troughs	0	Troughs	0	None	0%/0%	B. Sheep	15-Apr
Total Imnaha River			542,747		490,200		490,000				
Lostine River	Conventional	258,886	83,300	11	83,300	11	62,500	ADCWT/AD	50%/100%	LR	1st Acc
Lostine River	Conventional		83,300	12	83,300	12	62,500	ADCWT/AD	50%/100%	LR	1st Acc
Lostine River	Conventional		83,300	13	83,300	13	62,500	ADCWT/AD	50%/100%	LR	2nd Acc
Lostine River	Conventional					14	62,500	ADCWT/AD	50%/100%	LR	2nd Acc
Total Lostine River			249,900		249,900		187,500				
Grande Ronde	Conventional	236,146	59,036	15	59,036	15	56,084	ADCWT/AD	100%/100%	GR	2nd Acc
Grande Ronde	Conventional		59,036	16	59,036	16	56,084	CWT/AD	100%/0%	GR	1st Acc

Grande Ronde	Conventional	59,037	17	59,037	17	56,085	ADCWT/AD	100%/100%	GR	1st Acc
Grande Ronde	Conventional	59,037	18	59,037	18	56,085	CWT/AD	100%/0%	GR	2nd Acc
	Total Grande Ronde	236,146		236,146		224,338				

Total Production	1,471,693	1,419,146	1,292,688
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Appendix G. Coded Wire Tag (CWT) Sampling Guidelines for the 2015 Northeast Oregon Annual Operation Plan

In order to accurately evaluate the success of our hatchery programs, we must be able to correctly identify all recaptured salmon from each treatment/evaluation group. Recovery of coded-wire tags is an integral part of identifying these salmon. Each tag provides us with the population (to monitor straying and out-of-basin harvest), brood year, and age of each tagged salmon that is recovered, as well as the raceway in which it was reared (for any treatments that are being evaluated or association with known disease histories). These data can also point out whether one stock, treatment group, or raceway is performing particularly well or poorly, allowing us to examine our fish culture practices. Additionally, when salmon are recovered with a CWT, we measure the length of each salmon and, with that known age, we can infer the age of untagged salmon of similar length and expand to those not sampled, providing us with the age composition of the entire run. These tags provide us with the means to adaptively manage our hatchery programs.

Tagging Rates

Each recovered tag represents a portion of the entire group of salmon (including untagged and unrecovered salmon) that was tagged with that particular code, so each recovered tag must be expanded in order to derive estimates for the entire run. The lower the number of recoveries, the greater influence each individual recovered tag has on the final estimate. Therefore, a minimum number of recoveries is needed.

We have used a minimum of 35 CWT recoveries as that needed to calculate accurate estimates (de Libero 1986; Hesse et al. 2006). In order to obtain at least 35 tag recoveries, a larger number of salmon must be tagged. In order to determine that number of salmon that must be tagged in order to recover 35 tags, we need to know the likely recovery rate for tags. We estimate the recovery rate using known smolt-to-adult survival (SAS) rates and sampling rates. For Imnaha River Chinook Salmon (1982-2009 brood years), our median SAS rate has been 0.645% and our mean sampling rate (mostly from spawning ground surveys) is 21.5%, resulting in a mean tag recovery rate of 0.139%. If we use this recovery rate to calculate the number of salmon to be tagged, it will allow us to recover a sufficient number of tags for only half of the years, which is not sufficient for our purposes.

Tagging at the rate required for the 25th percentile of the SAS rates will allow us to recover at least 35 tags per tag group for approximately three out of every four years. Multiplying the 25th percentile of the SAS rate (0.230%) by the mean sampling rate (21.5%) gives us a lower tag recovery rate of 0.049%. Finally, we determine the required number of tags by dividing 35 recoveries by 0.049%, which results in 71,429 salmon that must be tagged per evaluation group (replicate). Tagging 90,000 salmon will allow us to recover a sufficient number of tags for 83% of the years.

Evaluation groups may be specific or broad. When conducting experimental evaluations of specific hatchery rearing practices, we use individual raceways as experimental units (evaluation groups) and try to have at least two replicate raceways for each treatment. Since we want ~70,000 tags in each replicate, each raceway should be 100% tagged with codes that identify specific raceways. Less rigorous monitoring evaluation groups may include more than one raceway and the required number of tags (70,000) can be spread across all raceways within an experimental unit, such as an acclimation group (early vs. late). Even more broadly, production salmon may be tagged as a single evaluation group across all raceways. Note that when tagging across raceways, it is always beneficial

(and no more expensive) to use individual codes for each raceway. This will allow us to calculate variances for each raceway and rough estimates of survival for each raceway without increasing the number of tags and may show us problems with individual raceways that would not otherwise become evident. However, for experimental evaluations, tags should not be spread across raceways in order to calculate the most rigorous variances.

Tag Recoveries

Tags are recovered from many locations, both within and outside the basin to which the salmon return. Outside the Grande Ronde and Imnaha basins, we obtain CWT recovery data from the RMIS database, providing us with ocean, Columbia River, and Snake River harvests and strays. Within the basins, we recover tags from salmon handled at weirs and hatcheries, from sport fisheries (tribal harvest is not sampled, but should be), and on spawning ground surveys. Tags from ages 4 and 5 adults are the most commonly recovered, while tags from age 3 adults (jacks) are more difficult to recover because few jack carcasses are found on the spawning grounds and we collect few jacks for use in broodstock. The best source of tag recoveries for jacks is from salmon collected for distribution to food banks, tribal subsistence, and/or nutrient enhancement.

Distribution of hatchery-origin Chinook Salmon to the tribes and food banks provides an opportunity for efficient CWT recovery sampling. Wallowa Hatchery has served as the live holding location for distribution salmon in recent years. The following bullets are meant to help facilitate CWT sampling of salmon destined for distribution to each of these destinations.

- 1) ODFW and NPT intend to alternate distribution salmon pick up weeks for both Lostine and Imnaha river salmon. The rotation will begin with NPT picking up any available salmon during the first week of distribution. ODFW will pick up any available salmon during the following week, alternating during subsequent weeks until one or both parties no longer desire available salmon or operation of the weir is discontinued.
 - a. Wallowa Fish Hatchery will report how distribution salmon were allocated (i.e., food bank, picked up by NPT or out-planted for nutrients) on a weekly basis.
- 2) ODFW Fish Research staff will conduct sampling of these salmon for CWTs. Joseph Feldhaus and Deb Eddy will coordinate sampling dates, times, and locations with Ron Harrod and Andrew Gibbs. NPT Fisheries Research staff may assist with or conduct sampling for ODFW Fish Research staff, when requested by ODFW Fish Research staff.
- 3) NPT production (Bruce McLeod/Nancy McAllaster) will communicate NPT distribution pickup dates and times with Ron Harrod and Andrew Gibbs. Current plan is for Tuesday pick-up.
- 4) Imnaha River: 20% sampling rate of all CWT salmon destined for distribution.
 - a. If possible, tagged salmon to be sampled for CWT will be transported to Wallowa Fish Hatchery for CWT collection. Otherwise, Lookingglass Hatchery staff will conduct collections at Imnaha Weir.
 - b. The preferred approach is to transport 20% of all CWT salmon destined for distribution to Wallowa Hatchery weekly and sample all of those salmon for CWTs.

- c. Alternatively to 4b. above, 40% of CWT salmon may be sampled over a four week period (during an ODFW week) if 20% sampling was not accomplished during the previous week that ODFW scheduled for sampling. ODFW may collect additional CWT samples at Imnaha weir on NPT distribution weeks, as long as it does not interfere with loading salmon for NPT distribution.
 - d. Post-sampled carcasses will be sent to a food bank or provided for tribal distribution.
- 5) Lostine River: 20% sampling rate of conventional production destined for distribution.
- a. Sampling 40% every other ODFW week is not ideal but acceptable.
 - b. Post-sampled carcasses will be sent to a food bank or provided for tribal distribution.

Citations

- de Libero, F. E. 1986. A statistical assessment of the use of the coded wire tag for Chinook (*Oncorhynchus tshawytscha*) and coho (*Oncorhynchus kisutch*) studies. Doctoral dissertation. University of Washington, Seattle.
- Hesse, J. A., J. R. Harbeck and R. W. Carmichael. 2006. Monitoring and evaluation plan for Northeast Oregon hatchery Imnaha and Grande Ronde subbasin spring Chinook Salmon. Prepared for Bonneville Power Administration, Portland, OR.

Recovery of coded-wire tags is an integral part of evaluating the effectiveness of our hatchery programs. Each tag provides us with the brood year and age of the fish and the raceway in which it was reared at Lookingglass Fish Hatchery (which also provides us with the stock to monitor straying). When fish are recovered with a coded wire tag, we measure the length of each fish and, with that

Appendix H. Adult Chinook Fish Health Monitoring Plan & Disease Treatments at Lookingglass Hatchery in 2015.

Stock	Examination Category	Protocol	Comment
200 (LR) 201 (CC) 80 (GR) 29 (IM) 81 (LGC)	Adult Spawners (Broodstock)	-A minimum of 60 females will be sampled for virus from each stock (or all females if <60). Samples will be individual ovarian fluid and caeca/kidney/spleen sample pools not to exceed 5 fish. - All females for BKD by ELISA	ELISA results will be used to implement BKD prevention control through culling of eggs known to be of higher risk.
200 201 80 29 81	Prespawning Mortality	All mortality up to 20: -Kidney sampled for BKD by ELISA -systemic bacteria by culture	Note: additional mortality may be sampled Lookingglass Creek mortalities will be worked up with CTUIR staff to assure data collection covers all the needed information
81 or 201 LG-CK	Spawning Ground Survey	-Collect a minimum sub-sample of 30 kidney samples from adult Chinook above the weir (hatchery intake)	Fish Health Request

Disease Treatments and other Drugs for Adult Chinook Broodstock

Location	Brood Year	Stock	Treatment for	Chemical/Drug	Protocol	Comment
Lookingglass	2015	200 201 80 80Z (SNP) 29 81	Fungus Control	Formalin Hydrogen Peroxide	Formalin administered a minimum of 3 days per week at 167 ppm for 1 hr. (Veterinary prescription) Hydrogen peroxide 3 days per week at 100 ppm	If formalin cannot be used then use hydrogen peroxide (second choice) Continue treatments throughout the entire spawning season.
Lookingglass, Catherine Creek, Upper Grande Ronde and weirs	2015	200 201 80 80Z (SNP) 29 81	BKD Furunculosis-Enteric Redmouth & other gram negative bacterial infections	Tulathromycin DRAXXIN-25 Oxytetracycline	Injection 2.5 to 5 mg/Kg(Veterinary Prescription) Injection 10 mg/kg (Veterinary Prescription) Inject fish kept for broodstock and reinjection only if deemed necessary Note: For the Lostine River stock only 50% of the broodstock will be injected with both antibiotics to evaluate the efficacy of injections.	Erythromycin will not be available for the 2015 season DRAXXIN (tulathromycin) will be used instead.Injected fish will not be used for human consumption or released where legal harvest is possible. If a decision is made to spawn GR 80Z SNP fish transferred from Bonneville Hatchery then these fish will be injected with tulathromycin and oxytetracycline as soon as possible after this decision is made (on or about July 1 st at the latest)

Appendix I. Lookingglass Creek Management Guidelines

Management Guidelines

The goal of the Lookingglass Creek spring Chinook hatchery program is to reintroduce spring Chinook into Lookingglass Creek using Catherine Creek stock to support tributary harvest, natural population restoration, and maintenance of a gene bank for the Catherine Creek stock.

Current production targets for Catherine Creek and Lookingglass production, per the *2008-2017 United States v. Oregon* Management Agreement is outlined in Table 2.

Table 2. Lookingglass Creek and Catherine Creek production outlined in Table B1 of the *2008-2017 United States v. Oregon* Management Agreement.

Release Site	Rearing Facility	Stock	Life Stage	Target Release Number	Primary Program Purpose	Funding
Lookingglass Creek	Lookingglass/Captive Brood	Catherine Creek	Smolt	250,000	Fishery/ Reintroduction	LSRCP/BPA
Catherine Creek	Lookingglass/Captive Brood	Catherine Creek	Smolt	150,000	Supplementation/ Fishery	LSRCP/BPA

All Lookingglass Creek adults arriving at the Lookingglass Hatchery intake weir prior to July 4 will be ponded into the adult holding ponds. Disposition of these adults will occur in early July according to the guidelines in Table 3, and adults designated to be passed upstream will be outplanted at that time. Disposition of Lookingglass Creek adults arriving after July 4 will be based on the percentages outlined in Table 3. All adults passed upstream will have genetic samples taken.

Table 3. Disposition of Lookingglass Creek adult spring Chinook salmon arriving at the Lookingglass Hatchery intake weir.

Escapement Level	% Pass Above	% Keep for Brood
150	67	33
200	60	40
250	55	45
300	50	50
>300 – adjustments will be made based on brood needs. If brood need has been met, remainder to be released upstream.		

An estimated 158 adults (47 natural origin and 111 hatchery origin) required to meet 250,000 smolt production level. Broodstock for the program will be collected from returns to either the Lookingglass Hatchery weir or the Catherine Creek weir. Either conventional or captive hatchery adults may be used for brood. The goal for broodstock composition will be to incorporate 30% natural origin adults, with no more than 25% of the returning natural origin Chinook retained for brood. If a shortage of natural origin adults occurs, then additional hatchery adults will be collected to meet the brood target.

Appendix J. Wallowa Fall Broodstock Experiment Background and Objectives

The Grande Ronde steelhead hatchery program was initiated in the late 1970s as part of the Lower Snake River Compensation Plan (LSRCP) to mitigate for Oregon harvest opportunity lost by construction of the four lower Snake River dams. The founding parents for the Wallowa program were endemic to the Snake basin and the resulting stock is a proven, productive hatchery population that has reestablished a fishery with effort, catch rates, and harvest levels similar to historic, pre-dam levels (Flesher et al. 2011). The LSCRCP program goal of returning 9,184 adults to the compensation area was met in 1997-98 and every year since 2001-02 (Warren et al. 2011).

Prior to closure of the native steelhead fishery in 1974, the majority of harvest opportunity occurred in the lower Grande Ronde River during fall (Carmichael et al. 1990), whereas with the current hatchery stock peak harvest typically occurs in the spring (Flesher et al. 2011). This apparent shift in timing of harvest opportunities may be associated with selection of the founding parents. The Wallowa stock was sourced from collections of Snake River steelhead during spring at Ice Harbor and Little Goose dams, and incorporated embryos from Pahsimeroi Fish Hatchery, Idaho. Since 1979, Wallowa stock adults returning to Wallowa Hatchery, Big Canyon, and Cottonwood traps (WA) have been utilized as broodstock.

Most Wallowa stock steelhead migrate through the Columbia River corridor in mid-summer, when water temperatures are warmest; a behavior that may encourage migrants to use relatively cooler mid-Columbia tributaries, particularly the Deschutes River, as thermal refuge. Once they enter the mouth of the Deschutes River, Wallowa stock steelhead are apparently more likely to stray far upriver than are other hatchery stocks. Managers hypothesized that the earliest returning portion of the Wallowa stock run—those adults that traveled through the Columbia River mainstem quickly and arrived in the Grande Ronde River in the fall—would produce progeny that would be less likely to stray. Therefore, in response to straying concerns, co-managers agreed to modify the Wallowa program to reduce impacts of hatchery releases on out-of-basin native stocks.

The desire to increase fall harvest opportunities in the lower Grande Ronde River, combined with efforts to reduce straying of Wallowa stock steelhead in the Deschutes basin, provided impetus for the Wallowa fall broodstock experiment. By creating an alternate brood line of Wallowa stock steelhead collected from the lower Grande Ronde River in fall, the progeny were expected to contribute to the following objectives:

1. Modify run-timing to emphasize fall-entry to the Grande Ronde River
2. Reduce recoveries of Wallowa stock steelhead in the Deschutes River
3. Enhance fishing opportunities in the lower Grande Ronde River in fall
4. Maintain successful stock performance measures exhibited by the standard Wallowa stock

Volunteers collected 109, 109, 115, and 77 hatchery steelhead via hook-and-line during Octobers of 2003 through 2006. Collections occurred in the Grande Ronde River mostly between the Oregon-Washington state lines upstream to Wildcat Bridge. After capture, fish were placed in a PVC tube and held in-river. Within 24 h of capture, fish were transported to Wallowa Hatchery and held until spawning the following spring.

Fall broodstock (hereafter, fall brood) fish were spawned separately from standard Wallowa production fish (hereafter, production). All fall brood progeny were marked with an adipose and right ventral (RV) fin clip to distinguish them from production fish when they return as adults. To evaluate the objectives of the experiment four groups of fall brood progeny, and four groups of standard production were PIT and coded-wire tagged to monitor migration timing into the Columbia River and its tributaries, and determine smolt to adult survival and straying rates (Gee et al. 2008).

Experiment Summary

During the course of this experiment, two generations of the fall brood line have been released. The first (or F1) generation consisted of direct progeny from angler-collected adults, and were released from spring 2005-2008. The two-salt component of the 2008 release returned in 2010; therefore, data for the first generation is nearly complete, pending some coded wire tag recoveries. The second (or F2) generation consists of progeny of the fall brood line that returned as adults, and were released as smolts in 2009-2011 (the fourth year of the F2 generation is now being raised at the hatchery). Currently, straying data based on coded-wire tag recoveries is not available for this generation, and PIT tag derived data only consists of one complete brood year (2008), and the 1-salt component of the 2009 brood year.

Using data collected from four brood years of the F1 generation, and one-and-a-half brood years of the F2 generation, the following summarizes the experiment to date within the context of the aforementioned objectives:

Modify run timing to emphasize fall-entry into the Grande Ronde: At Lower Granite Dam (the nearest PIT tag monitoring site to the Grande Ronde River), the F1 generation of fall brood returned, on average, three weeks (25 d) earlier than production returns. Average median run timing dates were 11-Sept and 6-Oct for the fall brood and production lines, respectively. The preliminary data collected suggests that run timing remains earlier for the F2 generation of fall brood, although the difference is approximately one week (9 d; 25-Sept and 4-Oct for fall brood and production, respectively).

Reduce recoveries of Wallowa stock steelhead in the Deschutes River: Stray rate indexes (coded-wire tag recoveries not adjusted for temporary use by steelhead) were not appreciably different between fall brood and production lines, and were actually higher for brood years 2004 and 2006. Data also indicates that stray rate indexes for both fall brood and standard production have declined during the experiment, and declines may be correlated with reduced barging rates of Snake River steelhead.

Enhance angling opportunities in the lower Grande Ronde River in fall: Data collected from the 2006-07 to 2008-09 run years (F1 generation of fall brood only) suggest that 51% of fall brood harvest occurred during the fall (from September to November), whereas only 23% of the production line were harvested during the same period. Similarly, the calculation of a harvest index (fish harvested / fish available in the fishery) also indicated that the fall brood fish were harvested at higher rates than the production line during the fall lower Grande Ronde River fishery (e.g., 10X higher in October). Although both groups contributed at similar rates across the LSRCPC compensation area, the fall brood line appeared to contribute at higher rates within Oregon tributaries, whereas the production line contributed at a slightly higher rate within the Snake River and associated tributaries (excluding the Grande Ronde River).

Maintain stock performance to meet program objectives: For brood years 2004-2009 length-at-release; survival, and travel times from release to Lower Granite Dam were similar between fall brood and production groups. Smolt-to-adult survival to Bonneville Dam was consistently higher for the F1 generation fall brood line than for the production line (mean difference of 32%). Preliminary data from the F2 generation indicate that survival remained higher for the brood year 2008 fall brood release, but the 1-salt component of the BY 2009 release did not appear to survive to adulthood at a higher rate than the production line. Age-at-return for the fall brood line was skewed towards 1-salt fish compared with the production line. The composition of 1-salt returns in the F1 generation of fall brood averaged 80.5% (range 67.7-89.7%) compared to 70.8% (range 61.7-77.0%) for the production line.

Migration timing for the F1 generation of fall brood was successfully shifted three weeks earlier at lower Granite Dam. However, the earlier migration timing exhibited by fall brood line did not appear to reduce utilization (temporary or permanent straying) by Wallowa steelhead in the Deschutes. Other factors such as transportation rates may prove to have a greater causal effect on stray rate indexes than stock migration timing. In addition, the opportunity to remove stray steelhead has increased greatly within the Deschutes basin provided the recent increase in research infrastructure (i.e. weirs). Together, changes in transportation rates and active removal may be a more effective means of reducing stray rates in the Deschutes than broodstock management.

Earlier migration timing of the fall brood line does, however, show promise in enhancing fishing opportunities in the lower Grande Ronde River fishery in fall. Relatively higher harvest indexes during the fall, and in Oregon tributaries, support that earlier run timing at Lower Granite Dam was associated with fall entry to the Grande Ronde River. In addition, the fall brood line may provide well-balanced angler opportunity throughout the run year, as contributions to spring fisheries in Oregon compensation areas were also substantial. That said the higher harvest rates observed in the fall brood line may also be due to attributes other than run timing.

The harvest benefits provided by the fall brood line may be, in part, due to a higher proportion of 1-salt fish in the returns. As noted, the first generation of fall brood releases exhibited higher smolt-to-adult survival rates, which is likely related to a higher proportion of the return suffering one less year of ocean mortality. Although higher survival rates would result in more adults in the fishery area, younger and smaller-sized adults may not be desirable for anglers. In addition, if the fall brood smolt-to-adult survival advantage does not continue through later generations, the harvest contribution advantage may also not continue.

In summary, we recommend gradually increasing the production of the fall brood line within the Wallowa steelhead program from current target releases of 160,000 to 400,000 by 2014. With increased production the fishery benefits seen during the experiment can be better realized for the angler; as smaller, experimental groups (~20% of total production) have constituted the fall brood releases to date. Gradually increasing production (by 24 females or 40,000 smolts) will better allow broodstock goals (numbers, spawn timing) to be met at Wallowa Hatchery. In addition, maintaining the production line will continue to provide harvest benefits and, pending long-term efficacy of the fall brood line (see *Information Needs* below), will be available should managers choose to revert back to the production line.

Recommendations for BY 2012

Brood take / Production: Spawn 72 females to create 240,000 smolts from the fall brood (30% of total production). Reduce production releases accordingly to maintain total release levels at 800,000 smolts.

Rearing: Continue releasing fall brood production from Wallowa Hatchery to consolidate spawning.

Marking: Maintain current tagging and marking to assess whether the F3 generation performs similarly to the F1 generation.

Recommendations for BY 2013 and beyond

Brood take / Production: For brood year 2013, spawn 96 females to create 320,000 smolts from the fall brood line (40% of total production). For brood year 2014, spawn 120 females to produce 400,000 smolts from the fall brood line (50% of total production). Reduce production releases accordingly to maintain total release levels at 800,000 smolts.

Increasing production beyond BY 2014 will depend on our ability to manage the fall brood line in a fashion that: maintains the run timing, stock performance, and harvest benefits consistent with results of the F1 generation; while offering a size-at-return similar to the production line, and harvest opportunity during both fall and spring periods. In addition, final production goals will need to consider rearing space allocations at both Irrigon Hatchery and acclimation facilities, and feasible broodstock collection protocols for hatchery staff.

Long-term management of the fall brood line will likely include occasional ‘refreshing’ of the broodstock with adults collected via angling in the fall Grande Ronde fishery. We expect refreshing the fall brood line will act to sustain run timing differences observed in the F1 generation, and diversify the genetic makeup of the broodstock. Tentatively, we will plan to refresh the fall brood line during the fall of 2013. Long term strategies may employ a focused one to two-week effort as occurred in 2003-2006, or a dedicated group of volunteer anglers that collect fish throughout the fall period.

Rearing: Long term rearing strategies will ultimately depend on desired production goals for the fall brood line, our ability to differentially mark the fall brood and production lines, and brood take needs.

Marking: Long term tagging and marking strategies will largely be determined when data from the F2 generation is complete. However, to maintain two steelhead lines will require differential marking, which is currently accomplished using left and right ventral clips.

Coordination with Washington: The state of Washington currently uses Wallowa-stock steelhead in the Cottonwood program (lower Grande Ronde River) releases. Currently, Washington is considering utilizing the Wallowa fall brood line for the cottonwood program, depending on results of the current experiment. We will continue to coordinate with the state of Washington, understanding that any desire to use fall brood Wallowa steelhead in Washington programs will affect brood take goals at Wallowa Hatchery.

Information Needs

As production is increased over the next few brood years, information gaps need to be resolved in order to fully utilize the fall brood line in the long-term. The younger age-at-return of the fall brood line is not necessarily a desirable trait, and may also be confounding the harvest benefits observed in the F1 generation. Going forward, we will require information on whether age-at-return can be better aligned with the production line, and if the harvest benefits persist with older fish.

Preliminary data from the F2 generation, although incomplete, may suggest that the desirable traits selected for in the F1 generation may be reduced in subsequent generations (e.g., run-timing, smolt-to-adult survival). It may be necessary to regularly infuse the fall brood line with fall-collected adults; the rate and amount of which may determine the cost-effectiveness of this strategy in the long-term.

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